

FCC Wants S-Band For Satellite DAB

by Alex Zavistovich

WASHINGTON The FCC has approved a Notice of Proposed Rulemaking (NPRM) on digital audio broadcasting (DAB), officially giving satellite-based technology a portion of the S-band, and is inviting comment on terrestrial systems as well.

The action, undertaken at the FCC's Oct. 8 meeting, also raised questions about the effective implementation dates for satellite- and terrestrially-based DAB systems, and led to a discussion of the importance of localism to broadcasting.

Under the NPRM, the FCC would reallocate the 2310-2360 MHz portion of the spectrum to satellite digital audio services. Current users of that spectrum—mobile and radio-location services—would be reaccommodated at the upper end of the S-band, from 2360-2390 MHz. The services would be allowed to continue operating in their present location until January 1, 1997.

The FCC also approved a Further Notice of Inquiry (FNOI) on terrestrial DAB. Acknowledging what it termed "widespread interest" in terrestrial DAB, and particularly in-band technology, the FNOI will solicit comments on that technology and related issues. An NOI on DAB was first launched by the FCC in 1990.

Damon Ladson of the FCC's Office of Engineering and Technology (OET) Frequency Allocations Branch noted that the action is "identical" to the recent results of the 1992 World Administrative Radio Conference, held in Torremolinos, Spain in February.

Neighbors, localism

In discussing the NPRM, OET Chief Dr. Thomas Stanley, suggested that satellite DAB might be implemented "toward the



Broadcasting During a Hurricane:

WIOD provided the calm during the storm when Hurricane Andrew struck Miami. See our story p. 14.

end of the 1990s," while a "truly successful" terrestrial system may not be in place until after the year 2000.

Although the Commissioners generally acknowledged the value in beginning a proceeding on DAB, they also raised some concerns.

Commissioner James Quello asked Stanley what effect Mexico's and Canada's endorsement of DAB at L-band would have on U.S. implementation. Stanley replied that "the U.S. will participate in coordination efforts" with the countries, noting the possibility of "power and coverage trade-offs."

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EIA Faces Difficult Timetable

by John Gatski

WASHINGTON With yet another system submitted for consideration as a potential U.S. digital audio radio standard, the Electronic Industries Association (EIA) will have its hands full in trying to test and select a standard by late 1993.

The latest system, a joint venture by NASA and the Voice of America (VOA), is the eleventh in the long list of EIA's digital audio radio (DAR) system proponents. EIA plans to begin testing systems by April 1993, and to select a standard by the end of 1993.

Proposals have been submitted by: the Amati Communications Corp., AT&T Bell Labs, Digital Planet, General Instruments, Kintel Technologies, Mercury Digital Communications, Massachusetts Institute of Technology (MIT), NASA/Voice of America (VOA), Strother LinCom, Thomson Consumer Electronics (the U.S. spokesperson for Eureka 147), and USA Digital Radio.

In light of the large number of systems to be evaluated, EIA Consumer Electronics Group VP Gary Shapiro admitted the timetable of testing and selection may be ambitious. "It's a very tight, optimistic timetable, but it's not inflexible," Shapiro said.

An NAB official said the schedule will be "next to impossible" to complete.

The NAB favors the joint industry group NRSC (National Radio Systems Committee) for selecting a DAR standard instead of EIA. The NAB also is pushing for an in-band standard.

Prior to and during the NAB Radio Show in New Orleans, the EIA's digital audio radio process was attacked by broadcasters

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RUNNING RADIO

Radio Hopes For Revenue Upswing in '93

by Pamela Watkins

WASHINGTON Radio operators in the midst of their 1993 budget process are looking for increases in revenue next year. Operators contacted by **RW** are braced for a continued slow pace of recovery and are keeping a close watch on economic indicators. Budgets are geared to improving the bottom line and holding down expenditures. Most believed caution was the most relevant word for 1993.

Paul Fiddick of Heritage Media Corporation said "we're just beginning our budget process but we do see every budget item increasing, that is, revenue, expense and profit, in 1993." Even though Fiddick sees increases, he reiterates that Heritage will "proceed with caution" and with what makes sense financially.

According to several radio groups, operating anywhere from four to 12 stations, single digit revenue growth is expected. However, this growth will be generated locally, rather than nationally.

Growth will be local

"In 1993, we're looking for three to four percent growth overall for

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Aphex Wins Patent Infringement Suit

FRANKFURT, Germany A German court has found the German firm Behringer guilty of patent infringement on a patent held by Aphex for the latter company's aural exciter.

Aphex Systems and its German distributor, AKG Akustische and Kino-Gerate GmbH, initiated the suit in 1987.

"It is unfortunate that it took so long to put a stop to this theft of our technology. It gave Behringer time to copy other products and become established in the marketplace," Aphex President Marvin Caesar said.

In a previous case, Aphex and AKG obtained a letter from Behringer containing an admission of copying the manual for the Aphex Model 612 expander/gate and a promise not to sell any more units with the purloined manual, according to Aphex.

Broadcasters Must Heed RF Safeguards

WASHINGTON The FCC has warned broadcasters that failure to safeguard tower workers from radio frequency (RF) radiation could warrant further action, including fines.

In a recent advisory, the FCC's Mass Media Bureau said some licensees may

not understand their responsibilities "or may not be diligent in protecting humans from RF radiation, particularly in cases where maintenance and repair work must be performed on or near antennas."

The advisory emphasized that broadcasters must reduce power as much and as long as necessary to avoid exposing tower workers to RF in excess of the 1982 ANSI standard.

The Commission adopted RF exposure guidelines in 1985 based on the American National Standards Institute (ANSI) standard. (The FCC is likely to modify its rules to accommodate an updated standard when a new RF exposure standard is approved.)

"The licensee may not refuse to reduce the power on the grounds that it could result in a temporary loss of advertising revenue," the FCC warned. "Further, the licensee may not avoid complying with ANSI guidelines

even if a particular tower crew is willing to accept RF exposure levels.

In addressing multiple users of towers and the special difficulties getting all stations to turn down their power, the FCC said "all licensees are jointly responsible for complying with ANSI guidelines and, therefore, must coordinate maintenance

continued on next page ►

Congress Approves AM Stereo Legislation

WASHINGTON It looks as though the FCC will have to approve an AM stereo standard as it did with FM back in the early 1960s.

Backers of legislation requiring the FCC to select an AM stereo standard have succeeded in getting a bill approved by Congress. At press time, the bill was waiting for signature by President Bush.

A bill approving the AM stereo standard requirement was incorporated in the 1993 NTIA (National Telecommunications Information Agency) authorization. It requires the FCC to begin a standards process within 60 days of enactment and select a standard within a year.

The legislation originated in 1991 when Sen. Larry Pressler (R-S.D.) introduced a senate bill, calling on the FCC to give AM the same technical consideration it gave to FM.

Although still involved in a patent dispute with rival Leonard Kahn, Motorola's C-QUAM systems is the apparent favorite to be selected by the FCC since it is considered the "de facto" AM stereo standard.

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► continued from previous page and repair activities and take any other appropriate steps necessary..."

DMX Withdraws Purchase Plan

NEW YORK Digital Music Express has withdrawn an offer to buy the remaining assets of its former competitor, Digital Planet, but left the door open to a possi-

ble future deal to purchase the assets. Digital Planet was the first casualty of the digital cable radio service war that began in 1990. After failing to secure needed financing, the company furloughed most of its employees last June and is now off the air. Digital Music Express, whose parent company is International Cablecasting Technologies in Los Angeles, had entered into a letter of intent to buy and put \$1.2 million into escrow, but "we

could not come to an agreement," DMX President Tom Oliver said. Oliver noted that DMX is still "on friendly terms with the people of Digital Planet and whether they come back to us with another idea, who knows? These things move hourly."

License Pulled for Tower Light Violation

JACKSON, Miss. The FCC has revoked the license of WOKJ(AM) for tower lighting violations over a five month period that the station was off the air. The FCC said it pulled the station's license because of the seriousness of the violation and "misleading suggestion" that the lack of tower lighting would be rectified. The unlit tower is located near an area airport and was dangerous to air traffic navigation, according to the FCC. The Commission lowered the original fine from \$20,000 to \$8,000.

DAT Bill a Done Deal

WASHINGTON At press time, the Digital Audio Recording Act (a.k.a. the DAT bill) was awaiting the signature of the president after it was approved by congress in early October. The bill will impose a royalty on consumer blank digital media and digital recorders sold in the U.S. The bill also mandates copy limiting techniques on the recorders, such as the Serial Copy Management System (SCMS). With tremendous support from the electronics industry and music publishing

groups, the final bill was approved by Congress in early October. Although not designed to affect professional products, opponents predicted that professionals who rely on the less expensive consumer DAT recorders would be affected by the copy limiting function.

EIA Faces Difficulties

► continued from page 1 because they believe the proposed standard voting arrangement favors the receiver industry. The proposed voting bloc gives broadcasters two votes, the receiver industry four votes and one vote each for satellite interests, software manufacturers, broadcast equipment manufacturers, radio networks, the semiconductor industry and the computer industry. The EIA said the voting bloc was not designed to minimize broadcaster input. Shapiro explained that the subcommittee, which contains broadcasters, will recommend a standard only by "consensus," and the voting bloc only comes into play when the standard is forwarded to the FCC for consideration. Shapiro also challenged the NAB's support of an in-band digital broadcasting standard before testing of all the technologies is completed. "What we are not going to allow is the NAB to select a system from the beginning and push that system," he said. "All systems will be tested first."

RBDS Mark Progresses

by John Gatski

WASHINGTON The U.S. should have an RBDS (radio broadcast data system) standard in place by early 1993.

The National Radio Systems Committee (NRSC) RBDS subcommittee will meet Nov. 10 to try to accommodate the few objections voiced in the RBDS ballot comments that were due Sept. 30, according to John Marino, the NAB's manager for technical regulatory affairs and an NRSC coordinator.

Marino said there were only two of 40 ballots that commented negatively on the proposed standard. If those objections can be resolved, the full NRSC probably will vote on the standard during its January meeting at the Winter Consumer Electronics Show in Las Vegas, he said.

RBDS is closely patterned after the European-developed technology RDS—a 57 kHz digital subcarrier that enables a radio station to communicate directly with receivers. The technology can provide text display, automatic station search via format, emergency alerting, and switching between multiple transmitters. The standard also will include ID Logic B that allows stations to be selected by format on AM via an internal computer in the receiver.

As expected, Marino said the objections received by the RBDS subcommittee concern the PTY (program type) codes that are assigned to music formats.

The digital codes have to be transmitted by the broadcaster to enable RBDS's format scanning feature to work. Some stations have objected to the proposed 21 format categories because they do not cover all format variations.

For example, there is only one country category in the standard, but some stations broadcast more specific types of country music, such as "classic country" or "new country." Also, there are three rock categories: rock, classic and soft rock. However, there are more specific rock formats as well, including alternative and heavy metal that are not included in the standard.

Proponents of the standard, however, said that RBDS formats are a general category for each format, and more narrow format options would complicate receivers for consumers. The proposed standard already has 21 PTY format codes with two spare PTY codes overall.

Marino said the NRSC is confident all objections can be satisfied before the standard is implemented.

Once the standard is approved by NRSC, it will be forwarded to the American National Standards Institute (ANSI) for standardization through that organization. Because RBDS is a subcarrier, the standard will not need FCC approval.



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Alphabet Soup and DAB

by Alex Zavistovich

WASHINGTON Acronyms. Anyone that's ever read a trade publication has had to deal with the flood of abbreviations and acronyms that make up the industry. Radio's no slouch in that department, with such whoppers as AQH, LMA, TSL, STL, RPU, RBDS...

Then there's digital audio broadcasting (DAB). What a headache. Although it's a fairly new subject, DAB has already spun off enough abbreviations to melt the wheels on your Captain Video decoder ring. Now, the FCC's Office of Engineering Technology (or should I say, OET) is foisting another one on us, with its recent DAB NPRM (gee, this is getting serious).

Just a quick review to bring you up to date. In addition to DAB, we've got DAR (digital audio radio), courtesy of the EIA (Electronic Industries Association); DRB (digital radio broadcasting), from Skip Pizzi of the CDRB (as in "Committee for..."); and BSS ("broadcast satellite service"), to say nothing of the more technical stuff like ASPEC, MUSICAM, ACT and COFDM. I won't even get into these last few: it's just too mind-boggling.

Now OET has unveiled a new one for you: "Satellite DARS," for "digital audio radio services." Never mind that it's only one "S" away from the EIA's DAR; the only explanation the OET has for why DARS is being coined is that DAB refers to terrestrial service, while Satellite DARS can include both

satellite and terrestrial issues.

OK, so I'm a little new to this whole thing, but if the principal difference between DAB and Satellite DARS is that DAB doesn't include a provision for satellite, why don't we just call one DAB, and the other Satellite DAB? Isn't that what most people do anyway? Am I missing something?

If I am, then so are some of the Commissioners, it seems. Ervin Duggan was worried that we might be the victims of "terminological coercion," and Chairman Al Sikes said it was all "tiresome at best."

★ ★ ★

One acronym I'm not sorry to see being developed, though, is "DMA." It stands for "Digital Manufacturers Alliance," and its inaugural meeting was held at the AES show in San Francisco.

The problem that led to the formation of the DMA is a lack of consistency in the implementation of the AES-EBU digital interface. Different companies, it seems, have differing levels of implementation, particularly where channel status is concerned. When you don't have compatibility, various pieces of digital equipment can't talk to one another. In the case of recorders, like DAT or other digital formats, manufacturers have discovered that if the end user can't get his digital interface to work, he ends up using the analog interface to make his transfers. That works, of course, but then he's paid the higher price for digital equipment to

record in the analog domain. Not a very good solution.

Enter the DMA. The basic plan, as I understand it, is to develop some data base of information so that manufacturers and users can know whether channel status information can be passed through a given product.



That's a good idea. Of course, the inaugural meeting *did* have some trouble getting off the ground. I mean, even though everyone was there to do something for the good of the industry, Panasonic's Steve Woolley first had to put to rest some concerns that there might be an ulterior motive at work. After all, the project *might* be of greatest value to Panasonic, whose SV-3700 DAT recorder is one of the products that's having trouble with incompatibilities (for the record, though, I think everyone concedes that the company's implementation of AES-EBU is above reproach).

★ ★ ★

Bob Finger, vice chairman of the AES's standards subcommittee on digital audio, shed some light on the society's standards-setting process. After the scope of the task is determined, a particular working group is assigned to write the standard. Then comes the "investigation" period, in which a draft standard is published in the AES Journal, to be opened for comments and revision.

The digital interface standard, Finger explained, has two parts: the electrical portion and the channel status portion. But there are levels in the implementation of the interface, divided along professional and consumer lines. So the AES set up "minimum," "standard" and "enhanced" criteria for implementation, just to try to find out what's out there and how it's being used.

Finger did explain the problems in developing a standard by the AES. First, he pointed out that the standards process is a "voluntary activity," and that "geographic" problems make regular communications difficult (except, I suppose, at conventions, where everyone's under one roof).

More importantly, he explained, "AES is not a compliance organization." He said, therefore, it was up to manufacturers to "police themselves" (an endorsement, I guess, for a group like the DMA.)

★ ★ ★

So, what was the upshot of the whole meeting? I think a number of companies, including Symetrix, Lexicon and Panasonic are committed to assembling some type of database, maintained on a computer bulletin board service such as CompuServe.

This service would be a clearinghouse for information from various manufacturers as to how the AES-EBU interface standard is implemented in their products. It would also provide a forum for users to let equipment manufacturers know what doesn't work with what.

If you want more information on the DMA, call Steve Woolley at 714-373-7277, or Mel Lambert at 818-753-9510.

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Addendum to WJAG's legacy

Dear RW,

I was reading the latest RW and saw James Wold's article, "Radio's News Legacy Began at KDKA," dated Aug. 5, 1992. Within that article, he mentioned WJAG, Norfolk, Neb. as beginning a daily news broadcast as early as 1922. As a licensed station, we did officially start operation in 1922; however, the station was in operation several years before the Federal Radio Commission started licensing procedures.

An interesting note is that WJAG is probably the only station in existence that is still owned by the original founding family.

We appreciate articles about radio's past because WJAG has been so much a part of radio's history, and we continue to strive to keep it a powerful media.

Keep up the good work.

Tony Wortmann, CE
WJAG/KEXL
Norfolk, Neb.

American Digital

Dear RW,

Thank you for your sensitive reporting editorial on American Digital Radio's withdrawal from the EIA digital radio broadcasting race (RW, *Pilot Tone*, Sept. 23, 1992). I have to admit that I was feeling down, and your comments helped me realize that ADR's participation was a positive force in the development of digital broadcasting.

Ted Schober
American Digital Radio
Haddon Heights, N.J.

N.Y. skyline controversy

Dear RW,

Interesting article on the 11-station common antenna for the Empire State Building in New York City. Only the picture on page one of the issue shows the Chrysler Building without the "needle" on top.

Come on, guys. You must have watched "King Kong" on TV some time. There's

no cylindrical section on the Chrysler Building for Kong to hang on to while fighting off the biplanes.

Gordon M. Pugh, P.E.
Manhasset, N.Y.

Dear RW,

Mary Gruszka wrote a great story about ERI's new FM combiner (RW, Sept. 23, 1992). But someone should check Gene Badio's graphic—sure looks a lot more like the Chrysler Building, rather than the Empire State Building.

No name provided
MUZAK
Stamford, Conn.

Dear RW,

This is mainly a long overdue compliment regarding your publication, which continues to be a huge asset to my advancement of knowledge in the broadcast media. In the Sept. 23, 1992 issue, the cover story "ERI Designs New York FM Combiner" featured a computer-generated rendering of New York City from high atop the Empire State Building.

Kindly advise me as to the availability of this photo or litho for purchase as I'm sure many readers of RW would like to acquire a reproduction of the photo used in conjunction with the story.

Joseph A. Morinelli
Drexell Hill, Pa.

Editor replies: Wow. I like letters, but you wouldn't believe the number of calls and letters we received on this whole N.Y. graphic thing. And what variety, too: "The Chrysler Building isn't that color." "There's no such perspective on New York." "The Empire State Building's nowhere near the Chrysler Building" ...

Well, on the one hand, all those calls and letters were perfectly correct. That wasn't the Empire State Building on the front page, and the Chrysler Building isn't that color. On that, I have to cry "uncle."

On the other hand, I have one item to bring to light, in the hopes that it might clear up this whole front page brouhaha, and stem the tide of disgruntled correspondence from friends of the Big Apple. That is: It was never supposed to be the Empire State Building.

Honest. It was just a computer-generated overhead view of the New York skyline, which we thought looked pretty cool, and conveyed that cosmopolitan, big-city flavor. (We have one reader, Joseph Morinelli, who thought it looked pretty cool, too.) Notice that the caption only refers to New York, where the Empire State Building is located, not to the building itself.

I guess it was an error in judgment. Still, I hadn't expected such a maelstrom of controversy. After all, if I had run a photo of the Golden Gate Bridge with the caption, "AES show comes to San Francisco," I wouldn't get letters saying, "Hey, that's not the Moscone Center, that's the Golden Gate Bridge," would I? Then again, maybe I would.

So, allow me to extend my apologies for any unintended confusion that our artistic excesses may have caused. And please don't blame Mary Gruszka or graphic designer Gene Badio for this debacle.

Counting Radio's Assets

Radio operators may be hard pressed to find a silver lining in today's economic climate, but the long-term outlook for the medium is encouraging.

No doubt, tough times remain and there is no easy money to be made. But many of the problems afflicting the industry are extraneous to the business. For example, the

shortage of capital to purchase stations is more a repercussion of bad business decisions that bankers made a few years ago than it is a reflection of the medium.

Financial speculators who came into the business to make a quick buck and get out are mostly gone. Those with no ability to be broadcasters have fallen by the wayside as well. The industry is consolidating through the use of local marketing agreements (LMAs) and through the relaxation of duopoly regulations. Those remaining are operators with the resiliency and know-how to survive.

Technology is lending a hand in helping to cut costs and improve the quality of the radio product. Creative operators who can combine technological enhancements with management skills to run lean, profitable operations will be poised to gain the greatest benefits of all.

Savvy engineers should be aware that smart owners are looking to use technology to their station's advantage. Engineers that steer the change to a more effective operation will be those that remain indispensable.

From an owner's point of view, the survivors are those who have learned to be smart marketers, aggressively selling themselves in every possible way.

The upside is supported in two ways: (a) Radio currently underperforms. The medium gets roughly 8 percent of total advertising revenue yet accounts for about 40 percent of media consumption; (b) Of potential benefit to radio is the shift of agency clients from mass-reach advertising to targeted advertising (cable and niche magazines have led the way).

An increase of just 1 percent in radio's share of advertising would generate more than a billion dollars for the industry. Better sales efforts, leaner operations, enhanced technology and focused marketing efforts will prove radio to be a fundamentally sound business for years to come.

—RW

They were just innocent pawns.

To our health

Dear RW,

I write to mourn the passing of Recording-Engineering-Production (REP), because although it was not a direct competitor with RW, it was a valuable addition for those of us who apply audio techniques used in that field to radio broadcasting.

The editor of REP writes in the final issue that his magazine has fallen victim to a decline in sales of studio equipment. I can't help but wonder if the same thing is happening as broadcasters try to make existing gear last longer.

It is there that RW plays an even more critical role, because engineering staff may have to "make do" with equipment being used far beyond its expected or designed life span. And I hope that even more attention can be paid to providing articles on the care and maintenance of this older technology.

Please especially don't forget the oldest "radio" still in use: AM. I know that the big money is in FM these days, but there's so much good to preserve and protect among small but long-time AM broadcasters, that we could use some help from colleagues who have an appreciation of tubes, rotary pots, and open-wire feed lines.

And I wish RW the best of health at a time so many radio stations are feeling a crunch in development capital to improve the technical side of their facilities. At least you don't have to fear a new owner plowing the place under and developing the real estate for many times

the profit that could ever be had from "broadcasting."

Ed Bateman, engineer & owner
Bateman Consulting Services
Lightfoot, Va.

Editor replies: True enough. Thanks, Ed, for the best wishes for our continued good health. We here at RW look to the future with new ideas and renewed energy. We are committed to providing our readers with the news and applications-oriented columns they need to get the most of their business, whether AM or FM, engineering, management or production.

You can count on RW to be the authority in radio broadcasting, and a source of expert advice. Remember, though, that to be its most effective, RW relies on interactive participation with its readers. Technical tips for Workbench, suggested topics for our columnists, even guest editorials and letters to the editor are welcomed by the RW staff. Although we don't have space to run everything that comes our way, it all helps shape our view of the industry we cover, and makes the publication better and more useful.

