

*****3-DIGIT 857
0101 000296706 9606 02 BQT 9702
TOM MILLER
KTZR
ASST CE
2033 S AUGUSTA PL
TUCSON AZ 85710-

RadioWorld®

Build Your Own
Cable Checker,
See p. 12.

Vol 19, No 5

Radio's Best Read Newspaper

March 8, 1995

Cellular Sites Must Protect AMs

by Thomas Pear

WASHINGTON The FCC recently adopted a set of rules that require Public Mobile Service licensees—specifically cellular and paging system operators—to correct any interference that new or modified towers cause to AM broadcasters.

Cellular and paging operators must now prove they will not interfere with AM signals before they construct a tower, a significant victory for AM station owners and operators, who, without advanced notice, have increasingly found their signals disrupted rapidly by paging and mobile phone cell sites.

Crawford Broadcasting Engineering Director Cris Alexander said the rules should help to solve the increasing problem of cellular interference to AM signals.

Traditionally, AM towers were located on the outskirts of the markets they serve. But over the last decade, cellular operators constructed transmitting towers closer in to the suburban areas that they served, Alexander said. In some cases, the closer-in cellular and paging signals sometimes interfered with the AM signal.

In some instances, cell sites totally prevented AM signals from reaching certain listeners in their licensed contours,

National Association of Broadcasters Engineer Dave Wilson said. A loss of listeners can mean a loss of advertising revenue, he added.

"I can't tell you how many times I built an AM array thinking this is way out in

the country, and three years later they were building housing across the street," Alexander noted. "Then, later, cell sites were installed in those areas to accommodate that populace."

Although the rules have been around for a number of years through an FCC Public Notice, writing the policy into the

continued on page 6 ▶

Some Fees Increase, Decrease Under Proposed FCC Schedule

by Thomas Pear

WASHINGTON A set of FCC proposed user fees hikes, recently released in the form of a Notice of Proposed Rulemaking (NPRM), could mean significant variations in the amounts broadcasters would have to pay.

Broadcasters had until Feb. 13 to file comments for or against the NPRM. At press time, the deadline had not yet closed. After that, procedurally, the commission will consider the comments and then issue a report and order that will finalize the new fees. Broadcasters were first hit with the user fees in 1994 as part of a federal government push to help agencies offset regulatory costs.

If the FY 1995 fee schedule is approved, Class A AM stations in Arbitron markets would see a 69 percent increase over the FY 1994 fee. In actuality, the fee would jump to \$1,525 from \$900. Class B AM stations in Arbitron markets would see an approximately 70 percent fee increase, from \$500 in FY 94 to \$850 in FY 1995.

Some stations, however, would see a fee decrease. Class A AM stations in non-Arbitron markets, for example, would see their license fees drop from \$900 to \$565, a decrease of approximately 37 percent.

In other cases, the difference is slight. Although Class C AM stations in Arbitron markets would see a 70 percent increase in regulatory fees, the actual amount is only raised to \$340 from \$200. Class C AM stations in non-Arbitron markets would see a decrease of approximately 38 percent in the fees between the two fiscal years—from

\$200 to \$125.

The fees also would increase for Class D AM stations in Arbitron markets and decrease for Class D stations in non-Arbitron markets. Class D stations in Arbitron markets would see their fees rise from \$250 to \$425, a 70 percent increase. Class D stations in non-Arbitron markets would see their fees decrease

from \$250 to \$155, a 38 percent decrease.

FM stations would see the same or similar changes in their regulatory fees.

continued on page 7 ▶



On-the-air with Ricky the K. Profile begins on page 23.

HARRIS ALLIED BROADCAST EXPRESS

SEE PAGE 17
for outstanding deals on the best
NEW radio equipment in the industry

FREE SHIPPING
on all orders
from our
BROADCAST EXPRESS

Look for
special pricing
on new
equipment
in our flyer
each month.

1-800-622-0022
Fax 317-966-0623 Southern CA 1-800-690-2828

HARRIS ALLIED

©1995 Harris Corp.

NEWSWATCH

Quello to Retire At Term's End

WASHINGTON Commissioner James Quello said he will likely retire from the FCC when his current term expires June 30, 1996. Quello told RW of his future plans in a recent interview that will be published in the next issue.

"I will not seek reappointment at age 83," said Quello who is currently approaching 81 years. He said he may remain at his post until a replacement is found.

Quello, a lifelong Democrat, was appointed to the commission by three republican presidents. President Nixon appointed him to serve his first term as commissioner in 1974 and he was reappointed by both Presidents Reagan and Bush.

The height of Quello's tenure on the commission came about two years ago when President Clinton asked him to serve as the FCC's interim-chairman until Reed Hundt was appointed to the position permanently.

After Quello retires from the
continued on page 2 ▶

NEWSWATCH

► continued from page 1

commission, he intends to accept a chair, a type of teaching position created and funded in honor of the person whom the chair is named after, at Michigan State University.

Although revenue derived from the chair would be used to fund a full-time professor. It would provide him with lecturing and opportunities in academic circles.

"That chair means quite a bit to me," Quello said.

The chair, however, is not a complete certainty. "It still has to

be funded," said Erwin Bettinghaus, the Dean of Michigan State's communication school.

"It (the chair) is likely," Quello said, "not a certainty, but it's likely."

If funding does come through, the chair would most likely be a telecommunications management chair, because of Quello's station management background as manager and vice president at Detroit's WJR.

Previous attempts to name a chair after Quello were thwarted because federal law prevents a sitting FCC commissioner from

accepting a such a position during his or her tenure.

"We put the whole thing on hold until he steps down," said Bettinghaus.

FCC General Counsel's Office Reorganized

WASHINGTON The FCC recently reorganized its General Counsel office, "to make it more efficient and to reflect more accurately its current mission," according to an FCC news release.

The commission recently

merged the office's adjunct division into its administrative law division, which will now be responsible for advising the commission on legal matters, adjudicating cases and interpreting statutes affecting the FCC.

The Office of General Counsel now consists of an immediate office, comprised of General Counsel Bill Kennard and two deputies; a litigation division; an administrative law division and a competition division.

Claudy Named NAB Senior VP of Science and Technology

WASHINGTON The NAB has named Lynn Claudy as its

new senior vice president of NAB's Science and Technology Department. Claudy formerly was vice president of science and technology.

Claudy succeeds Michael Rau as the leader of the nine-person science and technology department. Rau resigned last year.

Claudy joined NAB in 1988 as a staff engineer. He also served as director of advanced engineering and technology prior to being selected vice president in 1993.

Claudy holds a BA in music from Oberlin College, a BS in electrical engineering from George Washington University and an MS in electrical engineering from Illinois Institute of Technology.

NARRS Convention Slated

SALT LAKE The National Association of Radio Reading continued on next page ►

Index

FEATURES

Building Your Own Cable Checker

by Jim Murphy 12

Bergen, McCarthy Banter a Natural for Radio

by Read G. Burgan 13

Club DJs May Need Production Polish

by Alan Peterson 14

Manufacture Your Own PC Boards

by Jim Somich 16

Updates on Expanded Band, Towers

by Harry Cole 18

Workbench

by John Bisset 20

RUNNING RADIO

Time Machine Travels with '60s Sound

by Alan Haber 23

Top 10 Questions for Promotion Hires

by Mark Lapidus 24

Defining Workload Prevents Burnout

by Sue Jones 32

Bennett's Career Reflects Changes in Radio

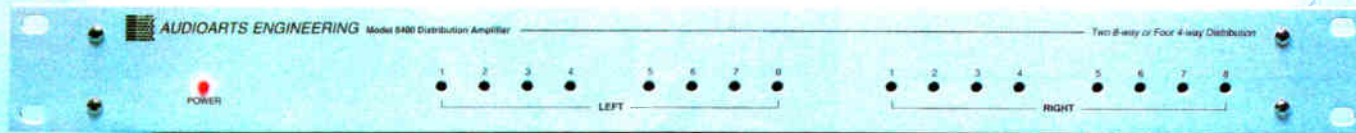
by Alan Haber 35

Radio for Kids Expands to Network

by Bob Rusk 36

WTTM(AM) Focuses on Community

by Stacy Walbridge 38



SECURITY

THAT'S WHY YOU NEED A DA

NATURALLY you'd expect the design experts at AUDIOARTS to provide it. After all, we've built hundreds and hundreds of audio consoles; we've got the track record.

The AUDIOARTS 8400 is now the only DA with performance specs good enough to keep up with our other designs.

COMPONENTRY: High quality of course! Individual 15-turn output gain trims for precise calibration, fully regulated DC supply (current protected), low magnetic field power transformer, high quality FR4 glass epoxy circuit boards (with solder mask coating to reduce the chance of foreign particle shorts) plus clearly marked component legends for easy service.

FEATURES: It's got what's needed! It's **DUAL FUNCTION:** the 8400 can be used as an eight output stereo DA or easily configured as four 1x4 DAs (using simple rear panel jumpers)—sixteen outputs total, each with its own front panel gain trim. It also has **separate connectors** for every input and output. This allows for easy wire changes in the field, rapid troubleshooting, and further avoids the conductor pinching that plagues screw terminals.

The 8400 has the componentry, performance specifications and interconnect system that make it the obvious choice for your facility. At AUDIOARTS we've got the engineering know-how; **benefit from our experience!**

 **AUDIOARTS ENGINEERING**

7305 Performance Drive, Syracuse, New York 13212 (tel 315-452-5000 / fax 315-452-0160)

End of 1995 Likely Timetable For Completion of DAR Tests

by John Gatski

WASHINGTON The primary issues facing the National Radio Systems Committee (NRSC) are the completion of digital audio radio transmission system testing and completion of high speed data subcarrier standard by the end of 1995.

National Association of Broadcasters (NAB) and the Electronic Industries Association (EIA) members comprise the NRSC, which develops industry technical standards.

NAB Director of Technical Conferences John Marino, the NAB's

San Francisco as the field test location, but the procedures will not be finalized until later this spring, Marino explained.

"They should certainly should have all the details worked out by the NAB spring show," he said.

As for the lab testing that is being conducted at the NASA/Lewis Research Center in Cleveland, few details have been released, either officially or unofficially, about how the systems have fared.

New band proponents have previously said that in-band, on-channel broadcasting is extremely difficult under the real world conditions of FM broadcasting.

The in-band proponents said that digital technology has advanced far enough to allow an in-band system to work.

"They (lab officials) have been very careful not to leak any information," Marino said.

The NRSC's work on a high speed subcarrier standard is on schedule to be finished by the end of the year. The NRSC's goal is to enact a standard that would be compatible with the 1,220 bps RDS standard already in place since 1993.

High speed systems would operate at speeds up to 20 kps and fit anywhere from 60 kHz to 100 kHz on an FM carrier and could provide much more data intensive services than RDS. However, high speed is considered a somewhat more-in-the future technology than RDS, which already has acceptance by 250 broadcasters nationwide.

As with RDS, high speed subcarriers providers and equipment manufacturers will have to wait until the consumer industry produces receivers that the public can buy.

The DAR process has taken longer than original estimates of late 1994.

liaison to the NRSC, said the lab testing of the five proponent digital audio radio systems is expected to be finished by April, but that field testing may not be finished until late 1995.

The digital radio task force and the appropriate subcommittees are still wrestling with the test plans and parameters for the field testing of the five systems: USA Digital Radio, AT&T, AT&T/Amati, MUSICAM and NASA/VOA.

Marino said the process has taken longer than original estimates of late 1994. Considering the process is "something brand new," Marino added, it is moving as "fast as possible."

The NRSC, which is primarily focused on the in-band systems, such as USA Digital and AT&T Amati, has selected

AUDIO BROADCAST GROUP & ENCO SYSTEMS

THE WINNING COMBINATION FOR DIGITAL AUDIO DELIVERY SYSTEMS...



...WHEN YOU'RE TALKING SIMPLICITY, POWER, ADVANTAGES, AND GROWTH CAPABILITIES. ONLY THE ENCO SYSTEMS DAD486X DOES IT ALL COST EFFECTIVELY - WITH NO LICENSING FEES.

AUDIO
broadcast group inc.
MAIN SALES OFFICE
2342 S. Division Avenue
Grand Rapids, Michigan 49507
Phone: 800-999-9281
Fax: 616-452-1652

AUDIO
broadcast group inc.
SOUTHEASTERN SALES OFFICE
200 Fareway Drive, Suite 2
Smithfield, North Carolina 27577
Phone: 800-369-7623
Fax: 919-934-8120

AUDIO
broadcast group inc.
WESTERN SALES OFFICE
P.O. Box 1638
Palmdale, California 93550
Phone: 800-858-9008
Fax: 805-273-3321

YOU MAY ALSO REACH US ANYTIME VIA ELECTRONIC MAIL
75371.144@compuserve.com

Circle (25) On Reader Service Card

NEWSWATCH

► continued from previous page

Services (NARRS) is preparing itself for its 21 annual convention here in Salt Lake June 1 through June 3.

The convention will be held in the Olympus Best Western, and broadcasters and equipment manufacturers should start making reservations now. The show will teach stations how to establish a radio reading service, a subcarrier audio signal that broadcasts newspaper, magazine and book readings to the blind and physically challenged.

Room rates are \$60 and \$70 for single and double rooms respectively. Reservations should be made at least two weeks prior to the start of convention.

For more information, call Steve Terry at 901-725-8833.

New Communications Act Drafted

WASHINGTON As promised, the Senate Commerce Committee introduced comprehensive telecommunications reform that would encourage competition in the industry.

"America is ready to tear down the anti-competitive barriers that keep consumers from having all the choices they deserve," Committee Chairman

Senator Larry Pressler said (R-S.D.) in a written statement.

Although Pressler's goal for passing the bill is July 4, the powerful committee chairman hopes legislation passage will come as early as April.

Broadcasters would not be directly affected by the bill, according to Senate staffers, but there are other bills forth-coming, which would have more of a broadcasting impact.

Representative Michael Oxley (R-Ohio), for example, recently proposed legislation that would repeal the anti-foreign ownership clause of the 1934 Communications Act (see RW, Feb. 8).

FCC's OET Moves

WASHINGTON The FCC's Office of Engineering and Technology (OET) recently relocated it's offices. It's new street address is 2000 M Street, Washington D.C. 20554. This is just across the street from its previous 2025 M Street location. OET staff is located in suites 230 and 480.

OET's new phone number is 202-739-0700. Its fourth floor fax number is 202-887-0198. The second floor fax is 202-887-5637.

Going Codec?

Go Comrex.

Beyond superior broadcast quality and rugged reliability, Comrex codecs are backed with an invaluable extra: Direct, personal tech support from someone who is prepared to provide whatever level of assistance you need. Just one toll-free phone call away.

With our full range of codec technology and a reputation for integrity and objectivity, we're able to offer the best sounding, cost-effective solution for SW56, ISDN or dedicated digital lines.

Questions about compatibility, connectivity, delay, system and transmission costs? We have the answers. And we'd be happy to arrange a demonstration.

A partial listing of Comrex codecs:

DXR (rackmount) DXP (portable)	DX100	DX200
G.722 (CCITT)	apt-X	ISO/MPEG Layer II MusicLine™
Excellent for Talk, Sports, AM or Voice Programming	Good choice for STL, Studio-to-Studio and higher quality audio	Superb FM remotes, Studio-to-Studio Links, Music Programming

U.S. 1-800-237-1776 • UK 0 800 96-2093

Europe: Request your free Comrex calling card.

Dynamic, ongoing support is also available via:

- Comrex ACCESS - quarterly newsletter
- Fax-on-Demand - library of technical and applications information
- Comrex Users' Forum, PC-networked on CompuServe
- Comrex Handbook - "Digital Telephony"



COMREX®

Comrex Corporation, 65 Nonset Path, Acton, MA 01720
508-263-1800 • Fax-on-Demand 508-264-9973 • Fax: 508-635-0401

Circle (171) On Reader Service Card

Ribbon-cutting Ceremony Launches New Era

DALLAS Flanked by James Arcara, president ABC Radio, on his left and David Kantor, executive vice president, ABC Radio Networks, on his right, Bob Callahan, president, ABC Radio Networks, officially opened the network's sparkling new headquarters here in Dallas.

Grand opening ceremonies were held on Feb. 16. ABC welcomed a couple hundred guests that night, both from the radio and the advertising community. I was in town covering the Radio Advertising Bureau annual conference and dropped by to see the state-of-the-art facility firsthand.

Champagne and assorted beverages flowed freely, and yours truly and The Radio World Magazine Editor, Chuck Taylor, got a tour of the facility from none other than Lee Abrams himself.

The shot of the atrium I've included does not do justice to the building. The building was originally built by an oil company as its corporate headquarters during the boom years. When ABC took over the facility, the building needed extensive modifications, but before that happened, ABC had all the interior wood paneling, flooring and moldings removed. After the facility was technically ready, ABC put all the wood back. The final effect is one of warmth and sumptuousness that really invites.

Tom Joyner, ABC's morning star, was scheduled to appear but got a last minute invitation to the White House (yes, that one) for a confab with his good friend President Bill Clinton. A good time was had by all though, and I enjoyed seeing some of radio's finest all gathered under one roof, including Gary Fries, RAB president and CEO, Paul and Julie Fiddick (from Heritage Media just down the road) and John David, NAB senior vice president of radio.

We also ran into Margaret Bryant, former chief engineer at Group W's WMAQ in Chicago and now the head engineer for the Dallas facility. Many of you may remember seeing her byline from time to time in *RW*.

Timing the event to happen while the RAB gathering was in town was probably a good idea. RAB '95 was a good gathering, coming on the heels of the RAB's release of last year's revenue figures.

Radio advertising grew at a rate of 11.3 percent in 1994, to an estimated \$10.65 billion, up from \$9.568 billion in 1993—its fastest rate of growth, says RAB, since 1985 when industry revenue grew at 11.5 percent.

National spot revenue grew an unprecedented 14.8 percent for the year, the largest increase in more than 50 years for that category! Locally placed radio advertising, the category that accounts for more than three-quarters of all radio advertising, increased 11.2 percent for a combined spot figure of 12 percent.

Last year was very important to radio in many other ways as well. For starters, 1994 marks the first year-end radio advertising revenue total to break the \$10 billion mark. In May 1994, you may recall, for the first time ever, radio ad revenue totaled more than \$1 billion for a single month.

The Radio Advertising Bureau figures are based on that association's radio revenue index of more than 100 markets—radio network ad revenue is compiled by the Radio Network Association as reported by Miller Kaplan Arase & Co.

I'm delighted, of course to have such good news to report. The credit for all this success goes directly to the radio folks in the trenches and to the associations that serve radio. And it was encouraging to see this year's RAB gathering break all attendance records—up from

1700 registrants or so last year to 2002 this year (including 200 international attendees).

The RAB has much to offer a radio station and a radio sales manager—maybe it is time to consider joining the RAB if you don't belong already.

One of the most eye-opening events at the convention was the keynote address

phone) will read you the day's headlines, based on your preference for news stories. You can ask it to read you a story if a particular headline catches your attention.

In this world of his, we will all live as "electronic tribes," no longer joined by our geography or our ethnicity, but rather by the people who share our interests on-



ABC Radio's top brass (r) cuts the ribbon at its new network headquarters in Dallas.

by Don Peppers. If what this man envisions—a world where interactive radio rules and anyone with a telephone and a tape recorder can be a broadcaster—really does come to pass, life is sure going to change both personally and professionally for all of us.

In his world, we will move beyond niche marketing to one-to-one marketing. In other words, as you drive to work, your two-way radio (or cellular tele-

line. People we may never meet in person—only via PC. On the one hand, reaching out to new people and a community for like-minded individuals sounds fun, but are we driving ourselves into physical isolation here?

Anyway, in this world, Don Peppers sees radio broadcasters jumping on the interactivity bandwagon to survive. It seems to me you had better at least look into it.

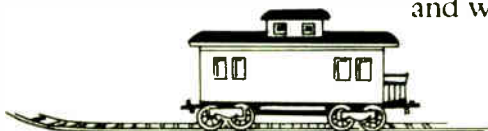


Get on the right track...

Unattended operation helps you operate your station profitably. All it takes is a satellite or automation program source, a good transmitter control system, and a way to handle EBS.

You take care of the program source... We'll help with the rest.

A transmitter control system from Burk Technology relieves you of the need to keep someone at the station just to take transmitter readings. Add our exclusive Studio I/O and we'll run EBS for you, too.



Burk gives you the flexibility to run your station the way you want, and in full compliance with FCC rules.

Call us now. We'll show you a new way to run a railroad.

TOLL FREE 1-800 255-8090

BURK
TECHNOLOGY

We've moved!

7 Beaver Brook Road, Littleton, MA 01460
Phone (508) 486-0086, Fax# (508) 486-0081

READERS FORUM

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

More info, please

Dear RW,
 In your Dec. 28, 1994, issue on page 16, you ran the article "Editing Made Easy with SAW for PC." Unfortunately there was no direction of Innovative Quality Software given. I would appreciate very much if you please could be so kind and give this direction so we can contact these people.
 Please also give the manufacturers address in all articles you publish in your magazine so they can be contacted. Thank you very much.

Rudolf H. Rahn
 FM-92, Miami, Fla.

Editor replies: Eagle-eyed readers can find that information in the product capsule that ran with the story. Innovative Quality Software can be reached at 702-435-9077.

Unfair comparison

Dear RW,
 I read with great interest the Oct. 5, 1994, article titled "Alpha-Cor's Flat Cable" by Rich Rarey. I was heartened by the use of Belden cable as a comparison.

However, I am not sure it was a fair comparison. The resistance of the flat cable, listed as 0.0022 ohms/ft (equivalent to 2.2 ohms/1000 ft.) is approximately equivalent to 13 1/2 gauge wire. I am not surprised that you could tell the difference between 13 1/2 and 16 gauge Belden 8471, as that is a doubling of resistance.

Would it not be fairer to compare it to Belden 14 gauge wire such as 8473 or 9717? I would be glad to provide you with whatever length you require to test.

There also must be a misprint on the

capacitance: "0.600nF/Ft." This is the same of 600pF/Ft. This is a huge amount of capacitance for a cable and would cause severe roll-off of high frequencies. In a 1,000 ft. run, audio would be 3 dB down at 442 Hz! Maybe they mean 60pF/Ft., or even 6pF/Ft.?

Thanks for your excellent newspaper.
 Stephen H. Lampen
 Advanced Technology
 Marketing Manager
 Belden Wire & Cable, Richmond, Ind.

Dinosaur era over

Dear RW,
 Let me add my voice to that of Brett E. Miller (RW, Jan. 25) on the protection of clear channel stations. It is time that we realize that the dinosaurs are extinct. The 50 kW clear channel AMs no longer play an important role in the broadcast industry. In fact the only role these stations play is that of spoiler. They are not generating revenue from advertisers 300 or 400 miles away.

Yet local stations that serve their local communities are faced with constant interference from these dinosaurs. During the winter months, when the community needs information on storms, school closings, and so on, these local stations cannot get on the air soon enough in the morning to provide this service, with January sign-on times of 7:30 a.m., for daytimers.

If we are serious about reducing the amount of interference on the AM band, then we must power down the dinosaurs. If these stations reduced their power to 10 or 20 kW they will amply cover their market areas; suffer no loss of revenue, and even save on their electric bills. Small stations such as ours would have the opportunity to provide our community with the service to which it is entitled.

The FCC has prohibited the high power Class C FM stations from the densely populated areas; AM stations should be limited to 10 kW in these same regions. The small "hometown" AM stations are the outlets that provide substantial amounts of community programming. It is imperative to their survival that they be allowed to continue providing service to their listeners.

Gene Boyd, President
 Tri-State Radio Inc.
 WCHE(AM) West Chester, Pa.

Dear RW,

I must wholeheartedly agree with the letter from Bob Bittner in the January 11th issue of RW. If you put something good and interesting and right on the air, and nurture it with hard work and, in our case, prayer, it will work and be successful—yes on AM. I am talking music, 24 hours a day, and Christian Contemporary music at that. No block programming, even a top 10 countdown music show that I produce in our studios. We are commercial advertiser supported, and they stay with us because we get results for them.

How do we do it? We do it by first of all scrutinizing our advertisers and not

FCC Guards AM Band

Interference has always been an enemy of AM broadcasting. From natural interference from lightning, man-made noise such as fluorescent lights, and station-to-station interference, the country's oldest commercial band has always taken it on the chin.

With that history in mind, the FCC's recent string of actions to reduce such interference is commendable. The latest action has strengthened a policy that, until now, had merely encouraged cellular phone and paging companies to safeguard against interference to AM broadcasts.

To put some teeth in its policy, the FCC codified the anti-interference decree, stipulating that if cellular or paging services interfere with AM signals, the services must correct the cause at their own expense. And, when these services put together their construction plans, they must avoid potential interference to area AM stations.

Although the FCC's old policy said that Public Mobile Services (cellular phones, pagers, etc.) had to protect AM broadcasts, radio industry observers said that the old policy was weak and lacked the authority of the new regulation.

With the FCC strongly enforcing the regulation, cellular/paging companies will have to take into account AM broadcasts, and AM stations that do suffer interference should be able to resolve the problem quicker. This is a positive step that stems, in part, from the AM Improvement docket that was approved in 1992 to reduce station-to-station interference as well as reduction of other out-of-service interference.

AM broadcasts are inherently susceptible to various kinds of natural interference and noise. However, the cellular/paging interference is a recent phenomenon brought about as a result of cellular and paging towers being located closer to cities and suburbs. Although AM stations may have their transmitters located further away from those communities, they still have had their signals interrupted by the closer-in, strong paging/cellular transmissions.

Many of the U.S.'s 5,000 or so AM stations are having a tough enough time trying to stay solvent in light of declining listenership (and as a result, revenues), lost to FM stations. They should not have to endure unnecessary interference from other services that further alienate their listeners.

—RW

allowing them on air unless they pass the rigid trust and dependability factors outlined by the Crawford Broadcasting Company. We do not deliver listeners to advertisers related to an "arbitrary ratings system." We deliver advertisers worthy of listeners' trust to the listener. I personally know and visit the advertisers on my afternoon show once a month, we don't just send a salesperson to "get accounts" on the air. We send a salesperson and a writer to scrutinize and find out why these people are worthy of our listeners' trust.

Think about that, a writer to service and get new ideas on the campaign to profit the advertiser. A salesperson dedicated to making sure the advertiser is right for the station. And then, I tell my listeners why they should support KLZ and its 24-hour music by giving our tested advertisers first chance at their business, an added measure of "I Use" in most cases as I put my name and reputation on the line by recommending the advertiser. A major market station with small-town service and trust.

A success story (one of many): One of our advertisers was advertising on a major player in the market with the one-time (if not now) leading program on the air in Denver. We got eight times the results for the advertiser that this ratings leader did. The advertiser quit them and upgraded with us. Radio done right. On AM. Commercially successful, and indispensable to our listeners as well.

K.C. O'Brien
 KLZ(AM) Denver

Scanning history

Dear RW,
 Slow-scan television probably no longer lives on any radio station, but it positively thrived on one in Michigan's Upper

Peninsula from 1975-77.

That's when I was project director of the system that used two of Houghton-licensed WGGL-FM's SCAs to carry thousands of hours of educational programs to students from kindergarten on up to Northern Michigan University Education majors.

WGGL-FM's then-station manager, Read Burgan, says in the January 11th article, "Early Innovation Using FM Subcarrier;" no money was committed and nothing happened after some 1974 engineering trials.

In fact, I had funding from the Michigan Dept. of Education, U.S. Office of Education (now the Dept. of Education) and HEW (now the Dept. of Health and Human Services) and other sources that allowed my staff of 10 to produce and broadcast about a dozen programs.

We served scores of schools through four cable systems, including WGN and TelePrompTer, plus a handful of rural schools with their own receivers. Many schools got their only meaningful instruction in music, fractions, the metric system and teacher "inservice" training from my Hancock-based Slow-Scan Television Project.

We got a lot of media attention for successfully broadcasting TV on the radio, *Broadcasting* magazine, the *Detroit Free Press* and the *New York Times* did stories on us, as did the local paper and the Marquette, Mich., CBS affiliate, so I'm particularly surprised Read's memory slipped.

Slow-scan TV seems quaint from a 1995 perspective, but it was a pretty big deal to lots of students and teachers 20 years ago.

John Kircher
 Director-Corporate
 Marketing Department
 WGMS(FM) Washington, D.C.

Radio World

Vol. 19, No. 5

March 8, 1995

Editor-in-Chief.....Lucia Cobo
 Managing Editor.....John Gatski
 Associate Editor (News).....Thomas Pear
 Associate Editor.....Whitney Pinion
 Contributors.....Frank Beacham/N.Y.
 Bruce Ingram, Pamela Watkins
 Nancy Reist, Alan Haber
 Technical Editor.....John Bisset
 Technical Advisor.....Tom McGinley
 Editor (International).....Alan Carter
 Editor (Radio World Magazine).....Charles Taylor



Radio World (ISSN 0274-8541) is published bi-weekly by Industrial Marketing Advisory Services, Inc., 5827 Columbia Pike, Suite 310, Falls Church, VA 22041. Phone 703-998-7600. Fax: 703-998-2966. Second-class postage rates are paid at Falls Church VA 22046 and additional mailing offices. POSTMASTER: Send 3579 forms and address changes to Radio World, P.O. Box 1214, Falls Church VA 22041. REPRINTS: Reprints of all articles in this issue are available. Call or write Regan Deatherage, P.O. Box 1214, Falls Church, VA 22041, (703) 998-7600; Fax: (703) 998-2966. Copyright 1995 by Industrial Marketing Advisory Services, Inc. All rights reserved.

—PRINTED IN THE USA—

Next Issue of
Radio World
 March 22, 1995

USA Digital to Headline in 'Vegas

by Alan Carter

LAS VEGAS, Nev. When USA Digital Radio goes on air at the 1995 NAB convention in April for the first public mobile demonstration, the AM program will be direct from the exhibit floor while the FM will simulcast a Las Vegas station.

"We're going to go completely digital on AM from the studio to the receiver," said Jeff Andrew, project manager for USA Digital Radio.

The FM signal will be carried from an existing station—which Andrew could not identify at press time because the final agreement was not signed—by digital microwave to the transmitter. The final signal will be 20 kHz stereo.

Live from NAB

The AM demonstration will be a mixture of live and automated programming from a digital studio organized and set up by Harris Allied in the Radio Hall. The 15 kHz stereo program will be broadcast on the expanded AM band at 1660 kHz during exhibit hours on April 10-13.

Disc jockeys from Gannett, Group W Radio and CBS, the three radio groups that comprise the USA Digital Radio consortium, will rotate air shifts using the Radio Systems DDS digital audio system in the live-assist mode, with the remaining time operating under automation. Other source material will be from the Audiometrics CD 10E single-play CD player with Orange Book capability.

The AM studio also will include a digital radio mixer, according to Jim Woods, director of product distribution for Harris Allied. While Woods declined at this time to identify the U.S. manufacturer of the console, he said the unit is fully digital with mixing in the digital domain and AES/EBU outputs.

"There are only two places (the demonstration) will be analog," said Dave Burns, studio product manager at Harris Allied. "That is the voice of the DJ and when people hear the sound."

Harris Allied is extensively involved in the transmission end of the demonstration, too.

The AM broadcast will use a Harris DX 10 standard transmitter with "a couple of minor modifications," said Harris Allied AM Product Line Manager John Delay.

The FM setup will use the Harris DAB 2000 transmitter, which is based on the Harris Platinum TV series. "This is a product we've conducted extensive tests with," Delay said. "The system is very straightforward."

Mobile tour

As part of the presentation, USA Digital Radio will have a half-hour bus tour around Las Vegas to demonstrate the effects of multipath and how USA Digital Radio holds up under mobile conditions.

Listeners will be able to make a four-

The AM program will be direct from the exhibit floor while the FM will simulcast a Las Vegas station.

way comparison among digital AM, analog AM, digital FM and analog FM.

In addition, the tour will include a stop at the AM transmitter site just south of the famous Las Vegas strip where broadcasters can examine the set up. Organizers are concerned about including an FM visit because the site at the main Las Vegas transmission point on Black Mountain is more difficult to reach.

"There is nothing complicated on the RF side," Delay said.

And that is exactly the point USA Digital Radio developers want to make with the demonstration.

"This system can be implemented very quickly," Andrew said. "We're talking about adding a digital exciter that could cost between \$10,000 and \$50,000."

Developers just are not sure about the cost of the exciter, Andrew admitted.

This is the first public mobile demonstration of USA Digital Radio. The group held demonstrations by invitation on AM in Cleveland, Ohio, and on FM in Chicago and also has presented video and taped audio programs.

Similar to '91

The 1995 demonstration is very similar to what the developers of the European Eureka-147 DAB system did at NAB in 1991.

Eureka-147 had a DAB and standard FM transmission broadcast at 30 W ERP from atop the Las Vegas Hilton. The FM signal was broadcast on 94.9 MHz and the DAB was broadcast at 479 MHz, with a transmission bandwidth of 3.5 MHz. The program included two different DAB channels, although the DAB actually broadcast eight separate CD-quality channels. A 1 W gap filler was installed atop the Golden Nugget hotel.

That same year, USA Digital Radio had a DAT tape fed to a MUSICAM encoder.

For those wanting to make a comparison between USA Digital Radio and Eureka-147, Andrew maintained listeners will hear no difference. USA Digital Radio is using a ISO/MPEG MUSICAM encoder at 256 Kbps on FM, the same as Eureka, he said.

"We're providing mirror coverage," Andrew said, "no more, no less."

As USA Digital Radio developers have said, the current system is designed for the American market. But Andrew suggested it can be adapted for other countries and he said there have been discussions with "two major international networks."

"Everyone believes the issue (of adapting the system) is solvable," Andrew said. "You have to take one step at a time."

"We're broadcasters protecting our own interests in the beginning." ☺

FCC Rule Protects AM Radio

► continued from page 1

Federal Code of Regulations solidifies the rules. Because the policy statement was not an official regulation, cellular owners could sometimes get away with constructing interfering cellular towers, leaving AM station owners with little recourse.

"It was difficult to enforce the statement," Alexander said. "It didn't have any teeth in it." Once cell sites were up and running, he noted, it was extremely difficult to have them removed.

But Public Mobile Service licensees will now have to assure their signals do not interfere with AM signals before constructing a cellular tower. And when they do interfere with AM signals, cellular operators must pay the cost of having the interfering signal corrected.

Specifically, the new rules read: "Public Mobile Service licensees that conduct or modify towers in the immediate vicinity of AM broadcast stations are responsible for measures necessary to correct disturbance of the AM station antenna pattern which cause operation outside of the radiation parameters specified by the FCC for the AM station, if the disturbance occurred as a result of such construction or modification."

Whenever a cellular tower is scheduled to be located within a kilometer (.621 miles) of a non-directional AM antenna, the cellular licensee must give the AM station advanced notice of the planned construction.

The new rules also require Public Mobile Services to take measurements to determine whether or not a particular site construction would affect an AM station's antenna pattern. The rules then hold Public Mobile Service licensees responsible for the installation and continued maintenance of de-tuning equipment "necessary to restore proper non-directional performance of the AM station tower."

The same rule applies if a cellular operator also plans to make a tower modification within a kilometer of a non-directional AM antenna.

In the case of directional AM stations, the rules are a little more stringent. If cellular tower construction or modification is planned within three kilometers (1.8 miles) of a directional AM broadcast signal, the cellular licensee must again notify the AM station in advance and cellular operators must again take measurements to determine whether or not cellular construction or cellular tower modification would affect the AM station antenna pattern.

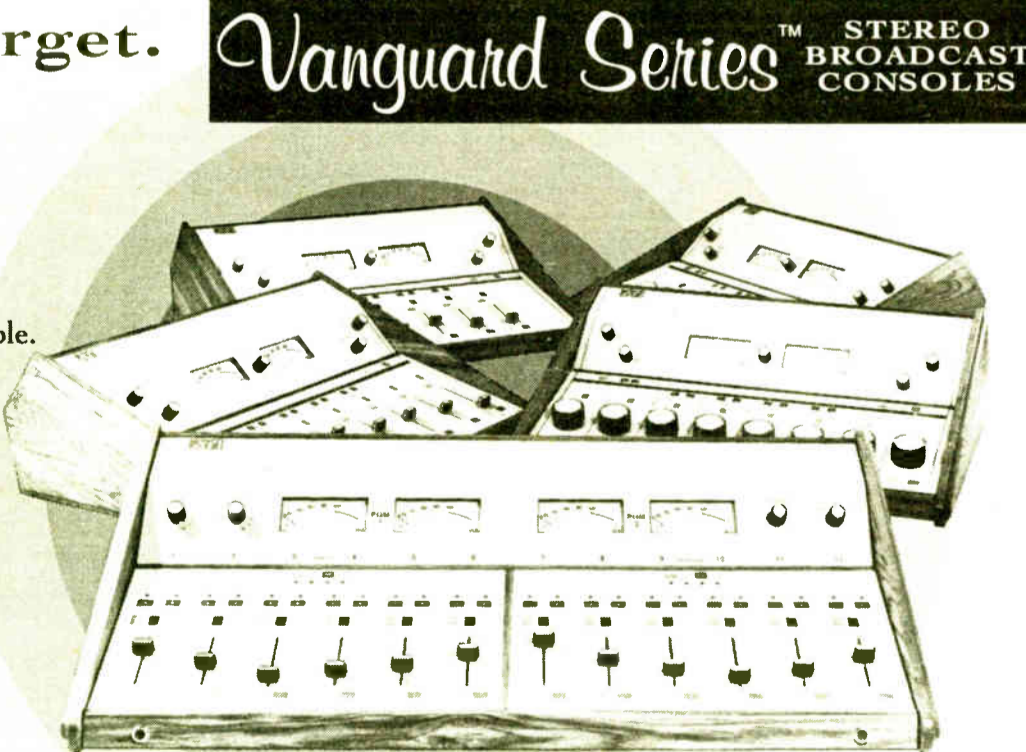
The burden again falls on cellular operators to install and maintain the necessary de-tuning gear to restore the proper performance of the AM station's signal. ☺

On Target.

Performance, value, and reliability through innovative technology.

5 models available.

- BC6DSL
- BC6DSR
- BC8DSL
- BC8DSR
- BC12DSL



ATI AUDIO TECHNOLOGIES INCORPORATED

Call or write for free detailed brochure.

328 W. Maple Ave. Horsham, PA 19044, USA
(215) 443-0330 FAX: (215) 443-0394

Proposed FCC Schedule Adjusts Fees

► continued from page 1

FM Class A, B1 and C3 stations in Arbitron markets would see their regulatory fees jump from \$600 to \$1,025, an increase of almost 71 percent. FM Class A, B1 and C3 stations in non-Arbitron markets would realize a decrease of approximately 38 percent, from \$600 to \$375.

For FM Class C, C1, C2, B stations in Arbitron markets the fees would increase

posed fee increase, the notion of increasing fees has the association concerned.

Broadcasters agreed with the NAB's assessment.

"It's just another attempt by the government to tax business to support government," said Dan Kelley, operations director for group owner J. Thomas Development of New Mexico, Inc., which operates KKFG, KDAG, KCQL and KPRZE. "It's just another attempt at sending a tax our way to raise funds as opposed to cutting programs and cutting waste."

Others in the broadcast industry are afraid the FCC is setting a bad precedent

with fee increases.

Jeremy Lansman, an engineering con-

sultant for KRUA in Anchorage, Alaska, said the fee hikes may result in a vicious circle of annual increases and

the subsequent hiring of more staff to administrate the hikes.

"If the FCC can increase fees, it can increase regulations every year and hire new people, and, thereby," he said, "increase the fees again each year as the cycle continues."

Lansman, who is also the owner of KYES-TV in Anchorage, feels that the FCC's system of assessing fees is unfair. He said that other types of communication services like cellular phone services and cable television providers are assessed by the size of their customer bases.

Broadcasters, on the other hand, he said, are assessed a flat fee that could prove more burdensome to locally owned stations than to corporate-owned stations.



The FCC is considering changes in regulatory fees.

from \$900 to \$1,525, about 69 percent, and for the same class station in non-Arbitron markets the fees would decrease from \$900 to \$565, or about 37 percent.

The commission also plans to increase its fees for new station permits. The proposed permit fee for constructing an AM station would be raised to \$120 from \$100, and the proposed permit fee for constructing FM stations would be raised from \$500 to \$595.

The proposed permit fees are assessed by dividing the 1995 fiscal year cost requirements for permits by the number of stations applying for permits, according to the text of the FCC's NPRM. In the case of AM stations, the revenue requirements are \$9,480 divided by 79 permits. In the case of FM, the cost requirement is \$418,285 divided by 703 FM construction permits.

Broadcasters react

Despite a decrease in many fees, the National Association of Broadcasters still objects to what they see as an unfair system that makes broadcasters finance the cost of running the FCC.

