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Radio '90 Preview  
Pages 22-31

# Radio World®

Vol 14, No 16

Radio's Best Read Newspaper

August 22, 1990

## FCC Attacks AM Interference

by Charles Taylor

**Washington DC** The FCC has taken on the role of stern guardian over the deteriorating AM band with a far-reaching proposal that strikes out at interference, which the Commission regards as the band's primary foe.

The 106-page text for the notice (MM docket 87-267) was released 18 July, three months after its adoption and includes a generous roster of changes—some dramatic—that the Commission believes will improve the quality of the service.

"There is a theme that we tried to stick with in this," said FCC Mass Media Bureau Assistant Chief for Engineering Bill Hassinger. "We want to do everything

possible to reduce interference and nothing to increase interference. We're hoping it's a theme where all the pieces act together toward that direction."

### Five goals outlined

For the existing band, the Commission outlined five broad goals: full-time operation with stereo modulation; competitive technical quality; nationwide daytime coverage free of co-channel and adjacent channel interference; nighttime coverage equaling at least 15% of daytime coverage—also free of interference—and simplified antenna arrays.

A good portion of the text also was dedicated to proposals for allocating the

AM expanded band. (See separate article this issue.)

But while the Commission pushed strongly for a number of substantial changes, it maintained that before any decisions become final, it wants public comment on the proposals. Comments are due 15 October, an extension of the

usual month-long period to file. Reply comments are due 15 November.

The Commission's first line of attack revolves around revision of technical standards, which it said would potentially decrease the actual number of AMs, thus prompting a reduction in  
(continued on page 11)

## Strother Files on DAB

by Alan Carter

**Washington DC** Louisiana-based Strother Communications has asked the FCC to allocate spectrum and establish terrestrial digital audio broadcasting (DAB) in the US to eventually replace AM and FM.

The petition for rulemaking was filed 27 July, two weeks before the Commission said it would take up a notice of inquiry on DAB.

### Previous request pending

The company's president, Ron Strother, already has one of three requests before the FCC addressing DAB. Strother previously asked the Commission for experimental authority to test

the technology over the air in Washington and Boston.

"I personally feel that DAB—the technology—is a foregone conclusion," Strother told *Radio World*. "It's already literally ready to come out of the prototype stage. This is not going to be some LPTV that may or may not be introduced into the marketplace."

Strother said his proposal takes into account existing broadcasters and preserves localism. "Everybody that has an existing broadcast license will receive a digital audio broadcasting channel," he said. Licensees with combos would receive two channels.

NAB Science and Technology Senior VP Michael Rau said the association was  
(continued on page 7)



## Inquiry Into Digital Radio Is Launched

by Charles Taylor

**Washington DC** The FCC has taken the plunge into the issue of digital audio broadcasting (DAB) with a sweeping Notice of Inquiry to collect public opinion on the development and implementation of the rapidly developing technology.

In a 1 August meeting, the Commission pointed out that while digital radio service promises to offer significant quality and performance improvements, it must be explored carefully, with attention given to a number of regulatory issues.

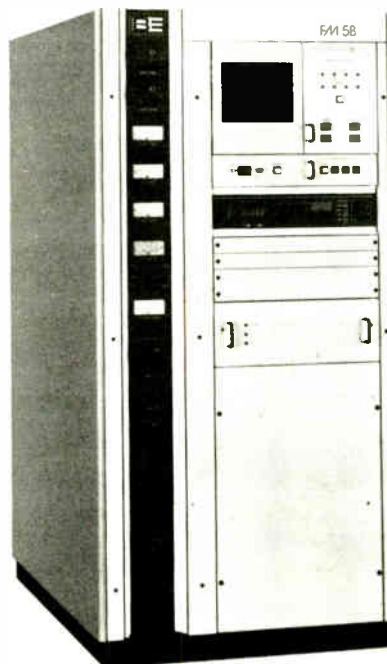
Issues to be queried in the notice, according to FCC Engineering and Technology Chief Thomas Stanley, will in-

clude: terrestrial versus satellite digital transmission; DAB's potential impact on the current radio service and ways to minimize negative effects; spectrum allocation; licensing procedures; ownership restrictions, and the distribution of facilities among states and communities.

The Commission noted the importance of expedient action on the issue, in light of its increasing international relevance. DAB will be a major agenda item at the World Administrative Radio Conference (WARC) in 1992.

While the majority of the five commissioners held back on making clear their opinion on the issues involved, Commissioner Ervin Duggan made a strong plea that DAB be embraced by  
(continued on page 7)

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## NEWS BRIEFS

### NAB Questions Drug-Related Proposal

**Washington DC** The FCC's proposal to require license applicants to report illegal drug convictions has met resistance from the NAB, in comments the organization filed.

The amendment would provide the Commission information necessary to implement Section 5301 of the Anti-Drug Abuse Act of 1988, which gives federal and state court judges the discretion to deny federal benefits to those convicted of

offenses such as possession or distribution of illegal substances. Federal benefits include Commission-issued licenses.

Those subject to such scrutiny would include officers of an applicant, directors, non-limited partners, holders of 5% or more of the voting stock and non-voting stockholders or limited partners with 5% or more interest in the applicant or licensee.

In its comments, the NAB suggested that the new rules would be too stringent.

"Compliance with the new reporting guidelines would amount to an unreasonable burden for licensees," NAB wrote, "because it would require broadcast station groups to monitor and report on the activities of generally all corporate officers and directors, in addition to shareholders with more than a 5% stake in these operations."

Outside directors not directly involved in daily operations decisions should be subject to limited reporting requirements,

NAB said.

It also suggested that a deadline of 30 days to report relevant violations should be expanded to six months or more.

### NAB Programming and Production Showcase Planned

**Boston MA** The fifth Programming and Production Showcase, a fair of products and services for radio, will be presented at the NAB's Radio 1990 convention here in September.

The showcase, to be held Friday, 14 September, from 4:30 to 6:30 PM, will present products and services including produc-

tion libraries, syndicated programs, programming software, jingles, entertainment graphics and voice/overs.

Last year's showcase attracted nearly 2000 attendees and 41 exhibitors.

For information on exhibiting, call Aimee Jennings at the NAB at 202-429-5402.

### Multiple Ownership Rule Waived

**Boston MA** The FCC has granted Eric Schultz a waiver of its multiple ownership rules to allow the partner of the licensee of WROR-FM here to serve on the board of directors of Brown Broadcasting Service, the licensee of WBRU-FM in Providence, RI.

The Commission concluded that the waiver would serve the public interest because WBRU operates primarily to provide broadcast experience and instruction to Brown University students.

"A grant of this waiver furthers the public interest in that it will allow the educational program at Brown University to benefit from Schultz's broadcasting experience," the FCC said.

The FCC noted that Schultz's role in the operations of WBRU is limited and entirely non-economic. Further, the Commission noted that the overlap areas of the stations are not substantial and that they serve separate and distinct markets.

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# NRSC Sweep Shows Compliance

by Alan Carter

**Washington DC** A random, unannounced inspection of AM stations nationwide for NRSC processing filters by the FCC has found 87% to be in compliance.

Inspectors from the FCC's 35 field offices went into 374 of the US's 5000 AMs two weeks after the NRSC RF emission rules went into effect 30 June.

Field Operations Bureau electrical engineer Jeff Young also said inspectors found almost 100% compliance with the 10 kHz stopband rule based on measurements by FCC Engineering Measurement Unit (EMU) mobile vehicles.

Of 119 actual readings taken, only one station was found out of compliance and that station installed the NRSC gear on the reserve transmitter, not its main unit, Young said.

## No fines issued

AM stations found without NRSC filters will not be fined, Young said, but the station found outside the stopband limit "may" receive an advisory notice.

The surprise inspections by Field Operations resulted after Mass Media officials were told some stations would only install filters if the FCC enforced the rule.

Bill Hassinger, assistant chief for engineering in Mass Media said the high percentage of compliance was "good news. It's encouraging."

Hassinger maintained compliance with

the new NRSC rules was something stations should do for their own good. "It has nothing to do with the FCC. It's for the stations. It's not a matter that they comply. It's mutual back-scratching."

Stations are required to reduce occupied bandwidth to 10 kHz under the first step of NRSC. Then by 30 June 1994, stations must comply with NRSC-2 that defines transmission parameters.

Referring to the new AM technical rulemaking just released by the Com-

mission, Hassinger said the NRSC rules are part of incremental improvements necessary for the band.

"It's one thing to compete against scratchy records," he said, "but now we have high-quality cassettes, CDs ... and DAB (digital audio broadcasting)."

## Inspections welcomed

National Radio Systems Committee (NRSC) Chairman Charlie Morgan praised the FCC for its action.

# FCC Freeze Halts AM Upgrades

by Charles Taylor

**Washington DC** An approaching cut-off that would have allowed more than 1000 US AM daytimers to upgrade for increased nighttime power has been invalidated—at least for the time being—by the FCC's ongoing freeze on major changes to AM stations.

The daytimer upgrade, passed in April 1985, made it permissible for designated stations to operate at night at a maximum of 500 W on former foreign clear channels. At the end of a five-year transition period, the stations could apply for a permanent upgrade to 1000 W, providing no complaints of interference developed.

The deadlines for applying for the upgrade were August 1990, September

1990, June 1991 and December 1991.

Now, however, the upgrade is on hold while the FCC ponders applications of its 12 April proposed rulemaking on technical criteria for the existing and expanded AM band.

The action, contained in MM Docket 87-267, is aimed at comprehensive reform for the ailing AM band, including measures to clarify the expanded AM band, AM stereo, simulcasting with FM stations and more. (See related articles this issue.)

"To put it simply, AM is on hold until we can complete the proceeding," said FCC Mass Media Assistant Chief for En-

"I think it was a tremendous show of support for AM," he said. "It shows they are a believer and want to improve AM."

Morgan suggested the results of the inspections should be proof to radio receiver manufacturers that AM broadcasters have "cleaned up their act."

"It's the receiver industry's turn," he said, noting consumers need improved AM radios that complement the NRSC standard. High-end receivers incorporating the NRSC standard are scheduled to be marketed from Denon and Philips.

Morgan said he will call for the NRSC to issue a statement of praise for the FCC.

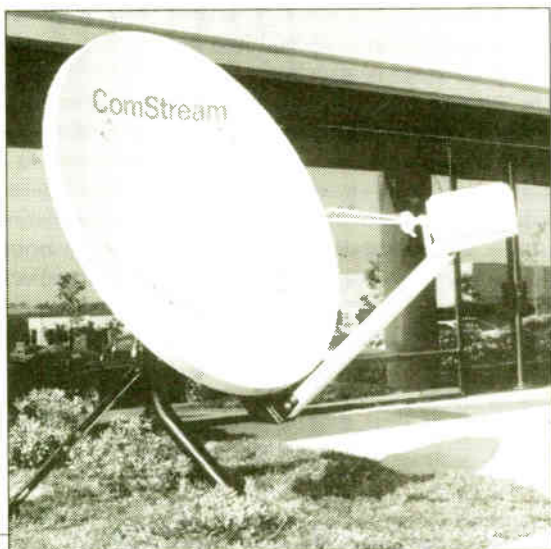
gineering Bill Hassinger. "We decided the daytimer rulemaking five years ago when the Commission had different things in mind. Now, we're looking at total revision. It could cause some things to have to back out."

The AM freeze will likely remain as long as 87-267 remains unsettled, which, judging progress so far, could be a good distance in the future.

The text accompanying the Commission's April rulemaking had just been released publicly in mid-July.

For information, call FCC Mass Media at 202-632-6460.

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# Heed the Tides Of King Canute

by Judith Gross

**Falls Church VA** It's not often that anybody connected with the business of radio regulation waxes literary . . . so you tend to sit up and take notice when it happens.

Take, for instance, comments by FCC Commissioner Ervin Duggan, on the Commission's NOI on Digital Audio Broadcasting (DAB). He found an eloquent way of telling the industry not to foolishly try to resist the inevitability of a new technology, when he invoked the name of an eleventh century Viking king.

"We must not be King Canute standing with his arms stiffly out trying to stop the oncoming tide of what is new . . ." said the Commish.

OK. A quick pop quiz to all my colleagues revealed that lotsa folks had no idea who this Canute mucky-muck was.

Well, he was at first a King of England (after the Danes invaded) later King of Norway and he helped the folks in England get over the miseries of long years of battle with invaders and all.



But old Canute is best remembered for setting up his throne right at the seashore—no, not to get a terrific tan—but to stand up and command the tides not to lap up and wet his rich robes. Well of course they paid him no mind, and poor Canute must have had a heck of a dry-cleaning bill.

The story is usually invoked to symbolize a foolish leader trying to stop the oncoming rush of something as inevitable as the ocean, the way Duggan so elegantly put it.

But I'm here to tell ya that Canute got

a bad rap. According to, of all people, Isaac Asimov (and you only thought he wrote sci-fi), who authored a book called *The Shaping of England*, Canute, who was a realist, and a regular guy and all, never really thought the tides were going to stop on his command.

In fact, he set the whole thing up: throne on the beach, wet robes, to show his courtiers how foolish they were for believing that a king had divine powers. So maybe Commissioner Duggan made a stronger point than even he imagined, in bringing up the old king's story.

That is, Canute knew the tides weren't going to stop just because he was king. A good example for any person, group or agency in radio these days who thinks the new technologies, DAB or whatever, can be stopped just because we aren't ready for them. I guess we shouldn't wait until we get all wet, too.

On the DAB front, in addition to the FCC's NOI, there are two interesting developments. Strother Communications, the company that wants to experiment with the Eureka 147 system for terrestrial digital broadcasts, now has a plan for the transition from current AM and FM to digital.

It was filed in a petition for rulemaking, and would give digital allocations to existing license holders.

And in a hearing before a Congressional subcommittee looking at spectrum, NPR President Doug Bennet said the government should give additional FM spectrum to the FCC for DAB and asked for a 20% set-aside for exclusive use by public radio for digital broadcasts.

It's all going to boil down to spectrum—no doubt about it.

☆☆☆

Hot off the presses! Just learned that Varian Associates has reached a tentative agreement to sell Continental, which had been on the block the last few months.

The intended buyer is a Houston-based company called Tech-Sym Corp., a company dealing in advanced electronic systems. We'll get some more info on them and give you details next time

around.

Everybody's still digesting the massive AM technical rewrite put out by the Commission. It'll be interesting to see how the industry responds to ideas like relaxing multiple ownership rules, eliminating simulcasting or requiring

or bad result? Depends on whom you ask. If you happen to be the AM who is going to go away . . .

I've heard some strongly negative comments about all of this. One consultant pointed out how with the proposed new rules, some AMs who could have taken advantage of ways to increase nighttime coverage will now no longer be able to do so, since a station seeking to change its nighttime coverage would actually have to show a decrease in interference.

So are we sacrificing present benefits to the band for future improvements? One irate consultant called the whole thing "a McCarthyist witchhunt" for interference. Whew!

☆☆☆

Shows, shows, shows. 'Tis the season. Got a chance to see some sneak previews of some items in one of Harris-Allied's "traveling road shows." This one was up in the stylish offices of Media Scan in my old Noo Yawk.



Harris-Allied hits The Big Apple

AM stereo.

Some of the more technical proposals, those dealing with reduced interference through redefining protection contours, have been greeted with dismay by consultants.

When you look at a proposal like imposing more stringent daytime ground-wave protection (from 0.5-0.5 mV/m to 0.5-0.079 mV/m) you could come to a couple of conclusions.

First, it seems to say that every AM doing things the way they have been done until now is out of compliance with new rules (if they are adopted). That means "grandfathered." It does not bode well for future upgrades in service.

Second, if all the Commission's proposals are adopted, we could end up with a lot fewer (but maybe stronger) AMs on the dial. Would that be a good

Denon had a new production model CD player; AKG gave demos of its DSE-7000 and ITC had its new cart machine. It was a good chance to chat with some vendors in a relaxed setting.

The focus moves up to Boston in mid-September for Radio '90. One company being very secretive is Auditorics. I hear they have a new product but when I want to know what it is—mum's the word.

I'm also looking forward to hearing from the NAB's DAB task force and fielding more industry reaction to all the digital hoopla at the show. Take a look at our preview in this issue for more details.

And the 40th annual IEEE symposium is fast approaching. It'll take place 6-7 September across the Potomac from here in beautiful downtown DC.

(continued on next page)

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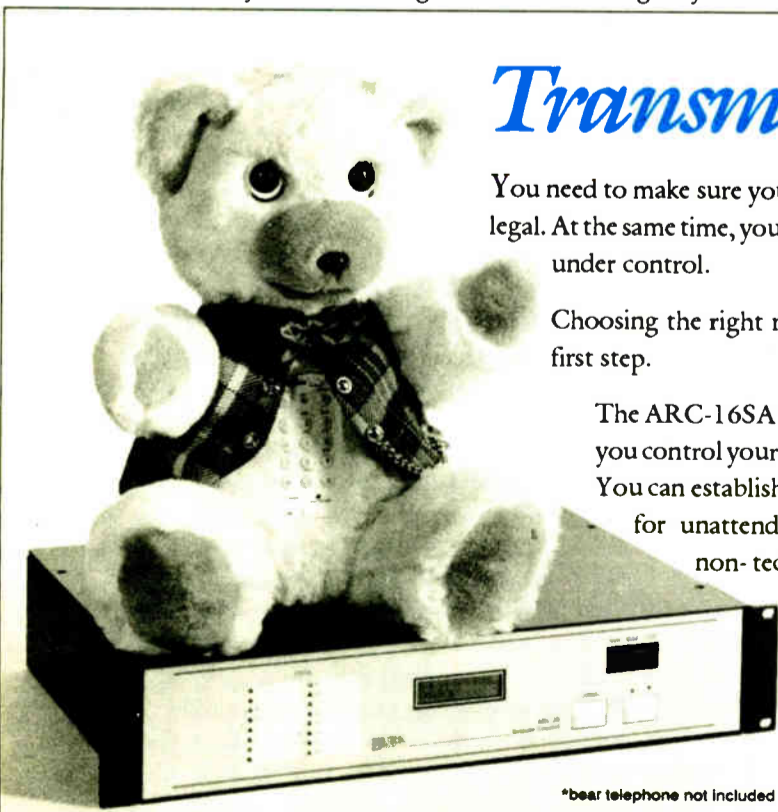
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## READERS FORUM

If you have comments for *Radio World*, call us at 800-336-3045 or send a letter to Readers' Forum (Radio World, Box 1214, Falls Church VA 22041 or MCI Mailbox #302-7776). All letters received become the property of Radio World, to be used at our discretion and as space permits.

### Learning from history

Dear RW:

As a radio broadcaster who owns, built and operates both an FM and a AM station, I feel the following must be stated for consideration of the radio broadcasting community.

The system, invented in the late teens, reached the public by the twenties. The public took to it, and by the thirties and forties was really providing a great public service. Some say it leaked out in the late fifties and early sixties.

By the late sixties a new system, invented and developed in the early thirties, was making its presence felt. It was a real race in the seventies and early eighties, but by the late eighties the new system had taken the lead and never looked back. The first system held on for a few more years. The second system had its heyday, but eventually a better system came along and all but put it out of business.

If you think this scenario is about radio broadcasting, AM, FM and DAB you're wrong. Think back to over 100 years ago, starting with the early 1800s, and you'll realize that what I'm referring to is steamboats, railroad trains and airplanes.

Mark Twain called them "floating palaces" and once they numbered in the thousands. The cry went up, "steamboats must be saved!" "Look at all the service provided, all the people employed." "Shall the public be denied this valuable service?" The public decided. Now only the Delta and Mississippi Queen remain and sail out of New Orleans, LA.

There was no way that steamboats could compete with the railroads. The trains were faster and could go more places. That is, railroads provided a better service. Greed and governmental action stymied the railroads. The airplane superseded the passenger train.

Broadcasting, by use of AM, in the medium wave band, is a low fidelity, noise-prone system that is totally incompatible with today's audience. It too shall go the way of the steamboat. Nothing can be done to stop it from happening.

Owner greed and government action is derailing the FM band. Poor programming policies, commercials that are boring, shock jocks, use of DA antennas, contour protection plus other ideas presented, will do to FM what happened to AM.

A DAB system should be comparable with other countries, but modified for use in America. The population density of America is not as great as Europe. The total coverage area of terrestrial DAB stations must be the same as the present total coverage area of maximum facility

The NAB's Radio '90 show holds the promise of surpassing previous years as the premier fall radio event.

It's the one industry convention dedicated solely to radio which brings all factions of the industry: management, engineering, programming and sales together in a single venue.

Unlike the spring NAB convention, the size of the fall show lends itself to a closer, less hurried look at the latest in equipment.

And this year, with new sessions devoted to emerging technologies such as DAB, along with the well-established seminars on digital radio and directional antennas, there's more for engineers and managers than ever before.

It's also an opportunity to meet the radio industry's key players and a chance to bring ever-increasing international attendees to a radio-only gathering.

It's clear that NAB has done a lot to insure the fall radio show's success, but there are still questions about how to build on this success and in what direction it should grow.

NAB has resisted splitting radio off from its spring convention despite the fact that doing so would undoubtedly boost the fall show. And, certain officers of the association have also stated they don't view Radio '90 as an engineering convention.

Because of these questions, it would be good for the industry to help guide the future of the convention by showing its support through attendance.

Although many budgets are tight right now, participation by managers and engineers as well as programmers would help make this year's show successful and could pave the way for an even stronger radio-only convention in the future.

If Radio '90 can deliver the quantity and type of attendees that guarantee a show's success, it may become, in the hopeful words of one exhibitor "radio's greatest show."

—RW

## Support Radio's Show

**Radio World**  
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**Next Issue  
Radio World  
September 12, 1990**

## Earwaves IEEE Sked

(continued from previous page)

On the agenda for radio sessions are several antenna-related topics including one on an antiskywave antenna for AM and horizontal pattern testing of circularly polarized FM antennas using time-domain techniques.

Michael Rau and Stan Salek from NAB Science & Technology are slated to talk about coverage and frequency considerations for DAB, which should be interesting. And Paul Donahue from Gannett will chair a session on satellite and general engineering.

For more info on the IEEE symposium contact Gerry Berman at VOA: 202-619-3771. He's coordinating the whole shebang.

And now that I have to get in gear for show coverage, I'm doing my best to stick to a rigorous training program. This week I spent four hours a day just standing still in one place on a slab of concrete—in four-inch spike heels.

Yeah, it sounds rough, but just think how well I'll hold up on the exhibit floor after that (if I last until then!).

Heard a juicy tidbit? Spill your guts to **Earwaves** by faxing JG at 703-998-2966, writing to PO Box 1214, Falls Church VA 22041, or calling 703-998-7600. Who knows, you could win a coveted RW mug.

class B/C FM stations.

Broadcasters, wake up and smell the coffee. Through the years we've seen technological changes from steamboats to trains to airplanes; from AM to FM to DAB. Those who do not know history are condemned to relive it. Do broadcasters know history?

Sidney J. Levet III, Pres. & CE

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WCKW-FM Stereo 92.3

LaPlace, LA

### Loudness not the answer

Dear RW:

After reading Eric Small's article, *Occupied Bandwidth: Early Data* (13 June RW) concerning the measurement of FM broadcast modulation and occupied bandwidth, my first reaction was to ask myself if all this is really necessary.

It seems to me that all of this uproar about "accurate" modulation measurement on the FM band is a direct result of station operators pushing the limits of modulation and then scrambling to find a way to justify themselves technically if and when they get busted by the FCC

for over modulation.

FM broadcasting has bigger things to worry about than trying to utilize every last Hertz of available bandwidth allocated to them just to be the "loudest" station on the band. Digital audio transmission, in whatever form it may evolve, is going to be a formidable opponent for FM broadcasting in terms of transmission quality, and this "loudness" mentality on the FM broadcast band just stacks the deck further against FM.

As I tune across the FM band here in Chicago, I can tell which stations are overdoing it modulation-wise, as they are generally the ones that just plain *sound bad*. I see no advantage to running CD and DAT players on the air under such conditions. When you have no effective dynamic range, what's the point?

Oh, and by the way. I had a dream the other night, and in that dream the Radio Lord of the Universe told me the real reason behind the existence of the "proof" switch on audio processors. It is there to prove that the transmitter could sound decent if left to its own devices.

Doug Horan  
Crown Point, IN


by Brad Gebhart



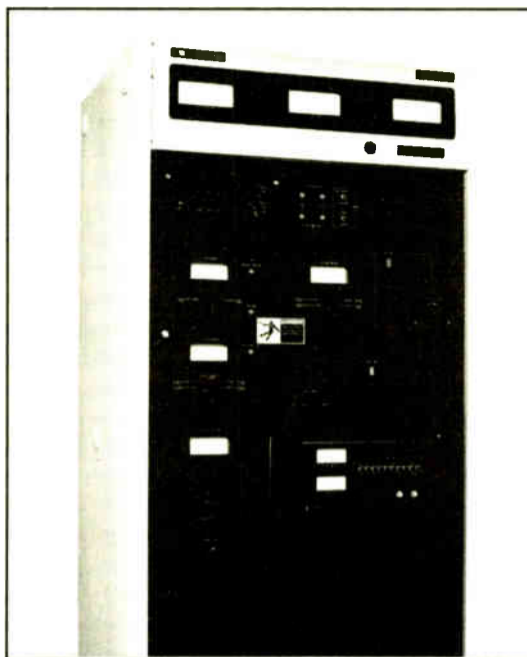


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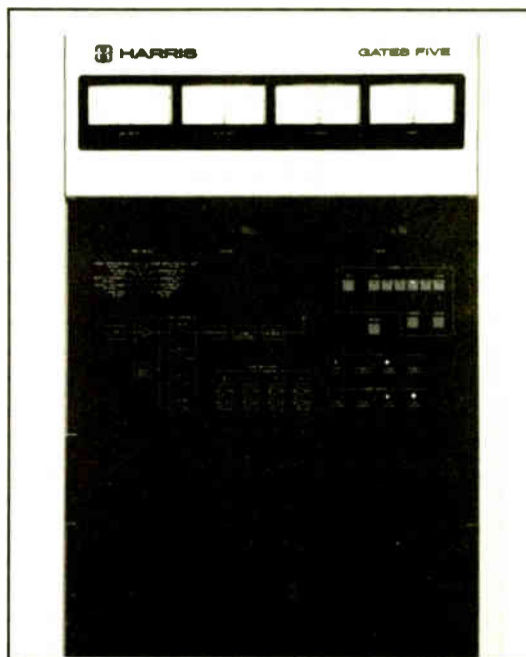
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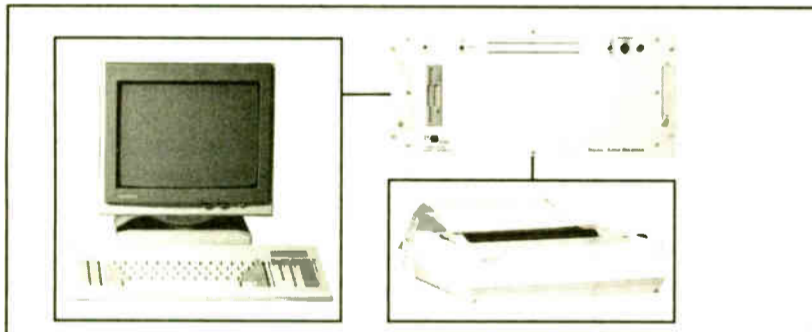
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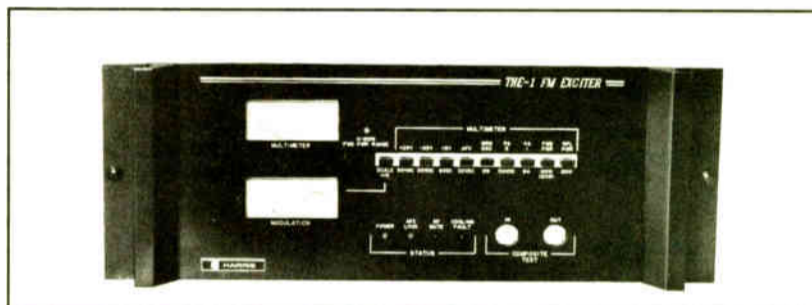
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World Radio History



# Strother Puts Forth DAB Plan

(continued from page 1)

"happy" to see support for a terrestrial system. NAB opposes direct broadcast satellite (DBS) delivery. He said the petition should be addressed in the FCC's DAB inquiry.

Gannett Radio Engineering VP Paul Donahue, acting chairman of an industry *ad hoc* group on DAB technology, said the petition was good in that it would spur comment on the issue. "Great, let's get the FCC moving and see what's happening," he said.

Neither Rau nor Donahue would address specifics on the petition, pending further review.

The petition describes a scenario where broadcasters would simulcast

their operations until there is significant market penetration of DAB receivers.

Strother said he is not working directly with receiver manufacturers but noted that "everybody has a generic prototype." He said he is beginning research into the development of a receiver—how it would function and look.

## Modification possible

While Strother noted that his proposal is based on the European-developed Eureka 147 DAB system because it is the only one available, he could modify his plan to accommodate whatever standard may be adopted. He also said he expected a "more sophisticated model" of the Eureka system by the first quarter of

1991 to be available for testing. Eureka 147 is currently under testing in Canada.

The Strother petition outlines a plan where the US would be partitioned into non-overlapping DAB market areas. One or more DAB channel groups composed of 16 individual channels, each consisting of 4 MHz of radio spectrum, would be assigned to each market.

Transmission facilities for each DAB channel group would be licensed jointly to the licensees whose channels make up each channel group.

After existing broadcasters receive their channels, those remaining would be allocated by a "window filing" and by a "first come/first service" similar to current FM.

The petition suggested the FCC set a designated penetration level for receivers before simulcasting would end and AM and FM phased out.

After the conversion, the AM and FM bands would be available for reallocation.

"... The United States can convert radio broadcasting from AM/FM to DAB in an orderly way that is totally consistent with the concepts of private station ownership, local service and licensees' accountability on which our system of broadcast regulation is based," the petition stated. "For both the broadcaster and the public, DAB can be just like AM and FM, only better."

Strother, in the petition, said 48 MHz is needed for terrestrial DAB and suggested 225-2700 MHz be used.

In the most spectrum-efficient configuration, each channel requires 250 kHz; therefore, 192 channels would exist, the petition stated. The channels would be assembled into 12 adjacent channel groups, each containing 16 channels.

## Spectrum reallocation

While much of the spectrum is allocated to the government, Strother asked the FCC to request that the National Telecommunications and Information

Administration (NTIA) release portions for DAB.

And the petition also noted the concern for spectrum for simulcasting high definition television. But, it maintained that recent developments in video compression may greatly lower spectrum requirements.

It also suggested that after conversion to DAB, the present FM band could be reallocated for TV.

The petition stated that Strother's proposal is for a terrestrial system, but called attention to a "comprehensive" system that may include a satellite component.

Strother, a former broadcaster, consultant and entrepreneur, formed Strother Communications Inc. for DAB developments. He will form Digital Audio Limited Partnership specifically for DAB work.