Correction

In the Sept. 23 issue of RW, the "Changing the Links in the Audio Chain" *Running Radio* story on page 26 incorrectly listed the Cutting Edge Unity 2000 under the "digital audio processing and analog stereo generator hybrid." The correct category for the Unity 2000 is "analog with digital control."

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New SEDAT OSI System Introduced

by Frank Beacham

ATLANTA Scientific-Atlanta, in an attempt to become the radio industry's de facto standard in digital audio compression technology, has announced it will publish the interface specifications for its SEDAT system.

An industry working group on digital interface standards, however, at present is leaning toward AES-EBU as a broadcast equipment standard.

The Scientific-Atlanta specifications will be called SEDAT OSI (open systems interconnection). By publishing the proprietary data, Scientific-Atlanta, which now claims

compressed forms, the company said. The compressed interface will be SEDAT-based; the non-compressed interface supports the AES-EBU standard.

Building upon a single interface design also will lower engineering and development costs for manufacturers and result in more modestly priced equipment for broadcasters, said Kent Malinowski, vice president of Scientific-Atlanta's Broadcast Radio and Data Systems.

"Last year, SEDAT technology was adopted by three of the world's largest radio networks," Malinowski said. "As standard-bearer, this is our logical next

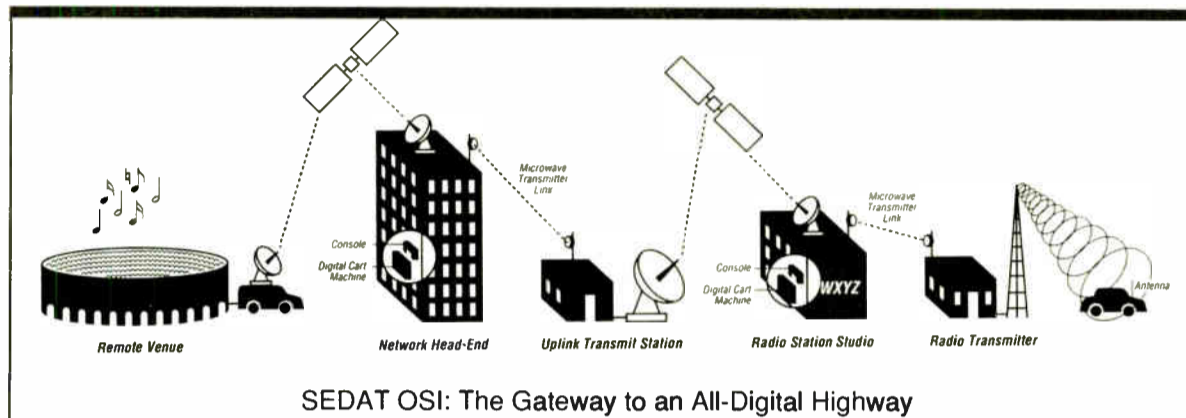
equipment. About 50 industry leaders have formed an ad hoc group to explore an interface standard. The group's chairman, Bob Weirather, director of marketing for Harris Corp.'s Broadcasting Division, said the manufacturers applauded the idea of an open architecture approach but are not endorsing any single manufacturer's compression scheme.

Weirather said the SEDAT OSI proposal is the first one from a major manufacturer and suggested it could be a strong industry contender for the delivery of satellite signals. But, he said, most manufacturers now seem to favor the AES-EBU interface "to

demonstrating how individual devices can mix together in the chain.

Both ABC and CBS Radio Networks converted their satellite audio transmission to SEDAT from Scientific-Atlanta's DATS system in July, 1991. In September, 1991, IDB Communications made the same conversion.

The company also introduced a new generation of satellite digital radio and broadcasting products which for the first time feature SEDAT technology in chip form. The new products include two receivers, two audio decoders and a new generation of audio uplink head-end equipment.



to have 75 percent of the U.S. market, also could help solve an industry problem by allowing an entire range of professional audio products to communicate along an all-digital transmission highway.

According to the company, SEDAT OSI permits, for the first time, a direct compressed digital connection between digital audio devices without the necessity of a decode/re-encode process. Reducing multiple decode/re-encode processes helps preserve digital audio quality throughout the broadcast audio chain.

Digital to digital

By using SEDAT OSI in their equipment designs, manufacturers can build broadcast equipment that provides digital-to-digital connections, both in compressed and non-

step. We have a responsibility to publish interface specifications so others may build peripheral equipment that is compatible."

Scientific-Atlanta also is developing chips that incorporate the company's interface and encode/decode circuitry that can be used by manufacturers in their products. If SEDAT OSI is incorporated into a wide range of equipment, it would create a series of compatible devices to allow broadcasters to receive, record, edit and broadcast programming entirely in the digital domain.

Looking for an interface

The Scientific-Atlanta announcement comes at a time when audio equipment manufacturers are attempting to arrive at an interface standard for digital broadcast

programming to affiliates, resulting in significant cost savings for both the networks and the stations.

Shortcutting conversion steps

ABC's Robert Donnelly, general manager of the network's satellite systems operation, said a major question facing the industry is how digital broadcast equipment is going to work together. "The interoperability of one digital format to another is a major issue," he said. "Right now things hang together only because people are very careful and because there's a lot of non-compressed material being used."

Scientific-Atlanta's challenge to make OSI successful, Donnelly said, is to vigorously explain to broadcasters the benefits of not only using digital systems but of

hand around" signals in the studio environment. "How AES-EBU fits with the OSI concept is to be seen," he said.

ABC Engineering Vice President Richard Martinez, a SEDAT user and supporter, said SEDAT OSI will make it easier to transmit radio

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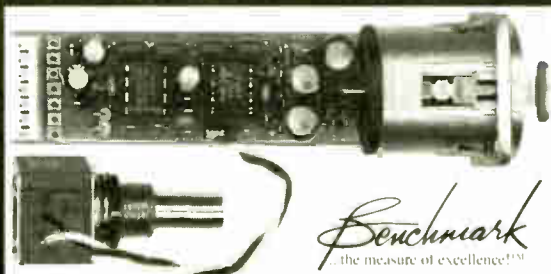
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U.S. Air Space Invaded by New Audio, Video Services

by Frank Beacham

NEW YORK USA Today's Sky Radio has begun transmitting two channels of live, satellite-delivered audio broadcasting to passengers traveling domestically in commercial airliners.

Designed to provide travelers with around-the-clock news, business, sports and weather coverage, USA Today audio broadcasts are now available to passengers on a few domestic United Airline flights. Over the next few months, United's entire domestic fleet will be equipped to receive the audio feeds.

USA Today, publisher of the daily satellite-delivered national newspaper, is offering a constant wheel of advertiser-supported live news, financial reports, sports scores and weather reports to passengers from a programming center at the newspaper's headquarters in Arlington, Va.

In addition to its main satellite-to-aircraft channel, the newspaper is also offering a second 24-hour, ad-supported, all-sports channel.

Each airline receiving Sky Radio is equipped with an antenna and a multi-channel satellite receiver manufactured by ComStream Corp. of San Diego. The

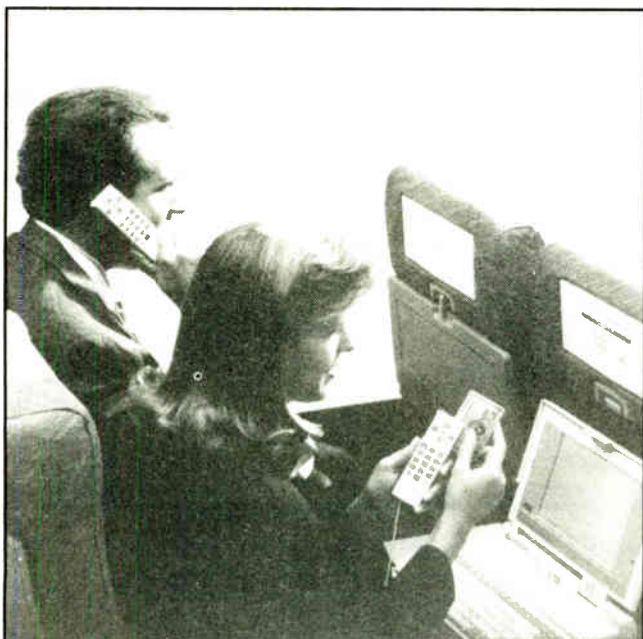
small receiver/audio processor installed in the aircraft receives the signal, processes the information and distributes the sound through the cabin's existing in-flight entertainment system.

The antenna, protected by a small aerodynamic radome cover, is mounted on top of the aircraft and tracks the satellite's signal throughout the flight. The system uses a special adaptation of the MUSICAM digital compression algorithm, which makes it possible to transmit multiple channels of audio.

ComStream also supplied digital audio encoder/multiplexers, digital satellite modems

and its PC-based Audio Network Management System to Sky Radio. The uplink system converts the audio input from the Sky Radio studios into digital signals for

continued on page 11 ►



In-Flight envisions a host of airborne audio and video passenger services.

Delta Air Lines also has contracted with USA Today for the service and will begin to offer the broadcasts soon. Delta and United represent two of the top three domestic airlines.

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MD "Cart Machine" Bows at AES

by Alex Zavistovich

SAN FRANCISCO Although product introductions at the Audio Engineering Society (AES) convention here focused on professional audio, Sony used the show to introduce a mock-up "cart machine replacement" built around the company's Mini Disc (MD) technology.

The MD cart was one of two such products on display at the AES show. The second, from Digital Broadcast Associates (DBA) was a floppy disk-based design utilizing the new "Floptical" disk drive.

The Sony cart machine mock-up, which featured external design only, was unveiled on the opening day of the AES show, Oct. 1. Mike Sekiguchi, product manager for Sony's Business and Professional Group, said a working prototype of the MD cart machine would be ready in time for the NAB's spring convention in Las Vegas.

According to Sekiguchi, no price has been set for the cart machine, which will come in record/play and play-only configurations.

Because AES is not a big draw for radio engineers, "it was hard to estimate reaction" to the MD cart machine's debut, Sekiguchi said. Still, he noted that some equipment manufacturers stopped by to inquire about Sony's plans for licensing the technology.

According to Sekiguchi, Sony is "quite open to any customer for licensing discussions," and he acknowledged that the AES show did yield "some inquiries."

Still, "it is too early to tell" what will happen regarding MD licensing, Sekiguchi added.

Close to CD quality

The MD is a magneto-optical disc-based recording and playback system that stores up to 74 minutes of stereo



A product destined for the broadcast market, Sony showed a Mini-Disc mock-up that could replace the cart machine.

audio on a single 2.5-inch disk. The system uses Adaptive Transform Acoustic Coding (ATRAC) to compress the audio,

yielding audio reproduction comparable, but not equal, to that of compact disc, according to the company. It includes a

DeBry's Digital Broadcast Associates (DBA). This record/playback unit, first shown in prototype form at the 1990 NAB spring convention, now uses APT technology for 4:1 source compression. The device delivers FM-quality audio with frequency response up to 15 kHz.

The pivotal point in DBA's develop-

Sony introduced a mock-up "cart machine replacement" based on Mini-Disc technology.

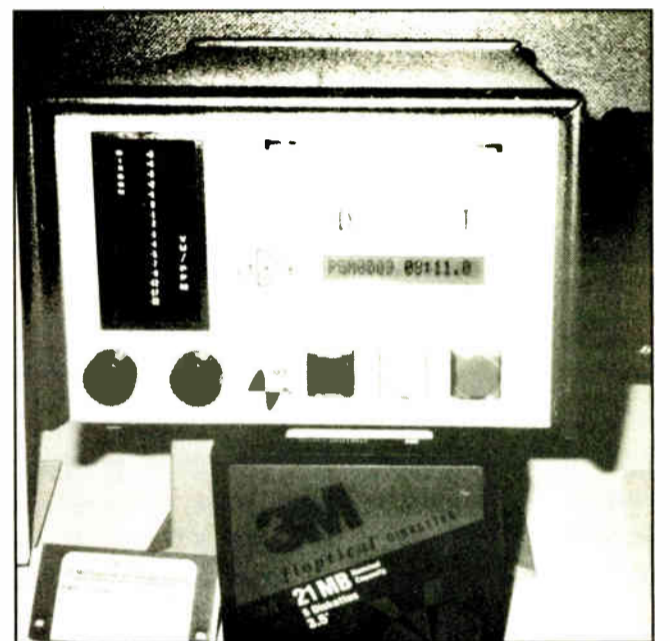
10-second memory buffer that allows the MD to continue tracking the program even when the unit is jostled or the disc itself is accidentally removed.

The front panel display of the MD cart record mock-up at AES included left and right channel LED metering and secondary and tertiary cue tone buttons. The design was created to emulate front panel controls of today's NAB-style cart machines, Sekiguchi said.

Talk of the MD's potential cart machine applications has followed the technology from its introduction at the 1991 Summer Consumer Electronics Show in Chicago. At a Sony products exposition in Washington D.C. this past summer, Ron Renschel, marketing manager for Sony professional audio products, reaffirmed cart machine possibilities in MD's future.

MD media is expected to cost approximately \$8 for a blank disc.

ment of its cart machine product came with the introduction of the "Floptical" disk drive. The Floptical is a product of Insite, and the technology is supported by the Floptical Technology Association, a consortium of companies owned in part by 3M and Hitachi Maxell. The drive uses 21 megabyte (21MB), 3.5-inch floppy

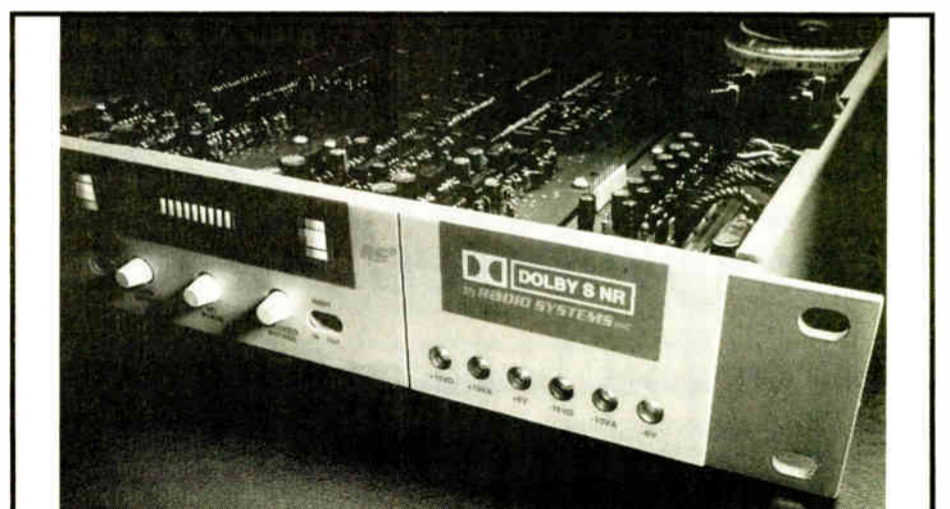


Digital Broadcast Associates "Floptical" disk-based cart machine also was shown at the 1992 AES Convention.

"Floptical" storage

Also on hand at the AES show was a floppy disk-based machine from Ron

py disks, providing storage equivalent to 28 720 kilobyte or 14 1.44MB floppy disks, according to the consortium.



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FCC Wants S-Band Spectrum for DAB

► continued from page 1

Commissioner Ervin Duggan asked Stanley whether the action undertaken in the NPRM would be a threat to localism, and how the concept could be preserved in the face of satellite-based DAB implementation. Stanley maintained that the issue raises a "question of relative values"—that is, localism versus "quality."

Satellite DAB "is not necessarily the death knell of localism," Stanley said, although he pointed out that broadcasters have to consider "economic pressures" for providing digital-quality audio. "If localism has value, existing broadcasters will find a way of seeking it out," he said.

Transitional rules?

Chairman Al Sikes also discounted satellite DAB's threat to localism and terrestrial

broadcasting. He pointed out that audio tape and CB radio did not undermine radio in automobiles, despite such fears when those technologies were introduced.

Sikes also noted that, if the next four to seven years are spent developing terrestrial DAB, and the FCC sets up transitional rules for DAB implementation, terrestrial broadcasters will find a continued market based on the strengths of the medium.

Still, in a separate statement, Commissioner Duggan said he remains "committed to shoring up radio's ability to provide the vital local service...that the Communications Act requires. In my view, localism remains a touchstone value of broadcasting." He advocated a "hybrid" system of satellite service

complemented by terrestrial offerings.

In response to the FCC decision, Satellite CD Radio applauded approval of the NPRM. The company offers a satellite-based system that would deliver CD quality audio programming to radio receivers in cars and other locations.

According to Robert D. Briskman, president of Satellite CD Radio, "On the present course of events, American consumers will be able to buy radios capable of receiving nationwide 30 channels of commercial-free, CD-quality music by 1996."

Because Satellite CD Radio is a subscription service and will be a music-only format, Briskman said the service "will not compete with local radio stations."

The NAB had another opinion of the NPRM. NAB Legal Counsel Jeff Baumann said the FCC "was rushing to judgment on satellite DAB, and the prospect that satellite development might be placed ahead of terrestrial DAB is troubling."

Baumann balanced his comments, however, by thanking the FCC commissioners for their "recognition of terrestrial broadcasters' needs for digital technology and their sensitivity to localism."

Adding to the already crowded realm of digital acronyms, the NPRM also attempted to coin a new acronym for satellite-based DAB: satellite-DARS (digital audio radio services).

According to the OET's Ladson, DAB would refer to terrestrial implementation of the technology, while DARS would embrace satellite and terrestrial applications.

Airline Audio, Video Services

► continued from page 9

transmission to the satellite and then on to the aircraft. The network includes a backup system.

USA Today has future plans to use the digital system for video transmission as well.

While Sky Radio uses satellite technology, a competitor, In-Flight Phone Corp. of Oak Brook, Ill., plans to market a 12-channel audio network to function with its new digital air-to-ground telephone service, said Darren S. Leno, In-Flight's director of communications.

In-Flight recently joined with Harris Corp. of Melbourne, Fla., to design and build the \$4.7 million multichannel audio ground-to-air system. The audio service will operate in the 900 MHz frequency band under the authority of an experimental license issued earlier this year by the FCC.

The airborne broadcast network will transmit programming to aircraft from ground sites blanketing the U.S. A special on-board receiver compensates for doppler shift that would otherwise disrupt the pitch of the audio, the company said. The feed is distributed digitally through the aircraft cabin to passengers.

The network also will carry 24-hour-a-day programming of live sports, news, entertainment and sports programming. Passengers will be able to plug their "Walkman"-type headsets into a jack in the armrest and choose programs from an LED menu display.

By interfacing the audio channels with In-Flight's FlightLink digital phone system, passengers will be able to choose from a diverse menu of programming.

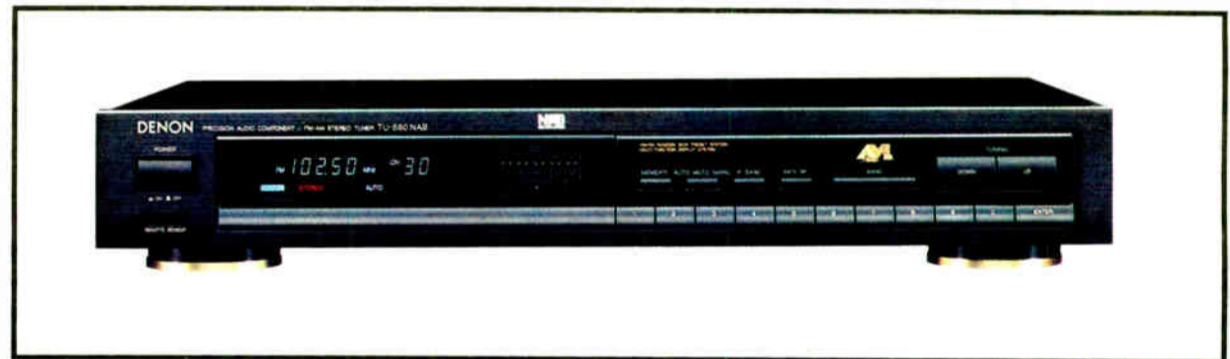
The system offers a variety of services including digital telephone calls, fax transmission, stock quote retrieval and electronic games. Eventually services will include airport layout, car, hotel and flight reservations, a service and entertainment guide to the destination city, flight positioning, a connection for portable computers, gift ordering and in-flight shopping, according to the company.

Although contractual negotiations continue, In-Flight programming is expected to be available soon on some domestic U.S. Air and American Airline flights.

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- Walsh function FM stereo decoder for the best possible immunity to noise and interference
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DENON Speakers (SC5.5)	\$189.00	\$200.00	\$10.00
Antenna	\$85.00	\$90.00	\$2.00
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Q-TIPS

Develop a Job-Hunting Strategy

by John "Q" Shepler

ROCKFORD, Ill. Jobs. They're a hotter topic of conversation than either politics or the weather.

The published unemployment rates tell only a fraction of the story. When you adjust those numbers for the fact that high pay, high-tech jobs are progressively being replaced with minimum wage restaurant and clerical positions, the frightening truth is that decent jobs are getting very hard to find.

With business still sluggish, I thought it might be a good time to put together a collection of job hunting strategies. I hope this

will be a help to both those who are between gigs and the rest of us who are concerned about what might happen tomorrow.

Who and what you know

Remember the old saying: "It's not what you know, it's who you know?"

Well, it *is* what you know. Your specific skills are what's in demand right now. Nobody seems interested in buying general talent for grooming.

Guess what else? It's also *who* you know. Personal contacts can get you considered ahead of other candidates and even before the job is officially open.

Working those personal contacts is also

known as *networking*. It's a simple idea. You call as many people as you can think of and ask them for job leads. If they don't know of any potential jobs, it's important that they give you a couple of names of people who might. This way, you always have more references to call. Eventually, one of these contacts will pay off in a job offer.

Most of us are a little queasy about calling up friends, not to mention strangers, asking for help. You'll feel a lot better if you keep the calls friendly and don't pressure anybody for a job. Just let them know you're snooping around for leads, not expecting a handout.

Personal contacts are by far the best way to land a job or gain a better position. As many as 80 percent of all openings are filled without ever advertising the position.

Advertised jobs are definitely worth pursuing, although it's hard to know when you've found all the ads. Start with your local paper and the Sunday paper for the nearest large city. Don't be disappointed if you don't see many interesting ads. These sources tend to pay off only a few times a year.

Comb the want ads

Trade publications are a better source. **RW** runs both "Help Wanted" and "Positions Wanted" ads every issue. Position Wanted ads are free.

Check every trade publication you can find. If you have an engineering degree and want to work as an equipment designer, check the ads in *Electronic Engineering Times* and *Electronic Design News*.