"We think they (the fees) are arbitrary head taxes," NAB Spokesman Doug Wills said. "We don't think the FCC should be financed off the backs of radio and television stations."

Wills noted that although the broadcasters would not be hit too hard by the pro-

ADX Ensemble

The ADX from PR&E. You've wanted one ever since you first laid eyes on it. You knew it was the only workstation to combine the speed and flexibility of moving fader automation with the creative power of digital editing. Problem was, you just couldn't squeeze a PR&E console and a workstation into the budget. Well here's the alternative.

Introducing the Ensemble. Like all members of the ADX family, Ensemble was created specifically to be the most effective and powerful workstation for radio production. The control surface of the ADX Ensemble gives you maximum control over your mix... right now. No more fooling around with mice, cute little screen faders and unlabeled buttons. You don't have time for that. With the Ensemble, even the most complex commercials, spots or promos are a snap.

No other full-featured workstation is as fast to learn or easy to use. The next time the AE sells one of those "simple" spots for immediate release, don't panic. With the ADX, you can be home for dinner. And last-minute changes are no problem, since ADX remembers everything you do. Everything. A spot produced last month or even last year can be fully recalled/reset and modified in minutes. ADX is a workstation guaranteed to reduce your stress level while extending your creative reach.

Best of all, the ADX Ensemble is backed by the same team of engineers and support staff that has made PR&E the first choice among the world's leading broadcasters. Call today for your full color brochure.

Pacific Recorders & Engineering Corporation
2070 Las Palmas Drive, Carlsbad, CA 92009
Tel: 619-438-3911 Fax: 619-438-9277
GSA Contract: GS-03F-4064B



Circle (162) On Reader Service Card

FCC Foresees New EAS As 'Hot' Topic in 1995

by Whitney Pinion

AVON, Colo. Addressing an attentive audience at an FCC open forum at Cassidy's Hole-in-the-Wall restaurant, FCC Representative Jon Sprague predicted that 1995 will be a "hot issues" year for the commission and for broadcasters. Some of those issues are likely to be the new Emergency Alert System (EAS) and reworking of fines.

The first evening of National Supervisory Network's (NSN) Ski and

Sky Summit, Jan. 26-29, Sprague and Nikki Shears, both from the Denver FCC Field Office, outlined these specific issues, some controversial, and fielded questions.

At the top of Sprague's list was the changeover from the Emergency Broadcast System (EBS) to the Emergency Alert System (EAS) in radio. Sprague said that he expects EAS expansion into cable in 1996, and, eventually, into paging companies.

Of particular interest to radio broadcasters



An FCC open forum was part of NSN's Ski & Sky Summit, set in the Rocky Mountains.

at this forum was the issue of unattended operation of broadcast stations. "With

technology that can self-correct," Sprague said, "stations don't need 24-hour attention." Although unattended operation has not yet been approved and approval could take time, Sprague foresees the transition, and that it's "not just talk."

Another concern addressed by Sprague was the recently announced hike in regulatory fees for broadcasters. The new fee schedule is out, and Sprague said that broadcasters might as well "break open the pocketbooks, 'cause it's gonna happen." He added that this money doesn't get funneled directly to the FCC but goes instead to a general fund.

Sprague also discussed the FCC's role as disciplinarian. "Wrongs used to equal dollars," Sprague said. With the prodding of the National Association of Broadcasters (NAB), the whole concept of the FCC's issuing fines is being scrutinized by the Court of Appeals to determine whether or not it's constitutional.

As a result, he said, some fines may be reduced from a many-thousand-dollar amount to "a slap on the hand, a written warning," he said. Not that broadcasters won't still be expected to comply with regulations, he added.

Another issue facing the FCC is the review of Part 73 and Part 74 to determine if the rules in them are necessary, or if they need to be modified or rewritten. The commission is open to suggestions during this review process.

The FCC also is rewriting, in its entirety, Part 17, which deals with the ownership of towers. The commission wants to "turn the whole ball of wax over to the FAA," Sprague said.

"There are a lot of unnecessary rules out there," Sprague said. "The government wants to eliminate superfluous rules." According to Sprague, the FCC is attempting to slim itself down somewhat, to be less of the bureaucratic creature as it has come to be perceived. To make ordering forms faster and easier, the FCC has established a toll-free number, 800-418-3676, for form orders.

Besides complaints about bureaucracy, another gripe voiced to the FCC by radio broadcasters is telephone and TV interference, according to Sprague. In fact, Sprague said, interference generates the greatest number of complaints and, thus, comprises the biggest area of enforcement for the FCC.

"This problem is 50 or 60 years old," Sprague said. He added that standards to minimize interference caused by telephones should be in place soon. Otherwise, and as is the case with other issues facing the FCC and broadcasters, there are "no easy answers." ☺

Put The Control Back In Your Control Room.

TM century

It's the Ultimate Digital Studio from TM Century. And it's the ultimate in new technology for giving program directors and air personalities more control than ever before. More local market control than de-centralized satellite networks or other digital systems. More creative control with a design based on live assist but with walk-away capability. More audio quality control, with CD changers rather than multiple hard-disk compressions that decrease your on-air sound quality. And even more risk control,



with compatibility for any other software you have, and flexible enough for expansion and changes. Yet it's the easiest of all systems to use, with features like hot buttons and pop-up windows instead of confusing icons, error-prone touch screens and multi-layered commands. Find out more about The Ultimate Digital Studio, the system designed by radio people for radio people. Call 1-800-TM-CENTURY®, or 1-214-406-6800.

The Ultimate Digital Studio®

Circle (188) On Reader Service Card

World Radio History

Your Job is Easy Because Telos Did the Hard Part

- Full duplex, 15kHz stereo operation on one ISDN line.
- Mono 15kHz operation on a single ISDN "B" channel or one Switched 56 line.
- Telos' advanced digital signal processing (DSP) experience harnesses the power of Layer III efficiently and economically.
- Compatibility with older 7kHz codecs that use G.722.
- 9600 baud RS-232 bi-directional data for communications and control.
- Four end-to-end "contact-closures" for remote machine operation.
- Split channel mode allows individual mono signals to be transmitted to separate sites.
- A V.35/X.21 port allows Zephyr to be connected to Switched 56 lines and other data paths.
- Each Zephyr unit serves as both a transmitter and a receiver.



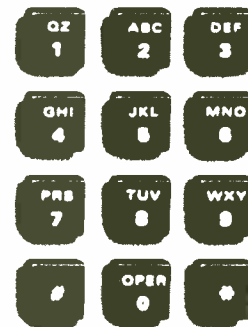
It's all here, including full metering, headphone jack, mic/line inputs, and input protection limiting. Straightforward controls make Zephyr a snap to operate.

Zephyr™ makes transmitting broadcast quality audio as easy as sending a fax. Combining the most advanced codec and ISDN technologies in a reasonably priced transceiver, Zephyr is the perfect choice for news, sports, music, and production.

We use ISO/MPEG Layer III to code the audio for transmission. Independent testing and the satisfaction of hundreds of users certify that Layer III is best for ISDN. Other coding schemes sacrifice audio bandwidth in mono and stereo-separation in dual-channel operation –

compromises you won't have to make with Zephyr.

With Zephyr, the broadcasters at Telos once again offer you the best sound, the most practical features, and the industry's best customer support.



We designed our own terminal adapter specifically for broadcast. Our ISDN Telephone feature even allows you to place a standard voice-grade call to a Plain Old Telephone Service (POTS) phone.

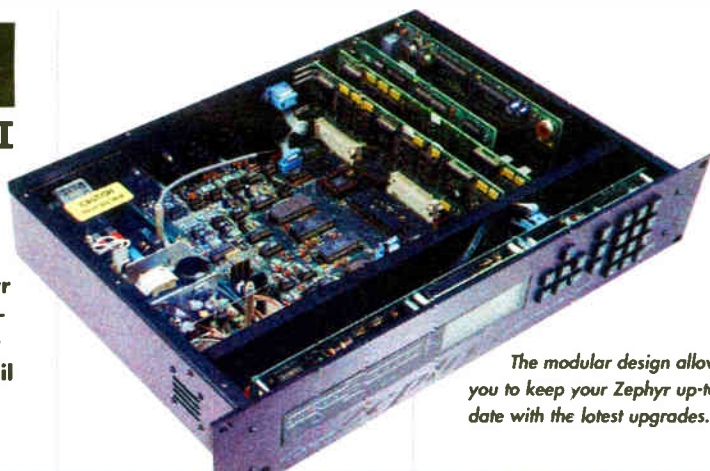
only from



2101 Superior Avenue
Cleveland, Ohio 44114
216.241.7225
FAX: 216.241.4103



Zephyrspace is an online listing of Zephyr users interested in collaborating with other users. For details, email jkrose@tiac.net.



The modular design allows you to keep your Zephyr up-to-date with the latest upgrades.

For over a decade, you have relied on us for the most innovative and reliable equipment for the broadcast-to-telephone interface.

The Best Way to Hear from There™

Telos Zephyr DIGITAL NETWORK AUDIO TRANSCIVER



Production Directors. Engineers. Even newsroom people swear by the DSE. Which is probably why these stations with one DSE soon wind up with two. Or even three. Learning is fast. Editing is easier. Everybody is more productive. Because not only do your station's multiple personalities get up to speed faster, they stay up there. To see it in action yourself call 1-800-622-0022 for a demo. The DSE 7000. The New Speed Of Sound.

The Only Digital Editing System Created For Multiple Personalities.



"My advice: if you're gonna buy one, buy two. Or you'll never keep the peace."

*John Buffaloe...Chief Engineer
KSON, San Diego*

"As quickly as you can conceptualize it, the DSE can do it. Or undo it."

*Bill Schultz...Production Director
103.5 WYNY-FM, New York*

"Radio lives by critical deadlines. With the DSE, time is on my side."

*Barbara Sherry...Production Director
KQQL FM, Minneapolis*



"It's the only digital system in radio that lets you edit by ear. What a concept."

*Ross Wilson...Production Director
K101, San Francisco*

"You install it, it runs, the production department is happy. Next problem."

*Dan Mettler...Chief Engineer
WVDE/WFBQ, Indianapolis*

"It gives our air talent so much creative freedom, they won't use anything else."

*Byron Swanson...Chief Engineer
KKRZ, Portland*

orban

H A Harman International Company

For a demo in the U.S. call Harris Allied Broadcast Center: 1-800-622-0022
Or contact Orban: Phone 1-510-351-3500 Fax 1-510-351-0500

Circle (31) On Reader Service Card
World Radio History

Pushing DAB Envelope in Canada

by James Careless

MONTREAL Normally a quiet country willing to go along with the standards of others, Canada has been relentless in championing L-band for both terrestrial and satellite Digital Audio Broadcasting (DAB) using the Eureka-147 system.

Still, what is most surprising is this research was not generated by a giant well-funded organization but a team of three staff engineers based at the publicly-owned Canadian Broadcasting Corp. (CBC) in Montréal: François Conway, Brian Sawyer and Michel Fortin.

Since the early 1990s, it has been their job, with the support of engineers from Industry Canada and the Communications Research Centre, to see if the L-band at 1500 MHz could provide 40 MHz of spectrum well suited to both terrestrial and satellite broadcasting.

"We were the experimenters," said Conway, who is supervising engineer of broadcast spectrum for CBC Engineering. "We were the ones doing the experimental work, setting up the facilities, doing the first test... finding the equipment and debugging the equipment."

It was a very ad hoc arrangement with the team not so much being formed, as just happening as they shared responsibilities among themselves, according to Sawyer, supervisor of standards and methods in CBC Engineering. "We just did everything that required doing," he said. "There was no name (for the project) that we referred to."

The first part of their job came in planning for the 1992 World Administrative Radio Conference, when Canada was developing its position for DAB spectrum allocation. On paper L-band looked like it could do the job, but the possibility also raised a number of questions.

To answer them, the CBC group staged what Conway referred to as "pure propagation tests" in Ottawa and Montréal. Using a minivan equipped with an L-band antenna, a Hewlett Packard 8591A spectrum analyzer and an IBM clone computer, the researchers monitored the propagation of a carrier wave transmitted on 1500 MHz.

Just gathering propagation data was not a simple task, given that the wavelength itself was only 20 centimeters and that eight readings were needed per wavelength to generate meaningful numbers.

"We gathered close to 53 million points," Conway said, "but still, in terms of propagation measurements required to establish propagation models and planning, it was relatively limited."

However, the data generated by the Ottawa/Montréal propagation trials in the summer of 1991, plus a subsequent Eureka-147 test broadcast in Toronto that measured signal reception and sound quality along a north-south urban/suburban line, convinced the Canadians that L-band could deliver propagation performance similar to the TV-UHF band, at a cost comparable to broadcasters comparable to conventional FM.

The endorsement of L-band by WARC—albeit with some reservations to recognize continuing U.S. in-band efforts—changed life for the CBC engineering team, somewhat.

"We were still alone with our L-band," Sawyer said, "but now we had a real allocation, so we said, 'We might as well try to use it and plan for it,' so in order to plan

for it, we had to do more measurements."

In the fall of 1992, those measurements took the form of a dual second-generation Eureka transmitter test. One unit was installed on the CN tower in Toronto: 2 kW ERP with the antenna height at 320 meters. The other site was 80 kilometers north at Barrie, Ontario, where the transmitter was tested at 97 and 230 meters above ground level, with respective ERPs of 6 and 17 kW.

This test measured the feasibility of establishing Single Frequency Networks (SFN) using multiple DAB transmitters, and, like the earlier Ottawa/Montréal trials, it made the grade. The Eureka system provided coverage in the L-band at a rate comparable in cost and performance to FM.

After a whirlwind trip to Mexico City, where a demonstration DAB station was established to coincide with the April 1993 meetings of the Inter-American Telecommunications Conference, the CBC group next conducted measurements up to 200 kilometers from a transmitter based in Trois Rivières, Québec. Afterward they turned their attention back to Montréal for the next big step: a three-transmitter coordinated network.

With a main third-generation Eureka transmitter based on Mount-Royal, the main AM/FM/TV transmitter site in Montréal, and two others located about 50 kilometers away, the L-band team began further tests in SFNs and coverage extenders with the two remote sites being fed off-air by the

Mount-Royal transmitter. They also set up a "permanent" experimental station in Toronto for further tests.

For the CBC team of Conway, Sawyer and Fortin, L-band has proven itself to be a medium worthy of study. "It more than exceeded our expectations," Conway said. "We were hoping that L-band would be a feasible band, that it would not be too expensive. As a result of our measurements now, we feel that it is more than feasible; in fact, there may be ways to design that it will be practically the same cost as VHF."

Equally satisfying for Fortin, senior engineer in broadcast spectrum at CBC Engineering, is the support the efforts of the team have won for L-band from other WARC members. "At one point we had a meeting of all these countries in Montréal," Fortin said, "and they were given a tour of the network here. Most of them could not believe what they heard."

Of course, the work is not over yet for the CBC, but as Canada approaches its goal of achieving DAB before 2000, it is safe to say they are now in "the home stretch."

Despite their small size, and limited resources, they have managed to have a significant impact in the evolution of DAB.

□ □ □

James Careless, an audio producer, covers the industry in Canada for RW from Ottawa.

Want To Know How We Raised DAW Performance To New Heights?

U

nlimited tracks. Greater control and flexibility to assemble, manipulate and modify. Amazing speed to edit and playback instantly. Reliability and confidence unique to the world of Digital Audio Workstations. Plus a level of audio quality that is discernably higher, even to the most discriminating ears.

It's the most logical and comprehensive solution for digital audio recording, assembly, processing and mixing. **Perfect for radio and broadcast production**, project studios, and sound for picture.

It's called the MicroSound Professional Desktop Audio System, and it represents an essentially different approach to disk based systems. **True (non-linear) Random Access Editing™** and proprietary **Floating Tracks™** architecture dramatically enhance creative freedom and save time.

Perhaps the only aspect we didn't raise is MicroSound's surprisingly reasonable price. MicroSound: **Proven**, Professional Desktop Audio from Micro Technology Unlimited. The sky's the limit.



microsound™ The Better Way.

Want to get the rest of the story? Call or write us for a free guide to Professional Desktop Audio.

Micro Technology Unlimited PO Box 2106, Raleigh, NC (USA) 27619
Voice: 919-870-0344 Fax: 919-870-7163

SEE US AT NAB '95 IN BOOTHS 5313/5314



Svetlana

ELECTRON DEVICES

Quality* Power Tubes

- 3CX15,000A7
 - 3CX15,000A3
 - 3CX10,000H3
 - 3CX10,000A7
 - 3CX3000F7/8162
 - 3CX3000A7
 - 3CX2500H3
 - 3CX2500F3/8251
 - 3CX2500A3/8161
 - 4CX15,000A/8281
 - 4CX10,000D/8171
 - 4CX5000A/8170
 - 4CX3500A
 - 4CX1600U
 - 4CX1600B
 - 4CX1500A
 - 4CX800A
 - 4CX400A
 - 4CX350AC
 - 4X350A/8321
 - 4CX250R/7580W
 - 4CX250BT
 - 4CX250BC/8957
 - 4CX250B/7203
 - 4CX150A/7034
 - 5CX1500B
 - 5CX1500A
 - YC130/9019
 - 8560AS
 - 811A
 - 833A
 - 833C
 - 4CX800A
- □ □ □ □

- Watch this list grow.
- Manufactured in Russia's largest power tube factory.
- Generous* warranty based on high quality.
- Honest prices based on quality at low cost.
- Shipment from USA stock.



Svetlana

ELECTRON DEVICES

Broadcasters
Call: 800-239-6900
FAX: 205-880-8077

OEMs, Distributors,
Volume Purchasers
Call: 415-233-0429
FAX: 415-233-0439

BOTTOMLINE BROADCASTER

Building Your Own Cable Checker

by Jim Murphy

MORGANTOWN, W.Va If you use a large number of audio cables in your studio work, or if you spend a lot of time with sound reinforcement and concert setups, a cable checker can turn your on-site pressure-cooker frustrations into a simple process of elimination and deduction, resulting in hours upon hours of blissful relaxation and recreation.

Well, it might not do all that, but it will at least shorten your headache sieges.

This is another one of those projects that takes only an evening to construct,

yet can save unlimited time when trouble-shooting cable problems.

A simple tester

It would be hard to find a simpler circuit than that shown in Figure 1. A cable is tested by placing a small voltage (5V to 10V) on each of three conductors and monitoring the respective lights. Each lamp shows continuity when its line switch is depressed, and a short between lines will illuminate an adjacent lamp. Because the indicators are so important, a lamp test switch will identify any burned-out bulbs.

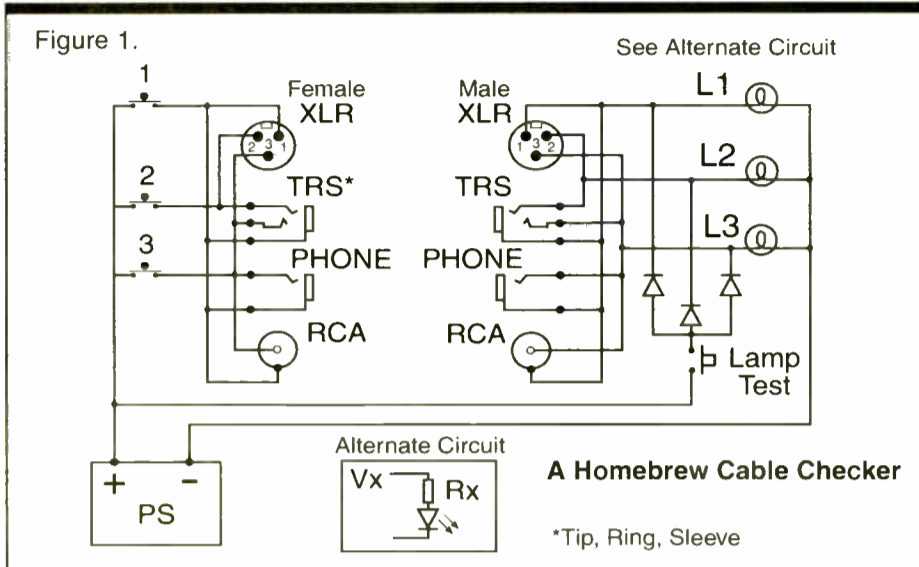
Using LEDs rather than bulbs will eliminate the lamp test circuitry, and will require less space. If you use diodes, be

Calculating the values is easy. See the insert box in Figure 1. All you need to know is the terminal voltage (V_x) and the current rating of the LED. Most LEDs operate between 20 and 40 mA. Use Ohm's law to determine the resistance, allowing about 1.5 volts for the diode. If you remember from an earlier issue, the ohms/volt value is 50 for a 20 mA string. Calculate the series resistor by multiplying the terminal voltage by 50, then subtract about 75 ohms.

Voltage

Assume the voltage source to be 12 volts. If you wish to limit the diode to 20 mA, the value of the series resistance would be: $R_x = V_x - 1.5 / I$. Substituting, $R_x = (12 - 1.5) / .02 = 525$. If

you use a 470 ohm resistor, the wattage continued on page 29 ▶



sure to place a current-limiting resistor in series with them.

Radio Stations Aid Listeners During Flood

by Naomi R. Inman

SANTA BARBARA In the early morning hours of January 10, radio-news teams for two California county, primary EBS stations awoke to find themselves in unfamiliar territory: guiding their communities through what the weather service calls a 20-year flood.

In Santa Barbara and Ventura counties, heavy rains dropped up to an inch of water per hour. By 6 a.m. flood warnings were in effect and reports came in of flooded homes and cars just blocks from radio station KTMS in Santa Barbara.

"(The recent flooding) shows how radio is the one that people turn to when they need to know what the hell is going on," said Peter Bie, news anchor and reporter at primary EBS station KTMS-AM in Ventura. KTMS was part of a three-station group (including KLITE-FM and KHPY-FM) to simulcast 10 continuous hours of commercial-free flood coverage and several days of follow-up coverage, in Santa Barbara county.

The flood

"The biggest disasters happen when there are no rating periods," said Rich Gualano, news director at KVEN (AM) in Ventura, in discussing the culmination of his station's 16-hour performance during the flood. KVEN is the primary EBS station for Ventura County.

Without hearing the official word, anchor

Peter Bie knew something was up during his commute to KTMS at 4:30 a.m. on January 10 for the routine 6 a.m. news coverage. "By five-ish I thought we'd better get on the air and start talking about it," Bie said. At the direction of the weather service, KTS broadcast the EBS signal at 6:05 a.m.

"Our whole effort from that point on was to tell people not to wait—to get out now. People were still trying to carry on the normal routine," Bie said.

Santa Barbara's last serious flood occurred in the 1960s. That, according to Bie, does not leave most of the public with a long-time memory on what to do, including radio people. In the local radio community, stations said that January 10 was the first time they had run an actual EBS signal.

Although Bie boasts a general sense of satisfaction with KTMS news coverage during the flood, he shared one significant frustration. "I was a bit disappointed, in those early hours, about the general confusion of who knows what, what is their phone number and how can we talk to them," he said.

He said emergency planners also admitted the need to work out a better game plan. Emergency services were not always clear on who in the media to call.

Throughout the day, KTMS kept the public informed for 10 straight hours. Their coverage included live reports, and up-to-the-minute information from the county flood patrol, police, fire, the Red Cross, FEMA and the weather service.

"In one day, many of our crew—and our listeners—became experts in new terminology. Everyone learned what 'doplar radar' means," Bie said.

Doing it right

South of Santa Barbara, local stations and Ventura county officials pointed to KVEN (AM) as the one to turn to during the disaster. By 6 a.m., KVEN had broadcast the EBS signal and had four reporters stationed in problem areas throughout the community.

"We got on the scene of every major problem before it happened," News Director Rich Gualano said. "We knew where problems were likely to occur because of past history and from scanner traffic."

KVEN had a problem with its emergency generator that failed at 9 a.m. and left the station dark for a half-hour. Throughout the day KVEN's coverage was three-fold: live reports from the scene of problems, official information from government agencies, and information from private individuals and other agencies.

During disaster coverage, one of the most important strategies is to sort out rumor from fact. Gualano warned. "It's important to have a filter for the information you get, and we don't report anything unless we are seeing it ourselves, or it comes from a government agency."

Overall, Gualano feels his station was admirably prepared. He points to room for improvement, however, in having enough staff to sort through information before it goes over the air.

"With any event, no matter how much you prepare," Gualano said, "you do a good job and in some things you do a bad job. It's a pretty messy business. The way we cover disasters, our listeners are listening to us gather the news, not just report the news."

In both cases, KTMS-Santa Barbara and KVEN-Ventura reported an overwhelming response from their surrounding communities. In the form of letters, phone calls and day-to-day social contacts, they heard what the ratings could never tell them. Not a single life was lost in Santa Barbara County, the hardest hit by the flood.

SINE SYSTEMS
Innovative Solutions

Walkaway Specialist:

- EBS Compliance Tools
- Remote Transmitter Control & Monitoring
- Dial-up Remote Broadcast
- Program Automation Accessories & Studio Aids

Feature Product

DAI-1

The DAI-1 Dial-Up Audio Interface provides an array of features unparalleled in the industry. It combines an autocooper, a dial-out alarm, two AGCs, a DTMF operated equipment controller and an audio switcher into one affordably priced device. It is commonly used as a tool for "walkaway" EBS compliance. Another popular application is to allow "dial-up" remote broadcasts when the studios are unmanned. The DAI-RP provides a space to rack-mount the DAI-1, a power supply, a screw terminal interface module and five general-purpose relays for equipment control and audio switching. The optional DB-1 50 millisecond delay board prevents DTMF tones getting on the air. The optional CI-1 Composite Insertion Module is available for use when discrete audio is unavailable.

For more information on this or any other quality-built Sine Systems products, contact your favorite broadcast equipment supplier or call "Sine" any time. Also, try our 24 hour Fax-on-Demand line.

SINE SYSTEMS
Voice: (615) 228-3500
Fax: (615) 227-2367
Fax-On-Demand: (615) 227-2393

24 Hour FAX-ON-DEMAND

1020 Maxwell Avenue
Nashville, TN 37206-3554

Conex Electro-Systems
AS-101 AUDIO SWITCHER

AS-101 Audio Switcher

10 Stereo In - 1 Stereo Out

- Illuminated and legendable control buttons
- Instant or overlap switching
- Front panel accessible level controls
- Options include: RS-232 interface, remote control, relay-follow-switch outputs
- Network proven quality and reliability

P.O. Box 1342 Bellingham, WA 98227
1-800-645-1051 FAX (206) 676-4822

Conex Electro-Systems, Inc.

ROOTS OF RADIO

Bergen, McCarthy Banter a Natural for Radio

by Read G. Burgan

LAKE LINDEN, Mich. If you look up "ventriloquism" in Volume 22 of the 1972 Encyclopaedia Britannica, you'll find the following: "Ventriloquism—the art of 'throwing' the voice; i.e.: speaking in such a manner that the sound seems to come from a distant source other than the speaker.... A figure or dummy is sometimes used by the ventriloquist to assist in the deception. The ventriloquist animates the dummy by moving its mouth while his own lips remain still, thereby completing the illusion that the voice is the dummy's, not his...."

Instructive, but pretty dull stuff. The short article goes on to discuss ventriloquism's ancient roots. What it fails to mention is the greatest ventriloquist of the twentieth century: Edgar Bergen.

Before you close the book, look very closely at the parenthesis at the end of the article. That's right, at the three letters: "E.J.B." What do they mean? They're the initials of the article's author. In this case they stand for... Ah, you guessed: "Edgar John Bergen."

In the beginning

Edgar Bergen was born on Feb. 16, 1903 of Swedish parents. His original family name was actually Berggren. His early boyhood was spent on a farm near Decatur, Mich., his adolescent years in the Chicago area. He discovered his facility for ventriloquism quite by accident at the age of 11. One day as he called out to a friend walking down the street, he noticed the boy directed his answer elsewhere.

Bergen soon discovered that he had a talent for vocal misdirection. Before long he was entertaining classmates and frustrating his parents and other adults with his newfound skill.

A 25-cent book on ventriloquism helped hone his skills. Harry Lester, a famous ventriloquist reluctantly agreed to give the eager Edgar three months of ventriloquism lessons. Bergen also learned sleight of hand skills and magic routines.

A serious ventriloquist needs a dummy. Bergen had one specially carved of white pine material by a bartender named Theodore Mack at a cost of \$35. The face of his dummy was modeled after an Irish newsboy Bergen had seen on a nearby street. Bergen himself carved the body.

Before long, Bergen was a hit at school assemblies and parties. Even his school teachers recognized he possessed an extraordinary talent to entertain.

Bergen entered Northwestern University as a pre-med student. To pay expenses, he performed as a combination ventriloquist and magician at various private parties. Summers were spent earning even more money on the Chautauqua and Lyceum circuits.

Paying some dues

He never finished college. From 1926 until 1936 he and his dummy, Charlie McCarthy, traveled over several continents playing the vaudeville circuits and perfecting his craft as an entertainer. His travels included Iceland, Sweden, England, Russia and South America where he even entertained at a leper colony.

It was a hard life. Long miles and low

pay. Eventually both his pay and his stature as an entertainer grew until he became a



Edgar Bergen with Charlie McCarthy

headliner. Bergen considered his first performance at the New York City's Palace Theatre in 1930 as his coming of age.

Six more years passed before the entire country would become his audience. In the fall of 1936 he played a private party in New York City where he came to the attention of Rudy Vallee. At that time Vallee had one of the most popular network variety programs in the country. Vallee asked Bergen to appear on his Dec. 16 broadcast on NBC. Bergen gratefully agreed.

But soon after both men had second thoughts. A ventriloquist on radio? Ridiculous. They each concluded that it was a bad idea. In the end, Rudy Vallee decided to risk it and persuaded Bergen to appear.

Bergen and McCarthy were an instant success. Vallee paid him \$150 for that initial appearance and invited him back repeatedly to the increasing delight of his audience.

In May of 1937, Bergen and McCarthy came into their own. Chase and Sanborn signed a contract with them for a weekly one-hour radio program on NBC. For years to come, the Charlie McCarthy and Edgar Bergen program ranked at or near the top of the ratings.

W.C.Fields was featured as Charlie McCarthy's foil during the first few months of the program. It was a marriage made in radio heaven. Their running radio feud evoked the nastiest barbs that radio censors would allow. The audience loved it. Here's a sample of their running dialogue:

Early radio repartee

CM: Mr. Fields, is that your nose or a new kind of flamethrower?

WCF: Quiet you termites' flophouse!

CM: Why you bugle beak! Why don't you put helium up your nose and rent it out as a balloon?

WCF: Quiet you animated hitching post or I'll sic a beaver on you.

CM: No wonder Mr. Fields nose looks like a flame, he's an alcohol burner.

WCF: I'll saw his leg off and beat the sawdust out of his head with it!

CM: You won't say that when I grow up.

WCF: When you grow up I'll string telephone wires on you.

CM: I've never seen my father, Mr. Fields.

WCF: Go out and look in my woodshed.

Bergen played the straight man to Charlie McCarthy. Charlie was radio's original bad boy. Bergen kept his age at fourteen. He was cheeky, sneaky, mouthy, clever, outrageous and much more. Although he actually had many costumes, his most familiar included top hat, tails and a monocle.

Radio's bad boy

He was also a womanizer. Over the years Charlie's leading ladies included Dorothy Lamour, Mae West and Marlyn Monroe. His Adam and Eve skit with Mae West elicited thousands of letters from offended listeners, caused the FCC to threaten to pull the licenses of stations carrying the program and incurred a 15-year network

ban against Mae West.

Charlie stood 38-inches high and weighed 40 pounds. Ultimately there were several Charlie McCarthy's, consisting of several heads and nearly half a dozen bodies. While the later creations provided Charlie with a variety of moods and appearances, none matched the original which Bergen insured for thousands of dollars and kept in his own private bedroom.

In the late '30s and early '40s, Bergen added two more dummies to his stable of characters. Mortimer Snerd joined the cast in 1939. He was an oaf—a farm fellow with buck teeth and pieces of straw sticking out of his hat. Mortimer and Charlie were dead opposites. Mortimer was as dumb as Charlie was smart. A psychiatrist said that the reason people liked Mortimer, was that he made them feel more secure than before they heard him because he was so stupid.

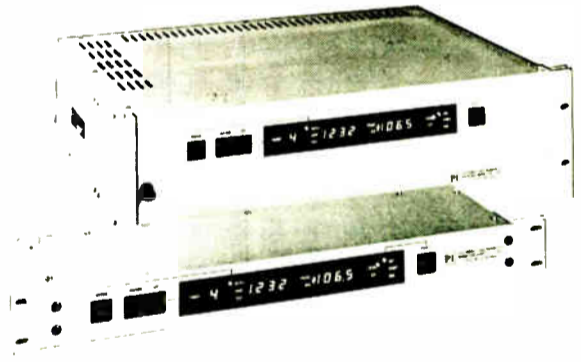
Effie Klinker, a man-crazy old maid was added in 1944. While Bergen experimented with other characters, these three were the survivors, and Charlie remained the most popular.

How did Bergen parlay a ventriloquist act into a successful radio series? Why did people embrace a dummy they couldn't even see? Sam Pierce was the producer for the Bergen-McCarthy radio series for many years. He concluded, "The reason

continued on page 19 ►

THE LINEAGE CONTINUES...

Today's 1900 Series Antenna Monitors



FEATURES

- 2 to 12 towers—Modular construction
- Fully Compatible with AM Stereo
- Suited to diplexed arrays
- Moveable Control & Display Panel option
- Jitter-free "True Ratio" Display
- Unambiguous positive or negative angle sign display
- Continuous remote outputs of all phase and ratio measurements
- Microprocessor remote control system compatibility
- From the world's leading antenna monitor manufacturer

For complete information, contact your authorized Potomac distributor, or

**POTOMAC
INSTRUMENTS**

932 Philadelphia Avenue • Silver Spring, MD 20910
Phone: (301)589-2662 • FAX: (301)589-2665

...THE STANDARD FOR THE NEXT GENERATION

Circle (71) On Reader Service Card

Club DJs May Need Production Polish

by Alan Peterson

HARRISBURG, Pa. For CHR radio stations, hiring a club DJ to jock a dance show is often a shrewd idea. The jock knows how to mix seamlessly, is very in tune with what is hot, and has a built-in following from his or her club gigs. A hot club DJ can make your station sound exciting.

When you ask a club DJ to pull some production time, however, you may find out your shining diamond will need some additional polish.

Serious work

It has been my experience that radio production done by some (not all) club-intensive jocks is in need of serious repair: levels are on the moon, mic technique is deadly, interpretation of the message is nonexistent and the spot is either drowning in unnecessary sampling or was power-mixed with a dozen beat-matched music cuts.

Should your console have EQ, your client's precious message will also have enormous amounts of bass boost. Levels to cart or hard drive go past the red and enter the infrared region. To summarize, not whateacall your station's best effort.

Why are these conditions mostly common to club DJs? Many club sound sys-

tems use huge limiters, so jocks depend on them for smooth segues each time regardless of settings. Jocks have to climb inside those \$80 cheeseball dynamic mics just to be heard in the clubs; they'll do the same thing to your RE-20 or Senny 421 strictly from habit.

Sampling and power-mixing is hip, but not always necessary (florists and luxury car dealers should avoid such approaches). The low end is over-EQ'd to simulate bazooka bass "so it doesn't sound wimpy," but it only slams the compressor in the production room and ends up muddy.

Sure, it sounds cool in the production room at 100 dB with the door open (so the bass waves have somewhere to go), but over the air, down the phone to the client or on a spec cassette, it just plain sounds bad.

EQ'ing excitement

As engineers and/or production directors, we need to help translate a DJ's style and the excitement he or she cre-

ates into a marketable and airable product.

First step is to explain why none of that big fat bass makes it to the air: everything way down there hits a brick wall as

um, not one that is read. Finally, show him what's going on behind the words: obviously an Acura car commercial requires a different read than an alternative club night spot. A home security alarm company needs emotion; an auto speedway needs nitro-methane mixed with testosterone. Breaking away from club-floor vocal technique is a big step and he or she may not latch onto it right away. Nurture this approach and

have him or her work at it.

Adjusting the levels

This leaves you time to help him or her with levels. The easiest way to understand it? Bypass the studio compressor/limiter. Plain and simple, if the mix sounds well-balanced without compression, it will still sound good with it. Hearing an uncompressed mix allows the ear to "microscope" the subtleties of it and make good decisions. Unless a very specific effect is aimed for (such as classic limiter breathing), fade down the laser blasts and reverb return levels, turn off the sampler for now, and don't allow the limiter to take control of the mix.

Finally (and be diplomatic with this one), music choices. Not every spot requires beat-to-beat mixes of several songs. First, it may sound too close to a station promo; program directors are fierce when it comes to differentiating commercials from station image. Second, it's mostly being done for the jock's ego: "Man, I sound as good on this sixty as I do in the club." Lastly, not all clients require this approach, and many a demo will be sent back for a re-cut with the note "change music" attached.

Your protégé

Instruct your new protégé that part of interpreting the copy includes visualizing ("auralizing"?) what sort of music is appropriate for the message. Then guide him or her through the station library and teach him or her how to use the cross-reference directory.

By no means, however, curtail his or her creative edge. These guys may have had access to recording gear much more sophisticated than yours and can coax some phenomenal performance out of your production room. If you have MIDI, watch him take to it like a pigeon to popcorn. Allow him time to rehearse, practice and do mixes, and in turn he will probably redefine what your room is capable of doing.

Lastly, be ready to watch him or her do his or her thing in the room, and get ready to learn some new techniques from what he may have brought from the clubs. None of us know all the tricks, so everybody gets better and the station gets richer.

□ □ □

Alan Peterson is production director for WNNK-FM, Harrisburg Pa., 17110, which employs several club and wedding DJs. All are capable, digital-literate production people.

Many club sound systems use huge limiters, so jocks depend on them for smooth segues each time, regardless of setting.

it passes through processing before being STL'd out the door. Better to strive for a balanced sound, one where all frequencies blend in a harmonious manner. Let him or her hear a sample of a similar spot produced by another jock at the station for reference and perhaps inspiration.

A primer in mic technique should be the first practical lesson in the studio. The first time someone stops "swallowing" the mic, he will be amazed at the amount of power and clarity that comes with a high-end unit (always say "no" if he asks if he can borrow it for the club... and he will ask too). Show him proximity effects: the airiness they achieve with moderate distance and the intimacy of close-miking with a low voice. Use your ear to find an EQ curve on the mic processor that is his or her signature.

Now that he can work a mic, give him a basic taste of how to interpret a piece of copy. Put extra spin on the emotional adjectives: new, crunchy, sexy, shiny and the like. Show how a lift in pitch towards the end of a phrase gives it a positive feel. Teach him to ignore commas in the copy; radio is a spoken medi-

FULLY AUTOMATED

TIME & TEMPERATURE

Another Wizard For Windows™ exclusive!

This amazing feature plays the correct time and temperature readings in your DJ's voice automatically! Simply schedule a Time or Temperature Announcement into your log and let the incredibly flexible Wizard For Windows™ handle the rest. Satellite liner calls can also be replaced by a time spot, temperature spot, or both!

Wizard For Windows™ is the ONLY true multi-user, fully networked system, providing the ultimate in ease of use, impressive gains in productivity, and superior sound quality.

For more information about radio's premier digital automation system, contact Prophet Systems, Inc.

1-800-658-4403

Outside the U.S. contact Broadcast Solutions Pty Ltd. in Sydney, Australia at (02) 439-6662.


Wizard For Windows

The Flexible Digital Automation System featuring Windows and Novell

Windows is a registered trademark of Microsoft Corporation. Novell is a registered trademark of Novell, Inc.

Circle (152) On Reader Service Card

POWER TUBES!



We have a full selection of all electron tubes required to keep stations on the air all the time. Here are some popular types:

4CX250B	3CX1500A7	3CX15,000A7
4CX5000A	3CX2500F3	PL328/TH328
4CX10,000D	3CX10,000A3	PL347/TH347
4CX15,000A	3CX15,000A3	PL667A/Y667A
4CX35,000C	3CX10,000A7	PL1057/YL1057

Plus...Graphite Anodes (new development)
3-500Z6, 4-400CG, 833D

When you buy from Penta, you're assured of

BEST WARRANTIES

Up to 12,000 hours or three years

COMPETITIVE PRICING

New tubes at near-rebuilt prices!

SUPERIOR SERVICE

Immediate delivery from stock!

PENTA LABORATORIES

21113 Superior Street
Chatsworth, CA 91311
phone: 818-882-3872
fax: 818-882-3968

800-421-4219

Circle (57) On Reader Service Card

total processing control



unity remote software

You're driving in your car wondering how your station would sound with just a little more boost in the high end. Well stop wondering and start processing. Because with Unity Remote Software, you can control your processing from your office, your home, and even your car.

Powerful Unity Remote lets you evaluate the sound of your station in "real world" listening environments and make adjustments as needed. Compare two settings while sitting in the program director's office. Determine whether your last set of changes sounds as good in a car as it does in a living room. If you want to switch presets or modify any parameter, just enter your changes by modem.