For information from Strother Communications Inc., call 504-542-9275.

# FCC Begins DAB Inquiry

(continued from page 1)

the industry.

"Wise entrepreneurs, in my judgment, plant their flags on new technologies that swim into view rather than try to resist them," he said.

Duggan also expressed hope that the Commission would not hold back on advancing technology. "There are concerns about the competitive effects on 10,000 local broadcasters, but we must not be King Canute standing with his arms stiffly out trying to stop the oncoming tide of what is new," Duggan said. "It is not only unwise, but foolish for us to take a position of resistance to this new technology."

The commissioner also voiced his support for the digital service proposed by Satellite CD Radio Inc., one of three companies that has thus far petitioned the FCC with digital innovations. The Satellite CD application proposes to create a hybrid digital service utilizing both terrestrial and satellite transmission.

"I may be premature, but I find the hybrid idea most appealing," Duggan said. "It seems to offer the best of both

worlds."

Stanley said that filings asking for experimental authorization by the other companies vying for US digital inroads—Strother Communications and Radio Satellite Corp.—would likely not be held back in their experimentation by impending action on this Notice of Inquiry.

However, Satellite CD's petition for rulemaking as well as a second Strother petition asking for a rulemaking would probably be folded into a sweeping rulemaking on digital radio, according to Bruce Franca, with the FCC's OET.

Franca said action on these, because they request spectrum allocations, would wait for the broader rulemaking, while the other companies' plans—seeking solely experimentation could actually serve the FCC's NOI.

Mention also was made of assembling an advisory committee and holding an *en banc* hearing similar to the November gathering on the AM service. Stanley, however, said the issue still is too new: "We need to wait six or nine months for clear policies and technical paths. It's premature."

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# MFM Joins the Ranks of DAB

by Alan Carter

**Monterey CA** An electrical engineering professor has developed what is being promoted as a digital transmission scheme that would allow digital audio broadcasting (DAB) to be compatible with current spectrum use.

The proprietary system marketed by Mercury Digital Communications is called Multi-Frequency Modulation (MFM).

It is described as a high speed, bandwidth-efficient, robust digital transmission technology, ideal for bandwidth limited applications. Among those cited

are bandpass or baseband environments over-wire lines, point-to-point radio transmissions and digital broadcasting.

## NAB presentation

Mercury Digital will make a presentation to NAB staff 7 September, according to Mercury Digital President and CEO Tom Duffy, who is a real estate and litigation attorney. The MFM process was developed by Mercury Research and Engineering VP Dr. Paul Moose, a professor at the Naval Post Graduate School in Monterey.

Duffy said MFM is not a compression scheme but "transmission technology."

The developers would only say that MFM produces substantially higher uncompressed data than existing technologies. Lab tests have produced a 7

ference or interchannel crosstalk.

Duffy said MFM is more robust than the DAB Eureka 147 developed in Europe and being tested in Canada.

## Resistant to impairments

Mercury Digital suggested the MFM process is resistant to common channel impairments, such as flat loss, attenua-

## Duffy said MFM is more robust than the DAB Eureka 147 developed in Europe and being tested in Canada.

bits/Hz data transmission efficiency and work continues on a 10 bits/Hz speed system.

In addition to CD-quality audio in existing FM channels, Mercury maintained MFM technology has the potential to transmit spectrum-compatible digital television signals at 25-42 Mbps, within existing 6 MHz TV channels, or 336 kbps video teleconferencing over a 48 kHz groupband leased line.

Its developers say MFM achieves bandwidth efficiency by creating a signal that needs no equalization, at baseband or bandpass frequencies, and does not require guardbands. They claim the MFM signal can be utilized to the edge of the available band without intersymbol inter-

tion, group delay distortion, listener echo, noise, phase jitter, frequency offsets, phase hits and gain hits.

Duffy said Mercury Digital was not in a position at this time to address questions about simulcasting possibilities if radio stations used their existing frequencies to broadcast by MFM. He called that a "political issue" outside the company's realm. "We're technologists," he said.

Mercury Digital was formed in January 1990 for the development and marketing of MFM, Duffy said. It hopes to license the technology domestically and internationally.

For information from Mercury Digital, call 408-649-0679.

# FCC Budget Debated

by John Gatski

**Washington DC** The House and Senate have approved similar versions of bills that set spending limits for the FCC but include much-needed upgrades to the Commission laboratory in 1991.

The House and Senate agreed upon authorization for fiscal year (FY) 1990 at \$109.8 million, but the versions differ on the total FY 1991 authorization and several other requirements. Authorization is not the actual budget which the FCC sets, but is a congressional spending limit with certain requirements.

The House and Senate versions agreed to include: the lab upgrade set for 1991, which the Office of Engineering Technology said is badly needed; allowance of commercial radio operator exam services to be delegated to outside parties; con-


tinued use of "older Americans" as technical and administrative employees through FY 1991 and extension of maximum notice for tariff filings from 90 to 120 days.

Other areas of agreement are prohibition against willful interference to radio communications and an amendment to the FCC's fine and forfeiture rules to encompass applicants who engage in misconduct during the license application process.

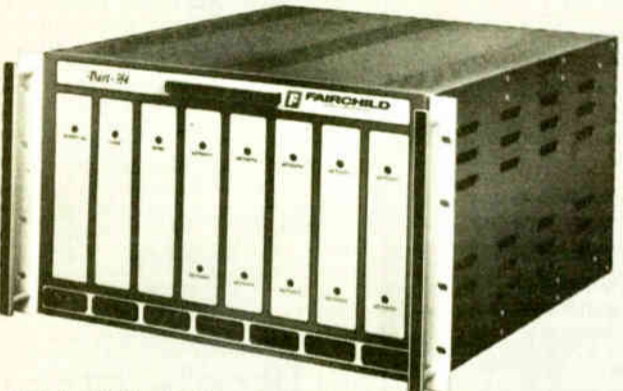
Areas yet to be worked out include: FY 1991 authorization (\$119.8-Senate and \$121.4 million-House); money to continue operation of a Hawaii monitoring station beyond FY 1991, and whether to include a House requirement to consider any FCC decision's (except equipment certification) impact on foreign commerce by the US.

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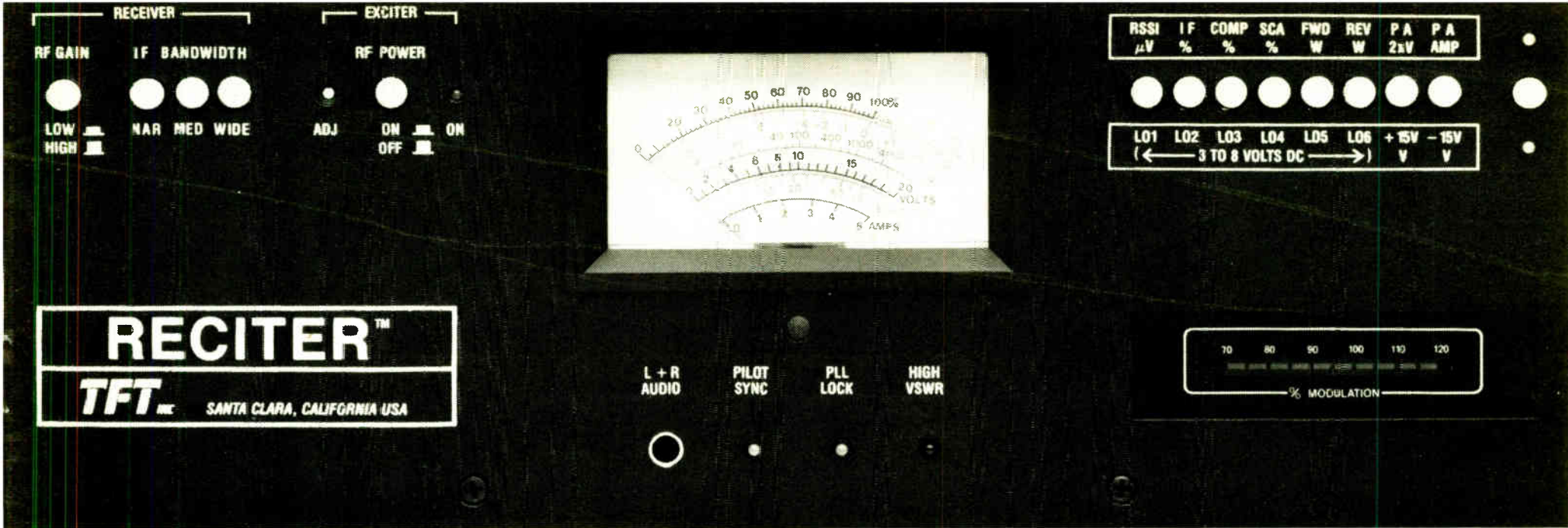
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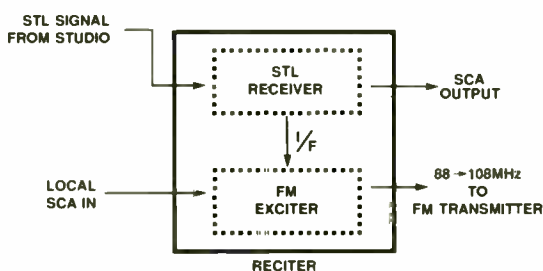
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# DAB Stands Up to Canada's Test

by James Careless

**Ottawa CANADA** "It's really delivering the goods."

That, simply put, sums up how digital audio broadcasting (DAB) is performing in ongoing cross-Canada trials, according to Michel Tremblay, senior VP for radio at the Canadian Association of Broadcasters (CAB). The tests have shown DAB overcomes the traditional problems of FM multipath and delivers a crisp, CD-like signal.

Along with the Canadian Broadcasting Corp. (CBC) and the federal government here, the private-broadcaster CAB

is one of the key partners in tests of the European-developed Eureka 147 DAB system.

Tremblay and other Canadian engineers met 16-17 July in Toronto, one test site, with their counterparts from France's Centre Commun d'études de telediffusion et telecommunications and Germany's Institut für Rundfunktechnik—the creators of the Eureka digital radio prototype.

The meeting followed the Toronto phase of the trials, which wrapped after running 5-15 July. The tests moved to Montreal 23 July-3 August and to Vancouver, 10-18 August. The tests started

11 June in Ottawa.

Because of the current success in Ottawa and Toronto, Canadian engineers planned to put the DAB-equipped minibus, which holds the receiving equipment, through even more rigorous experiments.

In the Montreal tests, Tremblay said, plans included possibly driving through tunnels and also running through some

areas of interference caused by proximity to powerful FM transmitters.

When the minibus rolled into Vancouver, its digital receiver was to be challenged by the mountains that surround the Pacific city—normally a deathtrap for conventional line-of-sight transmissions.

Members of the NAB Advanced Radio Committee, recently appointed by the Radio Board, were expected to observe the Montreal tests in early August.

James Careless is a Canadian free-lance writer and broadcaster.

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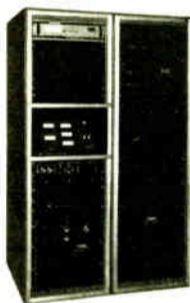
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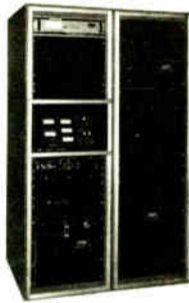
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# SMN Consolidation

by John Gatski

**Chicago IL** The nine-year old Satellite Music Network (SMN) is consolidating its Chicago operations with its Dallas headquarters as part of a move to centralize operations and save money.

About 20 of the approximately 60 full-time/part-time employees including the assistant engineer will be transferred to Dallas by 15 October. The other employees will be let go, according to SMN employees based at the Chicago office.

The move comes nearly a year after the company was bought by Capital Cities/ABC Inc.

SMN President/CEO John Tyler said the technology has developed to the point that will allow the company to consolidate in the Dallas headquarters at a considerable savings.

Tyler declined to reveal how much the company would save from the consolidation.

SMN began broadcasting from Chicago in 1981. It has since expanded and is now distributed to more than 1000 stations in the US and overseas.

The company located its broadcast facilities for the multiformat music service in Chicago initially because of the necessity to be uplinked to a satellite via a subcarrier on WGN-TV in Chicago. WGN was one of the country's first "super" stations that transmitted nationwide via satellite.

Today, the technology allows direct uplink capability from the network's own equipment and facilities in Dallas, Tyler said.

SMN's Chicago CE Art Reis is one of the 40 Chicago employees let go.

Reis said he has mixed emotions about seeing the Chicago facility closed down.

"In this building, we changed the face of broadcasting with the introduction of long form radio," he said. "We would have liked to see the network stay, but we understand."



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# AM Interference On Top of FCC's Hit List

(continued from page 1)  
interference.

It recommended that a first adjacent channel protection ratio of 16 dB be instituted for daytime operation. Currently, first adjacents are offered no protection. The recommendation was based on conclusions drawn by separate studies conducted by the NAB and B. Angell, supported in past comments by a majority of broadcasters.

## Increase groundwave protection

The technical rewrite would increase daytime groundwave protection contours for first adjacent stations. Instead of protecting from each station's .5 mV/m contour to the other station's .5 mV/m contour, the Commission is proposing protection from a station's .5 mV/m to another station's .079 mV/m contour.

Current rules for second and third adjacent channels include no protection ratios, but instead require that stations be separated at certain distances determined by the location of specific field strength contours. No changes were encouraged for these guidelines.

For determining nighttime interference, the Commission proposed that applications for new or modified AM stations would be acceptable if their individual nighttime limitations at the site of another co-channel or first adjacent channel station did not exceed 1.0 mV/m.

In hand, for protection to skywave service of Class I stations, the maximum allowable level would be 0.25 mV/m at or within the 0.5 mV/m 50% contour.

The recommendations replace an earlier FCC proposal to limit increased adjacent-channel nighttime skywave interference by including it in RSS calculations and by lowering the threshold used to determine whether interference occurs. An RSS-based alternative wrangled over by the Radio Advisory Committee also was rebuffed by the proposal.

These new protection criteria, the Commission said, assume the use of

narrowband receivers at night.

For stations wishing to move or modify their nighttime service the Commission is also proposing that authorization be contingent on a station's reducing current interference levels by 10%. This marks a departure from its current policy of allowing the same amount of interference in such cases.

Finally, the FCC noted that its freeze on new or changed AM facilities, instituted 5 April, will remain in effect as long as the proceeding for AM reform is open.

## End to split frequency

Another technical change offered was to halt the uncommon but up-to-now acceptable usage of split frequency operations—when a station uses one frequency during the day and another for nighttime operation. In the past, the practice has been utilized on a case-by-case basis in an effort to "relieve problems faced by daytimers," however, the FCC now believes it "would be inconsistent with our efforts to improve AM service."

Commenters who believe otherwise, the Commission said, should address specifically how such operations would *not* impede the reduction of interference.

The FCC also changed its tenor on the issue of nighttime skywave signals, which in the past the agency has not considered a source of interference. "This differs from our current practice, which defines interference as occurring only if the calculated skywave field strength exceeds prescribed levels," the Commission said.

In addition, it proposed to terminate MM docket 88-376, which allowed the theory of negotiated interference, where stations are allowed to accept interference within their normally protected contour.

"Although adoption of this change would provide greater flexibility for stations seeking increased service areas, it would also foster increased congestion and distorted service areas," the FCC said.

The Commission also recommended dismissal of a rule that permits interference within the normally protected contour of a station that is the only licensed station in its community. Again, in its effort to rid the band of interference, it found Section 73.37(b) contradictory.

The issue of stereo was addressed only briefly. The FCC issued no mandates, asking simply, "In the existing band, should stereo transmissions become mandatory as a part of any measure to increase service and reduce interference or after a certain number of years?"

## Non-technical reforms

The Commission's efforts to reduce interference through non-technical policy and rule changes focused on three primary endeavors: granting tax certificates to AM licensees who receive payment from others to surrender their licenses; relaxing multiple ownership rules in certain cases; and doing away with the practice of simulcasting FM programming over AM stations.

The effort to relinquish an AM's right to simulcast has perhaps been the most controversial issue in discussions following the proposal's 12 April release. Some in the industry have voiced the opinion that for many struggling AMs, simulcasting is the only means of staying afloat.

The FCC called on those broadcasters, in their comments, to present data supporting the public interest and economic benefits of program duplication. It also asked where exceptions to a rule against simulcasting would be appropriate. An example, it said, would be where the amount of overlap of the AM and FM service is minimal.

The justification for the change in policy, the Commission explained, comes out of evidence that in instances where stations have resorted to simulcasting as a way to prop themselves financially, "we are not aware of any cases for which such measures have reversed the decline in audience share or established a permanent sound economic base."

The practice also unnecessarily holds allocations open, preventing other parties from using the channel, the FCC noted. Also, it restricts other stations from making modifications and improvements and causes increased interference.

(continued on page 12)

# Text At A Glance

## Major reform proposals for the existing AM band

- Encourage or require stereo modulation
- Require 16 dB first adjacent channel protection for daytime operation
- Eliminate the 50% RSS exclusion and assume a 2 mV/m night limit for all stations
- Require a 10% interference reduction for modifying nighttime service
- Halt negotiated interference, as outlined in MM Docket 88-376
- Award tax certificates to licensees that surrender allocations
- Reduce or cease simulcasting FM signals on AM
- Establish qualifications for a high-quality AM receiver
- Reclassify AM stations
- Require stations relocating or modifying to reduce current interference

## Major recommendations for the AM expanded band

- Allocation preference to those creating most interference in the existing band
- Minimize use of directional antennas
- Allow 50% nighttime coverage during transitional period
- Encourage or require stereo modulation
- Allocation preference to licensees willing to broadcast from medium-sized cities with no current allocation
- Allocate by interference criteria or use prescribed distance standards
- Only current AM licensees may apply for expanded band channels
- Waive current maximum license ownership rules
- Establish a sample allocation plan with letters of intent due 15 October
- Move Travelers' Information Stations (TIS) at 1610 to any of the 10 new expanded band channels

Comments are due 15 October, and reply comments are due 15 November.



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# Expanded AM Band Goals Set

by Charles Taylor

**Washington DC** If the FCC has its way, the AM expanded band will never suffer the failings of the current AM service.

That appears to be at least one of the messages the Commission offers in its massive proposal attempting to reform AM, which includes a detailed plan to allocate and protect the additional 10 channels—from 1605 MHz to 1705 MHz—planned for the expanded band.

In its text on the expanded band, the Commission outlined six broad goals for the 250 to 300 expected new stations:

full-time operation with stereo modulation; competitive technical quality; 10 kW daytime power; 1 kW nighttime power or more if circumstances permit; non-directional antennas or a simple directional array and between a 249- and 497-mile separation between channels.

#### Modeled on existing band

Technical criteria for the expanded band primarily will be modeled after the existing band, the FCC said. However, the Commission hopes to minimize the need for directional antennas, thanks to appropriate spacing with the new allo-

cations.

Regarding nighttime service, the Commission proposed that a suitable candidate that could not guarantee 100% nighttime coverage of its community should be allowed a waiver without burdensome processing of applications. Thus, the FCC recommended that it should require only 50% nighttime city coverage.

It asked for comment on the proposal, including the option of allowing 50% on a temporary basis and ultimately returning to the 100% standard.

Comments are due 15 October, with reply comments due 15 November.

The most noticeable shift in attitude in populating the expanded band is the FCC's intention to have stations causing the most interference on the existing band given preference in allotments. Numerous broadcasters have petitioned that minorities, daytimers and public radio stations deserve allocation preference.

#### Commission dissents

But the Commission disagreed. "While the arguments for such reservations are not without merit, we believe that the most efficient and effective use of the expanded band is to resolve the

(continued on page 16)

## FCC Eyes Interference

(continued from page 11)

The Commission's practice to issue tax certificates to licensees who receive payment from another party to surrender AM licenses, sanctioned in MM Docket 89-46, will aid in reducing interference, the agency said. The FCC asked if tax certificates also should be issued to licensees receiving payment from other licensees to reduce their service area.

#### Common ownership changes

The final non-technical proposal involved relaxation of rules allowing common ownership of AM stations with overlapping contours. The FCC said it should consider waiving the contour overlap rule on a case-by-case basis to permit common ownership of two commercial AM stations with overlapping 5 mV/m contours if an applicant shows that an interference reduction to adjacent or co-channel stations would result.

The FCC asked for comment on the ramifications to the broadcasting industry of such a move.

Within the document, the Commission also supported development of a high-quality AM receiver. "We believe the serv-

ice would benefit if we settled on a single hypothetical model possessing desirable and yet affordable attributes," it said.

Current efforts by the NAB and Electronic Industries Association (EIA) to develop a high-quality AM were heralded and, according to the FCC, will induce manufacturers to make a significant improvement in the performance of AM receivers.

According to the proposal, the Commission is considering developing a list of those receivers that satisfy minimum criteria needed for a good quality receiver, to be updated and released publicly every six months.

In hand, the agency added, "We are convinced that, as the service improves, good quality, wideband receivers will become more common."

#### Advanced antennas, new classes

The text also referred to improvements that the service might gain with advanced antennas, however the FCC preferred to defer specific suggestions until testing has been completed and results analyzed.

Also among the proposals was a desire to reclassify AM stations so they will parallel terminology used in international agreements. Class I stations would be renamed Class A; Class II and Class III stations would be labeled Class B; and Class IV stations would become Class C.

Establishment of a fourth class, Class D, also was proposed. The new class would identify stations that lack fully protected unlimited-time operations. It would include the current Class II-D, Class II-S, Class III-D and Class III-S, and would provide "a keener focus on a category of stations which has its own set of special needs."

For information on or copies of the text for MM Docket 87-276, contact the FCC Mass Media Bureau at 202-632-6460; or NAB Science and Technology at 202-429-5391.

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# SW Plan Targets the Caribbean

by Paul Rebmann

**Miami FL** Commercial shortwave broadcasting to the Caribbean basin has been proposed in an application for an international radio station filed with the FCC in July.

The application proposes a 10 kW shortwave transmitting facility near Miami and studios to be located in Miami, according to Jeff White, GM of the operation, Radio Miami International.

Radio Miami International is a partnership owned by White and CE Indaleo Espinosa, both based in Miami. White is a broadcast journalist and international radio consultant, while Espinosa is an electronic and broadcast engineer.

White said they are applying for only 10 kW, even though FCC rule 73.751 specifies a minimum of 50 kW carrier power for international stations.

Espinosa explained that 10 kW is all that is needed to adequately cover the Caribbean basin due to the close proximity of the areas. Several shortwave stations broadcasting to the same area from other countries use only 10 or 20 kW, he added.

However, Tom Polzin, an FCC engineer on the international staff of the Mass Media Bureau, said no shortwave stations authorized so far have waivers of the minimum power requirement. He added that normally shortwave stations want the most power they can afford, and several religious shortwave stations

operate with 500 kW.

The minimum power requirements were intended to insure that shortwave stations are broadcasting outside the United States, White said. The directional antenna system for Radio Miami International will assure that the transmissions are intended for out of the US, he said.

The tower array described in the application is a vertically polarized corner reflector composed of three 50' masts supporting a wire screen and arranged in a 60° angle. The driven element will consist of another 50' mast positioned inside the angle formed by the screen. The antenna system is designed to produce a horizontal beamwidth of 60° and a 25° vertical beamwidth.

Espinosa said the station is expected to provide service to the Caribbean islands as well as coastal countries in Central and South America from Honduras to Columbia. This area includes most of ITU zone 11 and parts of zones 12 and 13, according to White. Radio Miami International will operate in the 49, 31 and 25 meter bands if granted authorization.

Programming will include "extensive coverage" of tropical weather conditions during the hurricane season, White said. He noted that Miami is a major news, music, cultural and transportation center for the Caribbean basin.

"We'll cover important business events like the annual Miami Conference on the

Caribbean, and we'll provide news and features of interest to international travellers in the region," he said.

Although White hopes the station eventually will derive most of its income from the sale of commercial spot announcements, the owners said they have to educate advertisers and agencies

about shortwave.

"This will be an experimental sort of thing, programming-wise," White said. Radio Miami International will probably start selling some blocks of airtime to outside people or organizations producing their own programs.

For information on Radio Miami International, contact Jeff White at 305-551-5834.

■ ■ ■  
Paul Rebmann CE for WEZY-FM/WLKF-AM in Lakeland, FL.

## Reaching Foreign Shores

**Miami FL** A lot's happening in shortwave that the US doesn't know about, according to a Miami radio businessman who wants to start a commercial shortwave service directed toward the Caribbean.

Jeff White, GM of Radio Miami International, said the international radio service recently has gained some popularity in this country.

He attributed the interest to the availability of inexpensive portable shortwave radios. White said now it is possible to buy a combination AM/FM/shortwave radio with a digital readout for less than \$50.

Most international stations are operated by governments or religious organizations. The FCC currently is coordinating frequencies for 19 shortwave stations, which is the number that are licensed or hold construction permits, according to Tom Polzin, an

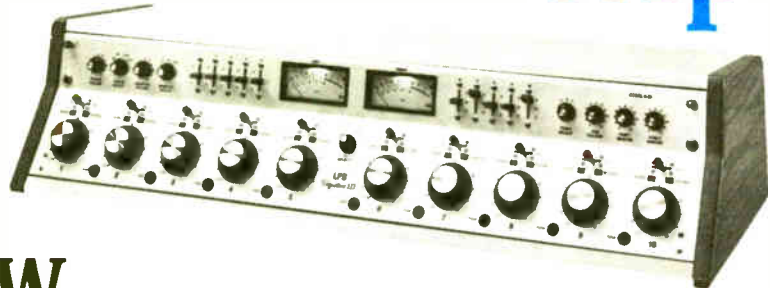
engineer in the FCC international branch of the Mass Media Bureau.

Religious shortwave stations are considered commercial and most of the US stations are religious. Polzin said that there were only four commercial shortwave stations in the US before 1980, with the other 15 authorized since then.

Polzin noted that shortwave broadcasting is an expensive proposition, and that the FCC also has instituted fees for the frequency coordination applications. The new fee is \$35 for each frequency-hour in each season of operation.

Shortwave stations are not assigned a single frequency as are AM and FM stations, but are assigned particular frequencies to use for certain hours. These assignments are issued for quarterly seasons, defined in the FCC rules for international broadcast stations.

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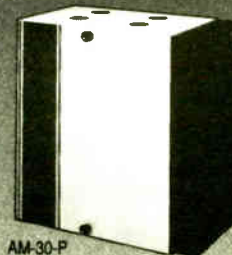
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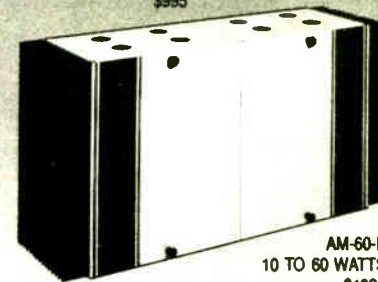
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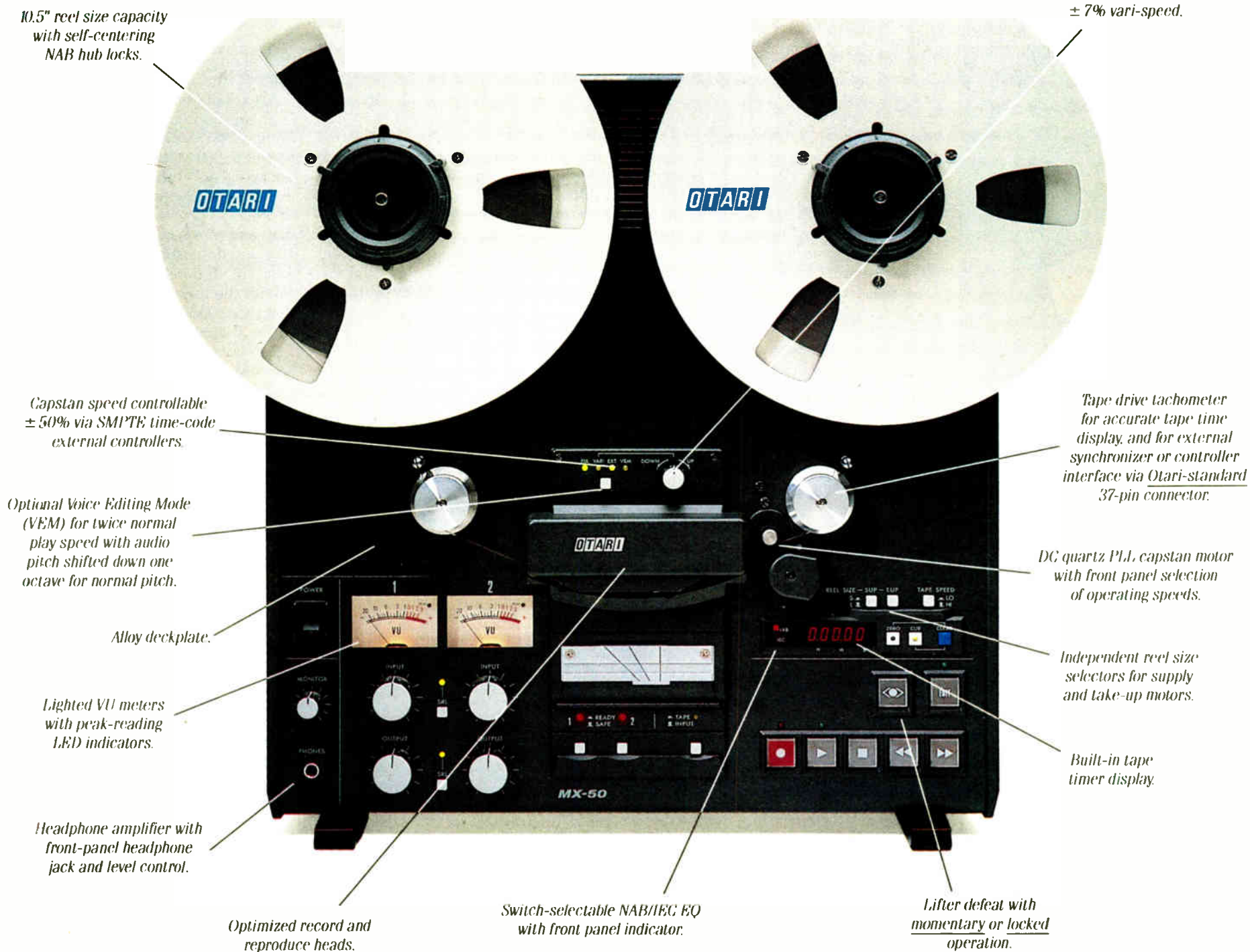
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# FCC's Plans for Expanded Band

(continued from page 12)

interference problems of the existing band," it said.

The Commission added that it had no reason to believe that the proposed approach would promote or disadvantage one segment of the industry more than any other.

Commissioner Andrew Barrett, however, took issue with the decision in a separate statement included in the proposal text.

"I am concerned particularly about the plight of new minority broadcasters who could assist in adding to the level of diversity in broadcasting," he said. "There is a need to ensure that minori-

ties are not precluded from ownership opportunities as this Commission allocates new spectrum."