There are papers that specialize in jobs. Some can be found on newsstands. One, *The National Ad Search*, can be found at the library or by subscription. The main focus is on higher level professional and managerial positions.

I've also stumbled on to another interesting source of job ads. Prodigy, the computer dial-up network, has a feature called Adnet that lists jobs by category.

There are almost always some listings for Radio and TV jobs including on-air, copywriting, promotion, and engineering.

Recruitment pitfalls

Ever been contacted by a recruiter? These are people who make their money matching candidates with employment openings. Most today are paid by the employer as a percentage of your starting salary. I'd stay away from anybody who wants you to pay.

I've had good luck with recruiters and recommend you talk with them. Just keep a couple of points in mind. Be sure you understand what is being offered.

Recruiters will try to make the jobs sound perfect, much the same way real estate agents try to make every home sound perfect. Nail down location, duties, and ballpark salary before you get too far into the conversation.

Also, don't expect the recruiter to go job hunting for you. They're paid to fill the jobs they have orders for. Often, though, if you make a good impression, your resume will remain on file until a suitable position becomes available. I got lucky on one that had been filed away for two years.

If all else fails, take the direct approach. Get a directory for all the stations and other companies that you will consider working for, and either call or send them a letter. Just like other forms of direct mail, the response won't be huge. Then, again, you only need one job.

I can honestly say that I have gotten jobs using all the above techniques. I've also gotten a lot of rejection over the years. It's not unusual to have the door slammed in your face dozens or even hundreds of times before you click with the right job. So, try not to get thrown off balance if you aren't having instant success.

If you have discovered other gold mines of job opportunities and would care to share them with the rest of us, please write me at the address below. I'll be glad to spread the word.

□ □ □

John Shepler is an engineering manager, writer, and longtime **RW** columnist. He can be reached at 5653 Weymouth Drive, Rockford, IL 61114.

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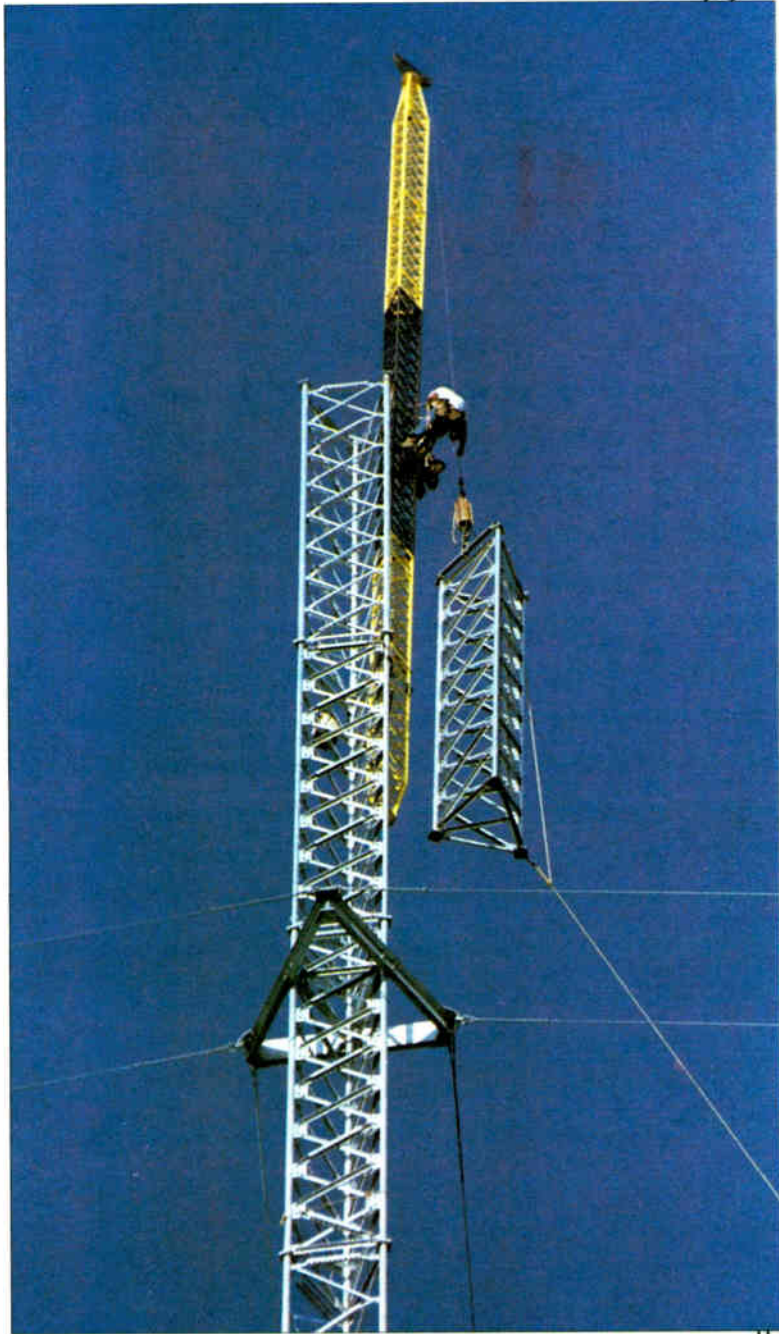
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OFFBEAT RADIO

WIOD Caught in the Eye Of Hurricane Andrew

by Dee McVicker

MIAMI By the early morning of August 24, WIOD(AM) of Miami, Fla., had literally captured its market by storm.

Winds upwards of 160 miles per hour were buffeting homes. People huddled under sinks and sandwiched themselves between mattresses; for many their only comfort was a battery-operated radio and the assuring voice of WIOD announcers.

In the ensuing four hours, WIOD's signal, at times barely audible over the howl of the storm, would take them through one of the worst hurricanes to hit the U.S. in this century.

In its wake, Hurricane Andrew left thousands homeless, tallied millions in damage, and leveled off entire coastal communities. Hardest hit was the township of Homestead, Fla., just 35 miles south of a small island on Biscayne Bay which held WIOD's studio and two towers.

Come hell or high water

Here, on Northbay Village Island, News Director Chuck Meyer and about 15 other station personnel had remained to broadcast the ordeal.

"The decision was made to try to cover this storm as best as possible because people relied on us," related Meyer, who along with the rest of the crew had prepared for hurricane coverage, but was nonetheless shaken by the force of the storm.

The ordeal started on Sunday, August 23, when announcers at WIOD, a Cox Enterprises station and the primary common program control station for emergency broadcast in the area, sounded the first of three EBS alerts. At eight o'clock that morning, the state of Florida declared a hurricane warning, triggering emer-

gency evacuation of coastal areas.

"Those people needed to get out," said Meyer, who began broadcasts of the evacuation process with airplane coverage of major freeways and roadways. Meyer also dispatched reporters to government emergency headquarters in the area, aware that once these people left the island, it was unlikely they would be able to return until after the hurricane.

It was at this point, he said, that the crew made the difficult decision to weather Hurricane Andrew on the island rather than set up a remote unit inland at WFLC(FM), WIOD's sister station.

Meyer and those remaining on the island were assured by a fellow anchor, who had witnessed a hurricane in the building in the 1960s, that the building would hold up under the assault.

Beacon of information

"Once we made that decision, we never looked back," declared Meyer. For 29 straight hours, Meyer and the WIOD crew would endure biting winds as they updated news, reported conditions and talked to terrified listeners.

The phone lines, to Meyer's amazement, held up throughout the storm, proving to be an important connection to listeners and reporters in the field. "We also had a two-way UHF repeater system that was a vital link as well," said Chief Engineer Mitch Wein, who gave up his post at the AM studios to keep the UHF link, among others, operational.

Despite severe winds, WIOD was able to feed programming inland to WFLC for those listening in on the FM band, as well as uplink its signal via satellite to a Cox station in Tampa, WSUN(AM), and another in Atlanta, WSB(AM).

continued on page 22 ▶



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ECLECTIC ENGINEER

Deciphering Station Coverage Maps

by Barry Mishkind

TUCSON, Ariz. Trying to figure out the real coverage area for a station can be difficult. Coverage maps handed out by station salesmen can bear little resemblance to where the station can actually be heard. "Theoretical coverage," "predicted contours," "measured coverage," and "reported coverage" are only some of the terms that need to be deciphered.

With the upturn in station sales and LMAs, there's an increase in attention being paid to those maps that usually are only sent out to advertising clients. Identifying an accurate map can be essential if you're buying a station. If you're selling, you don't want to cheat yourself out of a single square mile.

Maybe we should start with some definition of terms.

What's the reach?

Theoretical or predicted contours are what the computer says you should be able to cover. For an AM station, it's calculated from the station power, antenna height (expressed as a fraction of a wavelength), and the ground conductivity in the coverage area. On an FM, the height of the tower over the surrounding area is of paramount importance.

Yet there are problems. While computer programs are getting more and more precise, they don't always catch every geographic feature affecting the actual areas where reception is possible. A theoretical contour can run right through a mountain, where your signal can't go. Or, in some large cities, the tall buildings make signal strengths difficult to predict.

For this reason, many stations prepare measured contours by sending the engineer out in the field with a meter. A car or four-wheel drive vehicle is needed, although a helicopter can often save time and money because it doesn't have to maneuver over roads that may no longer exist, or around areas inaccessible to ground vehicles.

In putting these maps together, directional AM stations usually have the added advantage of the FCC Form 302 measurements made when the station was built. Even if the area has changed dramatically, such as having a greatly reduced water table (which lowers ground conductivity), the 302 will provide a good starting reference point. FM stations will want to check whether a patterning study was done when the antenna was built.

Reported coverage

"Reported coverage" is another option available when theoretical and measured contours fail to provide what the station feels is an accurate picture of the listening area. Sometimes the traditional 0.5 mV/m and 0.1 mV/m contours for AM or the 70 dBu and 60 dBu contours for FM can be insufficient to judge a station.

For example, in rural areas the signal strength needed for comfortable listening is lower than in the larger cities with their huge buildings. Also, modern receivers don't need 1000 mV for full quieting. A signal level far less than 250 mV is often more than enough for an FM station not overpowered by stronger adjacent signals.

On the other hand, a large suburban shopping mall that looks to be within a station's range can turn out to be a poor listening site, with shops not getting enough signal

to quiet a receiver. And adjacent signals (as well as intermodulation products from other stations) can destroy coverage well inside predicted contours.

Some stations mark on a map the locations of listeners who call or write, developing a coverage area map that way. A buyer will corroborate such coverage claims by having someone go out and check out the signal.

However, here's where some buyers make a major mistake: Just because they can receive the station driving around in a car doesn't mean the station can be heard in homes and shops. If your format calls

for a basically mobile audience, fine. But if your listeners are stationary, you'll need to go into various buildings and hear how the station sounds on a stereo or a clock radio.

Outside help

Other ways to develop coverage maps include using a consulting engineer with a knowledge of the market area. He can adapt the theoretical contours to existing conditions.

More economical are the data services like Communications Data Services or Dataworld, which develop and deliver coverage maps ready for your printer.

These maps often use color and can clearly identify problem areas such as where shadowing occurs.

And, of course, there are programs available that you can run on your own computer to derive coverage contours. Some are free and simple and give you a distance to plot on your own map.

□ □ □

Barry Mishkind, aka RW's Eclectic Engineer, is a consultant in Tucson, Ariz. He can be reached at 2033 S. Augusta Place (85710). Electronic addresses: BMISHKIND on MCI Mail, or "barry@coyote.data log.com" on Internet (also via CompuServe).

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FEED LINE

What to Look for When Prospecting for Stations

by W.C. Alexander

DALLAS In this installment of *Feed Line*, we'll go over what to look for when actually visiting a station to be purchased (be it an AM or an FM).

As a rule, the seller will want absolute discretion on your part when you visit the station. To keep things quiet, the person escorting you on your tour of the facilities will have to come up with some reason for you to be there other than the real one. All I can advise is just play along. Say as little as possible to anyone except the seller or your escort, and save your questions for when you are out of earshot of the station staff.

In the studio

At the studio end, I always start with a brief inventory of the major pieces of equipment. Many times I have found that I can look around inside a studio, making mental notes, then immediately put them on paper when I'm back in the hallway away from studio personnel. Don't worry about getting everything in your inventory, just get the important stuff (consoles, cart/CD/tape equipment, etc.).

The purpose of the inventory is to ensure that what you get in the sale contract is what you thought you were getting. The seller will always provide an inventory as an exhibit in the sale contract, and if you can compare it to your notes, you will be able to tell immediately if you are about to be shorted some major item.

Look over each studio with an eye toward what you anticipate doing with the station. For example, if your intended programming will be talk and the station is now all music, you will have to advise your employer of what will be needed to get the station ready for talk.

It almost goes without saying that the cost of equipment needed to replace existing worn-out or unsatisfactory equipment should also be considered.

Solid foundation

The overall quality of studio construction is another item to be considered. If a studio has been sloppily installed, this won't be acceptable for your operation, so the cost of making things right must be figured and reported. Note the construction and condition of the studio cabinets and woodwork.

How about the engineering area? Look over the audio processing. Is it up to standards and acceptable for your intended operation? How about STL equipment? If it is old or not type accepted, you must plan on replacing or updating it.

Look for clip leads and other temporary "patches" in the engineering area (or anywhere in the station). This is a sure sign of a temporary *quick fix* that more than likely has become permanent. While you're looking, inventory the engineering area. Include routing, processing, STL, RPU, and test equipment.

Finally, check into the lease situation (if any) for the studio space, and look at the condition of the studio building if it is owned by the seller and part of the deal.

A visit to the transmitter site is an absolute prerequisite to purchasing a station. Again, start with an inventory of the site. This is usually easier than the studio inventory, since there isn't as much equipment and

you don't have to worry about someone on the station staff figuring out that the station is about to be sold and starting a stampede.

Judging by site

If possible, take a peek inside all transmitters, racks, phasors, etc. The outside can look good, with the covers hiding such things as smoke or water damage, shoddy repairs, and the like. If there are lots of cobwebs, spider webs and crawly things within and without, this is a sure sign that the site is not visited often and that cleanliness and maintenance have not been too important in the past; this will directly affect the amount of work needed to put the transmitter plant in good operating condition.

Is there an auxiliary transmitter? How about an aux antenna and feed line? If these are things that you will want as part of your operation and they are not already present, you will need to determine whether there is enough room to house them, both in the building and on the tower.

Don't forget about room for any RF switches/patch panels that you will require. If the building isn't big enough, think about what will be required to expand it.

AM directional stations need a particularly close scrutiny when it comes to the on-site inspection. Look at the phasing and coupling equipment, and ask a lot of questions. Are all the controls marked? Is there a schematic for the phasor and each ATU on hand? Do the turn counters work properly? What is the common point impedance? Are the driving point impedances recorded somewhere?

A really *big* thing to look for is pattern stability. Look over the DA parameter and monitor point (MP) logs for the past couple of years. Are the parameters and MPs within limits? How close are the MPs to the maximum?

continued on page 20 ►



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WORKBENCH

RG-8 Kept KLQP-FM Alive

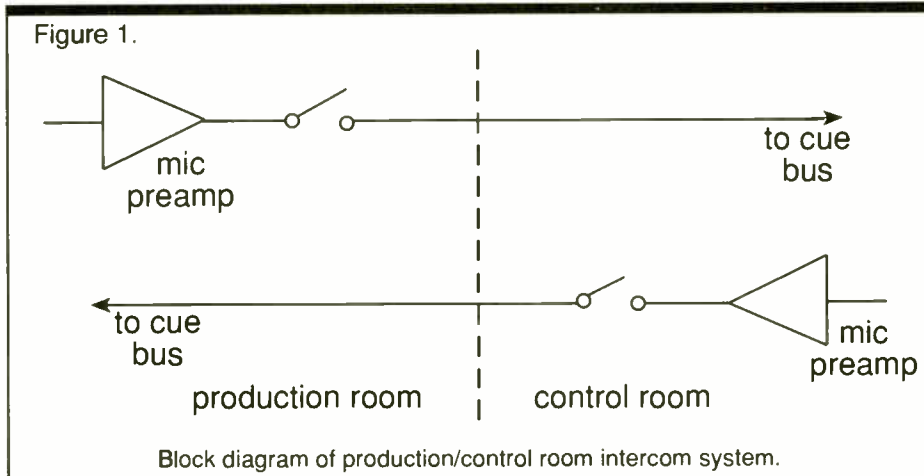
by John Bisset

FALLS CHURCH, Va. Small market radio sometimes seems to run by a whole separate set of rules. There are seldom any backup systems, the chief engineer may also be the GM and sell time, and the surrounding community usually has an intense dependence on the local station. This is the setting of KLQP-FM in Madison, Minn. Maynard Meyer is the GM (and CE) for the station, which he built from the ground up.

After nine years, you'd think he'd seen it all. One morning, the Elcom-Bauer 603 wouldn't come on. He tried everything—replacing the driver tube, a new final, even the resistor that went bad once before!

No luck, and being in the middle of the big Christmas advertising season, Maynard watched as his radio station died a slow death. A time domain reflectometer (TDR) showed that the transmission line was shorted eight feet from the transmitter building.

By now, the weekend had arrived, and with no hope of an equipment supplier's help, Maynard grabbed his hacksaw and cut just beyond the point where the short was located. With the bad section of line removed, Maynard pondered how to get the



RF to the tower. A local ham offered some spare RG-8.

Maynard soldered the RG-8 to the flange of the harmonic filter and secured the shield with a hose clamp. He used an old alligator clip and a cable clamp to connect to the 1 5/8-inch on the tower leading to the three-bay.

Dropping the power adjust control to almost nothing, he hit the master switch. Nothing smoked; in fact, the transmitter responded to every control. He increased

the power to about 1,000 W...everything was still working.

If you don't have a backup transmitter, consider picking up a length of RG-8 fitted

Most companies only offer the wider 12mm tape, which must be trimmed to fit. To contact Ed, dial WPGC at 301-441-3500. For more information on the Brother P-Touch, from Hawk Direct Sales, circle Reader Service 113.

★ ★ ★

Newer consoles provide a "talkback" system, to permit intra-studio conversation. For those stations with older consoles, all is not lost. Marshall Keith of Keith Broadcast Services in Minnesota tells about a station that needed an intercom with some special features. The first feature was to keep it cheap.

Marshall's client has a daily telephone sales show. When a caller places his call, the name, address, and order are taken from a phone in the production room. The caller is then put on hold.

Before the intercom, the caller information has to be transcribed onto a card, and held up for the announcer to read through the glass. Now, the intercom and cue are fed into the left headphone, and the program to the right.

Marshall used a trick he learned from Dick Kruse, an independent consultant from Brooklyn Park, Minn. Dick's intercom is

with either a bnc or Type "N" connector. By soldering an alligator clip to the other end, an emergency "exciter-only" cable is born. Attachment can be tricky, so the cost of an adapter from bnc to 1 5/8-inch or whatever size line you use may be worth the money.

Maynard Meyer can be reached at Q-92 in Minnesota. His number is 612-598-7301.

★ ★ ★

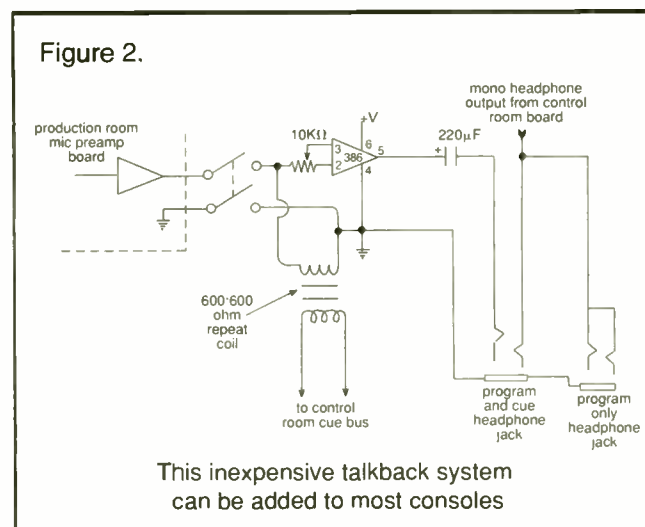
Here at *Workbench*, we're always looking for deals, and WPGC-FM's CE Ed Bukont passed on a good one. You may have seen the Brother PT-10 "P-Touch" labeler, or heard the commercials for it. It far surpasses the "Dymo" label in looks, printing a wide variety of colors, styles, and sizes of labels on a plastic adhesive strip.

Typical prices are \$200 to \$250 at so-called "discount houses." Ed's found an even better price at Hawk Direct Sales, 1-800-458-3430. Charles Kasun, the salesman there, sells a "broadcast package" that includes the P-Touch, a carrying case, and a roll of 9mm black on yellow tape for just \$159.

shown in Figure 1. He would come out of the mic preamp from the console in one studio, run through a momentary contact double-pole switch, and feed to the cue bus of the console in the other studio.

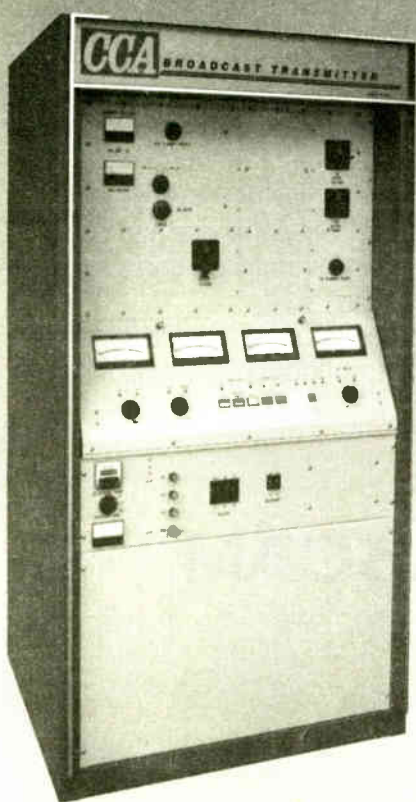
The only drawback to Dick's design is it

continued on page 20 ▶



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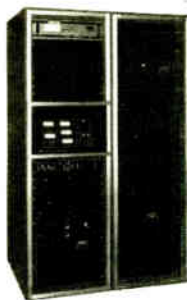
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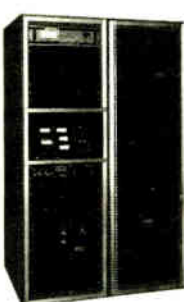
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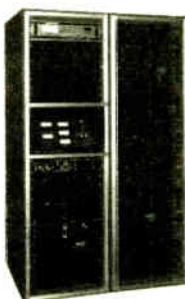
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Prospecting for Stations

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The station's tower (or towers) is another big ticket item that needs to be examined thoroughly. Look carefully at the guy wires and other hardware visible from the ground for signs of rust or corrosion. Examine insulators for signs of cracking or breakage.