Unity Remote provides you with the same information found on the Unity's Processing Display so that you can see, as well as hear, the effects of your changes. Day-part processing events may also be programmed remotely. Unity Remote runs on an IBM-compatible computer running DOS and supporting VGA graphics.

How much does Unity Remote Software Cost? *Absolutely nothing!* It's included free with every Unity stereo processor, and you can control any FM or AM Unity from the same software package.

Now shipping Remote Software Version 4 with full interactive metering displayed on your computer.
Unity 2000i and Unity AM users can contact Cutting Edge for your free upgrade.



the unity

the world's best sounding radio processors



CUTTINGEDGE

2101 SUPERIOR AVENUE • CLEVELAND, OHIO 44114 • TEL: (216) 241-3343 • FAX: (216) 241-4103

Circle (74) On Reader Service Card
World Radio History

Manufacture Your Own PC Boards

by Jim Somich

BROADVIEW HEIGHTS, Ohio

There is nothing like a professionally laid out pc board to make your projects neat, reliable and easy to build.

Sure, there is always perf board, but wiring quickly turns into a meaningless glob with circuits of any complexity at all. And if you are designing a circuit that requires any degree of stability, this "haywiring" will reduce the performance of your finished project.

What we need is a quick and easy way to make professional pc boards. What if you could run off pc boards on your copier or

laser printer? It's almost that easy with the toner transfer system of creating pc boards. The system is simple and foolproof and much quicker and easier than photographic techniques. It is also faster and easier than laying out artwork directly on clad boards.

Excellent etch resist

The common toner used in copiers or laser printers is comprised of about 50 percent pulverized plastic. This toner makes an excellent etch resist for the creation of printed circuit boards. The problem has been how to transfer the toner image directly to the circuit board.

To understand the process of transfer-

ring an image, we need to take a quick look inside a copier or laser printer. Without getting into the details of how these printers create the image, suffice it to say that the initial image is nothing more than carefully arranged toner dust particles. If you were to stop the process here and pull the paper out of the machine, you could blow on the image and it would fly away. To make it a permanent image, the toner image must be melted into the paper fiber.

Just before the paper emerges from the printer, it makes contact with a very hot "fuser" roller. The toner instantly melts into the fibers of the paper, making a

permanent image. These paper fibers act the same way as steel does when used to reinforce concrete.

Toner transfer paper, available from several sources including Digi-Key, has a special water-soluble coating on one side of a loose-weave, lightweight paper. The coating acts as a barrier to prevent the toner image from locking onto the fibers of the paper. Because this coating is impervious to heat, it's completely safe to run this paper through any laser printer or copier.

The key to this process involves a "double-fusing" technique. The first fusing is from the printer to the paper as already discussed. The toner transfer paper is now placed face down over the cleaned circuit board. The second fusing takes place as the back of the paper is subjected to high heat and a little pressure. The source of this heat can be a common household iron set to "cotton." The toner image remelts and bonds to the copper surface. The board is then placed into a tray of water, where after about a minute or two, the paper will slide off, leaving a perfectly transferred image.

Imaging methods

Two imaging methods are normally used for creating the pc board layout representation.

• **Personal computer with a laser printer:**
Option A-Design your layout on the computer screen

Option B-Using a scanner as an input device, capture the artwork from a magazine article.

There are many commercial and shareware programs available for pc board layout. I use a program called SmArtwork from Wintek. SmArtwork includes a simple auto-router, block editing functions and a library of pads, dips and sips.

• Photocopiers

This method would be used if you only have a dot matrix printer for output or you are fabricating a board from a magazine construction article. If a magazine's artwork is not printed clearly, you can correct the deficiencies by making a good copy of the pattern on regular paper and then using a bottle of correction fluid and black pen to make necessary touchups. You can then reprint to the transfer paper.

After the transfer process is completed, it is wise to go over the image and re-touch with an etch resist pen where necessary. If part of the image did not adhere to the copper, either you did not use enough pressure during heat transfer or the board was not perfectly clean. You can clean the resist off the board with acetone and start over.

Place the finished board in a tray of Ferric Chloride etchant for about 15 minutes (less time if you heat the solution and agitate constantly).

I use a high-speed Dremel tool in a drill press stand to drill my finished board accurately. Carbide-tipped drills in pc sizes are available from several sources, including Digi-Key. The pc drills have a 1/8-inch shank so they can be used in almost any hand tool or drill.

The toner transfer system allows me to construct circuits of moderate to high complexity with a professional finish. I have even used the system to make double-sided boards and component overlays.

Once you have made your own pc boards, you will never go back to perf board or other haywire techniques.

□ □ □

Jim Somich is a radio broadcast engineering consultant and president of MicroCon Systems Ltd., a manufacturer of broadcast equipment. He can be reached at 216-546-0967.



Let the VRC-2000 watch your remote transmitter site.

This is Mary Beth, your babysitter. Sure, she's great at tossin' a frozen pizza in the oven, finding *Knot's Landing* reruns, and tucking the kids in. But would you trust her with your "baby" at the transmitter site? With millions of dollars of equipment and thousands of dollars of FCC fines and downtime at stake, watching over your remote transmitter isn't your average babysitting gig.

The answer is the VRC-2000 Remote Control from Gentner. It not only monitors your transmitter, it can make changes for you automatically. If something goes wrong, it calls you or your technical staff to report the problem. Usually the problem can then be fixed by the VRC-2000, as you talk to it through your phone or your PC. Plus, you can access the



VRC-2000 from virtually anywhere. It's like having a person on duty at your remote transmitter site 24 hours a day, only it's more reliable and won't get cheese on the equipment.

Utilize the VRC-2000 to monitor and adjust everything you need at your transmitter, then relax — the babysitter's on duty. Call 1-800-945-7730

for more VRC-2000 information. And while on the line, ask about Gentner Conference Call Services.

 **Gentner**

The World Leader in Broadcast Telephone Interface Products

NOW
SHIPPING

We Made Talk Radio Easy...



The Way It Should Be.

Talk radio can be difficult. Your telephone system shouldn't be. Gentner designed the TS612 to make it easy. The way it should be.

The TS612 is a six-line (expandable to 12) Telephone System. It features Gentner's Direct Connect Technology™, which allows you to hook it into a regular telephone line.

Plus, its built-in handset and keypad eliminate the need for another screening telephone.

With the TS612 you can talk to callers off-air while other callers are on-air.

The TS612 features built-in mix-minus to compliment Gentner's digital audio enhancement. It has two DCT Superhybrids, automatic level control, dual air control surfaces, optional screener control surface, and dual audio bus operation.

You also have DCT connection to your hard disk or studio PC for screening and controlling calls.

The TS612 was designed specifically for talk shows.

Gentner

Contact the broadcast professionals at Harris Allied for complete details. Find out just how easy talk radio can be for you.

1-800-622-0022

Fax 317-966-0623

Southern CA 1-800-690-2828

 **HARRIS
ALLIED**

Circle (138) On Reader Service Card
World Radio History

©1994 Harris Corp.

COLE'S LAW

Updates on Expanded Band, Towers

by Harry Cole

WASHINGTON As we careen into 1995, the FCC has given us all a number of things to think about. In this column we'll take a look at a new proposed revisions in the way the Commission regulates towers.

But first, a clarification of an item we covered a month or two ago. In response to our column about the AM expanded band proceeding, the switchboard at the Cole's Law "Smash or Trash" Reader Hot-Line lit up like a Christmas tree. Of the four calls we got, two thought the column was a smash, and two thought it was trash.

At least one of the two who disagreed with our somewhat skeptical view of the expanded band matter happened to be one of 79 licensees anointed by the FCC to venture forth into the expanded band. He wanted us to know that he and others in his position are excited about the possibilities and very upbeat about moving up the band ASAP.

Expanded band radios

He (and one other caller) also wanted us to be sure to let everybody know that, contrary to a suggestion in our column, expanded band receivers are in fact readi-

ly available in the marketplace, and have been for some time. As evidence, he pointed to a listener who had recently bought a new car, only to discover that the radio did not extend into the expanded band. After complaining to the car dealership, the listener was given a new radio.

(Of course, in addition to demonstrating that such radios are available, this anecdote also illustrates that there may still be some, er, practical impediments to getting them into consumers' hands right away.)

So much for the old business. On the new side, the FCC is proposing to require tower owners (as opposed to each indi-

vidual applicant proposing to use a tower) to register their towers with the Commission. The idea is that each tower would be given a unique registration number. That number could then be used to keep track of the tower's coordinates, height, lighting/marketing specifications, etc., in the FCC's records.

The tower owner—as opposed to the owner(s) of each of the antennas on the tower—would then be under a continuing obligation to notify the FCC of any changes in any of that information. And if an applicant proposes to use a particular tower, it would only have to reference the tower's registration number.

The motivation for this proposal comes in large measure from the fact that, under the Commission's existing regulatory approach, when a tower with multiple tenants is modified, each of the tenants generally ends up having to report the modifications (if not request authority to make them).

Tower regs

That means a hefty amount of unnecessary duplicated effort on the Commission's part. So what the agency is trying to do is to separate out the mere structural aspects of towers, which will be the same for all users of any particular tower, from the RF-based licensing considerations which will vary from user to user.

This proposal seems to be reasonably good news for broadcasters. While it may create some additional administrative chores for those of you who own your own towers, it should make life easier when it comes to preparing applications. Theoretically, instead of having to fill in a bunch of information about your proposed tower site, all you would have to do would be to list the tower's registration number.

It may also make life easier in dealing with the FAA. It appears from what the FCC has said so far about its proposal that the FCC views the FAA as being interested only in purely structural aspects of towers; i.e., how tall they are, how close they are to airports, etc. This may be significant because it suggests that the FAA may no longer be interested (at least as far as the FCC is concerned) in electromagnetic interference ("EMI").

As some of you FM operators may recall, several years ago it was exceedingly difficult to get many upgrade applications approved because the FAA objected to the possibility that the upgraded operation might cause EMI to navigation systems. More recently, the FAA has revised its computer programs so that it seems to be seeing fewer potential EMI problems.

The one somewhat negative aspect of the FCC's proposal is that all tenants of a tower would still be responsible, albeit on a "secondary basis," for compliance with applicable tower rules. That means that broadcast licensees who are merely renting space on a tower could still be responsible for checking tower lights, assuring compliance with marking requirements, and the like.

It also means that, if a tower is way out of compliance, the Commission could conceivably fine the tower owner as well as all the tenants—meaning something of a windfall for the government in the way of fines.

On the whole, the FCC's tower registration proposal seems to be a rational and, ideally, useful approach to the problem confronting the FCC.

□ □ □

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



Stop sending your listeners mixed signals.

Make your move toward a complete digital air chain with the Harris DIGIT™ FM Exciter. The radio dial can be a confusing place for today's FM listeners.

They've heard the hype for "improved sound" from CDs and other digital program sources. But for many stations, the missing link in the air chain has been the exciter. Outdated analog technology often stifles the full potential of digital input.

With the Harris DIGIT™

FM Exciter — the world's first and only truly digital exciter — you can use your analog processing chain now, then quickly, easily, upgrade to a 100% digital air chain. Your listeners will get the sound quality they expect, while your station will get new market prominence. You'll also be prepared for an even broader digital future.

Compatible with virtually all FM transmitters, the 50 watt DIGIT provides 32-bit Direct Digital Synthesis precision for an incredibly stable,

clear signal that is not subject to degradation over time. No tweaking or tuning is ever required for full digital performance.

Upgrade now with the Harris DIGIT FM Exciter and your listeners will get the message loud and clear. Call us today for complete specifications.

U.S. and Canada: 217-222-8200
or fax 217-224-1439
International: 217-222-8290
or fax 217-224-2764



Bergen-McCarthy Team

► continued from page 13

Edgar was loved so, is because people believed the dummies. They really did believe the dummies, because on radio you didn't see them. Even the audience in the studio believed them."

Credibility factor

Just how believable were Bergen's dummies? Sam Pierce recalled an almost unbelievable example: "I was doing a series of spots with Edgar Bergen and the dummies at CBS one afternoon. All the cast were there. Edgar had completed two or three spots that we put on tape, and asked, 'Do you need me any more, Sam?' I seriously said, 'No, I don't think so, Edgar. I've got a couple of little things I'm going to do with Charlie and one I've got to do with Mort. So I don't need you. You can go.'

"He picked up, walked out of the studio, and out to his car in the parking lot. And I swear he knew exactly what he was doing; he just sat down in his car and waited for me. Pretty soon I said, 'Mort, let's do the Mort stuff....' And all of a sudden I realized what I had done. I had sent the voice of Mortimer and the voice of Charlie right out into the parking lot. I believed in them so much!"

With Bergen's abilities to create such believable characters, you'd assume that he was a consummate ventriloquist. Sam Pierce remembers, "He wasn't that good a ventriloquist as far as moving his lips. Oh sure, he was better than the average. But half the jokes in the show were Charlie's saying, 'Your lips are moving, Bergen.' And then we'd do a whole routine on his lips being moving. We made something of it."

On the radio programs, Charlie McCarthy's witty responses were razor sharp. His seeming adlibs came so fast and furious that listeners readily concluded that Edgar Bergen was the master of the quick comeback.

"Not so," says Sam Pierce. "Edger Bergen was a very quiet man who would have loved to have had the command of the adlib, but who really didn't. You see the writers had never written anything funny for Edgar; he was the straight man. Even though Edgar got big laughs because of being a foil with Charlie and Mort, he was lost with out something having been written that he could remember. He had a great memory. With the dummies he was bright and brilliant. He could really wow them. But alone, without them, he was lost. It was an odd thing to see."

Lost without the dummies

Pierce recalled a vivid example of this: "One year we were back in Chicago. Edgar had been appearing in person in a nightclub. We had done the radio show there. We had some spare time, so we decided to take the train instead of flying. We went back to the club car on the train. There were five or six young girls who were just wild because they recognized him. He began talking to them, trying to quip and make them laugh. But he got lost. He was struggling and the girls were looking a little disappointed.

"Finally he said, 'Look Sam, hang on a minute and I'll be back. Buy the girls a drink.' He was back in about five minutes and had brought Charlie and Mort back with him in the suitcases. He pulled them out and sat Charlie down on his knee. Then he started adlibbing with Charlie. In two minutes he had the place

in hysterics. He had the place falling down with laughter, because he had Charlie sitting on his lap. Then he pulled Mortimer out, started talking with Mortimer, and the same thing happened. It was a graphic example to me, that here was a man who depended on this combination, the wizardry of these dummies."

During the '30s and '40s, Bergen and Charlie starred in several movies, including: *You Can't Cheat An Honest Man* (1939); *Charlie McCarthy: Detective* (1939); *Look Who's Laughing* (1941); and *Fun And Fancy Free* (Walt Disney 1947). None of these films were particularly memorable, but they did serve to enhance the illusion of Charlie McCarthy being a real person. In the movies, it was easy to create scenes in which Charlie alone was featured with Bergen nowhere to be seen.

Master of innuendo

By the mid 1940s, Bergen was paid \$10,000 a week for his radio show, earned \$150,000 per motion picture and received yet another \$100,000 a year on royalties from Charlie McCarthy dolls and toys.

Over the years Edgar and Charlie received numerous accolades. In 1938 the Motion Picture Academy awarded Bergen a special wooden "Oscar" for the comedy creation of 1938. The most unusual award was when Northwestern

University gave Charlie an honorary degree: *The Master of Innuendo and Snappy Comeback*. The citation read: "Prince of parasites, violent in company, churlish in behavior, acid in conversation, wooden faced in all relationships, and thus in many respects a typical product of higher education in America."

Bergen's radio program ran from 1937 until 1956. When it ended, he continued to play nightclubs and theaters, but gradually faded into near obscurity as ventriloquism faded in popularity.

In the summer of 1978, Edgar Bergen called a press conference to announce his retirement. For one last time he began a three week engagement in Las Vegas. His friends and family, who knew his health was fragile and that his failing memory often left him in confusion, attended the opening night with trepidation.

As Bergen and McCarthy flawlessly worked their way through the old routines, the years seemingly melted away. When the program ended, Bergen and McCarthy quietly listened to an audio montage of assorted clips from their old radio shows. The audience applauded with a standing ovation.

Bergen and McCarthy repeated the act for two more nights. On the morning of the fourth day in Las Vegas—10 days after announcing his retirement—Bergen and McCarthy never awoke. Today, Charlie McCarthy resides in the Smithsonian Institution.

During the Golden Years of radio, Edgar

Bergen proved himself the ultimate ventriloquist by throwing his voice across an entire nation through the medium of radio. In his death, he shows an even greater ventriloquistic prowess. Each year more and more compact discs and cassettes are being issued bringing his unusual talent to a new generation—proving that Edgar Bergen is truly the world's greatest ventriloquist: throwing his voice forward into time and back from the Great Beyond!

□ □ □

Author's Note: The quotations from Sam Pierce are from a one-hour recorded interview made by the author at the Voice Of America studios on March 24, 1975.

Read Borgan is a free-lance writer and a former public radio station manager. He can be reached at 906-296-0652.

Gil Garcia of Clear Channel/Radio-Austin, TX finds out the rumors are true.



General Managers love it; Program Directors want it; Sales Managers will kiss it; Engineers would die for it. Works on all Formats, 24 hours a day; good for ratings.

Not a processor! Not a console!

WHAT IS IT? — Autogram is not talking!

Find out at NAB 95 BOOTH 4719, 4720, 4721.

For AUTOGRAM consoles call:

AUTOGRAM CORPORATION

1-800-327-6901

1500 Capital Avenue, Plano Texas 75074-8118
(214) 424-8585 ■ FAX: (214) 423-6334

Circle (202) On Reader Service Card

World Radio History



LMA/DUOPOLY CONTOUR MAPS

The DATAWORLD LMA/DUOPOLY Market Survey Contour maps present a precise electronic verification of overlapping and intersecting contours.

AM 5 mV/m and FM 3.16 mV/m City Grade contours are shown in full color, including transmitter site indicator. The map is supported with a printout showing all of the stations which appear on the map.

Daily updating of DATAWORLD'S AM and FM databases protects against errors and omissions.

OTHER MAP OPTIONS

- SHADOWING (TERRAIN SHIELDING)
- CONTOUR COVERAGE
- POPULATION DENSITY
- ZIP CODE BOUNDARIES
- RECEIVED SIGNAL LEVEL
- SPECIAL REQUIREMENTS

1990 CENSUS

WHO ARE YOUR LISTENERS?

1990 BUREAU OF CENSUS POPULATION COUNTING

- Comprehensive Ethnic and Demographic Data
- Ethnic/Demographic Data Available for Each Zip Code Within Coverage Area
- Age Analysis Reflected in Ethnic Breakout
- Resolution Increased to Block Level
- Percent of County Coverage Shown

ETHNIC PIE-CHART DISPLAY

- Projects Ethnic Population in Multi-Color Pie Chart Form

dataworld®

800-368-5754 FAX: 301-656-5341

Circle (122) On Reader Service Card

WORKBENCH

Re'an Organizes Patch Bay on Computer

by John Bisset

FALLS CHURCH, Va. If you have ever visited a network or large studio where patch bays rule the equipment racks, you may have been awed by the neat designator strips that identify each jack.

You may have experimented with your own patch bay designator labels using your word processor. Unless you have a lot of time, it's not easy to print out designator strips like the "professionals" use.

★ ★ ★

Another avenue for patch bay IDs is Re'an PatchLabel software. The \$100 software package greatly simplifies the preparation of patch bays. The software was developed as an efficient alternative to labeling patch bays with two or three lines of text in a quarter-inch wide strip. The PatchLabel runs on Windows, requires at least an IBM 386 with hard disk drive (at least 600K available), VGA or SVGA color monitor, a mouse and inkjet or laser printer operating in the landscape mode.

With this software package, Patch bays can be customized quite easily. The program takes into account the number of sockets and their diameter, to insure properly proportioned labels. Changing the patch bay layout, or for that matter, the designations strips, is as simple as clicking the mouse. The program has the layouts for over 15 types and brands of patch bays, further simplifying the process.

Re'an has built and wired professional audio and video patch bays, jacks, and cords for the professional audio and video industries. The company also manufactures knobs for many of your favorite pieces of gear.

This software packages their expertise in an inexpensive yet useful way, putting an end to smudges and hand-inked patch bays that no one can read. For more information, circle **Reader Service 163**.

★ ★ ★

Speaking of computers, in a recent publication from Dolby Labs, their presence on the Internet was announced. The most extensive presence is the Dolby Audio/Video Forum on America Online. Downloadable files of most of the major Dolby publications are provided, including technical papers. One of the most popular areas of the forum is the "Ask Dolby" message board, for questions addressed to Dolby's technical staff. You can access the forum by using the key word "DOLBY."

Bob Hawkins, a contract engineer in Indiana, recently encountered a problem with the plate current meter on his Harris FM-10H3 at WIFE-FM in Connorsville, Ind. Specifically, static would cause the plate current meter to wander.

Anti-static spray helped the situation for readings near zero, but was not a cure. Mid-level meter indications were unpredictable. In his travels to other stations, Bob noticed that the Modutec meter used in the CCA FM 20,000DS transmitter

was physically the same size—including the mounting studs—and it never acted strange.

After checking that the movement for the two meters was the same, Bob ordered one. The new meter cured the problem. The replacement meter cost a little over \$100, and made final tuning and adjustment a breeze. Jason at CCA can fill your order. Call him at 404-964-3530.

★ ★ ★

If you plan to exchange other meters, keep in mind that the measuring components must match. Some meters may have the same physical size, but a different full scale movement. The meter sensitivity is usually printed in small lettering somewhere on the meter scale faces in place.

Although not always a static problem, errant transmitter meters can run you in circles. During a maintenance session, it's a good idea to check the values of the meter multiplier resistors (make sure the transmitter is off and properly discharged!). Usually, sudden drops or improvements in efficiency—where no other symptoms are noted—can be traced to these resistors changing value.

Remote season will be upon us before you know it. If you haven't taken advantage of college interns to assist your remote setup, now is a good time to contact your local college or tech school. In exchange for college credit, the interns will perform on-the-job skills through a learn-as-you-do program that you and the college instructor can develop.

The legwork required to set up a program is worth bundles in duties that can be assigned to someone other than

you. Your management should appreciate your initiative and resourcefulness.

★ ★ ★

Like it or not, the better weather is coming, and with that weather comes the influx of remotes. In a past Workbench, we outlined a scheme of labeling mic cables to simplify choosing the correct length. Belden wrote and suggested using different colors to represent different lengths. Another good idea.

But how about getting rid of the cables altogether? Well, almost. Topham Audio in Orlando is selling a neat new device that turns any mic into a wireless mic. Manufactured by Lectrosomics, the wireless cube comes in three models. There are VHF narrow band and UHF narrow band versions for ENG use, and a UHF wideband model with high definition audio quality and full-function metering.

Each plug-in cube is about the size of a wall-wart power pack. The cube has an XLR female jack on one end, and is powered by a 9 Volt alkaline battery.

You simply plug in your favorite mic, and it becomes "wireless." Topham Audio publishes a production sound catalog that is full of useful products and accessories. For a copy, circle **Reader Service 99**.

□ □ □

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



You
can measure...

with the best monitor and the most accurate test set.

The FMM-2/FMS-2 series monitors provide an even greater degree of precision measurement than ever before... You can measure S/N below 90 dB, You can measure crosstalk below 85 dB, You can measure separations of better than 70 dB, You can measure frequency response to better than 0.25 dB, You can measure distortions to lower than 0.01%, and much more... Our uncluttered panels and autoranging voltmeters make these measurements a dream.




BELAR
ELECTRONICS LABORATORY, INC.
LANCASTER AVENUE AT DORSET, DEVON, PENNSYLVANIA 19333

Call or write for more information on Belar AM, FM, Stereo, SCA and TV monitors.

(610) 687-5550

Circle (217) On Reader Service Card



FM STUDIES

- **SPACING/INTERFERENCE SEARCHES** to locate a channel
- **DETAILED INTERFERENCE STUDIES** optimizing site location and directional antenna designs (calculates allowed ERP on all 360 bearings)
- **TERRAIN ELEVATION RETRIEVAL** determines HAAT for 8 or more radials
- **DISTANCE TO CONTOURS** plots projected coverage
- **POPULATION COUNTING** to determine potential listening audience
- **COVERAGE MAPS AND OVERLAYS** depicts signal coverage, zip code boundaries, received signal level, terrain shadowing and more

dataworld
A Service of DW Inc.

(301) 652-8822 (800) 368-5754

Circle (60) On Reader Service Card

MOVING?...

Don't leave us
behind!

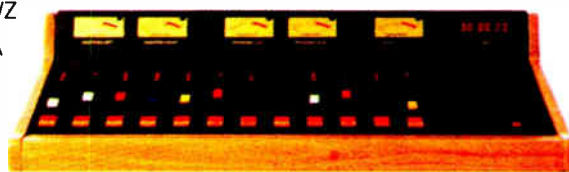
Mail or fax
your current label
and new address
(with effective date) to:
Circulation, RW,
PO Box 1214
Falls Church, VA
22041
or
FAX 703-998-2966.

Address changes
will be processed
within four weeks of receipt.

Thanks!



RS-Series Consoles from Radio Systems. 3m France 94.1 the Point Abilene Christian University Advanced Broadcast Systems AEI Music Network Albuquerque Public Schools Alderson-Broaddus College American Medical Association American Radio Network Amesi, Inc. Association Francophone D'Iqaliut Audio and Video Wholesaler Audio Broadcast Group B'nai B'rith Perlman Baruch College Beach House Studios Beacon Broadcasting Beaver College Boston University Bradley Broadcast Sales Brandeis University Branson Country Music Network Broadcast Supply Worldwide Broadcaster's General Store Bryant College Cable Radio Network Caldwell College Camp Ramah In the Poconos Camp Waban Capital Memorial Church Carnegie-Mellon University Cedarville College Central Texas College Central Virginia Educational Telecommunications Corp. Chapman College City of Louisville Clements Job Corps Center Cleveland Radio Reading Service College of Staten Island College of William & Mary Columbia College Columbia School of Broadcast Comco Broadcast Community School District 6 Compass Corporation CR Broadcasting Inc. Crouse-Kimzey Company De La Hunt Broadcast Group Defense Electronics Supply Dordt College Drexel University Bit Digital SA Eagle Rock Broadcasting Company East Stroudsburg University Eastern Kentucky University Eastern Montana College EIES of New Jersey Elon College Edinboro University Financial Broadcasting Network Florida's French Broadcast Network Full Compass Systems George Mason University George Washington University Gettysburg College Giesler Broadcast Goetz Broadcasting Corp Grace College of the Bible Greek Radio Harris Allied Haverford College Hawaii Library for the Blind Hispanic Radio Broadcasters Hofstra University Homewood-Flossmoor High School Illinois Eastern Community College Illinois Institute of Technology Independent School Dist #283 of Saint Louis Park, MN Indiana State University Iowa Radio Information Service Jack Straw Foundation Jarad Broadcasting Company Inc. Jersey City State College KAAK Radio KAAR Radio KAFE Radio KALV Radio KAQU Radio KAUS Radio KBCD FM Radio KBIU Radio KBLG & KRKX Radio KBMJ Radio KBOY Radio KBYR & KNIK Radio KCAL AM Radio KCBS & KRQR Radio KCCM Radio KCHX FM Radio KCNA Radio KCWD & KNWA Radio KDDR Radio KDOL Radio KECH Radio KEKB Radio KENI & KBFX Radio KERI Radio KEXS Radio Key Broadcasting KEYF Radio KEYV Radio KEZV & KOTA Radio KFAR & KWLF Radio KFBI Radio KFIA Radio KFUN & KLVF Radio KFXD AM & FM Radio KGA Radio KGEN Radio KGHF & KIDX Radio KGLM FM Radio KGMI & KISM Radio KGNZ Radio KGY Radio KHOT & KXM Radio KICO Radio KIDO Radio KIKR FM Radio KIOT Radio KIQK & KTOQ Radio Kirkwood Broadcasting Kirkwood Community College KJAV & KUBR Radio KJUN Radio KKBN Radio KKEY Radio KKGQ Radio KKHI Radio KLAV Radio KLBS Radio KLCE Radio KLFE Radio KLFX Radio KLRD Radio KLRZ Radio KLST Radio KLYT Radio KMAC Radio KMSL & KQDI Radio KNCY Radio KNEV & KROW Radio KNLR Radio KNNC Radio KOH Radio KOJJ Radio KOLM & KWWK Radio KOLR Television Kor-Us Community Broadcasting KORD AM & FM Radio KPCL FM Radio KPNT & WFXB Radio KPPL Radio KPRM AM & FM Radio KOEO & KMGA Radio KQNS Radio KQTP Radio KQTV Television KRCQ Radio KRKS Radio KRMD AM & FM Radio KROC Radio KROE Radio KROR Radio KRSA Radio KRSO, KDUO & KHTX Radio KRST & KRZY Radio KSGN Radio KSHA & KQMS Radio KSJN Radio KSJO & KSJX Radio KSPN Radio KSQQ Radio KSQY Radio KSVN Radio KTIG Radio KTLO AM & FM Radio KTOZ Radio KTPI & KVOY Radio KTPK Radio KTSR Radio KUBR Radio KUTY & KLKX Radio KVFX Radio KVML Radio KVNF Radio KWBR Radio KWEB & KRCH Radio KWOA AM & FM Radio KWSA & KCHQ Radio KXEQ Radio KXOK AM & FM Radio KXTZ Radio KXXZ Radio KYCR Radio KYRE & KSYC Radio KYUK Radio & Television KYYI Radio KZEN Radio KZKL AM & FM Radio KZPA Radio KZRR Radio KZSR Radio KZUL Radio KZYR Radio KZYX Radio Lafayette College Langston University Lansing Community College Laser 101 Radio LBS Broadcasting Lehigh County Community College Lincoln University Luther College Main Line Academy Manhattan College Manhattanville College Marketing Marc Vallee, Inc. Marywood College Maser Technology Group Ltd. Mcmanus Engineering Mercer County Community College Michael B. Productions Middle Tennessee State University Minot State University MNN Radio Networks Monmouth College More FM Morningstar Radio Network Morse Productions Mr. Gary Horn Nameloc Broadcasting National Religious Media Native Communications Nike Inc. North Carolina State University Northeast Broadcast Labs Northern Michigan University Northwestern College NSE National Satellite Net Oakwood Audio Oakwood College Ohio University Ozark Christian College Ozarks Public Television Pace Audio Services Platinum Music Point Loma Nazarene College Pratt Institute Purdue University Pyramid Broadcasting Radio Information Service Radio Korea USA Radio New Zealand Ltd Radio Santa Fe Ray Communications Rey-Cel Broadcasting Inc. Rhode Island College Richmond Unified Schools Ringling Brothers Roger Williams College Rose Communications Russian American Broadcast Saint Bonaventure University Saint Johns University Saint Lawrence University Saint Xavier University Santa Clara University SCMS SML Communicaitons Southern Connecticut State University Southern Methodist University Southwest Texas State University SPRL Infini Star Cablevision Stereo Mar Stereo Oriente Stonehill College SUNY College at Albany SUNY College at Geneseo SUNY College at Purchase Susquehanna University Taranaki Polytechnic Taylor University Technet Systems Group Temple University Tennessee State University The Kent County Public Schools The Praise Network Inc. Thin Air Investment Topaz Broadcasting Inc. Towson State University Transcom Corp. University of California (Riverside) University of Pittsburgh at Bradford University of Notre Dame University of Central Arkansas University of Hawaii University of Illinois University of Maryland University of Massachusetts University of Wisconsin Upsala College Ursinus College USS Independence Vincennes University Vincent Broderick Vision Broadcasting WAGW Radio WAKX Radio Walmart Stores Inc. WALV & WBAC Radio WANB Radio WANN Radio WARA & WWKX Radio WAYJ Radio WAYL FM Radio WAYM Radio WBBT & WLYU Radio WBDY Radio WBEL Radio WBIZ & WEUZ Radio WBTU Radio WBUX Radio WBVM Radio WCBA Radio WCBM Radio WCBR Radio WCBW Radio WCCK Radio WCEV Radio WCEZ Radio WCFL & WCSJ Radio WCHR Radio WCHZ Radio WCJO Radio WCKX Radio WCMB & WIMX Radio WCMR & WFRN FM Radio WCMT AM & FM Radio WCRA & WCRC Radio WCRB FM Radio WCRH Radio WDBA Radio WDFB Radio WDGY Radio WDNA Radio WDNH Radio WDNO Radio WDOOD Radio WDXL & WZLT Radio WZLZ Television WEEP & WDSY Radio WELS Radio WELY Radio WENY Radio West Georgia College Westchester Community College Western Broadcasting Services, Ltd. Western Carolina University Western Telephone & Data, Inc. WEVE Radio WEZQ Radio WEZX Radio WFDL & WDZZ Radio WFIW Radio WFON & KFIZ Radio WFPG Radio WFRT Radio, Inc. WFXS Radio WGCO Radio WGHT & WWIN Radio WGMI Radio WGNV AM & FM Radio WGRC FM Radio WGRX Radio WGTH Radio WGTS Radio WGUL Radio WGXL & WTSL Radio WHAT Radio WHBC Radio WHIT & WWQM Radio WHMP Radio WHP, WRVV & WKBO Radio WHRB FM Radio WHSN Radio WHVR & WYCR Radio WIBF FM Radio WIBU Radio WICN Radio WIDA Radio WILD Radio Wilkes University WIOZ Radio WIS Television WISM Radio WITV Radio WJAN Radio WJBX Radio WJCO Radio WJEZ & WPOK Radio WJIC & WNNN Radio WJJR Radio WJKE Radio WJLS Radio WKFX Radio WKGB Radio WKGF Radio WKHJ Radio WKID Radio WKLM Radio WKMY Radio WKSL Radio WKWT Radio WKXH Radio WKZV & WKEG Radio WLAB Radio WLGC FM Radio WLIX Radio WLJN Radio WLKI Radio WLSL & WAXM Radio WLTJ Radio WMAV & WNNS Radio WMMM Radio WMNF Radio WMRH Radio WMXY & WEIZ Radio WNCN Radio WNOI Radio WNNN Radio WNYE Radio WOBM FM Radio WOFM Radio WOGL CBS Radio WOLX Radio WOLZ Radio WOOF Radio WOUR Radio WPHE Radio WPMR AM & FM Radio WPSM Radio WOFE Radio WQGN & WSUB Radio WQLS Radio WQMT Radio WQWM Radio WRCA Radio WRDM Radio WRDR Radio WRFA Radio WRIC Radio WRIX Radio WROD Radio WROM Radio WRQK & WINW Radio WRVM Radio WRXK Radio WRYT Radio WRZK Radio WSEI & WVLN Radio WSHE Radio WSHQ & WSHZ Radio SHO Radio WSJD Radio WSKO Radio WSPY Radio WTAW Radio WTUZ Radio WTWZ AM Radio WTZE Radio WUBE & WDJQ Radio WUPE & FM Radio & Television WVNE Radio WVNU Radio Radio WWOC Radio WWQQ FM Radio WWRV Radio WXCO & WYCO Radio WXLC & WKRS Radio WXML Radio WXSR Radio WXTR Radio WXXK Radio WYTE Radio WYZM Radio WZBX & WSYL Radio WZZO Radio WZZR Radio Yeshiva University



RADIO SYSTEMS INC.

Almost 1000 broadcasters own one, 601 Heron Drive • Bridgeport, NJ 08014-0458 • (609)467-8000 • FAX (609)467-3044 recommend them, and buy another.

How to get surround sound without buying the theater...

Chase Technologies brings you an amazing new surround sound decoder that turns your stereo into a multi-channel home theater.

By Charles Anton

As much as I love renting videos, it's just not the same as seeing a movie in a theater. I remember the first time I saw *Jurassic Park*. I nearly jumped out of my seat when the dinosaurs roared. One of the reasons movies seem so real is because surround sound makes it seem like you're actually there when events are happening. Now there's an incredible new device that lets you use a stereo receiver to get that same surround sound in your home.

It takes more than four speakers to get surround sound; there needs to be a way of separating the signals. The new Chase Technologies HTS-1 decoder does just that, and in a revolutionary way that rivals the best Dolby Pro-Logic and THX systems.

Wins over critics. Gary Reber, editor and publisher of the most authoritative magazine on home theater systems, *Wide-screen Review*, stated, "...passive matrix decoders such as the new Chase HTS-1 work great as Dolby Surround™ extractors, and sound exceptionally natural when used for soundtracks and music."

Passive circuit. In 1972, legendary audio pioneer David Hafler invented a passive circuit to extract the "L minus R" difference

signals in stereo soundtracks. Because the circuit was patented, it was only available on expensive Hafler products. Now that the patent has expired, Chase can make this amazing decoding system available at a fraction of the cost of other systems!

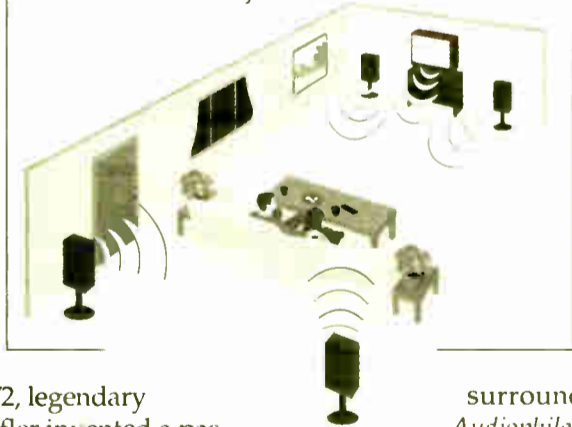
Breakthrough. The HTS-1 is able to decode the Dolby Surround™ signal in a videotape or Laserdisc because the spatial and depth cues have been matrixed into the "L minus R" portion of the two-channel stereo soundtrack. By decoding passively, the HTS-1 avoids costly and noisy signal processing. Plus you don't need any additional amps! Just connect the HTS-1 to your existing stereo system, add two speakers for the rear, and you'll experience the magic of home theater at a fraction of the cost.

Concert sound. The HTS-1 also decodes the ambience found in all music recordings. This sense of space, or "concert hall acoustics," is present in all CDs and cassettes, especially live recordings. John Sunier, the leading authority on

surround sound and producer of *Audiophile Audition*, a nationally syndicated radio program for audio

Surround sound has become the rage of the 90's because it adds depth and realism to stereo sound, giving you the home theater experience. It makes you feel like you're actually at a concert or theater. To "fill a room" with surround sound, you need more than two channels. The HTS-1 provides four channels of sound from any two-channel stereo source.

Free center channel. By connecting your VCR or Laserdisc player to your TV, you get sound from your TV speaker; this acts as the fifth or "center channel." Adjusting your TV's volume gives you as much or as little "center channel" localization as you desire, without extra speakers or amps. There are also no extra costs with the "fifth" channel. When used with the HTS-1, you'll have a true state-of-the-art five-channel system.



Passive. Chase Technologies' passive home theater system eliminates signal processing, yielding better clarity and detail. The effects sound amazingly real.

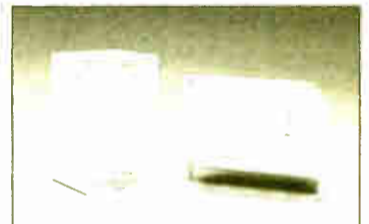


Active. All Dolby Pro-Logic decoders (even the built-in units) are active, meaning they decode and amplify the signal electronically. Noisy and expensive signal processing actually degrades the home theater experience. It's like putting a blanket over your speakers.



enthusiasts, says, "...the new Chase HTS-1, when used to decode the hidden ambience in all musical recordings, definitely outperforms all the Dolby and THX processors (which could cost you up to \$3,000)... I am impressed!"

Easy installation. Hooking up the HTS-1 is easy. Simply connect the speaker outputs of your receiver or amp to the HTS-1, then connect speaker wire to the front and rear speakers. The rear channel speakers don't have to be big. In fact, we recommend the Chase ELF-1 in either black or white finish to match your decor. They can be mounted with enclosed color-matched mounting brackets or can be flush mounted on the wall. They are also water and weatherproof; they can be used indoors or out.



Risk-free home trial. Let's face it—the best way to evaluate surround sound is in your home, not in a showroom. That's why we're offering this risk-free home trial. We're so sure you'll be delighted with the quality of these products and the surround sound experience that we are giving you 30 days to try them for yourself. If they're not everything we say, return them for a complete "No Questions Asked" refund.

HTS-1 Home Theater Decoder..... \$79 \$6 S&H
 Speakers designed by Chase for the HTS-1:
 ELF-1 Rear Channel Speakers\$99 pr \$6 S&H
 Please mention promotional code 117-RW-1103
For fastest service call toll-free 24 hours a day



To order by mail, send check or money order for the total amount including S&H (VA residents add 4.5% sales tax.) Or charge it to your credit card, enclosing your account number and expiration date.

