

*****3-DIGIT 857
S117298 D08 9502
TOM MILLER
ASST CE
KTZR
2033 S AUGUSTA PL
TUCSON AZ 85710 7905

RadioWorld®

**NFL
ISDN Co-op
Saves Budgets
See page 11.**

Vol 20, No 1

Radio's Best Read Newspaper

January 10, 1996

WJDM On-Air on Expanded Band

by Lee Harris

ELIZABETH, N.J. For years the expanded AM band has been sitting atop the dial, 100 kHz of silence and static, full of promise for certain broadcasters waiting to break free from interference-plagued, daytime-only allocations.

Now, for the first time in nearly 60 years, AM radio listeners have new territory to explore. After about six weeks of test transmissions, WJDM in Elizabeth, N.J., began regular programming on Friday, Dec. 8, 1995, on 1660 kHz, officially becoming the first U.S. station to operate on the expanded band.

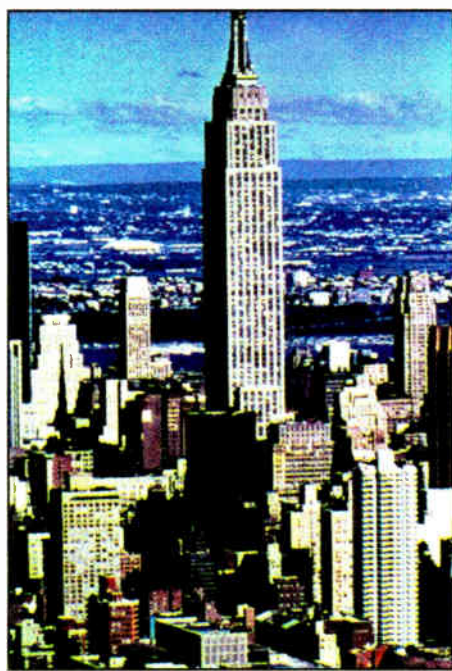
It is a dream come true for WJDM owner-manager John Quinn, who has been a tireless proponent of the expanded band. After 25 years of trying to serve his community with a 1 kW daytimer at 1530 kHz, Quinn has big plans for his expanded band operation, which has an authorized power of 10 kW-D, 1 kW-N. The stations are identified on air as WJDM-1530 and WJDM-1660.

Long legs

The new WJDM-1660 has long legs. Even with just 1 kW at night, Quinn said he has received reception reports from as far away as Seaside, Ore. There have also been reports from Montana, Iowa, Illinois,

Wisconsin, South Carolina and Maine.

Locally, the signal is a big improvement over WJDM's 1530 operation, especially outside the immediate Elizabeth area.



WJDM enters new market.

While WJDM-1660 is rather noisy in the unfriendly concrete canyons of Manhattan, the signal is quite strong (daytime) almost everywhere else in the New

York metropolitan area. The night signal is less dependable.

1530 and 1660

WJDM is transmitting with a brand-new Harris DX-10, operating in stereo at 10 kW-D, 1 kW-N duplexed into the 110-foot self-supporting tower used for WJDM's 1530 operation. The six weeks of testing were necessary to work out the complex tuning problems common to duplexed AMs.

For the first week of operation, WJDM was signing on the 1660 transmitter at 10:00 a.m. and simulcasting with the 1530 operation. Ironically, the bulk of

continued on page 6 ▶

DAB Tests Get L-Band

ARLINGTON, Va. Permission to use the L-Band is no longer a gnat in the face of the Digital Audio Broadcasting (DAB) field tests.

The Electronic Industries Association (EIA) announced last month that it had reached an agreement with the National Telecommunications and Information Administration (NTIA) and the Aerospace & Flight Test Radio Coordinating Council to use the

continued on page 6 ▶

West Coast Tempest Crumples Towers

by Bob Rusk

SAN FRANCISCO Winds gusting over 100 mph blew down two FM towers, destroying them in the devastating mid-December 1995 storm that also dropped a foot of rain in 48 hours in some parts of the bay area.

One of the towers, 30 miles east of the city at Mt. Diablo State Park, held eight FM boosters. The other tower, atop 1,200-foot Mt. San Bruno near San Francisco International Airport, supported the main and auxiliary antennas for KSAN-FM on 94.9 MHz and the auxiliary antenna for NPR affiliate KQED(FM) on 88.5 MHz.

"The tower buckled in three pieces," KQED engineering supervisor Fred Krock said. "It pulled three bolts out of a channel about half-way up the tower. The top half of the tower hinged itself down to the ground."

"In the process, the flailing pieces of debris mashed our four-inch transmission line, so we were operating at about 15 percent of full power."

KQED was off the air for "the five seconds it took for the generator to come up" when the storm knocked out electricity at 4 a.m.

continued on page 8 ▶

Harris DRC1000 Digital Radio Console

Everything you need in a full-featured radio console and more.



Contact your Harris sales representative for complete details

1-800-622-0022

 **HARRIS**



©1995 Harris Corp.

Circle (3) On Reader Service Card

World Radio History

NEWSWATCH

Advisory Council Elected

NEW YORK Five new members started their three-year terms on the Arbitron Advisory Council on Jan. 1, 1996. The members were elected by their peers from stations in their formats and market size.

Terry Bond of WIKY-FM in Evansville, Ind., now represents Adult Contemporary non-continuously measured markets. Album Oriented Rock in all markets is represented by Don Howe of KBPI/KRFX in Denver.

Chuck Morgan of KMGZ-FM in Lawton, Okla., filled the CHR/Top 40 non-continuously measured markets seat. Robert

Zuroweste of KXKL/KZDG in Denver was elected to the Gold/Oldies all markets seat. And the seat representing Spanish formats in all markets was filled by David Lykes of KLAT/KLTN in Houston-Galveston, Texas.

The entire Council consists of 13 elected radio broadcasters who each hold the position of general manager or higher and two appointed research representatives.

Steve Goldstein, executive vice president of Saga Communications will serve as the Advisory Council's chairman for 1996. Ron Rogers, president and general manager of KVET/KASE in Austin, Texas, will serve as vice chairman.

NAB Nominations

WASHINGTON The NAB mailed ballots for the Radio Board Seats for 1996 to radio stations on Jan. 5. Completed ballots are due by Jan. 26. Here are the nominees:

District 2 (N.Y., N.J.)

Randall D. Bongarten (WAXQ(FM))
David S. Gingold
(WHLI(AM)/WKJY(FM))
Andrew A. Langston (WDXK(FM))
William O'Shaughnessy
(WVOX(AM)/WRTN(FM))

District 4 (Del., D.C., Md., Va.)

E.B. Hawkins, (WILM(AM))
Rick Mack (WBIG-FM)
William Poole (WFLS-AM-FM)
David R. Roederer (WPSK-FM)

District 6 (N.C., S.C.)

Gary Brobst, Sr.
(WSOC-FM/WSSS(FM))
William McElveen
(WISW(AM)/WTCB(FM)/WOMG-FM)

continued on next page ►

Index

STUDIO SESSIONS

Versatile Philips Sound Enhancer by Don Jennings	18
The Philosophy, Style and Technology Behind WESAT by Rich Rarey	19
Taming Hot Multitrack Levels with Symetrix 488 by Alan Peterson	20
Monitor Placement for Accurate Mixing by Bruce & Jenny Bartlett	21
Return of Retro-Production Tricks by Alan Peterson	22

RUNNING RADIO

Designing a Beautiful Web Site by Alan Haber	26
Boost Staff Morale with Compensation Facts by Sue Jones	26
Jock Reunion Rocks Chicago's WJMK-FM by Alan Haber	29
Production Libraries Guide	30

FEATURES

Detroit Station Committed to News by Barry Mishkind	35
NAB's John David: Looking Out For Radio's Continued Growth by Alan Haber	36
Voiceover Talent Is Key to Success by Alan Peterson	38
Lombardo's Music: New Year Magic by Richard W. O'Donnell	40
Hall of Fame Unveils New Studio by Keith Clark	42
Shop Around for the Best Produced Sound by Ty Ford	43
Network Sports Digital Delivery by Dee McVicker	45
Workbench by John Bisset	45

BUYERS GUIDE

USER REPORTS

Fluke's Meter Scopes Out Problems by Randy Finch	47
CRL Simplifies Digital Audio Tests by Dennis J. Martin	48
Measuring RFR with Model 8718 from Narda by John Bisset	50
MSI Minds Modulation by Herb Squire	50
RFC-1/B from Sine Talks Back by Charlie Osgood	51
Dorough Test Set Smooths Edges by Al Parker	51
FMSA-1 Reliable, Accurate at Orban by Robert Orban	52

TECHNOLOGY UPDATES

Leader	54
Hallikainen & Friends	54
Tektronix	54

Take a LOOK at THIS:



Then look at our competition.

OF COURSE many stations are cost-conscious these days—just remember why you wanted a new console in the first place: to **UPGRADE**.

The **R-60** has what's needed, with all the right features: our **SIMPLE PHONE**® module for easy error-free talk segments; twin six bank preselectors, so you won't run out of input capacity; onboard machine control panel, clock, timer, a well-designed cue system, and a truly effective control room and studio monitor interface. And because it's totally modular, service is easy—even while you're on-the-air! Documentation: this can determine whether you have an installation day or an installation *week*. We've done it right to guide you through. And **PERFORMANCE**? Of course we've handled that; simply compare our specs.

DON'T MISS your opportunity to upgrade. Choose the R-60 radio console from AUDIOARTS.