He expressed hope that the Commission would favor the groups requesting preference in situations where no broadcasters in the existing band request a particular allocation or where none of the stations requesting the allocation can show that they would reduce interference in the existing band by moving.

"Such a scheme would . . . assist us in accomplishing our long-held goal of diversity of programming through media ownership," Barrett said.

## Preference to medium-sized cities

The Commission, however, did show some signs of preference. In its original assignment of spectrum, it lamented, many medium-sized cities were never assigned licenses because of the dominance of nearby larger cities, which received all available AM and FM frequencies.

This time, after full-time AM stations are considered, it proposed to consider ahead of all other daytime-only applicants, the applications of stations proposing to migrate to the expanded band that would provide a first local full-time aural service to cities with populations of 100,000 or more.

The Commission also suggested that at least until a transition period has expired, the new spectrum should not be open to new applicants—only to licensees of the current band.

Stereo also was viewed as a potential target for preference. As with the existing band, the FCC asked: "Should all stations be required to transmit in stereo or should a commitment to transmit in stereo be treated as a preference factor?"

Stations will apply for the spectrum, the FCC suggested, within a standard filing window. If a full-time petitioner has no other applicants competing, he would be eligible to receive an allotment.

However, if a number of petitioners file and that number exceeds the number of available allotments, they would be ranked by the amount of interference they currently are creating.

This would be determined by the ratio of nighttime interference caused by a station to the amount of nighttime service the station provides. The station with the highest ratio would be given preference.

## Interference versus distance

The Commission questioned whether assignments should be based on an applicant's technical evidence that he would not interfere with other existing stations (which is typically used in the current band) versus assignment strictly based on prescribed distance standards, thus protecting stations from interference.

The latter approach, the FCC said, would limit the full use of channels, however, would offer better protection, thus assuring listeners a high-quality, interference-free service. Second, this method would give licensees flexibility in selecting antenna sites.

However, because of the nature of AM, this system could be a challenge, the FCC said. "We realize that the urban areas most likely to produce migrators are also likely to accommodate few allotments if we regularly space stations."

For optimal results, based on these ideals, the Commission concluded that a method incorporating flexible station separations would lead to optimal results.

In order to demonstrate how its allotments will work, the Commission intends to establish a sample allotment plan, and encourages all interested stations to send letters of intent by 15 October.

Feasibility among channels 1610, 1620 or 1630 would first be considered, depending on interference potential with

existing stations at 1580, 1590 and 1600. Allotment would then work its way up the expanded band, using the following as a mileage separation guide: co-channels would be placed 497 miles apart (249 miles in the Commission's Zone 1) and adjacent channels 124 miles apart.

## Waive maximum ownership rules

Because stations in the expanded band would maintain their original allocations for a transition period of at least five years, the Commission recommended waiving maximum license ownership rules that would prevent a station owner from holding two AMs—the original assignment and its counterpart in the expanded band.

In hand, once the transition period has expired, the owner must agree to shut down his existing station, the FCC said.

Along that line, the Commission asked for advice on determining the transition period's duration. "We cannot predict how quickly wideband receivers will become widely available. Nor can we forecast audience listening patterns or potential advertising revenues for stations operating in expanded band," the FCC said. "Should (the transition period) be linked to the penetration of fullband receivers locally, regionally or nationally?"

The Commission also sought comment on the proposal to permit unlimited program duplication between the existing and expanded band.

Also discussed was an amendment of FCC allocation of Travelers Information Stations (TIS), which currently are assigned to 530 MHz and 1610 MHz. In its docket 84-467, the FCC proposed moving those stations at 1610 to 1700 because of potential problems with future Canadian and Mexican stations operating on 1610 and domestic stations on the upper adjacent channels.

With the July text, the FCC suggested that those TIS could be allocated to any of the 10 channels in the expanded band.

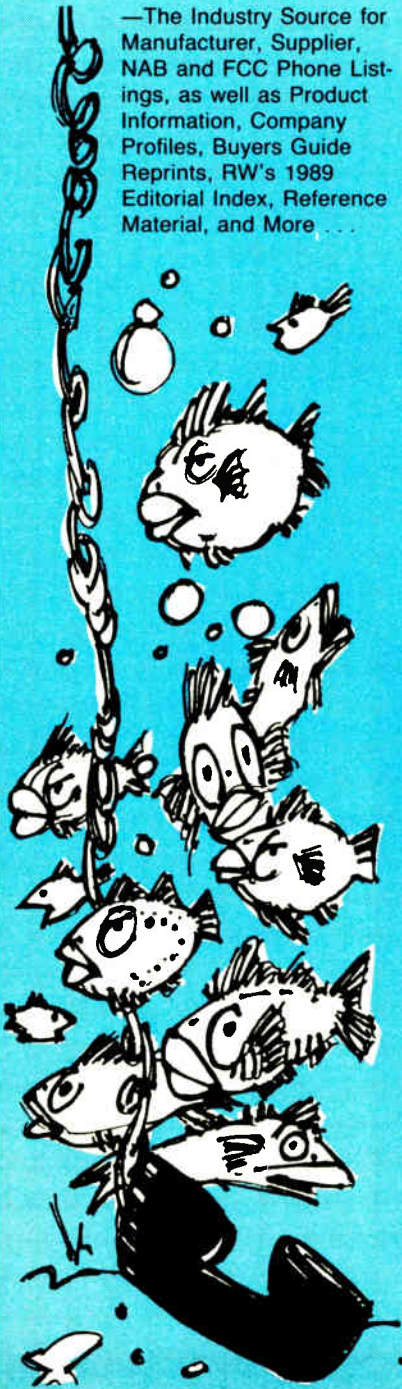
For information, contact the FCC's Mass Media Bureau at 202-632-6460.

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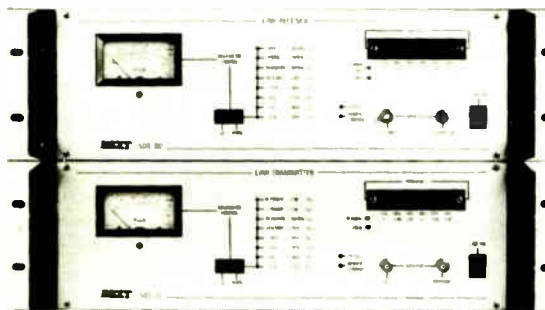
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# NRSC Deliberates Receiver Tests

by John Gatski

**Washington DC** Several changes have been made to NRSC proposed FM receiver tests that are supposed to assess whether processing degrades performance.

Although there was significant disagreement about the intent and methodology of the testing, some details were worked out at a 20 July meeting of the National Radio Systems Committee (NRSC) FM Composite Spectrum Studies Working Group.

The procedures were proposed last spring by Bob Orban of Orban Associates to assess the effect of aggressive audio processing on FM receivers. The differences of opinion over test methods surfaced during a May meeting.

The tests are supposed to subject receivers to various levels of processed signals and determine the best protection ratios.

Based on previous questions about

takes into account processing, he added.

In other matters relating to the FM processing effects test, Belar President Arno Meyer presented Digital Still Oscilloscope (DSO) readings of several unidentified stations to point out the accuracy of using such a scope.

Use of a DSO has been suggested to measure modulation during Orban's processing tests, according to Salek.

Meyer said the NRSC should use a higher speed DSO rather than the recommended 50 MHz scope.

He said his modulation measurements of the unidentified stations were used with a 400 MHz DSO and he maintained they were very accurate.

"You need the speed to give an adequate number of samples of all the frequencies," Meyer said.

## RF protection ratios

Working group members also briefly discussed a draft receiver RF protection paper submitted by Bonneville International Engineering VP Bill Loveless, who

was not at the meeting.

In his analysis of RF signal protection ratios, based on FCC rules, Loveless suggested that new Class A and C assignments "may be causing interference due to the wide variance of RF protection ratios built into the FCC allotment rules for different classes of stations."

Salek said the paper will be discussed in more detail at the working group's next meeting.

For information on the NRSC contact Stan Salek at 202-429-5391.

**The tests are supposed to subject receivers to various levels of processed signals and determine the best protection ratios.**

how many receivers to test, members have agreed to evaluate three receivers, according to NAB Staff Engineer Stan Salek, who coordinates the NRSC.

The receivers will include a high quality tuner such as the NAB's NRSC-specification tuner that will be built by Denon, a mid-quality receiver and an auto receiver.

Also, members tentatively agreed to allow the companies whose processors are selected for the test to define what is meant by "light, medium and heavy" processing levels, Salek said.

Further details involving the receiver tests are expected to be discussed during a 5 September telephone conference call between working group members, Salek added.

## European aspect

The effects of processing on FM signals also has interested European officials, based on discussion by the US's CCIR Study Group 10 and 11 Chairman John Reiser. Reiser also is the FCC's CCIR specialist.

Reiser, who was at the meeting as an observer, said European officials and broadcasters are interested in the NRSC processing effects study.

Currently, Europe's traditional method of measuring modulation does not "necessarily take into account processing," which has recently become a topic of much discussion there, Reiser noted.

The concern stems from a European broadcast trend toward increased processing, Reiser said.

## International standard

The NRSC's findings from its processing tests could be used to develop an international modulation measurement that



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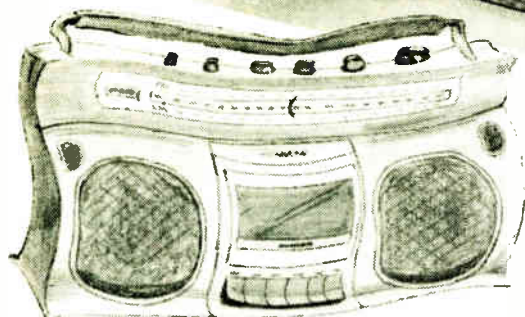
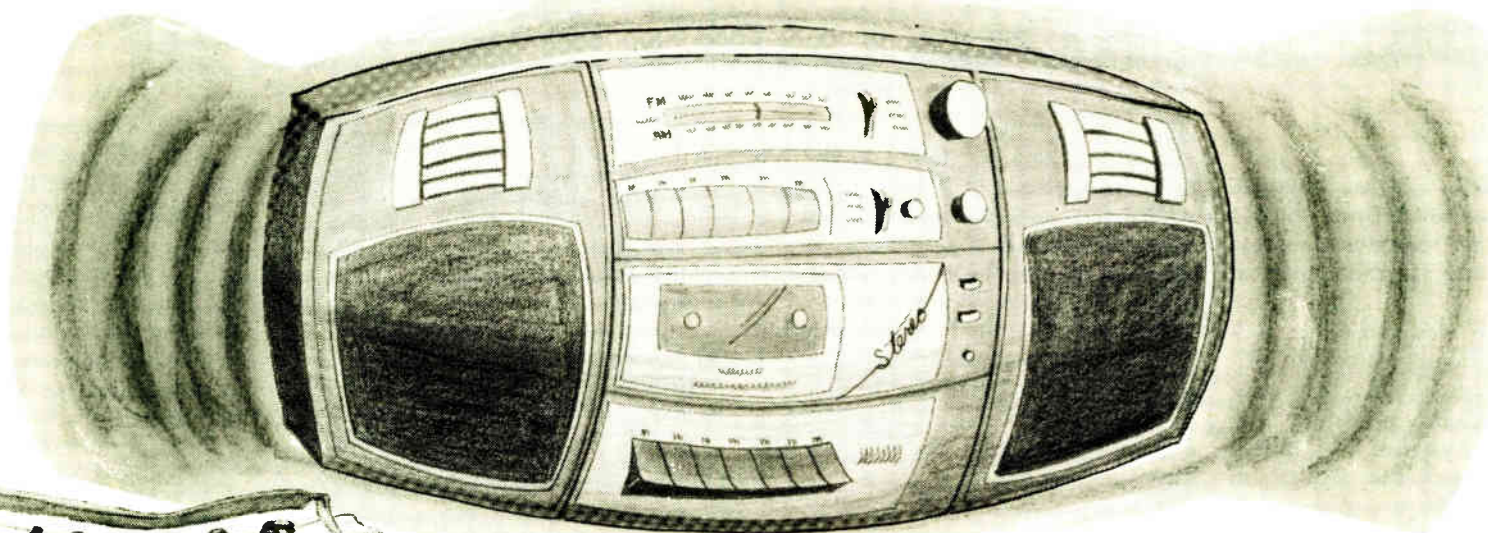
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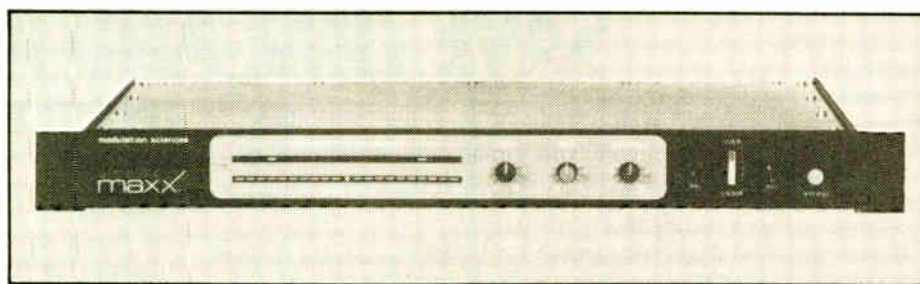


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# UCLA Closes Its Radio Archives

by Frank Beacham

**Los Angeles CA** The UCLA Film and Television Archives, one of the world's most prestigious media preservation facilities, has closed its radio archives due to lack of money and interest.

The archive will continue to store its massive radio collection but will accept no new material nor engage in any preservation efforts with existing programs, the university announced. More than 50,000 acetate disks and 10,000 tapes of radio programming from 1933 to 1983 are affected.

The collection includes a wide range of radio programming including 1940s productions of *Hallmark Playhouse* programs featuring Ronald Reagan, Deborah Kerr and Ann Blyth and Edward R. Murrow's reports of the Korean War and the Germans bombing England.

The collection also includes shows by Jack Benny, Orson Welles, *Fibber McGee and Molly*, *This Is Your FBI*, and hundreds of variety shows.

"Frankly, and maybe this isn't right, but the reality is that film and television studies at the university, and other disciplines, like history and sociology, which use mass media in teaching, are more interested in film and television, not radio," said Geoff Stier, assistant to the director of the archive.

Stier said, however, the university continues to support a radio preservation effort and hopes in the future, with proper funding, to re-open the radio archive.

However, Ron Staley, who has developed the radio archive over the past 13 years, told the *Los Angeles Times* he doubts the archive will ever be resurrected. "I've always felt that radio has been given short shrift, and this proves it. My one concern is what is going to happen to these materials." Staley, who began a vacation when the announcement was made, will no longer be associated with the archive, a university

official said.

"I don't want to use a four letter word, but I think this is deplorable," said John Gassman of LA's SPERDVAC (Society to Preserve & Encourage Radio Drama, Variety & Comedy). "I understand money is the thing, but I think to just let that collection sit is totally inexcusable. Radio as a medium is just as important as film and television. It has to be preserved or otherwise it won't be there."

Gassman, who has led a national effort to save radio programming, said UCLA's archives have great credibility and "a lot of people who want to donate

material automatically think of UCLA. Unfortunately, radio is excess baggage to them (UCLA). Nothing gets preserved. The material, when donated, sits there on the shelf and, after a time, deteriorates without being preserved on the new technology of today."

Frank Bresee, whose *Golden Days of Radio* is heard weekly by a world-wide audience of 200 million listeners on the Armed Forces Radio Service, lamented UCLA's action.

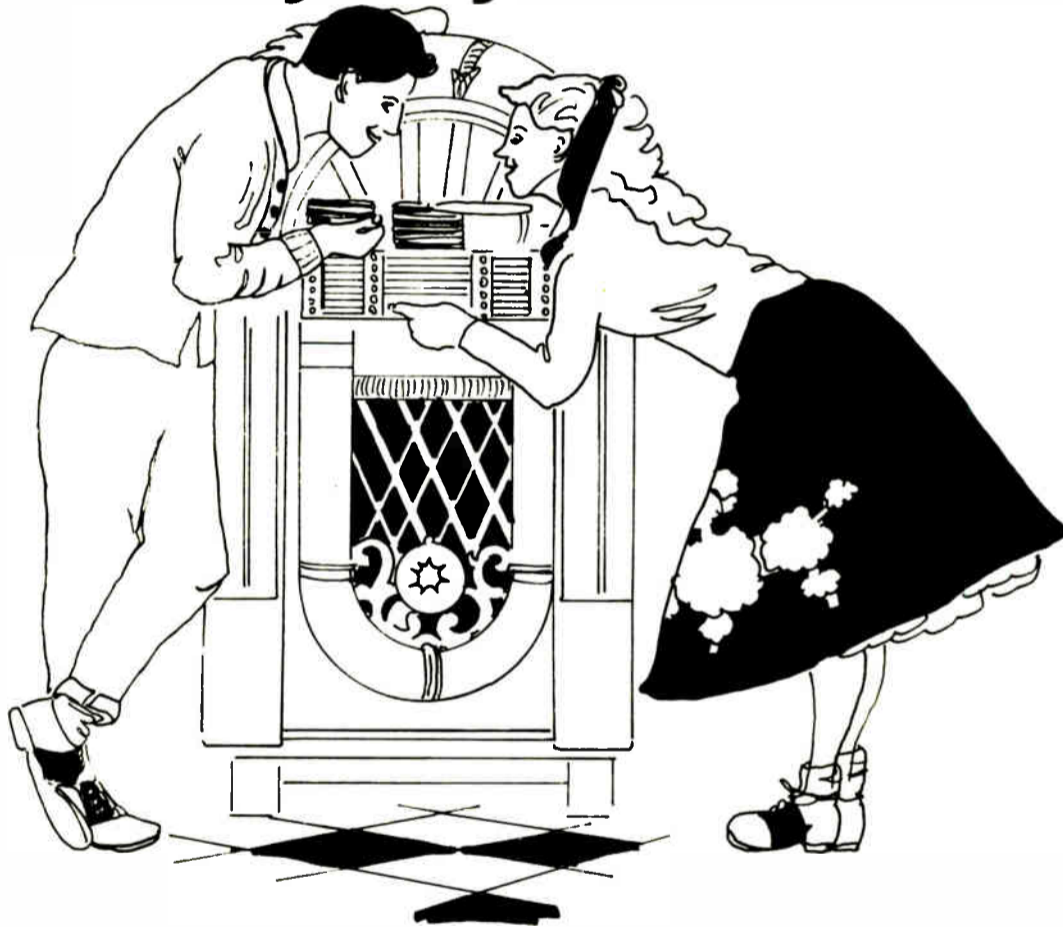
"Those radio shows are the history of our country during the last five or six decades," Bresee said. The veteran

radio host and program collector expressed doubt the archive would ever re-open.

"That stuff will sit gathering dust and two years from now the regime at UCLA will change and somebody will come along and say 'these old records are taking up space where we could put some television shows, let's dump them.' And they will. That's been the history of radio," Bresee said.

For information, contact the UCLA Film and Television Archives, 8013 N. Cahuenga Blvd., Hollywood, CA 90038. Telephone: 213-206-8013.

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# Boston Plays Host to Radio '90



by Charles Taylor

**Boston MA** The broadcasters are coming ... The broadcasters are coming ...

From 12 to 15 September, radio managers and engineers will descend on Boston for the annual NAB radio convention—Radio '90. The show's engineering conference begins 11 September.

Featured this year will be sessions on digital audio broadcasting (DAB), direc-

tional antennas, AM and FM improvement, the international market, learning one's way through the FCC hierarchy and more.

The Radio 1990 keynote speakers will be Paul Harvey, the nationally known radio commentator, on Saturday, 15 September; and prominent business tycoon Ross Perot, also on 15 September.

## Engineering conference

The engineering conference will feature special seminars and technical papers and reports, including a focus on the Radio Data System (RDS), on Tuesday, 11 September. (See related article this issue.)

The forum will explore the installation and use of the digital subcarrier technology, which allows FM stations to send text messages to radio listeners. It will cover the technical theory and operation of RDS, proposed changes to the European system for US use and the availability of transmission encoders and radio receivers.

A digital radio station workshop Wednesday, 12 September, will cover all new topic areas, with a major portion dedicated to radio's current hot spot, digital audio broadcasting (DAB). The seminar will review the technical aspects of generating and transmitting DAB, including the techniques used to fill coverage area gaps. Potential methods for US implementation also will be covered.

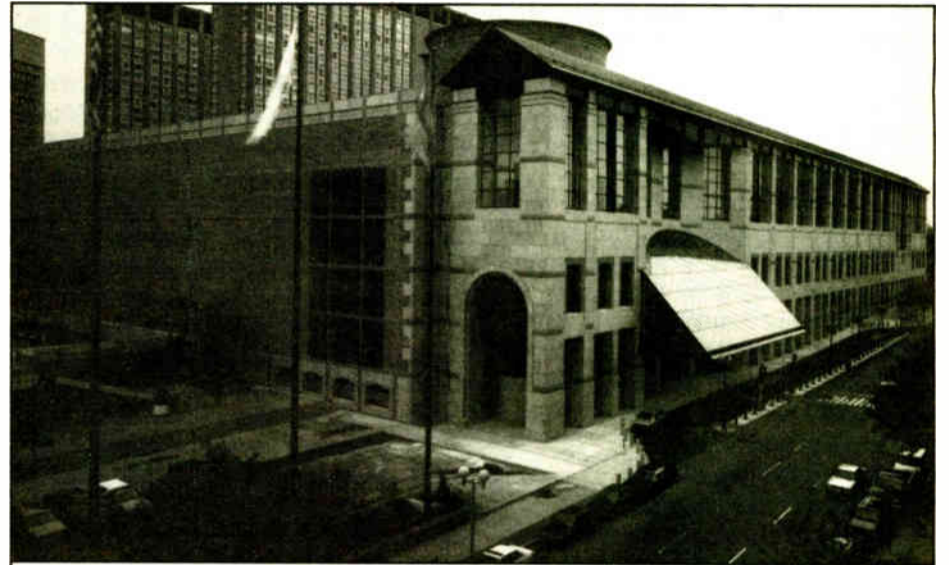
Also in the workshop, industry officials will discuss sampled-data theory, digital transmission and storage techniques, including DAT/CD technology. Included will be the third annual digital luncheon.

For engineers with a hankering toward the installation, maintenance and operation of AM directional antenna systems,

Owner and Management sessions will offer attendees a look at Washington's major players and issues; opportunities in international radio; and two roundtable forums on congressional policies.

The NAB task force on digital technology also will present a report at the show on its intentions for determining the technology's role in radio.

Ten stations among 45 nominated will receive the NAB's Crystal Awards for Excellence at a luncheon Thursday, 13 September. The awards were established in 1987 to recognize radio's efforts to im-



The John B. Hynes Veterans Memorial Convention Center will be alive with broadcasters this September.

NAB offers a seminar on such Thursday, 13 September and Friday, 14 September.

The course will be directed by Carl Smith of Smith Electronics, a recognized authority on the topic of AM directional antennas. Participants can discuss individual directional problems.

## A session for every fancy

Other sessions will include AM Engineering, Saturday, 15 September, with papers on two antenna studies—the low profile study and the NAB skywave suppression antenna system; FM Engineering; Progress of Radio Receiver Technology; Interference: Its Causes and Cures; AM Improvement and FCC Initiatives; and Radio Technical Measurements.

prove the quality of life in individual communities.

The Marconi Radio Awards also will be chosen among 115 nominees on Saturday, 15 September. The awards recognize the best of the radio industry's personalities, stations and formats of the year. The awards show will be hosted by radio personalities Larry King and Gary Owens.

Finally, a series of bus tours will show broadcasters the facilities of five local stations. Each tour will visit two stations, where participants will see the latest technological equipment in production and control rooms, and hear about the stations' operational strategies.

For information on Radio '90, contact the NAB at 1-800-342-2460.

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# Sessions Span Radio Spectrum

## This Year's Engineering Program Covers Topics Ranging from RDS to Progress in Radio Receivers

by Janet Elliott

**Boston MA** Radio '90 is the show for everyone in radio—and that includes engineers.

The 1990 engineering program, opening 11 September, will be new and exciting with information on ideas, technologies and methods to increase the technical knowledge and skill of radio engineers.

### Engineering seminars

New and noteworthy is the Radio Data System (RDS) Seminar which will take place on Tuesday, 11 September, 1-5 PM.

This new seminar will explore the installation and use of the Radio Data System (RDS). Now in use in Europe, the RDS creates a way for FM stations to

**A presentation on "RDS Alerting Capabilities" will be made by Gerald LeBow of Sage Alerting Systems, Stamford, CT.**

send textual information to radio listeners.

RDS works via the ability to control an electronic alphanumeric display on a special radio. The radio can display logo, format and alternate frequency data (among other functions). RDS can automatically keep track of translators and allows tuning by format.

The seminar will cover the technical

theory and operation of RDS, proposed changes to the European system for US use, and the availability of transmission encoders and radio receivers. A presentation on "RDS Alerting Capabilities" will be made by Gerald LeBow of Sage Alerting Systems, Stamford, CT.

Pierre Schwob of the PRS Corp. in New York will discuss "ID Logic—Ally or Alternative?" A panel discussion on standards questions facing broadcasters in the US will complete the seminar. David Reaves, WHTZ in New York, will chair the seminar.

The 22nd Directional Antenna Seminar will take place Thursday, 13 September, and Friday, 14 September.

Any engineer responsible for the proper installation, maintenance, and operation of an AM directional antenna system will find the NAB Directional Antenna Seminar valuable.

Topics presented will include: field strength measurements, adjustments and maintenance, using a Smith chart, instrumentation, ground systems, pattern shape, and broadbanding.

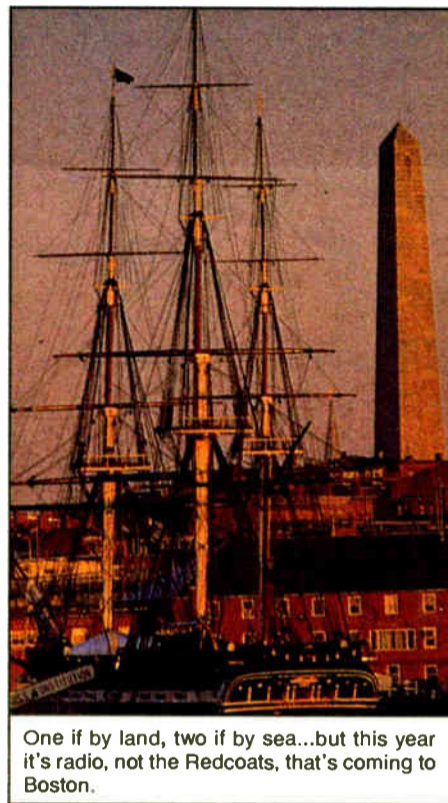
The seminar is programmed and moderated by Carl Smith of Smith Electronics Inc. Smith is a recognized authority in AM directional antennas and has written many books on this subject. He is known worldwide for his achievements in broadcast station antenna design.

Participants can also discuss their questions with the course instructors who include Alan Gearing, Jules Cohen & Associates, Washington, DC; Karl D. Lahm, Lahm, Suffa and Cavell, Fairfax, VA; Steve Kramer, Steve Kramer, P.E. Consulting Engineers, McKinney, TX; Ron Rackley, du Treil, Lundin and Rackley Consulting Engineers, Washington,

DC; and John Sadler, Federal Communications Commission, Washington, DC.

The Third Digital Seminar, on Wednesday, 12 September, will cover all new topics areas devoting a major portion of the program to Digital Audio Broadcasting (DAB).

Dr. Richard Cabot of Audio Precision, Inc. will begin by presenting a report on



One if by land, two if by sea...but this year it's radio, not the Redcoats, that's coming to Boston.

Digital Audio Interfacing Standards Progress.

Then Don Bird, from 360 Systems will talk about the features and design of his company's Digital Audio Cart Recorder. A company with a different kind of digital cart replacement technology, Computer Concepts Corp., will feature a presentation by Greg Dean on An All-Digital Commercial Insertion System.

After a break for lunch, an Introduc-

tion to Digital Audio Broadcasting will be presented by NAB staff engineer Stanley Salek.

Then William Spurlin from The Christian Science Monitor will discuss Real Time Audio Data Compression Technology. And Steven Edwards from Rogers Communications in Toronto will give a report about the DAB Test/Demonstrations in Canada, recently completed after a four-city run.

Continuing on the topic of DAB, Michael Rau, Senior VP of NAB Science & Technology will discuss US Allocations Challenges for DAB. And David Hicks, who chairs NAB's Radio Board will moderate a panel discussion called: "DAB: Friend or Foe?"

In addition to the latest information on digital technology, there will be plenty of other session of interest to engineers. An engineering management session will discuss Dealing with the Difficult Employee on Thursday, 13 September.

This workshop, led by Judith E.A. Perkinson of the Calumet Group in Hammond, IN, will explore how to understand and deal with the differences between people. It will show you how to develop a systematic approach to end the cycle of difficult behavior in others and ourselves.

### Receiver design

The Progress of Radio Receiver Technology on Friday, 14 September will examine the new features of AM/FM radio receivers which improve technical performance as well as working flexibility.

New National Radio Systems Committee (NRSC) guidelines for AM receiver designs and advances in FM receiver decoder technology that have improved performance will be presented. There will also be a report on a recent survey of key consumer industry principals on receiver design trends.

On Saturday, 15 September there will be a session on Interference: Its Causes and Cures. Broadcast engineers and utility company officials will look at broadcast interference and investigate sources, corrective actions and the role of the FCC.

Also on Saturday, Increasing AM Quality and the FCC Proposals will focus on the Commission's proposed rule changes to bring about AM technical improvement. Among the topics presented will be explanations of new coverage calculation methods and less complicated ways to simulcast an expanded band station with an existing station. Plus, the status of the related FCC Rule Making will be discussed.

Radio Technical Measurements on Saturday, 15 September will discuss how competition with other high fidelity media places a new focus on "getting the most" out of station technical performance.

Demonstrations of the ways in which stations can keep a high level of performance, using current, straightforward measurement methods are planned. Presentations will be made by David Harry of Potomac Instruments in Silver Spring, MD, and Kent McGuire and Ken Jones of Sound Technology in Campbell, CA.

FM Engineering on Friday, 14 September will feature a progress report from the NRSC-FM Subcommittee on multipath and composite transmission study activities and the status of FM directional antennas. Larry Eads of FCC will update engineers on recent FCC actions affect-

(continued on page 27)

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# Tracking Trends in Beantown

by Jeff Williams

**Boston MA** When one thinks of Los Angeles, warm weather, youth and a laid back attitude come to mind. With New York, there's the hustle of a big city and a place where only the brave survive.

Now think about Boston. You guess correctly if you think of education, politics, sports and people who seem to have a hard time saying, "Park the car in Harvard Yard."

A look at the radio market here also reveals a unique way of going about business. There is almost a parochial attitude to be accepted into the broadcasting community. In the programming sense there must be some care taken to become part of Boston and not acknowledge any other region.