COMTRAD INDUSTRIES

2820 Waterford Lake Drive Suite 106
 Midlothian, Virginia 23113

Running Radio

Top 10 List of
Interview
Questions,
See p. 24

Your Resource for Business, Programming & Sales

Time Machine Travels with '60s Sound

by Alan Haber

DALLAS The sound is awfully familiar, and, well, comfortable, like a pair of old slippers or a well-worn bathrobe. Of course, you cannot wear the sounds that barrel out of the mists of time, thanks to Ricky the K's Solid Gold Time Machine, but you can be transported back to a time when music was something altogether different than it is today.

Nostalgia? No. Oldies? No, again. Richard Kaufman, the aforementioned Ricky the K, who pilots the Solid Gold Time Machine, a program he is gearing up to distribute by satellite, does not use those words. He simply invokes feelings as he recreates the sounds of sixties radio that tug at the heartstrings of many baby boomers.

Latent nostalgia

While on the air on Saturday nights with the first incarnation of the Solid Gold Time Machine at KOMA(AM) in Oklahoma City, Kaufman said he discovered that a lot of people care about sixties radio and really miss it. Ricky the K, in fact, missed it, too.

He loved radio as a kid, growing up in

Engineering The Time Machine

Kaufman said the audio chain for his Solid Gold Time Machine program authentically recreates the sound of mid-sixties WABC(AM) New York, but with CD-quality audio. The dense, warm sound of the show is made possible because of what is in the audio chain: each channel has 31-band equalization with a unique EQ curve, plate reverb, and vacuum tube compression and limiting.

An RCA 77-DX ribbon microphone helps complete the audio picture. Kaufman said that, when developing the engineering scheme for the Solid Gold Time Machine, he put an equalizer in the microphone processing chain, and gave it a 2 dB boost at 9,000 cycles and a 4 dB boost at 12,500 cycles. This gave the RCA microphone, which already exhibits a warm bass response, some high end that the microphone itself does not inherently have. For compression, Kaufman is using a pair of capacitor-refitted Teletronix LA-2A compressor limiters, which were made between 1964 and 1969.

Livingston, N.J., where he was friends with the son of Nick Massi, bass guitarist and bass singer in the Four Seasons. He was surrounded by musical signposts as a



Ricky the K pilots the Solid Gold Time Machine.

kid—songwriter Irwin Levine, who wrote "This Diamond Ring" for Gary Lewis and the Playboys and "Tie A Yellow Ribbon Round the Old Oak Tree" for Tony Orlando and Dawn, lived in Livingston. Then there was Carole King, who lived about a mile and a half from Kaufman on a street in West Orange, N.J. called Pleasant Valley Way, where she wrote (with Gerry Goffin) a song for the Monkees called "Pleasant Valley Sunday."

Kaufman loved, and continues to love, music—just about any hit record released between the years 1955 and 1971. And do not forget his favorite radio stations—New York's WMGM, WINS, and, of course, WABC and WMCA. "Probably my earliest influence was listening to Ted Brown and the Redhead doing morning drive on WMGM," he said. What really "made it for me," he added, "was Dan Ingram," the legendary WABC (now WCBS-FM in New York City) disc jockey.

Ingram had the qualities that Kaufman counts as "critically important... For me to like a disc jockey, he has to be uptempo, happy, and be able to do humor. And he has got to be able to do the humor... quickly, and keep the elements moving."

Kaufman's other big influence, in addition to hearing Rick Shaw on WQAM in Miami during Christmas trips there with his grandparents, was the man whom he says taught him radio, Barney Pip on WCFL in Chicago.

Well-traveled road

Kaufman's radio career is not unlike that of many disc jockeys who have toiled on the airwaves. He worked at a small station in Indiana, and at WFOM in Marietta, Ga. He also worked at WNUE in Fort Walton Beach, Fla., an experience he remembers fondly because, among other plusses, the station was running reverb on the air and PAMS jingles (as were several of the other stations at which he worked).

The process of redefining Kaufman's Solid Gold Time Machine as a satellite-distributed program began when he left KOMA in 1992. He said he used KOMA

"as a laboratory for two and a half years, figuring out how to recreate sixties radio, whether you could actually do it and do it without a board engineer, do it as well as WABC did, and I figured out that you can."

Around 1983, Kaufman said he and his partner began the process of "obtaining the rights" to the PAMS copyrights, trademark and tracks. For Kaufman, the PAMS jingles he had come to love helped to define the sounds of sixties radio epitomized by the Solid Gold

Time Machine. Since then, Kaufman's company, PAMS Productions, has been producing recreations of the original PAMS jingles, sung by many of the people who sang the original incarnations, for oldies, big band and pop stations around the world.

These stations include WCBS-FM in New York City; WHAS(AM) in Louisville, Ky.; KOMA in Oklahoma City; CHUM in Toronto; Viking Radio in London; and Downtown Radio in Belfast, Ireland.

Kaufman is currently working with marketers to shop the Solid Gold Time Machine, which is designed to air four hours, five nights a week, to stations looking for a unique show targeted to listeners who love great music and the sound of sixties radio. A digital Ku-band satellite uplink has been installed at the PAMS Radio Network studios in Dallas by NSN Network Services that also will be offering receiver packages to stations that need them. Stations that pick up the show can expect to pay "a small monthly fee," according to NSN.

continued on page 32 ►



Is Your News Feed Eating Away Your Profits?

United Press International's radio network is substantially less expensive than your current news feed!

How? For starters, UPI has no required packages. You pay for only the programming you need. With UPI you're never charged for special events coverage. And, UPI has no multi-year contracts.

UPI offers news 24 hours a day, sports 16 times a day, and business all day long, including morning reports live from London, all without network commercials. We also have the industry's widest variety of one-minute features that are topical, timely and keep listeners interested.

Call now to find out how much you can save by gaining the UPI advantage.

UNITED PRESS INTERNATIONAL
UPI
**(800)
503-9993**

Circle (208) On Reader Service Card

PROMO POWER

Top 10 Questions for Promotion Hires

by Mark Lapidus

WASHINGTON When he told me he was "too busy" for an assignment, I knew I had hired the wrong person for the assistant promotion director position. He should have known better; he had held the job for several years at another radio station.

He was lacking an important key to success in radio promotion: constant adjustment of priorities. Could this person be taught? Possibly. However, had I conducted the job interview by posing the proper questions, I would have discovered this flaw and

addressed it prior to hiring him.

Although this article is written for those who do the hiring of promotion people, I urge those on the job to consider these elements against their own performance. Here's a top ten list of questions for potential promotion hires.

- What is the most successful promotion you have been involved with and what made it so terrific? The answer should reveal exactly what the person interviewed thinks was important about the promotion.

I recently had a candidate tell me the most exciting promotion she was involved with was an Aerosmith concert.

She thought it was great because she met a member of the group and the show was sold out. How did the station benefit? She replied that it sounded great when the DJs talked about the show.

Get the point?

As I questioned her further, she revealed that the station had no signage at the concert, gave away no tickets on air, had no presence on stage, and conducted no interviews with the band. She was not even certain if the station had carried commercials for the concert.

Obviously she had not learned that if a

promotion does nothing to generate ratings or revenue, it does not count for much.

Radio lingo

- Can you explain cume and time spent listening? OK... if you are hiring a promotion assistant to hang up banners and drive the van, this question may not be vital. However, you have hit a large pothole if a promotion director candidate does not know what the terms mean. Even an assistant promotion candidate should have at least heard the terms and be interested as to how they affect ratings and revenue.

- Pretend our budget is unlimited. How would you suggest we increase listening to the station? Probe for two basic concepts: promotion outside the station using TV, billboards, print, direct mail; and

continued on page 30 ▶

Running Radio Marketplace

A Supermarket of Radio Station Services

For information on the services shown below, circle the Reader Service number on the enclosed card or contact the advertiser directly.



CUSTOM COUNTRY MUSIC CD LIBRARIES

NO MORE BUYING EXPENSIVE "GENERIC"
MUSIC LIBRARIES.
PICK THE SONGS YOU WANT

DCproductions
1-800-789-3472

FOR DEMO CALL
912-872-8111 OR
912-246-1100



TIME, TEMPERATURE & WEATHER COMPUTER

A REAL REVENUE BOOSTER
FOR YOUR STATION

THESE ARE ACTUAL
SYSTEMS MAKING
\$990 EACH PER MONTH!

Reader Service No. 87

"I have long recommended Rules Service Company... to client stations. It has proved to be reliable and reasonably priced."

Barry Mishkind, Radio World Magazine

FCC Rules on Disc

- Featured in & endorsed by *Radio World*
- Acclaimed **Pick Hit** at '91 NAB by *Broadcast Engineering*
- Uses **Folio VIEWS 3.01**
- Redlining** indicates new & obsolete material
- Effective dates** indicated in "Pop-Up" notes
- "Jumps"** link different Sections & Parts of rules
- Convenient **search & backtracking** capabilities
- Bi-monthly revisions for a year included in subscription price
- Parts sold individually
- Available in windows & DOS versions

Rules Service Co.
Legal Publishers Since 1950

301-424-9402 (Tel), 301-762-7853 (Fax)
7615 Standish Place, Rockville, MD 20855 8:00-3:30 EST

Reader Service No. 177



COUNTS DOWN COUNTRY'S TOP 40

THE NASHVILLE RECORD REVIEW, HOSTED BY LORIANNE CROOK AND CHARLIE CHASE OF TENN'S MUSIC CITY TONIGHT, IS ONE OF RADIO'S FASTEST GROWING COUNTRY COUNTDOWN SHOWS.

A FOUR-HOUR WEEKLY SYNDICATED RADIO PROGRAM PRODUCED ON COMPACT DISC.

FOR MORE INFORMATION CONTACT

EAST: FRANK IACONA,
(203) 965-6217
WEST: CRAIG CHAMBERS,
(303) 771-9800

Reader Service No. 200

Attention Advertisers!

Reach **22,000+** broadcast professionals. RADIO WORLD's **Running Radio Marketplace** provides a perfect medium for test marketing your products and services. It's an efficient, effective and affordable advertising option!

For more information, including rates and deadlines, Fax **Christopher Rucas** at

1-703-998-2966

or Call **1-800-336-3045**



Dynamic Deals on Dynamax

**Dynamax DCR1000
Buy 3 players for \$8925
Get a FREE Record Module
worth \$2500**

**Plus
FREE
Federal
Express**

**Dynamax MX Series Consoles
IN STOCK NOW at Harris Allied
Call for Special Pricing**



Whether you need digital cartridge machines or modular audio consoles, Fidelipac and Harris Allied have the best of the best available now at great prices, in stock and ready to ship Federal Express at no charge to you. Now, that's a deal.

It gets even better. You can reduce your operating costs by using the DCR1000 Series. Thanks to its durable, maintenance-free design and use of standard 3-1/2" floppy disks to store high quality digital audio. And, over five minutes of 15kHz stereo audio on each 13 MB floppy disk.

The DCR's simple cart-like operation requires little or no training. The player has only three front panel buttons — START, STOP and CUE. START and CUE are literally instantaneous.

There is nothing to clean or align and no adjustments to make. The disk drive provides over 30,000 hours of service, can be replaced in 15 minutes, and costs less than a set of tape heads.

The MX Series Console offers the quality you demand, all the features you need, and a price you can afford.

Make no compromises. The MX Series is truly modular. Each input module includes all

of the active circuitry necessary for its operation. Its motherboard has no active electronic components, so you'll never have to disassemble the entire console to replace a single component. Other consoles claim to be modular. The MX Series truly is.

You get the highest quality components and construction in the MX Series. Available in 6 to 18 channels.

Even the call is free.

1-800-622-0022

Fax 317-966-0623

Southern CA 1-800-690-2828

 **HARRIS
ALLIED**

Why is DIGILINK the Hard Disk System for

Because ...

- **Over 1,000 Workstations have been sold**
Customers come back again and again !
- **Digilink replaces ALL tape equipment- carts, reels, etc.**
use it for Live On Air, Production, and Automation !
- **Digilink saves money every day**
No carts to lose, jam, or destroy
No routine maintenance, no heads to adjust, no cleaning
No carts to replace when a hard disk lasts an average 15 years
No reel tape to replace because you cut & splice electronically
- **Digilink costs less than tape equipment.**
The average Digilink with 10 hours of stereo storage is under \$8,000
The \$8,000 list price includes 600 one minute carts worth of storage
That means a Digilink is a \$5,500 machine with \$2,500 in media
- **Our Gemini Live On Air pushbutton control puts carts at your fingertips**
for fast On Air operation, every jock can even have his own set of carts
- **Digilink performs 8 channel multitrack editing for under \$2,000 !**
-or- use our stand alone Trak*Star multitrak Editor for under \$6,000 !
The only multitrack radio editor that can provide 100% On Air backup !
- **Network News, Production, Air, and even Traffic... over 15 studios !**
to transfer audio, text, & schedules in perfect digital on our network

#1 IN
STUDIO
FURNITURE

#1 IN
AUDIO
CONSOLES

#1 IN
DIGITAL
AUDIO



Dynamic Deals on Dynamax

**Dynamax DCR1000
Buy 3 players for \$8925
Get a FREE Record Module
worth \$2500**

**Plus
FREE
Federal
Express**

**Dynamax MX Series Consoles
IN STOCK NOW at Harris Allied
Call for Special Pricing**



Whether you need digital cartridge machines or modular audio consoles, Fidelipac and Harris Allied have the best of the best available now at great prices, in stock and ready to ship Federal Express at no charge to you. Now, that's a deal.

It gets even better. You can reduce your operating costs by using the DCR1000 Series. Thanks to its durable, maintenance-free design and use of standard 3-1/2" floppy disks to store high quality digital audio. And, over five minutes of 15kHz stereo audio on each 13 MB floppy disk.

The DCR's simple cart-like operation requires little or no training. The player has only three front panel buttons — START, STOP and CUE. START and CUE are literally instantaneous.

There is nothing to clean or align and no adjustments to make. The disk drive provides over 30,000 hours of service, can be replaced in 15 minutes, and costs less than a set of tape heads.

The MX Series Console offers the quality you demand, all the features you need, and a price you can afford.

Make no compromises. The MX Series is truly modular. Each input module includes all

of the active circuitry necessary for its operation. Its motherboard has no active electronic components, so you'll never have to disassemble the entire console to replace a single component. Other consoles claim to be modular. The MX Series truly is.

You get the highest quality components and construction in the MX Series. Available in 6 to 18 channels.

Even the call is free.

**1-800-622-0022
Fax 317-966-0623
Southern CA 1-800-690-2828**

 **HARRIS
ALLIED**

Why is DIGILINK the Hard Disk System for

Because ...

- **Over 1,000 Workstations have been sold**
Customers come back again and again !
- **Digilink replaces ALL tape equipment- carts, reels, etc.**
use it for Live On Air, Production, and Automation !
- **Digilink saves money every day**
No carts to lose, jam, or destroy
No routine maintenance, no heads to adjust, no cleaning
No carts to replace when a hard disk lasts an average 15 years
No reel tape to replace because you cut & splice electronically
- **Digilink costs less than tape equipment.**
The average Digilink with 10 hours of stereo storage is under \$8,000
The \$8,000 list price includes 600 one minute carts worth of storage
That means a Digilink is a \$5,500 machine with \$2,500 in media
- **Our Gemini Live On Air pushbutton control puts carts at your fingertips**
for fast On Air operation, every jock can even have his own set of carts
- **Digilink performs 8 channel multitrack editing for under \$2,000 !**
-or- use our stand alone Trak*Star multitrak Editor for under \$6,000 !
The only multitrack radio editor that can provide 100% On Air backup !
- **Network News, Production, Air, and even Traffic... over 15 studios !**
to transfer audio, text, & schedules in perfect digital on our network



DIGILINK

Hard Disk Digital Audio Workstations

#1 Selling
for Radio ?



We are #1, because we are leading the way...

With over 1,000 workstations sold, Digilink is by far the #1 digital audio system for live On Air radio, Production, and Automation. Digilink has achieved this unique success because it is easier to use, does much more, and costs less than any other digital product on the market today.

Digilink does more than other systems because of its abilities in On Air with live, CD, & satellite; in production with its multitrack editor; and in news with text. This makes it so that a Digilink workstation can be placed in each studio of your station to replace cart machines, reel machines, CD players, and often even consoles. At an average price of under \$8,000 per studio, Digilink is actually less expensive than the tape equipment that it replaces while giving you CD quality audio performance, an average media life of over 15 years, and equipment that requires no routine maintenance. You can even create a digital highway around your station by connecting all of your Digilink workstations and scheduling computers on our digital network to transfer audio, text, and schedules in perfect digital between studios.

With its ability to *simultaneously* record, play, crossfade, and network transfer, a single Digilink workstation can do all that is required for recording and playback for an entire studio. It is literally a studio in a box. It can be crossfading out of a CD into a hard disk song, dropping a hard disk jingle over the middle of the crossfade, recording a network audio feed for later playback, and receiving a new spot over the network from the production workstation. Digilink is the complete digital solution to your radio station's studio needs.

To create a *professional* digital broadcast solution you can't simply buy a digital audio board and IBM PC computer. Therefore, Arrakis builds our own DSP board; SCSI board; I-O board; audio routing switchers; video switchers; and modular, broadcast quality cabinets. This makes Digilink remarkably powerful with radio specific features such as digital crossfade and Trak*Star multitrack editing. This also reduces cost so that we are able to sell Digilink for as little as 1/2 the price of other products which have to buy less powerful cards and mark them up. Perhaps most importantly, building Digilink ourselves assures you of long term customer support from a single *broadcast* source. With Digilink, you don't have to be a computer expert, because we are.

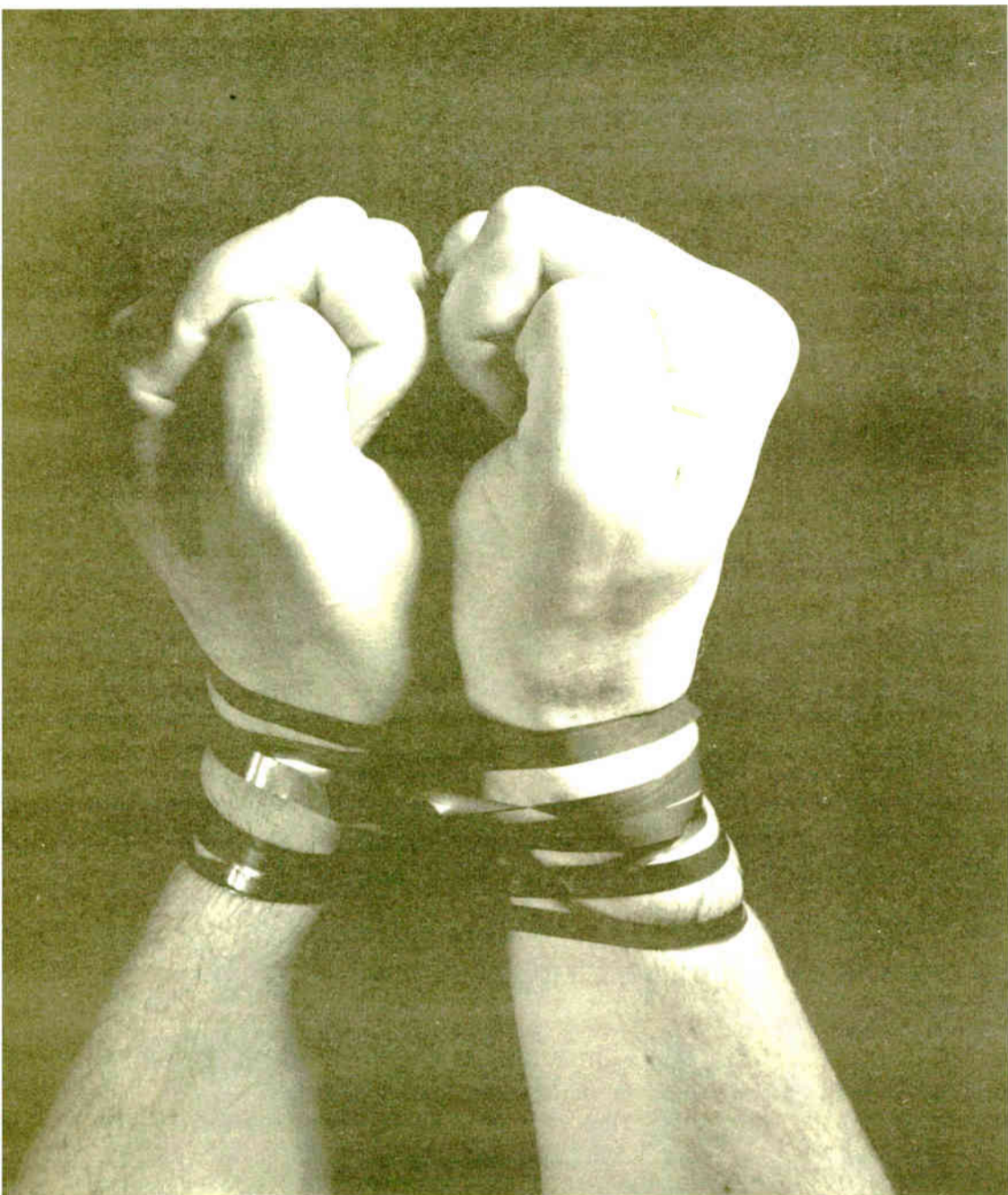
Whatever your studio needs- to replace a cart machine, add a new production studio, or add some level of automation, Digilink can do the job. Put a Digilink in one studio today, another next year, add a scheduling computer and network, and you will eventually discover that you have painlessly gone digital one step at a time. There is no question that Digital audio is here *TODAY*- it improves your sound, speeds your production, increases your reliability, and reduces your costs. Call and find out why Digilink is #1 and why customers come back again and again: customers like the United States Air Force who have selected Arrakis Digilink, consoles, and furniture for all of their radio stations worldwide.

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

arrakis
SYSTEMS INC.

2619 Midpoint Drive, Fort Collins, CO. 80525
Voice- 303-224-2248, Fax- 303-493-1076

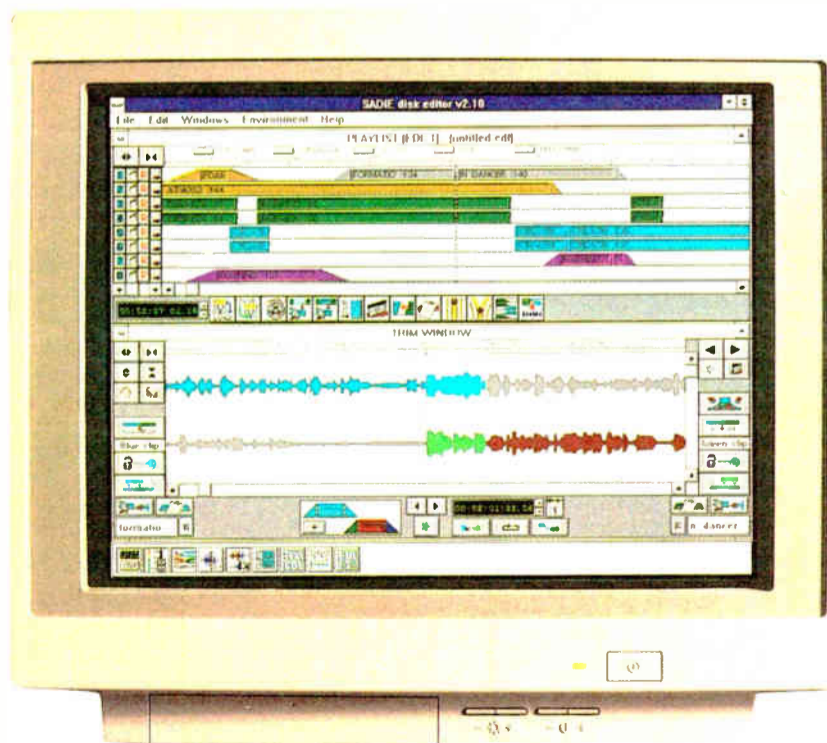
TIED TO THE JOB?



But have you ever thought about professional digital audio editing? Too slow? Too expensive? Difficult to understand? SADiE™ Disk Editors have changed all that. For a start SADiE™ runs on a PC, so you get much more computer for far less money. It has a fully functional Windows user interface, non-destructive sample accurate editing, real time cross fades with real time automated digital mixing, bounce down, overdub, EQ and dynamics control. And real time-saving.

SADiE™ Disk Editors have sold worldwide into broadcast, post-production, studios and mastering organisations. They have already been really put to the test out in the field and our existing customers will be pleased to see some of their suggestions in SADiE™ Version 2.2. The SADiE™ Disk Editor is just \$9,995* for a complete turnkey system, to include a 486/66DX PC, 2.0 Gbyte SCSI drive, 2 in: 4 out SADiE™ (digital/analog/SMPTE timecode support) and breakout box. Software updates are free for the lifetime of the product and there are *no hidden software extras*. It's all included in an honest straightforward price.

Tied to the job or just tired of the job - why not free up a couple of minutes today and phone or fax for some information.



Windows 3.1* on 486/66 host computer

Rapid graphical editing

Clear user interface

Fully non-destructive, sample accurate editing

Creates edits while recording

All crossfades calculated in real-time

Log and shuttle scrub modes

Unique Trim Window allowing real-time adjustment of audio

Real-time automated mixdown..

.. Bounce down

.. Dynamics control

.. EQ

.. Digital resampling

.. Time scrunch

.. Noise reduction

.. Overdub

.. Reverse playback

AES/EBU, SPDIF and balanced analog I/O

All standard sample rates

Full SMPTE timecode support with chase and trigger lock



Studio Audio Digital Equipment Inc
1808 West End Avenue
Suite 1119
Nashville, TN 37203
USA
TEL: 615 327 1140
FAX: 615 327 1699

Circle (28) On Reader Service Card

SADiE™ DISTRIBUTORS WORLDWIDE

Argentina Kappa T 081 31 0818 F 081 31 1493 • Asia Pacific VW Marketing T +44 372 728481 F +44 372 724009 • Australia TVC T 09 249 6688 F 09 249 6858 • Canada JSGS Ltd T 416 751 7907 F 416 751 7975 • Denmark SC Sound T 43 99 88 77 F 43 99 80 77 • Finland oy HedCom AB T 90 682 866 F 90 682 8489 • France Coach Audio T 87 77 00 00 F 87 77 01 21 • Germany Stefan Mayer Audio Engineering T 0 6851 6519 F 0 6851 6519 • Hong Kong/China Digital Professions Ltd T 852 318 0588 F 852 305 1455 • India Sound Team T 22 801 3275 F 22 861 9677 • Israel Sontronics Electronic Equipment T 03 5705223 F 03 6199297 • Japan Otartec T 03 3332 3211 F 03 3332 3217 • Korea Avix Trading Co. Ltd. T 02 565 3565 F 02 565 3561 • Netherlands JTM T 035 233 448 F 035 247 649 • New Zealand Videx T 09 444 6085 F 09 444 3837 • Philippines Tracks T 2 631 3277 F 2 631 3267 • Poland Unico T +44 223 63025 F +44 223 301488 • Russia Triarios T 095 909 5773 F 095 909 0501 • Singapore/Malaysia/Indonesia Edit Point T +65 338 1826 F +65 337 7156 • South Africa Tru-fi Electronics SA (Pty) Ltd T 011 462 4256 F 011 462 3303 • Spain Lexion T 93 203 48 04 F 93 280 40 29 • Sweden Tranzicom T 08 730 3710 F 08 730 5125 • Switzerland Media Solutions T 064 41 57 22 F 064 41 00 35 • Thailand KDM Trading T 2 318 2724 F 2 318 6186 • UK Studio Audio & Video Ltd T 01353 648888 F 01353 648867 •

* Windows is a registered trademark of Microsoft Inc. † Plus local taxes, duty and delivery where applicable. Studio Audio & Video Ltd reserve the right to change specifications without notice.

World Radio History

Custom Build Your Own Cable Checker

► continued from page 12

would need to be $P = I^2 \times R_x$, so $.022 \times 525 = .21$ watts. Because the LEDs are used intermittently, a quarter watt unit will suffice.

Any box or housing will work fine. The one I built has a wooden frame and a masonite front panel. I used XLRs, two and three-circuit phone plugs, a bantam, longframe, and phono, all in parallel. My layout has a line of connectors down one side, the switches and lamps in the middle, and an identical layout—with the exception of the XLR genders—down the other side.

Can't get into it this time, but we can learn some capacitor operation by looking at our multivibrator circuit. If you placed an oscilloscope on the base of one of the transistors, which of the waveforms of Figure 3 would you expect to see?

If you selected C you are absolutely right, and you are dismissed. Otherwise, read on.

Generally, there are two stages of any oscillator or multivibrator. I call them the startup stage and the running stage. At startup, for our circuit, both transistors are provided forward bias by R1 and

up interval is always shorter than the running interval; the first capacitor is uncharged, and has only to begin charging from zero instead of -9 later in the cycle.

So the charging and discharging continues, lighting first one LED then the other. The cycle is determined by the time constants of C2-R1, and C1-R2. You can make this RC anything you want. With the values shown, our circuit alternates about each 500 milliseconds.

By installing Q1 in a male XLR connector, it can be plugged into one end of a suspected cable, and the rest of the circuit, in a minibox, into the other.

Be aware that lengthy cables will not check reliably in this circuit, since the multivibrator has a tendency to quit if too much resistance is inserted in the base and collector leads.

Otherwise, if the LEDs alternate, the cable is good. If only LED 2 is on, one or more of the cable conductors is open. If LED 1 is on constantly, one or more conductors are shorted together.

A 2-inch x 2-inch x 3-inch minibox provides ample room for the two LEDs, the test switch, an XLR connector and the 9V battery. After mounting the transistor in the XLR cable connector, the hole can be plugged with RTV or a grommet.

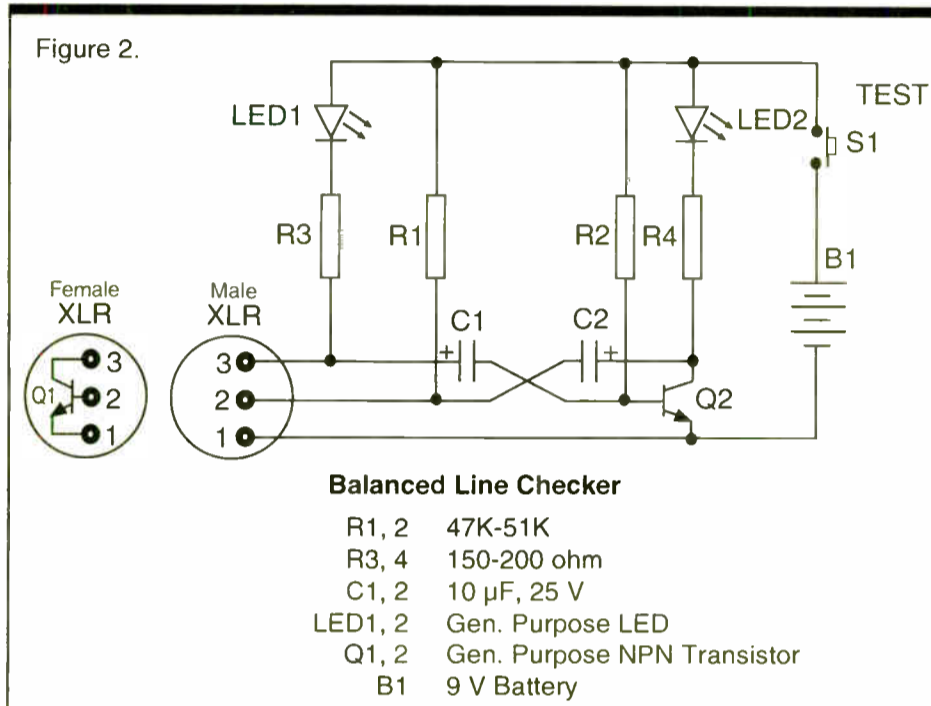
Toss this one in your toolbox and take a second to check each microphone cable as you lay it out for use. You'll be paid back tenfold for your time.

□□□

Jim Murphy is director of engineering for the West Virginia Radio Corporation. He can be reached in care of RW.

Attached testing

This, as I stated earlier, makes it easier to check a cable whose ends are far apart.



Although I use a power supply, a few flashlight cells would make the unit handier and portable.

One of the drawbacks of this checker is that you need both ends of the cable at the tester. With loose cables, this is no problem, but in the case of bundled or hidden cables, the checker in Figure 2, albeit limited, might be more useful.

Capacitors

Multivibrators have been around almost as long as I have, and there are many variations on them, the simplest of which is shown in the schematic. This circuit has some intriguing features for being as simple as it is, and demonstrates a capacitor scenario which our young readers and those just learning electronic theory might find fascinating.

Capacitors are one of the more impressive creatures in our electronic forest.

R2. Both begin conducting, but one always works a little faster, runs just a tad quicker, and beats the other to full conduction.

Suppose Q2 wins the race. C2's positive end, connected to the Q2 connector, is brought near ground, and this near-zero voltage is placed onto Q1's base, momentarily removing the bias from that transistor and turning it off. (Remember, an uncharged capacitor is equivalent to a short.)

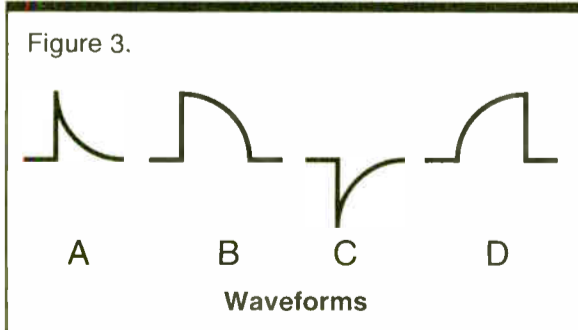
How it works

Q2 is now conducting, LED2 is "on," and LED1 is "off." What is happening in the circuit at this time? Glad you asked. Well, C2 is charging (backwards) via R1 toward the supply. This means that soon the base potential at Q1 will be enough to break into conduction, and Q1 will turn on. When this happens, things get interesting. Keep in mind that when Q2 is conducting, C1 is also charging through R3, and takes on a charge of positive toward the supply.

Now, back to Q1. When Q1 gets enough base current, it turns on, and its collector voltage drops to near zero. This little move has the effect of essentially grounding the positively-charged end of C1. Relatively speaking, the other

plate of C1 becomes about -9V with respect to common. This turns off Q2 with a vengeance.

After this, things get a bit repetitive with C2 now charging backwards while C1 comes up through the negative region, crosses the zero line, and begins charging positively. This is why the start-



and arguments are always at the ready when discussing what would happen if you could disassemble one and reassemble it without any leakage. Would its charge remain? If so, where does the charge reside? And what about distorted orbits, and how does this work in a vacuum type, hmmm?

Who needs the

Dividend

Composite Filter?

every

FM station

that

- Has subcarriers for RBDS, data services, or other applications, especially when those subcarriers generate revenue
- Uses a microwave STL
- Includes composite clipping in their processing
- Wants to regain lost modulation
- Seeks to reduce multipath related distortion

The Dividend Composite Filter reduces noise often generated by audio processing and STLs in the upper composite spectrum from 53kHz to 99kHz. Now you can protect your subcarrier signals, regain lost modulation, reduce multipath related distortion, and maintain signal integrity for only \$1195.

the dividend

composite filter

CUTTINGEDGE

2101 SUPERIOR AVENUE, CLEVELAND, OHIO 44114 • TEL: (216) 241-3343 • FAX: (216) 241-4103

STATION SERVICES

News and Services for Business, Programming and Sales

NHL Recap Show

DALLAS Former New York Islander Defenseman, Dennis Potvin, will host a weekly NHL recap show titled "Slap Shot" on Prime Sports Radio. "Slap Shot" currently runs three times each Monday at 7:13 a.m., 9:13 a.m., and 5:13 p.m.

Potvin, who is the color analyst for the Sunshine Network's broadcast of the Florida Panthers' games, will bring his unique perspective on the ins and outs of the NHL. Potvin's five-time selection to the NHL's All-Star Game and his vital role in four Stanley Cup Championship teams make "Slap Shot" both entertaining and informative.

"Slap Shot" is available to affiliates on a cash basis.

For information, contact Christal Aycock at 214-401-0069; or circle **Reader Service 170**.

Formats Available from Identity Programming

WARWICK, R.I. The long-awaited "A.C. Jazz" and "A Touch of Class" formats are now available from Identity Programming. The A.C. Jazz format includes adult contemporary vocals mixed with popular instrumentalists like Kenny G., Bob James, and David Sanborn.

A Touch of Class is an updated version of the old Big Band format, featuring

new artists like Natalie Cole, Harry Connick Jr., and George Benson.

For information and a demo, call Steve Bianchi at 401-461-6767; or circle **Reader Service 215**.

Daily Technology Update

CONCORD, Calif. "Focus on Technology" is a daily two-minute feature covering technology issues of most interest to your listeners: computers, sports, consumer products, business, entertainment, medicine, new products and innovations, medicine, terminology and more.

"Focus on Technology" is a 90-second segment with a 30-second commercial spot built-in. It is produced on compact disc and will be available late summer or early fall 1995 on a barter basis.

For information or a demo, call John Bondon at 800-383-5408; or circle **Reader Service 96**.

The Next Music Format?

BINGHAM FARMS, Mich. With modern rock programming becoming the next CHR, it is hardly surprising that people are beginning to look for the next music format. The Rialto Group, Ltd. is offering The Torch to fill this need.

A byproduct of the Rialto Group's research and experience in working in the modern rock field, The Torch is designed

to fill an unexplored niche in radio markets: a hip, well-positioned, high-end Adult Contemporary "escape button" for CHR/AOR listeners dissatisfied with the current options.

The Torch draws listeners from a variety of formats, including AC, AOR, NAC, modern rock, CHR, jazz and oldies.

Targeted at the 25-49 audience, skewed female, with the median listener an upscale 37-year-old woman, The Torch is positioned as a hip, urbane option for listeners seeking a break from hard rock and CHR.

The Torch can be as hip as modern rock, but without the harder, unfamiliar sounds typical of other stations. As cool

as a jazz station, just without the obscure instrumentals. As accessible as an AC, but without over-playing the Mariah Careys, Michael Boltons and Neil Diamonds.

With The Torch, it is the song, as opposed to the artist, that defines the format. It includes a wide spectrum of music, with artists ranging from Frank Sinatra, Louis Armstrong, Roxy Music and Marvin Gaye to Patsy Cline, Sarah McLaughlin, Harry Connick Jr. and Joe Jackson.

For information, contact Lex Kuhne in Michigan at 810-644-8480; fax: 810-540-2661; or circle **Reader Service 156**.

Ten Questions for Promotion Hires

► continued from page 24

promotion on your own air, using contests, hiring unusual talent or staging unique programming. ➤

- Have you ever purchased (or traded) media to promote either radio or some other product? Those who say "yes" will talk about successes and failures. These stories will permit further insight into their thinking. Those who say "no" should not be judged too harshly. It may be that previous companies had no budget for outside promotion.

If a budget did not exist, paint a scenario of unlimited money and find out how he or she would spend it on media.

Also ask...

- Here are several questions about our radio station:

What is our target demo? For assistant director candidates who have never been in radio, cut them some slack. Let them guess within a few years. However, someone with any radio background should know your exact targets for age and gender.

What do you think are the most important events and activities for our listeners in this city? Give him or her a "B" if he names your major annual promotions. Move him or her up to an "A" if he is able to name yours and add a few that you don't own, but should. Give him or her an "A+" if he also is able to steal or obtain a major event that you should be doing.

Can you name a few of our DJs? This will determine his or her previous level of interest in your station.

Do you have relationships with anybody in the market that will be helpful in this new position? This could be the question that breaks the tie between two good candidates. If answers are fairly equal on other questions, you'll want the person with the most contacts on your side. He or she may even throw a few names at you of people you know. This will help you go beyond a supplied list of references. The kind of contacts they think are important says a lot about their priorities.

Who are our two main competitors? What do they do better than we do? Again, this indicates market awareness and personal focus.

Ask for self-assessment

- Do you consider yourself a creative person? Those who do should give examples of their creativity. Those who do not should explain how they function in what many people consider a "creative" position.

- How do you handle multiple priorities? Someone who does this well will tell you about systems: compilation of lists, calendars, files and computer programs. Now is your chance to find out what he or she does when tossed an assignment that pushes his or her agenda over the edge. Does he readjust or "just say no"?

- What do you want to be doing in two or three years? Long-term goals will drive them in this job. It will help you determine whether or not they are selecting the right stepping stone to continued happiness.

Finally, don't ignore the obvious. Tardiness, bad resumes and an inability to converse fluidly speak volumes. Those who follow up with thank-you letters, phone calls and support materials deserve a second look. And a note to candidates: don't wait for openings to be posted to express an interest in a position. You never know when you'll be in the right place at the right time... and perhaps you'll be just the one they're looking for!