FREQUENCY RESPONSE

Line (10Hz-20KHz) ±1/10dB
Mic (20Hz-20KHz) ±1/10dB

THD+N (20Hz-20KHz)

Line, +4dBu .005%

Mic & Line, +16dBu .005%

IMD (SMPTE)

Mic & Line, +4dBu .004%

DIM

Mic & Line, +16dBu .005%

DYNAMIC RANGE

Line 114dB

Mic 98dB

HEADROOM

ref +4dBu 24dB

OFF & ASSIGN ISOLATION

1 KHz -110dB

20 KHz -105dB

BUS CROSSTALK

1 KHz -100dB

20 KHz -75dB

7305 Performance Drive, Syracuse, NY 13212
tel 315-452-5000 / fax 315-452-0160
E-mail: Wheatstone@aol.com

 **AUDIOARTS® ENGINEERING**

District 8 (La., Miss.)
 Stephen C. Davenport
 (WKXG(AM)/WYMX(FM))
 Bill Hickman (WMFM(FM))
 Judy Karst-Campbell (KRRV-AM-FM)

District 10 (Ind.)
 Steve Avellone (WFVI(FM))
 Kenneth S. Coe
 (WLOI(AM)/WCOE(FM))

District 12 (Mo., Kan.)
 Curt Brown (KTTS-AM-FM)
 John T. Lynch (Noble Broadcast Group)

District 14 (Iowa, Wis.)
 Mark Hedberg (KRIB(AM)/KLSS-FM)
 J.D. Lumanog (KRNL-FM)
 Mary Quass (KTOF(AM)/KDAT-FM)
 Thomas A. Walker (Mid-West Family Broadcast Group)

District 16 (Colo., Nev.)
 Dick Maynard (KEKB(FM)/KBKL(FM))

District 18 (South Texas)
 John W. Barger (KRIO-FM)

District 20 (Mont., Idaho, Wyo.)
 Larry Roberts (Sunbrook Communications)

District 22 (Ariz., Nev., N.M., Utah)
 Jeff Lyon (KSNM(FM))

District 24 (So. Calif., Guam, Alaska, Hawaii)
 Howard B. Anderson (KHWHY(FM))
 Gene A. Pietragallo, Jr. (KPSL(AM))

Career Fair Debut

WASHINGTON The National Association of Broadcasters and the Broadcast Education Association (BEA) are sponsoring a Broadcast Career Fair at the NAB '96 and BEA '96 conventions in Las Vegas.

The fair is designed for professionals and students interested in jobs in the television and radio broadcasting industries. It will take place Sunday, April 14, 1996, at the Las Vegas Convention Center.

Stations that participate in the Career Fair will receive a complete list of registered job seekers following the event. NAB member stations and non-member stations with personnel registered for NAB '96 may obtain a complimentary interview table. All others will be charged \$150. To participate, broadcasters must complete and return an agreement form to the NAB by Feb. 23, 1996.

Cutting Legal Costs

LAGUNA BEACH, Calif. Look out for padding, rounding up, clerical overhead and overcharging expenses on bills from your attorney.

Pickering, Bell & Major, a management consulting firm, has produced the "CEO's Guide to Managing and Controlling Attorneys, Legal Costs and Litigation Risks." Along with other tips, techniques, tactics and strategies for combating rising legal costs, the publication lists 10 common attorney billing abuses.

According to the guide, a recent Rutgers University study showed that 60 percent of attorneys acknowledged that their firms engaged in some or all of these practices. Ⓢ

AFN Bosnia Warms Troops Abroad

Armed Forces Network Entertains, Informs U.S. Peacekeepers On-duty in Bosnia

by Lynn Meadows

TUZLA, Bosnia With over nine million land mines waiting in the cold ground, broadcasters here have to learn how to avoid them. They have also had to go through weapons qualification to certify they can use their M-16 rifles.

In a recent issue of Newsweek, Col. David H. Hackworth compared a good day in Tuzla to "a really bad day in a Pennsylvania mining town — long before the EPA got into the act."

But shortly after they arrived, soldiers had "AFN Bosnia" to keep them company along with their body armor and M-40 protective masks. Thanks to the peace agreement signed in Paris on Dec. 14, 1995, there is familiar music and information on the air in Tuzla.

If only civilian radio stations could be constructed as quickly. On the Saturday before the peace agreement, the Army Broadcasting Service arrived in Bosnia. On Sunday, it set up its transmitters and by Monday at 3:00 p.m., the first wave of troops could listen to 250 W of music on 100.1 MHz or watch channel 10, which was being cabled into the common areas.

Sound from Frankfurt

The initial programming on both radio and television originated from the American Forces Network (AFN) in Frankfurt, Germany. AFN is called "The Power Network." It broadcasts news, sports, information and a little music.



Many of the soldiers heading into Bosnia had been stationed in Germany and requested the broadcast.

Dave Boggs, mobilization plans manager for the Army Broadcasting Service, said that after the peace agreement was signed, a portable mobile radio van would be flown in on a C-130 military plane. The slogan for the new affiliate is "Peacekeeper Radio."

Once the van arrived, the broadcasts were expected to be based in Tuzla for several hours each day. Boggs predicted that the local station would take over during the morning and evening when everyone was waking up, shaving, eating or trying to relax. The television and radio stations will also produce local news reports.

Another station at 1143 AM will play all AFN programming. Both the AM and FM stations are authorized at 1 kW

apiece. The Army also plans to broadcast from Kaposvar, Hungary, once a site survey is done and the Hungarian government gives its permission, Boggs said.

Because the Army is the geographical area manager for Europe, most of the DJs and technicians are in the Army. But the Air Force and Navy talent will chip in too.

Good reception

"The mountainous terrain makes it more difficult to get the FM signal out," said Boggs. The troops will be spread throughout the region near Tuzla. To

"You have to satisfy every musical taste that you can ... it ain't easy."

reach those out of range, the Tuzla station will have a backhaul line to Frankfurt. Soldiers stationed 100 miles from Tuzla will be able to listen via satellite through a series of small FM or AM transmitters.

Local broadcasting from Tuzla was delayed while the broadcasters and technicians



underwent the mandatory training.

"Every single person has to go through mine training," Boggs said.

The plan was to have the manned affiliate up and running before Christmas so couples separated by the mission could make requests back and forth on Christmas and New Year's Eve. AFN would play dedications requested by the soldier while the soldier's spouse

could respond via AFN Bosnia.

With just one station, one of the biggest challenges is pleasing everyone.

"You have to satisfy every musical taste that you can," said Boggs. Asked how that was done, he replied, "It ain't easy." The best solution, Boggs said is to play the formats for a couple of hours each. Ⓢ

Who do you call when you're ready for Codecs?

Radio broadcasters call us from all points on the globe when they have questions on radio remotes, STL or Studio-to-Studio links using SW56 and ISDN. Why? Years of experience, an unblemished reputation for integrity and objectivity plus the broadest line of codecs and technology — including the lowest-cost, full bandwidth systems available.

With G.722 and apt-x to the widely-used ISO/MPEG Layer II algorithm, we can provide you with the best-sounding, most cost-effective and ruggedly built solution for your application.

Call or fax to take advantage of our additional support:

- Comrex ACCESS — application-based newsletter
- Fax-on-Demand-extensive library of technical and applications information
- Comrex Users' Forum Network on CompuServe
- Comrex Handbook on "Digital Telephony"

You may have heard that codec remotes are "as easy as" When you find it's not quite that simple, we're just a toll-free call from anywhere. You'll get the kind of support you didn't think was still possible — knowledgeable, direct and personal. Ask any Comrex customer.

U.S. 1-800-237-1776
UK 0 800 96-2093
 Europe: Request your free Comrex calling card.



COMREX®

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

New Anthology of Radio's Best Programming

WASHINGTON Author Tom Lewis (*Empire of the Air*) and countless other historians have done a tremendous job chronicling the technical history and development of the broadcast media in general, and radio, the pioneer medium, in particular.

The focus, however, has largely been on the men who made radio and the invention itself. Here at **RW** we have spent the better part of 20 years reporting on radio's technical progress, both here in the United States and abroad.

Now along comes a book that can complement just about any collector's library. I'm referring to "Same Time ... Same Station: An A-Z Guide to Radio from Jack Benny to Howard Stern" by Ron Lackmann.

Scheduled for January publication, "Same Time ... Same Station" is available hardbound for \$45. And worth every penny.

I like the look of the book — it is coffee-table size and sports a handsome dust jacket — but the meat of it is the thing. Arranged much like an encyclopedia, the book lists alphabetically, synopses of hundreds of radio shows, their individual broadcast histories, sponsors and air times. The text also contains the biographies of individual radio personalities and key network figures, as well as the histories of the major networks.

Lackmann used 120 vintage photos of radio stars, over half of which he said had not been published before. The book contains more than 1,000 entries.

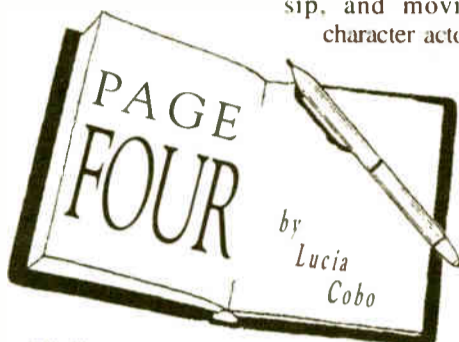
But before I get into some sampling, here's a brief bio on Lackmann:

Professional actor and speech, drama and communication instructor at Central High School in Valley Stream, N.Y. Former host of radio's "Education in Action" for WHLI New York. He also produced, directed, acted in and narrated 54 radio plays for Armed Forces Radio from 1957 to 1959. He also has written "Remember Radio" and "Remember Television." "The Soap Opera Almanac," and more

than 20 books for Weekly Reader.