The Boston radio market is the sixth-largest in the US, and contains more than 60 stations within its metropolitan area. These stations range from the big 50,000 W AM stations to the low power FM stations that bring out a new generation of broadcasters from the colleges.

## Most FM, but good AM

The majority of Boston stations are FM, but there are four viable AM stations that have become staples for their audiences. In fact, in the Spring Arbitrons two of those stations ranked in the top five.

One interesting aspect is that only one AM/FM combo duplicates its programming, a novel fact considering the current trend of many cost-conscious stations.

The four strongest AM stations are WRKO, WBZ, WHDH and WEEL, all of whom have been complying with the FCC's NRSC standard for some time. The smaller stations with less power, range or both, survive by using satellite service formats and, in some cases, if they are far enough away from the downtown area, use original programming to cover a limited region of the official market area.

An exception among the smaller AMs is 5000 W daytimer WILD, located in the downtown area, which serves listeners with the market's only urban contemporary format. The rest of Boston's AMs try to fill a niche by using formats that are usually not found on the local FM stations here: big band, country, Spanish or financial news.

## Many AM listeners

It seems to work well. According to Dan Griffin, GM at WHDH, "There are many AM listeners in this market. AM fills a particular need with weather, sports, news, school closings and just survival in Boston. The survival of AM will depend of personality, news, talk and sports."

When it comes to AM in this market, Griffin should know. In the past, he has worked at all four of the leading AMs. Griffin returned to the Boston market in 1983 from New York to become GM of WRKO. At the time, the station had just switched from its music format to talk.

WHDH switched from full-service to its current talk format two years ago, and still holds an audience that has listened for years. The station talks into the night and then moves on to satellite programming. It is not broadcasting AM stereo

and does not intend to install a system, Griffin said.

In an interesting development this past year, WHDH was approved to be bought by a local television station and has since moved into the TV station's building.

WRKO, with its talk format, currently leads the AM band because this station lives on controversy. With the current state of the New England economy and the commonwealth's budget problems, the station does very well. This is a station that changed from being one of the big rock and roll stations of the RKO/General dynasty to being the talk station of the 1980s and on into the

1990s.

On the technical front, WRKO has been in its studios since 1983 and currently has no plans to upgrade or move them.

## Unwarranted for talk

"AM stereo is not intended to be installed because the station uses the talk format," said acting CE Larry Bruce. "The transmitter is wired for stereo, but the interest in AM stereo is not there to warrant the use of the system."

WBZ, meanwhile, is New England—which is its motto. Being a full-service AC, it plays some music during the day

# MARKET UPDATE

and talk at night, with news interspersed. WBZ is an AM stereo station using the C-QUAM system. The station also does extensive remotes at different locations using a motorhome with an entire studio in it.

This is one of the Westinghouse 50,000 W stations that is well known for having a loyal audience and a coverage of 25 states at night. But recently, there has been a change in its programming direction, leaving some confused and wondering if local nighttime AM pro-

(continued on page 31)



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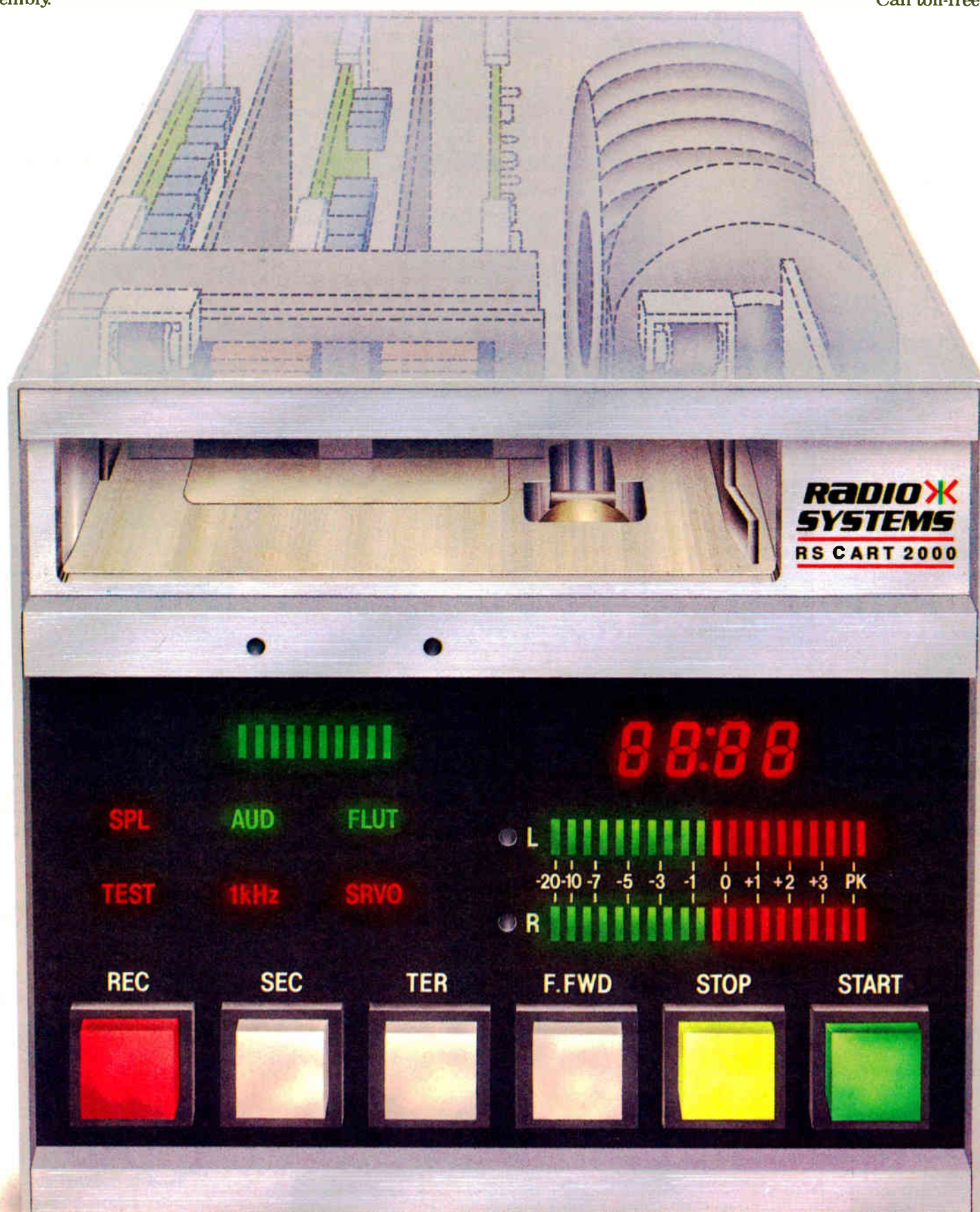
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# Radio '90 Sessions

(continued from page 24)  
ing FM broadcasters.

AM Engineering on Saturday, 15 September will include papers on NAB's two antenna studies. The low profile study is investigating possible methods that low power AM stations can use to concentrate a greater amount of coverage in their cities of license by using physically short and simple antennas. Al Resnick of Capital Cities/ABC, Inc. will present this report.

The NAB skywave suppression antenna system would allow stations to improve local nighttime coverage while reducing the skywave interference to distant co-channel stations. The system is now undergoing final tests at a site in suburban Maryland. Kelly Williams of NAB Science and Technology will discuss the results. Additionally, activities of the NRSC to improve the technical quality of AM will be reviewed.


Technical information on a variety of subjects will be available at the Science & Technology Booth, 1121, in the main exhibit hall. Get up-to-date information on recent FCC Rulemakings and Rules changes, handling interference complaints, digital audio interfacing and broadcasting, radio receiver technology, the Radio Data System, frequency coordination, plus many more.

National Radio Systems Committee handouts and the current meeting minutes are also available.

If you would like more information on Radio '90 engineering program, call NAB Science and Technology at 202-429-5346. For general information or to register, call 800-342-2460/Fax: 202-775-2146.

Janet Elliott is Director, NAB Science & Technology Operations.

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## Seminars:

Tuesday, 11 September	Radio Data System (RDS) Seminar	1-5 PM
Wednesday, 12 September	NAB Third Digital Radio Station Seminar, Hynes Convention Center	9 AM-5 PM
Thursday, 13 September	22nd Directional Antenna Seminar (Part I)	9 AM-5 PM
Friday, 14 September	22nd Directional Antenna Seminar (Part II)	9 AM-5 PM

## Engineering Panels:

Thursday, 13 September	Dealing with the Difficult Employee	3:30-4:40 PM
Friday, 14 September	The Progress of Radio Receiver Technology FM Engineering	2-3:10 PM 3:30-5:00 PM
Saturday, 15 September	AM Engineering Interference: Its Causes and Cures Increasing AM Quality and the FCC Proposals Radio Technical Measurements	9-10:30 AM 10:30-11:40 AM 1-2:10 PM 2:30-3:40 PM

Note: All times are subject to change. Please check with NAB for final schedule.

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Radio  
'90

## Product Preview

Radio  
'90**360 Systems Booth 1408, 1410**

Will feature its DigiCart digital audio cart machine. The DigiCart offers 16-bit linear digital sound using digital audio disks. The company also will show its AM-16 Series Audio Crosspoint switchers.

**A****AKG Acoustics Booth 400**

Will show the new Orban 4000A transmission limiter and Orban 290Rx enhancement processor. Other products to be shown include the Optimod-FM, Optimod-FM XT2 with six-band limiter and Optimod AM-stereo.

**Audio Broadcast Group Booth 245, 247**

Will show its "human engineered" studio system including the Audiotronics 200 Series console and other equipment. Other products to be shown include studio furniture and pre-wired options.

**Audiopak Booth 757**

Will show its redesigned A-2, AA-3 and AA-4 broadcast cartridges.

**Audio Technologies, Inc. (ATI) Booth 546, 548**

Will show its Vanguard Series eight and 12 mixer, on-air consoles with recently introduced modular front panel, said to be more user friendly.

**Audiotronics Booth 1128**

Introducing new product. Details at booth.

**B****Barrett & Assoc. Booth 506**

A wide variety of radio products will be shown.

**Bradley Broadcast Booth 649**

A wide variety of radio products will be shown.

**Broadcast Electronics Booth 1003**

Will show its line of cart machines, audio consoles, AM stereo generator and FM transmitters.

**Broadcast Technology Partners Booth 314**

Featuring FMX, a low-noise FM transmission system.

**Broadcasters General Store Booth 1412, 1414**

Will show Hit Design's Tailor Dynamic Equalizer and SMO-900 stereo modulation optimizer. Other highlighted products will include California Digital's DigiMod 2000, Sine Systems' News Director, KYFHO Labs' Master Spy and Harrison's AP-100 on-air console.

**Booth numbers are subject to change. Check NAB program for details.**

**Broadcast Supply West Booth 220**

Will feature the 360 Systems DigiCart and Audioarts A-50 audio console.

**Burk Technology Booth 1027, 1029**

Will show its ARC-16 remote control system and highlight other unattended transmitter control products.

**C****CCA Booth 1307**

AM, FM and shortwave transmitters.

**Central Tower Booth 819****Century 21 Programming Booth 914, 916, 918****Circuit Research Labs Booth 1227**

Will show the Audio Signature processor and MBL-100 news/talk AM processor.

**Computer Concepts Booth 1032**

Will show the Digital Commercial System (DCS) that features PC-based digital recording and instantaneous playback of commercials and jingles on hard disk.

**Comrex Booth 412**

Will show its line of telephone interface equipment including frequency extenders for cellular phones, hybrids, and couplers.

**Concept Productions Booth 144, 146, 148**

Will show its Computer Assisted Programming Systems (CAPS), including DAT decks, hard disk storage and full random access of all audio selections.

**D****Dataworld Booth 335**

Will show its full line of radio-related information databases and programs. Available are such studies as AM groundwave calculations and daytime and nighttime channel studies.

**Dielectric Communications Booth 231**

Will show ring-style FM antennas, coax transmission line and coax switch with operable remote control panel.

**E****Electronic Research Inc. Booth 750, 752, 754, 756**

Will highlight its cogwheel antenna system.

**Eventide Booth 654**

Will display the HS322 internal sampler board option for all H3000 Ultra-Harmonizers®. The gear stores two mono or stereo samples in RAM.

**F****Fidelipac Booth 356**

Will show the new CTR 90 series cart machines and AUDIOMAX cartridges.

**Flash Technology Booth 1210**

Highlighted will be medium intensity strobe obstruction lighting for towers.

(continued on page 30)



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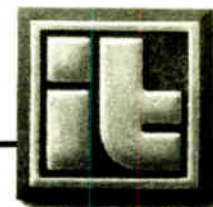
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Radio  
'90

## Product Preview

Radio  
'90

(continued from page 2B)

G

**Gentner Electronics Booth 300**

Products will include the VRC-2000 transmitter remote control system, Digital Hybrid II processing equipment, the Teleswitch that can access up to five telephone lines, and the PeopleLink personalized phone system.

H

**Harris/Allied Booth 350**

Highlighted will be the AIR Corp Pro Announcer speech processor that uses monolithic circuitry.

Also on display will be the Audisk automation system, along with Gentner's Tel-emix 2000 phone system with integrated DTMF touchpad and interfaces for recording equipment and delay systems.

Other products include AKG's DSE 7000 digital auto system for broadcast production, satellite downlink equipment, and digital analog, SCPC and sub-carrier equipment.

**Booth numbers are subject to change. Check NAB program for details.**

**Henry Engineering Booth 1232**

Will show the Fast Trac dubbing system and other studio products.

**Hnat Hindes Booth 1232**

Will show their complete product line, including the TRI-MAZE, MIC-MAZE and new CP 2013 Composite Processor.

I

**International Tapetronics Corp. Booth 320, 322**

Will highlight the Series 1 audio tape cartridge machine. The Series 1 includes a DC-servo capstan motor, new low-voltage solenoid, a solenoid/cam leveraging system that reduces overall heat rise, and hold-down/tape guidance system.

Also on display will be the 99B series and Delta Series cart machines and the ESL V eraser/splice locator. The Audio Switcher system will also be shown.

**Intraplex Booth 1216**

A new digital audio transmission with CD-quality using a high compression algorithm that permits 15 kHz stereo over a 256 Kb/s bandwidth or 7.5 kHz monaural over a 64 Kb/s bandwidth will be highlighted. It is retrofittable into all existing Intraplex T1 Multiplex equipment.

Other new products include low-cost digital audio transmission systems and networking modules for the addition of digital audio circuits to existing voice and data digital network.

K

**Kintronic Laboratories Booth 1034**

Products will include AM directional antenna phasing equipment, dummy load, open frame and vacuum contractors, AM multiplexing equipment, remote arc detector/sensor, transmitter power sensing unit, shortwave antenna model and info, and rigid transmission line.

L

**LDL Communications Booth 815 817**

Featured will be a full range of high-power FM antennas and combiner systems suitable for multichannel or single station use. Also computer-controlled monitoring of multichannel FM stations will be shown.

Other services will include LDL's turnkey capability for the supply and installation of master FM antenna and combiner system.

**LPB Booth 911**

The company's audio consoles and AM transmitters will be displayed in a working low power radio station. The Signature series audio console, available in 6, 8, 10 or 12 mixer models will be used to supply audio from a Denon DN-950FA CD cart player to a functioning LPB low power AM transmitter.

M

**Marti Electronics Booth 1218**

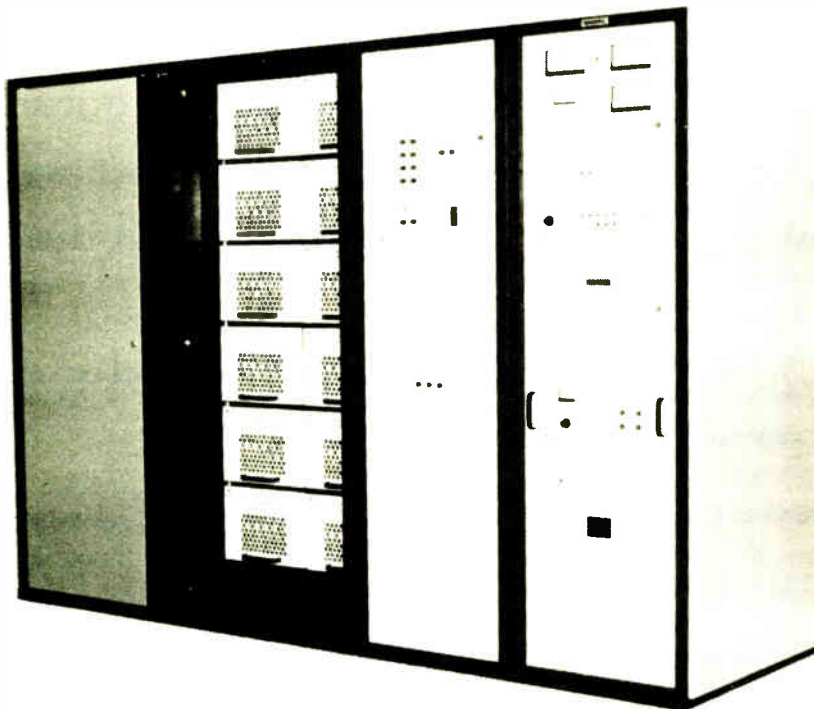
Will introduce the new RPT-30/6 6-channel portable remote broadcast transmitter. The equipment is designed to handle the crowded environment of large radio markets.



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# Product Preview

## Media Touch Booth 100

Will display the Touch Screen Broadcast Control System, OmniPLAY CD and DAT system, OmniPLAY Automation Engine and digital audio mass storage.

## Modulation Sciences Booth 1418

Will feature ModMinder Analyzer software, which works on IBM-compatible PCs. It expands the communications and control capabilities of the ModMinder remote package.

## Moseley Associates Booth 737, 739

Will feature the MRC 1620 remote control with optional Task Master 20, PC control smart options, smart options for MRC2 and a new family of program multiplex and SCA products.

## Motorola Booth 1103

Will demonstrate its AM stereo system.

## Murphy Studio Furniture Booth 0356, 1227

Will display its Elite and Premier studio furniture groupings.

## N

## National Supervisory Network Booth 1416

Will demonstrate the NewService NSN TrendSetter, a computer-assisted operations system that can enhance the productivity of operations personnel at manned stations.

## Nautel Booth 1227

Will show its line of solid-state AM transmitters.

## Northeast Broadcast Lab Booth 1227

Will feature a full working studio including furniture, audio console, cart machines, CD players, digital effects processors, broadcast telephone systems, DAT, portable and studio versions and patch bays.

## O

## Otari Booth 1221

## Q

## QEI Corp. Booth 746, 748

Will introduce the second-generation Digital Stereo Generator and the CAT-LINK Model 400 digital STL.

## R

## Radio Systems Booth 112

Will offer the new RS Cart 2000, which provides constant phase correction, splice finder, timer three cue tones, flutter correction, front-panel azimuth adjustment, direct drive DC servo motor, roller cleaning mode and more. Also shown will be RS Series consoles and RS DAT.

## S

## Shively Labs Booth 1016-1018

Will feature directional pattern studies for FM broadcasting. Also to feature its complete line of FM broadcast antennas, transmission line and multistation combiners.

## Studer ReVox Booth 551, 553, 555, 557

Will feature the A729 professional CD system controller, designed for fast, creative programming and production, both on-air and in post production. Also, the Studer Dyaxis hard-disk production system, C270 Series recorders and A807-4 TC recorders.

## T

## Tennaplex Systems Booth 1400

Will debut the latest version of its music and commercial control system, the BGMI Pristine MMCS. The PC-based systems play music or messages from CD, DAT, computer hard disk or any relay-triggered source.

## TFT Booth 530

Will introduce the Model 8900 reciter, a single-rack mount chassis combining an STL receiver and an FM exciter with IF interface.

## Titus Technological Labs Booth 1232

Will show and demonstrate its complete line of products, including the MLW-1.

## V

## Valentino Music Booth 1126

## Varian/Continental Booth 910

Will display the solid-state 500/1000 W FM transmitter and the new 11,000 W FM transmitter. Also: studio, monitoring and other related RF equipment.

## W

## Wheatstone Booth 913

Will display their complete line of broadcast consoles, including the new Audioarts A-50. Studio furniture will also be shown.

# Boston Broadcasting

(continued from page 25)  
ming is going to last in Boston. The station has fired its local talk show host and has opted for satellite programming instead.

## Media Touch customers

WBZ uses the Media Touch system, which allows commands through a computer screen.

Likewise, all-news and information WEEI began utilizing the Media Touch touch screen a few years ago to turn its studios into a combo operation.

"It is integrated with the news and traffic operations that go on around here," said WEEI CE Larry Vidoli. "This is very helpful for the traffic department because they don't have to look at the messy handwriting of some of the talent and they're able to pull up all of the information of a particular spot in their computers, which includes the last time the spot was played in the day."

John Connell, WEEI's CE at the time, designed the system and started to implement it. Since then, he has left the station to market and build the system on his own by founding Media Touch Systems.

Last year, the station also changed locations to allow more space and the ability to upgrade the system.

Stereo, meanwhile, is "on hold" for WEEI, Vidoli said.

## On the FM side

The FMs in Boston have an advantage over those in many US markets because the topography is fairly flat, thus multipath is not a problem. Most station transmitter sites are located in Needham, a Boston suburb, or on top of the Prudential building downtown.

The current hot topic here is the issue of non-ionizing radiation. So far, WROR, WBOS and WBUR have switched to a new master antenna at their Needham transmitter site. Plans are in works to move transmitters off the Prudential

building and move them elsewhere or to build a master antenna on the building.

The issue of modulation wars has been sparked in some major markets, but in Boston the war is not well known.

"What right do we have as broadcasters to take an artist's music and remix it with our processing?" asked Mike Cooley, CE at album classics-formatted WBOS. "Luckily, our format requires us to have a dynamic and separated sound" because of its appeal to what he said is an upscale male audience.

"When I arrived here (when the station was country), there was some composite clipping, but that was soon removed," Cooley added.

At CHR WZOU—currently the number one station in the market—CE Chris Hall says that for some time, the station has been backing off its processing. In the next few months, he said, its overall sound will change.

"I intend to buy a new transmitter and concentrate on the site until I am satisfied with the sound of the station," he said. That formula also includes a consciousness of composite clipping, which he claims is less and less of a negative factor in the market: "I do have a composite clipper—as a peak limiting device, not as an active processor."

But WROR, which has a Hot AC format, does use aggressive processing. "The processing adds a spark of excitement to the station and with state-of-the-art equipment, we can be louder now than in the past," said Harry Nelson, PD.

On the subject of loudness, WBOS's Cooley said, "Loudness is subjective. I think that loud is when there are dynamics and separation exists. Some people think the opposite. Because of the different sound that each station produces in this market, you can see that it is a subjective topic."

■ ■ ■

Jeff Williams is a producer for WRKO-AM in Boston.

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# The M&E CD Library System

by Ty Ford

**Baltimore MD** Whether you're working with a production music library at a radio station or at a commercial production facility, at some point the number of CDs becomes so large that it becomes impossible to remain in touch with all of the cuts.

The more additions to your library, the farther out of touch you get. Even if you use the library a lot, and even if you commit yourself to riffling through the library a half hour each day (this is what the skip feature on CD players was really designed for), you will lose contact.

## PRODUCER'S FILE

I started losing contact when my collection of CD production music libraries exceeded five feet in length. It occurred to me that a good database program with a flexible search capability would make life in the studio a lot easier.

After calling a few of my contacts at the libraries, the consensus was that although it might be a good idea, there were not enough computers in production facilities to warrant the software development ... yet.

### That was then, this is now

A year and a half later, there are at least three software packages: The M&E Library System from Gefen Systems, ScoreMaster from Computer Music Consortium, Inc. and Professional Librarian from Leonardo Software. Some individual music and sound effects companies also have their own librarian software.

This month's *Producer's File* takes a look at The M&E Library System. The Mac version of the software requires

a Plus, SE or Mac II with at least a 20MB hard drive. The entire collection of all the libraries actually takes no more than 10MB. Your Mac should be running Finder version 6.0 or higher, System version 6.0, 128K ROM and 1MB RAM. According to the manual the program runs with Apple Talk, Apple Share and Multifinder.

If you're running "Big Blue," you'll need an IBM PC, PCXT, PCAT or 100% IBM compatible system with DOS 3.1 or higher, a floppy drive and a 20MD hard drive.

I ran into problems after installing a demo version of 3.0. There were times when screen messages would pop up announcing that I couldn't do what I was trying to do because of some problem with the system.

A call to Hagai Gefen resulted in an explanation that, even though my Mac SE

## Gefen gets high marks for going to the extra effort of making the text as consistent as possible.

was running with 1MB of RAM, the various INITs I had installed had reduced the RAM to the degree that the application would not run properly. Sensing a good business expense opportunity, I chose to upgrade from 1MB to 4MB RAM (\$260), activated Multifinder and reinstalled the program.

New problems arose. The search-by-word function would only find the first word of each description, and some of the lists contained unreadable junk. Another call to Gefen and I was informed that while the 3.0 version of the application would run with Multifinder, it was

better to install the parts of the file individually rather than use the Install macro. Version 3.1 apparently addresses this problem, although I have not had the opportunity to work with it.

After copying the files to the folder (no big deal), I fired up the system again. This time everything in the demo seemed to work just fine.

### A gold star

Gefen gets high marks for going to the extra effort of making the text as consistent as possible. Rather than using the descriptive texts from each different library, one person at M&E actually listens to each piece of music and then adds the description to the database using his own words.

The menus are simple. "File" includes the basic open, close, save, page setup and print commands. The "Edit" menu gives you basic undo, cut copy, paste, clear and show clipboard commands.

They let you select different pieces of music and compile them in a separate file, which allows you to compile a list. Later these same edit features can be used to create a final list of cuts used for billing purposes.

Another new feature on the 3.1 update is the ability to tag selections in the file and put it into a client file. That way, when you are doing a search and come up on a tagged listing, you can check to see who used it last and when. It's also a great feature for tagging those cuts that really stand out when you're previewing newly arrived CDs.

An update expected in August of this year will generate a use report form. No more hunting for blank forms and wasting time doing the cleanup paperwork for production jobs.

The Mac version of the M&E library system is easy to run. The simple menus and screen are typically Mac-intuitive. The default setting automatically selects all libraries in the database. You can then

search by individual library, word, category, synonym or catalog number.

As you make a selection from any list, that piece is highlighted and you are shown its complete description. You are also shown its library name, catalog number, CD number, the duration of the cut and any track or index information.

### Various searches

To do a word search, type in a word or words and click on the word search button. All selections with that (or those) word(s) in their descriptions will be listed. The degree of exactness of your search word determines what you get. Typing in "CO" for example gave me listings for "contemporary," "country" and "comedy."

The M&E library comes with a selection of word categories like Action/News, Americana, Comedy, Dramatic, Jazz, etc. Clicking on each category opens up a list of subcategories that you can also click on.

Once you have selected a category and a subcategory, a click on the "select" button of that screen automatically does a word search using both terms. This results in a list of those pieces of music which fit the description.

In addition to categories and subcategories, the M&E library also searches by synonym. A separate collection of root words, each with its own sub group of synonyms are available by pulling down the "windows" menu and selecting "synonym ...".

It's important to note that you have to choose from the root words in the synonym file to do this search. Entering just any descriptive word for a synonym search doesn't work.

When you select a word from the root list, the synonym list appears next to it. The synonym list gives you a list of words that may help you define your selection better. Also, you can add or delete root words and synonym words to customize that part of your database.

If you go back to the main screen, enter the root word "easy" and hit the synonym button, for example, a list of music is generated that doesn't have the word "easy" in the descriptive text. Instead you get selections with the words "light" and "pleasant," which are synonymous with "easy."

### Catalog search

If you know the selection you're looking for is on a certain CD, you can enter the catalog number of the disk or tape in question and get a complete listing of all the cuts.

The software is a lot easier to fathom than the price list, due to the amazing number of options available. For example, \$250 gets you librarian software for the Promusic Libraries. The full-blown version, containing all of the libraries and extensive editing capability, costs \$825 for the IBM version and \$995 for the Mac version.

Quarterly library updates continue to track new releases. Gefen also markets complete systems including software, Sony CDK-006 CD juke boxes, networks, synchronizer software and more. For more information call Gefen Systems at 1-800-545-6900.

Ty Ford is an independent audio consultant and regular contributor to RW. Currently, he is writing an advanced production book for Focal Press. Reach him by phone at 301-889-6201 or by MCI mail #347-6635.

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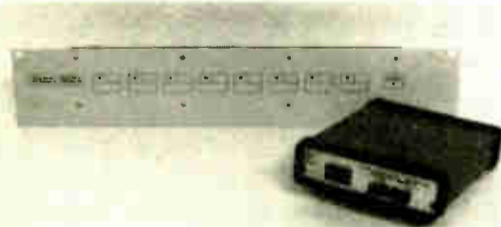
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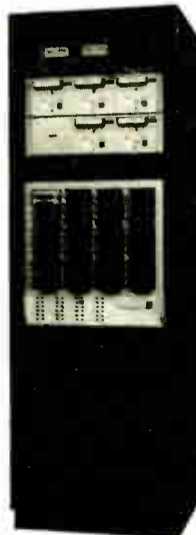
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# Computer Aids for STLs & RPU's

by Barry Mishkind

**Tucson AZ** When planning an STL path or an RPU shot, the engineer often has visions of the hours of work required.

However, as the use of computers proliferates in radio stations, it becomes easy to install and use one or more of the available programs to do the preliminary work.

## KEYBOARD CONNECTION

Two software vendors that provide programs of this sort are EDX Engineering and SoftWright. Both are headed by registered professional engineers with years of experience in filing FCC applications.

This makes the output of the programs suitable for use in some less complex filings, although others may require assistance from your regular consulting engineer.

### What you can do

The Terrain Analysis Package (TAP™) from SoftWright comes in modules that you can purchase as needed. The data can either be plotted on screen, or written to an ASCII file for your uses or a data file for 3-D plotting.

By allowing you to assign job names to each site, you can set up several sites of interest for either transmitting or receiving. Then each site can be calculated to other coordinates, or to a specified distance and azimuth.

Data can be stored on the hard disk for areas you normally use, or the program will prompt you for any additional data diskettes you need.

Depending on your needs or desire for accuracy, either 3 second or 30 second data can be ordered. Both sizes of floppies are supported, as well as CD ROM.

Output can be routed to the screen or a hardcopy device. If you don't have a plotter, the program will send the output to your dot matrix printer.

You can make changes along the way and specify flat earth or 4/3 curvature, for example. TERRN™ and RPATH™ from EDX Engineering do much the same jobs, although they come as separate programs instead of menu choices as SoftWright provides. Of course, a batch file could be set up to automatically move you from one program to the other.

RPATH is designed to drive a plotter and not a dot matrix printer, so that may be a consideration. On the other hand, there are translation utilities that can make the output go to any printer.