What is the site real estate like? Look over the topography, getting an idea of the type of soil, drainage, etc. Pay particular attention to the road or driveway. Does it provide all-weather access? If not, you had better figure the cost of bringing it up to snuff in your report.

Ask the owner or engineer whether the site has ever been flooded. Often, there will be tell-tale signs of flooding left behind even after full restoration has been made. Debris lodged well above ground level on a fence is a pretty good sign that flooding has occurred.

Find out about the lease situation with respect to the transmitter site property. Also, check into the tax situation. Often, large parcels of land used for transmitter sites are subject to roll-back taxes if they are not kept in agriculture.

Talk to the CE

In your inspection tour, don't overlook the resource of the station engineer. If he has been around for any length of time at all, he will have a wealth of knowledge on the entire station that will be very useful to you.

More than likely, the engineer, whether full-time or contract, will want to keep his job when the station is sold. It is to his advantage to be truthful with you, even if the truth is not pretty. Gain his confidence if you can, and let him know that you value his opinions and abilities.

To conclude your inspection, write a clear and organized report. I like to do this in outline form, providing headings for each part of the operation.

Conclude the report with your honest opinion of the station. As an experienced broadcaster, you will form an opinion on even non-engineering related areas of the

operation. Don't be afraid to comment on them in your report summary. If the whole thing stinks, by all means say so! Otherwise, be prepared to take on the newly acquired station and make it work.

□ □ □

Cris Alexander is director of engineering for Crawford Broadcasting. He can be reached at Box 561307, Dallas, Texas 75356.

WORKBENCH

► continued from page 18

will not work when the mic in the receiving room is on, because the cue speaker mutes. Figure 2 shows how Marshall modified the circuit right before the cue bus, adding a 386 op-amp to a box with four headphone jacks.

Two of the jacks are split with left channel-cue/intercom, right channel-program; and two jacks are standard mono program in both left and right.

Now, depending on where the headphones are plugged, you can get just program feeds for the guests, or cue/intercom feeds for the jock, all at a cost of less than \$20. Marshall Keith can be reached at 612-822-2621.

★ ★ ★

If you do much RPU or two-way work, you may be interested in receiving a Frequency Tolerance Chart from Burkhardt Monitoring. Ed Burkhardt has provided frequency measuring service to the eastern seaboard states for many years. His chart is part of his services brochure, and is useful for anyone in broadcasting, since it includes frequency tolerances for TV, translators, boosters, and STL systems. Ed Burkhardt can be reached in Glen Allen, Va., at 804-261-1800. If you'd like a copy of the chart, circle Reader Service 192.

□ □ □

John Bisset is a principal with Multiphase Consulting, a contract engineering and projects company. He can be reached at 703-379-1665.

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DIGITAL DOMAIN

DISQ Unveils "Supercomputer" at AES

by Mel Lambert

STUDIO CITY, Calif. DISQ Inc. unveiled a new "supercomputer" at the recent Audio Engineering Society convention in San Francisco. In my estimation, this remarkable new product is destined to have a fundamental impact on just about every facet of the audio industry.

Although its initial incarnation is being targeted primarily at the more well-endowed recording facilities around the world, my instincts tell me that elements of the new DISQ Digital Mixer Core are going to appear in other market segments—including radio.

In essence, DISQ is a joint venture company formed by AT&T Bell Laboratories, Gotham Audio and George Massenburg Labs. AT&T should need no introduction, aside from reminding **RW** readers that a great deal of fundamental R&D in many segments of telecommunications and audio is underwritten by its various divisions. Gotham should be familiar as a leading New York-based pro audio dealer. GML manufactures various outboard signal processors and equalizers, in addition to a microprocessor-based fader-automation system for up-market recording and production consoles.

Analog to digital

The Digital Mixer Core comprises a powerful audio "supercomputer" developed by AT&T Bell Labs, which is designed to connect an existing analog console via a custom interface from GML and Gotham. Connected directly to an existing Neve VR or SSL 4000, 6000 or 8000 series console, all mixing, routing and signal processing instructions (including EQ and dynamics control), can be extracted from the familiar knobs, buttons and faders fitted to the board's control surface, and then implemented entirely within the digital domain.

In this way, a recording or production facility retains the look and feel of a traditional Neve or SSL console, but can now take advantage of the enhanced mixing and processing power of a 32-bit system. Digital inputs to and outputs from the digital mixer core are currently SDIF-2 format, all analog I/Os (for monitoring and connection to non-digital outboards, for example) being handed via an enhanced Harmonia Mundi bw-102 system. Other digital formats, including AES/EBU, can be accommodated via dedicated interface units.

The Digital Mixer Core is housed within a 10-U, rack-mount chassis, with additional I/O and communications units. In operation, the various audio level, mute/solo and EQ in/out data is derived from a modified GML Series 2000 Automation System, which connects to the digital Mixer Core via a high-speed Ethernet link.

The Neve or SSL console is already fitted with additional signal-control elements on all knobs or faders. These devices are normally used by the system's recall function to scan each control and produce a digital signal that can be stored in memory, or passed to a storage device. In this

way, a mixing engineer can use previous values to reset each and every control to values from earlier recording sessions.

These same elements are scanned at high speed by the GML computer, added to the information being derived from the servo-controlled moving faders, and passed on to the digital mixer core system. In this way, real-time control of digital signal processing functions is implemented directly from a familiar control surface. In addition, all dynamic automation, snapshot recall and mix-level data is handled by the existing GML computer.

Top money for system

Initial system deliveries to Neve VR-equipped recording studios were scheduled to start after the AES convention; SSL-compatible systems are expected to become available during January 1993. The DISQ concept is not for the faint-hearted, however: System prices begin at close to \$350,000.

Something tells me that the new DISQ Digital Mixer represents an initial overture into a family of similar products, based on hardware developed by AT&T and similar organizations.

What the system represents is one of the first applications of leading-edge technologies that were developed originally for other industries. While AT&T Bell Labs has to be necessarily cagey about the system's origins—simply stating that it bears a passing resemblance to the hardware used by various combatants in "Hunt for the Red October" and similar scenarios—it doesn't take a genius to work out that systems such as this are capable of performing high-speed computations for sonar, radar and speech recognition applications.

Within the Digital Mixer Core, an array of high-speed AT&T DSP3 parallel processing subsystems handle the computa-

tions necessary to model a fully-automated, 72-channel, all-digital console in real time. The DSP3 is configured with up to eight parallel processor boards, capable of some 2.5 gigaflops (floating point operations) per second, sufficient to handle several dozen simultaneous channels of audio.

Radio a natural extension

But the configurations being demonstrated at the recent AES convention might be rethought for radio applications. A smaller frame might accommodate, for example, maybe six or eight stereo input sources routing, via EQ and per-channel dynamics sections, to maybe three stereo pairs.

The necessary control and display signals—allowing individual analog or digital sources to be identified and labeled via an appropriate readout—could be mapped from an assignable control surface whose control elements could easily be assigned under software to handle a myriad of different functions.

All that a designer needs to do is generate the necessary Ethernet commands recognized by the DSP3 mainframe, in terms of level, EQ, dynamics and cross-point parameters for each individual input and output, and arrange for them to be sent from the control surface to the DSP system.

Alternatively, a larger facility might take advantage of a full 72-input mainframe (or even larger), by segmenting various I/O blocks to handle simultaneous functions, including signal routing between different sources and destinations, as well as assigning discrete "chunks" of mixing power to master control and production rooms throughout the facility.

In this way, not only would the control surfaces be freely remappable under software control, but the size and complexity of the mixing and signal-processing power available at each location could be

dynamically allocated as necessary.

With access to the off-the-shelf power of a system such as AT&T Bell Labs' DSP3—plus other technologies that are bound to follow—the future for high-power, cost-effective and flexible signal processing does indeed look particularly healthy.

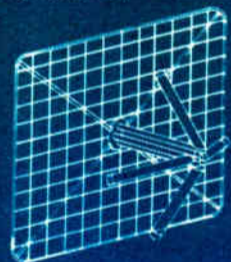
For information on the DISQ Digital Mixer Core, contact DISQ Inc. at 212-581-8938; or circle Reader Service 163.

□ □ □

Mel Lambert has been intimately involved with the production and broadcast industries on both sides of the Atlantic for more than a dozen years. Now principal of Media&Marketing, a Los Angeles-based consulting service for the professional audio industry, he can be reached at 818-753-9510.

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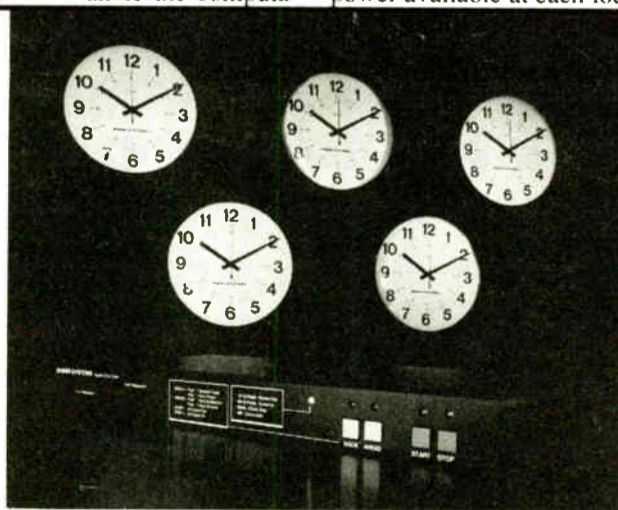
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World Radio History

Station Trading Looks Dynamic in 1993

by Charles Giddens

WASHINGTON The high flying 80s are gone and the cautious 90s are very much here. Station trading for the balance of 1992 into 1993 is in gridlock. Deals are getting done, but only with bank cooperation, large amounts of equity and a lot of patience.

The recent swap of Cox Enterprises' Charlotte WSOC-AM-FM for EZ's WHQT(FM) Miami is a forerunner of things to come. A tax-free swap gave each company a competitive pairing in the markets they kept.

Few players left

The first thing that must be remembered about today's station trading marketplace is that almost all banks are out of the business except for those loaning to large group operators and companies with other types of security.

There is also a growing interest in debt purchases. Debt purchase happens primarily when a financial institution or credit company decides to run from

a credit. They simply choose to sell their loans for a dramatic discount to get out.

We truly have a massive shakeout in the making. Top-to-bottom highly leveraged operations are being eliminated, either through receiverships or sales forced by banks. Values on non-cash-flowing stations have not yet bottomed. These values continue to fall as financing for non-cash-flowing properties has all but dried up.

High-risk lenders have experienced a flight to quality. Credit companies have, in essence, become multiple-driven senior lenders. They are in most cases the only store in town.

Opportunities for buyers with cash are good and getting better. There is a noticeable contrast in the making. Deals for well-positioned franchise stations with cash flow are settling into a range of 7 to 8.5x cash flow, except for the top 10 markets where multiples up to 10x may still work.

On the other hand, non-cash-flowing stations continue to slide downward. No one is sure when the bottom will be reached. The value of stations operating

in the red—below the top markets—will become what someone can and will pay for them. We are seeing stations with no cash flow trade for as little as half or less of their perceived value.

No capital to be had

The underlying truth is that there is an absolute shortage of capital. Equity is at a premium, so logically the first place you see this is at the borrower level. There will be very short buyer's lists on many properties that may have good facilities but either little or no cash flow, or worse, no franchise position.

There has been a lot of false hope about the relaxation of duopoly rescuing the industry. Opportunities have indeed increased, but the amount of available capital has not. Over time this realignment of values will become more pronounced.

Most observers had expected bank rollovers on loans to occur. Bad loan credits would get new owners with better balance sheets, and troubled stations would get another chance at being competitive. We may see some of this—once banks are burned on a credit the standard procedure is usually to take what they can get in cash and get out. This may change in the future as supply exceeds cash availability.

If the economy improves at its current slow rate into 1993, then station performances will have to be improved more by operating cost and staff reductions than

by market sales increases. By either method, increased financial performance will be necessary for the industry to attract new capital.

Automation will flourish

Large market broadcasters who have in the past refused to abandon 100 percent "live" broadcasting will begin looking at semi-automating a number of shifts. Operators can choose from a variety of more affordable, more versatile new digital production and automation equipment—and suddenly staff reductions savings become clear.

1993 will have more transactions than 1992 because the pressure to do something, right or wrong, is building. We anticipate a much busier trading environment in 1993 as banks are getting their balance sheets in better shape, so that they will and can afford to push more troubled loans out the door.

This change, along with an increasing realization by banks and operators that bad station loans rarely are put back into compliance by existing operators will create even more pressure in 1993. The radio transaction business has and is dynamically changing.

□□□

Charles Giddens is a partner in Media Venture Partners. He has been involved in the management of some 43 radio stations from large group operations down to smaller market stations. His company's partners have successfully negotiated the sale of nearly a billion dollars worth of radio and television properties and represent both sellers and financial institutions in the U.S.

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In the Eye of the Hurricane

► continued from page 14

A lot was riding on a backup power generator (barricaded earlier with sandbags) as well as two towers, a self-supporting tower put up after the hurricane of 1965 and a guyed tower put up in the 1950s that had survived the last hurricane.

168 m.p.h. curveballs

The worst of it began at 2 a.m. Monday. "As the hurricane started to reach full force, part of our newsroom went out of power," recalled Meyer. The backup generator quickly kicked on and the crew moved from their posts in the newsroom to the main on-air studio. They continued broadcasting until the storm started to break, four hours later.

For Meyer, it was a long, torturous four hours. "When you start having to handle 168 mile per hour curveballs, you just don't know what's going to happen next," he related.

Nonetheless, WIOD announcers did not miss a beat, keeping the phone lines open and the station on the air to provide a much-needed service to thousands of listeners experiencing the destruction of Hurricane Andrew.

Except for minor damage, including a transmission line and uplink satellite dish slightly out of alignment, WIOD suffered

little wind damage.

Nor did the station experience much in the way of water damage, or damage from a storm surge, where high water levels from the bay could have disabled the backup generator. "This was not what is known as a wet hurricane," informed Meyer. Had the hurricane traveled less than 25 miles north, remarked Wein, "it could have been a lot worse."

Following the destruction of Hurricane Andrew, WIOD and its crew covered damage relief with the same sense of duty as before and during the hurricane. A helicopter was brought in for damage reports, and WIOD reporters (many of whom had lost their homes to the disaster) continued actualities via 160 MHz Marti, cellular phones, or any other means of communication that would bring the story back to the studio and to the listener.

When the winds finally died down weeks later, Meyer reflected on the importance of radio in a crisis. "There's no question that the need for radio was accentuated," he said. "AM radio played the role that it traditionally plays, and in this particular case it was needed."

□□□

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

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The Many Faces of Hit Radio Formats

by Charles Taylor

WASHINGTON The debate continues: Is CHR radio a schizophrenic shadow of its former self in search of a dominant identity? Or does it remain the nation's primary listening post, though more tailored to market factors than ever before?

Clearly, popular music formats of the 1990s are in transition. What was simply "top 40" radio a decade ago—sampling the best from numerous musical styles—has splintered into more hybrids than can be counted on the fingers of

one hand: CHR, top 40, Hot AC, adult contemporary, CHUrban and Adult CHR.

Large radio markets can indeed successfully support several of the fragmented Hit formats, using monikers like Mix or Lite, or concentrating on core artists with whom their target identifies.

With such splintering now past its peak, it is time for programmers to decide how they will capitalize on the hybrid formats they have chosen to carry them through the decade. They must take care not only to exploit the strengths of greater musical focus, but to

protect themselves from the pitfalls of a narrower audience.

Top 40 troupers

Stations that have weathered tough economic times and refused to bail out of the now-challenging top 40 format are poised to enjoy the most satisfaction in the 1990s. With a combination of potent on-air talent, hip music and a streetwise persona, good old hit-based radio remains more fun and more daring than any format on the air. (There's no reason why it can't also be profitable.)

True CHR, which draws its core audi-

ence from the 12-18 sect, centers today on rap and hip hop. Teens in large markets, black and white, have taken to the music of the streets, where often the more hard core it sounds, the cooler it is.

And unlike the top 40 audience of a decade ago, listeners are exposed to countless more forms of the medium: MTV, cable television, music magazines and videos make the music more accessible and the audience more educated than ever, and privy to a lot more than just what the station may intend for them to hear. Top 40 music directors should be versed in the MTV generation, if not a product of it.

Stations that have succeeded in the format are driven on innovation—playing to their particular market, testing which mix of R&B, modern rock and heart-melting teen ballads is right

I salute top 40 owners who continue to make it work, despite persistent talk of the format's imminent decline.

Signature sound

That is not to say that the new breed of Hot ACs are not a welcome refuge on the dial. Few in the 18-34 demo are going to find a home amid the hand-waving rappers and long-haired grunge rockers that incite top 40's core.

The signature sound here is defined to an art. A steady spoon-feeding of Bonnie Raitt, Phil Collins and Michael Bolton is typical: more upbeat than the Barbra Streisand/Neil Diamond stamp of yesterday's AC, but safe enough to drift through the workplace.

The music is designed for those whose musical tastes already are concrete; however, these listeners are still vital consumers of products they trust. Because of this tendency to stick with tested artists, the format runs the constant risk of becoming stale.

I'm not suggesting that Hot AC stations attempt to be the leading station to break new acts in town, but listeners in their late 20s still have a taste for something with a little bite. Give it to them.

From a management perspective, Hot AC stations enjoy the luxury of tuning in most advertiser's primary targets. There's money to be made here.

Easy energy

Traditional AC stations have changed little over 10 years: because current product is not a priority, core artists can remain virtually unchanged for years at a time. The format's biggest threat has come not from Hot AC, but from the transition among instrumental beautiful music stations into the easy listening arena. Suddenly, ACs aren't the only stations in the market playing Carly Simon.

CHUrban, those hit-driven stations that play mainstream hits with a rhythm focus, today have a tough time distinguishing themselves from streetwise top 40 stations. This type of station is likely to flourish in markets with predominantly ethnic populations.

The great format challenge of the 1990s is far from settled, but progress has been made since the decade opened, when the mass exodus from top 40 was just getting underway in the States.

The goal now is satisfying the listeners these hybrid popular music stations have worked to attract. Station owners and programmers made the decision to explore formats outside of top 40. Now they must demonstrate confidence in the music, and bring the new niches to maturity.

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DIGITAL AUDIO FOR THE LIVE BROADCASTER FROM SMARTS BROADCAST SYSTEMS

By John Schad
President - SMARTS Broadcast
Systems

Hard drive digital audio has swept through the radio industry in the past couple of years. Starting first with satellite automation systems, companies soon began expanding into control of conventional open reel systems and compact disks.

In the rush to build new and better automation equipment, the live broadcaster, who represents the greatest majority of station in the country, was the last to be considered.

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Play-by-Play Nurtured Radio's Infancy

by James T. Wold

MINNEAPOLIS From the beginning there seemed to be a natural relationship between radio and sports.

In 1912, long before any thought was given to radio as an entertainment means, an experimental station at the University of Minnesota attempted to air football games using a spark transmitter and regular telegraph signals.

On Thanksgiving Day, Nov. 25, 1920, the Texas A&M University station, WTAW (then operating experimentally with the call letters 5XB), aired the first collegiate football game. One of the experiments included a play-by-play

wireless report from the field of the Texas University versus Texas Aggies grid game.

Sports outpaces news

As limited as radio was in its programming during this formative period, still it achieved significant popularity in sports and music. Sports became even more important than news.

Radio had always been effective in relaying scores and related sports information. As early as Oct. 5, 1920, baseball scores (of the World Series) were aired by WWJ Detroit.

By Aug. 5, 1921, KDKA Pittsburgh was broadcasting, play-by-play, Pittsburgh

Pirates baseball games from Forbes Field. In October of that year, World Series baseball was recreated by telephone through WJZ New York with Thomas H. Cowan broadcasting.

Cowan never saw the games—the plays were phoned from the ball field to the announcer who reported them into a live microphone.

Boxing was also a popular attraction with listeners. Much of the early history of sports on radio was written by KDKA during the summer and autumn of 1921. Scoring a number of sports firsts, KDKA aired the first live boxing match in 1921: a no-decision fight between Johnny Ray and Johnny Dundee, at Pittsburgh's

Motor Square Garden. This was the first blow-by-blow description in history and its success started some executives in the industry thinking about the potential of airing sports on radio.

The real ear-opener was WJY's airing of the Dempsey-Carpentier heavyweight championship fight on July 2, 1921 in "that great wooden saucer" at Boyle's Thirty Acres in Jersey City, N.J. Both radio executives and listeners were made aware of the important role radio could play in the world of competitive sports.

Early stars of the air

Major J. Andrew White was the reporter for WJY (sister station of WJZ), with David Samoff at his elbow to assist in the description. Since remotes were unheard of at this time, the Major was at the ring-side, and his accounts were transmitted over the wire to a J.O. Smith, who was the voice heard by 300,000 or so listeners. Most of them agreed that White's diction was so excellent, his own excitement so contagious, and his blow-by-blow account so vivid that it was as good as being present.

Sports became even more important than news.

WJZ aired a "running description" of the World Series in the fall of 1921 using the same recreation method as the boxing match. In the fall of 1922 the World Series was recreated from news wires by WJAG Norfolk, Neb.

By this time, however, sporting events were being broadcast directly from the stadium or ball park, and popular sportscasters like Graham McNamee and Ted Husing held forth at the microphones. In October 1923, Graham McNamee gave an on-the-spot play-by-play description of World Series baseball in his first network sports assignment, originating from WJZ in New York.

By the mid-1920s, sports broadcasts were gaining popularity all across the U.S. Out in the midwest, broadcasters were up to their neck in sports. In the first month of its operation in 1921, WGN Chicago inaugurated the great 500-mile Indianapolis Speedway classic, a breathtaking program that lasted nearly seven hours.

With a soundproof broadcasting booth beside the track and with microphones at the foot of the home stretch and the back stretch, all over the grandstands and in the pits, the station delivered a thrillingly told story of the vast spectacle.

WGN led the way

In the fall of 1921, WGN, not content with broadcasting the football and baseball games in Chicago when there were more important contests elsewhere, inaugurated a series of football pick-ups which, over a period of almost a decade, no other station could equal.

WGN broadcast from every campus in the Big Ten and included in its coverage of great games the stadiums of the Universities of Nebraska, Pennsylvania and Southern California.