OK, back to "Same Time ... Same Station."

If you are willing to spend some time perusing, you can find some real gems of radio history. For example, you would discover that Shell Oil Co. sponsored "The Shell Chateau," from 1935 - 1937 on NBC's Red Network every Saturday at 9:30 p.m. The half-hour comedy/variety series starred Broadway singer Al Jolson and featured Walter Winchell's celebrity gossip, and movie character actor



Wallace

Beery, comedians Smith Ballew, Joe Cook as well as Victor Young and his Orchestra. Singer Nadine Connor starred on the program for a while, with actress Mary Jane Highy supplying her speaking voice.

Or, did you know that Ozzie Nelson (bandleader and one-half of the Ozzie and Harriet radio and television series) led the orchestras on "The Feg Murray Show," "The Joe Penner Show," "The Red Skelton Show" and "Believe It or Not" beginning in the early 1930s?

One of my personal favorites is the National Barn Dance which went on the air in 1924 on WLS. This half-hour country/western music and comedy program had 60 NBC affiliates by 1933. It pre-dated "The Grand Ole Opry" radio program by a year (it went on in 1925). "The National Barn Dance" was aired from the Eighth Street Theater in Chicago, where the entire stage was transformed into a hayloft every Saturday night.

For many years, Joe Kelly hosted the program of regularly featured and guest performers. Among those appearing: Pat

Barret as Uncle Ezra; Luther Ossiebrink as Arkie, the Arkansas Woodchopper, and Hoyt Allen playing Pokey Martin.

And lest you think that our infatuation with celebrities is a symptom of our over-mediated generation, "The Hollywood Hotel," that aired first in 1934, was a multifaceted half-hour music/variety/comedy/drama series that starred motion picture actor Dick Powell. Louella Parsons was cohostess and "revealed the most intimate secrets" of the Hollywood stars. Other Hollywood luminaries such as Fred MacMurray, Herbert Marshall and William Powell also hosted the show.

One of radio's earliest 15-minute, five-days-a-week children's adventure serials, "The Air Adventures of Jimmy Allen" originally starred Murray McLean as Jimmy Allen, a 16-year-old messenger and pilot in training at a Kansas City airport, who became involved in numerous exciting, cliff-hanging air adventures.

One of the series' best remembered sequences was the great international air race, which included a blind-luck landing by Jimmy in China, as well as a delayed parachute jump.

You could spend hours curled up with this book — and never get bored. For more information, contact Andrew Galli at Facts on File Inc. at 212-967-8800, ext. 262.

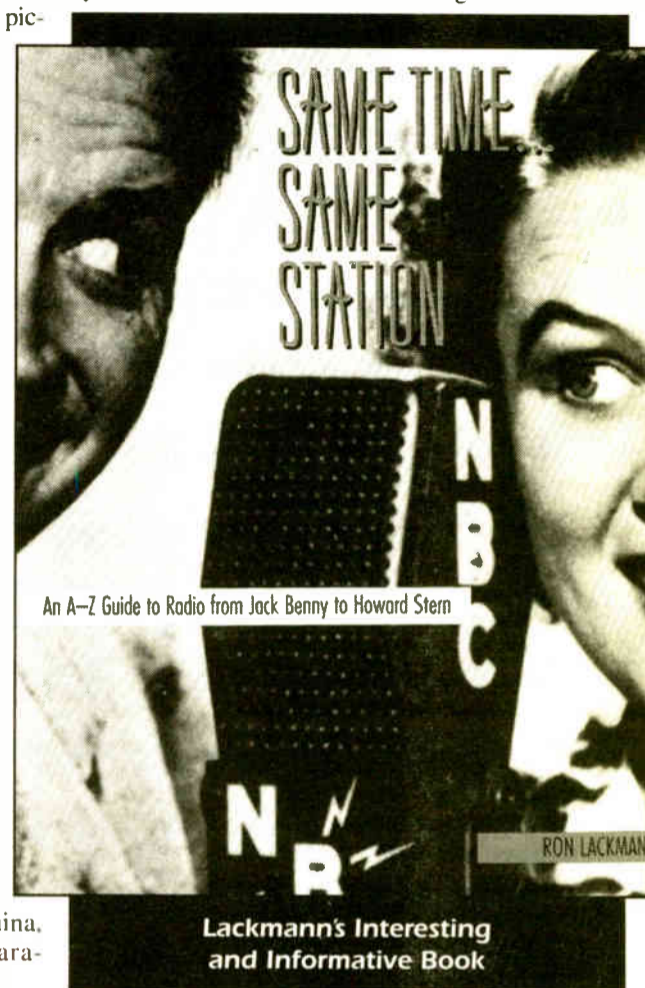
★★★

Before I sign off, just a quick news item. A snapshot look at 1995 at press time revealed that the radio industry continued to enjoy consecutive months of revenue gains. Year-to-date radio revenue growth

through October 1995 was 4 percent for national and local sales combined.

October 1995 vs. October 1994 figures and year-to-date January-October 1995 vs. January-October 1994 reveal that in all markets, local revenue was up 6 percent and 10 percent, respectively.

National Revenue figures for October



An A-Z Guide to Radio from Jack Benny to Howard Stern

Lackmann's Interesting and Informative Book

1995 and January through October 1995 vs. the same periods in 1994 were up in all markets 2 percent and 9 percent, respectively.

The Radio Advertising Bureau Index of Radio Revenue Pool Numbers are provided by the accounting firms of Miller Kaplan Arase & Co. and Hungerford Aldrin Nichols & Carter.

That's it for now.



ARC-16: the logical choice for LMA and duopoly transmitter control.

For more information on the ARC-16 family of transmitter controls, contact Burk Technology.

1-800 255-8090

BURK TECHNOLOGY

7 Beaver Brook Rd., Littleton, MA 01460
Phone (508) 486-0086, Fax # (508) 486-0081
email danrau@burk.com

Put us in your sites.

COUNTRY WESTERN

FM CLASSIC ROCK

A1V

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.

Needs and wants

Dear RW,

Paul Montoya, in his support for non-government-supported public radio (RW, Nov. 15, 1995) touched upon a key item of debate. Pure democracy versus individual rights and needs.

I think it is safe to say that we expect the government to follow the wishes of the majority. I think the majority supports a number of programs that, depending on the broadness of your view, benefit relatively few.

Even regulation that limits interference between stations benefits those few who have received an as yet essentially cost-free protected license to broadcast on a channel that is part of a public resource.

While these programs serve the needs of the few, the indirect benefits are many. So too for public broadcasting. There are approximately 500,000 hours of commercial airtime each week in this country, yet I think it would be impossible to find even 1,000 hours of long-form news, in-depth interviews, scientific coverage or literary value on commercial stations.

I hope a raft of letters proves me wrong, however, I spend a lot of time scanning the dials and I have not found even one such half-hour. (This is not true on cable, but then again, I'm paying for Discovery, A&E, etc.)

You're wrong, it is not the commercials I dislike, in fact I find commercials occasionally valuable. If "Prairie Home Companion," "ATC," "Nova," "Frontline" and "What Do You Know?" were commercially supported, I would certainly watch and listen.

Where is this quality programming on the commercial dial? Did I fall asleep during the hour on cross-dressing truck drivers married to ex-nuns and miss it? Was it interrupted by O.J. coverage? Was it before the end of the world (paid programming) prophet ordered me to send him money or roast in the fires of hell?

There are needs and wants. I hope you

make a fortune serving the wants (Paul owns an AM station in Cheyenne, Wyo.), but please do not get in the way of public broadcasting serving the needs.

And by the way, do I understand you to claim that 4 percent of the population is served by public broadcasting? Say what? Isn't that more like 4 percent of listeners contribute directly to public broadcasting, and more like 40 percent of the population that views and listens in a week?

Is it so difficult to believe that there are things of value that are not attached to the sale of a product? Is it not possible that what benefits the individual may also benefit society?

Frederick M. Baumgartner
Denver, CO

Corrections

Dear RW,

Just got my Oct. 18, 1995 copy of RW. C. Howard McDonald is correct that Barton Yarborough played Doc Long on "I Love a Mystery." *Mea culpa*. He is wrong, however, about "I Love Adventure."

"I Love Adventure" was a summer replacement series that ran on ABC from April 15 to July 18, 1948. It brought back Michael Raffetto and Jack Packard in their original roles.

The new Mutual version began in the fall of 1949 and continued until 1952. Just setting the record straight — well, a little straighter for now, at least.

Read G. Burgen
Lake Linden, MI

Times change

Dear RW,

John Bisset addresses a very important concern in "Radio Losing Best of Its Engineers" (RW, Oct. 19, 1995). While it is true that the ranks of qualified, experienced broadcast engineers are indeed diminishing, we must not lose sight of the fact that the industry itself is quite different than the time when most of us began our careers.

I heard someone at NAB '95 say, "In 1965, the average general manager was reading Billboard Magazine. Today, the average GM is reading the Wall Street Journal." Radio is business. We must not lose sight of this fact. An independent consulting or contract engineer is the president of his or her own business. An engineer who is an employee at a broadcast company must strive to affect the bottom line in a positive fashion, not just be a part of it. Technology is an important part of the broadcast industry, it is an engineer's job to manage it effectively.

Perception is very important. How you appear, act and address issues presented to you is constantly evaluated by the GM. Do you present options to the GM? Have you suggested ways to improve operating efficiency, save money or realize income from sources other than advertising revenues? Tower space rental, land rental, SCA leases, site relocation to afford better market coverage and diplexing AM and FM stations are only a few possibilities that can be explored. Do you appear before a manager or owner in a worn T-shirt and torn jeans or in a more respectable, yet practical, fashion? Are you well versed in today's business practices?