### Adding more features

Both SoftWright and EDX provide more options for using the data. As add-in modules, SoftWright provides a series of programs for directional and field and contour calculations for AM/FM/two-way applications.

EDX doesn't provide an overall menu shell, but a wide variety of programs can be added to utilize the data generated from TERRN. They range from SHDMAP™, a program that will develop plots of RF shadow areas, to ground conductivity calculators, to

FM/TV channel study programs.

Which is the better program package? It depends on your needs and preferences for display and data export, as well as the size of the area where the program is used.

SoftWright and EDX have different procedures to enter and manipulate the data. EDX takes greater advantage of a color monitor. SoftWright seems more flexible for output. Also, they have different pricing policies on the data. (Of course, you can enter the data manually, but that defeats the whole purpose of a database, except in an emergency.)

So, you may want to see a demonstration of the program functions of interest to you before deciding which is best for you. Both of them export the data to a wonderful program call SURFER™ from Golden Software, that produces maps in 3-D and color.

Adding SURFER to either package will give you the ability to develop topographic and coverage maps. A demo disk is available for this program, too. Costs can be surprisingly modest, starting at \$395 plus data file blocks of topographic data.

### Software update

As many readers will know, especially if you read *any* computing magazines, Microsoft has recently released Windows, version 3.0, with a lot of publicity. I've been anxiously waiting for Win-

dows 3.0 to see if it lived up to its promise. It really does get tiring for a PC user to hear all the time how wonderful the Macintosh is, and how easy it is to use.

Well, Windows 3.0 really shows off the graphics capabilities of the PC. The icons and push buttons (when the mouse clicks on them they "depress") really

## Windows 3.0 really shows off the graphics capabilities of the PC.

look sharp. Yet, pretty looks are not enough to sell the program—the way Windows lets you fully utilize those 286 and 386 machines is the clincher.

The 640K barrier is now officially gone! Windows lets you take full advantage of all the RAM you have. And that means speed. Beyond that, it can use the hard disk as extra memory.

Of course, a key feature is the ability to easily transfer information or pictures between applications. Windows ties word processors, spreadsheets and databases together with graphics programs in a way that makes your computer time much more efficient.

Copying files is as easy as dragging

your mouse across the screen. While the file manager lacks a few frills that some shells provide, it works well in visually depicting what you are doing.

Installation is much easier than previous versions. It even searches out your existing applications so you get up and running quickly.

With over 500,000 copies out, many manufacturers are jumping on the Windows 3.0 bandwagon to bring many popular programs into the Windows environment. Naturally, Microsoft is a leader here, with Word for Windows and Excel available now for Windows 3.0, and more products appear every day with "Windows 3.0 Compatible" on the box.

The built-in programs are even worth attention, including two word processors, a graphics program, calendar, calculator, a basic telecommunications program, even a cardfile with ability to autodial the phone numbers on it.

For more information on the products mentioned above, contact Harry Anderson at EDX at 503-345-0019, Larry Ellis of SoftWright at 303-329-6388 or Golden Software is at 800-333-1021.

■ ■ ■

Barry Mishkind is a consultant and contract engineer in Tucson. He can be reached at 602-296-3797, or on FidoNet 1:300/11.

In the 12 September issue of RW, Ed Montgomery will begin a 12-part course on Amplifier Fundamentals.

Amplifier Fundamentals is an overview of how amplifiers function. It will review audio and RF amplifiers, small-signal and power amps and cover terminology, decibels and circuit analysis.

The cost of registering for the course is \$35 and all who register will be mailed an exam at its completion. The course is good for 1.2 CEUs of credit and can also count toward SBE certifications. To register use coupon below.

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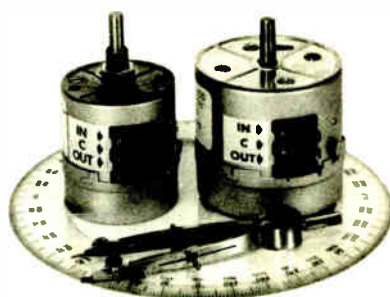
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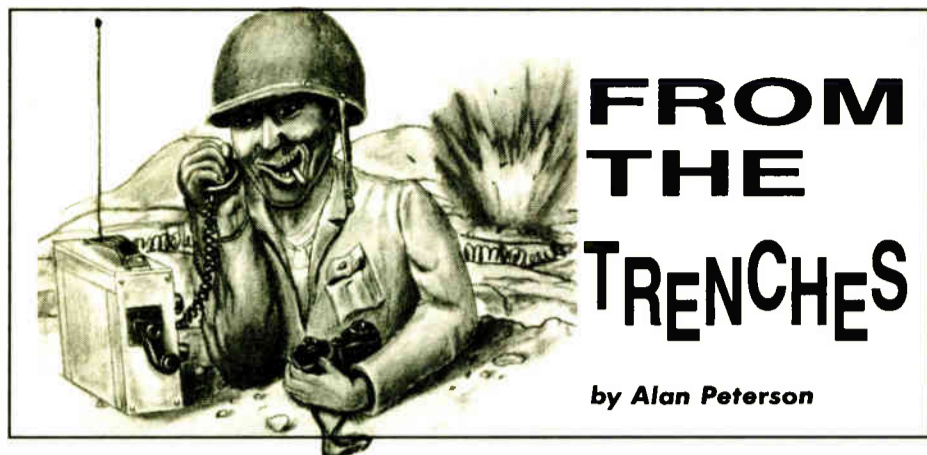
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by Alan Peterson

## How'd He Do That?

Dear JG,

When I wrote you back in February (*Tricks of the Trade*, 2 February issue), I didn't anticipate the run of calls and notes written to me by other broadcasters asking about other "helpful household hints," as it were.

Because more things can go wrong in a radio station than in any house ever encountered by Heloise, the answers aren't as cut-and-dried as one would like. I mean, there's not much call for "how-to-get-Kool Aid™-stains out-of-the-carpet." Rather, it's "how-to-drain-the-spilled-alcohol-bottle-out-of-the-Otari-4-track."

Be that as it may, I'd like to take a couple of lines to share some more advice. Apologies to those to whom these tips are groaningly obvious; this will be the kind of page you tear out and show the

jocks. All are based on phone calls, notes and actual visits and none can be considered *the* definitive answer; as I've said above, lotsa things can go wrong. Sooo . . .

*Why do my splices go "thump?"*

Betcha you've magnetized your blade. Betcha you casually toss it down between cuts. Everytime you do that you're giving the magnetic particles in the blade a Wile E. Coyote drop-off-a-cliff. Do this enough times and they'll align themselves with the earth's polar magnetic pattern. Pass the blade (don't scrape it) across a playback head; if the meter deflects, you've got a thumper. A shot over the bulk eraser should do it.

*What do you do with that oatmeal box you wrote about?*

Mic tricks! For the price of breakfast you've bought a fixed-frequency micro-

phone bandpass filter for commercial effects (imagine what the price of oatmeal would be like if they printed that on the box).

Other fun things to have around: a metal trash pail, five feet of raingutter down-pipe, ten feet of pool filter hose and a Tupperware™ cold-cut box. Don't laugh 'til you've talked into 'em.

*Why do a lot of produced spots sound like they've been half-bulked?*

Take your "in" basket off your computer. A moment's thought will make this obvious.

*Why keep one old mechanical typewriter at your station? You've got a dozen electrics and word processing—get rid of it!*

Sorry, but next time the power fails and the emergency juice doesn't fire right away, my partner in the newsroom is going to need something. What do you have planned at your station for an outage? Do your phones stay on? Copier work? HVAC?

### What do you do with that oatmeal box you wrote about?

If your plant is heavily dependent on the utilities for nearly everything, keep a cheapie \$12 phone with clip leads handy, a package of carbon paper and a few fans nearby. Do you have a power-out plan?

*Can I use the laser in my CD machine to reheat a buttered bagel?*

Only during a ratings period and only if you work crosstown from me.

*My boss buys the worst equipment. Look at this reel machine—it can't even record.*

Don't blame your boss: All your tapes are twisted. With some of today's back-coated and lubricated tapes, the old "shiny side outside" rule seems to apply only to apples now.

Suspect a problem? Don't be too quick to leap on the boss—put a one-eighty in your tape and see what happens.

*Why does my satellite signal sound like I've got half a foot of snow in the dish?*

Before you strip the PC boards to look for nothing, run outside and look to see if any bees, hornets or wasps have moved into town and opened up the Feed Horn Condominium complex.

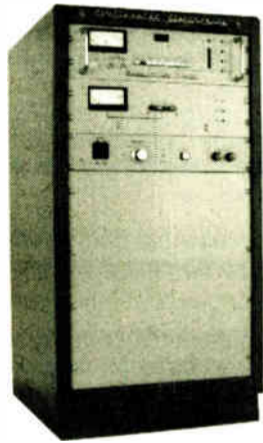
Trying to pass a couple of squinky volts of microwave energy through a fistful of bugs is comparable to riding through a revolving door on a tandem bicycle—can't be done. Talk to your satellite company and then to an exterminator.

I'll be meeting everybody at the Boston show (Radio '90), so I'm hoping to hear about more tricks and tips from those attending. Stop me if you see me, Jude, and ask me why Frankenstein doesn't have any children . . . answer on request.

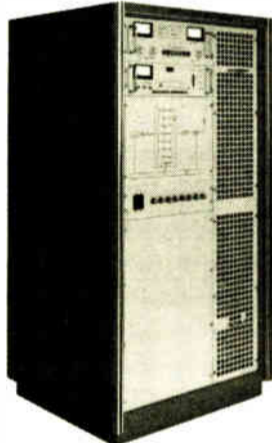
Up to my kneez in beez,  
—Al

Al's favorite answer to "How do I get into radio?" is, "Just pry off the back." Write to him c/o Radio World.

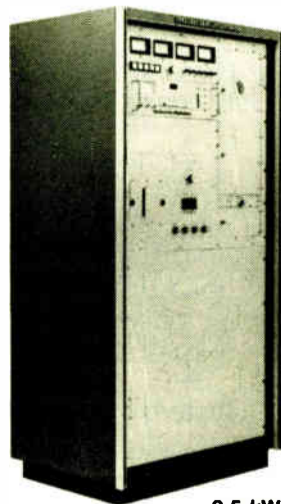
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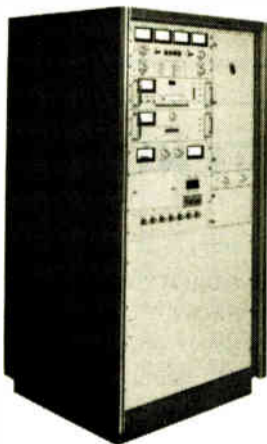


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# A Basic Primer for Noise Generators

by Thomas Vernon

**Harrisburg PA** Whether you're designing circuits or tweaking amplifiers for ultimate performance, noise and distortion are usually viewed as the darker side of electronics. With diligence they can be reduced, but never quite eliminated.

But noise doesn't always have to be bad! This month we'll look at noise generators, including three that you can build yourself. Then we'll discuss how to put that noise to good use.

## What is noise?

Noise is usually defined as any unwanted signal appearing at an amplifier's output terminals. It is a randomly occur-

ing signal characterized by its frequency spectrum, amplitude distribution, and mechanism responsible for its origin. In most electronic circuits, its origins are thermal.

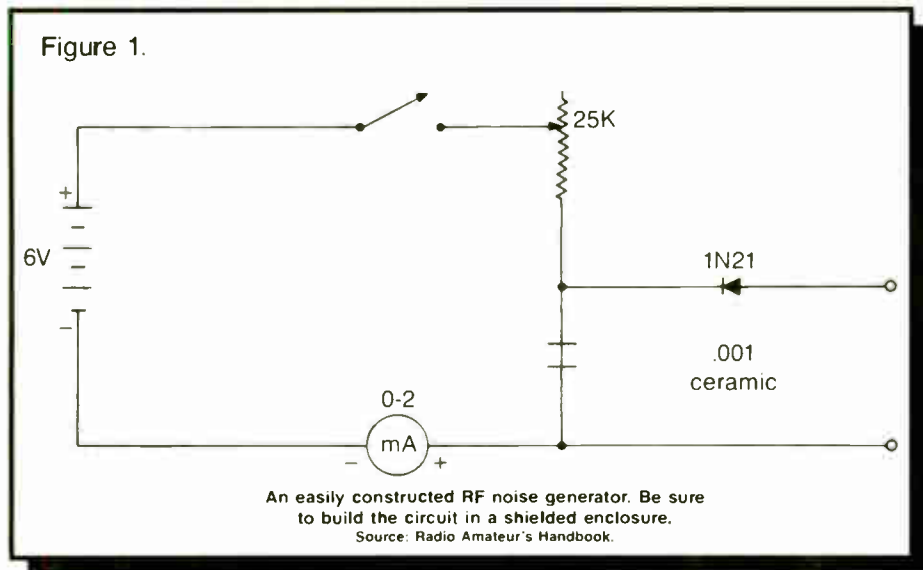
at higher frequencies. Later solid state devices usually employed a special noise generating diode or resistor as the noise source. This was

## STATION SKETCHES

followed by amplification and filtering to get the desired response curve.

### Digital noise

Some of the more exciting new designs produce digitally synthesized analog noise using pseudo-random-bit sequences. Since this noise is generated by shift registers, the



ing signal characterized by its frequency spectrum, amplitude distribution, and mechanism responsible for its origin. In most electronic circuits, its origins are thermal.

The most prevalent form of noise is 1/f, or Johnson noise. It manifests itself as base current noise in transistors and cathode current noise in tubes.

Research in general systems theory has shown that 1/f noise occurs naturally in many surprising places. The yearly flow of the Nile over the last 2000 years, the speed of ocean currents, the flow of traffic on expressways, and the flow of sand through an hourglass all plot out to a 1/f spectrum!

The earliest noise generator circuits date back to the '40s, and of course, used vacuum tubes. Sometimes magnets were placed around the noise generating tube to reduce oscillations and increase noise

bit pattern repeats, but any portion of it looks like random 1s and 0s.

Digitally generated noise has some definite advantages over its analog counterpart. The main advantages are predictability and ease of maintenance. Bandwidth is easily controlled by adjusting the clock frequency. When this white noise is filtered digitally, the output waveform is independent of the clock frequency.

Older analog circuits usually employed specially selected components to generate noise. Finding replacements and verifying generator specifications can be a problem if the product is obsolete or the manufacturer has gone out of business.

Also, the low amplitude of noise generated requires so much amplification that these devices are susceptible to RF interference and can pick up stray

(continued on page 38)

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# Putting Noise to Good Uses

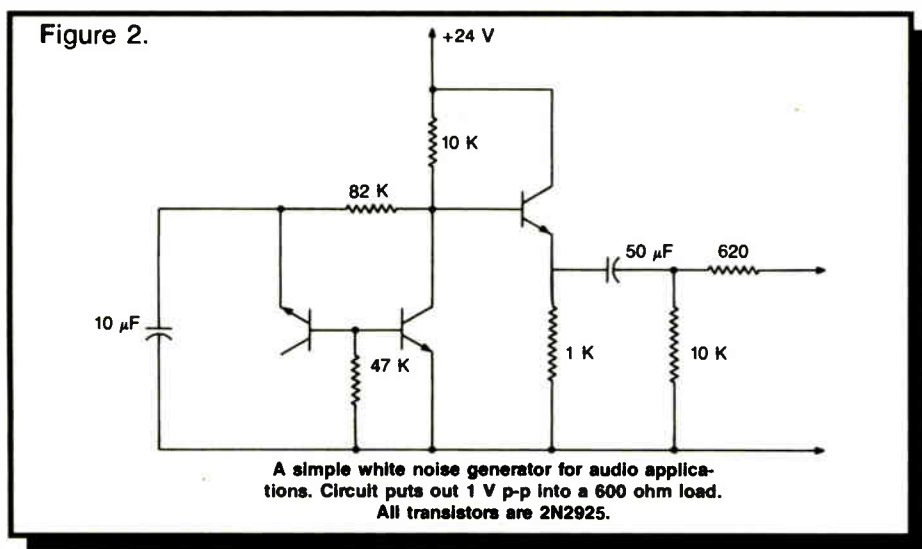
(continued from page 37)

signals. Digital generators don't have these problems.

If you want to ride the crest of new technology, build your own digital noise source. Affordable custom ICs are now available. Add a few discrete components and you're in business. The National MM5837 is one of the more popular of these noise devices.

## Do it yourself

Figure 1 shows a white noise generator derived from a Walt Jung publication. Output is 1 V p-p into a 600 ohm load.



Construction and component values are not critical.

Audio noise generators often have a selector switch for white or pink noise. White noise has equal power per Hertz, while pink noise has equal power per octave. Thus its power density drops at 3 dB per octave. This curve approximates the power in music, with less energy per Hertz with increasing frequency. This is what makes pink noise an excellent vehicle for testing sound systems and audio devices.

Applications around the studio include alignment of tape and cartridge machines.

Begin by aligning playback heads with a commercially produced pink noise alignment tape or cartridge. Next, record mono pink noise and adjust the record head for optimum high frequency response. You can use an oscilloscope, or do it by ear.

Once your recorder is set up you can make up your own master alignment tape to match all the playback machines to your record decks.

Audio processing equipment is easily set up with a pink noise source. The advantage here is that the setup results are much more consistent over time than pro-

cedure adjustments have improved the SNR, or just increased the gain (and noise) of the receiver.

The RF noise generator is useful in solving this dilemma. The generator is connected to the receiver's antenna terminals. The receiver is operated with the AVC off

## Noise is usually defined as any unwanted signal appearing at an amplifier's output terminals.

and the RF gain control at maximum.

The output from the speaker terminals at this time is the receiver noise. The generator is now turned on, and the gain adjusted until the output measured across the speaker terminals doubles. The output from the noise generator is now measured, and subsequent alignment adjustments are made for this 2:1 noise ratio with minimum output from the noise generator.

Figure 2 illustrates a low cost RF noise

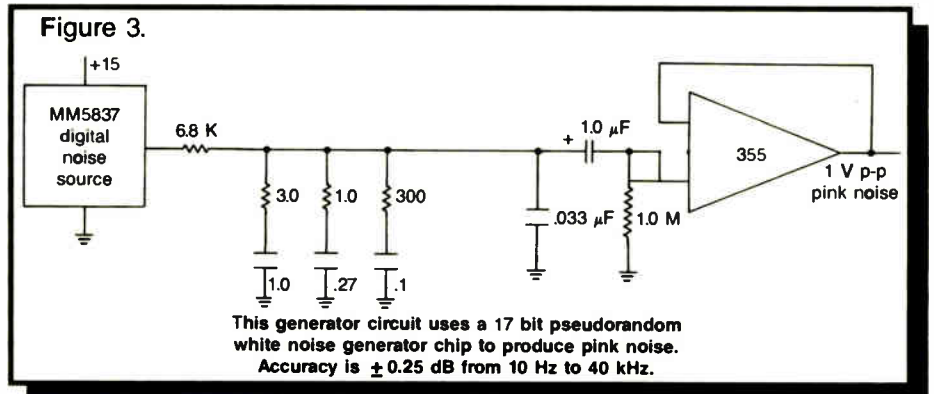
generator. The most accurate way to do this is with a true RMS voltmeter. Be sure that the meter you're using has the frequency response to handle the frequencies you are interested in. Some meters have a response that rolls off around 20 kHz, while others are flat out to 100 kHz. Using a meter with a limited bandwidth will give false low readings.

Sometimes with audio work, a band-pass filter is inserted between the output of the unit under test and the voltmeter to limit the noise being measured to the audio band. This would prevent measuring false high readings on a wideband VTVM.

## Consider the crest factor

The crest factor of the meter is also important. This is the ratio of peak to RMS voltage that can be accurately measured. A crest factor of 3:1 or better is required for measuring random noise. Information on bandwidth and crest factor can usually be obtained in the meter's instruction manual.

For metering noise in the megahertz range, an oscilloscope may be your only option. Here accuracy is compromised



generator. Again, construction isn't critical, but the 1N21 diode is easily damaged by excessive heat, so take appropriate precautions.

A few words about measuring noise

somewhat because you're eyeballing the scope. The RMS value will be around 1/6 of the p-p voltage.

A broadband source of random noise can be very useful for testing both audio and RF devices. While laboratory devices are available with frequencies extending into the gigahertz range, the simple devices described here have many good applications around the radio station.

...

Tom Vernon, a regular RW columnist, divides his time among broadcast consulting, computers and instructional technology. He can be reached at 717-367-1151.

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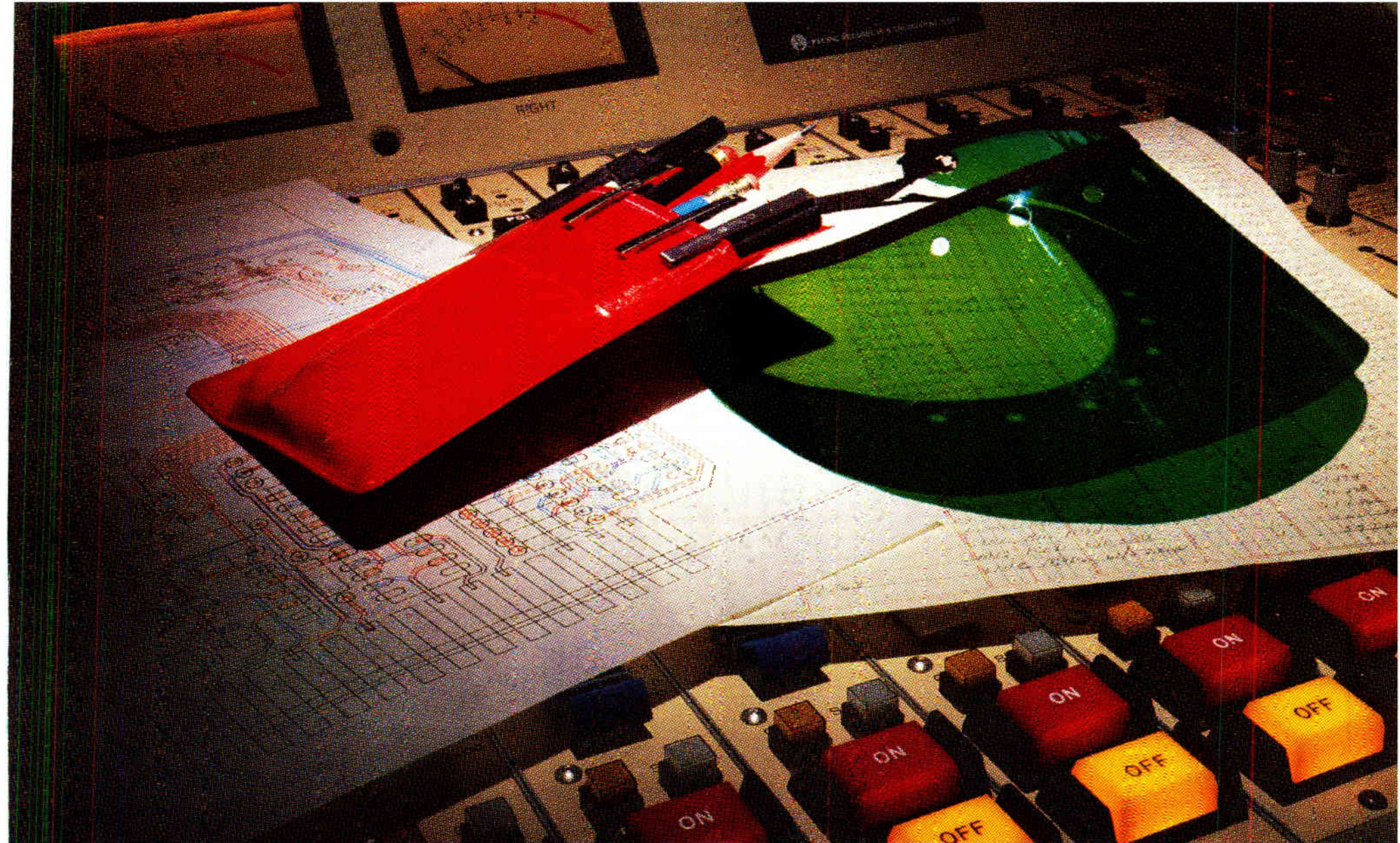
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RW



# EAS: Colorado's Answer to EBS

by Frederick M. Baumgartner  
Part I of II

**Indianapolis IN** Almost no one will deny that the EBS has serious limitations. Its 1950s technology, slow pace, "cry wolf" mandatory testing, repeated

tion of the population and it will be late and likely inaccurate.

A number of piecemeal proposals have attempted to repair parts of the EBS system. SBE members in Michigan are quite successfully reducing the "cry wolf" testing irritation and speeding up the system by shortening the tones.

Oklahoma and San Francisco are implementing alternative communications channels and signaling to support EBS's single point distribution. San Francisco is also moving to serve the deaf with its updated EBS.

In the midst of these efforts comes the

ing. The terrain and the inherent limitations of the EBS system make a working state system impractical. Still, Colorado is a practical state—if the old technology doesn't work, it will find something that does. That something is EAS.

EAS is built around a very simple piece of equipment. The heart of it is DTMF tone encoders and decoders, with one important difference—they all run 12% higher in frequency.

The ordinary \$2.50 CMOS encoder/decoder can be shifted up in frequency (most often all this requires is changing the 3.58 MHz crystal to 4.00

the EAS carries priority and location information.

Second, while the EBS decoder can listen to only one source (the CPCS-1 or a relay station) the EAS decoder can scan eight sources, looking for an EAS activation.

Let's look at what that means in the real world.

### Speed

Each step of the EBS requires a 23-second tone sequence to be sent. An operator then determines if it is in fact a real activation or just another weekly test, then another 23 second tone sequence is sent; the procedure may have to be repeated.

At each step the message may be lost through technical fault or operator error.

Figure 1.

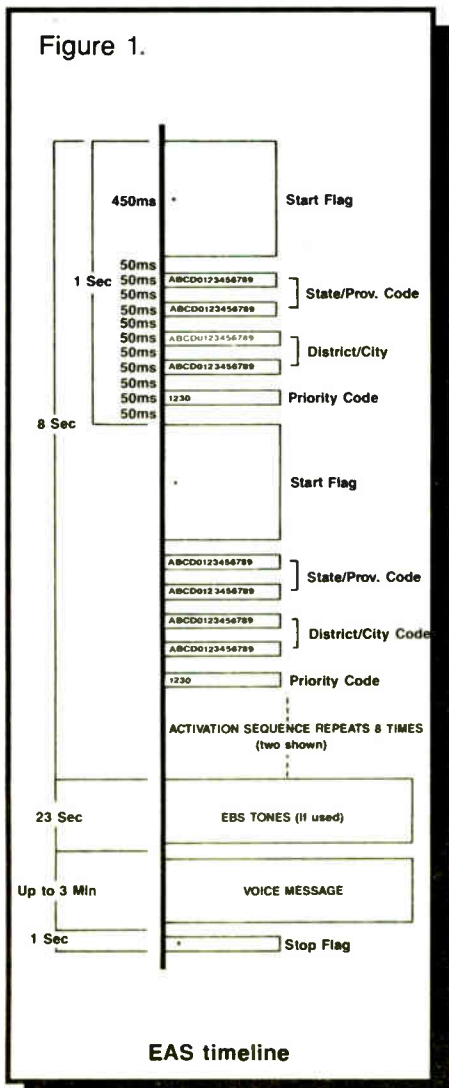


Figure 2.

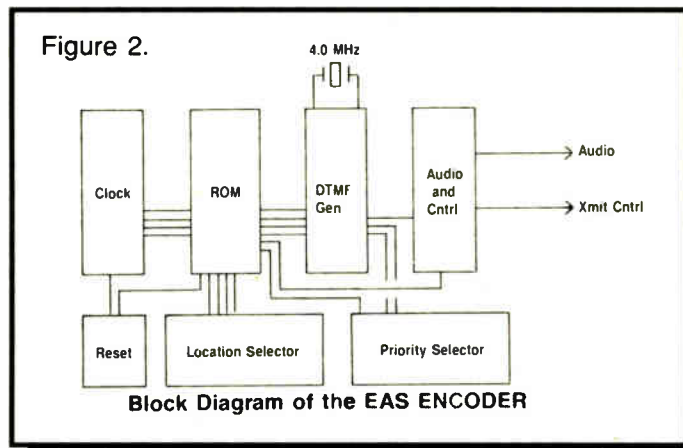
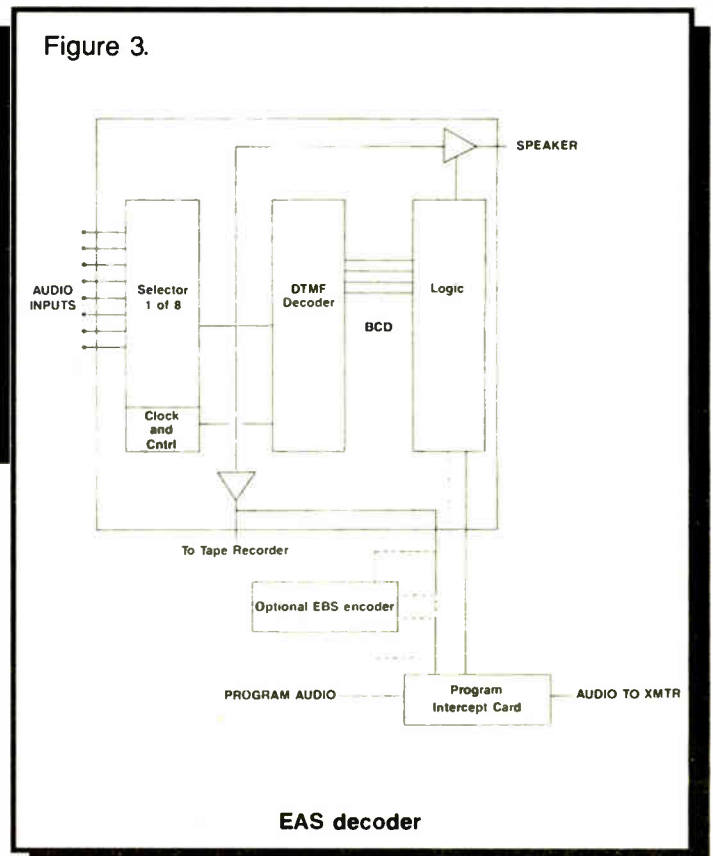


Figure 3.



emergency announcement system (EAS), a method conceived in Colorado. It is proving a cost effective tool that borrows improvements from other EBS updates.

### Why EAS was developed

Colorado is an area of rough terrain and high-tech emergencies with everything from Rocky Flats and torpedoes dropped at the intersection of I-25 and I-70 to Doppler detected tornadoes. Its mixture of major, medium and super-small stations and wide variety of electronic media make it an ideal location to develop and test an EBS supercharger.

The state does not now have an approved EBS plan, but not for lack of try-

ing. The result is a device that is much faster and considerably cheaper than the EBS two-tone system. But there are two other advantages to EAS technology.