□□□

Mark Lapidus is director of marketing for Liberty Broadcasting. Liberty owns stations in Washington, Baltimore, Richmond, Va., Long Island and Albany, N.Y., as well as Hartford, Conn., and Providence, R.I. It recently launched the Wolfman Jack Show on a national network.

STATION/STUDIO SERVICES

427 SOUND EFFECTS
\$89.00

For a 5-CD set with a 30-day money-back guarantee.

Take an extra \$10 off if you mention this ad!

Send \$79 to Ghostwriters
2412 Unity Ave. N., Dept. RW
Minneapolis, MN 55422

For credit card orders call
(612) 522-6256

READER SERVICE 42

Save Money
Be Legal

Have your EBS Equipment modified for the New Short Tone

We're the
SHORT-TONE SPECIALISTS

- ✓ All makes, all models
- ✓ \$75 pre-paid includes Decoder and switchable Encoder mods.
- ✓ Return Shipping FREE!

AddieTech Inc. 
438 N. Waiola
LaGrange Park, IL 60525-1824
708-579-3749 FAX 708-579-3754

READER SERVICE 141

Custom Radio Jingles!
Retail Client Jingles!

Complete Packages Start At

\$795


Productions Recording

1-305-743-4248

READER SERVICE 154

BUY-OUT MUSIC — \$99

Sixty 60-second music beds for .. \$99
198 :30 & :60 music beds for ... \$198
120 production effects "Zings, Zaps and Zoodads" for \$99
122 New Lasers & Sweepers for ... \$99

For FREE DETAILS on production music, sound effects, call

.....
Ghostwriters (612) 522-6256

READER SERVICE 133

ATTENTION PROVIDERS!

Promote your services to **Radio World's** 22,000+ readers. Reach Radio Station and Recording Studio owners/managers and engineers with your message. For information on affordable advertising call **Simone** at **1-800-336-3045**.

Products & Services Showcase

For more information on the products shown below, circle the appropriate Reader Service No. (s) on the enclosed Subscription/Reader Service card or contact the advertiser directly.

S.C.M.S., Inc. Charlotte, N.C.

Low Prices - Experienced Staff
New and Re-built R.F. and Audio

THIS MONTH'S SPECIAL

TRADE YOUR USED BROADCAST
EQUIPMENT FOR A DIGITAL WORK STATION
A \$2,950 VALUE COMPLETE WITH:

- A 486 COMPUTER
- SAW SOFTWARE
- 16 BIT SOUND CARD
- 4 SIMULTANEOUS STEREO TRACKS
- OPTIONAL EFFECTS PROCESSING

— You Know We Know Radio —

Toll-Free 800-438-6040
FAX 704-889-4540

READER SERVICE NO. 140

Introducing (ta-da) The Jr. Audio Director Plus™!

It's an 8 input to 2 output ON LINE or monitoring device.

\$550



The new Benchmark Jr. Audio Director Plus™ brings more to the party! It brings more control and selection features, and a stereo headphone amplifier, along with the performance and value that are traditionally a Benchmark for the industry.

In a half wide, 1RU high chassis, the Jr. Plus has two input switch banks which allow left and right outputs to select between eight sources. Additional switches provide a Mono Mix, with adjustable gain reduction of 3 to 6 dB, and a Right Channel Polarity reversal. LEDs indicate switch action. Inputs may be passively mixed ahead of the input amp by depressing two or more buttons.

Installation is "instant" with a No-Mod™ Rack Mount adapter and plugable Euro-Style barrier strips.

Available now.

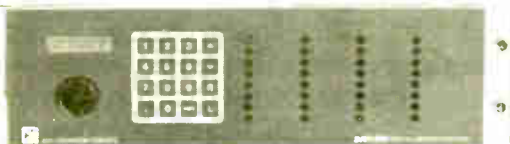
Benchmark
...the measure of excellence.™

BENCHMARK MEDIA SYSTEMS, INC.
Phone 800-262-4675, or 315-437-6300, FAX 315-437-8119

READER SERVICE NO. 48

PROGRAM ABILITY

Programmable Digital Remote Control. What others promise, Hallikainen & Friends delivers to your exact specs with the DRC 190. With its extended BASIC language, the DRC 190 can control, alarm, display and log measured and calculated system parameters. Typical installations also generate a daily report showing the minimum, maximum and average of each parameter, simplifying oversight of the system. For true flexibility of user control over evolving equipment demands, get with the program, get the DRC 190.



PROGRAMMABLE EXPANDABLE AFFORDABLE DRC 190

HALLIKAINEN & FRIENDS

141 Suburban E4, San Luis Obispo, CA 93401-7590 USA
805-541-0200

READER SERVICE NO. 209

ELIMINATE PODIUM CLUTTER.

PB2X8 Pressbox/Microphone
Distribution System

MICROAMP SERIES



Eliminate the usual press conference microphone clutter with just a single or a back-up pair of microphones.

Feed each of eight transformer isolated channels from either input or both Mic/Line inputs mixed.

Drive a high level XLR and a medium or low level TRS line simultaneously from each output.

Use as a 2X8 DA, stereo 1X4 DA or two input mixer.

Studio grade performance, field proven ruggedness.

- Rack or desk mount.
- Two low noise Mic/Line inputs
- Phantom power, low cut filter
- Loop thru expansion inputs
- Calibrated test oscillator
- Switchable bargraph VU meter
- XLR, 1/4" and 3.5mm TRS jacks
- Headphone output

SEE US AT BOOTH # 16602-16702

CALL OR WRITE FOR A FREE DETAILED BROCHURE.



AUDIO TECHNOLOGIES INCORPORATED
328 W. Maple Ave., Horsham, PA 19044, USA
(215) 443-0330 (800) 959-0307
FAX: (215) 443-0394

READER SERVICE NO. 117

Excalibur Electronics

CDA-1

Composite Distribution Amplifier



This 1 in, 3 out distribution amplifier allows you to distribute stereo composite and/or subcarrier signals as easily as audio.

- ♦ DC-100 kHz frequency response
- ♦ 90 dB signal/noise ratio
- ♦ +6 dB to -20 dB gain range
- ♦ Individual 20-turn output trimmers
- ♦ 1 3/4" rack mount enclosure

EXCALIBUR ELECTRONICS, INC., CHANTILLY, VIRGINIA
Please circle our bingo number for a data sheet and a dealer list.

READER SERVICE NO. 2

Radio World

Vol. 19, No 5 Radio's Best Read Newspaper March 8, 1995

Attention Advertisers!

Reach 22,000+ broadcast professionals! Radio World's Product Showcase provides a perfect medium for test marketing your products and services. It's an efficient, effective and affordable advertising option.

Product Showcase ads
always get impressive results!

Advertise in
the Product
Showcase
Directory!

"It Works! It's Great!"

For more information,
including rates and
deadlines, fax
Christopher at
1-703-998-2966
or call
1-800-336-3045

Advertising
is good for
business!

SOLID STATE 1250 W FM AMPLIFIER

CALL 800-986-9700



Silicon Valley
POWER
AMPLIFIERS

2 YEAR WARRANTY

REMOTE CONTROL

SINGLE OR 3 PHASE

HARMONIC FILTER

MADE IN USA

.....\$6,950

800-986-9700 FAX 408-986-1438

529 FORMAN DRIVE, CAMPBELL, CA 95008

READER SERVICE NO. 186

MANAGER'S NOTEBOOK

Defining Workload Prevents Burnout

by Sue Jones

BURKE, Va. Do you know when it is time to hire another sales representative, additional support staff, or contract for additional engineering services? How many accounts do you expect a sales representative to handle comfortably and provide good service? How much overtime, after hours time, can your engineer handle before fatigue takes a toll? Are you fully aware of all the activities your traffic director, air staff, promotions director and business manager are handling this week?

Knowing these management statistics for your station and their impact are vital for running at optimum level. In duopolies or LMAs, the temptation to assign the work of two or more stations to one person may be an overwhelming burden to the staff member. Having a clear understanding of workloads and work capacity has many benefits.

Expanding and downsizing

Obviously they are important for decisions to hire new staff or to downsize. If a sales representative can comfortably handle 30 accounts, at what point do you hire another representative? When your

sales rep reaches 35 accounts? 40 accounts? or 45 accounts?

For engineering you should have established acceptable levels of response for various types of technical problems (i.e., off-the-air versus repair of a tape cartridge machine). If you are adding another station in the same area, will you expect your engineering staff to handle both stations?

If so, will the existing staff have adequate time to respond to immediate technical problems and handle the routine and preventative maintenance? If you have established the response times for various types of problems and you notice a decline in the response times, you need to investigate the reasons. In this situation, it could be that the staffing level is inadequate to cover all the tasks in the expected timeframe.

Performance evaluation

Could your business manager handle two separate budgets and the monthly accounting with both payrolls? It may be more cost effective to have one business manager and install an automated accounting system to maintain the records and automate the accounting function.

Defined work capacity provides the

framework for evaluating performance. If sales representatives are expected to handle 30 accounts successfully and one of your representatives cannot handle

more than 20, you have a yardstick for objectively evaluating that person's performance against expectations.

However, if all of your representatives carry a widely varying number of accounts and there is no defined expectation, there is no standard for measuring performance. Evaluations will be reduced

continued on next page ►

Time Travels: '60s Sound

► continued from page 23

The Solid Gold Time Machine, which will originate from the brand-new PAMS Satellite Radio Network Communications Complex in Dallas, will air on GSTAR 1, transponder 8, in the ComStream ISO/MPEG compressed CD quality digital format. The show will be peppered with several hundred of the re-sung PAMS jingles, played on 12 cartridge machines installed at the PAMS studio.

Kaufman feels there will be three groups of people who will listen to his show—those who think music began when the Beatles happened in 1964 and hate anything from 1955-1963, those who think music ended when the Beatles came, love the years 1955-1963 and hate 1964-1971, and those who like the entire 1955-1971 period. Kaufman is, predictably, an inhabitant of the last group.

Ricky the K's fave sounds run the gamut from the Beatles and the Dave Clark 5 to doo wop, the Cameo-Parkway sound from Philadelphia, Phil Spector's Wall of Sound, and even such hits as "Israelites" by Desmond Dekker and the Aces (Count bubble gum music in there somewhere, too—White Plains "Love Grows (Where My Rosemary Goes)" is a particular favorite.

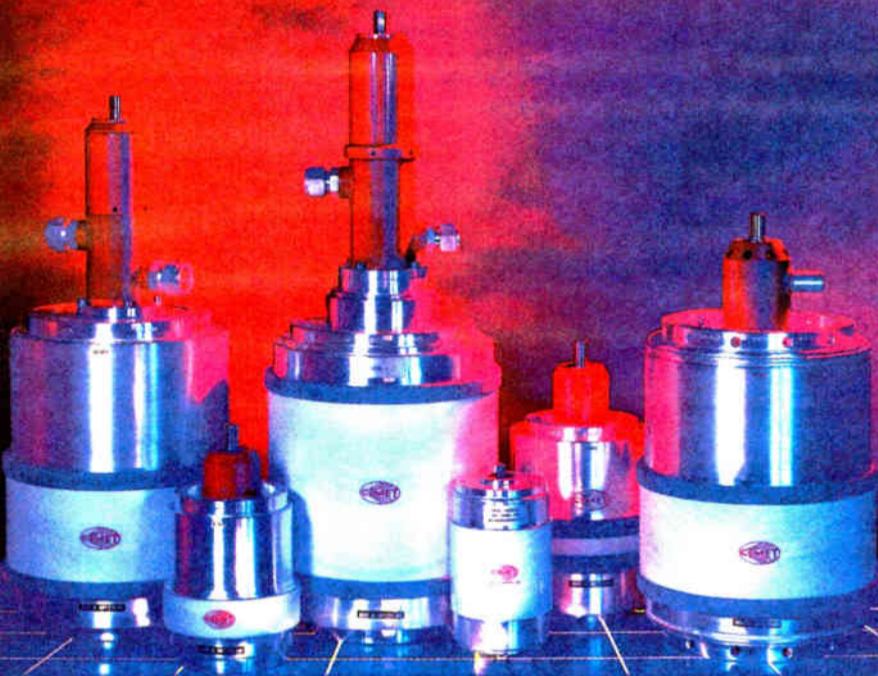
Kaufman will play only hit songs from a library of between 2,600 and 2,700 records from the years 1955-1971. "No song will get played on this show more than once every 30 shows," he said, "to keep things fresh." In addition, only the "correct" versions of songs will be played. "This has been a problem for many oldies stations who get their oldies music library from CDS—a lot of times they have the wrong version (of a song), and what I have done is, if the right version is on CD, I have taken (it) from the CD...If there's no right version on CD, then I'm taking it from the original 45 or from the album, but I'm always using the original, hit version."

Ricky the K is looking forward to bringing his Solid Gold Time Machine to the satellite airwaves. And, if you hear 1967's "Open Letter to My Teenage Son" by Victor Lundberg, or 1963's "Dominique" by the Singing Nun, rest assured the modern day flag waver of sixties radio is playing these songs because they were hits. "I am going to play every hit between 1955 and 1971," said Kaufman, "and I figure if I hate it, somebody's got to like it."

□□□

For information on Ricky the K's Solid Gold Time Machine, call Richard Kaufman, PAMS Radio Network, at 214-271-7625, or Bill Sepmeier, NSN Network Services, at 303-949-7774.

A Special Commitment



Since 1965, COMET has been committed to one objective — keeping our customers satisfied with the highest quality vacuum capacitors available.

Our experienced technical staff is dedicated to the advancement of capacitor technology, and will meet your custom requests with a design proposal in a matter of days. And, while we do specialize in made-to-order designs, we also stock a number of popular capacitor types for your off-the-shelf needs.

Call COMET when you have a special design request, want expert technical service, or need a replacement capacitor now.



COMET NORTH AMERICA, INC.

11 Belden Ave. • Norwalk, CT 06850 (203) 852-1231 • FAX (203) 838-3827

Circle (118) On Reader Service Card

ATTENTION P.D.s

Schedule the best in "OLD-TIME RADIO" with

When Radio Was...

Hosted by ART FLEMING, original star of "JEOPARDY"



Five shows per week—54 minutes each.
BARTER, NO CASH PAYMENTS!

For information and a free demo tape contact David West at
DICK BRESCIA ASSOCIATES (201) 385-6566

When Radio Was celebrates its 6th year on 150 stations

Circle (169) On Reader Service Card

► continued from previous page
to a subjective rather than objective decision. There could be legal ramifications to this problem.

High-performance staff

Under-worked or over-worked staff create additional problems. Defining a comfortable and fair work load balance works for the employees and owners/ managers. Staff members should have enough time to complete their work in an organized manner rather than just responding to the most pressing problems. They can focus their attention on the work at hand instead of the distraction of undone and increasing/decreasing amounts of work. The bottom line is, the jobs get done with quality work.

Considerations:

Expecting staff to increase its workload without some compensating factor will create additional problems. The first problem will be the staff's attitude. How well you introduce the reasons to increase the work may divert or intensify a problem. Simply advising the staff they will be doing additional work because another station has been acquired will inspire no one.

The staff will view this situation in terms of fairness. They will be expected to perform one-and-a-half or double the workload in the same amount of time for the same compensation.

Consider some of these approaches to cover the workload without doubling the expenses.

- Offer additional compensation. It may not be doubling an employee's salary, but even half of the salary you would pay for another staff person is less than the full price of a new employee. Compensation may be in several forms: 1) salary increase, 2) trade items (membership in the health spa, furniture, cars, travel, or scrip), or 3) additional time off (a staff member's choice of two paid three-day weekends).

Freelance help

- Contract with another company to provide some of the work during peak loads, such as contract engineers or temp agencies, to assist the business manager for the end-of-the-month billing and payroll processing.

- Automate manual processing where possible. Get an automated accounting system for your business manager. Install word processing equipment with laser printers for the sales secretary to generate more proposals in the same amount of time instead of using an electric typewriter. Simulcast using the same format for more than one station, eliminating the need for your programming and air staff to juggle two formats at the same time.

If separate formats are required, consider PC-based commercial storage systems to eliminate labor-intensive dubbing of spots for both stations.

- Hire part-time staff. Your existing staff may be able to add to their existing work load with automated assistance. However, you may find that hiring a junior part-time person to handle the routine jobs will allow your full-time senior staff member to concentrate on the crucial areas requiring station and industry experience. An added benefit to this arrangement is the lower cost for a junior part-time person, quality work is delivered, and you are training and evaluating a

potential full-time staff member at the lowest financial and personnel risk to you.

There are several risks of not knowing the work capacity for each position at the station. 1) Determining when to hire additional staff is best-guess or hindered.

It could be that the staffing level is inadequate to cover all the tasks.

- 2) Performance evaluations are more subjective rather than objective. 3) Staff performance, work volume could be reduced. 4) Staff morale could decline, impacting performance.

One problem often feeds another. Low staff morale, due to increased workload, may be the incentive for your staff to find employment at your competition. Your increased staff turnover rate will require recruiting, hiring, and training activities from you and your managers at a time that is hectic for all.

Problem indicators

Overworked staff can mean fatigue and burnout. The quality of the work will decline. One indicator of this type of problem is staff reporting for work late and leaving early. Another clues include staff taking increasing amounts of time off, lack of enthusiasm for new activities/ideas, or unmet deadlines/deliverables.

This is only a partial list of risks. Risks

can be minimized by establishing workload capacity for each position and continually monitoring performance against those expectations. Lower risk also means taking the appropriate actions to compensate for increased or decreased work loads. If you cannot list each position at your station and the standard performance expectations, get started on defining each of them today so that you do not have to crisis-manage them in the future.

Save your crisis management skills for those issues that you cannot control or predict.

□□□

Sue Jones is a Senior Manager for Computer Data Systems Inc. in Rockville, MD. She can be reached at 703-323-0491.

Get Your Network Up and Running

With Us It's Easy and Affordable

With NPR Satellite Services® you don't have to worry about building an uplink to get your network underway. We not only provide dependable and flexible satellite space segment, we'll provide you with a transportable uplink while you build your own. Or, if you want to eliminate your start-up capital costs, you can use one of our uplinks in major markets across the United States on a full-time basis.

Our C-band, Single Channel Per Carrier (SCPC) space on Galaxy IV, known for its reliability, has the flexibility to provide digital or analog audio, and allows you to control your network broadcasts from a single location. And now we can also provide ComStream digital audio equipment for your radio network.

Call us to discuss putting together a satellite services package that works for you at (202) 414-2626.

NPR SATELLITE SERVICES®

635 Massachusetts Avenue, NW ■ Washington DC 20001 ■ (202) 414-2626

Products & Services Showcase

For more information on the products shown below, circle the appropriate Reader Service No.(s) on the enclosed Subscription/Reader Service card or contact the advertiser directly.

DIGITAL AUTOMATION SYSTEM

- The Best Integrated Play List Scheduler (Music & Breaks) & On-Air Playback Combination Available Today
- Music on Hard Disk and/or CD Jukeboxes
- Dolby AC2 Overlapping Hard Disk Audio



- Feature Rich Digital Automation at an Affordable Price & Updated Quarterly
- Complete On-Line Redundancy
- Provide Your Own Computers/Players and Save \$\$\$, or Buy/Lease From Us
- Pays For Itself By Increased Productivity

WEST/INT'L EAST
310/670-7500 803/370-2400
 FAX 310/670-0133 FAX 803/370-2314

READER SERVICE NO. 210

MARTIN LEASING CO.

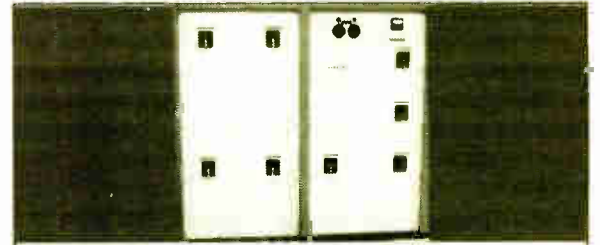
- Start-Ups, CP's, Upgrades, Packages
- 100% Financing - No Down Payment
- Skip Payments. Low Initial Payments
- 1 Page Credit Application
- Conserves Bank Lines
- Fixed Rates - Inflation Hedge
- Lease-To-Own Financing
- Transmitters, Antennas, Digital, Automation, Studio Eq., Other Equipment Too!!



The Broadcast Equipment Specialist

BEN WEINGARTEN
1-800-253-2734 Ext. 22
 (310) 274-7988 FAX: (310) 274-1905

READER SERVICE NO. 29



- CUSTOM ANTENNA PHASING SYSTEMS
- ANTENNA CONTROL SYSTEMS
- AM/MF ANTENNA TUNING UNITS
- DIPLEXERS & MULTIPLEXERS
- TRANSMITTER COMBINERS
- DUMMYLOADS (WITH MATCHING NETWORK)
- ASSOCIATED RF COMPONENTS
- CALL OR FAX FOR MORE INFORMATION

PHASETEK INC.

550 CALIFORNIA RD. UNIT 11
 QUAKERTOWN, PA 18951
PHONE: 215-536-6648
FAX: 215-536-7180

READER SERVICE NO. 121

DIGITAL ANTENNA MONITORS

In-Stock-Available for Immediate Delivery



Price US\$2400.00 2 Towers
 Will operate with any remote control equipment.



Price US\$1780.00 2 Towers
 For AM directionals with studio located at transmitter site.

These monitors are state-of-the-art instruments of unequalled accuracy (.5% or better on ratio and .5° or better on phase) and stability. With typical modulation the true ratio readout of these monitors is a factor of 10 more stable than instruments that measure normalized amplitude, and their phase readouts are rock solid. Phase sign is automatic, no extra operation. In addition to the analog DC outputs for remote control the Model CMR has a multiplexed BCD digital output which can be used to drive the Remote Indicator Model CMR-1. RF inputs have dual protection. Gas discharge tubes across the sample line terminations plus relay protection.

GORMAN REDLICH MFG. CO.
 257 W. Union St. Athens, Ohio 45701
 Phone 614-593-3150 • FAX 614-592-3898

READER SERVICE NO. 52

ACCEPT NO SUBSTITUTES

- Eliminate flanging (hollow room) effect
- Eliminate bad room acoustics
- Hold absolute levels
- Correct voice symmetry

AIRcorp 500PH Microphone Processor



- Front panel input level select +4 to -50 dB
- Three section variable boost and cut equalization
- Compander/Expander cross coupled for maximum punch
- Built-in earphone jack
- DE-ESSER designed to protect pre-emphasis curves
- Simultaneous mic level and line level outputs
- Internal 48 Vdc Phantom Supply



Call your dealer

or call **214-304-0455** or fax: **214-304-0550**

READER SERVICE NO. 144

Call MYAT For Rigid Line & Components

Facing a "right now" emergency? Planning a new installation? Upgrading your facility? Whatever the need, MYAT is the solution. MYAT products are quality-built for maximum performance and long life. And we take delivery commitments seriously.

Call your favorite RF distributor or MYAT direct at 201-767-5380, or fax 201-767-4147 for our complete catalog and reference guide.



380 Chestnut St

P.O. Box 425

Norwood, NJ

0 7 6 4 8

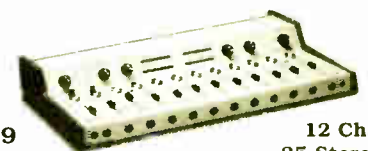
READER SERVICE NO. 6

EVEN THE BEST CAN BE MADE BETTER

Introducing the new

MINI-MIX 12A

THE COMPACT MIXER WITH A COMPACT PRICE FROM THE QUALITY LEADER



\$3499

12 Channels
 25 Stereo Inputs

Service & Affordable Quality for Over 23 Years



1500 Capital Avenue (214) 424-8585
 Plano Texas 75074-8118 1-800-327-6901
 FAX (214) 423-6334

READER SERVICE NO. 75

Bennett's Career Reflects Changes in Radio

by Alan Haber

SAN FRANCISCO 1969: Richard Milhous Nixon became the 37th President of the United States. Astronaut Neil Armstrong was the first man to walk on the moon. And Woodstock, the infamous four-day music festival, transformed the sleepy little town of Bethel, N.Y., into the site of perhaps the most cosmic counter-culture happening this country has ever seen.

And, Alex Bennett, consciousness raiser and talk show host, arrived at WMCA New York, where he covered the rumor of Paul McCartney's death in all its paranoid glory. He also covered Woodstock.

According to Bennett, WMCA would have been the only station at Woodstock "with a telephone line, and probably could have made a fortune. But, you know, they wouldn't listen to me. So I had to go to the Woodstock festival on a Saturday, during the day, and then I had to get back to the city that night to do my show. I just stayed for the beginning part of the festival."

A keen observer

Throughout his years on the air, talk show host Bennett has been a keen observer of the history surrounding him as our nation's political and societal timeline has grown. His radio career has been, and continues to be, a major cultural happening. The man, who counts two Jacks (Parr and Benny) among his heroes, and wore the crown of America's number one counter-culture broadcaster while at WMCA, began his career by traveling the small market station circuit, and spending two years behind the mic at the Armed Forces Radio and Television Service in Hollywood.

In 1964, while at "good music" KGMS(AM) in Sacramento, Calif., Bennett responded to a blind-box advertisement in a radio industry publication calling for an announcer sporting a "British style and accent." Transforming himself (Bennett was born and raised in San Francisco), he sent in a tape, and even created a fake biography for himself.

Beginning in 1965, he would work for more than two years for radio legend Gordon McLendon at KILT(AM) in Houston, with the on-air moniker "James Bond."

When he heard that McLendon wanted to start a talk show on the station at night, Bennett said he wanted the slot. Viewing the emergence of the Drake format as "the end of personality radio," Bennett wondered how he could continue to be a personality on the air. The answer: talk radio.

Love to hate

Switched from mornings to a nighttime talk show at KILT, Bennett became known as "The Man You Love to Hate" as the ratings soared. (Bennett said McLendon had wanted a "completely confrontational in-your-face talk show.") Alex Bennett, talk show host, was on his way, although, at this point in his career, he said he "had no real politics going for me... You wanted (me) to be conservative, I'd be conservative. If you wanted me to be a liberal, I'd be a liberal. I had no morality either way."

The Vietnam war was going on at this time, and Bennett had talked about it on the air, although he said he "didn't even know about it... it was just a matter of being argumentative." Soon, he became

informed, and what he called the start of his "radicalization" began.

This "radicalization" was completed, he noted, "when I wound up in Chicago working for WIND and, like the first week I was there, the Chicago (Democratic) convention came to town, and I got tear-gassed and beaten. That completely radicalized me."

Prior to WIND, where he landed in 1968, Bennett spent six months of 1967 at all-talk WLOL in Minneapolis-St. Paul, which he left after a disagreement with management. Bennett remembered thinking he knew that, if he was ever going "to do talk again, it's got to be on a rock station, because they are the only people who would understand this."

Underground friends

After WIND, Bennett descended on the Big Apple, landing at WMCA. At the time, the station spent half its broadcast day playing music, and the other half talking. Bennett settled into the overnight slot, four days a week (he also took over Barry Gray's Saturday mid-day slot from 11 to one o'clock). And then, Bennett started an alternative music show on Saturday evenings, taking over legendary disc jockey Murray the K's slot.

It was at WMCA that Alex Bennett, famous talk show host, became known as a friend to the counter-culture, having rock musicians and political radicals as guests on his show.

Interestingly, Bennett said that the counter-culture moniker was not thought out. In fact, he noted, "I do things by a certain amount of instinct. ... Instinct told me that, basically, the left had never gotten a free forum in this country. In other words, if you brought on somebody like Abbie Hoffman, you had to go out and get Congressman so-and-so to counteract him. And I often said, 'Well, if you had Congressman so-and-so on, would you ask Abbie Hoffman to come on?' And of

course, the answer would be no."

The first guest on Bennett's WMCA show was social and political activist Paul Krassner. Subsequent guests included "almost every major rock personality of the time," said Bennett, and people like Abbie Hoffman and Jerry Rubin. Bennett said his guests spoke frankly about their beliefs.



Talk Show Host Alex Bennett

Bennett was eventually fired from WMCA, because, it was said, the station was going to be broadcasting New York Yankee baseball games, and his show would have to be preempted. "Some people," Bennett remembered, "blamed it on the fact that I had certain radicals on, and certain sponsors did not want to advertise on a program that had those kind of views." Bennett said about 1,000 people showed up in front of the station to protest his firing, which was covered in the New York newspapers, and as far afield as the entertainment industry trade publication, *Variety*, with no less than four articles on one page.

After some soul-searching, Bennett put

the WMCA firing behind him, landing in front of the microphone in 1971 at New York's WPLJ-FM (the station had recently changed call letters from WABC-FM). Starting out doing a morning talk show, he soon gravitated to overnights, where he toiled for four years.

Off to Frisco

After briefly returning to WMCA, and racking up 11 years on New York radio, Bennett came home to San Francisco, where he's been ever since, but not before meeting up with the still-in-hiding Abbie Hoffman. Bennett, who had not seen Hoffman in five years, categorized his life at the time as being "pretty well in the toilet." He told his wife that he had to do something to change things. "I saw Abbie," he remembered, "and here's a guy who's on the lam from the law and living fine, you know. He's got everything going against him, and he's doing okay. I said, look, if he can do it, I can do it."

Bennett heard about a morning opening at KMEL in San Francisco, where he went to work in 1980. He offered to fly himself there on his own dime and work a week for scale to show he could do the job. "The first day, they did not like me," he said. "The second day, they tolerated me. The third day, they kind of heard something they liked, and, by Friday, they were offering me the job."

At KMEL, Bennett featured comedians on his music show during which he played about eight records an hour. The former Counter Culture King was now called The King of Comedy (he even hosted the PBS television program "Comedy Tonight" for six years).

Live 105

Bennett left KMEL for KQAK, The Quake, a new station that was powering up. At The Quake, comedians were once again an integral part of his show.

continued on page 38 ▶

THE SECRET'S OUT—DIGITAL FURNITURE

MODULAR
FLEXIBILITY
WITH A
CUSTOM FIT

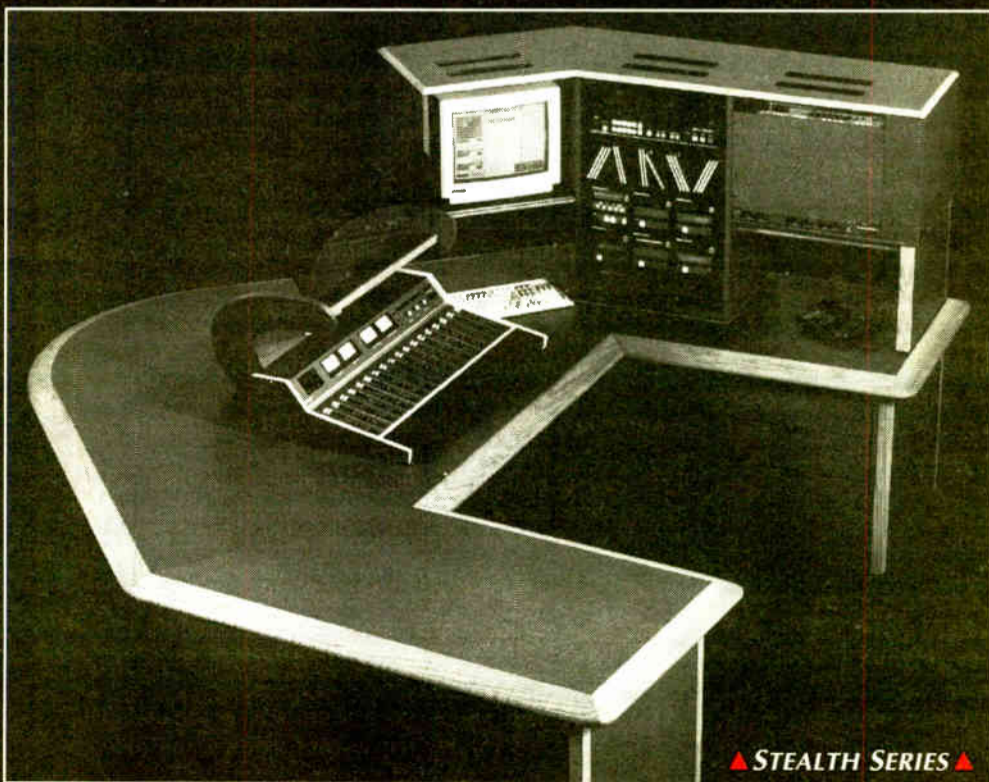
We Offer Six Elegant
Lines of Studio Furniture

4153 BONITA STREET
SPRING VALLEY, CA 91977

PHONE 619/698-4658

FAX 619/698-1268

MURPHY
STUDIO FURNITURE



▲ STEALTH SERIES ▲

Circle (159) On Reader Service Card

Radio for Kids Expands to Network

by Bob Rusk

SEATTLE A mix of music ranging from selections by Kermit the Frog to "Weird Al" Yankovic, plus a little country, some classic rock, and lots of current hits might seem like a bizarre format.

But for KKDZ(AM) at 1250 kHz, it is a winning combination. KKDZ—better known as KidStar—is radio just for kids.

Going national

KidStar went on the air here in May 1993, and will soon beam its programming

to stations in the Top 10 markets in the country as well.

Major national sponsors such as Nestle and Nike are part of the expansion, having already signed to advertise on the KidStar Interactive Network.

"From the beginning, we developed KidStar to be a national network," said Jodell Seagrave, general manager and co-founder of KidStar. Seagrave isn't ready to announce who the KidStar affiliates will be, but she did say, "some of the network will turn on in April."

KidStar, currently broadcasting from 6:00 a.m. to midnight, also programs

news, sports, features, and contests of interest to kids.

"It's a full-service format for kids," added Seagrave, a 15-year veteran of local and national radio sales and management. "We also showcase a lot of audio that comes in from kids on the PhoneZone. That's one of the things that keeps them tuned in. At any time, there are about 90 ways for kids to get their

chores is "hot;" boring chores you have to do all the time is "not."

Other choices on the PhoneZone include "I'll Never Do That Again" safety stories; "One-to-One" tutoring; and the music request line. With several phone numbers covering the Seattle metro area, it is a free call for kids to reach the PhoneZone.

KidStar has an estimated weekly cum



KidStar staff member Amy Shively consults with the experts during "test pilot" session.



Hassle-free Widgetry.

Yet another unique, problem-solving widget for the broadcaster. Announcing the Telestor by Henry Engineering.

Telestor takes the hassle out of recording news reports, weather updates, and other "actualities" that are sent via dial-up phone line.

There's no need to have someone put a cart in a recorder, start the machine, record the actuality, check the cart, and take it into the air studio. Telestor does it automatically.

Simply connect Telestor to a regular phone line. It

answers the line, waits for the Touch-Tone password, then records the audio from the line. After the feed, Telestor plays it back to the caller for verification. It can be re-recorded if necessary. If not, the caller hangs up. That's it. The actuality is now ready for instant on-the-air playback.

Telestor stores one message in digital memory, up to 5-1/2 minutes long.

Telestor is available now from Harris Allied.
1-800-622-0022
Fax 317-966-0623
Southern CA 1-800-690-2828

**HARRIS
ALLIED**

voices on the radio. That is really important to six-to-11-year olds."

There have already been more than one million calls to the PhoneZone, which is sponsored by a diverse group of regional and national companies such as McDonald's, Seattle-based Microsoft, and the upscale Nordstrom department stores.

Kids interactive radio

Nordstrom sponsors the "What's Hot and Not" line, where kids call in and record what they think is cool. Among the latest results: Getting paid for doing

of 100,000 listeners between the ages of two and 11 in the Seattle market. In addition, 40,000 parents (mostly mothers) between 25-49 tune in each week. None of the programming, however, is specifically aimed at parents.

"The programming is completely kid-directed all the time," explained Seagrave. "We know that parents are part of the equation, but our goal is to engage the kids so listening is their choice—not a result of their parents' urging."

Programming is divided into four day-parts: Before school, during school, after

continued on next page ►

The NEXT Generation All Digital

Audio Processing System



Come hear CRL's new
all digital

DP-100 in action!

NAB booth #2719



Circuit Research Labs, Inc.

+1/602 438-0888 Fax +1/602 438-8227

RUNNING RADIO

▶ continued from previous page school, and bedtime.

"In the hours before school, you hear Jimmy our morning host," said Seagrave. "He has a character called the Weather Squirrel, who helps kids know what kind of day they will be facing. There are also between eight and 12 songs an hour.

Contemporary hit radio

The music tends to be contemporary. The kids call the PhoneZone and vote on what music we play. There is a very high awareness among kids about music.

"We play a lot of the same artists that you would hear on a CHR station, but songs are screened for quality control. Every word is gone over. We make sure we aren't playing something inappropriate for kids."

During school hours, programming is aimed at preschoolers. When school is not in session, KidStar has different programming wheels. All on-air personalities are adults, and KidStar has no kids on staff, but young listeners are able to get a feel for what it is like to work in radio.

When President Clinton hosted leaders of the 15-nation Asia-Pacific Economic Cooperation group in Seattle, for example, some preteen listeners accompanied the KidStar news director to the event and were able to ask questions. And the kids even received paychecks.

"We do pay for the work kids do when they are out reporting for us," said Tiffany Heston, KidStar client services director. "Kids who are interested in our news department can call our 'Scoop Smith' line and talk with our news director. We will create opportunities for kids who are interested in covering the news—if they are of the right age and are well spoken.

"Anytime kids show an interest in doing anything with the station, we try to open opportunities for them," Heston continued. "Most of the on-air activity with kids involves having them come in for interviews with on-air personalities to talk about things like their marble collections or Earth Day."

24 hours a day

With the network set to launch, KidStar is planning to expand its programming to 24 hours a day.

"You'd be surprised by how many kids are already listening from 10 p.m. to midnight," added Heston. Kids who can't sleep or are sick tune in during the late hours.

Children's Media, which owns just the Seattle flagship station, does not plan to own other stations in the KidStar Network.

"Seattle is the prototype market, in part, because many of our board members live here," said Seagrave, the general manager. "All of our investors during the developmental stages have been individual high-net-worth investors. Many of them are Microsoft executives.

"Another reason we started in Seattle is because we thought it was a good place to test everything. It is a top 25 market, but it's not like trying to start in New York, Los Angeles, or Chicago.

"We started about three years ago. We spent eighteen months doing nothing but research and development. One of the first things we noticed was that there was almost no data about kids and radio showing whether they would listen,

when they would listen, what they might listen to, and whether their parents would participate."

There was no data to convince advertisers, either. But KidStar's research has apparently paid off. Sponsors are buying advertising packages that cost from \$5,000 to more than \$1 million.

KidStar is not the first national network for preteens, however. Previously-launched networks for kids include Radio Aahs.

The KidStar Network expects initially to attract two million listeners. And Seagrave feels that number will increase significantly.

"We're already getting inquiries from broadcasters in other markets," she said. "I wish we were ready to expand beyond the top 10 markets."



Vanessa Gibbons, 12 (c), and Carter Yasutake, 10 (r), work with KidStar personality Annie Rae.

Value

R A D I O M I X E R



P R O D U C T I O N M I X E R


Many broadcasters know that PR&E provides the consoles and systems for market-leading radio stations and network facilities throughout the world. Unfortunately, with a client list that reads like a "who's who" of the industry, some broadcasters with more modest budgets feel that PR&E consoles are out of their reach. We'd like to introduce you to Radiomixer™, a first-class on-air console at a coach-class price.

Created by the same team of designers and engineers responsible for major-market "showcase" facilities, Radiomixer offers the reliability, performance, and many of the features of our world-famous BMX, at a price guaranteed to satisfy the most demanding budget. Using top quality components, Radiomixer delivers advanced features including the most elegant telephone mix-minus system available, along with uncompromising sound quality and reliability.

And when you add multitrack production power on top of the Radiomixer's standard features, you have Productionmixer, the most affordable high-performance production console in broadcasting. There isn't another console family in their price class that can offer the total value of Radiomixer and Productionmixer.

Why settle for less, when you can have genuine PR&E features, quality, reliability and service? Call today for your full color brochure.

Pacific Recorders & Engineering Corporation
2070 Las Palmas Drive, Carlsbad, CA 92005
Tel: 619.438.3911 • Fax: 619.438.9277 • GSA: GS-03F-2057A

DESIGNS THAT MAKE THE DIFFERENCE

Circle (192) On Reader Service Card

WTTM(AM) Focuses on Community

by Stacy Walbridge

TRENTON, N.J. Mix a marketing professor who organizes cockroach races and holds class in a mausoleum with a Trenton, N.J., radio station finding its niche in community involvement programming and you have the ingredients for an increasingly popular radio show.

Host and creator of WTTM(AM) "Consumer Connection," Blaine Greenfield, is combining his business knowledge with curiosity and energy to move beyond marketing by cheering on the everyday worker and small business owner. While the show provides an outlet

for Greenfield to test his marketing skills, WTTM is also realizing the benefits.