In 1925, along with another Indianapolis Speedway broadcast, WGN took its microphones to Louisville for the Kentucky Derby. When Earl Sande brought Flying Ebony in with flying colors, WGN was on hand with a corps of announcing engineers and turf experts. Such broad-

continued on page 34 ►

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Radio Hopes for Revenue Upswing in 1993

► continued from page 1

the radio industry, with the bulk of that coming from locally generated advertising," said Bill Stakelin, chief executive officer of Apollo Radio. Stakelin continued, "National spot advertising is probably going to remain stagnant or level throughout 1993 with very little, if any, growth at all."

Dean Sorenson of Sorenson Broadcasting, whose group operates six stations in the upper Midwest, believes his base will continue its revenue growth of two to five percent throughout 1993. "All our business is local," Sorenson said. "Our national business is non-existent."

Local revenues have been the mainstay for the majority of radio groups and have continued to post modest increases. Because national spots are down, however, the overall national revenue picture remains flat or stagnant, with no drastic recovery gains in the forecast. For Sorenson, who's never been concerned with national advertising spots, the picture looks the same.

But some exceptions to the general two to five percent locally generated revenue can be found. "Throughout this year—with the economy being flat and with radio revenues being flat nationally—Shamrock Broadcasting enjoyed a very positive growth year in 1992 with revenues 10 percent ahead of 1991, locally as well as nationally, with the same station base," said Bill Clark, Chairman/CEO of Shamrock Broadcasting.

Even with such a positive revenue pic-

ture, Clark plans to budget for no growth in 1993.

At the root of such a conservative and cautious outlook is the nation's economy. Said Clark, "When more positive developments in the economy, such as an increase in Gross National Product (now called Gross Domestic Product), an increase in employment levels, an increase in consumer confidence, and other factors that contribute to positive developments are realized, we anticipate

Local revenues have been the mainstay for the majority of radio groups and have continued to post modest increases.

being able to take advantage of that." Until the economy turns around, Shamrock plans to proceed with caution.

The present state of the economy, although essential in forecasting budgets, has not totally hampered radio acquisitions. Shamrock's Clark hopes to acquire stations in 1993. Heritage's Fiddick acquired two FM stations, in Cincinnati and Kansas City, in 1992 and might acquire more in 1993.

And even though Apollo's Stakelin "doesn't see a robust recovery in 1993," the group has plans to purchase two more stations in Salt Lake City in 1993.

The economy has made the radio operators look at the bottom line with caution, only purchasing what can be offered, Sorenson said. "We're looking for acqui-

sitions but we're not finding stations that meet our parameters, such as a new market with a 10,000 to 25,000 population in the upper midwest." Sorenson continued, "We'll only go ahead with the deal if it makes financial sense."

Capital expenditures, such as transmitters and engineering equipment are not being put on hold because of the economy. These expenditures have been in the budget pipeline. Along with budgeting for minor and major capital expenditures,

maintaining adequate staff and benefits are also important.

Although eliminating staff or hiring less expensive staff is the easiest way to make sure the budget revenues and expenditures agree, the radio executives interviewed by RW have resisted this type of fix. Fiddick said, "just as we didn't lay anyone off in the downturn, we're not going to see a lot of hiring in the upturn."

Sorenson said, "We've always had to run real, real lean." In the early 1980s, radio suffered severe employee cutback and loss of revenue.

The lesson learned was to hire only the best talent and the people needed. Sorenson believed that the sales department should remain intact, and Stakelin said talent should never be cut.

Since the 1981-82 downturn, radio operators have learned how to survive and grow when economic hard times abound in the general economy. As the budget process continues, radio operators will proceed conservatively.

Operators have confidence in the economy even though growth has been modest. But they have seen growth. "We're very confident about our future and the future of the radio business and the general advertising economy," Clark said, "but we realize that our optimism has to be modified by some degree because of our concern about the state of the overall economy."

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1992 Revenue Mixed So Far

NEW YORK The Radio Advertising Bureau (RAB) radio revenue index of more than 100 markets indicates that local radio revenue through August 1992 is up three percent over the same period in 1991.

Combined national spot and local revenue was flat for the period January-August 1992 compared to the same period in 1991. All figures are based on the index revenue pool results compiled by the RAB and network revenues compiled by Ernst & Young as reported to them by members of the Radio Network Association.

Local revenue in most regions of the country was up slightly or flat for the month of August (versus August 1991). Numbers showed a four percent decrease in the West that brought down the national average.

National spot revenue was down nine percent for August (an improvement compared to the 15 percent decrease posted in July). Combined local and national spot revenue for August decreased by two percent over August 1991.

The accounting firms of Miller Kaplan Arase & Co. and Hungerford Aldrin Nichols & Carter provide the local and national spot revenue data on the markets used to calculate the revenue index.

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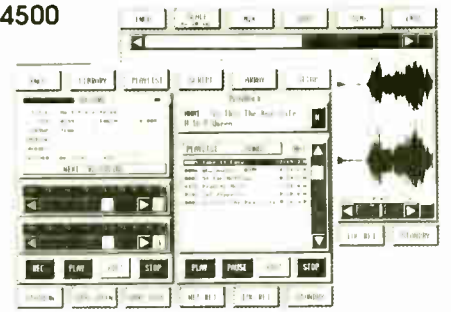
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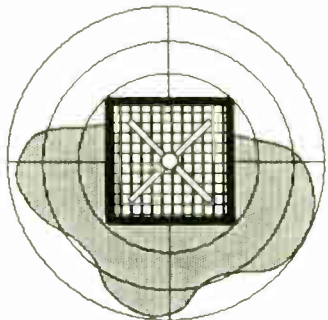
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RTNDA Provides Forum For Journalists' Debate

by Gordon Govier

SAN ANTONIO, Texas This year's Radio-Television News Directors Association convention here featured lively debate on the role of the media in politics. Broadcast journalists had a chance to compare notes and experience, and all had the chance to listen to CNN founder Ted Turner espouse activism among journalists.

"Tell them what they need to know, sandwiched by what they want to know," Paul Harvey said.

In a question and answer session with RTNDA delegates, the most listened-to radio newscaster in the country addressed the age-old entertainment versus information dilemma most broadcast journalists struggle with in today's media climate. Harvey was presented with the RTNDA's prestigious Paul White Award and gave the annual Paul White address.

Some good, some could be better

Harvey credited broadcast journalists for helping to bring down the Berlin Wall, bring the Persian Gulf War story home, and bring about some housecleaning in Congress. He talked about radio writing at its best, when it can "paint pictures on the mirror of your mind."

But in between, the ABC commentator took to task those journalists who have changed their role from watchdog to attack dog. "Our own excesses are leaving us vulnerable to the same degree of public disrespect which is presently unseating Congress," he said.

He questioned the need to expose every secret, patronize every environmental alarmist, and bad mouth the U.S. without providing some balance and perspective.

"I'm fed up with politicians trashing our country when it is the best country on the planet," Harvey said. "The Heritage Foundation blames us of the media for accepting distorted government statistics which lead to distorted public misconceptions which lead to imprudent legislation."

He cited miscounted Census Bureau poverty figures and scientific refutation of global warming and ozone environmental alarms.

Media bias complaints are old hat. NBC "Today" host Katie Couric suggested in her speech earlier in the convention, reviewing quotations going back as far as the Truman administration. The media have been a handy target for politicians when things haven't been going well.

Liberals and the media

"I do think we should ask ourselves if the media is too liberal," she continued. Some professors she talked to about the subject offered some reasons: Liberals are attracted to media jobs because they don't pay well, or they're interested in activism and wanting to change things. More liberal attitudes may also develop as reporters are exposed to the diversity of views on major issues.

CBS's Leslie Stahl addressed the delegates as well. "The public wants substance," she said, noting that news programs, including her own "60 Minutes," are getting good ratings.

She said the public also seems to want to hear substance from the political can-

didates, but when they get it they vote against the candidate. That forces campaigns into other strategies. "What it will take to solve our problems is something (the public) doesn't want to hear," she concluded.

Cable TV magnate Ted Turner kicked off the second annual RTNDA Environmental Reporting Symposium by reading the Environmentalists for Clinton/Gore position paper and talking about how much better off the country would be with more people more sensitive to environmental issues. "Environmental businesses have been growing faster than the U.S. economy," he said. "Ignoring the environment hurts the economy and costs jobs."

RTNDA's Distinguished Service Award was presented to former AP Chief Middle East Correspondent Terry Anderson. Members had ritually passed resolutions during the past few years, asking Anderson's Beirut captors to release the hostages.

"I doubt very seriously that all those resolutions had much of an impact," RTNDA President Dave Bartlett said. "Our prayers, at least were answered."

Issues of life and death

Journalism can still be a hazardous occupation, as BBC correspondent Martin Bell testified. "The New World Order is a darn sight more dangerous than the old Cold War ever was," he said, summing up his report on the last 15 months in the former Yugoslavia. Thirty-one journalists have died there during that period.

"I think we're in for quite a long haul," he said. "There won't be peace until a new generation comes in and the old communists are gone."

There were no "News in the Zoo" sessions at this year's conference. The debate over the role of the radio news reporter instead centered on the talk radio format.

"Reporter and talk show host are two different jobs," said WELI (New Haven, Conn.) talk show host Steve Kalb, in a session titled "Keeping the News in News Talk Radio."

Kalb, a former radio reporter, said reporters shouldn't have their opinions reflected in their stories. But talk shows don't have that constraint. Fellow panel member G. Gordon Liddy said radio listeners get better news reporting from talk shows because people are becoming more and more unhappy with institutionalized and sanitized reporting.

Mutual talk show host and newscaster Jim Bohannon doesn't see a problem with wearing both hats. "People understand that reporters have opinions—even if they haven't heard them," he said.

In the candid Liddy style that appeals to younger audiences, the former Watergate conspirator told timid radio programmers to stop worrying so much about demographics. "Just do the job and you'll get the audience," he said.

□ □ □

Gordon Govier is news director at WNBC-FM Madison, Wis. and editor of SCRIBE, a quarterly newsletter for news directors in religious broadcasting. He can be reached at 608-271-1025 and through CompuServe at 76326,3402.

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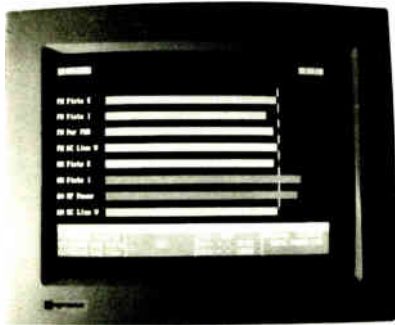
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Format Providers Grow in Numbers

by Karl Baehr and Harry Nelson

ALBUQUERQUE, N.M. When it comes to selecting a format for your satellite station, what should you look for? You have your choices these days in content, delivery, cost and support. This month we take a look at some of the available 24-hour, music-intensive formats and some unique niche options.

SupeRadio

The SupeRadio network has gone through quite a few changes over the past year, redirecting the "City FM" adult con-

temporary format and introducing the "Super Hit Country" format. City FM is now a "well balanced, uptempo" AC format according to EJ Gore, VP Sales of SupeRadio. Super Hit Country is based on WSIX in Nashville, "America's number one country station," according to Gore.

Both formats feature digital transmission, and unique "real time" delivery. "Real time allows for a more localized sound for our affiliates," says Gore. "We are the only network in the world currently broadcasting in real time to match the time zones our affiliates are in."

SupeRadio has approximately 60 affiliates. Cost per station starts at \$500 per month. There are no commercials to clear. Contact EJ Gore at 508-480-9000.

Morningstar Radio Network

A relative newcomer to the satellite arena, Morningstar provides an AC Christian music format, with a bright, upbeat delivery that appeals to adults aged 18-49. According to PD George McNerlin, Morningstar "can provide a viable, positive, quality format that fills a niche."

Morningstar has about 30 affiliates at this point, offers the advantages of digital delivery and has lined up some of the best names in religious broadcasting at the network. Monthly cost is based on usage rather than market size, and starts at \$100. For more information call Mike Miller at 713-871-8485.

Children's Satellite Network

Here's a neat idea: a radio station programmed for children. It's an idea that another group tried a few years ago with little luck. It's an idea that CSN President Bill Barnett knew would work. "if it was done right and proven first." CSN appears to have done that. The format is based on "Radio Aahs" which has been on the air for two-and-a-half successful years in Minneapolis.

CSN went on the air with nine affiliates on Oct. 1 and offers a unique blend of entertaining as well as educational programming.

Cost for CSN programming starts at

\$500 a month. CSN does require commercial clearance. Contact Rick Lemmo for more information at 800-949-4-CSN.

Satellite Music Network

There have been a few adjustments at SMN recently. "The Heat" CHR format has been changed to "Young AC." "Z Rock" is becoming more mainstream but will maintain its current intensive rock edge.

SMN offers 10 formats, including: "Real Country" a traditional country format targeting adults aged 35-plus; "Country Coast to Coast," targeting adults aged 25-54; "Young AC" targeting 18-to-44 year olds; AC "Starstation" targeting folks 25-to-44, and "Classic Rock" with 25-54 target demo.

Other SMN offerings include the unique Urban/AC "The Touch" format, designed to offer "strong younger numbers as well as a target of 25-to-49." "KOOL Gold," targets adults aged 35-plus with 50s and 60s oldies and "Pure Gold" targets those aged 25-54 with oldies from the 50s, 60s and 70s. "Z Rock" targets 18-34 year-old males and the nostalgia-driven "Stardust" targets adults aged 35-plus.

Commercial clearance is required—two minutes each hour. Cost information was not made available in time for publication. For more information call Frank Woodbeck at 800-527-4892.

Moody Broadcasting Network

Moody offers a "Full Services MOR/Inspirational" format featuring music and talk programming. The talk programming available addresses current issues as well as religious issues intermixed with music targeting the 25-54 demographic.

Moody has about 270 affiliates. Cost is based on usage, not market size, and in some cases is supplied at no charge. For more information call David Woodworth at 312-329-4433.

JSA Radio Network

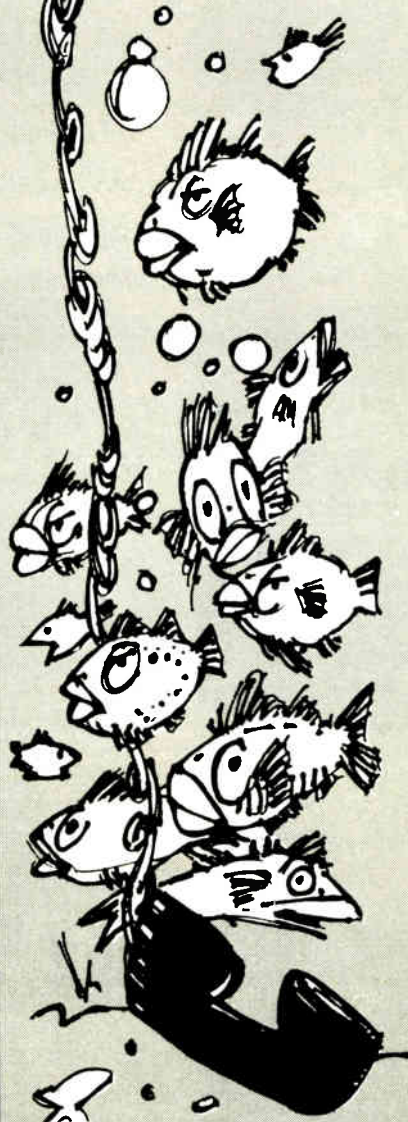
JSA currently provides five formats on satellite: "Adult Contemporary," "Great

continued on page 36 ▶

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- 005 027 049 071 093 115 137 159 181
- 006 028 050 072 094 116 138 160 182
- 007 029 051 073 095 117 139 161 183
- 008 030 052 074 096 118 140 162 184
- 009 031 053 075 097 119 141 163 185
- 010 032 054 076 098 120 142 164 186
- 011 033 055 077 099 121 143 165 187
- 012 034 056 078 100 122 144 166 188
- 013 035 057 079 101 123 145 167 189
- 014 036 058 080 102 124 146 168 190
- 015 037 059 081 103 125 147 169 191
- 016 038 060 082 104 126 148 170 192
- 017 039 061 083 105 127 149 171 193
- 018 040 062 084 106 128 150 172 194
- 019 041 063 085 107 129 151 173 195
- 020 042 064 086 108 130 152 174 196
- 021 043 065 087 109 131 153 175 197
- 022 044 066 088 110 132 154 176 198

Copy & Mail to: Radio World, PO Box 1214, Falls Church, VA 22041

A Suggested Blueprint for Studio Design

by Edwin Bukont

Part V of VII

GREENBELT, Md. In this installment, we will tackle the actual floor plan of the studio. In keeping with the spirit of duopoly, we will design a 5,000-square foot facility to house a live announce, music FM and an alternatively programmed, recently acquired, automation-assisted sister station.

Our hypothetical stations are in a top 100 market and serve listeners in the city, suburbs and outlying areas. Our site choice is an existing five-story office building in a suburban office park near a highway intersection. We are going to rent.

The chosen leased site offered us several accommodating factors. Instead of erecting a tower, the combined height of the building and its location on a high point in the landscape will allow us to erect our STL, RPU and satellite antennas upon the rooftop, using existing structural steel that supports a decorative skirt around HVAC and elevator machinery.

There is ample free parking adjacent to the building. After hours, employees can park inside an access-controlled garage with direct entrance to the building lobby.

There is an existing emergency power

generator that serves several telephone and computer systems of other tenants. This generator has appropriate options installed to ensure clean power is delivered to the loads. We will utilize this generator and transfer system for our studio power. This service will be separately metered.

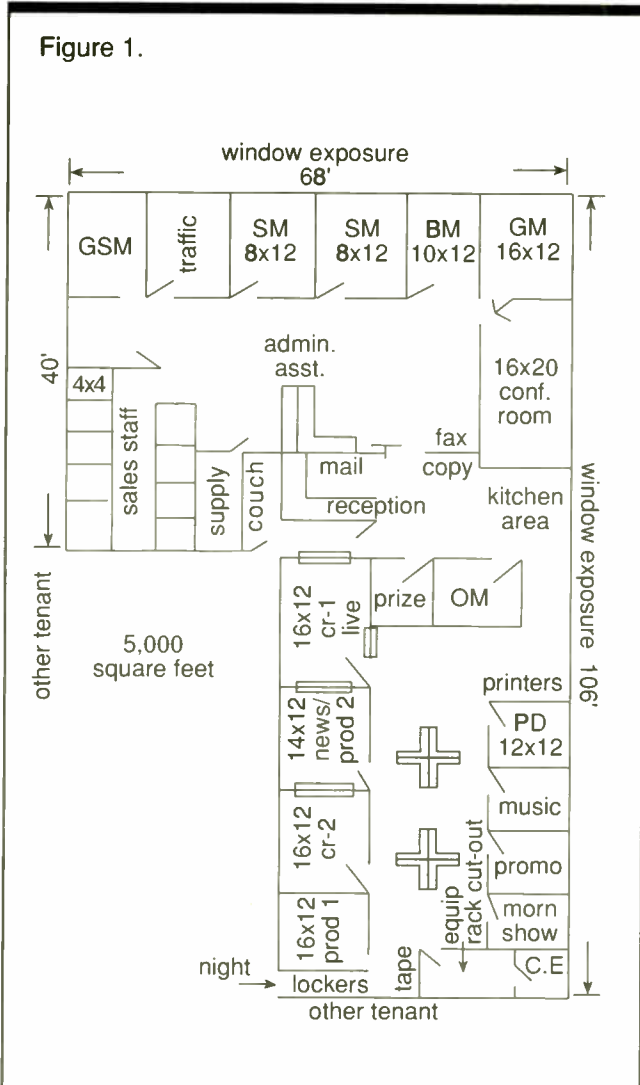


Figure 1.

tax and expense savings as well over a downtown location.

In Fig. 1 you can see that we have divided the facility into two parts—administration and programming areas. The design should control traffic to sales and programming areas while maintaining two means of exit after hours, and easy access to common areas. We placed sales and studios at opposite ends so as to minimize traffic and distraction in the studios and isolate salespersons from the loud and lively banter of the air staff.

Our floor plan allows all staff access to centralized, 24-hour services such as

kitchen, mail, fax and copier, while keeping supplies and files protected from pilferage.

Engineering was deliberately placed at the rear corner. The shop placement serves as a buffer between programming and the neighboring tenant and reduces wiring costs by having technical areas as close as practical to the building core—thus having wiring run away from, rather than to or across, the suite area.

Control 2 will be used for our automation-assisted station. As there will not be a full-time operator here, this studio can serve as a buffer between production

continued on page 36 ▶

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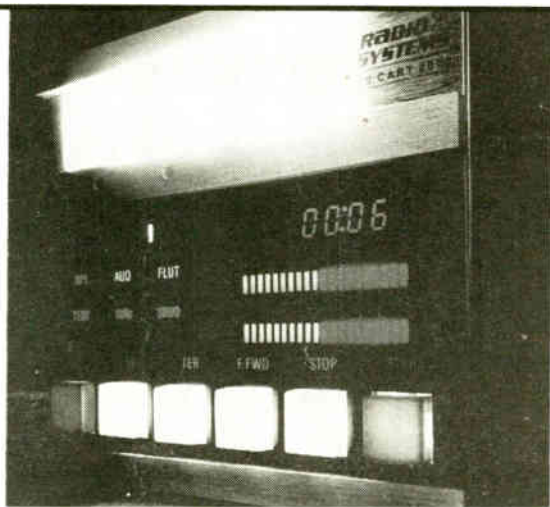
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MARKETING & MANAGEMENT

Who Should Build Your Database?

by John Cummuta

ALGONQUIN, III. In this fourth article on database marketing, we'll look at some options as far as who will actually do the work of database marketing for your station.

Up to now we've discussed elements of what database marketing is, how it works and how to begin gathering listener and potential-listener data to put into your database. So this is an appropriate point to consider how much work this really entails, and whether your staff is up to doing it themselves.

A rule of thumb

As a consultant, I use a black-and-white rule to determine whether a client should attempt to do his or her own database marketing: *Are they a direct marketing business, or are they a different kind of business simply wishing to add database marketing to their arsenal?*

If the company generally concentrates on more "mass" forms of advertising and marketing, such as TV, radio, newspapers, billboards and so on, I generally recommend to the company that it seek an outside specialist to conduct or at least initiate its database marketing activities.

In general terms, radio stations are not direct marketing-oriented businesses, so my rule of thumb would indicate that you should use outside professionals to manage your database marketing programs. At least you should talk to them before getting started.

Potential exceptions to this rule are smaller stations with limited budgets. Many of these stations have strong owner involvement, and many of these owners are computer literate to the point that they would feel comfortable attempting the work themselves. Since they are also working with smaller audiences, it is more realistic to try.