Management often views engineers as

Keep On Track

The last few years tantalized with the promise of a U.S. broadcast system characterized by a newly invigorated AM band. An overhaul of the AM technical standards coupled with an expanded band to relieve congestion and interference problems as well as programming to boot, all contributed to a much improved AM landscape in early 1996.

New FCC duopoly rules and the rise in local marketing agreements made it possible to keep some AMs operating when it might have made business sense to let them go dark before. Expected de-regulation of radio ownership by the Congress can further make life better for AM operators.

The news that WJDM started operating on its new expanded band frequency (1660 kHz, see page 1) is one more forward step ensuring AM's viability in the future. News that the commission is reworking its database and calculations of who gets to move to the expanded band (after already allotting 70-plus stations to it last year) is a minor snag — if the commission acts with alacrity to issue the new allotments and keep the momentum going.

It would be a disservice to the broadcasters who have waited patiently for help with the pioneer medium to let the AM expanded band recalculations languish alongside of say, the RFR Exposure Rules. You know, the ones that could impose new and exciting RF standards, arising from ever-developing ANSI standards relating to human exposure to RF.

If they ever get dusted off and acted upon by a commission that has had the pertinent information for more than two years.

Migration to the expanded band of the most seriously interfering stations is the last step in a process that would ensure stability for AM. AM may not produce any Murdochs, Sarnoffs or Turners, but it can provide a living for many entrepreneurs while providing the local service all communities need.

Perhaps the most encouraging development — the kind that could ensure AM longevity — will be AM in-band, on-channel digital audio broadcasting.

Picture the morning commuter in 2010 listening to digital music and local news just where it has always been — on AM — as if there was never a chance that it could be taken away. That vision is inching closer every day.

—RW

technicians. Engineers have the option of being a Mr. Fixit or a greater asset to the company. I've had the opportunity of being a station manager and consider the experience an invaluable education.

While I am not attempting to champion every management decision, I point out that radio is now a buyer's market. Duopolies, LMAs and multistation operations are the norm. Engineers have to adjust to today's business environment while providing the quality technical services that our jobs require. At the same time, respect from management must be earned, then commanded.

Independent contractors and consultants often have a considerable investment in engineering equipment. Continuing education is a must. Having started in radio back in 1972, I gained a strong experience in tube technology. Many stations maintain older tube transmitters as auxiliaries. Those same stations might be digitally automated, use digital telephone systems and STLs and have solid state transmitters spanning a technology spectrum over 50 years. We must have experience in that entire span of technology and have the equipment and expertise to service and interface with it.

The technology span I mention is not unlike John's analogy to the automobile. Servicing today's computerized engine and emissions system is far more complicated than tuning up a '65 Impala. Most of us are accustomed to paying \$45- to \$75-per-hour service rates for automobile work, consumer item repairs, attorney fees, CPA fees and doctor visits.

Engineers, be they regular employees or independent contractors/consultants are also professionals and must demand parity in compensation for their services. In order to do so, however, you must fit the role of a professional. How professional would you consider your doctor, attorney, CPA or architect if they dressed as some engineers do?

I'm not trying to overemphasize appearance, but keep in mind that managers expect a certain minimum standard and you must meet that standard and yet be practical.

John correctly emphasizes the importance of communication. A manager or owner must understand the investment an engineer makes in tools, equipment and continuing education. If you are not compensated for trade shows like the NAB, then reasonable expectation cannot be made by management for keeping pace with evolving technologies, FCC Rules, etc. In the past decade, CDs have replaced vinyl and are now the de facto music medium. Digital editing and storage systems are replacing cart and tape machines.

The technical knowledge required to service and maintain this equipment doesn't fall from the sky. Discuss with your manager the investment being made in your education by trade show attendance. Learn all you can. Ask questions. Treat every purchase as an investment, not just an expense. Justify every investment by demonstrating how it will help the bottom line. If you are not SBE certified, then get certified. If you are certified, pursue elevation to the next level. This in itself is a demonstration of your commitment to professionalism and self advancement.

The industry has changed. I wish I could fill the role of mentor to fledgling engineers as many had done for me back in my high school days. Newcomers to the broadcast engineering profession are few, and senior experience level engineers are moving on. If you feel the urge to move on or the scenarios John mentions are familiar, a self evaluation may be in order. Image is just as important as the respect you deserve, once it has been earned.

Thomas G. Osenkowsky
Brookfield, CT



Vol. 20, No. 1 January 10, 1995

Editor in Chief.....Lucia Cobo
Managing Editor.....Whitney Pinion
Technical Editor.....Alan Peterson
Associate Editor.....Angela Novak
Staff Writer.....Lynn Meadows
Assistant Editor.....Christopher Nicholson
Technical Advisors.....John Bisset, Tom McGinley
Editorial Director.....Marlene Lane
Assistant Editorial Director/Audio.....Alan Carter

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 Christopher Rucas, 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
January 24, 1996

WJDM Finally Breaks Silence after Dark

► continued from page 1

this programming is the sort of time-brokered foreign language and religious material common to the upper reaches of the existing AM band in major markets. However, when WJDM-1530 signs off at 4:30 p.m., WJDM-1660 launches into a locally-originated oldies format continuing until sign-off around 10 p.m.

Ready-made duopoly

Quinn told RW that he expects to start signing on 1660 at local sunrise and expand the oldies format to midnight

within the next few weeks. Currently, the night format consists of '60s and '70s oldies with a recorded station ID every three or four songs. No jocks, no news, no weather and no spots. Quinn said this is temporary, but he was secretive about his long-term plans for 1660.

All he would say for now is that he intends to program the expanded band frequency separately and that the format will be "a nice addition for the New York area." The new format is slated for launch sometime in January. WJDM-1530 will continue with its mix of English talk

shows and brokered programs. Once the new format is running on 1660, Quinn said he may build studios across the river in Manhattan.

Both the format and studio plans are noteworthy in light of the original intent of the AM-band expansion. It was proposed as a means of bringing full-time radio service to communities that had none. With a population of more than 110,000, Elizabeth was the largest city in the country without full-time local service.

Studios in Manhattan and a format aimed at New York would seem to be at odds with those original plans. It was also generally understood that expanded band stations would simulcast on their new and original frequencies for a period of five years. But Quinn said the rules allow him to program separately, in effect giving him one of the few duopolies in

the nation's largest radio market.

Quinn said now that he is up and running on the expanded band, he has received "nearly an offer a day" from parties interested in purchasing his station. While he would not say what the interested parties have been offering, it is safe to assume that the new WJDM is a multimillion-dollar property.

Big bucks

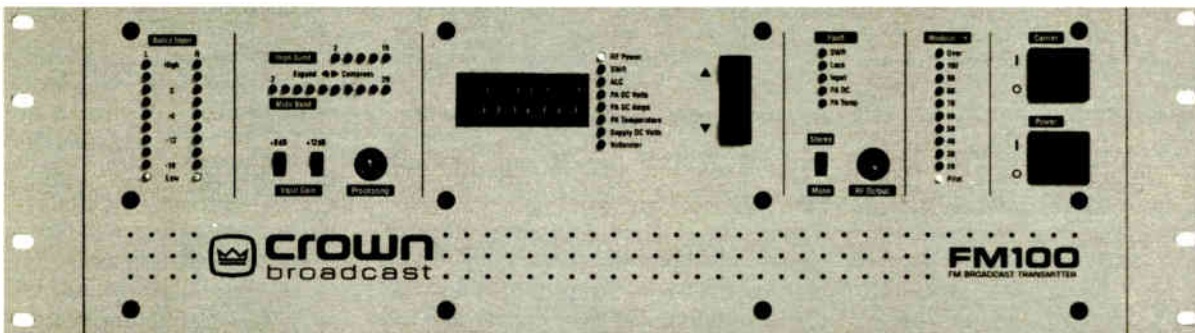
Even unrated, lower-power AM stations are capable of making big bucks in the New York market by serving the various large ethnic communities. WPAT(AM) on 930 kHz with 5 kW, licensed to Paterson, N.J., with a signal not much better than the new WJDM's, recently sold for \$20 million.

Quinn estimated that there are 280 million receivers in the United States capable of picking up the expanded band, but until now, of course, there had been nothing to receive.

So what is WJDM doing to promote its pioneer homestead on the expanded band?

"We're making frequent mentions on 1530 and advertising in the local papers," Quinn said. With well over 100 signals already filling the airwaves around New York, John Quinn has lots of competition. But for now, he has the AM expanded band all to himself. ☺

Translator! The FM Transmitter of Choice



Integrated Transmitter Systems by CROWN®

Applications

- Suited for FM translator service
- Ideal for satellite or terrestrial-fed systems
- Use it as a stand-alone transmitter
- Use it as a stand-alone exciter with composite input
- Use it as an FM exciter with built-in IPA
- Great for community and campus radio
- A perfect backup transmitter system

Models

- FM30, adjustable from 3 to 33 watts output
- FM100, adjustable from 20 to 110 watts output
- FM250, adjustable from 20 to 250 watts output
- FM500, 50 to 500 watts (available third quarter '95)

Integrated System Components

- FM exciter (digitally tunable, frequency-agile)
- Audio processor (with compressor/limiter)
- Stereo Generator
- RF Amplifier
- Lowpass Filter
- New, optional FM Receiver Module
- New, optional FSK IDer

Features

- Excellent signal quality and reliable performance
- Lightweight, compact, easily shipped worldwide
- 110/120 VAC, 220/240 VAC or DC powered
- Built-in digital metering and diagnostics
- User tunable from 88 to 108 MHz
- Optional tuning for 65-73 MHz in 10 kHz steps
- Modular, flexible design
- Fully illustrated and detailed user information
- Type notified for FCC part 73 & 74; meets FCC, DOC, and CCIR requirements
- Quick setup; designed for easy installation even by non-technical people

For more information, contact Crown Broadcast Sales at (219) 294-8050 or fax (219) 294-8222.