Located in the central part of New Jersey, WTTM operates in one of the most competitive markets on the East Coast. According to Station Manager Dan Shaw, Mercer County has more radio signals reaching it every day than any other county in the country. Not only is the station competing with signals out of New York and Philadelphia, but with stations located in Trenton and other towns throughout New Jersey and Bucks County, Pa.

"When you've got all this competition you've got to find some way to create a

niche for yourself. And our niche is focusing on the local community," says Shaw.

The connection

Several years ago, upon finding itself without a unique personality, the station switched from a country western format to all news and talk. Increasing the coverage of local sporting events added to a steady gain in listeners when Greenfield first came to work for WTTM. "I've always wanted to have a radio show where I could interview local business owners and people who are involved with improving the community," said Greenfield.

Airing on Fridays from noon to 1:00 p.m.,

the "Consumer Connection" format is informal and casual. Normally, two guests are invited to appear for 30 minutes each. Before the show Greenfield takes 15 minutes chatting with each one to make them comfortable and to discuss what each would like to talk about. On the air Greenfield will keep the talk informal and make each guest sound like an expert. After their appearance each guest receives a certificate of appreciation as an honored guest and within two weeks Greenfield will mail them a tape of the show.

Real benefits

The benefits "Consumer Connection" brings to the station have been both real and indirect. Due to the nature of an all news and talk format, WTTM is constantly digging for stories with local police departments, school districts and hospitals. Many station contacts have appeared on Greenfield's show helping to strengthen WTTM's ties to the community. "So much of the news or talk that goes on a radio station like ours is negative. This is one of the very shows where the whole hour is positive," says Shaw.

Many of the station's advertisers have also been invited to appear on the show. Those who accepted enjoyed the opportunity to be treated as an expert. Like Barry Gerber, owner of a local travel agency specializing in group travel, "The

continued on page 42 ►

Why would anybody put 50 compact discs into something like this?

So broadcasters would never have to so much as touch a CD again. No matter what.

No matter what size their CD library, 100 or 1000. No matter what they want to program for when. No matter what kind of computer equipment they have. No matter what goes wrong with a CD, a player, the changer.

No matter what.

High capacity CD players are all but a must these days, no question of that. How high a capacity, that's a question. Which one's the easiest to load, that's another good question. And what brand is the most reliable, that's probably the best question.

Introducing the 100-CD "Instant Library Change" CD Player/Changer from NSM of Germany.

It's the answer to all those questions. And a lot more.

Put simply, our Model 3101 is the most efficient, totally flexible, all-but-infallibly reliable CD Player/Changer ever made for broadcasters.

The snap-in/snap-out 50-CD magazines are the key.

Once CD's are loaded in the magazine's numbered slots, you never have to touch them again. You simply snap-in two magazines, 100 CD's worth, into our 3101 Player/Changer. Then any of its 100 CD's are all but instantly accessible. It takes an average of less than five seconds for our 3101 to find and begin playing any one of them.

You can change the entire library in just about the same time ... just by snapping out the two magazines, snapping in another pre-loaded set.

What happens if our 3101 breaks down?

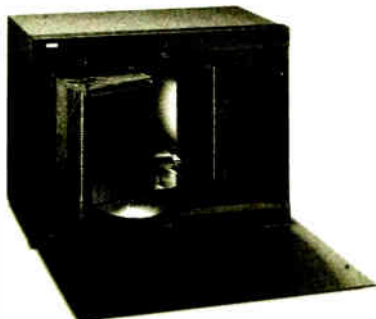
We won't say it could never happen. We will say that it'll be rare. Our 3101 has the highest reliability rating in the industry, way above all the others. Its MSBF (Mean Swaps Between Failures) is over 200,000 and our current units in laboratory

tests are experiencing well over 400,000. What's more, our reliability is street-tested every day in coin-operated jukeboxes throughout the country — we're the largest manufacturer of commercial jukeboxes in the world.

But when the inevitable happens — when something does go wrong — just snap-out the magazines and put them in another 3101. You're back in business. Try that with any other CD Player/Changer.

Link about as many 100-CD capacity 3101's together as you like.

In fact, up to 16 can be controlled through a single RS 232 interface by a single PC ... most likely, the very equipment you have right now.



Circle (11) On Reader Service Card

See why the NSM is the most reliable, serviceable CD changer available. NAB Booth 5201

Program any selections, in any order, for any start time ... cue up, blend, whatever you like. Store any number of loaded 50-CD magazines you need nearby.

If you don't want to use a computer, no problem. We have a stand-alone controller that's fully programmable and has its own back-up CD player.

Not only won't you touch your CD's again, our 3101 won't either.

Each CD is cradled in its own tray. And our mechanism grips the trays to remove and replace CD's, never the CD's themselves.

The sealed changer also protects your CD's against dust, dirt, and other airborne contaminants.

We've told you a lot. Make us prove it.

Call, write or FAX for detailed literature and a copy of our 2-year limited warranty, the best in the business. Then try a "you heard it with your own ears" test of our 3101's superb sound quality. Your CD Changer search will be over.

And you'll know exactly why we put 50 CD's into a little magazine.

So you'll never have to do it again.

NSM
Consumer Electronics

40 Cain Drive • Brentwood, NY 11717
Phone: (516) 273-4200 FAX: (516) 273-4240

© Copyright, 1994, NSM - Bingen, Germany; Bensenville, IL; Brentwood, NY

Bennett Sees Radio Change

► continued from page 35

Unfortunately, The Quake blew up around him, but ultimately, the general manager of KITS-FM San Francisco took over Bennett's KQAK contract, putting the man once again behind a microphone. The format changed to modern rock and became known as Live 105. Bennett spent the next three-and-a-half years peaking the ratings, during which time he was nominated as rock personality of the year in Billboard Magazine's annual poll.

In 1989, KITS and Bennett had a brief parting of the ways, but three months later, Bennett was back behind the mic at Live 105. "We all decided we needed each other again," said Bennett, "and that's where I've been ever since." Bennett's show is done in front of a live studio audience.

Bennett loves radio. If he has a reservation about the medium, though, he said it is that "it's not very adventurous any longer. There is nobody taking any chances. It has been almost completely taken over by consultants. Instinct—gut level instinct—is something that doesn't seem to be very much the order of the day. That, I think, is the major problem with broadcasting."

But the Alex Bennett of the '90s is different from his 1960s and 1970s incarnations. For one thing, his program on Live 105 in San Francisco is basically an entertainment show. "I've learned that no matter what message you have to put across, if you are not entertaining people, they are not going to listen. If there is any message, I will state (it) right out there in front."

The show is not political in nature, he noted. "The main job of the show is to entertain and to have fun," he said.

Products & Services Showcase

For more information on the products shown below, circle the appropriate Reader Service No. (s) on the enclosed Subscription/Reader Service card or contact the advertiser directly.

NEW Receiver!

UNIVERSAL SCPC XE-1000



SCPC BROADCAST AUDIO RECEIVER

New, affordable, frequency-agile receiver, direct channel entry by keyboard, selectable companding 1:1, 2:1, 3:1, wide/narrow bandwidth, de-emphasis selectable, 950-1450 MHz, line output 600 ohms, muting, transponder agile, LNB power supply, 50-channel memory, full baseband output, high-quality audio. Every needed feature at a sensible price (lowest in the industry). Write or call for full information on this quality receiver—the answer for your station. Networks call for prices.

UNIVERSAL ELECTRONICS, INC. 4555 Groves Road, Suite 12 Columbus, OH 43232
 Communications Specialists Phone: (614) 866-4605 Fax: (614) 866-1201

READER SERVICE NO. 167

GET WITH THE PROGRAM!

DON'T FORGET, we have a special on until April 1, 1995. If you forgot, call us *at once*: (904) 426-2521. We also offer new lamps for old. Ask anyone. Ours shine brighter, burn better, and cost less. If you've ever had a coverage question, interference problem or merely dreams of empire—Radiosoft *does it all* with pizzazz, panache, productivity and price. Runs in DOS or Windows, sits up and does tricks.

WARNING! USE OF THIS PRODUCT MAY BE ADDICTIVE!

And the small print says this advertisement will go on forever, actually only this month, until you all finally see the light and call us, or buy our stuff 'cause we know it's good for you and you really ought to try it 'cause it'll save you more than it costs unless you have no idea what a computer is but a 10-year-old could run this it's so easy so just TRY IT! will you hurry up and call so I don't have to keep on writing this ad... If you don't know what we're talking about just look on page 9 of the last RW Feb 22 and you'll see two of a million screens you can make in seconds, and you'd better *get with the program* soon 'cause it's going to have fabulous new capabilities and there's just GOT to be a price increase so just break down and CALL, we don't bite in the leg or the pocket especially compared to everyone else so gang call RADIOSOFT at 904-426-2521 and get ready for some good old fun cause it's even better than it sounds or why would we be taking the trouble to tell you about it & c

READER SERVICE NO. 105



DON GIOVANNI'S ITALIAN CAROUSEL

SYNDICATED WEEKLY RADIO SHOW

- "Goodtime" Italian Oldies
- Italian Celebrity Interviews
- Unique format

BARTER BASIS — NO CASH MARKET EXCLUSIVE

ICBN

Italian Carousel Bdct Network

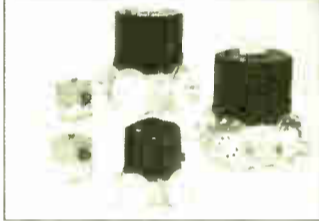
For Info & Demo call 607-648-3104

READER SERVICE NO. 129

FREE SHIPPING*

SEE US AT NAB '95 BOOTH #19401

FOR OUR COAX SWITCH FAMILY



WHY SWITCH TO MCI?


• QUALITY	• PRICE - 7/8"	- \$2,450
• DELIVERY	- 1 5/8"	- \$2,800
• RELIABILITY	- 3 1/8"	- \$3,600
• PERFORMANCE	- 4 1/16"	- \$5,000
• BROADBAND	- 6 1/8"	- \$6,200
• COMPACT SIZE		

Control Panel also available upon request.
 *Continental USA-regular ground service only

For More Information Call:
MICRO COMMUNICATIONS, INC.
 P.O. Box 4365 • Manchester, NH 03108-4365
 Toll Free: 1-800-545-0608 • Fax: 603-624-4822

READER SERVICE NO. 14

The CircuitWerkes AC-12 Telephone Autocoupler Bay



Get up to 12 couplers in a neat, compact chassis


- Auto answer & disconnect.
- 2 audio busses for mass feeds.
- Individually card selectable buss or auxiliary audio I/O.
- LED indicators for ring, clipping, power & online.
- Ring counter answers on user settable ring number.
- Momentary or latching dry contact outputs at pickup.
- Remove & install cards without affecting the rest.
- A special, non-bussed, balanced audio card for IFB feeds, etc., is available.

The AC-12 rack-mounted coupler bay is the best way to eliminate a wall or cabinet full of yesterday's couplers. Our unique dual audio busses eliminate the tedious and messy wiring associated with networks and other mass feeds. Each card can also individually either send or receive telco audio. Best of all, a fully loaded AC-12 lists for under \$185 per coupler.

CircuitWerkes
 6212 SW 8th Place
 Gainesville, Florida 32607
 (904) 331-5999 / fax 331-6999

READER SERVICE NO. 106

VACUUM & GAS CAPACITORS



Over 800 Capacitor Models

Voltage Ratings to 100 kV
 Variable & Fixed
 Vacuum & Gas
 Unlimited Capabilities

Applications: Communications Power, Electronic, Semiconductor Fab, Dielectric Heating Equipment, & Medical MRI & Heart Defibrillators. Ask about our vacuum & gas relays & other components.

JOSLYN JENNINGS CORP.
 Phone: (408) 292-4025 Fax: (408) 286-1789
 Request a **FREE** catalog

READER SERVICE NO. 151

Going Digital?

When You're Ready, We're Ready.

WireReady NSI.

Framingham, Massachusetts • 800 833-4459 • 508 879-0080

- WireReady®
- ScriptReady™
- CartReady™
- PhoneReady™
- StormReady™

WireReady® products let you use your station's own computer(s) to:

- computerize wire services and satellite network log printers,
- manage local news, promo copy, and your sales effort,
- produce, store, and playback digital audio, automated or live.

Ready to find out how to get high-performance features like these for a fraction of the cost of other systems? Then you're ready for **WireReady**.
Call today.

SEE US AT NAB BOOTH #2108

READER SERVICE NO. 197

Products & Services Showcase

For more information on the products shown below, circle the appropriate Reader Service No.(s) on the enclosed Subscription/Reader Service card or contact the advertiser directly.

How Good Can a Mixer This Size Be Anyway?



Actual Size

Try great specs to start with. Then add reliability that's backed by a THREE YEAR Warranty! It's just one of the 37 *STICK-ON*™ products from RDL™. Find out how RDL *STICK-ON* innovations can make your job easier. Call us today at 800 281-2683 or 805 684-5415 for your free catalog of these great value tools!



RDL Radio Design Labs

P.O. Box 1286 ■ Carpinteria, CA 93014
In Europe call (31) 20-6238 983 Fax (31) 20-6225 287

Radio Design Labs

READER SERVICE NO. 111

WIRELESS IFB SYSTEM

Used by hundreds of TV stations for van-to-field cueing in ENG & SNG applications. Transmitter provides mix of program and instructions to rugged, pocket receivers.

- 100% duty cycle
- Wideband audio
- Excellent operating range



COMREX®

Comrex Corp., 65 Nonset Path, Acton, MA 01720
Tel: 1-800-237-1776 Fax: 508 635-0401

READER SERVICE NO. 174



Econco REBUILT POWER TUBES



Approximately One Half the Cost of New

3,000 Hour Unconditional Guarantee

Call for Our Price List

Econco 1318 Commerce Ave. Woodland, CA 95695
Phone: 916-662-7553 Fax: 916-666-7760 Telex: 176756
Toll Free: 800-532-6626 From Canada: 800-848-8841

READER SERVICE NO. 19

AUDIO BROADCAST GROUP, INC. introduces the dramatically redesigned for 1994/95 Data Stream Series of our exclusive "Digital Ready" Studio Furniture. Created specifically for the efficient housing and operation of today's digital hard drive storage/studio automation systems and workstations. Our designers have combined the ultimate in functional work space and eye pleasing appearance.



AUDIO BROADCAST GROUP, INC. Supplying broadcast equipment and studio systems with integrity to the broadcasting community for over 33 years.

AUDIO BROADCAST GROUP, INC. Your single source supplier of AM/FM studio packages, AM/FM transmitter installations, as well as all major lines of on air and production studio equipment.

For additional information on how we can serve you, please call today

MAIN SALES OFFICE	SOUTHEASTERN SALES OFFICE	WESTERN SALES OFFICE
2342 S. Division Avenue Grand Rapids, Michigan 49507	200 Fareway Drive, Suite 2 Smithfield, North Carolina 27577	P.O. Box 1638 Palmdale, California 93550
Phone: 800-999-9281 Fax: 616-452-1652	Phone: 800-369-7623 Fax: 919-934-8120	Phone: 800-858-9008 Fax: 800-273-3321

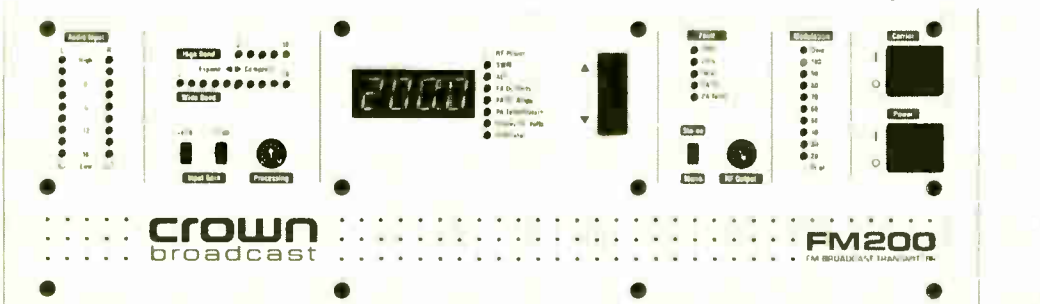
For over 33 years



AUDIO BROADCAST GROUP

READER SERVICE NO. 88

Never Go Off the Air Again.



When the power fails, your signal won't. Crown's FM200 transmitter, with optional automatic back-up power, will keep your station on the air. Available in 30, 100 and 200 watt models.

Each FM200 includes:

- FM Exciter
- Audio Processor
- Stereo Generator
- RF Amplifier

All of which operates from your AC or DC power source.

Crown broadcast
A Division of Crown International, Inc.
1718 West Mishawaka Road
Elkhart, Indiana 46515-1000
Fax 219-294-8302
Broadcast Sales 219-294-8050

READER SERVICE NO. 20

Attention Advertisers!

Reach 22,000+ broadcast professionals! RADIO WORLD's Product Showcase provides a perfect medium for test marketing your products and services. It's an efficient, effective and affordable advertising option. For more information, including rates and deadlines, fax your sales representative at

1-703-998-2966

or call

1-800-336-3045

MARKETPLACE

Recently Introduced Products for the Radio Broadcast Professional

EBS Kits

Wind River Broadcast Center Laboratory offers EBS short-tone kits, which allow a station's engineer to modify the EBS receiver/decoder to meet the FCC's requirement of eight-second alert tones.

Each kit comes with detailed and illustrated instructions and certification that the kit, when installed properly in a working EBS unit, puts a station in compliance with 73.941 as modified by the 1994 Report and Order, FO dockets 91-301 and 91-171.

For information, contact the company in Colorado at 800-669-3993, or circle **Reader Service 46**.



SCPC Audio Receiver

The SCPC XE-1000 audio receiver from Universal Electronics Inc. is a microprocessor-controlled unit that allows the reception of all SCPC channels on any satellite.

Full readout of transponder, frequency, bandwidth, de-emphasis, companding, channel name and memory channel in use are displayed on an easy-to-read LCD. The SCPC XE-1000 has 50-channel

nonvolatile memories that can be recalled by touching a single button to select any SCPC channel placed in memory, along with the parameters used for the channel.

A new audio section produces low-distortion, broadcast-quality sound to two 600 ohm line outputs, plus 4 ohm speaker output and front-panel headphone monitoring jack.

For information, contact Thomas P. Harrington in Ohio at 614-866-4605; fax: 614-866-1201; or circle **Reader Service 80**.

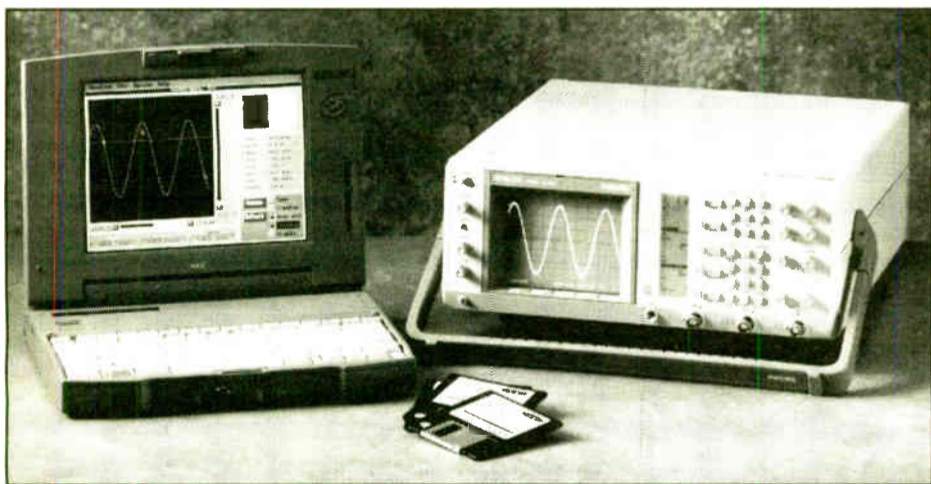
Editing and Production Desks

Winsted Corp.'s line of Digital Desks for multimedia editing and production are ergonomically designed to curve around the user, providing a comfortable, efficient work space.

Winsted offers five models with two desktop heights of 27.5 and 29 inches and adjustable monitor shelves. All units are designed to integrate easily with all multimedia systems. Models range from a 48-inch-wide workstation to a 94-inch workspace desk.

All models feature riser shelves, a wire management system and black granite laminate work surfaces.

For information, contact the company in Minnesota at 612-944-9050; fax: 612-944-1546; or circle **Reader Service 81**.



Interfaces

Fluke Corp. offers optional interfaces for its CombiScope series of oscilloscopes that extend the functionality of these instruments.

The 60 MHz PM 3335 is available with an optional bidirectional RS-232-C interface for hard-copy output and remote control. Also available for the PM 3335 is a combined RS-232-C and GPIB/IEEE.488 interface, which offers convenience for use of the scope in automated test system environments.

Another option is the full RS-232-C interface in combination with Fluke's AnyWave 2.0 software package and a serial communication cable. AnyWave extends an instrument's capability for creating specific test setups and for the management and processing of measurement data and results.

For information, contact the company in Washington state at 800-443-5853; fax: 206-356-5116; or circle **Reader Service 149**.

**For More Marketplace Items
From Radio World
See Page 44.**

S Prepare yourself for Success

at NAB '95 ...

- Check out all the latest equipment
- Find new ideas to cut costs, boost sales
- Compare notes with other broadcasters, production & post-production pros
- Explore your multimedia options
- Learn about your digital future
- Uncover new marketing opportunities

Welcome International Delegates

NAB '95 offers a special welcome for the more than 15,000 international executives expected to attend. The U.S. Department of Commerce is working through some 250 U.S. Embassies and Consulates to help organize delegations for NAB '95.

Contact the commercial officer at your nearest U.S. Embassy for details. International delegates are provided with a special international business center that offers translation services, import/export counseling and other help designed to maximize the value of NAB '95.



Registration Is Easy...

Call (+1) 301 694-5243 or fax to (+1) 301 694-5124. To learn more about the program or exhibits, call NAB: (+1) 202 775-4971 or fax to (+1) 202 429-5343, or contact your nearest U.S. Embassy, or call NAB's Fax-On-Demand at (+1) 301 216-1847 from the touch-tone handset of your fax machine and follow voice instructions. If you are interested in exhibiting, call Eric Udler at (+1) 202 429-5336 or fax him at (+1) 202 429-5343.

NAB95

**APRIL 9-13, 1995
LAS VEGAS
CONVENTION
CENTER
LAS VEGAS, NV**

Locals Get On-Air Time

► continued from page 38

half hour went by so quick. I like what the show is about and I really enjoyed talking with Blaine."

The guests come from a wide range of specialties and do not necessarily have anything in common. Following Barry Gerber was a local dentist who developed a unique method for treating gum disease. The most common thread linking the guests is their lack of exposure to the broadcast side of radio. Most advertisers feel flattered when treated as an expert.

Now in his third year with the show, Greenfield is expanding the program to include a Consumer Connection Award where individuals throughout the tri-

county area are recognized for their outstanding service. Announced at the beginning of each show, recipients need only demonstrate a commitment to the work they perform. Past recipients have included a police officer that goes out of her way to settle family disputes, a mailman who makes sure packages and letters he delivers are kept out of the rain, and a nursing home volunteer who knows all the patients by their first name.

Unsung heroes

According to Greenfield, these people are like the unsung hero, who would never be noticed by the television or radio stations in New York or Philadelphia. Greenfield's goal is to

champion and encourage these people. "Too often we criticize poor service, but we don't take the time to recognize memorable service," said Greenfield. "It is our intention at WTTM to change that. We

Greenfield attributes much of what he does to Murray Raphael, who wrote "The Great Brain Robbery," one of his favorite books for developing ideas. In his marketing classes, on his show and in person

you frequently hear him say that no idea is brilliantly new or original—you steal, beg, borrow, adapt, and modify them from other places.

But when asked how his radio show, college teaching, and marketing all tied together, he simply said, "A service is the rent we pay for living on earth. If I



Blaine Greenfield of WTTM(AM) honors local heroes.

want to recognize those individuals who do make a difference for consumers."

can help as many people as possible—that is what I'm trying to do."

Products & Services Showcase

For more information on the products shown below, circle the appropriate Reader Service No.(s) on the enclosed Subscription/Reader Service card or contact the advertiser directly.

ARE YOU LOOKING FOR A COST EFFECTIVE ALTERNATIVE TO MANUFACTURER SERVICE?

SERVICE, REPAIR & CALIBRATION

- STL's • RPU's • TSL's
- Exciters • AM/FM Broadcast Monitors • Remote Control Systems

SPECIALIZING IN EQUIPMENT BY

- Belar • Marti • Moseley • McMartin
- TFT • And others...

An authorized TFT service center <

IN CASE OF EMERGENCY

We can help get you back on the air with our STL Loaner Program. We have STL's available that will be set to your frequency prior to shipping. We also provide over-the-phone technical assistance.



2198 Hubbard Lane, Grants Pass, OR 97527

(503) 471-2262

READER SERVICE NO. 94

Shape Up!

Coverage. Saturation. DBk contours. In FM broadcasting, the "bottom line" is always based on your pattern.

More than any other manufacturer, Shively has the experience and reputation for providing crucial pattern solutions for critical propagation problems. On any tower. At any power level. Remember, **it pays to be heard.**

A good pattern. The shape you need. Talk to your consultant.

And contact us.

Shively Labs

A Division of Howell Laboratories, Inc.
19 Harrison Road, Bridgton, ME 04009
207-647-3327 FAX 207-647-8273

READER SERVICE NO. 83

Composite Audio DA and Switcher!



The CDS-200 Composite DA/Switcher

APPLICATIONS

- Switching Between Composite STL's
- Main/Alternate Processing Switching
- Feed Two Transmitters and an RDBS Encoder
- Feed one SCA Generator to Two Transmitters
- Distribute Composite with the Ease of Audio

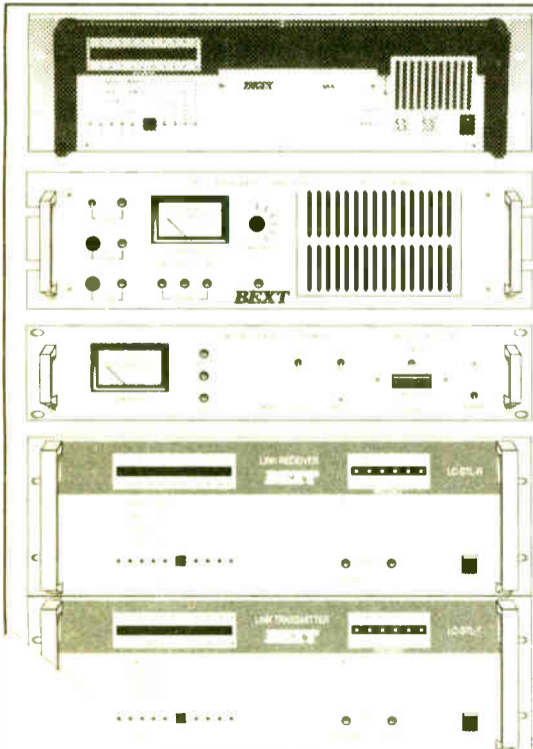
FEATURES

- 2 Input Switcher
- 3 Isolated Outputs
- Individual Level Control for Each Output
- Front Panel and Remote Control with Full Status
- Power Fail Memory with Bypass Mode
- Inputs Selectable for Balanced or Unbalanced Operation
- Front Panel Test Jack

bdi Broadcast Devices, Inc.
5 Crestview Avenue
Peekskill, NY 10566

Tel: (914) 737-5032 Fax: (914) 736-6916

READER SERVICE NO. 8



BEXT

High performance RF

- Exciters
- Amplifiers
- Translators
- Transmitters
- STL's

Backed by our two-year warranty and the BEXT 24-hour engineering hotline.

619-239-8462
FAX: 239-8474

1045 10th Ave.
San Diego, CA 92101

READER SERVICE NO. 126

Attention Advertisers

Reach 22,000+ broadcast equipment buying prospects at AM, FM and AM/FM radio stations, networks and groups, recording studios, engineering and consulting firms every month.

Products & Services Showcase appears in every issue of Radio World. To advertise your product or service, contact Simone Mullins at

RADIO WORLD

P.O. Box 1214
Falls Church, Va 22041 USA
Tel: 1-800-336-3045
FAX: 703-998-2966

CCS Introduces the

CDQPrima™ Series



CDQPrima Model 120 shown

Five of the best codecs in the world

After you've built over eight thousand codecs, what do you do for an encore?

Introducing the CDQPrima Series, our third generation family of five codecs built with one goal in mind—to give you the most advanced communications tool in the world.

With ISDN rapidly becoming available everywhere, line charges dropping and new standards emerging, you need a full bandwidth codec that can grow with you and not leave you stranded. And growing is what CDQPrima does best.

We've eliminated obsolescence from CDQPrima. Every CDQPrima model can be upgraded directly over the ISDN line, so changing chips when standards come and go is a thing of the past. And our modular construction makes hardware upgrades a snap.

CDQPrima gives you full 20 kHz bi-directional stereo, plus ancillary data and SMPTE time code. World standard MUSICAM® and G.722 audio, with connectivity to over ten thousand codecs worldwide. And built-in ISDN terminal adapters with internal bonding to take you all the

way to astounding 384 kbps audio quality.

CDQPrima lets you program each unit for automatic functions and instant networking with no external hardware. And with five models to choose from, there's a CDQPrima to fit your budget.

We've got lots more to tell you about the new CDQPrima. Call us, or your authorized CCS dealer for details, and be ready for tomorrow with the best codec in the world today.

 **CCS** Audio Products
Crystal Clear Digital Audio

670 North Beers Street, Building 4, Holmdel, New Jersey 07733 USA Phone: (908)739-5600 Fax: (908)739-1815

Circle (13) On Reader Service Card
World Radio History

MARKETPLACE

Recently Introduced Products for the Radio Broadcast Professional

On-air Console

The R-60 on-air console from Audioarts Engineering features a standard six source line selector, module extenders, gold contact switches, Penny & Giles faders, Sifam meters, 16-bit digital audio and a Simple Phone module.

R-60 modules can be removed or replaced while the console is on-air, saving downtime or tedious removal of parts from single-face plate designs.

The gold contact switches prevent tarnishing for high reliability. All switches are multicolor for easy identification and

back-lit by LEDs to eliminate bulb burnout.

R-60s are available in eight-, 12- and 18-input module sizes, with all models having two additional input and/or accessory blank positions.

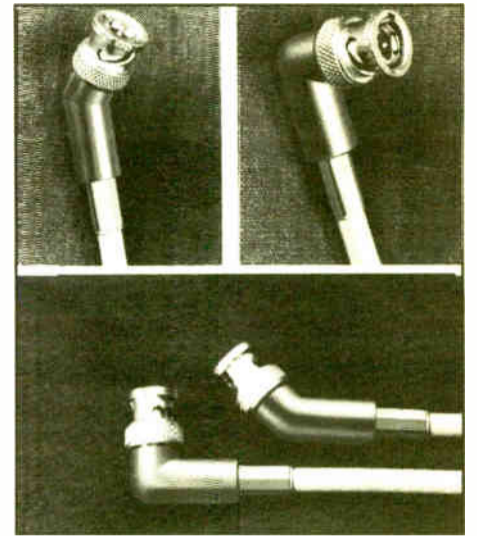
For information, contact Rick Strage in New York at 315-452-5000; fax: 315-452-0160; or circle **Reader Service 134**.

Traffic-Automation Interface Software

Power-Link software service specializes in providing full-featured interfaces and recon-

ciliation for traffic systems to automation systems. Features include schedule editing, easy file manipulation, error capturing and correction, sequence creation, audit trail, archiving of logs, on-site training, and telecommunications for centralized traffic, spot and music reconciliation. Power-Link is designed to decrease the time the user spends on these daily tasks, while improving the readiness of the shedule file from traffic, and to document all action taken.

For information, contact Richard H. Rowland in Oregon at 503-857-9293; fax: 503-857-9294; or circle **Reader Service 65**.



Angled Connectors

Trompeter Electronic Inc.'s 45- and 90-degree angle BNCs are designed for routing in tight packaging environments. These BNC connectors solve the problem of damage, change in electrical characteristic and undesirable signal degradation caused by bending of cabling in cramped applications.

These connectors feature fully enclosed heat-treated beryllium copper outer conductor springs to prevent distortion and mechanical damage, improve EMI/RFI suppression and reduce signal loss.

For information, contact the company in California at 818-707-2020; fax: 818-706-1040; or circle **Reader Service 78**.

Series Mode Surge Suppressors

Price Wheeler Corp.'s new line of patented series mode surge suppressors are designed specifically for networked environments and critical applications. Ground loops, formed when electronic equipment share common power and data lines, are not compromised. There is no joule or surge current limitation, eliminating thermal runaway, explosions and untimely failures. No metal-oxide varistors (MOVs) or other sacrificial components are utilized. Power line noise is filtered off signals outside the normal power wave amplitude and frequency range. Clamping is a constant 2 V above the peak regardless of power line voltage. Point-of-use, rack-mount, hard-wired and OEM configurations are available.

For information, contact David Schwartz in New Jersey at 800-528-0313; fax: 908-528-0333; or circle **Reader Service 72**.

Battery Tester

The Astratec Fastcheck battery tester from Adcour Inc. quickly tests NiCd, nickel-metal hydride and lead acid batteries. This system requires no special training or knowledge to operate. A user inserts a calibration card, connects the battery and the test is performed automatically in less than 10 minutes.

Fastcheck comes with various contact plates and adapters for ease of battery handling. The calibration modules are available as fixed cards or as user-adjustable modules that are connected to the test module.

For information, contact the company in Massachusetts at 617-784-8123; fax: 617-784-5563; or circle **Reader Service 54**.

Looking for the ultimate affordable digital STL solution?



Look No Further!

Moseley

Moseley Associates Inc.
111 Castilian Drive
Santa Barbara, CA 93117
Phone (805) 968-9621
Fax (805) 685-9638

WHEN Moseley introduced the DSP 6000 in 1992 it was immediately acclaimed by the broadcast industry as THE digital STL solution. Here's why. The DSP 6000 virtually eliminates the problems associated with conventional analog transmission such as noise due to signal fades, birdies from intermod interference, and lack of spectrum for multiple audio feeds to LMA and Duopoly transmitter sites. Almost three years later, the DSP 6000 is the de-facto industry standard for sonic clarity and reliability with sales approaching 2,000 installations worldwide. But you probably already knew all of that stuff, right?

What you may not have known, is that the DSP 6000 also works in conjunction with your existing Moseley analog composite STLs! If you've invested in a Moseley PCL 505/C, 600, 606, 606/C or 6000, a few simple modifications convert your entire system to digital! And it won't cost a pot of gold (just under \$6,000). Call us for modification instructions, or better yet, ship us your STL and for a mere hundred bucks, we'll make the modifications and do the setup for you.

Isn't it time you stopped chasing rainbows and started enjoying the sonic clarity of digital? "Digitally clear. Clearly digital. Just the way we planned it." ▼

RadioWorld

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.

ACOUSTICS

Want To Sell

Tired Of Bad Sound? Let Us Give You A Few Pointers.



STUDIOFOAM SOUND ABSORBENT WEDGES

The industry's most absorbent foam line! Features a uniform cut for clean & easy installation- no "innies & outies" like that other brand. How's it work? Up to 60% better than foams that can cost 5 times as much! NRCs from .50 to 1.30. Passes the stringent California firecode & tests 48% more flame retardant than Sonex. Available in 1", 2", 4" & 12" (bass trap) sizes in 2'x4' sheets. Super long-lasting; doesn't crumble like other brands can. Available in a wide range of colors from neutral to wild to match any decor. What Value!!! Min. 1 box. 1"-\$8.99 ea. (20/box), 2"-\$11.99 ea. (12/box), 4"-\$22.99 ea. (6/box)

Clients: Ford Motor Co. • Kodak • Warner Bros. • Hitachi • Dennis DeYoung (Styx) • Baldwin Piano • Editel • Mike Wanchic (J. Mallencamp) • Rockwell Int'l • US Gov't • Opryland USA • Bell Telephone Research Labs • MPI Home Video (ABC News, Apple Records) • Carvin • Penn State Univ. • WhisperRoom • MTX • Martin Marietta • Manley Labs • NJJ (NFL on Fox, Coke)

USAfoam • Box 20384, Indianapolis IN 46220 • (800) 95-WEDGE • Fax (317) 257-2USA

Circle (67) On Reader Service Card

ANTENNAS/TOWERS/CABLES

Want To Sell

Rohn 45G 30' new tower, \$850; MarkGrid 10', 950 MHz, dish new never used, \$2000. D Lang, NW TalkRadio, 7404 SE Johnson Ck, Portland OR 97206. 800-313-5313.

10 bay ant ERI FMH-10AC circular polarized, tuned to 105.5, new, \$35,000; 100' 3" Heliac, new on reel, \$5/ft; 100' of new 3" cable wave CC300-50J on spool, \$15/ft; lg. pool for 3" wave guide, new, \$500. M Wodlinger, 813-262-1118.

FM 10 bay high power on 99.5, \$5500. F Hoffman, Corpus Christi TX. 512-851-1725.

4" coax hangers #12 (60), very good cond, \$100. B Lacy, 407-773-1962.

Cable Wave A 10R 50507 1 5/8 in coax, approx 6 275' rolls w/connectors, \$1100/roll. S Ross, Quinn Bldg, 733 N Green St, Brownsburg IN 46112. 317-852-9119.

Continental G5CPS-12, 12-bay, broadband centered at 105.5, operated at 107.5, \$17,000; Andrew HJ8 3" line, 440', \$4000; Miscellaneous parts from dismantled DA, variety of caps, coils, switches, BO. J Mulhern, KSCB, 1600 E 8th, Liberal KS 67901. 800-373-3891.

ERI 1105 medium power and dual cycloid, on 98.3 MHz, \$1850. Max, KCMJ, Box 551896, Dallas TX 75355. 800-891-006.

ERI 8-bay low pwr rototiller, 2 yo, BO; ERI high pwr isocoupler, 2 yo, 3" ETA connectors, BC; Cablewave 250', 300', 3" air coax cable, ea w/EIA flange connectors, 2 yo, removed to upgrade, BO. J Hackman, WATW, 2320 Ellis Ave, Ashland WI, 715-682-2727.

UTC 120 180' guided bdct tower w/side lights, beacon, electric eye, flasher, chokes, tower base & remote meter, you dismantle & ship, BO. J LoPresti, WGSB, 111 Avalon Dr, Warner Robins GA 31093-1137. 912-929-4904.

Dielectric antenna TFU-304 w/deicer, Channel 48, will load & or deliver. Call Ben Wall at TowerComm Inc. 1-800-653-1171.

AUDIO PRODUCTION

Want To Sell

360 Systems DigiCart/1 model 1000, in gd cond, w new 44 MB cartridge drive, manual, keyboard adaptor cable, Digital Audio Disks, new (4), used (6), BO. S Runck, KFNW, 701-282-5910.

360 Systems 16x16 audio router expansion (only) unite \$350; Shure ST-3000 telephone interface/teleconference system w/mics, speaker, control unit and keypad, \$195. G Wachter, KFYI, 602-258-6161.

Allison Gain Brains (4), fair cond, \$50/ea; Dolby CAT22 (2) A type NR cards for Dolby 361 mainframe, \$100/ea; dbx K9-22 (2) type I NR cards for Dolby 361, \$100/ea. B Kennedy, EMC Prod. 300 York Ave, St Paul MN 55101. 612-771-1555.

CASSETTES • CARTS • REELS

J & I AUDIO/VIDEO

A wholesaler in the Radio and Television market.

Now running SPECIALS on audio and video:

BASF CASSETTES-AMPEX R-Rs
AUDIOPAK, FIDELIPAC & ITC CARTS

For more information call Kris Elliot at 1-800-942-1711

or write to: J&I Audio/Video
20899 Kelvin Pl.
Woodland Hills, CA 91367

Circle (90) On Reader Service Card

Altec 1592A mixer w/1588, 1579, 15095 modules, \$150; 1599 B Mixers (2) w/1588/15095 Modules, \$90/ea; 351-C 50W pwr amp, \$90; Shure SE 20 Pro Phono Preamp, \$50; Russco 442B dist amp, \$75; Altec 1567 tube mixers, near mint to parts, sell or trade for tube gear, vintage mics. W Kremer, 301 SW 16th St, Ft Lauderdale FL 33315. 305-524-5652.

Langevin 119A Progar AM7A limiter, AM 5301 level line or hitecs-filters, CBS stereo adapt for Audimax II RZ or UTC HA106 transformers, HA 114 many Langevin parts & channel, strips for trade or sale. P Barlow, Studio Trax, 382 N Lemon Ave, Walnut CA, 909-594-1841.

Aphex Expressor, signal processor, mint/new cond, \$350; Symetrix 528 voice processor, exc cond, \$400/bo. R Crabtree, 313-848-6453.