The only thing these stations must real-

ize is that database marketing is an ongoing, continual maintenance activity. You don't do database marketing this week, then try it again next quarter. Once you start down the database road, the process becomes a living organism that demands continual attention to maintain its viability.

There are a number of professional marketing companies that are beginning to focus on the radio industry. These companies offer a variety of services that range from complete turn-key systems to what I'll call "work-share" programs, where the station does some of the work and the service company provides the more technical elements of the process.

These companies also offer a variety of services, from those that concentrate on gathering information about your own listeners, to those that seek to steal loyal listeners from your competition.

I'll list a few of these professionals here. These are not the only companies offering such services aimed at the radio industry, but they are most of the major players.

• **TransAmerica Marketing Services, Inc.**, 8130 Boone Boulevard, Suite 350, Vienna, VA 22182, 703-903-9500. One of America's major league database marketing service companies, TransAmerica was one of the first to bring in experienced radio people to put together sophisticated database marketing programs specifically for your type of business.

They offer a full range of database marketing programs that include extremely innovative enlistment techniques to pull listeners from the competition, then maintenance campaigns to keep them in your audience. These folks can do it all for you, or show you how to handle parts of the process yourself. Ask for Michael Loncke when you call. He's a former major market radio GM.

• **RADIOACTIVE Radio Network, Inc.**, 1700 SW 12th Ave., Boca Raton, FL 33486, 305-525-9750. RADIOAC-

TIVE specializes in getting your listeners to call in, then the computer electronically captures the caller's phone number, from which his name and address can be electronically matched. So you don't have to ask for and write a lot of information.

The system offers "Music On Demand," where the listener is encouraged to call and select the song (from a predetermined group) that he'd like to hear, and it automatically pops into the play list. Meanwhile the caller's name, address and phone number are pulled into your database. The RADIOACTIVE system operates on a PC in your facility. Talk to Steve Williams.

• **ATI**, 6121 Hollis Street, Emeryville, CA 94608, 800-466-0444. *MediaVoice* is the featured product/service of this company. This PC-based system is an interactive, voice-based program that lets your listeners call in for a variety of types of information, from community activities to concert information to horoscopes.

When a caller is logged, the system gathers database information that can then be used in station marketing, as well as in advertising campaigns offered to the station's advertisers. Talk to Director of Sales Dennis Winger.

• **Altair Communications Inc.**, 1914 Maple Leaf Drive, Windermere, FL 34786, 407-298-4000. Here's another company that has incorporated a call-in generating mechanism—in this case a promotional contest called Magic Numbers—into a computerized data-gathering system. The information can again be used by the station for its own off-

air, loyalty-building promotions, and offered as targeted direct mail campaigns to advertisers. Talk to Bob Johnson.

• **AMERIVOX Listener Systems**, 2208 N.W. Market St., Suite 4, Seattle, WA 98107, 206-784-0081. This is another computerized inbound calling system that offers the caller news headlines, sports, weather, concert lines, horoscopes and similar products, in return for certain responses by the caller to information-gathering questions by the computer.

Like some of the systems above, the AMERIVOX computer also allows calls to be automatically forwarded directly to the advertiser sponsoring the information service or computer ad. Talk to Don McDaniel.

• **RADIOMAIL**, Ft. Lauderdale, FL, 800-872-2090. RADIOMAIL's service features a phone-answering PC at the station gathering the database information. RADIOMAIL sends appropriately personalized mailings, birthday cards and other targeted correspondence to your audience. The company can also analyze your database and use that info to find potential listeners that match your profile, inviting them to sample you. Talk to Michael Del Fonzo.

All of these companies offer many services beyond those I highlighted here. The sophistication of their systems is beyond the scope of this article. I suggest you ask each for information packages. They are quite specific.

More database marketing next month.

□ □ □

John Cummuta is an independent marketing and management consultant, and the author of the Sales Machine database marketing course. He can be reached at 708-658-9107.

Play-by-Play Nurtured Radio

► continued from page 28

casts made the country more radio sports-conscious than ever before.

Also in Chicago that same year, WMAQ brought every home baseball game throughout the season to the airwaves. The station was hooked up with KHJ in Los Angeles so that west coast residents could get a taste of midwest sports.

Incidentally, it was Miss Judith Waller, director of WGN and a name to become a standout in the years to follow, who first sold P.K. Wrigley on the idea of broadcasting the games from Wrigley field. WJZ New York originated World Series games to a nationwide network in 1926.

Go west...

Out on the west coast another memorable sports classic, the New Year's Day Rose Bowl, was to figure prominently in broadcasting's growing place in the sports world of the 1920s. On New Year's Day 1925, KNX picked up the Notre Dame-Stanford game, the only year to date the Irish have smelled roses. WGBS also picked up the game by direct wire from Pasadena with Sigmund Spaeth at the microphone.

It was the 1927 game, however, which made sports history. With a coast-to-coast hookup requiring 4,000 miles of telephone wire, KFI, with Graham McNamee at the microphone, made the first west-to-east transcontinental broadcast over long lines and left football fans across the country limp with

the thrills of a tie between Stanford and Alabama.

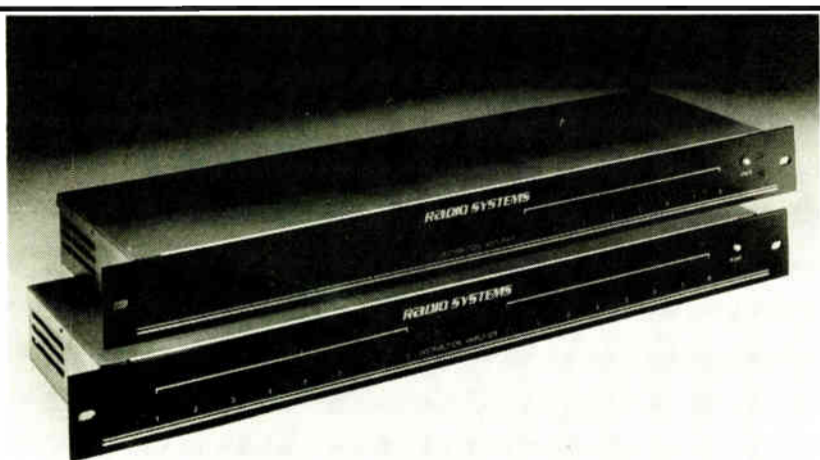
Through knowledge that comes with experience, broadcasting's technique in sports reporting has developed a finesse and efficiency from the excellence and expertise of the sportscasters of the past.

All around the U.S., different styles and talents entered the field of sportscasting during the last half of the '20s. Some of them went on to make big names for themselves during the golden years of radio. In Atlanta, Ga., Billy Munday had begun broadcasting Georgia Technical Institute games over WSB, and became very popular locally. When Georgia Tech was selected to play California in the Rose Bowl in 1929, NBC decided to team Munday up with Graham McNamee, and Munday's exaggerated drawl and Southern charm soon made him a national favorite.

Instead of competing with the sporting event for audiences, the thrilling and expert promotional voice of radio meant attendances for these events far exceeding anything in the past. The world of sports has meant much to broadcasting in its struggle for recognition, and in turn the radio has done much to put great emphasis on the wholeness of sports.

□ □ □

James T. Wold is a free-lance writer based in Minnesota. He is the author of "Minnesota Microphones," published by Northstar Press. Wold can be reached at 1106 South Seventh Street, Minneapolis, MN 55415.



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Circle (134) On Reader Service Card

World Radio History

Blueprint for Studio Design

► continued from page 33

(which can be loud) and the other studios. Offices for programming support personnel are provided as well.

A large bullpen was provided to give enough space to the talent to perform their "other" duties when not pulling an airshift.

Common ground

A common printer counter has been provided for prize, news, programming fax and programming computer printers. Since news is usually a part of the morning show, the news director will share office space in the morning show office.

Our newsroom will serve as Production

2 and as backup for both control rooms. News Control is large enough to support extra equipment and personnel if such should occur. Windows and a clear line of sight provide the Control Room 1 operator with a view to the outside.

Our receptionist and administrative assistant are located in the traffic "core" of the suite, where they can maintain contact with just about everyone, especially staff who are away from their desk at the copier, mailboxes, fax or kitchen.

You will note that access to the administration/sales area is through a sliding door, which can remain open and out of the way during office hours but is locked after hours.

For security reasons, I strongly suggest a locked, electric strike release door between the lobby and the remainder of your suite. Our conference room is centrally located—close to the most frequent users but locked after hours.

I would advise providing a separate fax machine for programming and a small supply of office materials for the weekend programming needs. Our stations have general sales manager and separate local sales manager for each station. Business, operations and programming management is shared for both stations. Sales support is shared for both stations.

We have tried to provide most personnel with office dimensions of 10'x10' or 10'x12'. Managers with larger data processing systems, such as traffic or programming, have larger offices. Studios

are large enough to allow access to the rear of equipment cabinets for air flow and service access.

□□□

Edwin Bukont is the CE at WPGC-AM-FM Morningside, Md. (Washington). He can be reached there at 6301 Ivy Lane, Suite 801, Greenbelt, MD 20770.

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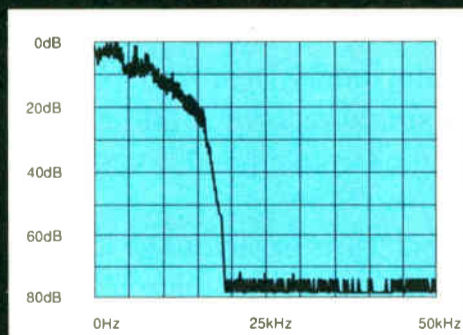
The 4000 provides transparent limiting with any source. Blind tests confirm that the sound of the Orban Transmission Limiter 4000 is virtually indistinguishable from the original source when driven as much as 15dB into limiting—even to trained listeners. Try it for yourself and hear what your facility can deliver when it is protected, not just restricted.

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Orban engineers took years to develop the complex algorithms which permit the 4000 to protect inaudibly. Yet, they kept the front panel of the 4000 clean, clear and businesslike. The precision LED displays indicate any action of the compressor or HF limiter circuitry. The only adjustments are for INPUT level and OUTPUT level. The built-in tone generator and test mode permit rapid system setup and alignment.

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Number of Choices Increasing

► continued from page 32

American Country," "Soft Sounds," "Goldies" and "Soft Hits."

JSA currently has approximately 500 affiliates, and continues to grow at a respectable rate. JSA does not require commercial clearance. Information regarding cost was not available at the time of publication. For information contact Tony Belzer at 800-876-3303.

Unistar

We talked with Unistar's Ed Solomon and Neil Sargent about the company's formats. Unistar offers nine formats including "AC II" targeting 25-to-40 year-olds, and "Format 41," designed to appeal to females aged 33-49. "Adult Rock 'n' Roll" targets those aged 34-44.

Unistar offers two country formats, "Country 25+" and "Hot Country" designed for the 18-34 demographic, as well as the "Oldies Channel" (ages 35-44), "AM Only" (for those older than 45) and "CNN Headline News."

Unistar has approximately 1,300 affiliates. According to Solomon, "price is based on individual station negotiation," so put on your best poker face and call Neil Sargent 805-294-9000.

We did try to get in touch with Cadena Radio Centro and Hispano USA but did not receive a response or information in time for publication.

Please be aware that there are also several providers of full-time, non-music satellite programming such as Sports Entertainment Network; American Forum (talk shows and sports); IBN and CBN, both religious block programming; Sun Network (news/talk shows), and Independent Broadcasters (talk shows), to name a few.

□□□

Karl Baehr is president of KBE Broadcasting By Design, a consultancy offering a variety of services to satellite affiliates. Baehr is a former programmer and air personality. Harry Nelson is president of Harry Nelson & Associates, a satellite consultancy and an Operations Manager at Satellite Music Network for nearly a decade, programmer and former air personality of the year. Harry Nelson can be reached at 800-67-RADIO and Karl Baehr can be reached at 505-828-0488.

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STATION SERVICES

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Brent Musburger Joins ESPN Radio

BRISTOL, Conn. Veteran broadcast sportscaster, Brent Musburger will join the ESPN Radio network beginning in January 1993. Musburger will broadcast a five-minute segment, Monday through Friday, in afternoon drivetime. The segment will focus on sports news of the day and interviews with newsmakers from the world of sports.

For information contact Dan Quinn at ESPN at 203-585-2200; or Patricia Evans at ABC at 214-991-9200; or circle **Reader Service 36**.

Christmas CD Library Available

INDIAN ORCHARD, Mass. The Music Director Programming Service released a library of seven CDs containing 160 Christmas hits, seasonal songs and traditional holiday music.

The CDs are targeted to AC-, country- and CHR-formatted stations. Song selection includes "White Christmas" performed by Bing Crosby, Nat King Cole performing "Christmas Song," Bobby "Boris" Pickett's "Monster Holiday," Madonna's "Santa Baby" and Stan Freberg's "Green Christmas."

For information contact Budd Clain at 413-783-4626; or circle **Reader Service 121**. Drew Marketing & Productions in Vancouver, British Columbia, distributes the CDs in Canada. For information contact company executives at 604-879-1500.

Zapnews Adds Entertainment Features

FAIRFAX, Va. Zapnews is offering affiliates a new menu of entertainment features, designed to give morning drive teams a live source of entertaining show prep material.

The service now offers Astrozap, a romantic and financial astrology chart for every sign; Zoap Zuds, a daily recap of the TV soap opera highlights; Humor Hotline, a satirical shot at the day's headlines, and Bookworm, a straight-forward script that reviews books without attempting to be funny.

Other features offered by Zapnews include: Tips'n'Trash, video news; Bitz'n'Glitz, a dozen kickers; Tomorrow in History, noteworthy events and celebrity birthdays; Zap the Experts, a daily quiz, and Tube Tonight, guide to the day's television and cable offerings.

For information contact Jim Hood at 800-783-2772; or circle **Reader Service 19**.

Sports Byline USA Targets Males 18-49

SAN FRANCISCO Station operators looking for late-night programming designed to appeal to young men can turn to "Sports Byline USA." The program is hosted by Ron Barr and originates at KSFO(AM) San Francisco.

Sports ByLine USA airs Monday-Friday, 10:06 p.m.-1 a.m. ET. The program invites listener call-ins (via a toll-free number) and Barr conducts interviews with sports celebrities and industry executives,

along with breaking sports news and final scores.

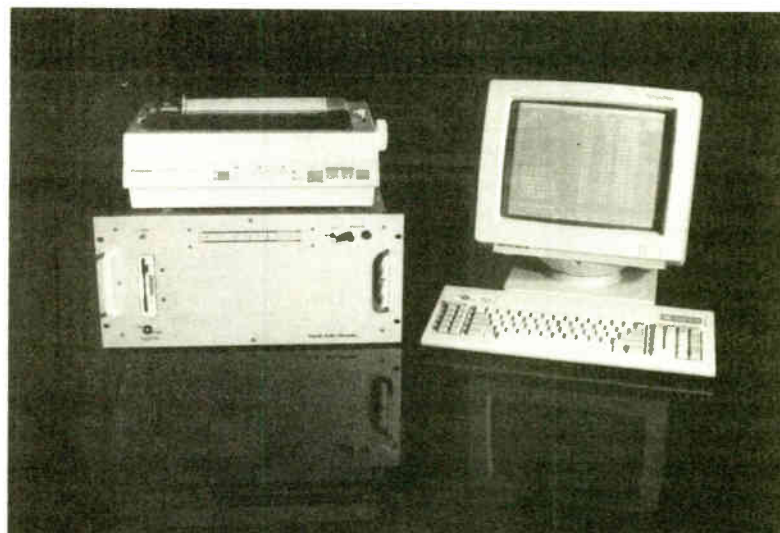
For information contact Ron Barr at 415-398-5600; or circle **Reader Service 166**.

Directory of Events Published

CHICAGO The 1993 edition of "Chase's Annual Events" began rolling off the press last month. The new edition, featuring a day-by-day calendar of special events, local and national celebrations, notable birthdays, historic anniversaries and observances, includes more than 10,000 entries, sponsor phone numbers and event indices by name, topic and state.

The 592-page directory costs \$38.95 plus shipping, with discounts offered for the purchase of three or more books.

For information contact Julia Walski at 312-782-9181; or circle **Reader Service 43**.



AUDISK. The Broadcaster's Time Machine.

Time is money. Whether it's the sale of air time or the efficient use of staff time, the broadcast manager is continually challenged to optimize the value of a radio station's time. That is exactly what Gentner's AUDISK system can give your station.

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Integrating a digital storage system that is time saving, flexible, yet provides superior audio quality, is no longer a luxury, it is essential to your station's profitability.

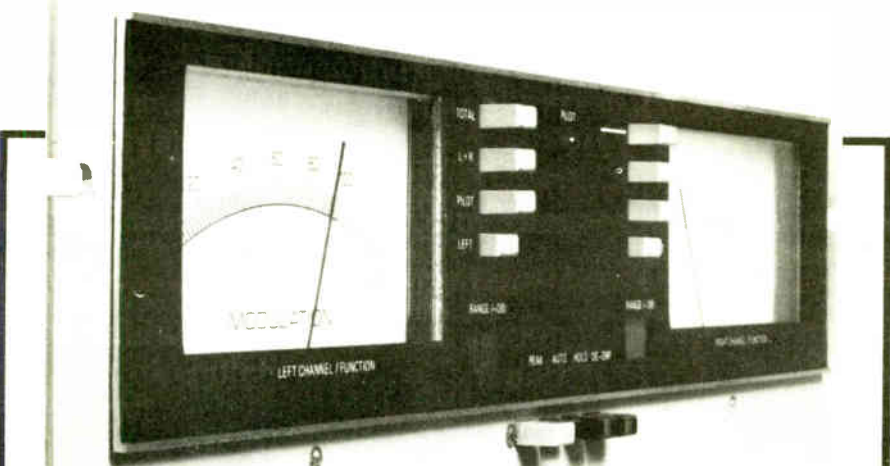
Time and time again AUDISK has been put to the test by radio stations throughout the world. And with each test, the result is the same. Stations are saving time, increasing productivity, and improving their on-air sound.

With AUDISK, the time spent on basic production tasks and the time wasted juggling carts in master control is virtually eliminated.

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"Send me literature." Circle (167)

Radio World Broadcast Equipment Exchange

"Broadcast Equipment Exchange" accepts no responsibility for the condition of the equipment listed or for the specifics of transactions made between buyers and sellers.

AMPLIFIERS

Want to Sell

Crown D-150, \$250; D-300A, \$350; Soundcraftsman stereo, 21-band, \$200. B Wilson, 502-465-3342.

Dynaco PAS 2, gd cond, \$95. J Parsons, Parsons Sound, 2781 Fayson Cir, Deltona FL 32738. 904-532-0192.

Haffer; Crown, QSC, Belles mon amps, Ramko dist amps. K O'Connell, O'Connell Prod, POB 909188, Gainesville GA 30501. 706-983-9841.

EMC 120ex 120 Hz 2-way crossover, rack mount, \$100. D Tebbe, WMEE, 2915 Maples Rd, Ft Wayne IN 46816. 219-447-5511.

Gates cart rec amp; (2) TEAC RA-41 rec amp; Gates RF amp, D Nadon, WLYT, POB 9250, Haverhill MA 01831. 508-374-4733.

Crown D-150A, \$250; D300A, \$250. 502-465-3342.

New 250 W solid state amp, \$1800. Call for details. Bill Hoffman, 518-583-9490.

RCA, Altec tube mic pre's & tube amps & mixers; Langevin AM-16's, sale or trade. Tracy Eaves, 615-821-6099 (evenings before 10PM EST).

Want to Buy

Denon POA440, 6600, 8000; Sansui B2301, C2301/BA5000; Fisher SA1000, K1000; Nak PA5/2; B&W MPA810; Peplow all; ARC M360, D150, D79, D75, D76; Crown Macro Reference; Marantz 1-10; McIntosh all; JBL Harstfield; Paragon; Cascade. R Katz, Allegro Sound, 15015 Ventura Blvd, Sherman Oaks CA 91403. 818-377-5264.

Crown DC-300 reas cond. Bob, WKLX, 259 Monroe Ave, Rochester NY 14607. 716-454-3040.

Fairchild 610 (4) monitor amp, installed in rack mount, recapped, \$175. M Guthrie, 813-855-5642.

ANTENNAS & TOWERS

Want to Sell

ERI FML3E 3-bay tuned to 104.9, 1 5/8" flange, exc cond, BO. Alan, 205-275-8839.

Harris 2-stage nitrogen regulator, \$40. J Gober, Auburn Univ, POB 2633, Auburn AL 36831. 205-987-9198.

Shively 6810 new, 8 bays w/radomes. direc ant, freq on 100.3. 312-374-9200.

Gorman Redlich AM direc mon, \$1000. J Randolph, WMGE, Box 1230, Danville KY 40422. 606-236-2711.

Dielectric 4-bay high pwr tuned to 97.3 MHz, 1 bay bad, mounting hardware, BO. D Tebbe, WMEE, 2915 Maples Rd, Ft Wayne IN 46816. 219-447-5511.

ERI FML 2-bay FM tuned to 96.7 MHz, gd cond, avail immed, \$900. M Ripley, KOZE, POB 936, Lewiston ID 83501. 208-743-2502.

Rigid line, 3-1/8", up to 800' avail, on tower, exc cond, pressurized, you remove from tower. M Kobylch, WJET, 1835 Ash St, Erie PA 16503. 814-455-0240.

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Cablewave 3 1/2" end, \$100; 3 1/8" elbow; Andrew 1062, \$200, 7/8" to F ant adaptor, \$25. J Cunningham, KEOR, Rt 2 Box 113B, Stonewall OK 74871. 405-265-4496.

Phelps Dodge CFM LP 3 used, \$3000; Andrew 340' of 7/8", flanges on ea end, \$1000. J Leutzinger, KOCD, 3001 W 13th St, Joplin MO 64801. 417-624-1230.

Swaggart 300' useable sections of 386' twr, 20' sections, 28" face w/beacon, flasher, sidelights, guy cable; Cablewave 350' of coaxial 3" line on spool, used, \$2100. W Wist, WAUS, Andrews Univ, Berrien Spgs MI 49104. 616-471-3400.

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Rhone 55 (17) 10' sections/(9) 20' sections. R Whitlock, KITE, 838 G Sidney Baker, Kerrville TX 78028. 512-792-4560.

10-bay low pwr tuned to 95.3; 4-bay Phelps Dodge CPLFM-4 FM. Randy, 816-885-6141.

AUDIO PRODUCTION

Want to Sell

TEAC/Tascam M320 20-chnl, 2 yrs old, \$1500/BO. D Matys, KLTR, 10333 Richmond #6937, Houston TX 77042. 713-780-0937.