First, while the EBS has only one message carried by the tones ("activation"),

In any case, time is lost. Even when the weather service is allowed direct entry, the NWS (National Weather Service) tone and the EBS tone and wait period still require at least one minute.

By contrast, the EAS system will activate a chain of stations up to eight deep in eight seconds. The announcement can begin immediately, so most EAS announcements would be completed before the old EBS could have been activated.

With potentially lifesaving tornado information now so quickly available, it seems a shame to waste the technology by waiting typically two minutes before notifying the public.

### Hub versus matrix

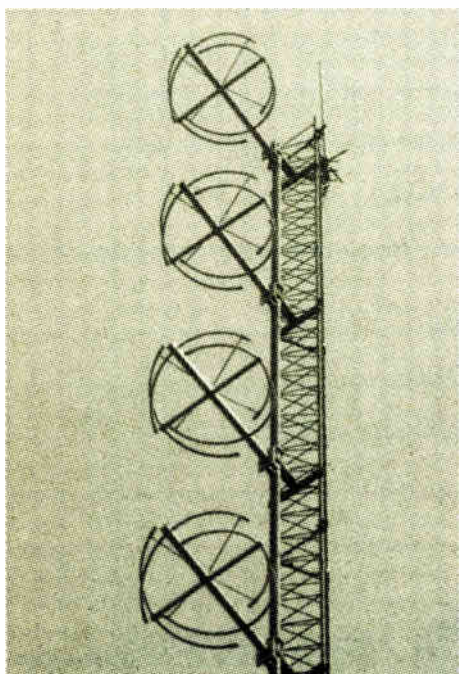
The EBS system relies on a single distribution point, the CPCS-1 station. Each activation must reach the CPCS-1 (although many stations allow the NWS to circumvent the CPCS-1).

The practical limitation is that only a few of the sources of emergency activations have access to the CPCS-1. Access to the CPCS-1 is not always good; in some cases the contact is by dial telephone.

In contrast, the EAS allows many entry points. The scanning function of the EAS decoder means that the NWS, metropolitan ringdown lines, sheriff's radio in rural communities and a number of other broadcast stations can be monitored.

(continued on next page)

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# KRNA Builds a Rock-Solid Studio Setting

by Dee McVicker

**Iowa City IA** Robert Norton, at one time an engineer for large-market radio and now the

operations manager for KRNA in Iowa City, IA, slips on his engineering hat every year or so to update the station's studios. Call it a professional

hobby, but Norton is by no means dabbling; he's making tremendous headway with a control room, a 2-track, an 8-track and a news room.

His most recent project was the 8-track, a sort of nemesis that has been haunting him since the station moved into the new facility in 1985. At that time, the 8-track was envisioned as more of a 4-track and the primary source was decidedly vinyl. That's all changed.

A single story, the facility

was built for radio from the ground up. It was also built rock-solid. That is, it was built for the heavy modulation of KRNA's rock and roll format.

to the next, Norton went to work in 1985 to install thick, solid walls.

Today, the studios are well isolated by layers of sheetrock, placed strategically over 2x4s to deaden audio leakage. "All together in one wall," said Norton, "you have six layers of sheetrock."

Norton also spared no expense and put in double thick doors for each studio. The layout of the facility was also

(continued on page 42)

## EBS Alternative

(continued from previous page)

There are three advantages with this approach. First, even if a large number of stations are off the air, or fail to pass the EAS message, the system will "restructure" or "heal" itself. Only a fraction of the stations need to survive for the system to work.

Second, in rural areas, the most reliable means of communications may involve satellite (for example, Denver's TV stations are uplinked and receivable in mountain communities), community translators, the sheriffs' repeater or state two-way systems. Even mountain-top ham repeaters may be used.

### More security needed

EAS allows anything that works to be used. Of course, a second level of security is needed when the public has access to the communications channel input (i.e., telephone and ham repeaters).

But this security may be as simple as PL, digital PL or allowing a ham repeater to accept EAS activations only from the NWS or a broadcast source. In medium and major markets there are enough secure means of communication to make the question of security moot.

Third, entry points into the system can be tailored for the community. In very rural America it may be necessary for the sheriff or state patrol to activate the local EAS from the squad car (the county sheriff cannot bring up the state EAS).

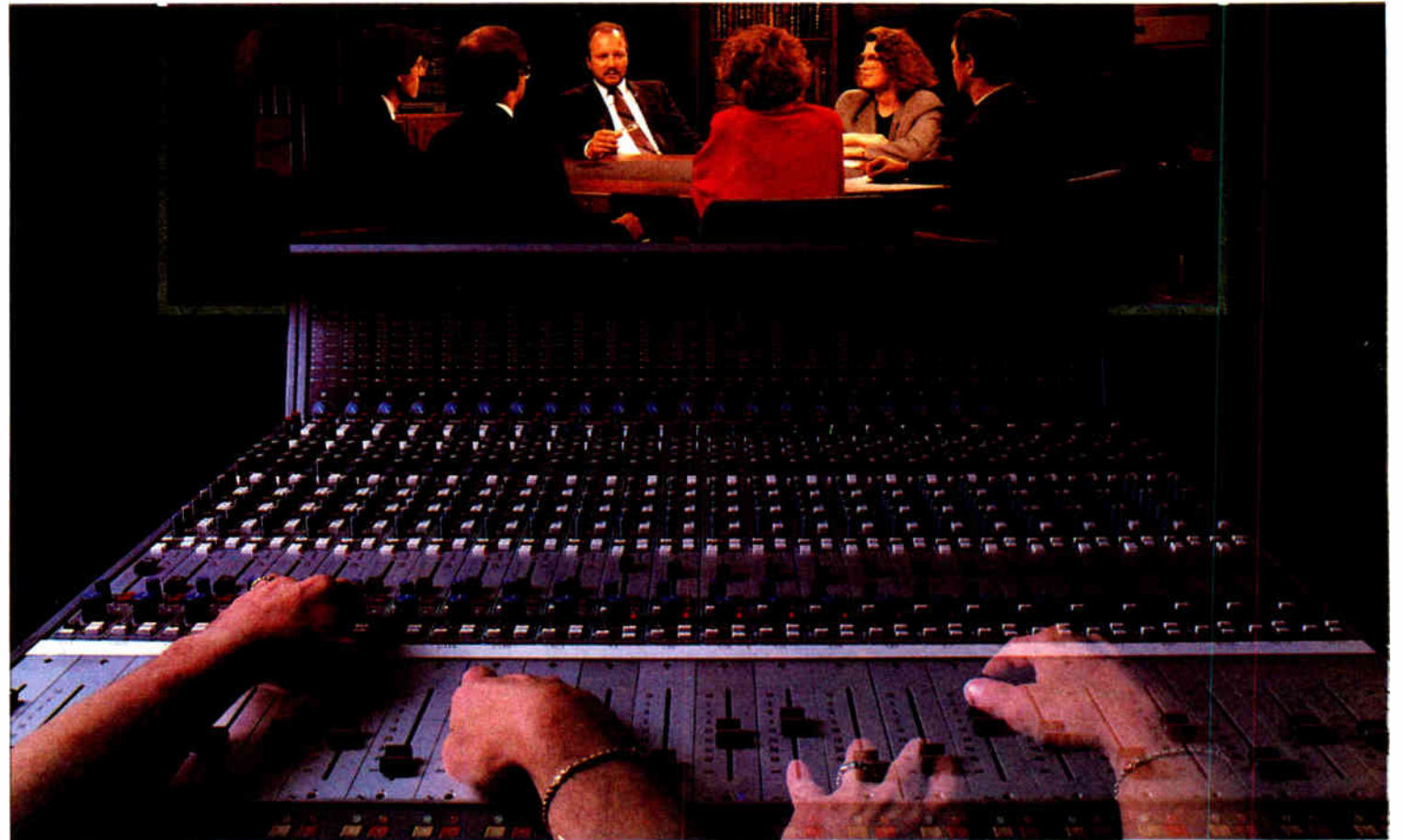
The EBS system is pretty much an "all or nothing" proposition. Either the state (or region) is activated completely, or it is not. The same "shotgun" approach is used for any level of emergency, from advisory to nuclear attack.

The EAS system is highly targeted. Each EAS activation carries information that defines the state, region, city and priority level desired.

EAS encoders will send information on the location and priority level of the activation. Decoders are programmed to respond only to EAS activations that involve their coverage area. The priority information allows the station to deal

with each activation appropriately and—if desired—automatically.

Next: Priority levels in the EAS.



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Fred Baumgartner is engineering manager at Indianapolis' WTTK and WTTV-TV. Previously, he was at KWGN-TV and KHOW/KSYX in Denver.



# Building a Rock-Proof Facility

(continued from page 41)

crucial to eliminating audio leakage. Norton decided on a right angle pattern with a layout that would buffer critical studios from each other.

In the corner, he situated the control room. Branching out on one leg of the right angle are the engineering room and the 8-track production studio. On the other leg, Norton situated the newsroom and next to it, the 2-track studio.

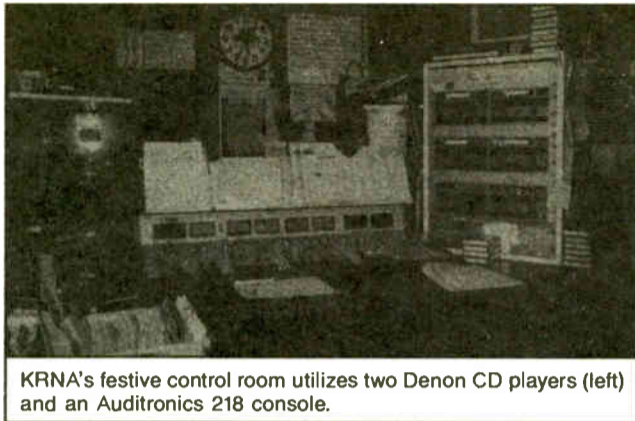
In the control room, where an all-CD format is loaded up on one of two Denon DN-950FA compact disc players, Norton installed the Auditrionics 218 board. An in-board mic compressor and equalizer support a controller's Shure microphone. Two Scully 280 playback/recorders, for on-air contest bits, and six ITC SP series cart machines were imported from the old facility.

A Studer A727 CD player is also resident in the studio for backup, as well as two Technics SL-1200 MKII turntables for what used to be the primary source in 1985 but now are used only for the oc-

casional cut on vinyl.

The 2-track production studio, which had been carrying the production load until the new 8-track was added, also has the Auditrionics 218. Its cabinetry, like all the studios, was designed by Norton and contracted out to a local carpenter to build. "I copied the in-vogue thing of putting formica on top and putting the oak edge around it," said Norton of the studio furniture.

Fitted around the light oak furnishings



KRNA's festive control room utilizes two Denon CD players (left) and an Auditrionics 218 console.

in the 2-track are two MCI JH110C 2-track recorders that, according to Norton, take quite a beating, as well as two ITC triple deck cart machines, two Tech-

Technics SL-1200 MKII turntables and two Technics SL-P1200 CD players. A Denon DN-950FA compact disc player is also available.

The production studio Denon machine can also be used as a control room backup, although it has never had occasion to. Two UREI LA-4 compressors, an H910 Harmonizer, a UREI 535 equalizer and the Orban 111B spring reverb are also in the 2-track, along with two Nakamichi cassette machines.

## Gates newsroom

In contrast to the studios that air rock and roll from CD is the station's newsroom, an antique affair with Gates Criterion cart machines, an aging Sparta board and an Ampex AG440 recorder. They're still workhorses, said Norton, who insisted that the Ampex AG440 is still the "best recorder in the building as far as ruggedness goes."

The biggest surprise, however, is that the newsroom has two personal computers. "It's a totally electronic newsroom in spite of the rather old recording equipment," said Norton. The personal computers are used to prompt the UPI wire service as well as actuality scripts, which are scripted from WordPerfect software.

The newsroom, with the exception of the computers, hasn't changed in ten years and Norton suspects it won't change for another ten. Norton's recent pet project, the 8-track room, is less than a year old and still not complete, according to Norton. "It's usable," he said, "but it doesn't have the MIDI stuff I want." Even so, in the Cedar Rapids/Iowa City market, KRNA's multitrack studio is the only 8-track room to be found.

## Turning four tracks into eight

The decision to go from the station's original plan of a 4-track, which already exists in the market, to an 8-track appears to be the doing of Broadcasters General Store, via an MCI JH110C-8 recorder. "While Dave (Kerstin, at Broadcasters General Store in Carol Springs, IL) was looking for a 4-track recorder, he was telling me about this 8-track he had," remembers Norton.

One of the last JH110C-8s made by MCI, Broadcasters General Store was holding the merchandise for another station. When this deal fell through, Nor-

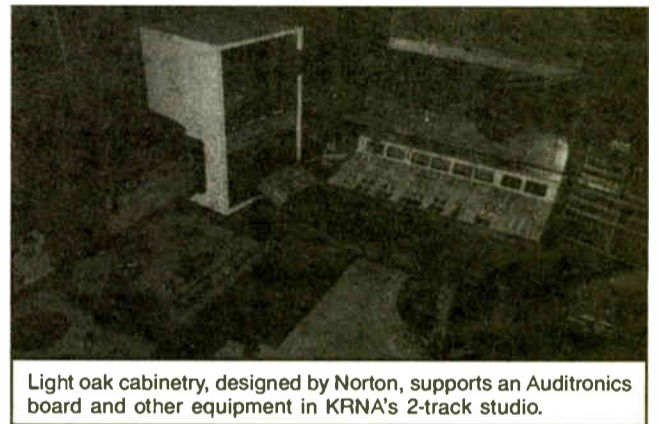
ton picked up the recorder, according to his recollection, "for what I would have paid for a 4-track."

To complement the 8-track recorder, Norton brought in two MCI JH110C 2-track recorders (the parts were interchangeable between the 8-track and 2-track recorders!) as well as a Technics SL-1200 MKII turntable, an ITC 3-deck cart machine and, of course, an 8-track console.

## A single story, the facility was built for radio from the ground up.

The board Norton selected was the Pro 790 Harrison, which "has a mic EQ, and there's a loop on the mic channel to go to the mic compressors—I use LA4s," said Norton. The 8-track console, like all KRNA consoles, is spared the necessity of additional channels by the use of a Shure M267 mixer.

Said Norton, "The Shure mixer comes up in remote. If I need to mic other people we use that instead of using very expensive channels. That way we can plug in six more mics into any studio." With little budget to spare, Norton completed the 8-track—at least for the time being—with what he refers



Light oak cabinetry, designed by Norton, supports an Auditrionics board and other equipment in KRNA's 2-track studio.

to as "the poor man's Harmonizer," the Alesis Quadraverb.

Popular with bands, and unbalanced, the Alesis lets production personnel do limited special effects. "(It's) not as good as a Harmonizer," admitted Norton, "but it will create reverb and phase shifting."

With this studio complete, Norton is taking a break. When he slips on his engineering hat again, he said, it will most likely be for a new transmitter site or when the new digital cart machines come to fruition. He can hardly wait.

Dee McVicker is a free-lance writer and regular contributor to RW. To inquire about her writing service, call 602-899-8916.

## ENGINEERING SCHEDULE



### • Thursday, September 13

AM Directional Antenna Seminar  
8:00-5:00 pm

Engineering Management:  
Dealing with the Difficult Employee  
3:30-4:40 pm

### • Friday, September 14

AM Directional Seminar  
8:00-5:00 pm  
The Progress of Radio  
Receiver Technology  
2:00-3:10 pm

FM Engineering  
3:30-5:00 pm

### • Saturday, September 15

AM Engineering  
9:00-10:30 am

Interference: Its Causes and Cures  
10:30-11:40 am

Increasing AM Quality and the  
FCC Proposals  
1:00-2:10 pm

Radio Technical Measurement  
Demonstrations  
2:30-3:40 pm

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### • Tuesday, September 11

Radio Data System Seminar  
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### • Wednesday, September 12

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# WORKBENCH

## Two Monitors To Construct

by Jeff Littlejohn, CE  
WYSY AM/FM

**Chicago IL** The following simple and inexpensive projects will help you accomplish two helpful tasks.

The first allows you to actually listen to AM noise, synchronous and asynchronous, while you're tuning your FM box. The second helps you monitor the competition.

For the construction of the AM noise monitor, see Figure 1.

When using this device to tune the transmitter you should hear a couple of things.

First: AC Hum. This is the asynchronous AM noise caused by power supply ripple.

Second: Program Material. This is the synchronous AM noise that can be minimized by tuning.

### A couple of notes

1. AM noise will change as the transmitter warms up, so let it run for three or four hours before making final adjust-

ments.

2. The program content that you hear while tuning will get softer as you reach minimum AM noise.

3. All transmitters are different; but as a general rule, the point of minimum AM noise will not be the point of maximum efficiency.

### Monitor circuit

The second project was inspired by a former program director who wanted to be able to monitor three stations in the market at one time. At the time I had almost no money to spend and a limited amount of time to work on widgets. The circuit in Figure 2 is what I came up with.

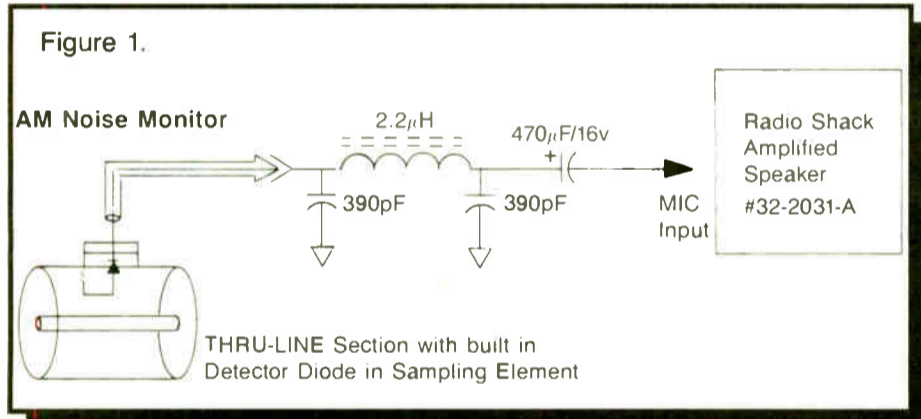
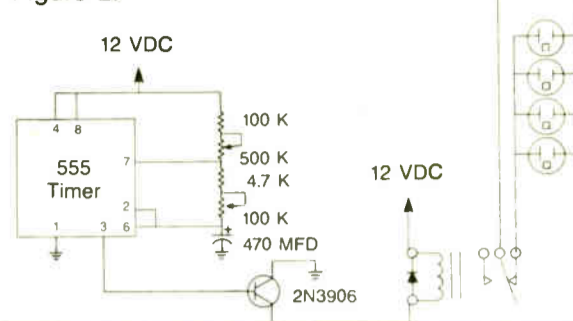
I used a cheap plug-in type wall adapter to run it to save time in construction and modified a plug strip to supply the power.

The unit is very simple to use: just plug into a wall outlet and plug a couple of boomboxes into the plug strip. The recorders need to have mechanical switches so the unit will stay in the rec-

ord mode when the power is shut off. The two potentiometers are used to adjust the on and off cycle time.

Jeff Littlejohn can be reached at 708-851-4600.

Figure 2.



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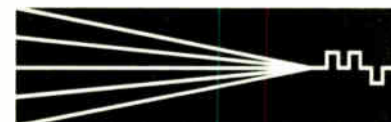
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# How to Handle PCB Equipment

by Steve Crowley

**Washington DC** It was nice to read about the Michigan Association of Broadcasters' program to dispose of members' polychlorinated biphenyl (PCB) items (RW, 11 July 1990). From that story and phone calls, I know this is of continuing concern to broadcasters.

## CONSULTANTS CORNER

There was no legal problem with PCBs until 1976. That's when Congress passed the Toxic Substances Control Act. The Act directed the EPA to regulate PCBs.

The toxic effects of PCBs are well documented. These effects can be compounded since PCBs accumulate in the body. The biggest problem occurs when PCBs burn; the products of combustion, which include dioxins, are more hazardous than the original PCBs.

Though PCBs are no longer used in the manufacture of broadcast equipment, they may exist in equipment manufactured before 1979, where they're usually found in transformers and capacitors.

### PCB transformer definition

A transformer is considered a "PCB transformer" if it has at least 500 parts-per-million (PPM) of PCBs in the dielectric fluid. If you have one, it must be inspected quarterly for leaks. If a leak de-

velops, it must be cleaned up as soon as possible, but no later than 48 hours after discovering the spill. Stricter rules apply if the spill contaminates water, sewers or food sources.

In addition, transformer records must be maintained and PCB transformers must be registered with the local fire department. There are also special labeling requirements, and if there is a fire-related incident involving release of PCBs, it must be reported to the US Coast Guard National Spill Response Center (800-424-8802). Of course, measures must be taken to contain any spill.

When it comes time to dispose of a PCB transformer, it can only be done through accepted disposal methods. As an alternative, a qualified company can

## A large PCB capacitor contains 3 lbs. or more of dielectric fluid.

drain and refill the transformer so it contains less than 50 parts-per-million of PCBs. Then it does not have to be labeled or inspected.

PCB capacitors are categorized into large and small types depending on the amount of dielectric fluid they contain. A small capacitor contains less than 3

lbs. of dielectric fluid. If you don't know the weight of the fluid, you can assume it is less than 3 lbs. if the capacitor volume is less than 100 cubic inches.

If the PCB capacitor volume is between 100 and 200 cubic inches, and the total weight is less than 9 lbs., it is considered to have less than 3 lbs. of fluid. A small capacitor has no use restrictions and can be disposed of as municipal solid waste unless it's leaking—then tougher disposal restrictions apply.

### Large capacitor regulations

A large PCB capacitor contains 3 lbs. or more of dielectric fluid. If it has a volume of more than 200 cubic inches, it must be considered as containing more than 3 lbs. of fluid. Disposal restrictions apply to large capacitors.

Large PCB capacitors operating at 2000 V and above are subject to labeling requirements—lower-voltage large capacitors must be labeled if they are taken out of service.

Since 1 October 1988, use of large capacitors has been prohibited unless they are located in an area with restricted access and containment for any leaking dielectric fluid. If there is any risk of exposure to food or feed, they cannot be used.

This is just an overview of some of the PCB rules. There's a lot more . . . rules regarding record keeping, repair, storage. If you keep PCBs in your station, you have to manage them. Worse than this inconvenience, if there's a fire, the

PCB combustion products may render your transmitter building or studio unusable for a long time.

When anyone asks me about labeling or record keeping for PCBs, I answer their question . . . then suggest they get rid of the PCB items in an approved manner. Programs like the Michigan Association of Broadcasters' can take a big bite out of the disposal costs.

### Where to go for information

If you have PCBs at your station (or if you don't and are in the used equipment market), you should read and retain Part 761 of the EPA's rules. You can get the rules free from the EPA by calling 800-424-9065 (in Washington, DC: 554-1404) and requesting their "PCB Package."

You can wade through the rules yourself, but the FCC's rules read like a first-grade primer by comparison. And what I received looks like a fourth-generation photocopy. I recommend the NAB's publication *A Broadcaster's Guide to EPA PCB Regulation Compliance* (Phone 800-368-5644—members \$15, non-members \$30+\$4 postage and handling). It not only contains the EPA's rules, but interpretations in plain English.

The NAB guide also provides useful information on identifying PCB items, finding disposal companies, and specific steps to take in the event of a spill. Your attorney should be consulted if there is any question regarding the applicability of the rules to your situation.

■ ■ ■

Steve Crowley is a registered professional engineer with the consulting firm of du Treil, Lundin & Rackley, Inc., 1019 19th Street, NW, Third Floor, Washington DC. Phone: 202-223-6700; FAX: 202-466-2042.

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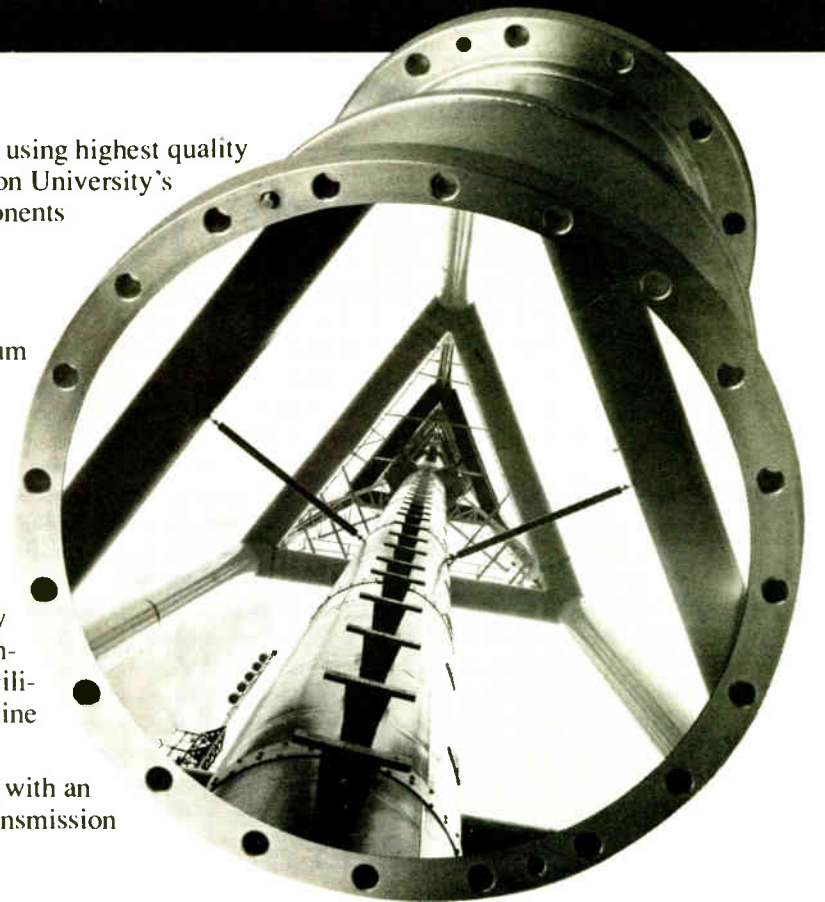
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# Opportunity From Adversity

## Overcoming Obstacles Can Bring Out Qualities In You That Will Make You Successful in Life

by John Cummuta

**Downers Grove II** Henry Fonda played Admiral Chester Nimitz, the World War II Pacific Fleet Commander, in the movie *Midway*. At one point in the story Nimitz has committed the bulk of his crippled fleet to ambush the Japanese Navy as they try to invade Midway Island. Then, just at the most critical moment, an aide informs Nimitz that Admiral "Bull" Halsey, his top battle commander, is in the hospital and can't lead the raid.

### A day for problems

No sooner has he digested that when another subordinate comes up and says, "Admiral . . . we've got a big problem." Nimitz replies, "Go ahead . . . today's the day for 'em." It turned out that the Japanese had changed their communications encryption codes from the ones that we had already broken—the ones that had given us the edge of knowing where they were going to attack.

## ENGINEERING MANAGER

Dealing with these heavy decisions, Nimitz went to visit Halsey in the hospital. After reciting the list of obstacles standing in his way, Nimitz looked at his friend with "What should I do?" written all over his face.

Halsey characteristically answered, "Chet, you once told me, 'When you're in command . . . command.'"

Nimitz left that meeting, quickly made the tough decisions, sent the fleet off into battle, and as history records, our

victory at the battle of Midway irreversibly turned the conflict in the Pacific around in our favor.

While that little story is interesting, there's a critically important truth in it. If such problems had not always been cropping up during the war, there would have been no need for Admiral Nimitz.

It's the same where you work. You may feel, from time to time, that you're overwhelmed with problems. And just when you think you have heard them all, a few new ones sneak onto your list.

### Earning your pay

So, you get stressed out or feel a sense of drowning, and you wish you had absolutely *no* problems. Well think again, because problems are why businesses have managers, and when you get your paycheck, handling problems is what ev-

ery dollar is for.

W. Clement Stone, a self-made multimillionaire, credits his success to several key principles, and one of the most important to him is his observation that, "In every adversity there is the seed of an equal or greater benefit." Let that sink in, because it's absolutely true.

First of all let's establish that life is fair. Not just sort of fair, but completely and precisely fair. You get out of life *exactly* as much as you put (continued on page 48)

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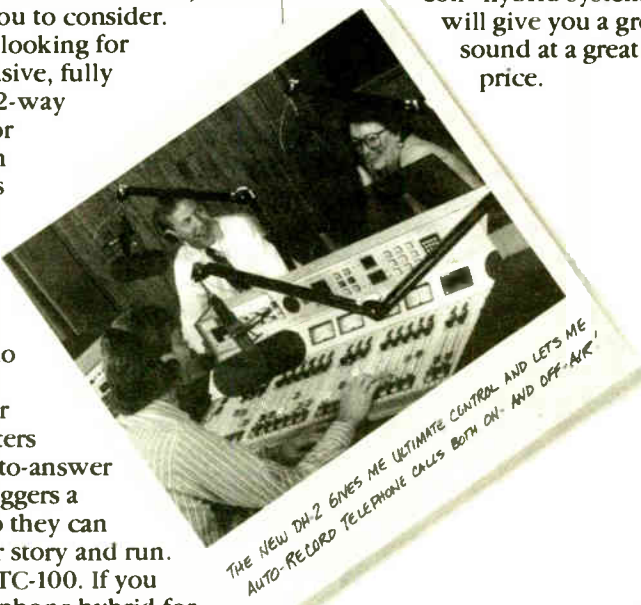
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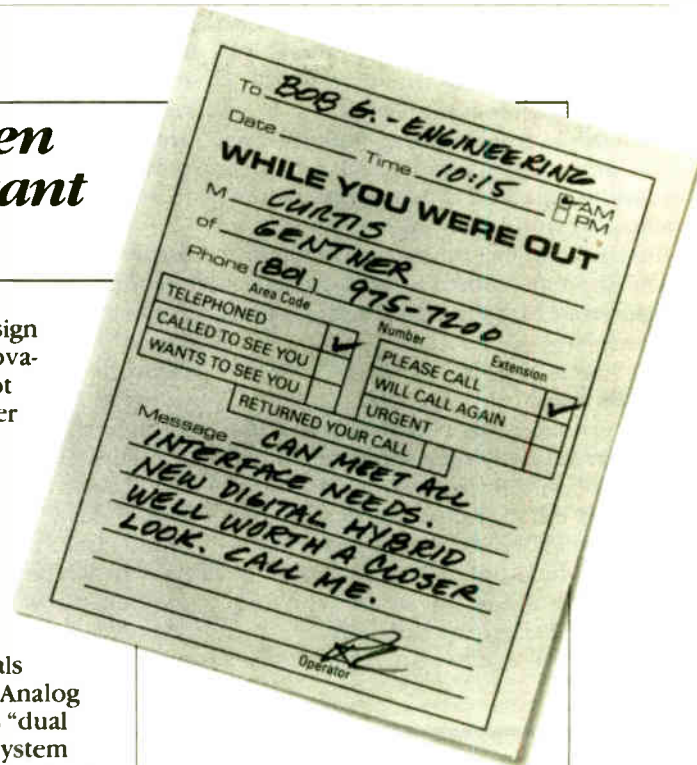
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# What Is Benign Discrimination?

by Harry Cole

**Washington DC** For today's text we have a choice: from the Bobby Fuller Four songbook, "I Fought the Law and the Law Won"; or from the last verse of "The Man Who Shot Liberty Valence" (i.e., "a law book was no good").