BBE 422A sonic maximizer, \$100+shpg; Radio Shack 42-2115 3-input, 3-output matrix switch cntrl cntr for 3 audio decks (2), \$15/ea+shpg; Radio Shack 15-1956 4-input stereo audio & video selector switch, \$10+shpg. G Runn, N CA News, 5383 Willow Lake Ct, Byron CA 94514. 510-516-0299.

BOGEN Tech-craft TCE-2000 1/3 octave graphic EQ, w/high & low freq rolloff sliders, \$75; Altec 9018-A passive octave band filter (EQ), 8 10-position rotary cntrls, \$75; Delta Lab Electronics digital delays, model ADM 256, \$150, model ADM 1024, \$199; ADC Std Pro Patch Mark II patch bays, 2 x 24 array, normals out, lk new, \$150/ea; UREI 533 graphic EQ, 10 section octave band, 12 dB boost or cut, rack mount, \$250. R Sumner, CAVU Corp, 44632-112 Guilford Dr, Ashburn VA 22011. 703-450-2288.

dbx 118 compressor/expander, dbx 124 noise red unit, exc cond, both w/manuals, can be used together in series or individually, \$125/ea, \$250/both + shpg. D Fields, Legacy Prod, POB 194, Avoca AR 72711-0194. 501-451-8803.

Henry Engineering Mix Minus Plus, new, \$90; Henry Engineering LogiConverter, new, \$90; Valley International HH2X2B Level Matching Interface, \$150. C Scherer, WMMS, 200 Skylight Office Tower, 1660 W 2nd St, Cleveland OH 44133. 216-781-9667.

Moseley TFL-1 Audio Limiter, \$150/BO; Barcus Berry audio processor, \$500/BO; Eventide FL-201 flangers (2), \$200/ea/BO; DBX 363X noise gate, \$150/BO; Orban 111B reverb units (2), \$150/ea/BO. T Ray, WTIC, 203-522-1080.

Micro Technology microsoudn digital audio workstn, 2 gig HD editor, 486 computer, AES/EBCU in out +4 bal in out, rack config, \$9500. P Boone, UNC Public TV, 306 Emerson Dr, Mebane NC 27302. 919-563-3995.

MXR digital time delay, chorus, flanger, \$100. P Lenz, WWSW, One Allegheny Sq, Pittsburgh PA 15212. 412-323-5300.

Fostex 3180 reverb unit, will swap for Urei "Cooper Time-Cube". E O'Brien, Imperial Sound, 383 N Studio St, Terre Haute IN 47803-9773. 812-877-2663.

Goldline digital RTA, \$300. dbx 140A type II NR, \$150; J Maples, WMYU, 8419 Kingston Pike, Knoxville TN 37919. 615-693-1020.

UREI 1122 solid state stereo transcription preamp, \$75. R Sumner, 44632 Guilford Dr, Ashburn VA 22011. 703-450-2288.

ADC 1/4" patchbays and cords, NEW, UNDER HALF PRICE, ADC TT patchbays, \$129 up, NEW cords, \$9.95. W Gunn, POB 2902, Palm Springs CA 92263. 619-320-0728.

Good used studio tape 1/2" \$15, 1" \$30, 2" \$55. W Gunn, POB 2902, Palm Springs CA 92263. 619-320-0728.

UREI LA4 mint pair, \$1095; Lexicon Alex, \$295; bulk eraser, \$49; Stewart direct boxes mono, \$50; 4 Ch, \$95; Cue command decoder, \$125; ABC Network decoder, \$125; NEW Tascam midizer MTS1000, \$750; Dyna stereo 120 rack mount amp, \$229; Sherwood FM tuner, new tubes, \$49; Infonics 7" reel copier 3 copies, \$125 ea; Crown & Furman elec crossovers, \$95. W Gunn, POB 2902, Palm Springs CA 92263. 619-320-0728.

Want To Buy

Audio Precision System One audio analyzer. J Urbanczyk, 5520 W Trouhy Ave, Skokie IL 60077. 708-676-9177.

Collins audio equip, 12Z, 212Z, 116 F-1, also any Collins broadcast lit, catalogs or manuals. J Stitzinger, 23800 Via Irana, Valencia CA 91355. 805-259-2011.

dbx 120 X-DS. R Burton, 213-874-1000.

Marshall Electronics AR 300 delay unit; Burwen DNF 1100 stereo noise filter; UREI 565 ST Little Dipper filter set; Ampex SA10 amplifier. P McManus, Paul's Remote, 4011 Orchard Ave, San Diego CA 92107. 619-223-1730.

Ampex tube mixers, plug-in mic pre-amp modules for PRI0's. W Gunn, POB 2902, Palm Springs CA 92263. 619-320-0728.

AMPLIFIERS

Want To Sell

Belar RFA 1 FM RF amp, \$200; AudioMetrics DA, 8x2, \$200. J Maples, WMYU, 8419 Kingston Pike, Knoxville TN 37919. 615-693-1020.

Crown DC-300A pwr amp w/IC-150, \$400/BO; National RFA-4 AM RF amp w/alarm, \$100. P Lenz, WWSW, One Allegheny Sq, Pittsburgh PA 15212. 412-323-5300.

Dynaco ST70 tube amp, pre-amp and tuner; Classic Sherwood 3 way speaker system (2), BO. R Davis, Wango Records, 304-274-1419.

Hnat-Hindes SX-87 phone hybrid, early version, \$150. S Schweiger, WXLO, 250 Commercial St, Worcester MA 01608-1721. 508-752-1045.

LPB DAI-16, new. J Geio, J & H Programming, POB 1697, Marco Island, FL 33969. 813-642-6899.

Ward Beck dist amp, \$300/BO. T Ray, WTIC, 203-522-1080.

Want To Buy

McIntosh MI-200 rackmount tube amp. 212-343-0265.

WANTED:

Pultec EQ's; Fairchild, Teletronix, dbx, UREI, Sontec Limiters. Neumann, Telefunken, AKG and RCA mics. MacIntosh or Marantz Gear; Lang, Neve and API gear. Misc old tubes and guitars.

DAN ALEXANDER AUDIO

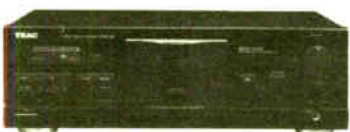
1340 Mission Street
San Francisco, CA 94103
(415) 252-7102
FAX: (415) 252-7524

Record Cutting Equipment, Marantz CD recorder, records. 612-869-4963.



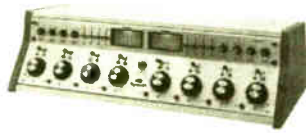
706 Rose Hill Drive Charlottesville VA 22901

Remote Controllable Cassette Deck!



TEAC
\$ 259

- Controls Play, Record, Pause, Stop, Rew, Foward
- Rack mounts available at additional cost
- CD unit Coming Soon!



S15 Model Shown

We have a S15 8 Pot Dual Mono Console in stock available for immediate shipment for just \$4095!



HENRY RADIO



100W to 500W
Solid State
Up to 20KW tube



1 KW under \$ 6000!

Check out these great deals on rebuilt equipment. Many more available - Call Us!

Eventide BD-942 3 Second Stereo Delay -	REBUILT	\$ 1,095
ITC Delta Stereo RP Cart Machine -	REBUILT	\$ 1,395
ITC Delta Stereo Play Cart Machine -	REBUILT	\$ 795
ITC 'OMEGA' Stereo Cart Player -	REBUILT	\$ 395
Audiotronics 110A 18 Pot Stereo Console w/ Eq. -	REBUILT	\$ 1,695
Otari MX-5050 BQ-II 4 Track Reel -	REBUILT	\$ 1,595
Otari MX-5050 Mark III-2 1/2 Track Stereo Reel -	REBUILT	\$ 1,995
Orban 622B Stereo Parametric Equalizer -	REBUILT	\$ 295
Orban 111/B Dual Spring Reverb -	REBUILT	\$ 175
Valley People 400 Mic Processor -	REBUILT	\$ 349
Yamaha SPX 990 Effects Generator -	REBUILT	\$ 395
Broadcast Tools 6X1 Routing Switch -	REBUILT	\$ 249
Technics SL-P1200 CD Player - Production Model	REBUILT	\$ 495
Teac X1000R 1/4 Track St. 10.5" Reel w/Auto Reverse	REBUILT	\$ 595
JBL 7510A 24 Input Automatic Mic Mixer -	REBUILT	\$ 395
Potomac Instruments FIM-71 FM Field Strength Meter	REBUILT	\$ 3,995
Radio Systems TI-101 Telephone Hybrid -	REBUILT	\$ 329
Gentner SPH-3 Telephone Hybrid -	REBUILT	\$ 399
Denon CD Cart Shells (1000 Available!) - Good Cond.	EACH	\$ 2.95
CBS/Audiomax 4450A Stereo AGC -	REBUILT	\$ 195
Micro-Track PM5-MX 5 Pot Mono Rack Mount Mixer	REBUILT	\$ 295
McMartin EBS-2/TG-2 EBS System -	REBUILT	\$ 349

Call us for the Best Digital, New & Completely Rebuilt Equipment! (804) 984-HALL (4255) (804) 984-FAXX (3299)

Circle (82) On Reader Service Card

World Radio History

AUTOMATION EQUIPMENT

Want To Sell

25 Hz tone generator, gd cond. J Gelo, J & H Programming, POB 1697, Marco Island, FL 33969. 813-642-6899.

BE Control016 complete systems w/IGM Go-Carts (4), spare parts, \$1000. B Moede, WEMI, 1909 W Second St, Appleton WI 54914. 414-749-9456.

Cetec Schafer brain, 19 audio inputs, lockout/alarm, manual, override panel, power supply, BO. J Mulhern, KSCB, 1600 E 8th, Liberal KS 67901. 800-373-3891.

Complete Systemation automated systs (2), \$6000. M Wodlinger, 813-262-1118.

Format Sentry FS 12-c controller w/2 fade modules, precision clock, 286 computer w/2 floppies, mono screen, FS CD controller w/18 pack Pioneer upgrade (2), FS DS-1 storage unite w/8 hrs storage, \$8900. J King, KBIM, POB 2308, Roswell NM 88202. 505-623-9100.

Cetec 7000 automation system. With (3) terminals, (9) ITC R-R, (5) Sono-Mag carousels, (2) 48 tray ITC Instacarts. System price \$5000. Call Tu-Mar Broadcasting, Houghton MI. 906-482-7700.

Format Sentry FS-12C, 1 48 tray IGM Instacart, 4 R-R ITC plybk machs, 1 Panasonic CD plyr, 1 Tandy 1,000 SL computer, 1 Tandy DMP printer, 1 Spotmaster rcd plybk cart mach w/25KH tone alert, 1 DRS uninterruptible pwr sply, 2 6' racks, & all related equip, all new, owe \$16,000, will sacrifice. A Terry, 703-647-8493.

Harris 9000 automation syst, mono w/pwr sply w/new capacitors, Ti-Omni 800 model 840 printer, TEC model 70 X video screen w/keyboard, Micropolis disk storage model 1055-2, dual drive, plus 2-48 tray Instacart IGM, plus parts for both, needs some work, or used as spare parts, \$1000+shpg. Larry, WXLPL, Davenport IA, 319-326-2541.

Smartcaster digital automation syst, stereo, simult rcd/plybk, all accessories, nvr used, \$10,000/BO. T Ray, WTIC, 203-522-1080.

SMC 350 RSB 24 tray Carousels in exc cond installed in complete SMC rack unit. \$600/4 pieces. B Christie, Grande Radio Group, POB 907, La Grande OR 97850. 503-963-4121.

SMC 350 RSB carousels (4), gd cond, \$250/ea, \$800/all. P Patton, WWAM, POB 279, Jasper IN 37347-0279. 615-942-1700.

CART MACHINES

Want To Sell

ITC 99B completely refurb. R/P, stereo, new logic and audio cards, gd cond, \$1950. J Katonah, WFGB, POB 777, Lake Katrine NY 12449. 914-336-6199.

06A J03 UMC plybk cart machine, \$75/BO; UMC rcd/plybk cart machine, \$150/BO. T Ray, WTIC, 203-522-1080.

Audicord DLRS stereo cart rcd, less than 3 yo, \$650; ITC SP Series triple deck plybk cart mach, \$500. ITC SP series single pak plybk cart mach, \$250; Abco cart rack carousel plus 350 Fidelipac carts, 3 yo, \$250. B Lacy, 407-773-1962.

ITC ESL-IV splice finder eraser, \$400. J Maples, WMYU, 8419 Kingston Pike, Knoxville TN 37919. 615-693-1020.

AudioCord A Series stereo cart plyrs (2), 1 ITC SP stereo cart plyr w/SWA card, 1 TapeCaster 700 stereo cart rcd, 1 Otari CTM10 stereo/mono cart plyr, 1k new, 1 ITC Delta I/IV stereo cart rcd, just rebuilt by ITC, BO. J Pierce, KMZQ, 702-595-5705.

Great Prices on original equipment tape heads for ITC, BE, Fidelipac, Otari, Tascam & others!

(804) 984-4255

HE HALL Electronics

Fidelipac 300 series carts, lg quantity, various lengths, most in xint cond, some new, \$3 or \$4/ea+shpg. M Sophos, WDFH, 21 Brookside LN, Dobbs Ferry NY 10522. 914-693-3963.

ITC Delta Stereo rcd/ply, 1k new, works great, \$1000/BO. C Scherer, WMMS, 200 Skylight Office Tower, 1660 W 2nd St, Cleveland OH 44133. 216-781-9667.

Pacific Recorders Tom Cat (12) PB, Tom Cat (4) R-P, Micromax (2) R-P, in use, well maintained, will inc good stock of spare parts, we want to sell them all. C Murray, KMGF, 503-484-9400.

RCA/BE RT120 Series stereo R/P, rebuilt; PB machine, manuals, spare parts, new carts, \$1300/all or BO. J Stromquist, WNCB, 2828 Piedmont Ave, Duluth MN 55811. 218-722-3017.

Sono-mag Corporation 350 Carousel (3) 24 tray, stereo, good condition, plus spare parts, all \$750+shpg. Larry, WXLPL, Davenport IA, 319-326-2541.

Tomcat and Micromax; Otari Mark II 8 trk w/DBX; Splicefinders, compressors and more. J Rivers, KTLV, Dallas. 214-630-9400.

UMC Beacart 201-121-049 ply only deck, no top cvr, \$150/BO; BE 2100 ply only, missing top & bottom cvrs, \$150/BO. R Thompson, KLON-FM, 1288 N Bellflower, Long Beach CA 90815. 310-985-5566.

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

Want To Buy

BE 3-deck cart mach, motors must be rebuildable, \$100. D Rust, BE, 217-224-9600.

Fidelipac ESD10 cart eraser/splice finder or similar. J Steele, WKBX, 111 N Grove, Kingsland GA 31548. 912-729-6000.

UMC Bearcart, cart machines, will pay \$50 non-working, up to \$125 working. Don, WMCR, 601 22nd Ave, Meridian MS 39307. 601-693-1450.

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

CASSETTE & REEL-TO-REEL RECORDERS

STUDER SERVICE SPECIALIST

Thousands Served • Unbeatable Rates
Precision Capstan Resurfacing

Audio Advantage

Tel (615) 742-3834

PRICE-QUALITY-SERVICE
Let Us Prove It

Want To Sell

Otari 5050-SHD 8 trk 1/2" newly rebuilt, heads have full, life left, \$1800. W Gunn 619-320-0728.

Antique wire & tape rcds, Ampex 400, vry early, Brush sound mirrors 403, 401, Webcor, Pentron electrocordr ekotape, sell or trade, SASE for list. W Kremer, 301 SW 16th St, Ft Lauderdale FL 33315. 305-524-5652.

Cetec/Gauss 1250B cassette tape quality control machine, working condition, \$300. B Kennedy, EMC Production, 300 York Ave, St Paul MN 55101. 612-771-1555.

Fostex RB 8-trk 1/4", nvr used, \$1800. J Davis, 706-655-2145.

REVOX PARTS/SERVICE

Cassette-CD-Open reel
Rebuilt A77s, \$850.⁰⁰
Capstan resurfacing, ALL BRANDS.
JM TECHNICAL ARTS
30 Music Sq. W. #156
Nashville, TN 37203 (615) 244-6892

MCI JH110B 2 trk, roll around metal cab, gd cond. J Gelo, J & H Programming, POB 1697, Marco Island, FL 33969. 813-642-6899.

Ampex 440-B (2) 1/4" 7.5 ips, full track, gd cond, \$700/ea; Ampex 351 1/4", 7.5 ips, full track rcd w/Novonics 361 electronics, working cond, \$500. B Kennedy, EMC Prod, 300 York Ave, St Paul MN 55101. 612-771-1555.

Ampex 350 series plybk only deck, mono, 4-tube amp, works great, BO. S Smith, KBFW, 360-734-8555.

Panasonic port DAT mach, low hrs, all accessories, incl fact svc manual, fresh bait, \$800. P Carson, Carson Conslts, Rt 32 Box 73, W Friendship MD 21794-0073. 202-288-6332.

Ampex ATR 100 (2) 4 trk \$3500 ea, 2 trk 1/2" \$4000, (2) 2 trk 1/4" \$2500 ea. 212-343-0265.

CLEAN PATCH BAYS NO DOWN TIME



VERTIGO BURNISHERS AND INJECTORS RESTORE ORIGINAL PERFORMANCE TO YOUR PATCH BAYS

\$34.95 Ea. Plugs with the distinctive Vertigo design are available in 1/4" and 1/2" sizes.

VERTIGO RECORDING SERVICES

1215 Magnolia Blvd. #116 818-907-5161
North Hollywood, CA 91607 fax 818-784-3763

Technics 10A02 R-Rs (2) + 1 for parts, Best Offer. J Pierce, KMZQ, 702-595-5705.

Radio Systems RS-DAT (3), RS-670's in good condition, no rack mounts, \$1500/ea OBO; RS-1000 with rack mount, \$1900/BO; Otari ARS-1000 PB machines in good condition, \$425 ea/OBO. C Barniowski, WLPE, 706-733-8201.

Revox B-77 1/4-trk 3 3/4x7 1/2 ips, \$450. G Grassie, RNTC Bdcng, POB 146, Dexter NM 88230-0146. 505-734-5565.

Uher CR134 cassette, \$195; DAT decks with new heads \$550, Tascam ATR 60 8 track with stand, remote, \$3250; Otari 5050-8 no hrs on heads, \$1595; Ampex 440B-8, \$2450; Tascam 25-2, \$695; Ampex ATR700, \$695; Scully 16 track 2", \$3450; Tascam 52 top of line, \$950; M79-24 fully rebuilt, \$11,500; Tascam locator for 85-16, \$495; Fostex E22 1/2" timecode deck, \$1400; Fostex A80 8 track with 450 mixer, \$1350; Tascam 5, \$450; Nagra 10" reel adaptor, \$950. W Gunn, POB 2902, Palm Springs, CA 92263. 619-320-0728.

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

Creative Midwest farm boy seeks PM, prd in P3, desire FT; tape and resume. Dave, 612-693-6583.

Energetic broadcaster with 5 yrs public radio and TV experience ready to work where you are. Christopher, 402-551-4665.

Home with the armadillos, native Texan, recent broadcasting school graduate, seeks FT C & W on-air/productio position in TX. Buddy, 817-244-3724.

Fish waiting for bite, serious, energetic, witty AT, ready to move, any format, reel me in. Hilary, 612-623-3962.

Help! Country jock wants out of new/talk, 14 years experience, ready to work overtime, prefer Deep South or VA. Brian, 904-453-8849.

Pure Talent! Seeks bigger and better, willing to relocate, good attitude, great ethic, awesome pipes, 5 yrs exp. Kevin, 800-332-0983.

Exp sportscaster, looking for full-time position, have experience in College Basketball, Minor-League Football & various Baseball Games, attended & completed ESPN Sportscaster Workshop. R Lillard, 804-239-9758.

8 years major market experience, heavy engineering background, on-air, production, multi-track, copy, news, creative, funny, willing to relocate, radio or recording studio. Todd, 216-267-6834.

Attention K-Mart shoppers, blue light special, just graduated, wit, comedy, I make a mean crepe suzette, looking for prd/on-air position. Matt, 918-747-

Equipment installer looking for position, have experience with broadcast, audio, video, and telecommunications equipment. D Chapar, 203-698-0508.

Experienced middays, remotes, production, news, phones, and more, ready to relocate and work for your team. Angela, 405-573-0579.

Experienced creativity technician in promotions, prod and on-air, looking for FT employment in NE. Chad, 505-526-2561.

Hardworking programmer seeks to take your station to the next level, PD/management, exp. Roger, 615-235-6889.

Recent grad, creative, energetic, good worker, seeking first pro AT job, love writing and producing spots, will relocate. Tom, 612-866-9421.

Graduate seeks FT employment in any market, work hard at MD, PBP, AT, sales; tape & resume. Sean, 612-263-1728.

I just graduated from bdcng school, have terrific voice & am willing to travel & I'll get you the ratings! Micah, 405-588-3259.

Marketing/Promotion Director or Assistant, medium or large market desired, country or AOR format, budget minded & resourceful, sales experience, willing to relocate. Brian, 505-327-1771.

Multi-talented, colorful & diligent, seeks habitation at your station, see for yourself, will travel! Lynn, 405-628-3707.

New man on the rise, ambitious, dependable, recent grad seeks small/med market on-air, copywriting, sports, or prod position, any format, will relocate. Kenny 405-672-2756.

Engineer 20+ years experience, SE only. D Salter, 205-699-6425.

Tight board with smiling voice, good time personality looking for rock format. R Ray, 15 Crofoot Sandwich IL 60548.

"Quiet man"...but not quiet on the air, will travel, looking for christian or oldies format, seeking on-air & sales. Tim, 405-672-5763.

On-air personality seeks medium market, 5 year experience including programming and music direction. Drew, 717-530-1541.

On-air announcer with serious rock music background, talented production, versatile, intelligent & ready for work, will relocate. Chris, 405-741-8344.

Operations manager, traffic manager, news director, promotions, sales, you name it, looking for FT employment in NE. Natalie, 505-526-2561.

Radio rookie just out of school, eager & ready for an exciting career doing on-air, prod, or news, focusing on OK or KS. Gail, 405-758-1224.

Trustworthy young grad willing to relocate for job on-air, production, copy, news or sales. Steve, 405-672-9024.

Young AT/exp LA producer seeks FT AT & production, sales, ???, ready for next challenge, all formats and markets, will relocate. Ken, 213-661-6078.

JANET (502) 895-5888. Versatile, intelligent, great for start ups or existing stations, wants FT airshift, first PD gig, tired of false starts and unrated, small markets.

TRAINING SERVICES

FCC General Class License. Cassette recorded lessons for home study. Our 30th year. Bob Johnson Tele-communications, 1201 Ninth, Manhattan Beach, CA 90266. (310) 379-4461.

HELP WANTED

News Director for Central Illinois, AM/FM combo. Prior On-Air news experience a must. Send resume and references to W1ZZ/WSTQ, c/o G.M., PO Box 377, Streator, Illinois 61364.

CHIEF ENGINEER

Dominant 50KW New England FM seeks teamplayer Chief Engineer with strong knowledge of studio, transmitter maintenance and Novell network. Communication skills, positive attitude and desire to work with the best required. Minimum 5 years experience. Confidential replies to: Radio World, POB 1214 Falls Church, VA 22041 Attn: Box #95-3-8-01RW

Benchmark Communications, one of America's premier group owners is accepting applications for **RADIO STATION CHIEF ENGINEER** for present and future operations. A minimum of one year radio experience, and/or an A.A.S.E.E. or related field is required. S.B.E. certification, computer knowledge, and ham radio are pluses! Compensation is based on experience, education, and professional qualifications. You must include verifiable work, education, salary history and references. **No phone calls or faxes.** Equal opportunity employer. Deadline: April 15, 1995. Reply to: Jerry E. Brown, CPBE Director of Engineering Benchmark Communications 168 Business Park Drive, Suite 201 Virginia Beach, VA 23462

CHIEF RADIO ENGINEER PART-TIME

Need person with 4 years experience in broadcast engineering or electronics degree to maintain technical operation/management of 100,000 watt university radio station. FCC license and SBE certificate required. \$13,201-\$15,841. Send resume to: **GSU Employment/Job #5306** One Market Place South, Ste. 340 Atlanta, GA 30303 By March 31, 1995 AA/EOE/ADA

CHIEF ENGINEER

50KW and 5KW full-time AM seeks chief engineer. Experience with remote broadcast, studio & transmitter maintenance and directional AM required. Minimum 3 years experience. SBE certification is a plus. Based on knowledge and experience. Potential 40K salary. Send resume, references and salary requirements to: **Jesse Garcia, WXXQ/WFRL** 483 N. Mulford Rd. Rockford, IL 61107 EOE

CHIEF ENGINEER RADIO STATION

North Jersey powerhouse **WMTR/WDHA** is looking for an experienced Chief Engineer. Successful candidate must be proficient in FCC rules and regulations, AM and FM transmitter operations and maintenance, AM directional antenna systems, automated satellite format delivery, remote broadcasts, studio maintenance and construction, telephone hybrid systems, and computers. Must be able to work in a fast-paced environment, for two highly active North Jersey radio stations, and be able to generate and maintain budgets. E.O.E.

Please forward resume to:
Business manager
WMTR/WDHA Radio
55 Horsehill Road
Cedar Knolls, NJ 07927
or Fax 201-538-3060

STAFF ENGINEER

Indianapolis FM-FM/AM three person engineering department seeks person with strong transmitter & studio knowledge. Good communication & people skills a must. Minimum 5 yrs broadcast engineering experience. FCC license, computer network, digital audio a plus. Send resume & salary requirements to: **Dan Mettler** WFBO/WRZX/WNDE 6161 Fall Creek Rd Indianapolis, IN 46220 E.O.E.

HELP WANTED: Any company or station can run "Help Wanted" ads for \$1.50/word or buy a display box for \$60/column inch. Payment must accompany insert, use your MasterCard or VISA; **there will be no invoicing.** Blind box numbers will be provided at an extra charge of \$10. Responses will be forwarded to listee, unopened, upon receipt. Call 800-336-3045 for details.

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

Call Simone for more information: 703-998-7600

CASSETTES/R-R...WTS

Studer A710 stereo cass deck, \$595. R Sumner, CAVU Corp, 44632-112 Guilford Dr, Ashburn VA 22011. 703-450-2288.

ITC Reel-to-Reel Specialists.
Complete stock of spare parts.
Motor rebuilding and heads
for both reel-to-reel and
cart machines.

VIF INTERNATIONAL
PO Box 1555
Mtn View CA
94042 U.S.A.

Inside USA: 1-800-848-4428
Outside USA: 1-408-739-9740
FAX: 1-408-739-0809

Otari Mark II-IV 1/2" 4-track, multi-track, mint, less than 50 hours, Best Offer. R Kaufman, Pams Productions, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

Scully '100' recorders, record/play amplifiers, 8, 16, 24 track heads. Sequoia Electronics, 4646 Hounds-haven Way, San Jose CA 95111. 408-363-1646.

Long Life MEC Tape Heads
One year warranty
Flat response of
±1dB 35 Hz to 16 kHz

SEQUOIA ELECTRONICS
(408) 363-1646
FAX (408) 363-0957

Teac 3440 4-track recorder, \$700; Ampex 601 1/2-track recorder, \$100; Ampex 440B full-track recorder with roll-about cart, \$600. P Lenz, WWSW, One Allegheny Sq, Pittsburgh PA 15212. 412-323-5300.

Tascam TSR-8 8 trk, mint, less than 10 hrs, inc remote, \$1950/BO. R Crabtree, 313-848-6453.

Want To Buy

Any working R-R, or non working, players or recorders. Don, WMCR, 601 22nd Ave, Meridian MS 39307. 601-693-1450.

Nagra 4.2 rcdrs, 16mm Arriflex-S & Bolex equip, Sync sound motors for Arriflex & any 35mm Lecias for studio prod. Henry, 914-949-5920.

Ampex ATR100 taperecorders for parts. Circuit cards, heads, motors, machine parts, or electronic parts. Call 818-907-5161.

CD PLAYERS

Want To Sell

Cyberx 50' keyboard and monitor extender for mono/CGA/EGA, \$85. G Wachter, KFYI, 602-258-6161.

Otari MS 5050-B (2), 2 trk, mint cond, \$1900 ea/BO. C Barniowski, WLPE, 706-733-8201.

Studer A727 (3), \$300/ea. J Maples, WMYU, 8419 Kingston Pike, Knoxville TN 37919. 615-693-1020.

CONSOLES

Want To Sell

Bdct Electronics BE4M50A 4 pot, mono, new, nvr on line, all manuals, \$625. G Grassie, RNTC Bdcng, POB 146, Dexter NM 88230-0146. 505-734-5565.

Broadcast Audio Series II consoles (2), good condition, spare parts & manuals, 1 BE 150A console, exc cond w/manual, BO. J Pierce, KMZQ, 702-595-5705.

Collins 2125-1, good condition, with manual, \$250. J Stitzinger, 23800 Via Irena, Valencia CA 91355. 805-259-2011.

Collins port 808A-1 console with dual turntable, mono, \$300+shipping. Larry, WXLN, Davenport IA, 319-326-2541.

Gates Stereo Yard, fair condition, prefer pick-up, \$200; Gates mono board, Octal-Base tube type, prefer pick-up, \$100. R Blair, Columbia School of Bdcng, 5808 Columbia Pike, Baileys Crossroads VA 22041. 703-820-2020.

LPB S-15A, 8 pot, 24 input, mono, exc cond, \$1300. J Wilsbach, WMSS, 214 Race St, Middletown PA 17057. 717-948-9136.

Shure 675 remote prod master, \$100/BO. P Lenz, WWSW, One Allegheny Sq, Pittsburgh PA 15212. 412-323-5300.

Shure M67 (2), \$100/ea. J Maples, WMYU, 8419 Kingston Pike, Knoxville TN 37919. 615-693-1020.

Wheatstone SP-5A 8-trk, used for 6 yrs, good condition, 2 mic-10 line inputs, \$8000. R Scott, WHFS, 8201 Corporate Dr, Landover MD 20785. 301-306-0991.

Mackie 1604, \$575; Soundcraft Spirit 24x24, \$3950; Ramsa 820 20x8x16 w/meter bridge, \$1950; Quantum 23x16x24 as used by LA Philharmonic, \$4950. W Gunn, POB 2902, Palm Springs CA 92263. 619-320-0728.

Want To Buy

Ramko DC-38 need 4 ins input card, working or not. D Roberts, WDUZ, POB 310, Green Bay WI 54305. 414-468-4100.

Neve consoles: any condition or parts Also: UA, UREI, Teletronics, Fairchild, RCA, Pultec, API, any TUBE GEAR or COMPRESSORS Call 201-798-2745 or fax 201-963-4764

Western Electric 23-A any WE-23 Series console or associated equip. S Horner, KMRD, 2310 Ponderosa, Camarillo CA 93010. 619-535-1210.

Neve console, any type and parts. 212-343-0265.

DISCO-PRO SOUND EQUIPMENT

Want To Sell

Crown D-75 monitor amplifier, \$250. J Maples, WMYU, 8419 Kingston Pike, Knoxville TN 37919. 615-693-1020.

Quad 8 RV-10 spring reverb, good cond, \$50. B Kennedy, EMC Prod, 300 York Ave, St Paul MN 55101. 612-771-1555.

Yamaha 4115 PA speakers w/15" & horn, \$400/BO; Cerwin-Vega PD-3 speakers 15" 3-way, \$300/BO. P Lenz, WWSW, One Allegheny Sq, Pittsburgh PA 15212. 412-323-5300.

EBS EQUIPMENT

Want To Sell

NEW REQUIRED EBS SHORT-TONE Decoder Mod. Kits
Easy - Low Cost - FCC legal!
1-800-669-3993
MC - Visa - American Express

FINANCIAL SERVICES

EQUIPMENT LEASING

Excellent rates • Fast approval

Call for quote

Jon Fugler, Broadcast Innovations
(805) 594-1235

EQUIPMENT FINANCING
ON ALL RADIO EQUIPMENT

- Easy to qualify
- Fixed-rate, long-term leases
- Any new or used equipment
- 100% financing, no down payment
- No financials required under \$50,000
- Refinancing existing equipment

ENF EXCHANGE NATIONAL FUNDING

Call Mark Wilson (800) 275-0185

FINANCING
LOANS BY PHONE
(800) 699-FLEX

- We finance all types of Broadcasting Equipment
- Flexible Credit Criteria
- Flexible Payment Plans
- No Down Payment, No Payments For 90-Days Available

To apply or request additional information call Jeff Wetter.

FLEX LEASE, Inc.

LIMITERS

Want To Sell

Symetrix 421 AGC/leveler, mint, \$375/bo. R Crabtree, 313-848-6453.

THE Purple Processor™
Finally! A loud, clear and DYNAMIC FM processor without the grunge! We can prove it!
Call 1.904.622.7700 for a DEMO.

Ashley SC-50 (4) peak limiter compressors, \$50/ea. J Maples, WMYU, 8419 Kingston Pike, Knoxville TN 37919. 615-693-1020.

CRL FM processor pkg w/SPP-800 stereo prep processor, SEP-800 spectrum energy processor, SMP-850 stereo mod processor, & SG-800-A stereo gen, \$4000/pkg. L DuPree, KQID, 1115 Texas Ave, Alexandria LA 71301. 318-445-1234

Harris M5-15R stereo gen, \$1000/BO. R Thompson, KLON-FM, 1288 N Bellflower, Long Beach CA 90815. 310-985-5566.

Hnat-Hinde, prototype mic processor, \$50; CBS Audimax III, mono, nds wk, cleaning, \$50. S Schweiger, WXLO, 250 Commercial St, Worcester MA 01608-1721. 508-752-1045.

Orban 3100, \$1600. S McGrath, WGNY, 429 Little Britain Rd, Newburgh NY 12551. 914-561-2131.

Want To Buy

Fairchild 670 or 660 tube compressor/limiter, Teletronics LA-2A tube compressor/limiter or UREI LA-3A solid state compressor/limiter, call after 3PM CST. 214-271-7625.

MICROPHONES

Want To Sell

RCA 77 DX, 77 D TV grey, near mint, Altec 67D Es, Altec M-21s with power supplies, RCA BK 5, 74 JR, Shue 300 in box, Scott 410-C, Tube Sound lvl meter, sell or trade for other mics & tube gear, \$ASE for list. W Kremer, 301 SW 16th St, Ft Lauderdale FL 33315. 305-524-5652.

Telefunken tube mics, preamps, Hittler tube bottle mic, Neumann, Schoeps, Siemans tube mics. Will trade for RCA ribbon mics. Call before 10PM EST. 615-821-6099.

EV RE20's, \$275-325; Sony ECM377 large dia. cond mic, \$495; RCA 44BX matched set of 3, \$3950; Shure new SM7, \$395; AKG new D112, \$295; Crown GLM200 lavalier like new, \$125. W Gunn, POB 2902, Palm Springs CA 92263. 619-320-0728.

Shure SM-7 (2), exc cond, \$275/ea. B Kennedy, EMC Prod, 300 York Ave, St Paul MN 55101. 612-771-1555.

RCA 44BX will trade for condenser mic from 1920's or 30's. J Steele, WKBX, 111 N Grove, Kingsland GA 31548. 912-729-6000.

Want To Buy

RCA mics for collection or trade, on-air lights, recording lights. J Phillips, 414 Washington, Defiance OH 43512. 419-782-8591.

77-DX's, 44-BX's, WE KU-3A's On-Air lights, recording lights & audition lights. Top price paid. Fast response. Bill Bryant Management, 2601 Hillsboro Rd, G12, Nashville TN 37212. 615-269-6131, FAX: 615-292-3434.

RCA ribbons, AKG 451's, Neumann KM84's, EV 635A. W Gunn, POB 2902, Palm Springs CA 92263. 619-320-0728.

RCA 77DXs/44BXs ribbon, chrome/TV grey, gd cond, BO. R Kaufman, Pams Productions, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

MISCELLANEOUS

Want To Sell

Abco 500-cart lazy susan (2), \$100. P Patton, WWAM, POB 279, Jasper IN 37347-0279. 615-942-1700.

Gentner Microtel telephone-tape interface, barely used, \$215. Bill, 617-266-4220.

Sony 48V phantom pwr sup, as new cond, \$50. B Kennedy, EMC Prod, 300 York Ave, St Paul MN 55101. 612-771-1555.

Modulation Sciences CLD-2500 composite line driver syst, \$1000. S Schweiger, WXLO, 250 Commercial St, Worcester MA 01608-1721. 508-752-1045.

High voltage transformer, 208-220 volt input taps (3), 2900-3300 volts out at 600 MA, \$180+shpg; High voltage choke, 10 Henry, 10 KV, \$80+shpg; High voltage filter capacitors, 2 5mfd, 7500 volt, 1 20mfd, 2000 volt, 1 10mfd, 2000 volt, no PCBs, \$20/each. K Lamson, 510-447-7405.

AUDIO TRANSFORMER MAGIC



9K-600-6

audisar
P.O. Box 1561, Bellevue, WA 98009
206-454-2040

Circle (17) On Reader Service Card

Gentner SPH-5A phone hybrid, \$400/BO; Titus MLW-1 auto audio switch, \$900. T Ray, WTIC, 203-522-1080.

Topaz 15 kVA true UPS w/batteries, 3 phase in, 1 and 3 phase output, \$1995. G Wachter, KFYI, 602-258-6161.

Want To Buy

Neil Terrell Tiger Tape sides 11 & 12; Book by Powell, "How To Rund Station, Everything You Wanted To Know." C Adams, WKUZ, POB 342, Wabash IN 46992. 219-563-4111.

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

DISTRIBUTOR DIRECTORY

The following distributors serving the broadcast industry would be glad to help you with any of your requirements.

CORNELL-DUBILIER MICA CAPACITORS
FROM STOCK

JENNINGS VACUUM CAPACITORS
FROM STOCK

JENNINGS VACUUM RELAYS

SURCOM ASSOCIATES
2215 Faraday Ave., Suite A
Carlsbad, California 92008
(619) 438-4420 Fax: (619) 438-4759

...country, top 40, news, urban, talk, jazz, the classics, mixed bag...

RADIO! The beat goes on!

CROUSE-KIMZEY OF ANNAPOLIS
tops in broadcast equipment
1-800-955-6800
ask for Kathleen

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



Call Simone Mullins, Classified Ad Manager, to reserve space in the next issue. Use your credit card to pay, we now accept VISA and MASTERCARD.

RadioWorld
5827 Columbia Pike, 3rd Floor, Falls Church, VA 22041

Select from these categories for best ad positioning:

Acoustics	Consoles	Software
Amplifiers	Disco-Pro Sound Equip.	Stations
Antennas & Towers & Cables	Financial Services	Stereo Generators
Audio Production (Other)	Leasing	Tapes, Carts & Reels
Brokers	Limiters	Tax Deductable Equipment
Business Opportunities	Microphones	Test Equipment
Cart Machines	Miscellaneous	Transmitter/Exciters
Cassette & R-R Recorders	Monitors	Tubes
CD Players	Receivers & Transceivers	Turntables
Computers	Remote & Microwave Equip.	Positions Wanted
	Satellite Equipment	Help Wanted

Classified Advertising Rates Effective January 1, 1994

	1x	3x	6x	12x
1-9 col inch (per inch)	\$60	58	54	49
10-19 col inch (per inch)	55	52	49	44
Distributor Directory	100	95	90	85
Professional Card	65	60	55	50
Classified Line Ad		\$1.50 per word		
Blind Box Ad		\$10 additional		

To compute ad costs: Multiply the number of ad inches (columns x inches) by the desired rate schedule for your per unit cost. Example: a 3" ad at the 1x rate is \$180, at the 3x rate \$174, at the 6x rate \$162, at the 12x rate \$147, etc.

MONITORS

Want To Sell

Belar SCM-1 SCA modulation monitor, \$900. M Persons, WJYY, 40 Front St, Brainerd MN 56401. 218-829-1326.

McMartin TBM 1005D FM rebroadcast receiver, new, for rebroadcasting, simulcasting, translators or monitoring of RF, modulation, or injection. ALSO: (used) AM/FM modulation monitors, Buy or Sell, Repair & Calibrate McMartin, Belar. Call Goodrich Ent Inc., 11435 Manderson St., Omaha, NE 68164. 402-493-1886 fax 402-493-6821

Belar SCM-1. SCA monitor, \$150; Midland 23-148 voltage regulator, \$50. J Maples, WMYU, 8419 Kingston Pike, Knoxville TN 37919. 615-693-1020.

Want To Buy

Potomac AM-19 at least 5 towers. G McClintock, WNQM, 1300 WWCW Ave, Nashville TN 37218. 615-255-1300.

RECEIVERS & TRANSCEIVERS

Want To Sell

ICOM IC-V100 2-way radio syst, w/pwr sply, req ICOM programmer to set freqs, \$1200. S Schweiger, WXLO, 250 Commercial St, Worcester MA 01608-1721. 508-752-1045.