ADC Pro Patch (48) bay, #4-26169-0010 w/patch chords, \$100. G Hultman, Hultman Media, 300 Limpy Creek Rd, Grants Pass OR 97527. 503-474-6466.

dbx 142 bdct noise reduc system, \$200. J Gober, Auburn Univ, POB 2633, Auburn AL 36831. 205-987-9198.

TEAC/Tascam M-320 20-chnl, 2 yrs old, \$1500/BO. D Matys, KLTR, 10333 Richmond #6937, Houston TX 77042. 713-780-0937.

Crown VFX2 stereo, elect cover, \$150; (2) MCI Autolocator III for 110, J4-24, \$1000. Wayne, 619-320-0728.

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Publishon Internal Machine 90 stereo in/out, stereo pitch shifting, dig delay, echo, .05 memory, excel cond, BO. R Kaufman, Pams Prods, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

MCI JH110A 2-trk in stand w/sound & vision remote/locator, \$1200; Orban 674A parabolic stereo EQ, \$600; Foxtex 3070 comp/limiter, \$150; Foxtex 3180 reverb, \$50. W Gunn, 619-320-0728.

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Conex CS-25 dual 25 Hz tone decoder w/hi-pass filter, \$125/BO. R Bauer, KCPX, 35 Century Park Way, SLC UT 84115. 801-486-3911.

SMC MSP-1 2000 event prog w/batt backup, logging printer, (4) 450 Carousels, (3) mono cart PB, sat switcher in 2 racks, \$5995. D Kelly, KWPN, Box 84, West Point NE 68788.

SMC 250 Carousel, rblt & aligned, \$200+sh. R McDaniel, KJRG, Box 567, Newton KS 67114. 316-283-5150.

Bdct Automation live assist controller w/thumbwheel operation, 24 events of progr, LEDs at a glance, 1 yr old w/manual, \$1950. R Chambers, KSUE, 3015 Johnstonville Rd, Susanville CA 96130. 916-257-2121.

IGM-EC (2) 24 mono Go-Carts, 18 mos old, \$11K; (4) Harris 9000, (3) cart decks, (3) SMC Carousels. J Murphy, WMXO, 118 W Henley St, Olean NY 14760.

SMC RSC-50 & RSC-100 random selector units for Carousels, dig display, \$100. G Gibbs, KMNS, 901 Steuben St, Sioux City IA 51102. 712-256-0628.

Conex CG25R 25 Hz tone gener, \$200. A Moii, Moii Tex, 6231 E 100th, Tulsa OK 74137. 918-743-7834.

Instacart (2) 48-hole w/Sentry firing systems; IBM PC w/software. 503-774-0459.

Schafer 903E (2), on air, spare Audiophiles, BO. J Paoli, 818-774-5378.

Sonomag 250 (4) Carousels w/Harris Syst 90 interface cards, \$150 ea/\$500 all. Gary, 314-581-5500.

CD Jukebox CD-600 RS-232 interface, 60 disc plyr w/ext controls for rem access, like new, \$800. J Bosa, Bosa Co, 429 Poinciana Dr, Miama Bch FL 33160.

Harris System 90 w/(6) SMC Carousels, ITC Net Delay Cart, (4) ITC 7500 R-R PB machines, TI 733 printer, \$2500. Ken, KANE, 2316 E Main St, New Iberia LA 70560. 318-365-3434.

IGM Instacart (2) stereo, 48-trays ea, \$1400 ea/BO. G Thomas, KELI, Box 3834, San Angelo TX 76902. 915-655-5483.

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ITC 3D mono, triple deck w/WRA rec elects, 3-tone, \$800/BO. R Bauer, KCPX, 35 Century Park Way, SLC UT 84115. 801-486-3911.

BE Dura Trak 90A (2) stereo R/P, \$1425 ea; (4) stereo PB, \$950 ea; 3000A stereo R/P, \$1325; 3000A mono delay rec, rack mount, new, \$800. D Kelly, KWPN, Box 84, West Point NE 68788.

BE 400-A mono, rec & PB, \$175; Tapeaster 700-P stereo PB, \$225. M Gollub, WMJS, Box 547, Prince Frederick MD 20678. 410-535-2201.

ITC SP (2) w/3 cue tones, exc shape, free spare audio card & mating conns if you buy both, \$375 ea. P Hess, WPPJ, 134 Derwent Dr, Pittsburgh PA 15237.

ITC R/P stereo, 3-cue tone, exc cond, \$900. J Gober, Auburn Univ, POB 2633, Auburn AL 36831. 205-987-9198.

Spotmaster 2000 R/P mono compact w/sec tone, record, very gd shape, \$500. G Gibbs, KMNS, 901 Steuben St, Sioux City IA 51102. 712-256-0628.

Pac Rec Micro-Maxx w/std hds, mint cond w/rack mount, power cords, manual, \$1600/pair. K Rosato, Sound Bdcg, 303 Webster Ave, New Rochelle NY 10801. 516-696-1172.

Spotmaster. D Nadon, WLYT, POB 9250, Haverhill MA 01831. 508-374-4733.

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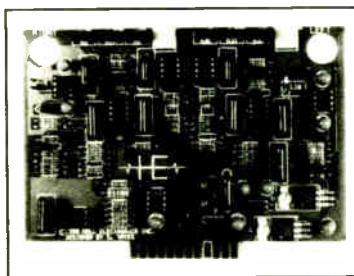
Harris Criterion 90-1, mono, \$250. D Matys, KLTR, 10333 Richmond #6937, Houston TX 77042. 713-780-0937.

Spotmaster 500B, R/P, \$250; 505B, P only, \$190, rblt, gd cond; BE 1000, R/P, gd cond, \$220; Tapeaster 700P, \$200; 601 stereo limiter, \$200. J Cunningham, KEOR, Rt 2 Box 113B, Stonewall OK 74871. 405-265-4496.

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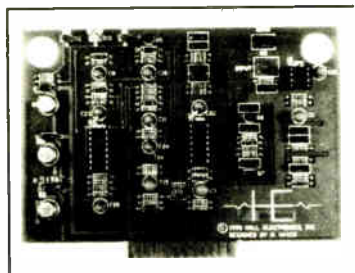
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Pioneer RT 1020L gd shape, \$300; Ampex ATR 700, \$750; Pioneer RT 701, new hds, \$350. J Parsons, Parsons Sound, 2781 Fayson Cir, Deltona FL 32738. 904-532-0192.

Tascam MS 1" 16-trk w/rem, ES-500 synch, used 7 times, mint cond, \$10K. 800-285-4252.

Ampex AG440 8-trk rec, 10 hrs on relapped hds, exc cond, \$1800, w/roll around cab, \$2300. B Seifried, Eclair Engrg Svcs, 221 Pine St, Florence MA 01060. 413-584-6767.

Otari MX 7308 1" 8-trk, 15/30 ips, low hrs, exc cond w/remote, \$3900; Ampex 350/40 motors & parts, \$150 & under; Studer PR99 2-trk 7-1/2 & 15 ips, low hrs, exc cond, \$1950; Technics 1500RS 2-trk, 15, 7-1/2 & 3-3/4 ips w/1/4-trk PB hd w/rem, exc cond, \$950. L Wagner, 407-299-1299.

Crown CX824 classic, new w/sync, var spd, rem, 800 xport, \$850. D Kocher, Dig Sound Makers, 1901 Hanover Ave, Allentown PA 18103. 215-776-1455.

Otari MX5050 III-4 2 yrs old, 4-trk Pro rec, \$2500/BO. D Matys, KLTR, 10333 Richmond #6937, Houston TX 77042. 713-780-0937.

Tascam 388 8-trk board/rec combo w/dbx, manuals, gd cond, \$1500+s/h. H Lam, APT, Box 22801, Houston TX 77227. 713-780-7227.

Tandberg 11/P, whole/parts. J Morinelli, 215-789-2742.

Otari ARS1000 (7) 2-chnl w/25 Hz tone sensor & cue tone relays, exc cond w/manuals, \$650 ea. R Chambers, KSUE, 3015 Johnstonville Rd, Susanville CA 96130. 916-257-2121.

AKAI MG1214 12-trk rec/mixer, \$3000. B Seifried, Eclair Engrg Svcs, 221 Pine St, Florence MA 01060. 413-584-6767.

Sony APR5003 1/4" w/center-trk for SMPTE video lock, edit deck, exc cond w/rem & stand, \$4500; Otari MX5050 III 8-trk, 1/2", very gd cond, \$2000. K O'Connell, O'Connell Prod, POB 909188, Gainesville GA 30501. 706-983-9841.

Otari. 503-774-0459.

ITC 770 (4) stereo PB, \$450 ea/\$1600 all; (2) Ampex 350, \$100 ea; (2) Scully 280 mono, R/P, \$100 ea. F Konwinski, WSOY, 1100 E Pershing, Decatur IL 62524. 217-877-5371.

Tascam 32 2-trk, new factory hds, exc cond w/rack ears, rem ctrl, manual, \$900. M Friend, WTJU, 711 Newcomb Hall Sta, Charlottesville VA 22904. 804-924-0885.

Otari 5050BII 2-trk stereo. 3 3/4-7 1/2 IPS, \$1600; (2) Otari ARS 1000 25 Hz, gd cond, \$650 ea. L Salge, KCMR, POB 979, Mason City IA 50401. 515-424-9300.

Technics M95 3-hd, Dolby NR, mem counter, manual bias adjust controls, tape selector, exc prod, very gd cond, \$125. C Yengst, 908-269-0991.

Otari MX5050 III-4 2 yrs old, 4-trk, \$2500/BO; Studer 807, 2-trk, 2 yrs old, 3-sp, shuttle wheel, \$3000. D Matys, KLTR, 10333 Richmond #6937, Houston TX 77042. 713-780-0937.

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Otari 5050B-III (2) stereo, perf shape, \$1425 ea; full-trk, \$1295, in svc. K Thomas, Rebel Rcdg, 5555 Radio Ln, Jacksonville FL 32205. 904-388-7711.

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Tascam 32 2-trk w/rack ears, \$900; Ampex ATR800 7 1/2/15/30 ips, VGC rack mount, full-trk, mono, \$1500; MCI 110B, 2-trk, rem/locator, VGC, \$1500. Wayne, 619-320-0728.

Tascam TSR-8 8-trk w/dbx, rack mount, exc cond, low hrs, \$2500. P Bombar, Open Studios, 102 Coleman Ave, Elmira NY 14905. 607-734-1751.

Scully R/P. D Nadon, WLYT, POB 9250, Haverhill MA 01831. 508-374-4733.

Telefunken M15A 2-trk in console cab, 7 1/2-15 ips, \$4000. R Rhodes, Roger Rhodes Music, POB 1550, NY NY 10101. 212-245-5045.

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Otari BIII 8-trk, 1/2", excel cond, sell/trade; Otari CTM-10, stereo, sell/trade. P Parks, KLV1, 27 Sawyer, Beaumont TX 77702. 409-838-3911.

Otari Mark II-IV 1/2" 4-trk, multi-trk, mint, less than 50 hrs, BO. R Kaufman, Pams Prods, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

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Ampex ATR800 mono, like new, \$1200 & AG440-8 1" 8-trk; Otari 7800 1" 8-trk, \$2900. W Gunn. 619-320-0728.

Otari MX-70 16-trk 1", mint cond, \$10,500. W Gunn, POB 2902, Palm Springs CA 92263. 619-320-0728.

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Otari MK III-B head bridge w/o hds. R Robinson, 203-269-4465.

Tascam/TEAC 4-chnl 1/4-trk; Tascam 122-B. T Heathwood, Heritage Radio, POB 16, Boston MA 02167. 617-969-9966.

Ampex 602-2 pref 1/4-trk; Ampex 350s/351s/440s, complete/parts; Otari 5050 MkIII, 4-trk. Wayne, 619-320-0728.

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Denon DN-950FA plyr, 2 yrs old, \$750. D Matys, KLTR, 10333 Richmond #6937, Houston TX 77042. 713-780-0937.

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Want to Buy

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BE 8M150 8-chnl rotary mono, \$975. J McDonald, Wind River, 329 E 3rd, Loveland CO 80537. 303-669-3442.

Rockwell Collins 212R-1 not working, parts, BO. Q Morrison, KGLL, 5125 S College Ave, Ft Collins CO 80525. 303-223-0435.

RCA BC-8A dual prog output, 24-input, gd cond, \$950. G Gibbs, KMNS, 901 Steuben St, Sioux City IA 51102. 712-258-0628.

Roland CompuEditor (2) auto fader pkgs, SMPTE based w/15 long throw ALPS faders, 15 chnls of voltage-controlled gain elements, \$850. B Seifried, Eclair Engrg Svcs, 221 Pine St, Florence MA 01060. 413-584-6767.

Trident Series 65 32 in, 16 out, oak cab, pedestal base, wiring harness, mod ext card, new, \$10K. J Diamond, Blue Diamond Studios, Box 102C Chubbick Rd RD1, Canonsburg PA 15317. 412-746-3455.

Altec 15C7A (3), gd shape, \$100 ea. J Parsons, Parsons Sound, 2781 Fayson Cir, Deltona FL 32738. 904-532-0192.

British Helios 24/16/24 circa 1970s, updates/mods w/doc, mic preamps, (9) sep sps w/wood rack cab, mahogany desk; Neve, \$9500/BO/trade; snake (16) inputs w/ext PS, 250' Belden 19-pr cable, MIL conns, ss strain reliefs, 10' Neumann XLR snake mates w/box/Belden snake, exc cond, \$750/BO/trade. Katz, Allegro Sound, 15015 Ventura Blvd, Sherman Oaks CA 91403. 818-377-5264.

RCA BC-8A (2) 8-chnl mono, \$150 ea FOB. R Bauer, KCPX, 35 Century Park Way, SLC UT 84115. 801-486-3911.

Audlronics 200 tel phone interface mod, \$250; 201 peg personality EQ w/eq card & ext card, \$225. D Tebbe, WMEI, 2915 Maples Rd, Ft Wayne IN 46816. 219-447-5511.

Harris Gatesway 80 mono 8-chnl, gd cond, \$500. M Ripley, KOZE, POB 936, Lewiston ID 83501. 208-743-2502.

BE 4S-50 4-chnl stereo, gd cond. L Saige, KCMR, POB 979, Mason City IA 50401. 515-424-9300.

Gates Gatesway II. K Kenzie, KIXY, 13 E 11th St, Washington MO 63090. 314-239-0493.

Howe Tech 9000 clean, works great, spare pwr sply, parts, 2 yrs old, \$4500. P Wolf, WDCQ, 12381 S Cleveland Ave, Ft Myers FL 33907. 813-574-5548.

Quad 8 8-input mono, nds pwr sply. J Gaffney, Ross-Gaffney, 21 W 46th St, NY NY 10036. 212-719-2744.

Audlronics 200 series, blue face mods, (1) mic input (MIS), gd cond, \$125; (1) mono line output, gd shape, \$125; (3) stereo line output, \$150 ea, \$650 all. M Guthrie, 813-855-5642.

SMC 6-chnl, solid state, very gd cond, 600 ohm, \$200+s/h. F Smith, 615-624-7126.

Ward Beck R2200 stereo, 18 input mods, (2) pwr splys, (10) patch bays, prod, \$4200+s/h/BO; Ward Beck R2200, stereo, 17 input mods, pwr sply, (10) patch bays, air, \$4000+s/h/BO. J Shadle, KPSN, 3719 N 32nd Ave, Phoenix AZ 85017. 602-279-5577.

McMartin B-501 mono, gd cond w/spare parts & extra board, 5 pots, aux inputs, \$300. J Cunningham, KEOR, Rt 2 Box 113B, Stonewall OK 74871. 405-265-4496.

EMPLOYMENT

To place ads in this section, use the ActionGram form. To respond to box numbers write Radio World, PO Box 1214, Falls Church, VA 22041. Attn: _____

POSITIONS WANTED

Tell your GM you've found that new prod dir, 15 yr pro, MIDI, dig, multi-trk, airshift. 203-350-NOW-7.

17 yr pro seeks PD/mgr pos in OR, pref coast, can help bring your station to life. David, 702-825-0945.

Freelance engr w/heavy duty exper for any job, anywhere w/great refs, audio, RF, automation, xmtrs, ants/construc, domestic/intl. 813-849-3477.

Quick fix prog, sales, mktg & engr expert, freelance for struggling stations anywhere. 813-849-3477.

Quick fix prog, sales, mktg & engr expert, freelance for struggling stations anywhere. 813-849-3477.

PD/OM avail w/20+ yrs, perfer cont Christian format. Jo, 304-762-2527.

5 yrs on air exper w/prod & sales, looking for long term FT pos, any format, oldies spec. Mike, 314-869-3284.

Engrg pro w/extensive radio field svc exper seeks hi-tech field svc pos, RF, audio, dig, construction & sales spt bck-grnd. 517-379-4803.

DJ/Trainee/volunteer sks pos, any format, 5 yrs exper as DJ, some prod work,

willing to learn, ham operator for 3 yrs, pref CA/CO/PA/AZ/AL, will work anywhere. J Benjamin, 602-788-1882.

Serious about radio air personality looking for station that values 15 yrs exper & natural ability to comm & entertain adults. Mike, 609-729-3520.

20 yr pro has relocated to Ft Myers FL, AC/oldies/CHR, reliable, great numbers, sks on-air shift. D Palmer, DHP Enter, 4370 Harbour Terr, N Ft Myers FL 33903. 813-997-3796.

Former CATV chf tech w/16+ yrs exper in RF, AV, equip maint, syst design & ops seeks challenging tech pos. J Powers, 607-272-7717.

Experienced radio engineer with varied background desires to relocate. any stable position welcome..Computer Literate..Resume on request. Write to: Radio World, POB 1214, Falls Church VA 22041. Attn: Box #11-04-01RW.

Freelance engr w/heavy duty exper for any job, anywhere w/great refs, audio, RF, automation, xmtrs, ants/construc, domestic/intl. 813-849-3477.

10 yr male radio vet exper in most formats seeks PD/air pos, pref midwest, can relocate immed, familiar w/Dig DJ. 219-271-8457.

CE w/big prod voice & over 15 yrs hands-on engrg exper seeks CE pos w/prod/air shift in competitive top 100 mkt. G Morgan, 704-563-8676.

Mgmt, small-to-med mkt, 10 yrs bdct exper, elects degree & exper, working on bus degree. D Koehn, 609 S 15th, Quincy IL 62301. 217-228-2115.

HELP WANTED

Paxson Broadcasting of Jacksonville has an opening for an assistant to the chief engineer of a multi-station complex. Applicant should have at least an Associates Degree in electronics, a minimum of three years experience in radio broadcast engineering and be able to handle any emergency, from the studio site to the transmitter sites. Computer knowledge a plus. No phone calls please, send resumes to: Kyle D Dickson, Chief Engineer, Paxson Broadcasting, 8386 Baymeadows Rd, Ste 107, Jacksonville FL 32256. E.O.E.

ENGINEER WANTED: Broadcasters Unlimited, Inc. is seeking Technical Personnel. If you are a motivated team player, interested in a C.E. or Assistant C.E. position with a stable company, Send us your resume. Salaries depend on experience. 3810 Brookside Dr. Tyler TX 75701. E.O.E.

ABOUT OUR EMPLOYMENT SECTION

HELP WANTED: Any company or station can run "Help Wanted" ads for \$1.50/word or buy a display box for \$55/column inch. Payment must accompany insert, use your MasterCard or VISA; there will be no invoicing. Blind box numbers will be provided at an extra charge of \$10. Responses will be forwarded to listee, unopened, upon receipt. Call 800-336-3045 for details.

POSITIONS WANTED: Any individual can run a "Position Wanted" ad, FREE of charge (25 words max), and it will appear in the following 2 issues of Radio World. Contact information will be provided, but if a blind box number is required, there is a \$10 fee which must be paid with the listing (there will be no invoicing). Responses will be forwarded to the listee, unopened.

Mail to: BROADCAST EQUIPMENT EXCHANGE
PO Box 1214, Falls Church, VA 22041
Attn: Simone Mullins

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CART MOTORS REBUILT to quiet flutter-free perfection-shafts resurfaced
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HEADS RELAPPED and precise digital/optical
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CAPISTAN & REEL MOTORS REBUILT for MCI, OTARI and more.

For peak performance from your recording equipment, call The Audio Magnetic Professionals.

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224 Datura Street, Suite 614, West Palm Beach, FL 33401
Call 1-800-826-0601 for "Same Day Service" in Florida (407) 659-4805
Authorized Parts Dealers for: MCI • OTARI • TEAC/TASCAM

CONSOLES . . . WTS

Harrison MR-4, 28x24, great condition, \$26,500. Tom 816-931-3338.

Want to Buy

Opamp Labs 20-input, 8 subs plus stereo mix out, gd prod board, \$2500. L Wagner, 407-299-1299.

McCurdy SS 7400 manuals, schematics, parts, working/not. M Salvaggio, MFS Prod Svcs, 417 Laubach St, Hellertown PA 18055. 215-838-1657.

Gates Mdl 6-10 chnl, pref tube mdl. M Bitner, WGWD, POB 919, Quincy FL 32353.

DISCO & SOUND EQUIPMENT

Want to Sell

Emulator II+ sampling kybd, 2 disk drives, reads & writes SMPTE, built-in sequences w/small library of sounds, \$850. B Seifried, Eclair Engrg Svcs, 221 Pine St, Florence MA 01060. 413-584-6767.

Community CSX-52 500 W 3-way loudspeakers, 15" woofer, 6-1/2" mid, pzt tweeter, power sense protection cover, carpeted cab w/handles, corners & steel grill, 40 Hz-20 kHz, exc cond, \$600 pair. B Fisher, KPCK, Box 829, Bowman ND 58623. 701-523-3883.

Noise reduc units: dbx 208 8-chnl, new, extra card, \$2000/BO; dbx 150 2-chnl, new, \$300/BO; dbx 154 4-chnl & dbx 155, both in rack, used, mint, \$600 both. J Diamond, Blue Diamond Studios, Box 102C Chubbic Rd RD1, Canonsburg PA 15317. 412-746-3455.

Whirlwind 27 XLR snake new, 50', XLRs both ends, BO+s/h; Ross 8-chnl stereo mixing board w/rack mount, perf cond, BO+s/h. H Lam, APT, Box 22801, Houston TX 77227. 713-780-7227.

HME MX10 6-chnl stereo, hi lo EQ, rack mount, \$300; Shure audio master & feedback controller, \$85 ea; dbx 1531-P stereo graphic EQ, \$225. D Kocher, Dig Sound Makers, 1901 Hanover Ave, Allentown PA 18103. 215-776-1455.