A Division of Crown International, Inc.
1718 West Mishawaka Road
Elkhart, Indiana 46515-1000
Phone: (219) 294-8050; FAX: (219) 294-8222
e-mail: broadcast@crowintl.com

EIA, NTIA Make Deal

► continued from page 1

L-Band to test the Eureka-147 DAB system in the San Francisco field tests.

After seven months of discussion, the three came up with a "test protocol" that establishes detailed frequency coordination procedures to avoid interference with flight testing of aircraft and aerospace vehicles. Missing from the agreement are the earlier phrases that would have made the EIA responsible for flight crashes.

The tests are scheduled to begin in February. The L-Band (1452-1492 MHz) will be available for testing through the end of April.

Although a second round of testing will follow in May, Lisa Fasold, spokesperson for the EIA said that Eureka-147 will not participate in the second round as they have no additional modifications to make to their system.

Other DAB proponents have said that Eureka-147 was already allowed to make a major modification when the EIA agreed to let the system use another transmitter. The other systems will use only one transmitter located on Mt. Beacon for the field tests. Eureka-147 will use an additional transmitter on Mt. San Bruno.

The rest of the proponents have until Jan. 31 to modify their equipment in time for the first round of testing. If they cannot meet that deadline, they have until April 30 to turn in their equipment for the second round.

An experimental station will provide the test signal for the Eureka-147 and in-band, adjacent channel (IBAC) field tests. For the remaining systems, KBGG will provide the FM signal and KABL will provide the AM. ☺

Mystery Phone Terrorist Plagues Radio Host

by Alan Haber

CINCINNATI Carmine Guzman, the aggressive, left-wing radio talker who blew onto the Cincinnati airwaves in December 1994 with the force of a tornado flanked by twin snowstorms, is no stranger to adverse reaction.

After all, he has been attacked on several occasions; a pipe bomb was found under the hood of his car, swastikas have been painted on his door, and he has found himself under police protection. There have also been complaints to Guzman's advertisers.

The engaging, liberal ex-New Yorker, who refers to his callers as "brothers and sisters" and often says "peace" before going into a commercial break, describes himself as "an old-fashioned Jewish liberal who is incredibly angry at this game of right wing three-card monte that these Nazis dressed as Republicans are perpetrating on the more dimmer wits."

It looks as though Guzman is getting beat up once again. According to his

station, TalkRadio 550 WCKY, a "phone terrorist" has been holding telephone lines hostage during Guzman's 7 - 10 p.m. show during November and early December last year. Operations Manager Darryl Parks said Guzman normally gets around 30 calls an hour; when the "terrorist" is at work, that number dwindles to between five and 10.

WCKY's engineers, in cooperation with Cincinnati Bell Telephone, have been investigating the situation which, according to the station, came about when listeners began complaining they always got busy signals when trying to call Guzman's show, even though lines were available.

"Evidently, the phone terrorist has set multiple phones to speed dial the studio during Carmine's show on randomly selected days, tying up incoming calls," according to the station.

The situation had not been remedied at press time. Guzman, for his part, seems to have given up on finding a solution.

"I mean, who cares at this point?" he told a caller on his Dec. 11, 1995, show.

"It doesn't bother me anymore. These people are bigger than I am. So, in one fell swoop they can knock my Jewish rear end out. I'm certainly not going to lose any sleep over it."

Nor, it appears, are most of Guzman's callers, who may not agree with many of the things he says but will (perhaps reluctantly) admit when they do agree with him.

Guzman's rapid-fire delivery, enhanced by a somehow appropriate slight echo, fills every nook and cranny of his three-hour, opinion-filled talk fest. Parks categorizes the show as "combat talk."

Prior to going on the air in Cincinnati (he started at WCKY's sister station, WLW(AM)), Guzman had never worked on the air before. Born between New York's Little Italy and Chinatown, both of his parents were Hasidic Jews and, according to Guzman, "card carrying communists." He went through what he calls his "long hair phase," but said he has always been "a good, liberal Jewish boy from New York."

Like many of the other aggressive talk show hosts on the air today, Guzman is hardly shy about his feelings and perfectly willing to confront his detractors. For example, he invited members of the Ohio and Indiana offices of the Ku Klux Klan to debate him on the air, on what the station billed as "Carmine Night with the Klan." The event never came off because the Klan refused to agree to Guzman's condition that its representatives wear their robes in the studio.

He often expresses his dislike for talkers Rush Limbaugh (who he calls "Flush") and G. Gordon Liddy (who he calls "G. Gutless"), both of whom are carried by WCKY. Guzman follows Liddy.

Guzman is the ultimate fish out of water with little or no taste for his current surroundings. He said Cincinnati is in "the stone age" and calls it "the city without pity." He bemoans the annual Ku Klux Klan festival, held in the city's downtown Fountain Square. He keeps himself busy, when he is not on the air, writing for "a very extremist left-wing alternative paper."

He also keeps himself busy reading plenty of newspapers in preparation for his show. The self-proclaimed "ultimate neurotic Jewish boy" says he does not use "any kind of half-truths or jingoism or yellow dog stuff" on the air. He tells the truth.

He appears in his press photo in silhouette. He even travels to and from WCKY by a station-approved car service - he

does not take his own car because he is afraid it will get blown up.

The equal opportunity talker said he is having a lot of fun on the air.

"I bang every right wing hate group, and I bang 'em hard," he said.

Guzman has been known to dedicate some of his shows to the memory of Alan Berg, a liberal radio talk show host who was killed in 1984.

"When I get calls by right wing groups," said Guzman, "they threaten me over the air. They habitually say I'm going to be the Alan Berg sequel, and I'm going to



Carmine Guzman

get cut down in a hail of 9-millimeter fire and all that stuff."

Guzman doesn't seem to be bothered in the least.

"I've got a certain inherent, dysfunctional thrill-seeking edge," he said. "It doesn't bother me. I should have been dead years ago by all rights for the type of life I've lived. ... It's not because I'm particularly heroic or dripping with middle-aged testosterone — when your number's up, your number's up."

Guzman is not afraid that the Federal Communications Commission might come down on him; he thinks it would have happened by now. He never stops himself from saying something because it might offend someone.

"I don't ever feel that I've gone too far because I don't feel that I'm seducing anybody in an ambush," he said.

In Cincinnati Carmine Guzman is at peace with himself, phone terrorist be damned.

"I've had an interesting life," he said. "If they gotta do me, let them do me. I'm all paid up."

New Year Ushers in European Standards

by Christopher Nicholson

WASHINGTON As the new year rang in, so did new regulations in the European Community (EC) that govern electromagnetic compatibility (EMC).

Now, all electronic equipment legally sold in EC countries must undergo extensive testing to receive a "CE" stamp.

For manufacturers in the United States, the new requirements prompted mixed emotions. While most do not have a problem with regulations being put into place to control EMC, they do carry concerns regarding the cost and confusion surrounding the mandates.

Lynn Distler, vice president of marketing for Comrex, explained that her company has certified product in Europe over the years and is used to the process. Distler said Comrex had no problems adhering to regulations, but it has not — until recently — been clear what they were.

Distler said that there is some cost involved in the process, but it is something that has to be done. "We plan to have the CE mark on our products," she said.

Tim Bealor, director of RF and studio products for Broadcast Electronics (BE), expressed similar reactions. Bealor said the idea of having a regulation is not a problem, but implementation fees, some of the testing and not being able to ship a product into certain areas without certification begins to make it a little hurtful as a manufacturer.

Bealor added that if the EC chooses to enforce the regulations, it will have an impact on imports. BE will test the waters with one or two more common products that have a significant amount of potential sales in the affected countries. It then will try to devise a way to test, document and comply to the regulations.

"For us to test and comply and document all of our products is a monumental task," he said.

Jim Woods, director, distribution products,

for Harris Allied, is frustrated by the regulations for a number of reasons. He explained that the regulations were vague and were not being enforced uniformly across the EC.

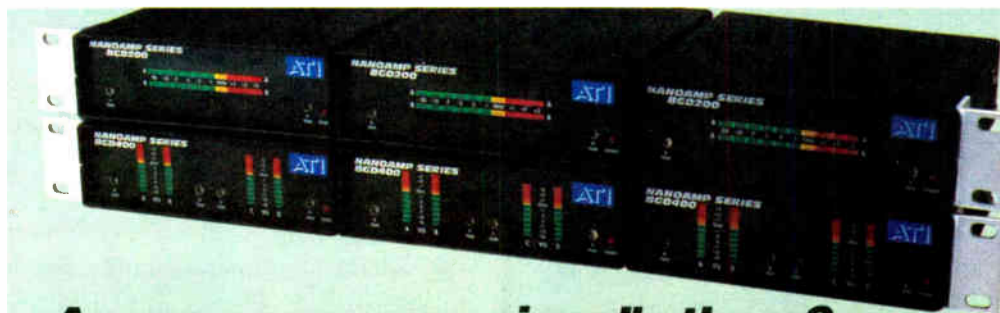
"While the existence of the regulations has been known for quite some time, any sort of a clear interpretation of how to comply and how strictly they're going to be enforced wasn't available until a couple of months ago," said Woods. The lack of available lab space was another point that Woods voiced concern over.