Or perhaps a title from the Beatles says it all: "I'm a Loser." That's right, we're talking about the *Shurberg* case, now perhaps better known as *Metro Broadcasting, Inc. v. FCC*. If you missed the headlines on this at the end of June, the bottom line is simple: The United States Supreme Court, by a 5-4 vote, upheld the constitutionality of two of the FCC's minority ownership policies.

I represented *Shurberg Broadcasting of Hartford*, the party which had successfully attacked the minority distress sale policy on constitutional grounds in the US Court of Appeals in Washington. The Supreme Court's reversal of that decision was, to say the least, a disappointment.

## An ill wind

Hey, nobody likes to lose. But, at the risk of sounding like a sore loser, I think it's important to recognize that the Supreme Court's decision bodes ill on a number of levels for the broadcast industry as a whole and, perhaps surprisingly, from civil rights advocates who may have applauded the decision.

The attack against the Commission's

minority ownership policies was relatively simple: The Constitution prohibits the government—state or federal—from discriminating against people on the basis of race.

## COLE'S LAW

The FCC's policies are clearly race-based classifications which favor some and disfavor others solely on the basis of race or ethnicity; therefore, according to well-established (at least, we thought it was well-established) precedent, those policies are unconstitutional unless they are directed to a goal of overriding importance and they are narrowly tailored to achieve that goal.

## Supreme Court disagrees

The Court, however, decided that that previously well-established precedent should not apply here. Instead, the Court held that, as long as Congress is trying to achieve some important objective and as long as the means it is using are "substantially related" to that objective, "benign" racial classifications are hunky-dory. In these cases the Court found, first, that "broadcast diversity" (by which it presumably was referring to program diversity) is an important governmental goal and, second, that the minority ownership policies are "be-

nign" classifications intended to achieve that goal. Case closed.

So why is this bad, you ask? Think about this. The majority opinion (written by Justice Brennan) focuses in considerable detail on the regulatory role of the Commission.

In particular, it re-states with approval the notion that some regulation of programming is permissible because of the scarcity of broadcast frequencies. It re-emphasizes that broadcasters are "fiduciaries for the public," and that "it is the right of the viewers and listeners, not the right of broadcasters, which is paramount."

These are, of course, not new thoughts. But over the past ten years or so the Commission has been moving the broadcast industry away from them. The Fairness Doctrine was abandoned, for example, because of the notion that spectrum scarcity no longer justified it. The Commission's much-hailed deregulation program has been based on similar justifications.

The Court's opinion, which seems to embrace the scarcity rationale, thus may encourage a return to a more regulated environment. It will, at a minimum, put strong arguments in the hands of public interest advocates challenging, for example, the programming performance of incumbent licensees.

True civil rights advocates, too, have cause for concern. The civil rights movement, after all, has been dedicated to the elimination of racial and ethnic discrimination. The Court's decision does not accomplish that—far from it.

Rather, the Court has effectively said that discrimination by the federal government is all right as long as it is somehow "benign." In so doing, the Court effectively declared that discrimination is an acceptable governmental mechanism.

## Define "benign"

Mind you, the Court did not trouble itself to define the term "benign." Presumably, discrimination is "benign" if its proponents claim that the discrimination is designed to be helpful and not harmful. In this day and age, of

course, government officials are not likely to adopt a policy expressly designed to harm anyone on the basis of race.

But *any* racial classification *will* be harmful to people who don't happen to be in the favored class. Moreover, who is to say what is helpful (and thus, "benign" and constitutionally acceptable) and what is harmful? After all, the notion of "separate but equal" facilities for races, conclusively rejected by the Supreme Court in *Brown v. Board of Education*, was supposedly a "benign" means of advancing the interests of all races by permitting everyone to enjoy equal (albeit separate) public facilities.

Would separate travel facilities (such as "back-of-the-bus" seats or separate lunch counters reserved for certain races) be acceptable under the *Metro Broadcasting* case? Probably.

What if Congress, noting an "underrepresentation" of blacks in the rosters of National Hockey League teams, imposed a program requiring the recruitment of black hockey players, in order to provide positive role models for black youth? That might be acceptable, too, as might a similar program to encourage Asian youth to play major league baseball.

And what about Hispanics and Asians (or whites, for that matter), all of whom appear to be "underrepresented" in the National Basketball League?

These may be unattractive notions, but they are appropriate to consider in the face of a Supreme Court decision which condones, indeed encourages, precisely that kind of thinking. By endorsing governmental racial classifications of this sort, the Court has turned its back on the notion, articulated by Martin Luther King, that people should be measured by the content of their character, not the color of their skin.

And, whether we like it or not, the Court's decision is now the law of the land.

■ ■ ■

Harry Cole is a partner in the Washington, DC-based law firm of Bechtel & Cole, Chartered. He can be reached at 202-833-4190.

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# Make Lemonade from Lemons

(continued from page 45)

in. Jesus said, "As ye sow, so shall ye reap." Newton said, "For every action there is an equal and opposite reaction." Others have spoken the same truth in different words.

## An opportunity to grow

The point is that to grow, you must invest something. You must sow. If you wanted to become a better tennis player, you'd have to starting playing against people who are much better than you. It would be hard work, but you would have to overcome the obstacles of their

superiority; and that would force you to get better yourself.

To borrow some more words from Ad-

miral Halsey, a young flier once asked Halsey to relieve him of command of his squadron. It seemed that the young officer didn't think he had the "right stuff

to lead men in important battles. Halsey replied, "There are no great men, son . . . only ordinary men who are

**"There are no great men, son . . . only ordinary men who are forced by circumstances to do great things."**

forced by circumstances to do great things."

Those circumstances forced Halsey to become probably the greatest fighting

admiral of World War II, and the young flier became an ace.

Of course, they both could have ducked their responsibilities and fallen back into the ranks of ordinary people doing ordinary things, but they didn't.

They took advantage of the opportunities their problems presented them, and they rose to new heights of experience, self-confidence and value to their superiors. Without the problems, these two men would never have known their extraordinary potentials.

Quickly—without concentrating—tell me the biggest problem you were worried about a year ago. If you're like most folks, that horrible obstacle, the one you sweated bullets over a year ago, has somehow slipped into oblivion. That's because it never was as big as you imagined it.

I once read of a study that some university had done on the things that people worry about. It turned out that only about 7% to 8% were worth worrying about. The rest were exaggerated figments of their imagination.

The 1930s American humorist Will Rogers once said, "In my life I've experienced many terrible things . . . a few of which actually happened."

## Adjust the brightness

The point is that you could probably take the intensity of the things you see as problems and turn the mental brightness down half way. Then turn it down half way again, and you'd probably still be overestimating its importance. That's not to say you shouldn't address it. It is simply to say that you must never let your problems devour you.

One of the most important rules, and the hardest to observe, is that work problems should stay at work. This is toughest for success-oriented achievers. They are mulling over their challenges almost continuously, but that's not necessarily good. At least it's not good to be consciously thinking about work problems when you're not at work.

If that concerns you, you'll be happy to know that your subconscious mind—the part that really solves most of your problems anyway—will be working on your challenges and opportunities 24 hours a day. And when it has some suggestions, it will dump them into your conscious mind for you to consider.

I guess the one thought that puts it all in perspective is that the only people who don't have problems are the ones who reside in the cemetery. If you ever find it hard to be grateful for a problem, consider the alternative.

People who rise to the top in business, in personal relationships, in life, are those who consistently and persistently overcome the problems that life brings them.

So if you're one of those professionals who is serious about making a mark in broadcasting or any other endeavor, be grateful for your problems. They're your continuing opportunities to show the world and yourself what you're made of.

John Cummuta is president of Advanced Marketing Concepts, Inc., a broadcast management and marketing consulting firm, and a regular RW columnist. He can be reached at 708-969-4400.

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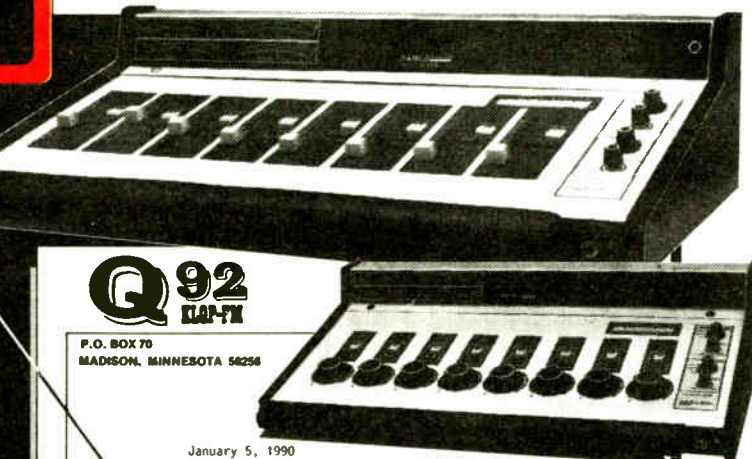
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I had one occasion to call your service department for an answer to a question I had on a minor problem and I received some friendly and accurate advice. Incidentally, the minor problem resulted from a severe lightning strike at our studios, the Ramko board survived it nicely!

I would recommend the xl SERIES audio consoles to anyone with a small budget who is looking for "big" quality.

Very Truly Yours,

*Maynar R. Meyer*  
Maynar R. Meyer  
General Mgr./Chief Engineer

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Dollar-for-dollar and feature-for-feature, RAMKO consoles are the finest available in broadcast applications.

What sets RAMKO apart, however, is not simply the quality of the product. When problems develop (and with today's complex circuits, it's inevitable), your technicians have provided invaluable assistance over the telephone which has enabled us to make fast repairs.

It appears to us that your competitors spend a lot of money on slick four-color ads, while RAMKO puts its resources to good use quietly developing rugged, dependable consoles. So good, in fact, that our technicians refer to the RAMKO console as the "noise-free" board.

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# BUYERS GUIDE

Consoles

## AMX Rates High at WDFX

by Jeff Breitner, CE  
WDFX

**Detroit MI** Pacific Recorders & Engineering describes its AMX console as a "broadcast operations console"—one that can handle the rugged life of an on-air board and one flexible enough to be of use in a production studio.

Yet how many times have "one-size fits all" products fallen short of even the most conservative expectations? The AMX will meet the challenge of a variety of broadcast applications.

The AMX, like all of PR&E's consoles, is modular. For wiring ease, all wiring connections are made in the rear of the console. Mainframe sizes are 10-, 14-, 18-, 22-, 26-, 30- and 34-input positions. The mainframe comes standard with the



source for another set of line outputs. Any of the three mix busses can be selected (although not simultaneously) and sent to a set of outputs independent of the normal line outputs. This can be a handy device if distribution amplifiers are used in a production studio.

### Telephone mix-minus

Almost all studios have a need to record telephone conversations. Whether it be with state of the art digital hybrids or less lofty methods, the AMX is quite at ease in making mix-minus for telephone use.

A very simple method of supplying mix minus is by using two mix busses and a mono-output module. The mono output module will sum the left and right channels of the selected buss. If

more than one buss is selected, it too is part of the output.

If the user requires a bit more extravagance, the telco mix module will sum the channels of the selected mix bus and give additional control over the incoming telephone audio. Control panels for the Telos brand of telephone hybrids are also available and make a nice complement to the console.

There are also a host of other option

modules and accessories suited for different needs. Items such as remote control panels, studio monitor modules, slate/talkback monitors, remote input selectors and extra control turrets make the AMX very well suited for either a specific or wide range of tasks.

In the real world of radio, how does the AMX perform? The one in use at WDFX has withstood the incessant use dealt to it every day. It's turned out to be a great two-track production console. Very little coaching of the production staff was required to get them off and working when the console was first installed. And there's never been a problem which resulted in studio downtime.

PR&E has a reputation of being not for the budget-minded. However, once consideration is given to the features and quality of the AMX, the money is found to be well spent.

■ ■ ■

*Editor's note: For additional information on the AMX consoles, contact Anders Madson at PR&E: 619-438-3911, FAX: 619-438-9722, or circle Reader Service 26.*

## USER REPORT

mixing bus metering and meter switchers, line output/DA modules, control room monitor and a send/return foldback module.

### Return to sender

The send function is a useful concept: It allows audio from any input module to be routed to one of the two send busses. Send audio can be strapped as a left-right sum of the input module or discrete left and right channels.

The return buss routes audio into any or all of the three mix busses and is controlled with its own fader. The advantage of being able to easily punch audio to another location is readily apparent. There's no patching involved in sending various workparts to effects equipment.

And getting it back to the console for the final mix is just as easy with the return controls. Additional versatility is gained with the "pre-send" controls on each module. Pre-send routes audio ahead of the module fader to the send busses.


The AMX has been designed to allow each input module to be independently processed. This is accomplished with an extra row of slots above the input modules. Optional accessories for these slots are stereo and mono equalizers and a voice processor module.

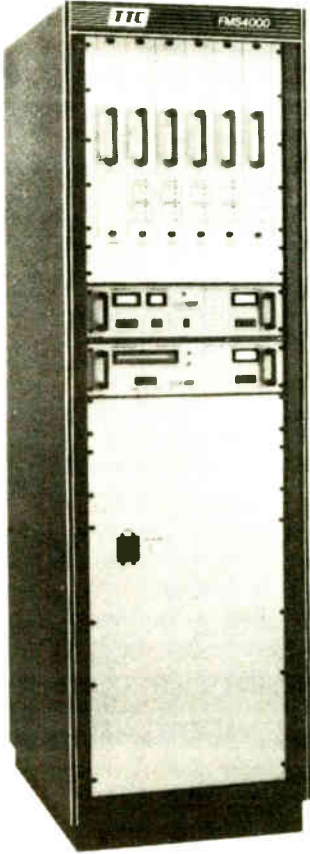
Even though the PR&E equalizer and voice processor modules do a good job, for some people it may not accomplish the desired amount of equalization or voice compression. It may be a good idea to provide additional mic processing via patch send and return points and put any existing equalizers in the effects rack.

A very useful optional module is the line output switcher. Its function is simply what the name implies—it selects the

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# The DAT Standard.

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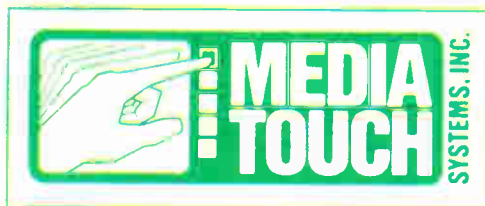


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# Arrakis Number One at WVKS

by Gary Fullhart, CE  
WVKS-FM

**Toledo OH** A corollary of Murphy's Law states, "Never, ever, buy serial number one of any product." I'm pleased to report the law can be (at least on occasion) repealed.

## USER REPORT

At the Spring 1989 NAB show, Arrakis Systems unveiled its new 12,000 series console. Our corporate technical operations director looked over the show demonstration model and made arrangements to have it shipped to us after the show.

While we technically purchased the demo model, Arrakis felt it was best to ship us an unmanhandled unit. So we were sent a newly built console (but still with serial #001). The choice of Arrakis for our on-the-air board made sense for us, as we had just finished installing a 10,000 series in our remodeled production studio and had a 150SC installed as a remote mixer in our Super Roving Radio mobile studio trailer.

### On top, not through

Installation began in early June 1989 and was straightforward. The 12,000 uses a modular design and has several modules available, like stereo line input, mono mic input and an internal 1x4 distribution amp. Unlike many other consoles, the 12,000 rests on top of the cabinetry, rather than fitting through it.

As you could expect with a new product, there were a few "typos" in the manual that took a few extra minutes to resolve and correct. I have received two revisions of the manual since.

All connections are made underneath the hinged meter bridge. So far, I have

had no connector problems.

Interfacing the 12,000 was very simple. The modules provide dry contact relay closures (50 milliamps max.) for both "start" and "stop" of external devices. DIP switch programming on each module selects whether the closure is momentary or continuous. Remote channel on and off is accomplished by shorting the correct logic connection to ground and works equally well with open collector or relay closures.

Additional DIP switches select timer reset, muting and channel assignment to the two mix-minus busses. Standard features include three stereo output channels—program, audition and utility.

Each channel has both direct module outputs and pre-fader patch points. The patch point link is made with an on-the-module connector, so no wired connection has to be made at the output connector.

The cue system is designed to utilize the studio monitor speakers and headphone output. Whenever a fader is pulled into the cue position, the monitor and headphone volume dim and mix in the stereo autocue signal. The depth of the dim is internally adjustable.

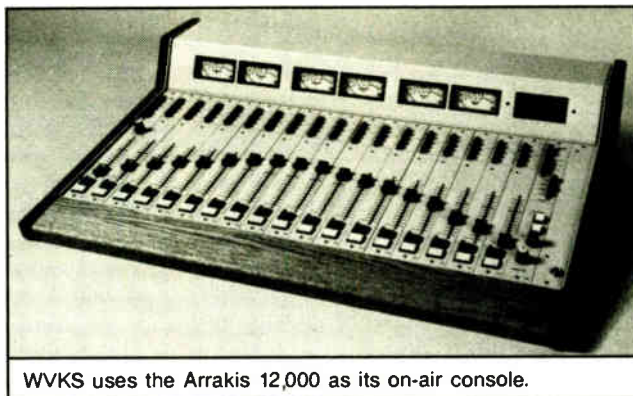
### No hit with DJs

Originally, I thought this was a rather nifty feature. The DJs, however, hated it. When they were mixing while talking on the air, they sometimes, by accident, pulled the fader into cue. Their headphone volume would drop, and they would hear the "faded out" audio at full volume.

This caused so many complaints I had to totally disable this feature and add an external cue amplifier. We had to have

a special module outfitted by Arrakis to provide an external cue output. I see in the latest manual revision this is now a standard provision.

The monitor outputs are at line level and require an external power amplifier for the speakers. The headphone output will directly drive high impedance headphones. I added an external headphone amplifier so any type phones could be used. A second amp connected to the "unmuted Studio 1" output provides for guests' headphones; they are not af-



WVKS uses the Arrakis 12,000 as its on-air console.

ected by the console's headphone volume control.

As in all Arrakis products, VCA control of the audio is used, eliminating the "scratchy pot" syndrome. Main inputs and outputs are active balanced. The only transformer is in the power supply (externally mounted cabinet). P&G slide faders, conductive plastic rotary pots, ITT Schadow switches and gold board connectors are utilized throughout.

### Lamp failures overcome

The only ongoing problem we had was premature lamp failure. The design originally used 28 V bulbs operating at about 24 V. Even dropping the lamp voltage to 12 V didn't solve the early failures. After almost a year, Arrakis has now switched to a 12 V lamp that has eliminated the failure. They also provided free retrofit kits.

Apparently the 28 V bulbs were more susceptible to mechanical shock problems. I have also had to replace the shot clock timer under warranty. It developed the tendency to reset to 3 minutes, rather than 00:00.

Despite some initial errors and warts that are not uncommon in new products, all in all, the Arrakis 12,000 has performed well for us. It is a simple yet flexible console that can be adapted to work in all but the most complex of on-the-air situations.

Will I still be wary of buying "serial #1"? Yeah, probably. But, with this #1, we will continue to thumb our noses at Mr. Murphy.

...

*Editor's note: For more information on the 12,000 series, contact Michael Palmer at Arrakis Systems: 303-224-2248, FAX: 303-493-1076, or circle Reader Service 77.*

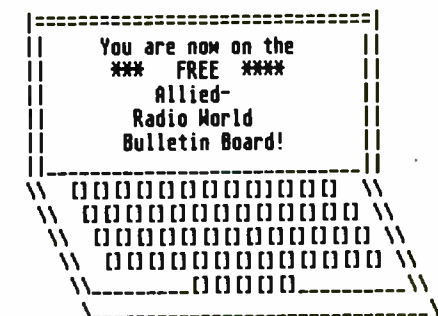
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# KCMO Chooses A-500 for Air

## Kansas City Broadcaster Upgrades; AM and FM Control Rooms Both Use Wheatstone Consoles

by Lloyd Collins, CE  
KCMO-AM/FM

**Kansas City MO** The studios and offices of KCMO radio were relocated to a new 11,000 square-foot facility in the summer of 1987. New consoles for both AM and FM control rooms were a necessity.

The consoles had to be "user friendly"; they needed excellent audio specs, mechanical durability and had to fit into a pre-approved budget. The Wheatstone A-500 consoles were judged the best fulfillment of the criteria.

## USER REPORT

The A-500 is available in mainframes sized for 10-, 14-, 18-, or 22-input modules. We selected the 18-input size for FM, and the larger 22-input mainframe for the needs of the News/Talk AM format.

### Straightforward layout

The console layout is easily understood and the knobs and buttons are spaced for easy operation. Each input module has illuminated pushbutton "On" and "Off" switches at the bottom where they are easily operated. Next up the line is a Penny & Giles fader, then output bus selection and control and, finally, input selection and control.

Each stereo line input module has a "mono" button just above the fader. There is also a "balance" control that functions as a pan pot when the module is in mono. These will help overcome those little surprises you can get from outside source material.

A monitor module for the control room is part of the standard mainframe. It allows selection of eight sources for the monitor system (four internal and four external). Controls for cue speaker level, headphone level and headphone equalization are also on this module. The headphone amp can be switched to either the cue bus or the monitor source selector. A button near the control room level control mutes the control room speakers.

Since our consoles were purchased, other helpful modules have been added to the lineup. An intercom module allows communication with up to eight locations through the announcer's mic. A rack mount version is available for locations that do not have a console. A "Multiphone Module" aids in interfacing up to three phone hybrids to the console and an "Outside Line Module" can replace outboard mixers for a variety of submixing tasks.

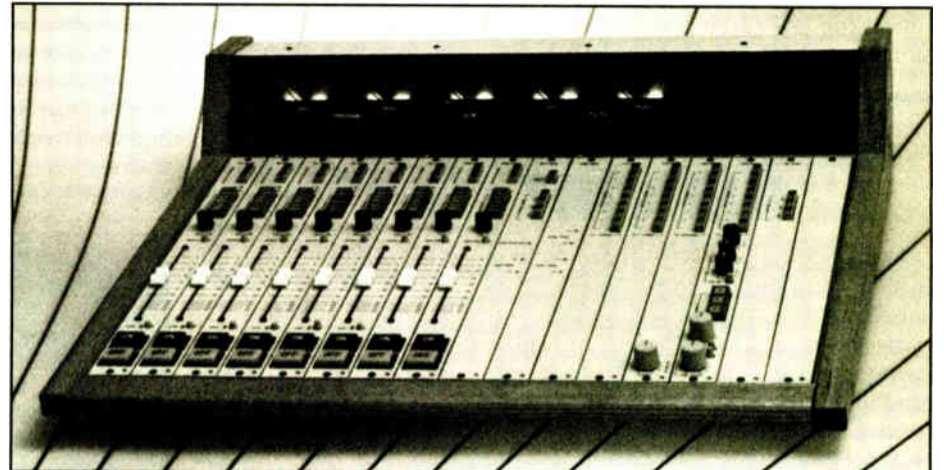
Full function remote control for tape machines is available in module form as are line selector modules for additional input switching capability. The optional modules along with the basic input channel modules combine to make up a console that is quite capable of handling most studio tasks.

### Specs check out

Electrically, the console tested very nicely. Frequency response was within  $\pm 0.1\text{dB}$  out to 25 kHz and was down 0.4dB at 100 kHz on a line input. THD+N measurements showed no more than 0.01% from 20 Hz to 20 kHz at +18dBm out. SMPTE IM measurements yielded results of 0.007% at the same output level from a line input.

The audio path is straightforward,

with no VCAs or FET switching circuits. There are only six amplifier stages from input to output, most running at low gain. This contributes to a low overall noise spec.



Wheatstone's A-500 comes in sizes of up to 22 input modules. Shown is an 8-input model; KCMO uses an 18-channel and a 22-channel version.

The mainframe wiring is ribbon cables on a metal bottom plate. Main bus ribbon connectors are all gold contact, insulation displacement type. The technol-

to be interfaced without external hardware. If, however, you want to start a machine and put it on air from another studio, a double pole switch and its associated wiring or an interface circuit will be needed.

Internal logic functions such as muting and timer reset are assigned in the "Matrix Master" module. Here, diodes are placed on a matrix board connecting

the "A" and "B" on signals from each input module with the functions to be controlled. This allows a replacement module to be placed in any slot without

**Full function remote control for tape machines is available in module form as are line selector modules for additional input switching capability.**

ogy, borrowed from the computer industry, has survived one liquid spill we know of. Some functions in the console were halted until we cleaned the liquid out of the connectors, but the board remained on the air during the ordeal.

Machine start and stop functions are accomplished by dry contact closures on the "ON" and "OFF" switches and associated contacts in the selector switches. This allows a wide range of machinery

needing to set its switches or jumpers.

After some time with this layout, I believe I would prefer to make the selection on the individual module. I think it would be quicker and less disruptive when changes are needed.

Installation was mostly painless. We encountered a mainframe wiring error at one connector in one console and a broken trace on a PC board during initial tests. Other than those easily corrected problems, the consoles came to life as expected.

Besides light bulbs, the only parts requiring repeated replacement over the three years of service have been some On/Off switches. We attribute most of that to wear and tear (spelled "abuse"!).

Would we buy more Wheatstone consoles? I'll say it this way: Each console purchase is evaluated on the basis of intended function, human interface, electrical specifications, and cost/benefit analysis. I would include the Wheatstone product in any such evaluation in the future.

Editor's note: For more information on the A-500 console, contact Gary Snow at Wheatstone: 315-455-7740, FAX: 315-454-8104, or circle Reader Service 94.

## Corrections

In the 27 June Buyers Guide article WMMZ's Sound is Tailor-Made, Broadcasters General Store's phone number should have been given as: 904-622-9058. In the 25 July article Dolby AC-2 Reduces Bit Rate, Dolby's phone number should have been given as: 415-558-0200.

RW regrets any inconvenience caused by these errors.

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# WHIM Ties the Knot with RS-12

by Anthony Kord, DE  
Bear Broadcasting

**Providence RI** "Do you, Anthony, take this console to love, honor, and cherish?" The planned studio move date for WHIM was dangerously close to my wedding day. If wiring didn't proceed quickly, I might find myself taking the hand of WHIM's new console in holy matrimony instead of my beautiful bride.

I needed a console that installs quickly without requiring additional switches, relays or wiring to become fully functional. Yet, I wasn't willing to sacrifice quality. Of course, all this on a tight budget.

Familiarity with Radio Systems' original ESA line of consoles prompted me to investigate the RS Series. What I discovered was a console extremely well prepared to enter a broadcast environment. Additionally, these boards are aesthetically pleasing, have an easily grasped layout and perform exceptionally well electronically and mechanically. I'm now happily married to both my wife and the Radio Sys-

used to require hours of console modification with drill, chainsaw and wire cutters, as well as bags of resistors, relays and switches, takes but a few minutes with the RS series console.

## USER REPORT

Remote control of your audio sources is easily accomplished with optional cards that install inside the console. I used basic remote interface cards to provide a relay closure for CD machine starting. Turntable interface boards help me remote-start my Technics turntables and insures that they stay synchronized

with the console's start/stop commands.

The console's standard open collector output worked well for my cart machines, but I was tempted by Radio Systems cart machine interface boards. These provide console tally lamp follow of cart machine lamps, cue tone channel turn-off and next channel event sequencing. Other options that looked tempting are an inboard distribution amplifier, audio input switcher and intercom system.

### Sounds as good as it looks

Even before "power up," the jocks liked the RS console's attractive black overlay, color coded fader knobs, engraved switch buttons and stylish oak trim. Since nothing extraneous appears

on the front panel, console operation is easily grasped by even the most timid of jocks.

Putting the console on line brought more smiles; Chet Atkins and Hank Williams never sounded sweeter. Front panel faders control DC input to a high quality VCA, minimizing the length of the audio path and eliminating fader contact noise. Distortion figures of 0.02% and SNR of 88 dB means that WHIM's digital audio sources encounter no degradation in the Radio Systems RS-12.

Servicing the RS-12 makes it evident why there's a "radio" in Radio Systems' name. A special tool is provided by the factory for opening the console to discourage unauthorized access by curious

(continued on page 58)



The RS-12 console (center) has proven itself on the air at WHIM for over a year.

tems RS-12 Console.

The Radio Systems RS Series is available in 6-, 12-, and 18-fader versions, each fader with two-input capability. Since Radio Systems is the only place to buy a Radio Systems product, the sales staff can readily explain the console's fine points. They helped me select the 12-channel version for WHIM as well as tailor the board's numerous options to my needs.

### Made for radio

Installing the RS-12 console was a breeze. All inputs and outputs are made via quick connect barrier connectors. Changing the console layout is simply a matter of pulling off a connector and plugging it into another input.

Radio Systems' knowledge of the broadcast environment is refreshingly evident when console setup time arrives. Programming jumpers allow quick configuration of each input for monitor muting, remote control pulse or holding output, cue inhibit and timer reset (of the console's built in timer). Gain sensitivity for each input is easily set via plug-in DIP attenuators and gain jumpers.

To help avoid "wasted" console inputs, microphone level and line level inputs can be accommodated on the same fader. Trimmer pots conveniently adjust external monitor input levels as well as console output levels. In short, what

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# Future for Consoles Still Analog

by Alex Zavistovich

**Falls Church VA** In years past, like other radio equipment, console technology was believed to be in line for a digital facelift. But, with the exception of some prototype experimentation, digital consoles have not materialized. Instead, industry insiders are seeing an ever-growing demand for reliable analog models with features tailored to specific station needs.

Paul McLane, broadcast sales and marketing representative for Radio Systems, commented, "There's no question that digital technology is changing studio life.

However, we have seen no dropoff of demand for good, long-life analog products. People need a good, reliable centerpiece for their studio."

He added that "there has been a strong demand for these products, despite a soft economy. The Radio Systems RS line has just passed number 300 and is going strong."

Wheatstone's Manager of Sales, Ray Esparolini, commented that "no one's asking for digital consoles. They are, however, looking for performance that meets digital standards and allows use of digital source equipment."

Anders Madsen, sales and marketing

manager for Pacific Recorders & Engineering, also agreed there is a "low demand for digital consoles." He went on to note some of the difficulties inherent in producing such equipment.

## Two types of digital console

In consoles, there are digital front ends, which control analog switching, and true digital consoles that carry only

analog front end, Madsen underscored the need for good switches, preferably gold contact.

"Silver contact switches have caused some people problems due to intermittent signals" resulting from tarnishing of the contacts, said Madsen. He went on to say that, therefore, any discussion of a pure digital studio needs to address a completely digital console.

But such a discussion, at least for now, may be moot. "Radios are not set up to receive square waves, and STLs, exciters and transmitters still broadcast analog," Madsen pointed out. Considering the extra cost of digital consoles—both for manufacturers and consumers—and the basic lack of need for them as yet, "they are not an effective means to an end," he concluded.