UA 1108 (10), \$100 ea; (12) UA 508 EQ, \$65 ea; (10) Neumann PV-176 preamps, \$100 ea; (10) Neumann 3-band EQ, \$175 ea; API 550 EQ, \$475; (2) API 553 EQs, \$165 ea; (2) API 559 graphic, \$225; (2) API 562 Param, \$200 ea; Lexicon super Primetime, \$775; PCM-41, \$250; Eventide H-910, \$225. M Linett, 818-244-1909.

Sound Workshop 262 stereo reverb, new, \$500/BO; ART DR1 & O1A dig reverbs, new, \$895 ea/BO; (2) ADA 2.56T dig delays, new, \$500 ea/BO; (2) Nexus

96-pt patch bay 1/2" front, RCA back, new, \$300 ea/BO; (2) Loft 450 delay line plyr, new, \$500 ea/BO; AB Syst 301 amp switcher, new, \$250; (2) AB Syst pwr amp, new, XLR, trans inputs, \$500 ea/BO; Switchcraft 48 patch bay, used, \$100/BO. J Diamond, Blue Diamond Studios, Box 102C Chubbic Rd RD1, Canonsburg PA 15317. 412-746-3455.

Altec 1750 1/3 octave, mono, active EQ, green fold-down faceplate, exc, \$25. J Addison, Stowe Media, 171 Hartford Rd A-7, New Britain CT 06053. 203-827-0329.

Peavey MK4 24-chnl, \$1400; CS-800, \$375. 502-465-3342.

Altec 88B/908-8A (2) horn & driver, exc cond, \$150 both/BO; (2) EV DL15X 15" hi-pwr woofers, never recond, \$125 ea/BO. G Becker, 813-960-8153.

Gibson SG (3) elec guitars, cherry finish, (1) 1974 std ltd edition, (1) 1968 SG Jr, (1) 1972 SG-100, all w/cases, \$1000 + s/h-will separate. J Tanis, Civitas, 925 N Northlake Dr, Hollywood FL 33019. 305-920-4218.

Klipsch Lascasas horns in road cases, will handle 300 W per chnl, excel cond, BO. R Kaufman, Pams Prods, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

Dolby 301 A-type stereo, discrete, \$500. W Gunn, 619-320-0728.

EDUCATION

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\$150 - meals included

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FAX 404-964-2222

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EQUIPMENT Financing, Lease Purchase Option. Need equipment for your radio, television or cable operation? New or Used. No down payment. Carpenter & Associates, Voice 504-764-6610 Fax 504-764-7170.

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- No financials required under \$50,000
- References available

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LIMITERS

CBS 4400 Volumax gd cond, \$100. R Laine, All Oldies, POB 10665, Golden CO 80401. 303-233-9393.

Harris/Gates M-6543 Solid Statesman FM w/manual, \$100. T Rosen, ISBCC, 1129 Accacia Ave, Bakerfield CA 93305. 805-871-6094.

Altec 1591A, \$125. J Parsons, Parsons Sound, 2781 Fayson Cir, Deltona FL 32738. 904-532-0192.

Ashely SC-50 exc cond, \$150; Marti CLA-40, gd cond, \$60. J Gober, Auburn Univ, POB 2633, Auburn AL 36831. 205-987-9198.

Gates M35298 stereo tube, \$100/trade. B Wilson, 502-465-3342.

UREI LA-4 (2) manuals; 535/533 manuals, BO. D Tebbe, WMEE, 2915 Maples Rd, Ft Wayne IN 46816. 219-447-5511.

We buy Optimod 8000A's and 8100A's
414-482-2638

Optimod AM 9100B, new, \$5500. B Ray, WGAI, 179 Lovers La, Elizabeth City NC 27909. 919-335-0856.

CBS Labs 4110 FM Volumax, gd cond, stereo, \$175. G Gibbs, KMNS, 901 Steuben St, Sioux City IA 51102. 712-258-0628.

Neve 3314A w/meters & pwr sply, \$2600 pair. M Linett, 818-244-1909.

Dorrough 310 AM/FM AGC, peak limiter, \$450. J Arzuaga, WREI, Road 2 KM 102.5, Quebradillas PR 00678. 809-895-2725.

CBS Audimax 4450A; Volumax 4111; Volumax 400; Audimax III; Audimax IIS; FM Volumax IIS, \$50 ea. F Konwinski, WSOY, 1100 E Pershing, Decatur IL 62524. 217-877-5371.

CRL SPF-300 like new, NRSC filter, \$175. B Buchanan, KSHN, 517 Travis, Liberty TX 77575. 409-336-5793.

Orban Optimod 8100A clean, exc cond, \$3200; Mod Sci Stereo-Maxx, little use, excp clean, perf cond, \$2200; Texar Prism near new cond, flawless oper, \$1400. E Sutton, WOKI, 1900 Winston Rd, Knoxville TN 37919. 615-531-2000.

Gates SA39B comp, D Nadon, WLYT, POB 9250, Haverhill MA 01831. 508-374-4733.

UREI BL-40 excel cond w/manual, \$300; BBE 224 proc, excel cond, \$200. R Laine, POB 10665, Golden CO 80401. 303-233-9393.

WE 189D xformers, \$35 pair; UTC LS-141 hybrid xformer, new, \$50; UTC LS-33 20 W line to line xformers, \$120 pair; Cinema Engrg #64266 xformers, \$30 pair. R Robinson, 203-269-4465.

Optimod 8000A, \$1450. L Salge, KCMR, POB 979, Mason City IA 50401. 515-424-9300.

DAP 310. K Kenzie, KIXY, 13 E 11th St, Washington MO 63090. 314-239-0493.

BE AM 400 lim/comp. D Nadon, WLYT, POB 9250, Haverhill MA 01831. 508-374-4733.

MICROPHONES

Want to Sell

Telefunken/Schoeps CM61 tube mic, mint cond, \$2475; CR-176 large diaphragm tube mic, \$1250. R Katz, Allegro Sound, 15015 Ventura Blvd, Sherman Oaks CA 91403. 818-377-5264.

Sony ECM-33P, new, \$200; C-22 & ECM-22, used, mint, \$150; ECM-21, used, mint, \$100; Fostex M55RP, new, \$300/BO; (2) MB Peerless MBC-520 new w/pwr sply, used, mint, \$400/BO. J Diamond, Blue Diamond Studios, Box 102C Chubbic Rd RD1, Canonsburg PA 15317. 412-746-3455.

Milab 1111 VIP-50 (2) w/shock mounts, \$800 ea. K O'Connell, O'Connell Prod, POB 909188, Gainesville GA 30501. 706-983-9841.

Telex WHM-500 wireless, 171.825 MHz, \$50. P Russell, Bowdoin Coll, Sils Hall, Brunswick ME 04011. 207-725-3066.

Sony ECM-MS5 stereo w/DC-MS5 pwr sply & GP-5 shock mount hand grip, \$850; AKG C522 stereo electret condenser pckg, \$500, both new. G Odell, 203-296-2972.

Desk mics (hiZ), EV-Shure mic stands, also baby booms (3); tubes, new (32) RCA, GE, Sylvania; Sams tube sub books #8 & #6; RCA tube manual; Sony head demagnetizer (new); jack femal connectors; EV 502 transformer primary/secondary. Mr. Oliver, 212-874-7660/0274. Call afternoons till 10PM.

EV 676 supercardioid mics 3/\$200; EV RE10 mic, \$125. W Gunn, 619-320-0728.

Telefunken U-47, Neumann U-67, KM-54 mint; RCA ribbon mics (2) KU3A's 10,0001, (3) 77-DX, (1) 44-BX, (2) BK-5; Altec tube mics M-11, M-20, M-30; 639 film version mic ect. Trade or sale. Tracy Eaves, 615-821-6099 (evenings before 10PM EST).

Telefunken M921 dual (2-way, not front/back) nickel capsules, cardioid only, classic tube mic; Neumann KM84 pair, mint, \$1100. W Gunn, 619-320-0728.

Want to Buy

AKG C24. R Katz, Allegro Sound, 15015 Ventura Blvd, Sherman Oaks CA 91403. 818-377-5264.

EV RE20/PL20. C Wright, Screaming Bunny Prod, 5288 Indian Garden, Petoskey MI 49770. 616-348-2740.

Sennheiser 421s/441s, Neumann KM84s, EV RE20/PL20. Wayne, 619-320-0728.

RCA 77DX/44BX ribbon, chroma/TV grey, gd cond, BO. R Kaufman, Pams Prods, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

MISCELLANEOUS

Want to Sell

Rec studio w/Tascam 38, noise reduc, mics, compressors, mixer, mint cond, whole/part. 602-497-2219.

Rotron Blowers for Elcom, CCA, CSI, McMartin, Harris, rebuilt & new.
Goodrich Enterprises Inc.
11435 Manderson St., Omaha, NE 68164
402 493 1886 FAX 402 493 6821

Estate sale w/Altec 10-chnl 1220 audio mixer (2) GE TV B&W cameras, circa 1953, Hercules 5302 tripod, Gibraltar tilt head, Collins 12-Z remote amp, (5) Shure audio mixers, Collins 26 C limiter amp, more. G Reiss, RT 1 Box 141, Wilcox NE 68982. 308-995-5541.

Scoop light fixtures for TV studio, \$25 ea; EV HR-90 radial horns, \$175 pair; Gollehon radio horns, \$125 pair. B Wilson, 502-465-3342.

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(2) DOWNLINK STUDIOS for SALE or LEASE

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Tripp-Lite (2) 1000 W 12VDC to 110 AC pwr inverters, \$150 ea; Gentner rewired patch bay, wired to st blocks, \$100/BO. D Tebbe, WMEE, 2915 Maples Rd, Ft Wayne IN 46816. 219-447-5511.

Want to Buy

On-Air light, old, 1955-1965. R Orr, WSEV, POB 486, Branson MO 65616. 417-334-6012.

UTC LS-10X, 12X, LS-18 xformers; Western Electroacoustic Labs mic PS#120A schematic. R Robinson, 203-269-4465.

Chicken Delight jingle & other memorabilia. T Wilds, T Wilds Enter, 3564 E 2nd #47, The Dalles OR 97058. 503-298-2592.

Jazz record collections, 10" LP/12" LP be-bop, swing, dixie, highest prices paid. B Rose, Program Recdgs, 228 East 10th, Nyny 10003. 212-674-3060.

Radio transformers by Chicago, UTC, Triad, Peerless, Freed, Sola, send list. J Gangwer, 942 32nd St, Richmond CA 94804. 415-644-2363.

MONITORS

Want to Sell

TFT 884 FM mod & stereo mon; 845 FM SCA, 67/92 kHz. L Martin, Musiplex, 4541 S 88th St, Omaha NE 68127. 402-331-2632

Potomac AM-19 (204) 2-twr direc ant, \$1500/BO. B Buchanan, KSHN, 517 Travis, Liberty TX 77575. 409-336-5793.

TFT 742A FM stereo mod; TFT 763 mod main-chnl, new parts, \$2500 both + s/h. 614-775-2600.

SPACE AVAILABLE

Call Simone Mullins
at 1-800-336-3045

Gates GTM 885 FM mod monitor; Gates freq monitor. D Nadon, WLYT, POB 9250, Haverhill MA 01831. 508-374-4733.

Want to Buy

RF amp to drive FM station mon pckg, will tune, \$200-300. P Adams, WKUJ, POB 342, Wabash IN 34692. 219-563-4111.

Belar AMM-1/AMM-2 mono, AM, gd cond, working, BO. R Miller, KUAW, Box 575, Lahaina HI 96767. 808-572-5534.

Any older McMartin mod monitors. C Goodrich, 11435 Manderson, Omaha NE 68164. 402-493-1886.

MOVIE PROD EQUIP

Want to Sell

Moviola 16 & 35mm upright w/any combination of hds, exc cond; Eastman Kodak Mdl 2 TV rec camera, 16mm, working, 1200' mags, 115 V, manual. J Gaffney, Ross-Gaffney, 21 W 46th St, NY NY 10036. 212-719-2744.

RCA H1001 (2) 16mm optical trk rec, 1 w/WEE elects, 1 camera & 1200' magazines; Westrex RA1519 35mm port mag rec w/R&P, gd cond, manuals; RCA PR41 35mm stage rec, port w/mixer amp & mic, preamp, 220 V, mint cond. J Gaffney, Ross-Gaffney, 21 W 46th St, NY NY 10036. 212-719-2744.

RECEIVERS & TRANSCEIVERS

Want to Sell

BE FC30 SCA gener & mod mon tuned to 67 kHz; RCA BW95A mod no, nds repair, \$600 both. Gene, 319-243-1390.

AM STEREO RECEIVERS

Portable, Home/Studio, Auto
RRADCO GROUP
708-513-1386

Lafayette LT-725 AM/FM/SCA stereo tuner, just tweaked, \$100/BO. Dave, 703-751-9346.

Onkyo T4130 AM/FM stereo tuner, dig w/20 presets, \$150. L Salge, KCMR, POB 979, Mason City IA 50401. 515-424-9300.

SCA RECEIVERS—ALL TYPES

Reading Service / Ethnic / Data
Professional, Portable, Table

DAYTON INDUSTRIAL CORP.
(Manufacturer)
4411 Bee Ridge Rd. #319
Sarasota, FL 34233
Tel: 813 378 5425 FAX: 3394

PHONE: 703-998-7600 FAX: 703-998-2966



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Radio World
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Falls Church, VA 22041

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Brokers
Cameras (Video)
Cart Machines
Cassette & R-R Recorders
CATV-MATV Equip.
CD's
CD Players
Computers

Consoles
Disco-Pro Sound Equip.
Financial Services
Limiters
Microphones
Miscellaneous
Monitors
Movie Production Equip.
Receivers & Transceivers
Remote & Microwave Equip.
Satellite
Software
Stations

Stereo Generators
Switchers (Video)
Tapes, Carts & Reels
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Positions Wanted
Help Wanted

Display Rates for Classified Advertising Effective January 1, 1991

	1x	3x	6x	12x
1-9 col inch (per inch)	\$55	53	50	45
10-19 col inch (per inch)	50	48	45	40
Distributor Directory	90	85	80	75
Professional Card	60	55	50	45
Classified Line Ad		\$1.50 per word		
Blind Box Ad		\$10 additional		

To compute ad costs: Multiply the number of ad inches (columns x inches) by the desired rate schedule for your per unit cost. Example: a 3" ad at the 1x rate is \$165, at the 3x rate \$159, at the 6x rate \$150, at the 12x rate \$147, etc.

RECEIVERS . . . WTS

Regency Microcom H44B 35 W, VHF, 4-chnl, \$20. P Russell, Bowdoin Coll, Sills Hall, Brunswick ME 04011. 207-725-3066.

SCA decoder, high quality micro-miniature 67/92 kHz, prewired & ready to install, \$15. D Jackway, Background Music Eng, 5742 Fair oak, Springfield MO 65810. 417-881-8401.

Want to Buy

Marantz 18 FM stereo, solid state w/mon, 1" scope, working. J Addison, Stowe Media, 171 Hartford Rd A-7, New Britain CT 06053. 203-827-0329.

REMOTE & MICROWAVE EQUIP

Want to Sell

Burk Tech TC-8, \$1200. J Murphy, WMXO, 118 W Henley St, Olean NY 14760.

Moseley DRS-IAR dig w/status panel, gd cond, \$700/BO; RCA BTR-15BW w/Hallakainen dig display, gd cond, \$500/BO. R Bauer, KCPX, 35 Century Park Way, SLC UT 84115. 801-486-3911.

COMREX RENTALS
1, 2 and 3-Line Extenders Switched 56 Systems
Call Steve Kirsch for details
Silver Lake Audio
(516) 623-6114

Moseley WRC-10 dial up, \$500. J McDonald, Wind River, 329 E 3rd, Loveland CO 80537. 303-669-3442.

TFT 7610C & R w/7630 expander & spare parts, \$950. G McClintock, WWCR, 1300 WWCR Ave, Nashville TN 37218. 615-255-1300.

Marti STL-8 xmtrs, rcvrs & combiners, dual stereo/indiv link, very clean, exc cond. M Ripley, KOZE, POB 936, Lewiston ID 83501. 208-743-2502.

TFT 7703 STL rcvrs, gd cond, \$1000 pair; Textel autopatch interface for 2-way radio, \$100. D Tebbe, WMEE, 2915 Maples Rd, Ft Wayne IN 46816. 219-447-5511.

Marti RPT 15 UHF/higher wattage. C Phillips, WXVO, POB 987, Clinton TN 37717. 615-457-2697.

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Gentner VRC-1000 perf cond, (16) telemetry/metering chnls w/manual, \$1600. B Buchanan, KSHN, 517 Travis, Liberty TX 77575. 409-336-5793.

Vintage pkg w/Collins console & 2 turntables; vintage RCA rc/studio end. D Nadon, WLYT, POB 9250, Haverhill MA 01831. 508-374-4733.

Marti RPT 30 UHF 25 W xmtr/rcvr w/auto identifier & yagi ants, \$1500; Regency 15 W UHF xcvr, gd cond, \$150. P Wolf, WDCQ, 12381 S Cleveland Ave, Ft Myers FL 33907. 813-574-5548.

Marti STL-8 (2) xmtrs & (2) R-200/950 rcvrs on 946.875 & 947.125 MHz, \$2500/both. B Herzog, WPKR, POB 3450, Oshkosh WI 54903. 414-236-4242.

Moseley 303 3 trans/3 rcv. K Kenzie, KIXY, 13 E 11th St, Washington MO 63090. 314-239-0493.

Moseley TRC-15 (2), 1 w/Hallikainen interface for radio send/wire return, \$1000; 1 is orig, radio send/audio out for SCA return, \$500, both work well

w/manuals. M Martindale, KVON, 1124 Foster Rd, Napa CA 94558. 707-252-1440.

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McMartin RPV-1430 (4) 30 W, 450-456 MHz, 13.5 VDC, (4) bdct xmtr, \$400 ea; (3) WR Comms WR-1455, 8-chnl, 30 W, 450-512 MHz, mobile xcvr, \$250 ea; (2) Cel-wave PD 526-4, 120 dB UHF duplexers, \$700 ea. F Grayney, CKBW, 215 Dominion St, Bridgewater NS B4V 2G8, Canada.

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Sci Atl 7300/7325 w/rcvr w/15 cards, will sell w/ or w/o McCurdy decoder system for Unistar format & T2F-100, \$5500. P Posen, KEZLN, POB 291, Palm Desert CA 92261. 619-340-9383.

Wegener Panda 2 rcvr w/1601-50 main-frame, 1605-12c pwr sply, 1606-51, 1610-01 (2), 1646 35 Hz tone decoder, set on CBN, can be changed, used 8 mos, \$2200. M Schwarzbauer, WFFF, 1715 Michigan St, Sturgeon Bay WI 54235. 414-743-7443.

Wegener 1601-50 RS w/1606-21 black converter, 1621 sat audio demod, 1645 25 Hz decoder, 1646 35 Hz decoder, 1605-03 pwr sply, exc cond, \$750/BO. R Bauer, KCPX, 35 Century Park Way, SLC UT 84115. 801-486-3911.

SCPC ntwk needs for expansion: Harris, Adcom, Avcom & others. M Sagnelli, Great Lakes Media, 2929 Covington Ct, Lansing MI 48912. 517-371-2142.

Scientific Atlanta 7300/7325 w/ or w/o McCurdy decoder syst for Unistar format & T2F-100, \$5500. P Posen, KEZLN, POB 291, Palm Desert CA 92261. 619-340-9383.

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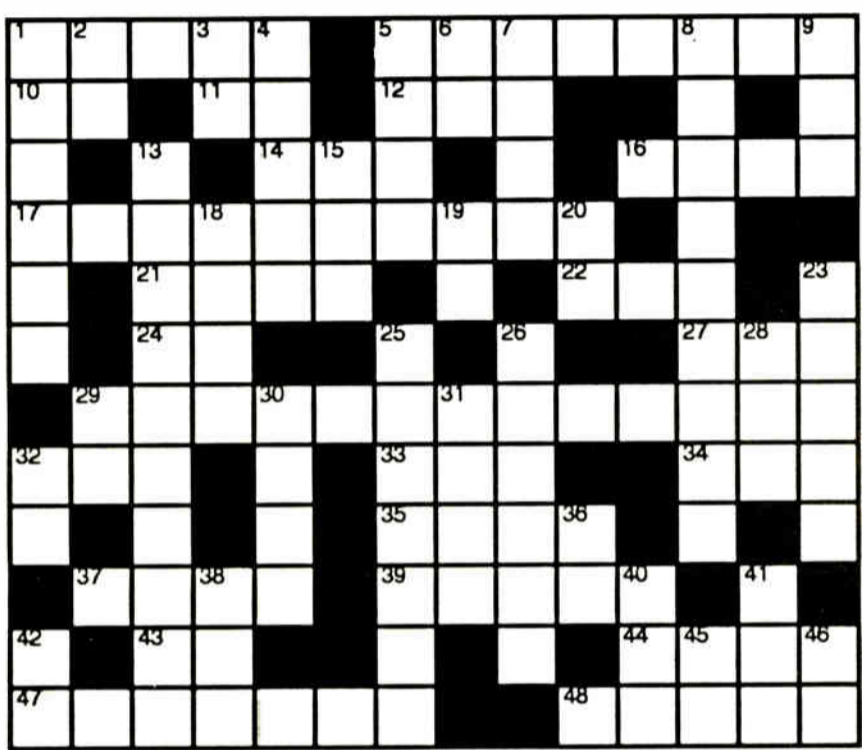
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This Month's Crossword



by Steve Walker solution in next issue of RW

- | | |
|---|--|
| <p>Across</p> <ol style="list-style-type: none"> Collection of songs 360 Systems' digital cart deck Cornhusker State Keystone State Flying Saucer Tape deck function, abbv. Splice A-6000 is their finest To fall in drops Also Pronoun Drink "Listen to the future" Damp Type of chip Drink made from plant leave Open to the air Autopilot To work like dough Abbv. for a chess move Follow orders In partnership To assent | <p>Down</p> <ol style="list-style-type: none"> Respond French article Direction Sports + _____ = Revenue Vehicle for carrying air or cable Logical function Slang for stupid person "A little bit of magic..." Little kid "A Dave Scott Company" Sixth Sense Field of study in humanities Where the Wiz is Latin conjunction "You can measure..." Digilink mfr. "Talk Console" mfr. Female deer Pronoun Type of wood, often used on boats Metal money Evergreen state Sound like German "yes" _____ Radio Picture Domestic animal often used as pet Payment for service Liquid measure Junior Samples' phone exchange Pronoun, archaic |
|---|--|

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A-6000

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