Woods expects to have certain products certified by February or March, making for light sales through the first couple of months of the new year. He anticipates that over a six month period though, the regulations will not have a dramatic impact on sales.

Woods said that some of the companies that Harris Allied sells are choosing not to go through the certification process. He said that their business in Europe does not justify the expense of the certification.

Woods called it a management challenge just to sort through the regulations and the list of companies that Harris Allied represents.

"It's been challenging," Woods said. "One more thing to put on an already crowded plate."



Are you sure your signal's there?



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

Call or write for free detailed brochure

NANOAMP SERIES™

Bargraph Meters

BGD200-VU or PPM
(DUAL METERS)

BGD400-VU or PPM
(QUAD METERS)

- Bright, multiple color, ten segment LED bar graph displays
- Balanced bridging inputs, quick release connectors, desktop and rack mounting kits

Engineers Battle Stormy Elements

► continued from page 1

The tower went down about two hours later.

Mt. San Bruno is the site of 10 towers that hold both FM and UHF-TV antennas, as well as antennas for two-way and other uses.

"I was up there and the towers were swaying to such a degree that we were fearful more would come down," said KSAN-FM chief engineer Erick Steinberg. The strongest wind gusts were reported to be 134 mph.

With both of his antennas out of commission, Steinberg took the KSAN-FM exciter to the transmitter site of sister station KBGG-FM (98.1 MHz) on Wolfback Ridge in nearby Marin County.

"KBGG has a dual transmitter," said Steinberg. "I used half of it and put KSAN-FM into the KBGG-FM auxiliary antenna. We used backup phone lines to supply audio, making a patch to the studio. I had it up and running with 5 kW ERP by 11:30 a.m."

When it fell, the tower did not strike any buildings or any of the other towers. A few days after the collapse, KSAN-FM was able to return to Mt. San Bruno with a temporary one-bay antenna mounted on an adjacent tower. The storm did not damage any of the other towers at Mt. San Bruno.

KSAN-FM now plans to put its main and auxiliary antennas on separate towers.

Wild wind

Another station, KSOL-FM on 98.9 MHz, has its main and auxiliary antennas on the massive 967-foot, three-legged Sutro Tower. The tower, designed to withstand destructive wind and earthquakes, sits atop a 900-foot hill in the heart of the city, adjacent to Twin Peaks near Golden Gate Park.

"There was some minor damage to the tower because of winds at the 200-foot

level," said KSOL chief engineer Chuck Waltman. "A piece of sheet metal was blown away. A second piece blew off, but was secured before it could fall. The wind gauge at the top did blow off, however."

KSOL's main antenna at the 650-level was destroyed, but was not blown off the

By the Saturday following the Dec. 12, 1995 storm, several 60-foot wooden poles had been temporarily installed to hold the booster antennas, and the roof of the container had been secured. The container was moved to make room for a new one. It was anticipated that a new tower would be installed in February.

By the Saturday following the Dec. 12, 1995, storm, several 60-foot wooden poles had been temporarily installed to hold the booster antennas.

tower. The antenna had an "electrical/mechanical failure," Waltman said. "Aside from small insulators, it's intact. There was arcing, probably caused by the mechanical vibration."

Waltman switched KSOL to the auxiliary antenna at the 180-foot level, and the station continued to operate at full power. The Sutro Tower supports antennas for four FM and 10 TV stations, but the KSOL main antenna was the only one that was damaged.

Across San Francisco Bay, the 285-foot, self-supporting Mt. Diablo tower held FM boosters for KSOL, KYLD, KFRC-FM, KYCY, KSAN-FM, KBGG, KFOG and KIOI-FM. Equipment racks were housed in a giant shipping container at the site.

"A portion of the tower fell directly across the roof of the container, penetrating the roof and letting rain in," said Waltman. "There was severe damage to the KFOG rack and moderate damage to the others." Lighting fixtures also came down and coax cables were severed.

There was no immediate dollar estimate of the damage caused to radio stations, or of the extra hours worked to keep them on the air.

Engineers' convention

"The morning of the storm, we could have had a chief engineers' convention at Mt. San Bruno," commented KQED's Krock. "We were all up there babysitting our generators." KQED relied on generated power for 36 hours.

The storm affected radio stations 450 miles to the north, on the central Oregon coast. A power outage knocked every AM and FM station in Lincoln

County off the air. Wind gusts reached 107 mph and tore the roofs off several businesses, including a pizza parlor and a gas station.

Within three hours, just one station — KORC(AM) on 820 kHz in Waldport — was able to return to the air, operating from the transmitter site with 30 W powered by a generator.

Thankful listeners

"We have a phone out there with an unlisted number," said Nancy Jarvis, who owns the station with her husband, Matt Jarvis. "Matt announced the number and said if there's anybody listening, please call. The phone didn't stop ringing. People were so thankful to hear somebody broadcasting local information."

In Newport, Ore., KYTE-FM on 102.7 MHz returned to the air 24 hours after the power went out, using a generator until electricity was restored five hours later.

"We also powered the exciter of KSHL-FM (97.5) and simulcast programming," said KYTE-FM general manager David Miller.

The stations have separate ownership but joined forces to provide news coverage. At KBCH(AM) and sister station KCRF-FM in nearby Lincoln City, there was no power to the transmitters so the disk-jockeys became TV stars, disseminating information on the local cable access channel.

The barometric pressure at one location on the coast dropped to 28.53 indicating the same strength as a Category 2 hurricane. It was the most severe weather in Oregon since the 1962 Columbus Day storm. ☺

State Associations Step Into Inspector's Role

by Lynn Meadows

KANSAS CITY, Mo. Know anyone who has gone through a station inspection with dry palms and a normal pulse rate? If you work in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Missouri or Wisconsin, you just might.

In those states, stations can request a mock inspection from their state broadcasting associations. If the station fails, most states give the owners 120 days to set things right. If the station passes, owners get a two- to three-year grace period from routine FCC inspections.

The idea may have germinated from a mock inspection program launched by the New Hampshire Association of Broadcasters in 1993. The association foot the bill to have all of its member stations inspected using the FCC checklist. The program ended when the last station had been inspected and did not include any FCC involvement.

Partnership

The idea of a partnership between broadcasters and the FCC hatched from the minds of Rod Orr and Jim Dailey. Orr is a broadcaster with stations in Branson, Mo., and Tennessee. He is a former president of the Missouri Broadcasters Association

(MBA). Dailey is the engineer in charge of the FCC field office in Kansas City.

While serving as the chairman of member services, Orr talked with Dailey about setting up a mock inspection program in the state. Dailey went him one better. Along with offering to help train the MBA's inspector, he proposed offering a two-year grace period to each station that passed inspection. The idea was to create a "partnership with industry" rather than an adversarial relationship, said Dailey.

Everybody's happy

The resulting plan "fits in nicely" with the current trend toward self-regulation and the downsizing happening at the FCC, said Don Hicks, executive vice president of the MBA.

For the station, this is an almost zero-threat inspection. As Hicks said, even the best operators can miss a minute detail. The inspections cover technical issues and the public file but do not touch Equal Employment Opportunity compliance. EEO compliance is "way, way too subjective," said Hicks.

Most often the MBA inspector finds paperwork problems, Hicks said. Instead of the FCC using scarce resources to find minor problems,

continued on page 13 ►

LET YOUR TOWER PAY YOU

Signal One can locate tenants, execute lease agreements, & manage your tower site to produce revenue you never realized was available.

Signal One manages and owns communication sites throughout the USA and has a large customer base that includes BellSouth, PageNet, PageMart, Federal Express, motorcarriers, and other financially-sound users that can help you enhance your operations.

Call Signal One today... and let us demonstrate how we can fill your tower site with tenants.

Fax your tower site information to **(423) 954-3222**. We will include your information in our nationwide site database for our many customers to utilize and lease on.

SIGNAL ONE
"One Call and Your Signal Is On"™
(423) 954-1111
5700 Brainerd Road, Uptain Building, Suite 407
Chattanooga, TN 37411

The hybrid you put between these cables is your most important connection for successful talk shows

Listeners and programmers agree.

The quality of your talk shows and call-ins are as critical as who you have talking.
And stations who are most serious about their sound and ratings use Telos.

Telos' digital hybrids have earned their reputation for exceptional performance.
In addition to full-duplex audio, Telos hybrids achieve consistent levels from caller to caller.

Our full range of products includes the top of the line Telos 100 Delta with a digital dynamic equalizer so advanced you won't find it anywhere else. When it comes to complete systems, the ONE-x-Six proves you don't have to spend a lot to get Telos quality and features.

Let Telos connect you to your callers. Isn't it time you experienced great phones?



2101 Superior Avenue • Cleveland, Ohio 44114 USA • Tel: +1.216.241.7225 • Fax: +1. 216.241.4103 • email: info@zephyr.com

Circle (200) On-Reader Service Card

World Radio History



[The DSE 7000 Version 5.0]

With a workstation this fast, nothing can slow you down.



▲ "With time compression, the DSE has added ten years to my creative career."

*John Frost... Creative Director
KROQ-FM, Los Angeles*



▲ "The ear is faster than the eye. And the DSE is still the best editing system for radio."

*Gundolf Weber... Tonmeister
Producer MDR life, Leipzig, Germany*



▲ "Anyone can learn to do anything on the DSE in an hour. And UNDO it in a second."

*Debby DeLuca...
Commercial Production Director
HOT-97, WQHT-FM, New York*



▲ "Three stations, 36 commercials a day, who has time to fool with a waveform editor?"