## INDUSTRY ROUNDUP

digital information through their infrastructure, said Madsen.

In the case of a digital front end, front panel switches send digital information to logic circuitry within the console, controlling analog output without audio appearing at the front panel controls. While this arrangement may be superior to an

## New wrinkles in analog

So, a practical digital console is still a long way off, and tied to the development of other broadcasting gear. If digital is not the trend for the future, what is?

Wheatstone's Esparolini pointed to several themes emerging in today's

(continued on page 62)

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**People** AKG Acoustics, Inc. recently announced the promotion of David Roudebush to US marketing and sales manager for AKG Acoustics, the Orban Professional Products Division and dbx Professional Products Division. Roudebush was formerly worldwide marketing manager for Orban Professional Products.



**Otari Corporation** has promoted John Carey to VP of sales and marketing. Carey has been with Otari since 1981.

**The National Supervisory Network** announced that Brent Jacox has joined the company as director of software development. Formerly, Jacox was NSN's project coordinator and principle author of NSN's client user computer programs.

**Hall Electronics** President Jon Hall has appointed Bob Bousman to the position of sales engineer with the firm. Houseman is a former employee of Harris, Broadcast Electronics, CCA Electronics and General Electric.

**Appointed distributors** Television Technology Corporation announced an agreement with Socatel Consultants Inc., to provide services as an exclusive distributor in Canada. Socatel is planning to arrange a network of dealers and technical representatives across Canada.

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# Studer Fits WFUV Inside and Out

by Robert Jewell, CE  
WFUV

**Bronx NY** When WFUV, a public radio station on the campus of Fordham University, decided to improve its remote broadcasting capabilities, the Studer 961 appeared to be the answer.

The decision was based on the need

overbridge and all controls are fully protected during travel.

A selection of three input modules can be mixed and matched to suit various live broadcast and recording applications. You can choose from a mono input unit with an equalization section or two stereo units with or without the equalizer section. The mono unit accepts mic or line level inputs with a continuously variable sensitivity from -70dB to -10dB or in "click stop" 15dB increments.

Overall frequency response of the 961 is 31 Hz to better than 16 kHz,  $\pm .05$  dB with 3dB points falling at 4.5 Hz and 45 kHz. Unweighted noise voltage on the mic chain with a 200 Ohm termination (hold onto your hats!) is less than 125dBm.

The mono unit also provides three separate inputs for mic, line and the internal audio

generator. In addition, mic level inputs can provide switchable 48 V phantom power.

points with balanced +6dB inputs and the ability to "loop-in" the built-in compressor or other effects through jacks on the rear of the unit. Headroom on channel faders is +20dB for 1% THD.

The equalizer sections are three-band type with a high frequency EQ shelving at 20 kHz, an adjustable mid-band EQ for 150 Hz to 7 kHz and a low frequency EQ shelving at 20 Hz. The EQ sections are clean and lend themselves well to real-world situations.

Each Master Unit contains a single high-level input on a rotary pot, balanced insert points, master channel summing, a balanced floating line amp and a limiter/compressor that functions using PDM.

is quite a life-saver!

Other modules are a talkback unit and motor unit, both with features only to be found on larger, "on-air" consoles.

The audio quality of our remote broadcasts, mainly high dynamic range music material, often prompts calls of praise from listeners whose donations comprise a large part of our funding—the life-blood that keeps us on the air.

### A pleasing performer

WFUV's News and Public Affairs Director, Chuck Singleton, said he has been very pleased with the performance and reliability of the professional-quality console. The unit receives extensive use by students at Fordham, who comprise a large portion of our staff.

"In a room full of equipment, the Studer is the only thing that I have never had to put on the bench. Everything else has at some point failed, at least once," said Assistant CE Steve Uckerman.

The controls of the 961 are laid out in an extremely logical manner, making it very flexible and efficient to use. "Setup and use is a snap," according to Uckerman.

While the Studer 961 is not cheap, it has proven to be an invaluable investment for WFUV. If you're looking for flexibility and value, the Studer line of portable consoles may be your answer.

■ ■ ■

*Editor's note: For more information on the Studer 961 console, contact Dave Bowman at Studer: 615-254-5651, FAX: 615-256-7619, or circle Reader Service 133.*



WFUV uses the Studer 961 both in production and for remotes.

for a durable, feature packed mixer that would provide the high level of performance we demand. It would also be needed for the proverbial "short notice" remotes, some in under less-than-ideal conditions.

Five years have passed and the 961 has far exceeded our initial expectations. In fact, we have found it to be an excellent performer in our own Bronx-based studios. Because of its plug-in-and-go design, installation in the news and public affairs production facility was effortless; it has since been used non-stop as the staff's board of choice.

### On the road

When it is time to hit the road, removal is a cinch. Unplugging the easily accessible XLR field and monitor, removing the power cord and replacing the covers is all that is required. Construction is modular throughout with a fold-up design; the VU

**"...the Studer is the only thing that I have never had to put on the bench."**

The stereo modules only accept line level sources. Line level sensitivity is from -10dB to +20dB, enough range for any source we have ever encountered. The stereo units also include a pan-pot and individually-controlled auxiliary outputs.

### No clicks or coughs

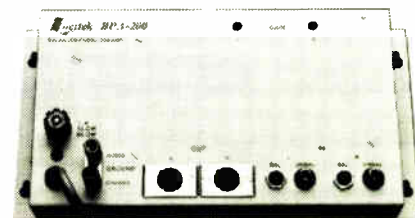
Both modules include click-free, silent muting and cough switches, pre-fader listening capability, fader starts, insert

## USER REPORT

The compressor is absolutely remarkable. Compression ratios are adjustable from 1:1.5 to 1:20 and a gain reduction meter provides a useful visual indication of activity. Release time is also adjustable and a linking button couples two Master Units for stereo material. The compressor/limiter is uncanny in its ability to handle complex program sources and leave it clean with a "garbage-free" sound.

To aid in setup and calibration, the 961 contains a built-in audio generator, a phase correlation meter and a phase reversal switch on all inputs. This alone

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World Radio History



# Logitek Key to WXPN Facelift

## Friendliness and Flexibility Central to Station's Selection of Perfectionist Consoles for Production

by Scott Fowler, CE  
WXPN

**Philadelphia PA** Last year our station refurbished its entire studio plant. Our new layout consisted of a master control room, three production rooms (which also serve as alternate control rooms), and three studios for hosts, guests and musicians.

One of the production rooms was designed for 4-track use, while all of the other rooms were designed for 2-track. We purchased three Logitek Perfectionist Consoles for all of our 2-track production/control rooms.

The Logitek console is definitely friendly and has a low-density layout. The program and audition buttons are labeled and color-coded and they illuminate when activated, providing quick feedback to the operator.

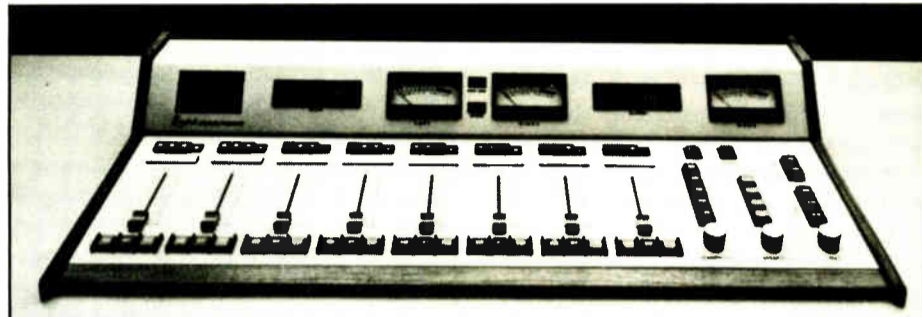
Downpot cueing keeps the cueing off the air. Controls for the monitor, built-in cue speaker and headphones are off to the right side, away from the action. Selector buttons for Pgm, Aud, Cue and Aux are individually labeled to provide clear identification. The volume controls for the monitor, headphones and cue speaker are large enough to be effortless to use and give the operator a positive sense of control.

### Flexible in operation

Flexibility was a necessity at our station. The Logitek consoles allow a choice of four inputs per channel, selectable by a small row of four buttons above each

tek console, we can easily accommodate three microphones and telephone audio from this studio, plus an extra input or two if needed.

We have our largest studio wired for eight microphones and we can record or



WXPN uses three Logitek Perfectionist boards for production purposes.

broadcast a variety of live programs from this studio through the control console at any time. We also have room for an input from our routing switcher that allows us to put any other control room, or additional network program, on the air through the master control console.

We use a 12-channel console in our master control room, which gives us 48 inputs. There is enough flexibility that we can assign the inputs in a logical fashion and repeat important inputs on separate faders to avoid having them unavailable when another input on that channel is in use.

### Extras

Other operational features include separate meters for program and audition channels on the 12-channel console, a built-in digital clock, a timer with user-selectable reset when a channel is switched to program mode and two headphone jacks. A remote start is available for each input and the signal can be set per channel for continuous or pulse by a switch on the input card inside the console.

A mono sum button for the speaker preamp is a great feature for checking phase problems in stereo production work and is a quick check for monitor speaker phasing at times when you are searching for the cause of acoustical anomalies.

Those of us in engineering can appreciate some additional features. There is a mono sum meter on the console, which has helped me to keep input wiring in phase. All of the inputs are at line level and Logitek provides up to eight microphone preamps inside the console which can be wired to any input.

All of the input and output wiring is normally brought out of the console to punch blocks. That provides for many

time. We had one timer card that did not keep time. The console clocks have their own crystal oscillator and they tend to drift too much. We need accurate time for meeting the network and we have to set the clocks almost daily. A clock board that can interface with a master clock system would be a great plus for us.

A few bushings have worn out inside the Penny & Giles faders of one console. Logitek taught me on the phone how to carefully disassemble and reassemble the faders, and I talked them into supplying me with extra bushings. Now, when an old bushing set fails, I can replace them myself within an hour if necessary. Of course, they will exchange the fader if you wish.

I've experienced occasional mechanical problems with the input selector buttons, and with the lighting for the program/audition buttons. One feature that could be eliminated is the button that switches everything from program to audition and vice versa.

Overall, we are pleased with our Logitek Perfectionist consoles. They are friendly and flexible to use. They look good, sound good and can bring professional quality to any station.

■ ■ ■

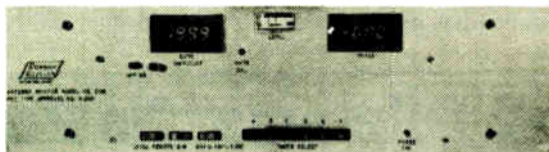
*Editor's note: For more information on Logitek consoles, contact Tag Borland at Logitek: 713-782-4592, FAX: 713-782-7597, or circle Reader Service 90.*

## USER REPORT

fader. In our master control room, we need inputs for CD players, turntables, cart machines, tape machines, microphones and network programming.

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# UPI Uses Vanguard for Remotes

by Sam Brown, CE  
UPI Radio Network

**Washington DC** ATI's Vanguard consoles have not been blessed with a life of leisure or a sedentary existence at UPI Radio—we use them for remotes.

A full studio console may sound like overkill for those accustomed to dragging out a tiny mic mixer for that big

## USER REPORT

broadcast from the grand opening of a pizza shop, but in network news reporting it's a necessity.

### Board configurations

The ATI Vanguard is available as an 8- or 12-fader stereo board with slide controls; knobs are available in the 8-pot configuration only. On the 12-mixer version, there are two input selections per channel. With no optional enhancements, the 8-pot model has two single microphone channels, four line channels with two-input selectors and two single selection line inputs.

All wiring is installed on easy, well marked punchdown terminals that do not require special tools. Either version has user-changeable connections from the microphone preamps to the inputs and

removable jumpers for monitor muting. Additional jumpers can be installed for muting on any input and levels are selectable as 0 dB, -10 or -20 for each.

Another nice option is factory-installed start and stop buttons in front of the faders, wired to a punch block inside. These allow for easy remote operation without separate homebrew panels or buttons mounted in tables.

One of the Vanguard's available options is an input extender module that allows selection between five different sources per standard input for two inputs. These selections may be wired separately, creating ten positions, or in parallel to maintain "mixability" between any two of five sources.

One option necessary for most applications is on-air light relays; none are included in the purchase of the console alone. You will also need to supply a monitor amp or provide an amplified monitor speaker for use with the Vanguard.

### Getting the story

In a temporary studio at a busy event, ease of operation is essential. The straightforward design of ATI's Vanguard allows anyone to adapt quickly. There are no extra "mystery buttons" for options you don't have or oddly named features designed for other industries.

The Vanguard is just big enough to have the feel of a real board, but small enough to be moved easily. The 8-mixer

version is just 24"x8"x18" deep, and weighs less than 10 lbs.

Its power supply is external. It's a small metal box roughly the size of a portable cassette recorder, weighing about 10 lbs. The power supply is set up for 120 V, 60 Hz, but it can be user-modified in the field by moving internal jumpers.

The instruction manual is clearly writ-

switches' life expectancy is three to five years in 24-hour on-air use. Unlike the earliest issue of Vanguard consoles, the switches are on a replaceable panel costing about \$180—not an outrageous sum for a part that is infrequently needed and in some applications never replaced.

### Counting the beans

This brings us to one of the most important factors in choosing broadcast products, and one of the Vanguard's best selling points: price. The manufacturer's suggested list price for the 8-channel version (slide or rotary pots) is a modest \$3395, with actual selling prices often \$200 less.

A suggested list of \$4995 for the 12 channel board results in an actual price averaging about \$4600. On-air light relays cost an additional \$125; LED meters, \$350; and the dual 5-source input expander option lists for \$275. All of this plus an additional dual mic preamp for \$150, remote start and stop buttons for \$125 and a spares kit—also \$125—will still keep the price of your



UPI Radio uses the ATI Vanguard board for remote applications.

loaded 8-channel board under \$4500 or 12-channel well under \$6000.

Most major market broadcasters probably would also opt for something larger and more versatile than the Vanguard for primary facilities; however, it's perfect for the extra studio, production workstation, back-up purposes and of course on the road. In small to medium markets the ATI is an excellent candidate for any studio.

Editor's note: For more information on the ATI Vanguard series consoles, contact Neil Glassman at Bradley Broadcast Sales: 301-948-0650, FAX:301-330-7198, or circle Reader Service 50.

ten and has a sense of humor. It makes for worthwhile reading even if you've already figured out this console's relatively self-explanatory layout and wiring arrangement.

The one aspect of the design that worried me was the use of membrane switches for channel and input switching. So far at UPI we haven't had any switch problems; however, our usage has not been fulltime, as might occur in an air studio. Still, these membrane switches also are used in McDonald's cash registers, where they have proven reliable under heavy-use conditions.

The ATI people tell me that the

## WHIM Married to RS-12

(continued from page 53)

jocks. Parts more likely to fail, such as faders and on/off switches, are connectorized for easy replacement. Should the need arise, any PC board can be removed in a few minutes.

The only trouble I've experienced at WHIM is a broken headphone jack. Radio Systems' attentive warranty service put a replacement in my hands the next day.

### Marital bliss

My marriage to the Radio Systems RS-12 at WHIM has proven to be most gratifying. Providence has enjoyed the

console's crystal clear country sounds for over a year; I've enjoyed the console's lack of nagging.

Since your state may not allow marriage to both a human and a broadcast console, please consult local authorities before contemplating matrimony.

Even a close friendship to the Radio Systems RS Series console could prove just as rewarding.

Editor's note: For additional information on the RS-12 console, contact Dan Braverman at Radio Systems: 609-467-8000, FAX: 609-467-3044, or circle Reader Service 118.

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# Auditronics Scores Triple Hit At KRXY

**Affordable Consoles Have Allowed the Station To Enhance Its On-Air and Production Facilities**

by Mark Werner, Asst. Tech. Dir.  
KRXY-AM/FM

**Denver CO** If the transmitter is the cornerstone of radio, then the mixing console should be considered the foundation. It may be the single most important pur-

## USER REPORT

chase a radio station will have to make—after all, every piece of audio that goes on air will pass through it. And our audio is the only thing we have to sell.

Currently, we are using three Au-

ditronics consoles.

The first, a 224, was purchased seven years ago for on-air use, a year later a 218 was added and just recently a 418 was purchased for use in an eight track studio.

the edge connector. Wiring the 418 is almost easy—all connections are Amphinol crimp pin connectors. The one thing you don't want to do, though, is lose the small pin removal tool that comes with the console. If you lose the tool and insert a pin the wrong place you will be forced to cut the connector off and start over.

The thing that made all of our installations easier was to bring all inputs and outputs out to a patch bay. This gave us an insert point for any effects we would ever need at a later date and it also made the final connections easier.

As for control and audio interface, the first console was a little over-designed. A few of its features had to be disabled

**All Auditronics consoles are modular, making it simple to place any of the input modules in any position. The appearance and ease of use of the consoles are good.**

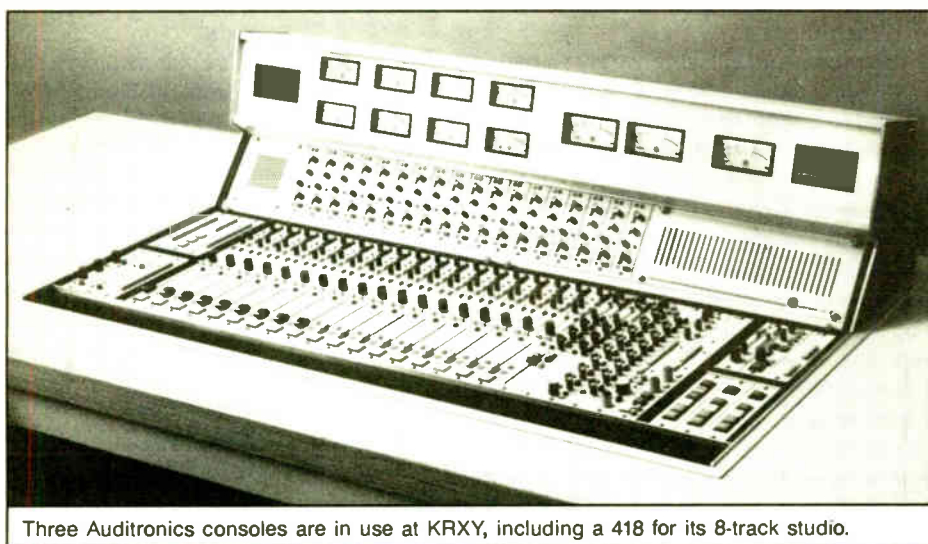
because they just confused the jocks. In newer models the features are now jumpers—you select what you want or don't want, customizing to your station's needs. The audio is straightforward balanced 600 Ohm inputs, with module choices of mono, stereo, line or mic level.

### Reliability is key

At this time, reliability is one of the strongest reasons to purchase an Auditronics. Over the years we have had to replace very few worn-out parts. The one thing that we have had to replace are the

### Modular design

All Auditronics consoles are modular, making it simple to place any of the input modules in any position. In our in-



Three Auditronics consoles are in use at KRXY, including a 418 for its 8-track studio.

stallations we ordered several of the blank panels and custom-made a phone line selector, routing switch for record input, clock control, remote control, etc.

The appearance and ease of use of the consoles are good. Everything is clearly marked and easy to see. On the 200 series we discovered the button lens is the same one that ITC uses for the 99 cart machine. We ordered extra blank red lenses to replace the "ON" from ITC and took them to a local engraver who engraved the various device names. This helps to identify the modules and the appearance is more professional than

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Dymo labels.

When we were comparing consoles for a recent 8-track studio construction project, we got input from the production director. He recommended the Auditronics console for ease of use of the foldback circuit and commented that the console performed comparably to higher priced models from other manufacturers.

The money we saved by purchasing the less expensive Auditronics console—almost \$10,000—allowed us to buy more effects and knowing we were building a room the production director

wanted to work in capped our decision to buy the board.

Your console decision will help or hinder your station for years. If you use every scrap of information at your disposal to make it, you can be confident that you made the correct choice. With Auditronics, we know we made the best purchase for our station.

Editor's note: For more information on any of the Auditronics consoles, contact Murray Shields at Auditronics: 901-362-1350, FAX: 901-365-8629, or circle Reader Service 13.

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# KTAA Starts Right with Ramko

by **Bacilio Maciel, CE**  
KTAA

**Kerman CA** At one time or another, we all find ourselves standing on the threshold of an equipment purchase. We may be building a radio station or production facility from the ground up, we may be replacing equipment that is outdated or was perhaps destroyed by a "green jock" who spilled his soda into the audio console and gave it a sugar-coated lobotomy from which it will never return, or we may be doing a routine updating.

I recently found myself facing the arduous task of building a radio station, KTAA-FM in Kerman, CA, from the ground up. I had to come up with an audio console that would satisfy the gamut of needs that would develop.

Above all I wanted to be secure in the fact that no one down the line would find reason to say, "I don't know what Bacilio was thinking of when he ordered this piece of scrap metal." I needed a console that would be well priced for its capabilities, would have a great deal of flexibility, would be easy to operate and, most of all, be practical without costing the proverbial arm and a leg.

My decision became easy when I came

across the Ramko xL82S. It was priced very reasonably and had lots of features without looking like a control panel from the space shuttle. In short it was extremely easy to use and didn't have bank upon bank of unnecessary buttons and switches.

The two Ramko xL82S consoles I ordered have literally exceeded my every expectation and have proven to be workhorses that have stood up to the use and abuse that has been dished out here at KTAA-FM in our very hectic start-up period.

### A capable gem

Let me tell you a little about the Ramko xL82S and just what it can do. As far as capabilities this little gem will leave you wanting for very little, if anything.

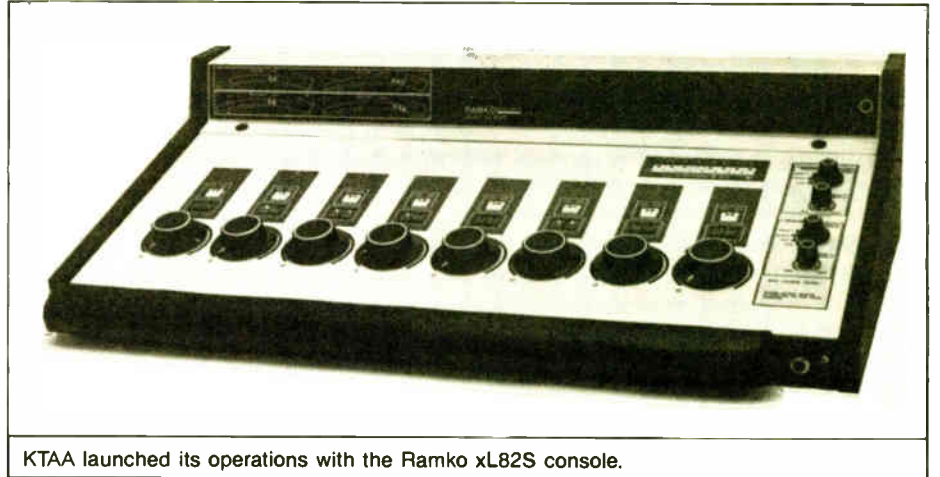
Its program and auxiliary mixers allow the operator to do two separate mixes simultaneously and to monitor each mix separately with a selectable monitoring control. The same is true of the separate headphone selector, which gives the operator the additional option of monitoring one source through the studio monitors and a second through the headphones.

Monitoring is just the icing on the cake, however, because flexibility is the

operative word here. The switchable relays allow for mic or line input capabilities and built-in relays allow for a moni-

In addition, separate meters for audition allow the operator to monitor two separate sources simultaneously without having to switch any selectors.

Finally and perhaps most importantly the unit is lightweight yet extremely durable; it allows for clean and accurate fades and mixing. You don't have to be



KTAA launched its operations with the Ramko xL82S console.

tor mute for various channels as well as for installation of on-air lights without the hassle of complex or additional wiring.

Something we have found very useful

a six-armed mutant to do production, and the channel eight selector is expandable to accommodate additional inputs from various outside sources.

I can truthfully say that my decision

**I can truthfully say that my decision to go with the Ramko xL82S has made me look like a genius.**

here at KTAA-FM is the preset levels on the consoles. We have two versions of the board: one with rotary pots and one with faders. The pots are set to the standard 11 o'clock position; the faders are set at the 0 db setting.

### Easy to read meters

Metering is another facet of the Ramko that I found to be very satisfying. They are practical, easy to read and will please even the space rangers who can't seem to function without a panel of dancing lights to satisfy their high-tech fantasies.

The meters are extremely easy to read as well through the tasteful use of color-coded LED lights that allow for easy meter reading even from a great distance.

to go with the Ramko xL82S has made me look like a genius. It satisfied the budget constraints of my business manager and the boss. It has kept my demanding production director from constantly standing in front of my desk and whining that he can't do this or can't do that.

In short, I solved a veritable mountain of potential conflicts and problems by having the foresight to choose the Ramko xL82S for KTAA-FM. You may serve yourself and your facility well to do the same.

■ ■ ■

*Editor's note: For more information on the xL82S, contact Mike Pardee at Ramko: 916-635-3600, FAX: 916-635-0907, or circle Reader Service 56.*

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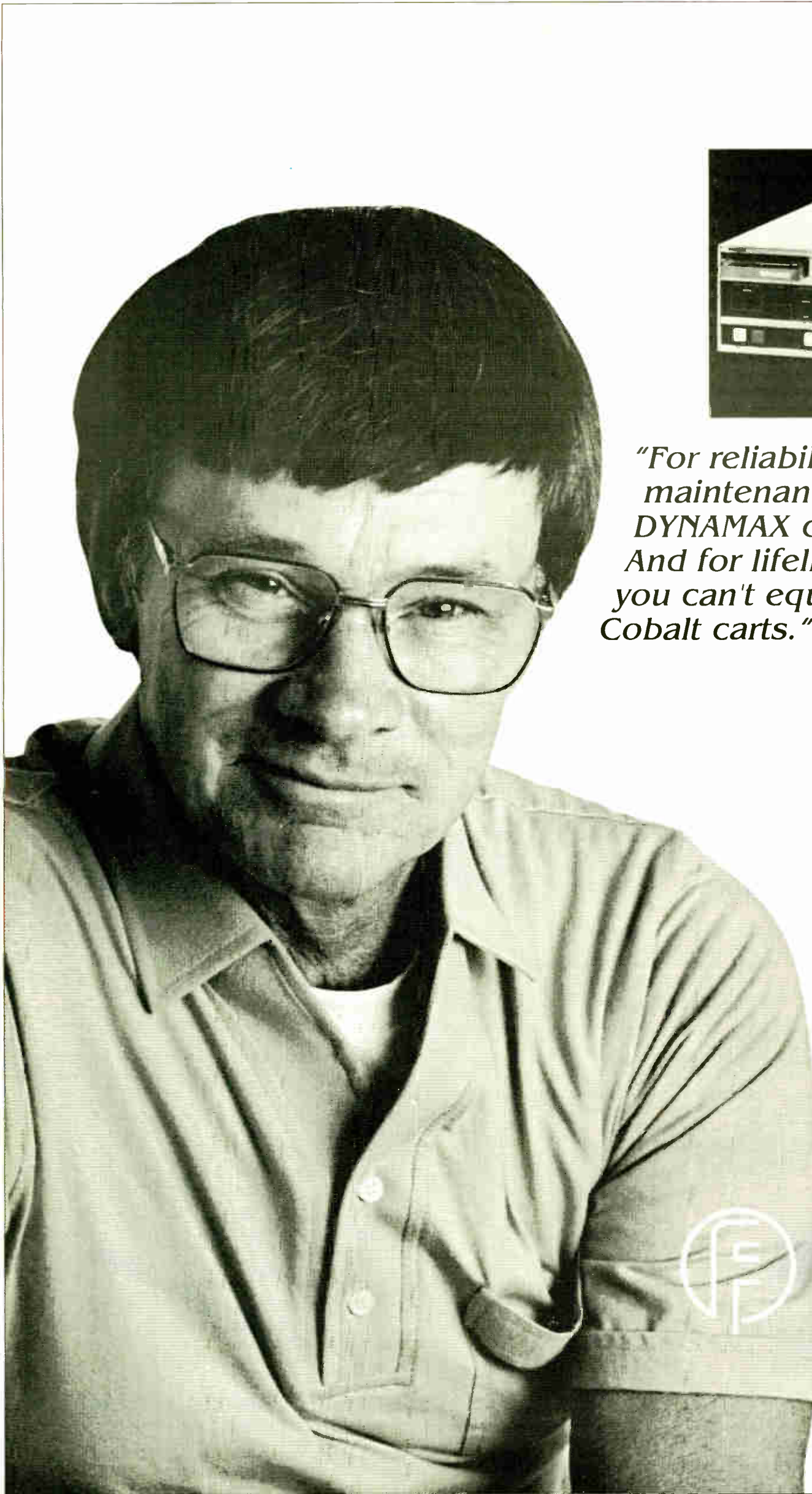
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# Console Trend Analog

(continued from page 54)  
radio stations. In production, he said, there is a move toward multitrack consoles. "Any more, stations in larger markets have to have 8-track production capability. This means there is a trend toward true 8-track type consoles."

"In the past, many stations had used air consoles for their production studios," Esparolini explained. But this move toward production multitracking means a need for on-board EQ, multiple busses and more effects sends; therefore, a move away from air consoles.

News people are also looking for something new, he said. Traditionally these folks have searched for small, three to five rack space consoles. More and more, however, are looking for "real" consoles that are rack mountable, which has led Wheatstone to create a rack mount version of its A-20 console, Esparolini added.

Radio Systems' McLane has noted a need for consoles that are simple to service, reliable and quickly installed. He commented that the decreasing number of engineers in radio means stations are looking for products they can repair themselves, if need be. This means "connectorized guts" in the boards, McLane said, to facilitate changes of switches, for example.

Radio Systems is now providing "tethered switches" so that a station can pop out the old switch and install a new one, without having to solder any con-

nections, McLane added.

PR&E's Madsen commented that some of the greatest changes in consoles are taking place because of the political changes in Europe.

## Cumbersome features

"The international community has always incorporated two or three features in their consoles that manufacturers in the US have considered cumbersome," he said. Now that many stations are no longer nationally supported and have to be concerned with competition, Madsen noted, they have to care more about how they sound.

This means a turning away from such features as fader start, in which a fader simply ramps up to gain, without an on and off button, he said. Also, there is less need for EQ channels—"you don't want the DJ changing the sound of his voice; you want to standardize the sound," he pointed out.

In short, there has been no digital facelift for consoles—as yet, there has been no need, and no demand. But analog consoles are getting better, and manufacturers see stations availing themselves of the new improvements.

"A great number of station owners are improving their facilities in the face of a soft economy," said McLane. "We're looking at a bridge into an era of new technology with solid equipment at an affordable price."

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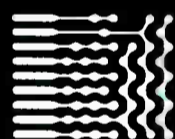
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