GE Superadio III, custom modified w/noise free SCA w/improved selectivity & sensitivity, \$95. Other modifications avail. Performance guaranteed. **800-944-0630**

Racal RA6790/GM tunes 500 kHz to 30 MHz, synth, AM, FM, CW, SSB, two LCDs, 5 filters, \$1450; ICOM IC-H2 VHF handy-talky, 2-chnl, more than 2.5 W output, w/drop-in desk chrgr, new NiCad batt pack & antenna, manual, commercial band, \$125/ea. R Sumner, CAVU Corp, 44632-112 Guilford Dr, Ashburn VA 22011. 703-450-2288.

SCA RECEIVERS—ALL TYPES

Reading Service / Ethnic / Data Professional / Table Will work to meet your receiver needs

DAYTON INDUSTRIAL CORP. (Manufacturer) 2237 Industrial Boulevard Sarasota, FL 34234 Tel: 813 351 44545 FAX: 6081

Scott 800-B in Chippendale console & spare chassis set, Collins 51-J-4, Communications rcvr, BO: Zenith 3000-1 recapped, vry nice, \$150/BO; sell or trade for tube bdct gear, vintage mics, SASE for list, W Kremer, 301 SW 16th St, Ft Lauderdale FL 33315. 305-524-5652.

Sony ICF 9660 AM-FM-TV sound rcvrs (2), \$25/ea+shpg. G Runn, N CA News, 5383 Willow Lake Ct, Byron CA 94514. 510-516-0299.

Yaesu FRG-7 communications receiver, AM/SSB/CW .53-30 Mhz, \$150+shpg. M Saady, 1st City Rec, 213-05 75 Ave, #2L, Bayside NY 11364.

REMOTE & MICROWAVE EQUIPMENT

Want To Sell

Switched 56 CSU/DSU INC model 1056 rack mount, \$250. G Wachter, KFYI, 602-258-6161.

RENT IT HERE! Call Steve Kirsch for Details

COMREX
1, 2, & 3-Line Extenders
Switched 56/ISDN Systems

TELOS
Zephyr
Digital Phone Hybrids

GENTNER
FTT 3100 3-Line Extenders

SHURE
FP-410 Automatic Mixers

REMOTE AUDIO PACKAGES

SILVER LAKE AUDIO • 516-623-6114 • FAX: 516-377-4423

Gentner VRC-1000 and VRC-2000, dial-up remote cntrls, M Persons, WJYY, 40 Front St, Brainerd MN 56401. 218-829-1326.

CCS Micro 56 56 kB digital codec sys w/codec box (2), and modem (2), V35 cables (2), \$3000. R Cowell, KNTR, POB 308, Ferndale WA 98245. 206-384-5117.

Marti STL8-950 STL xmtrs (2, non-cert), on 951.375 & 951.625 MHz, nds wk, cleaning, \$400/ea; Marti R200-950 STL receivers (2), on 951.375 & 951.625 MHz, nds wk, cleaning, \$400/ea; Marti SCG-8H subcarrier gen, on 67 kHz, nds cleaning, \$300. S Schweiger, WXLO, 250 Commercial St, Worcester MA 01608-1721. 508-752-1045.

Marti SCG-10 subcarrier gen, 39khz, \$200/BO; Marti SCG-10 subcarrier detector, 39khz, \$200/BO; Coastcom SSB subcarrier system, 67khz-102khz, \$350/BO; TFT remote control system, \$800/BO. T Ray, WTIC, 203-522-1080.

Moseley TPR-2 STL rcvr transfer panel, \$75. J Maples, WMYU, 8419 Kingston Pike, Knoxville TN 37919. 615-693-1020.

WE RENT

TELOS ZEPHYR

QEI QUICK-LINK
Stereos RPU, NO License

COMREX
3-line extender

Frank Grundstein
Audio/Video Consultants
610-642-0978

MCI PTS10/PRS10 Composite STL 945 5, BO. J Pierce, KMZQ, 702-595-5705.

VRC 1000 remote control unite, \$1500. J Maples, WMYU, 8419 Kingston Pike, Knoxville TN 37919. 615-693-1020.

Mosely TRC-15, taken out of svc in upgrade, manuals, \$700+shpg. R Peterson, KDMO-AM, 221 E 4th, POB 426, Carthage MO 64836. 417-358-6054.

Mosley PBR-15 remote cntrl, both ends, \$100. P Lenz, WWSW, One Allegheny Sq, Pittsburgh PA 15212. 412-323-5300.

Studer Automatic Hybrid, 2 line telephone interface with manual, \$595. R Sumner, 44632 Guildford Dr, Ashburn VA 22011. 703-450-2288.

Symetrix 108 Broadcast phone system, 8 lines, 3 Hybrids, \$1000/BO. T Rusk or J Harvill, KSSN-KMVK, 501-227-9696.

SATELLITE EQUIPMENT

Want To Sell

BUY
Satellite Systems pays cash for Westwood One Radio Networks satellite receivers!

REPAIR

Satellite Systems repairs all major brands of satellite equipment, including the Fairchild Dori 384 and Scientific Atlanta. Our turn-around time averages under 24-hours. Plus, we provide pre- and post-service support along with a 90-day warranty.

SELL

Ariel Digital Satellite Receiver—5 cord slots, Fairchild compatible.

Zephyrus SCPC 700 System Receiver and other available models. Just call and ask!

SATELLITE SYSTEMS

Satellite Equipment for Radio
615 East Brookside
Colorado Springs, CO 80906
(719)634-6319 Fax: (719)635-8151

UNIVERSAL SCPC XE-1000

NEW!



SCPC BROADCAST AUDIO RECEIVER

New, affordable, frequency-agile receiver, direct channel entry by keyboard, selectable companding 1:1, 2:1, 3:1, wide/narrow bandwidth, de-emphasis selectable, 950-1450 MHz, line output 600 ohms, muting, transponder agile, LNB power supply, 50-channel memory, full baseband output, high-quality audio. Every needed feature at a sensible price (lowest in the industry). Write or call for full information on this quality receiver—the answer for your station. Networks call for prices.

Phone: (614) 866-4605 Fax: (614) 866-1201

UNIVERSAL ELECTRONICS, INC. 4555 Groves Road, Suite 12 Columbus, OH 43222
Communications Specialists Phone: (614) 866-4605 Fax: (614) 866-1201

Channel master Ku-band feed horns, without LNB, new, \$5/ea + shipping. G Finney, WPWB, 912-788-2124.

Comstream ABR 200 to to Super Radio's Adult Hit fm, \$1500. B Hearst, WCCR, 725 Wood St, Clarion PA 16214. 814-226-4500.

Modulation Assoc Audio 1 SCPC rcvr w/downconverter, fixed tuned to xponder 2, 64.5 mHz (2 units), \$3500/BO. R Thompson, KLON-FM, 1288 N Bellflower, Long Beach CA 90815. 310-985-5566.

SA 9000 10' dish with extender panels and Avcom 2 receiver and motor drive and LNA for \$300. You haul. D Hurd, Nova Earth Stns, E1111 Everett, Spokane WA 99207. 509-483-2473.

Full inventory of commercial, high-stability +/-100 kHz or PLL +/-15 kHz LNB's, C-Band, Ku-Band. A must for digital or SCPC reception. Low competitive prices. SCPC commercial frequency agile receiver. Other hard-to-find commercial broadcast satellite products. Call for prices. Universal Electronics, Inc. 614-866-4605, FAX: 614-866-1201.

SOFTWARE/DATABASES

Want To Sell

PC SOFTWARE for Broadcasters. Traffic, Billing, & Accounting. Powerful, inexpensive. Works with automated, satellite or live operations. INTERFACES with popular DIGITAL AUTOMATION SYSTEMS. Try it for 60 days, no obligation.
Absolute Broadcast Automation
Naples, Florida (813) 643-3689

ViewLogic ProSeries 5.5 schematic capture software for Windows, \$350; with ProSpice circuit simulator, \$450. G Wachter, KFYI, 602-258-6161.

U.S. RADIO STATION DATABASE: stand-alone program containing 11,825+ stations. Many searches, prints mailing labels. MAC/IBM (specify disk size). Visa/MC \$129.95/yr. (+quarterly updates):
1-800-626-2360 ext. 300
BBH Software, Inc.

Circle (86) On Reader Service Card

STATIONS

Want To Sell

10k AM, non dir, C-QUAM stereo, N Central AZ. 602-774-0864.

Building, property, transmitter in Tarkio MO. \$50,000. 816-542-0404.

FL 5 kW AM, day with night power, positive cash flow, NFL/college games, new tower/ground systems. \$290,000 w/land. Mark. 205-236-6484.

Last chance for full-time 1 kw AM in Central VA, excellent equipment, owner ret, license expires in '95, will lease or sell & finance, real estate, \$50,000/Best Offer-corp or assets. G Jones, 804-376-5354.

Orangeburg SC area (3 1/6 covers) WORC-FM, C3, 25,000 watts, new equipment, off air, owner ret, studio can be at Orangeburg or at transmitter site, STL included, no LMAs or leases considered, last full year approximately \$30,000 gross \$125,000 cash, assume \$30,000 equipment lease, rent site 20 years, buyout \$1500. C Jones, 803-492-7613.

1000 watt AM located in Southern New England; includes all studio and transmitter equipment; 400K or Best Offer. Serious buyers call 1-800-845-0338.

MANCHESTER NH 5kw-U WKBR, \$290k. Additional 46-acre site option. Bob 617-449-5618.

Want To Buy

AM & FM F/T combo, CP ok. 718-4328.

Couple willing to buy mail to med mkt FM in South/Southeast, reasonable. Otis, CCS Prod, POB 34321, Houston TX 77034. 713-944-1502.

CONSULTANTS

Consulting Communications Engineers

- Station improvement and modernization
- FCC Applications and Field Engineering
- Frequency Searches and Coordination
- AM-FM-CATV-ITFS-LPTV

OWL ENGINEERING, INC.
1-800-797-1338

1306 W. County Road, E, St. Paul, MN 55112 (612)631-1338 Member AFCCP

PC - SOFTWARE

AM FM TV Search Programs
Contour Mapping-STL Paths
RF HAZ-1990 POP Count
FAA Tower-Draw Tower

Doug Vernier
Broadcast Consultant
1600 Picturesque Dr
Cedar Falls, IA 50613

800-743-DOUG

EVANS ASSOCIATES
Consulting Communications Engineers

- TV • FM • AM • ITFS • Satellite
- FCC Applications, Design and Field Engineering
- Video/Data/Voice • Light Fiber & Microwave • Wide-Area Networks & STL's

210 S. Main Street
Thiensville, WI 53092
(414) 242-6000 • FAX (414) 242-6045
Member AFCCP

North America RF & Audio
Mirkwood Engineering Services

Broadcast and Telecommunications Consultants

Multidiscipline Engineering and Planning Firm including • Application & Allocation Services • Project, Engineering & Construction Management • Site Acquisition • Rural & Remote Site Installations • Field Service • Studio Design & Installation

50 Park Ave. Claremont, NH 03743
(603) 542-6784

W. LEE SIMMONS & ASSOC., INC.

BROADCAST TELECOMMUNICATIONS CONSULTANTS

5 Gracefield Road
Hilton Head Is., SC 29928
1-800-277-5417
803-785-4445
FAX: 803-842-3371

SERVICES

LOCATION SERVICES IN THE UNITED KINGDOM

Planning remotes from the U.K.? we provide a comprehensive service • we organize venues for your shows • we provide temporary equipment • live links via ISDN/Switched 56 • experienced radio engineers • we help you line up guests

Contact London (44) 81 442 8900
Good Morning from Great Britain
Wired for Sound Ltd., London N15

REMOTE EQUIPMENT RENTALS

COMREX and GENTNER

1, 2 & 3-Line Extender Systems
Now With The New TELOS ZEPHYR
MARTI VHF/UHF RPU Systems
ISDN & Switched-56 Systems
Call or FAX Dwight Weller
WELLER AUDIO-VISUAL ENGINEERING
Baltimore, Maryland
Phone: (410 or 800) 252-8351
FAX: (410) 252-4261

- Propagation Services
- FM Studies
- Population Studies
- FCC/FAA Databases
- LPTV Studies

Tower Sales & Erection

Think of Site Development in 7 states & Maryland
AM/FM Broadcast TV
Microwave Systems
Antennas & Towers

TOWERCOMM
Communications Specialists

637 Tusculum Dr
Raleigh, NC 27614
(919) 781-3344
(919) 781-6944

Where In The World Are You?

Reach radio professionals worldwide by advertising in Radio World's international edition.
Call Simone for more information.
1-800-336-3045

Communications Data Services, Inc.

800-441-0034
703-534-0034
fax 703-534-7884

6105-E Ariington Blvd,
Falls Church, VA 22044

MLJ

Moffet, Larson & Johnson, Inc.
Consulting Telecommunications Engineers

Two Skyline Place, Suite 800
5203 Leesburg Pike
Falls Church VA 22041
(703) 824-5660
FAX: 703-824-5672
Member AFCCP

MULLANEY ENGINEERING, INC.
Consulting Engineers

- Design & Optimization of AM Directional Arrays
- Analysis for New Allocation, Site Relocation, And Upgrades
- AM-FM TV LPTV Wireless Cable (MDS/MMDS/ITFS/OFS)
- Environmental Radiation Analysis •Field Work •Expert Testimony

9049 Shady Grove Court
Gaithersburg, MD 20877
Phone: (301) 921-0115
Fax: (301) 590-9757



Don't Gamble with your Advertising Dollars!

Advertise in Radio World and reach 22,000+ broadcast professionals.
Call Simone at 1-800-336-3045 today!

STATIONS...WTB

Former owners would like to buy AM, FM, combo or CP in small market. Robert, 210-680-5778.

Purchase, Lease to purchase, O&O - your dark, nearly dark, troubled or redundant AM, (FT,DT) FM, LPTV in Western U.S. Reply to Radio World, POB 1214, Falls Church VA 22041. Attn Box #: 95-01-25-01RW.

TAPES/CARTS/REELS & CD's

A&D
Cart Rebuilding
Do Bad Carts Have Your Temperature Rising?
Let A&D clean, load & pack your carts. They'll be serviced within 10 working days! *Guaranteed!*
3706 Vold Ct. 715-835-7347
Eau Claire WI 54601 Fax: 715-835-1151

Want To Sell

Ampex Grand Master 456/3M 226. 1/4" R-R tape for sale, some cut, some not, metal & plastic 10 1/2" reels, exc rcoing cond. \$10 metal, \$7.50 plastic. Glen, 205-672-7200.

Ampex 456 one carton of 10 on hubs, new, \$100 + shping. M Saady. 1st City Rec, 213-05 75 Ave, #2L, Bayside NY 11364.

AudioPak blue and black label, 3 1/2, 5 1/2 and 10 1/2 min, make offer on any quantity. C Barniowski, WLPE, 706-733-8201.

LP's, big band, MOR, Rock and Roll, contemporary, 1000s avail: 45's (1000+); complete Big Band, MOR, contemporary/oldies mix, recorded on Ampex 456 on metal 10 1/2" reels; J Gelo, J & H Programming, POB 1697, Marco Island, FL 33969. 813-642-6899.

RCA & Tapecaster cart players, \$75-\$150; Ampro cart recorder, like new, \$300; Spotmaster cart winder/timer, including 4 hubs of new cart tape, \$150. P Lenz, WWSW, One Allegheny Sq, Pittsburgh PA 15212. 412-323-5300.

Records 78 rpm, jazz, big band, 1916-40, excellent condition, make offer D Fields, Legacy Productions, POB 194, Avoca AR 72711-0194. 501-451-8803.

Scotch prod facility deleting classic rock library & logged classical music on 7" & 10.5" reels. Best Offer: 7" & 10.5" reels. \$35+shpg. D Pulwers, 703-751-9346.

Pams Jingles ref tapes, 1951-1976. Best Offer: R Kaufman, Pams Productions, POB 462247, Garland TX 75046. 214-271-7625.

MARATHON PRODUCTS COMPANY

Audio Cartridge Rebuilding Division

Rebuilding/reloading, like new, all brands, any length up to & including 3.5 minutes, \$1.95 ea. FOB out plant, 48 hrs delivery. (New rate effective 9/1/93)

New NAB Marathon cartridges prices on request.

35 Years professional experience!
Lifetime member AES R.D. MYERS Sr.
Manufacturers of Audio Devices,
Continuous Tape Mag.

69 Sandersdale Rd. Charlton, MA 01507
1-508-248-3157 or 1-508-853-0988

Circle (63) On Reader Service Card

Scotchcart II's, 380 between :20 & :30, excellent condition, \$1.25 ea; 96 slot wire Carousel, \$75. Stu, First Take Recording, 16128 Orchard Grove Rd, Gaithersburg MD 20878. 301-963-7758

Want To Buy

Broadcast group seeks FM comm station to lease/purchase in IN, IL, OH or MI. Vera, POB 428267, Evergreen Park IL 60642. Mr Stevens, 312-445-9200.

Records 1949-69 45 rpm LPs, R&R, R&B, Doo-wop, EZL, prefer promo material on vinyl, will consider polystyrene. D Fields, Legacy Prod, POB 194, Avoca AR 72711-0194. 501-451-8803.

Fidelipac/Audiopak Mastercart II gold or AA-4 light blue in 2:30 through 4:00 lengths, must be in vgc, call after 3PM CST. 214-271-7625.

TAX DEDUCTIBLE

Want To Sell

Community/public station needs studio equipment, tape recorders, mics, signal processors, consoles, software, computers, will ship, provide gift letter, tax documents. M Cohen, KGLP, 200 College Rd, Gallup NM 87301. 505-863-7625.

Non-profit religious school needs satellite equip to receive programming. Garrett, 915-533-4700.

Wanted, donation of used radio station/audio equipment for elementary school radio training programming, audio boards, microphones, nothing too old. R Jeranek, Washington Elem, Washington Ave, Union NJ, 908-851-6460.

TEST EQUIPMENT

Want To Sell

Fluke 8520A precision 5 1/2 digit digital multimeter, 2 and 4 wire measurements, math capabilities, IEEE 488 interface, \$485; Hewlett Packard 5006 digital signature analyzer w/probe & pods, \$195; Tektronix Polaroid C-30A scope camera, \$95. G Wachter, KFYI, 602-258-6161.

Fluke 8120A digital VOM, \$75; Tektronix 529 video waveform monit, \$100; Telegquipment TLD-54 25MB/auto trigger, dual trace scope, \$200. P Lenz, WWSW, One Allegheny Sq, Pittsburgh PA 15212. 412-323-5300.

Tektronix 400 MHz 4 trace 7834 storage oscilloscope frame, \$400; 7A13 differential comparator, \$200; 7A24 400 MHz dual trace amps (2), \$200/ea; 7B92A Dual time base, \$250; all for \$895. G Wachter, KFYI, 602-258-6161.

Hewlett Packard 332A distortion analyzer with AM detector, \$595; 333A DA, \$695; 334A DA with AM detector, \$795. R Sumner, 44632 Guilford Dr, Ashburn VA 22011. 703-450-2288.

Potomac AM-19 ant monit, 2-tower single pattern \$1000/BO; Potomac AM-19 remote meter panel, \$50/BO. T Ray, WVIC, 203-522-1080.

Tektronix 475A solid state port dual trace 250 MHz oscilloscope, like new, with manual & probe, \$1050. R Sumner, CAVU Corp, 44632-112 Guilford Dr, Ashburn VA 22011. 703-450-2288.

Tektronix C-4 oscilloscope/spectrum analyzer camera, \$90. M Persons, WJY, 40 Front St, Brainerd MN 56401. 218-829-1326.

WANT ACCURATE AM BANDWIDTH MEASUREMENTS THIS YEAR?

The Shielded Loop Antenna

- ▶ SUPERIOR NOISE REJECTION
- ▶ CALIBRATED
- ▶ 20-40 DB NULL @ 90 deg

AM-FM FILTERS & LOOPS

CHRIS SCOTT & ASSOCIATES
BOWLING GREEN, KY
FAX: 502-781-1232
PH: 502-781-5301

Want To Buy

Wattmeter to measure 50-120 watts on AM band. J Robinson, KOMW, Box 151, Omak WA 98841. 509-826-0100.

TRANSMITTERS

Want To Sell

Harris FM 1K with MS-15 exciter, \$6800; Technical Material 25 kW 50 ohm, RF load, \$950. D Harry, POB 128, Los Gatos CA 95031. 916-624-3431.

Collins 20V-3, excellent condition, compl with spare parts, \$3500. J Sitzinger, 23800 Via Irana, Valencia CA 91355. 805-259-2011.

Harris 3.5kW FM xmtr, 7 yo, excellent condition, \$15,000. M Wodlinger, 813-262-1118.

BE FX-30 FM solid state exciter, \$2995. Max, KCMJ, Box 551896, Dallas TX 75355. 800-891-006.

Continental 802A FM exciter; Harris/Gates FM-2.5H3 transmitter; Orban 8100A FM Optimod with 022 card; ERI LP-2 bay rototiller antenna; Belar FMM2 and FMS2 monitors. All in good to like new condition. Chris 816-628-5959.

THE Purple Processor™

Finally! A loud, clear and DYNAMIC FM processor without the grunge! We can prove it!
Call 1.800.732.7665 for a DEMO.

1972 CCA 10 kW, gd cond, \$10,000. M McNeil, Guardian Comm, 800 Compton Rd, Cincinnati OH 45231. 513-931-8080.

Harris SX 5-A, 1989, solid state 5k transmitter, excellent condition, tuned to 1410 khz. \$23,000/BO. G Richardson, WJLD-AM, 1449 Spaulding Ishkooda Rd, Birmingham AL 35211. 205-942-1776.

Continental 317-C2, 50,000 W AM, good condition, \$15,000 FOB Jacksonville; Gates FM-20 H3, 20,000 W FM, fair condition, \$10,000 FOB Jacksonville. P Christensen, Prism Broadcast, 3101 University S, Jacksonville FL 32216. 904-783-3711.

Used equipment for sale: Belar SCM-1, Belar RFA-1, Belar FMS-1, Belar FMM-1, Moseley MRC 1600 syst, TFT EBS receiver/generator, Genlner patch panel, and Harris racks. Call Transcom Corp 800-441-8454 or 215-884-0888.

Want To Buy

QE1 675 FM exciters; QE1 675T150 amplifiers; QE1 675T300 amplifiers; QE1 675T500 amplifiers. Call Bob Brown 609-232-1625.

McMartin AM/FM xmtr, any model, exciter or stereo modules. Goodrich Ent., 11435 Manderson, Omaha NE 68164. 402-493-1886.

TUBES

Want To Sell

ECONCO

Quality Rebuilt Tubes
Approximately 1/2 the Cost of New

Call for Our Price List

800-532-6626

916-662-7553

FAX 916-666-7760

Circle (66) On Reader Service Card

TRANSCOM CORP.
Serving the Broadcast Industry Since 1978

Fine Used AM & FM Transmitters and Also New Equipment

For the best deals on Celwave products, Andrew cable and Shively antennas.

1 kW FM 1978 Collins 831C-2	1 kW AM 1980 Continental 314R-1
1 kW FM 1975 RCA BTF 1E2	5 kW AM 1977 RCA BTA 5L
3 kW FM 1980 CSI 3000E	10 kW AM 1974 CSI T-10-A
3 kW FM 1974 Harris FM3H	
5 kW FM 196? Gates FM5B	
10 kW FM 1968 RCA BTF 10D	
20 kW FM 1976 Harris FM20H/K	

1077 Rydal Road #101
Rydal PA 19046
800-441-8454 • 215-884-0888 • FAX No. 215-884-0738

Circle (132) On Reader Service Card

You Need It... WE MAKE IT!

Your one call for Quality, Reliability and Economy in FM transmitters

- **SST Series** — Low Power Solid State FM from 30 to 500 watts.
- **Legend Series** — Medium Power Solid State FM 1 to 11KW
- **ECO Series** — Medium Power Grounded Grid Triode, Single Tube FM from 4 to 11 KW.
- **MK Series** — Medium and High Power Grounded Grid Triode, FM from 1.5 to 50 KW

The ECO - 10

"The Transmitter People"
Energy-Onix
518-828-1690
FAX: 518-828-8476
752 Warren Street, Hudson NY 12534

Circle (21) On Reader Service Card

TUBES..WTS

REBUILT ELECTRON TUBES
 Partial List: 6623, 23791, TH150, 6425F, 5604, 6696, 6697, 5681, 5682, 5671, 7804, 3CX10,000H3, 3CX20,000H3, 4CX5000A, 4CX35,000C

Worn out power tubes purchased

Vacuum Tube Industries, Inc.
 1-800-528-5014
 508-584-4500 X75

Vacuum capacitors glass, variable & fixed, most sizes and voltages. L Entz, KGEI, 1406 Radio Rd, Redwood City CA 94065. 415-591-7374.



Svetlana ELECTRON DEVICES
 Quality Power Tubes

3CX15,000A7	4CPX800A
3CX15,000A3	4CX400A
3CX10,000H3	4CX350AC
3CX10,000A7	4CX350A/8321
3CX3000F7/8162	4CX250R/7580W
3CX3000A7	4CX250BT
3CX2500H3	4CX250BC/8957
3CX2500F3/8251	4CX250B/7203
3CX2500A3/8161	4X150A/7034
4CX15,000A/8281	5CX1500B
4CX10,000D/8171	5CX1500A
4CX5000A/8170	YC130/9019
4CX3500A	8560AS
4CX1600U	811A
4CX1600B	833A
4CX1500A	833C
4CX800A	833C

• Watch this list grow.
 • Shipment from USA stock.
 • Manufactured in Russia's largest power tube factory.
 • Generous warranty based on high quality.
 • Honest prices based on quality at low cost.

See Us At NAB '95 in Booths 5313/5314

Broadcasters
 Phone: 800-239-6900
 205-882-1344
 FAX: 205-880-8077
 OEMs, Distributors
 Phone US: 809-578-3852
 Int'l & US: 415-233-0429
 FAX: 415-233-0439

Circle (124) On Reader Service Card



Power You Can Trust

Power Grid Tube Remanufacturing with New Tube Processes

Call 800-414-8823



Circle (43) On Reader Service Card

Want To Buy
 Western Electric 357A or 357B. 350A. 331A. 349A. P Patton. WWAM. POB 279. Jasper IN 37347-0279. 615-942-1700.

Freeland Products, Inc.
 75412 Highway 25
 Covington, LA 70435

Serving the World with Quality Since 1940



SAVE MONEY ON TRANSMITTER TUBES. WE REBUILD YOUR DUDES (USED TUBES) AT ABOUT 1/2 OF THE NEW TUBE PRICE. WE REBUILD TRIODES, TETRODES, TELEVISION, RADIO AND INDUSTRIAL TUBES, AND UHF KLYSTRONS.

CALL TODAY
(504) 893-1243
 FOR A FREE INFORMATION PACKET

TURNTABLES
Want To Sell
 Russco FMSB preamps (4), \$25/ea; Technics SP-15 TT/Russco tonearm, \$175. J Maples. WMYU. 8419 Kingston Pike. Knoxville TN 37919. 615-693-1020.

Technics SP-25 turntables (2), \$150/each; Audio-Technica ATP-12T tone arms (2), \$150/each; Stanton 680SL cartridges (2), \$30/each; ATI P-100 phono pre-amps (2), \$200/each; ATI P-1000 phono pre-amp, \$275. S Schweiger. WXLO. 250 Commercial St. Worcester MA 01608-1721. 508-752-1045.

Technics SP-25 turntables (5), 3 with covered base, AudioTechnica tone arms, Audiometrics pre-amps, Best Offer. J Pierce, KMZQ, 702-595-5705.

Technics SP-10 MK-II turntables (2), no bases, tonearms or pre-amps, have power supplies. \$350/ea/Best Offer. T Ray, WTIC, 203-522-1080.

Technics SP-15 with Micro-trak tonearm, \$200/BO. P Lenz, WWSW. One Allegheny Sq, Pittsburgh PA 15212. 412-323-5300.

Technics SL-1800 (2), direct drive, working, \$50/ea. B Kennedy, EMC Prod. 300 York Ave, St Paul MN 55101. 612-771-1555.

The advertising deadline for the April 5 issue of Radio World is March 10, 1994

ADVERTISER INDEX

This listing is provided for the convenience of our readers. Radio World assumes no liability for inaccuracy.

Page No.	Advertiser	Reader Service No.	Page No.	Advertiser	Reader Service No.
6	ATI	85	36	Harris Allied	4
31	ATI	117	42	J Squared Technical Service	94
30	AddieTech Inc.	141	45	J&I Audio/Video	90
34	Air Corp	144	39	Joslyn Jennings Corp.	151
26,27	Arrakis	77	49	Marathon Products	63
3	Audio Broadcast Group	25	34	Martin Leasing	29
40	Audio Broadcast Group	88	39	Micro Communications, Inc	14
47	Audisar	17	11	Micro Technology Unlimited	55
51	Auditronics	37	44	Moseley	139
19	Autogram	202	35	Murphy Studio Furniture	159
34	Autogram	75	34	Myat Inc.	6
48	BBH Software	86	41	NAB	—
20	Belar	217	38	NSM	11
31	Benchmark Media	48	33	National Public Radio	16
42	Bext	126	10	Orbin	31
42	Broadcast Devices, Inc.	8	7	Pacific Recorders	162
4	Burk Technology	103	37	Pacific Recorders	192
36	CRL	34	14	Penta Labs Inc.	57
39	Circuit Werkes	106	34	Phasetek	121
32	Comet North America	118	13	Potomac Instruments	71
3	Comrex	171	34	Pristine Systems	210
40	Comrex	174	14	Prophet Systems	152
12	Conex	165	30	Radio Active Productions	154
43	Corporate Computer System	13	40	Radio Design Labs	111
40	Crown Broadcast	20	32	Radio Spirits	169
15	Cutting Edge	74	21	Radio Systems	113
29	Cutting Edge	128	39	Radiosoft	105
24	DC Productions	87	24	Rules Service Company	177
39	Don Giovanni	129	31	S.C.M.S.	140
20	Dataworld	60	42	Shively Laboratories	83
19	Dataworld	122	31	Silicon Valley Power	186
40	Econco	19	12	Sine Systems	205
49	Econco	66	28	Studio Audio & Video	28
49	Energy-Onix	21	11	Svetlana Electron Devices	136
31	Excalibur	2	50	Svetlana Electron Devices	124
25	Fidelipac	182	8	TM Century	188
16	Gentner	157	9	Telos Systems	213
30	Ghostwriters	42,133	49	Transcom Corp	132
34	Gorman Redlich	52	23	UPI	208
24	Group W Satellite	200	45	USAFoam	67
45	Hall Electronics	82	39	Universal Electronics	167
31	Hallikainen & Friends	209	50	Varian	43
1	Harris Allied	98	2	Wheatstone	40
17	Harris Allied	138	52	Wheatstone	207
18	Harris Allied	190	39	WireReidy	197

Advertising Sales Representatives

U.S. East: Skip Tash 703-998-7600 Fax: 703-998-2966
 U.S. West: Dale Tucker 916-721-3410 Fax: 916-729-0810
 International: Stevan B Dana +1-703-998-7600 Fax: +1-998-2966
 Europe: Dario Calabrese +39-2-753-0274 Fax: +39-2-753-2697
 Japan: Eiji Yoshikawa +81-3-3327-2688 Fax: +81-3-3327-3010

Free Subscriptions are available upon request to professional broadcasting and audiovisual equipment users. For address changes, send current and new address to RW a month in advance at P.O. Box 1214, Falls Church, VA 22041. Unsolicited manuscripts are welcomed for review - send to the attention of the appropriate editor.

ADVERTISE
 in RADIO WORLD's
 CALL 800-336-3045

Broadcast Equipment Exchange



SUBSCRIPTION/READER SERVICE FORM

Radio World
 FREE Subscription/Renewal Card

I would like to receive or continue receiving Radio World FREE each month. Yes No

Signature _____ Date _____

Please print and include all information:
 Name _____ Title _____
 Company/Station _____
 Address _____
 City _____ State _____ ZIP _____
 Business Telephone () _____

Please circle only one entry for each category:

I. Type of Firm

D. Combination AM/FM station	F. Recording Studio
A. Commercial AM station	K. Radio Station Services
B. Commercial FM station	G. TV station/teleprod facility
C. Educational FM station	H. Consultant/ind engineer
E. Network/group owner	I. Mfg. distributor or dealer
	J. Other _____

II. Job Function

A. Ownership	G. Sales manager
B. General management	E. News operations
C. Engineering	F. Other (specify) _____
D. Programming/production	

Reader Service
 March 8, 1995 Use until June 8, 1995
 Please first fill out contact information at left. Then check each advertisement for corresponding number and circle below.

Purchasing Authority
 1. Recommend 2. Specify 3. Approve

001	023	045	067	089	111	133	155	177	199
002	024	046	068	090	112	134	156	178	200
003	025	047	069	091	113	135	157	179	201
004	026	048	070	092	114	136	158	180	202
005	027	049	071	093	115	137	159	181	203
006	028	050	072	094	116	138	160	182	204
007	029	051	073	095	117	139	161	183	205
008	030	052	074	096	118	140	162	184	206
009	031	053	075	097	119	141	163	185	207
010	032	054	076	098	120	142	164	186	208
011	033	055	077	099	121	143	165	187	209
012	034	056	078	100	122	144	166	188	210
013	035	057	079	101	123	145	167	189	211
014	036	058	080	102	124	146	168	190	212
015	037	059	081	103	125	147	169	191	213
016	038	060	082	104	126	148	170	192	214
017	039	061	083	105	127	149	171	193	215
018	040	062	084	106	128	150	172	194	216
019	041	063	085	107	129	151	173	195	217
020	042	064	086	108	130	152	174	196	218
021	043	065	087	109	131	153	175	197	219
022	044	066	088	110	132	154	176	198	220

Radio World, PO Box 1214, Falls Church, VA 22041, or FAX to: 703-998-2966

ACTION-GRAM
EQUIPMENT LISTINGS

Radio World's Broadcast Equipment Exchange provides a FREE listing service for radio stations and recording studios only. All other end users will be charged. Simply send your listings to us, following the example below. Please indicate in which category you would like your listing to appear. Mail your listings to the address below. Thank you.

Please print and include all information:
 Contact Name _____
 Title _____
 Company/Station _____
 Address _____
 City/State _____
 Zip Code _____
 Telephone _____

I would like to receive or continue receiving Radio World FREE each month.
 Yes No
 Signature _____ Date _____

Please Circle only one entry for each category:

I. Type of Firm

D. Combination AM/FM station	F. Recording studio
A. Commercial AM station	G. TV station/teleprod facility
B. Commercial FM station	K. Radio Station Services
C. Educational FM station	H. Consultant/ind engineer
E. Network/group owner	I. Mfg distributor or dealer
	J. Other _____

II. Job Function

A. Ownership	G. Sales Manager
B. General management	E. News operations
C. Engineering	F. Other (specify) _____
D. Programming/production	

Brokers, dealers, manufacturers and other organizations who are not legitimate end users can participate in the Broadcast Equipment Exchange on a paid basis. Line ad listings & display advertising are available on a per word or per inch basis.

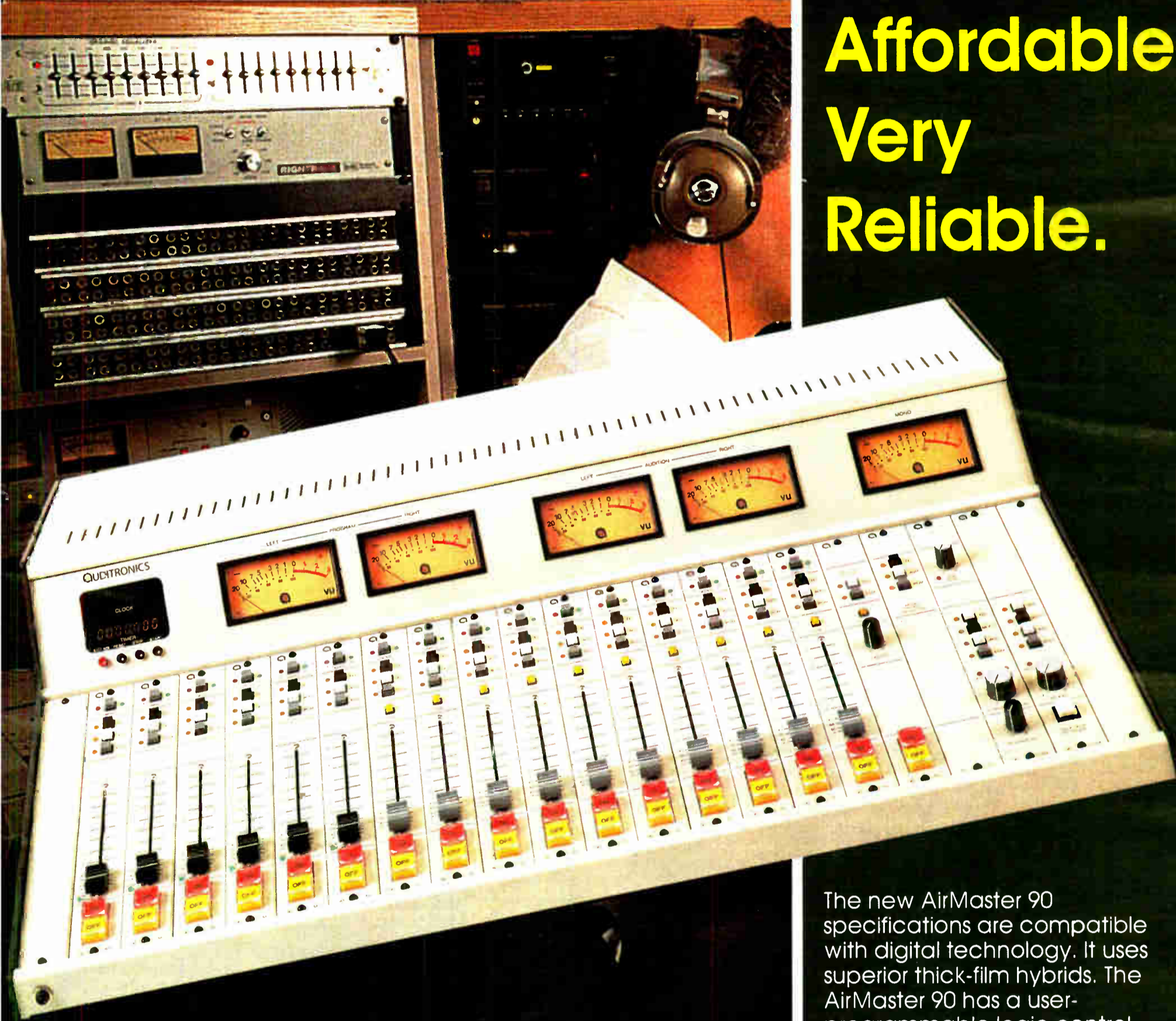
WTS WTB Category: _____
 Make: _____ Model: _____
 Brief Description: _____
 Price: _____

*Closing for listings is every other Friday for the next month's issue. All listings are run for 2 issues unless pressed for space or otherwise notified by listee.

Broadcast Equipment Exchange
 PO BOX 1214, Falls Church, VA 22041 • Tel: 800-336-3045 • Fax: 703-998-2966

AIRMASTER 90

**Very
Affordable.
Very
Reliable.**



The Sound Of Perfection

AUDITRONICS

3750 Old Getwell Road, Memphis, TN 38118
901-362-1350, FAX: 901-365-8629

Circle (37) On Reader Service Card

The new AirMaster 90 specifications are compatible with digital technology. It uses superior thick-film hybrids. The AirMaster 90 has a user-programmable logic control system that utilizes a PIC microprocessor. Faders control precise stereo-balanced VCA's and push buttons are electronic with LED status indicators.

The AirMaster 90 has a TWO YEAR WARRANTY . . . after all, it has the highest possible reliability in the industry.

Success Means Making the Right Decisions



We DID.

OUR NEW R-60 CONSOLE has what stations really want: reliable illuminated switches—*everywhere*; smooth feeling P&G faders; a powerful monitor section. Our exclusive Simple Phone™ module is friendly and easy-to-operate, providing error-free talk segments.

The R-60 is **TOTALLY MODULAR** to streamline service—no motherboard mounted components. The quality of each module is unsurpassed; we even measure every resistor, capacitor, and diode

before it's installed. Completed consoles are burned in prior to final test. Meticulous care is the key here, so you can expect the ultimate in reliability.

Perhaps more important than high technology features and good looks is the fact that the R-60 is built and supported by Audioarts Engineering—a highly professional and dependable company you can count on.

A SUCCESSFUL STATION BEGINS WITH R-60.



AUDIOARTS ENGINEERING

7305 Performance Drive, Syracuse, New York 13212 (tel 315-452-5000 / fax 315-452-0160)