*Peter Belt... Chief Engineer
Radio 10, Amsterdam*



▲ "I've stopped looking for a better digital workstation for radio. With upgrades, the DSE is future proof."

*Russell Kerr... Planning & Development Manager
IBC, Auckland, New Zealand*

From Auckland to Amsterdam, the DSE 7000 has earned a reputation as the fastest editing system for radio. Now, with time compression and expansion, nothing can slow your creativity down. The DSE is the only digital workstation that lets you edit by ear in real time. You don't

have to stare at a complex waveform screen, "name" every sound, or mix with a mouse. Just cut, leader, erase, move, loop, copy and mix in a completely natural manner. The DSE 7000. Now with Version 5.0 the New Speed of Sound is making quick work of the world of radio.

orban[®]

H A Harman International Company

© 1995 Orban and DSE 7000 are registered trademarks. 1525 Alvarado St., San Leandro, CA 94577 USA
Phone 1•510•351•3500 Fax 1•510•351•0500 E-mail custserv@orban.com

Circle (213) On Reader Service Card
World Radio History

NFL Stations Learn to Share, Cut Costs

by Lynn Meadows

LEWISVILLE, Texas Budgeting for ISDN lines is tricky. Budgeting for a football season worth of ISDN lines is expensive.

"You put this fairly expensive circuit in and you take it out the next day. And the next week, here comes along another radio station and it puts in its ISDN line for one day and takes it out and goes home," said Mike Simpson, president of Midcom Inc. in Texas. "The next week, this just keeps repeating."

Midcom has worked with KVIL-FM since 1990 to equip and produce the Dallas Cowboys' game-day broadcasts. It started using ISDN lines for the broadcasts in 1993.



ISDN Network Termination Panel

Anyone who uses ISDN lines knows the costs can be steep. At RFK Stadium in Washington, D.C., Midcom paid upwards of \$400 for an ISDN line for just one game. Like the other broadcasters, Midcom had to pay a month minimum for just one night.

Learning to share

In addition to the ISDN lines, stations broadcasting the football games also install POTS lines for game day. Once producers from the different teams started talking about how much it cost to install lines at each station, Simpson said, "We all got to thinking 'This is ridiculous.'"

In 1994, the Washington and Phoenix stations formed a co-op with Midcom.

"We each put a line in for the other at our own home stadium," said Simpson. It made sense because the teams are in the same division and play each other twice a year.

At the end of the 1994 season, the three started kicking around the idea of taking the co-op league-wide. It was Bill Newman, president and general manager of KCFX(FM) in Kansas City, who conceptualized the co-op idea, said Simpson.

The original plan was to have every radio station set up the visitor's radio booth in their home stadium with an

ISDN line, three regular telephone lines and circuits to the locker room. The lines would stay in all season for any visiting team's radio station to use.

Midcom NFL/ISDN co-op

Simpson began approaching general managers, program directors and sports directors at the stations.

"I've discovered you can't get two people to agree to where to eat lunch much less get 30 stations to agree on how to do any one thing the same way," he said.

Eleven stations agreed to join the Midcom NFL/ISDN co-op for the 1995/1996 season. Stations in the co-op are KESZ(FM) (Arizona Cardinals); WZGC(FM) (Atlanta Falcons); WBT(AM) (Carolina Panthers); KVIL-FM (Dallas Cowboys); KOA(AM) (Denver Broncos); WWJ(AM) (Detroit Lions); KTRH(AM) (Houston Oilers); KCFX(FM) (Kansas City Chiefs); WBCN(FM) (New England Patriots); KSD-AM-FM (St. Louis Rams); and WJFK-FM (Washington Redskins).

Midcom became the administrator and third-party coordinator. It ordered an ISDN line, three POTS lines, and all necessary dry pairs for the 29 stadiums in the league.

Managing calls

Because only members of the co-op are allowed to use the lines, some simple precautions were taken. All POTS lines have toll restriction where it is available, and the ISDN lines require a SPID (Service Profile Identification) number. Midcom mails a manual with all the necessary SPIDs and phone numbers to each co-op member.

The lines were set up to avoid long distance charges in order to keep paperwork shuffling to a minimum. Calls can be initiated from the station to the studio, made with calling cards, made collect or made using 800 numbers.

"That prevents us from going through literally 150 telephone bills that we get every month for these 29 stadiums," said Simpson.

This season, each co-op member wound up paying around \$12,000, said Simpson. The bill covered installation of the lines, administration of the co-op and technical support.

"We just do it on a season basis because some teams will play eleven games at home and eight on the road. It kind of varies. Plus you've got preseason which is not necessarily consistent."

Before the co-op started, Simpson said the costs for lines at the individual stadiums varied widely.

"You go spend \$2,000 to do one game in Atlanta and the next week, you can go to California where telephone service is very inexpensive and you might spend \$500," he said.

The co-op has also saved members time, Simpson said.

"ISDN technology is not necessarily new," he said, "but it's new to a lot of telephone companies so in a lot of cases, they don't have a clue as to what they are doing."

Although he admits the phone companies are improving, Simpson said that engineers in the co-op used to fly in as early as Wednesday for a Sunday night game just to get the lines to work.

"Typically, they were always going out at least as early as Friday because they had to be there one full business day on site," just to make sure the lines were working.

Now, Simpson said, most engineers in the co-op fly out with the team charter flight on Saturday for a Sunday game.

After the Superbowl

Depending on costs, some ISDN lines will remain through to the first coin-toss of the 1996 preseason. In California, for instance, Simpson said it is far less expensive to leave the circuit in all year than rip it out in January and

put it back in July.

In some Bell South locations like Florida and Georgia, however, the monthly charge is so expensive "that in two months time of paying the monthly charge, you could more than pay for installation," he said.

Midcom is hoping more stations will join the co-op for the new football season. Simpson expects between 15 and 18 stations to be wired in for the new season.

And with Nashville getting the Oilers and the Browns leaving Cleveland, there will be new doors in new towns to knock on.

Model 8718 Survey Meter

Complex RFR Measurements Made Simple



- Auto-Ranges
- Read-out in any unit of measure: mW/cm², V/m, V²/m², etc.
- Built-in data logger makes site mapping fast and easy
- Time and spatial averaging—automatically
- Stored data downloads with Windows™ compatible software
- Compatible probes all provide RMS detection even in near-field, multi-signal environments

When used with Narda's patented shaped probes, the 8718 greatly simplifies the task of making RFR surveys, especially in complex, multi-signal environments.

* IEEE/ANSI C95.1-1991

For more information, call: (516) 231-1700.

Or write: 435 Moreland Rd., Hauppauge, NY 11788

Need information now? Call Narda's FaxBack 1 800 4NARDANY (462-7326)

Request Document #112

LORAL
Microwave-Narda

Watch Usage During Peak Periods

by Jon Banks

ROCKVILLE, Md. Have you looked at your electric bill recently? You should.

Our transmitter site is billed under "time of use" rates. The power company uses this new billing system for commercial customers to discourage electric consumption at peak demand times.

Uneven electric demand is a big problem for power companies. As electricity use increases, it is the peak demand that forces utilities to build expensive new power plants. When the demand is low, the utility can shut down the costlier-operating generators and run only the most economical ones.

In the mid-Atlantic area, air conditioners cause the biggest peaks in power consumption on weekday summer afternoons. Our utility, Potomac Electric Power Company, has been aggressively pursuing options to reduce those peaks.

Pro-rating power

It has offered rebates to residential customers who allow their air conditioners to be periodically shut down during peak

Note too, that electricity is almost twice as expensive at peak times than off-peak.

summertime demand periods. Incidentally, the signalling is done with an FM subcarrier.

For large and medium commercial customers, the utility has implemented a rate

structure making electricity more expensive during peak demand periods and much less expensive off-peak.

The average is about the same as the old flat rate, but if you do not plan your electric use carefully, it can be much more expensive.

Figure 1.

Billing Season		Cents per kWh of Total Consumption			Dollars per kWh of Peak Demand		Taxes	Total Bill
		Peak	Interim	Off-Peak	24 HR Demand Charge	Peak Hours Demand Charge		
Summer May-Sep	Rates	6.7¢	5.6¢	3.5¢	\$3.65	\$9.75		
	Typical bill	\$502	\$410	\$567	\$192	\$515	\$252	\$2452
Winter Oct-Apr	Rates	5.8¢	4.7¢	3.5¢	\$3.65	None		
	Typical bill	\$424	\$357	\$673	\$171	None	\$227	\$1854

Peak times are from 12N-8P weekdays; offpeak is 12M-8A weekdays and all day on weekends and holidays; interim time is everything else.

Table 1 shows the components of our bill. Note the summer rates, from May to September, are higher than winter rates. Note too, that electricity is almost twice as expensive at peak times than off-peak.

The next two columns, the Demand Charges, are the real kicker. We pay \$3.65 per kilowatt hour (kWh) for the greatest draw we put on the electric meter in any half-hour over the entire billing month. And only during summer, we are charged an additional \$9.75 per kWh for our greatest draw during peak hours.

That item alone makes our bill jump \$500 a month when the summer rates start.

The new electric meters are as fancy as the rate schedule. They have an internal

clock, an LCD display, and are read with a hand-held infrared wand.

To measure peak demand, the meter counts the revolutions of the little wheel over a 15-minute period. This is added to the last 15-minute period, and, if greater than the previous maximum, gets stored

in an appropriate memory register. The meter readout shows the different parameters, flashing one after another.

If you have one of these sophisticated electronic meters, learn to read it. Find out if your utility offers conservation or rebate programs that would benefit you.

Our electric use is probably typical for a medium-size transmitter site. We have

main and backup transmitters, each operating at 26 kW and normally drawing about 40 kW. Two air conditioners draw about 8 kW each, and the tower lights draw 5 kW at night. Other technical equipment draws about 3 kW tops.

The biggest mistake to make would be to run the backup transmitter into a dummy load on a summer afternoon. The peak demand charge will cost 40 kW times \$9.75, or \$390 just to test that transmitter.

Of course, once you have turned it on, you could run it every day that month without paying that peak charge again; just the 6.7 cents per kilowatt-hour for the electricity you are using.

Absorbing the cost

Obviously, if you have a sick transmitter and you need to fix it right away, that \$390 is just the cost of doing business and you will simply have to live with it. But if you can plan your routine tests and take steps to control your peak electric use, you will come out ahead.

Remember, outside of those peak periods, the demand rates are actually cheaper than the old flat rates.

What can you do to save a few bucks? First of all, check your bills and contact your power company. While many utilities are implementing demand billing, the details vary. Learn when your billing month starts and stops.

Again, learn to read those sophisticated electronic meters. If your utility offers conservation or rebate programs that

continued on next page ►

64 Years Ago

Reprinted from Radio World, January 2, 1932.

Editor's note: The RW of old, printed for a time in the 1920s and 1930s and today's RW are unrelated except in name.

Hawaii-U. S. Phone Service

Direct radiophone connection between the American continent and the Territory of Hawaii was opened formally recently by Secretary Wilbur when he talked by radio from Washington with Governor Lawrence M. Judd of the Territory, in Honolulu, the connection having been made possible by the completion of a communication channel by the American Telephone and Telegraph Company.

Wires carry the voices from points on the American continent to San Francisco. Then short waves serve to connect San Francisco with Honolulu. From Washington to Honolulu the total distance is about 5,500 miles. The distance from Washington to San Francisco being about 3,000 miles and that from San Francisco to Honolulu being 2,500 miles.

Naval Radio Stations Shut

Washington. The Federal Government closed down its naval radio stations at the Great Lakes Naval Training School, near Chicago, as a measure of economy, according to an announcement from the Navy Department. The equipment, however, will be kept in operating condition so that it may be used for communication with training vessels of the Naval Reserve Units during their Great Lakes cruises next summer. The Navy department also closed the radio stations at Savannah, Ga., and at St. Augustine, Fla., permanently.

WMAK Ordered to Quit

WMAK, Buffalo, N. Y., has been ordered off the air by the Federal Radio Commission. The station was operating on a frequency of 1,040 kc. with a power of 1,000 watts and was operated by the Buffalo Broadcasting Corporation.

The Buffalo area would receive adequate service without WMAK, the Commission stated in its decision. The Commission's action sustained Examiner Ralph Walker.

N.B.C. PROGRAM LIST FOR YEAR TOTALS 33,000

Thirty-three thousand broadcasts involving more than one quarter million participants in a score of nations comprised the 1931 program year of the National Broadcasting Company.

The N.B.C. year revealed the world in review with stirring events and dynamic personalities on the air for the first time. First international addresses by Premier Mussolini and Pope Pius XI inaugurated the radio cycle. World flights, political and sport spectacles followed. A globe-girdling tribute to Marconi, the Oxford-Harvard debate and the radio premiere of Metropolitan Opera climaxed broadcasting of 1931.

Analysis of a typical broadcasting month showed program percentages to be: music, 62.9 per cent; literature, 11.8 per cent; educational (all types), 21.3 per cent; religion, 2.5 per cent, and novelties, 1.5 per cent.

Broadcasting developments by N.B.C. brought the addition of \$1,000,000 in talent to daytime programs, establishment of television studios and laboratories atop the Empire State Building, addition of a second Pacific Coast network, and the signing of a lease for twenty-seven studios and other space in Radio City. Included also was the linking of KGU, Honolulu, with domestic networks, and the exclusive broadcasting and entertainment alliance with the Waldorf-Astoria Hotel.

The Wizard™ has gone STEREO!

The new **DIGITAL** FMSA-1 gives The Wizard System unmatched stereo monitoring capabilities. . .



Superlative stereo performance. Linear-phase filters that reveal the true performance of your audio processing. The stability of digital stereo demodulation. The sophisticated graphical presentation of The Wizard. And—with the RS-232 port—operation on site or off.

Contact Belar today for more details on what should be your next modulation monitor

BELAR ELECTRONICS LABORATORY, INC.
119 LANCASTER AVENUE • P.O. BOX 76 • DEVON, PA 19333-0076 USA
(610) 687-5550 • FAX (610) 687-2686
Call, write or FAX for more information on Belar AM, FM, Stereo, SCA, and TV monitors.

Home Grown Station Inspections

► continued from page 8

Hicks said agents can concentrate their energies on major problems.

In fact, FCC chairman Reed Hundt has proposed to close down several FCC field offices this year. At the moment, Dailey's office has two engineers and oversees over 800 broadcast stations in Kansas, Iowa and Missouri. Since 1985, Dailey said they have conducted 215 station inspections in Missouri.

more states are in the planning phase. He listed Connecticut, Delaware, the District of Columbia, Maryland, Kansas, Massachusetts, Minnesota, New York, Oklahoma, Pennsylvania, Tennessee and Vermont as states that are considering starting a program.

Dailey estimated that the average fine levied in Missouri would have been approximately \$1,000 for each station with a violation. He added that for under

actual inspection is growing slimmer and slimmer. The grace period is also voided if a complaint is filed. Opponents argue that because anyone can file a complaint, no one will ever be home free.

In New Hampshire, however, the inspections program had a happy ending. Three days after the Concord, N.H., stations went through a mock inspection, the FCC did a surprise inspection and all four stations passed.

Conflict of interest

Like Missouri, Florida grants a two-year grace period to stations that pass. Alabama, Louisiana and Mississippi grant stations a three year reprieve.

In several states, the administration is handled by the broadcasting association. Stations pay the association for the inspection and the association in turn pays the inspector.

Still, eyebrows can raise when one thinks of human nature and — dare we say it — graft.

"It's not a conflict of interest in my opinion," said Ben McKinnon, executive director of the Alabama Broadcasters Association. Alabama's inspector is a retired engineer-in-charge from the Atlanta field office. McKinnon said he "lends a lot of respectability to the program." Several states, including Louisiana and Florida, have also hired retired FCC agents.

"Our job is not to protect the stations out there," said Carl Smith, a veteran broadcaster and executive director of the Oklahoma Association of Broadcasters.

For his part, Dailey is not too concerned about graft in the inspection process.

"We will eventually hear about it if there are abuses," Dailey said. The FCC is trying to work up a minimal set of guidelines. One of those, said Dailey, is that the inspector can have no financial interest in the resolution of problems.

"A genuine regulatory philosophy ought to include a component that says all that we are after is compliance — not punishment," said John Laabs, president of the Wisconsin Broadcasters Association.

"The overall reason for the program is to bring more stations into compliance," said Browning. He added that some stations down in Florida's panhandle have never seen an inspector simply because the FCC does not have the manpower.

"We haven't found a down side," Dailey said of the program. As for Orr, the independent inspector visited his stations in Branson about two months ago. They passed.

If the station fails, most states give the owners 120 days to set things right. If the station passes, owners get a two- to three-year grace period from routine FCC inspections.

That is 21 stations a year. By contrast, the MBA has inspected 29 operations since it began its program some six months ago. The Florida Association of Broadcasters had 23 station inspections under its belt after three months of operation. And director of membership David Browning said another 100 have signed up.

Planning stages

The idea has caught like wildfire, prompted in some areas by upcoming license renewals. Dailey said that many

\$400 dollars, stations are getting a second chance to pass and can be inspection-free for two years.

Allan Sprague, president of the New Hampshire Association of Broadcasters, calculated that the cumulative fine the stations would have paid for the violations found during the mock inspections in his state in 1993 was \$832,000.

Some detractors ask why broadcasters should be doing the FCC's work. They question the need for an operator to pay \$350 or so when the likelihood of an

Keeping Your Eye On Electricity Use and Costs

► continued from previous page

would benefit you, pursue them.

In our station's case, we are too small a user to benefit from the plans our utility offers. To qualify, we would have to double our power use.

Finally, fall back on the basics. Turn off lights and equipment not needed when you leave. Do not run both transmitters during peak times. Test the

backup in the morning.

See what you can do to make your cooling system more efficient. Run exhaust fans, which are cheaper than air conditioners. If you have two air conditioners, set the thermostats to favor the smaller one and test them one at a time.

The best way to economize would be to use an antenna with more bays. A four- to six-bay antenna is much more efficient than a one- or two-bay assembly.

Unfortunately, you are not going to be able to change that unless a major rebuilding of the transmitter location is planned.

□ □ □

Jon Banks is chief engineer of WARW-FM in Washington. Reach him care of RW.

**COMING SOON
IN RADIO WORLD:**

FEBRUARY

- RAB PREVIEW
- TUBE MARKETPLACE

MARCH

- NAB PREVIEW

APRIL

- SPORTS AND EVENTS MARKETING

Cellular Telephone Interface
Microphone, tape and tuner inputs • Headphone Jack • Send and receive level controls
Works with most Motorola bag phones

CONEX ELECTRO SYSTEMS
1-800-645-1061 (360) 734-4323 FAX (360) 676-4822

Circle (91) On Reader Service Card
World Radio History

POWER UP



TASCAM PA20MKII POWER AMPLIFIER

- 25 Watts Per Channel
- Balanced XLR Inputs
- Headphone Jack
- Level Control
- Rack Mount

\$169.00

Mfr. List \$250.00

Save 32%

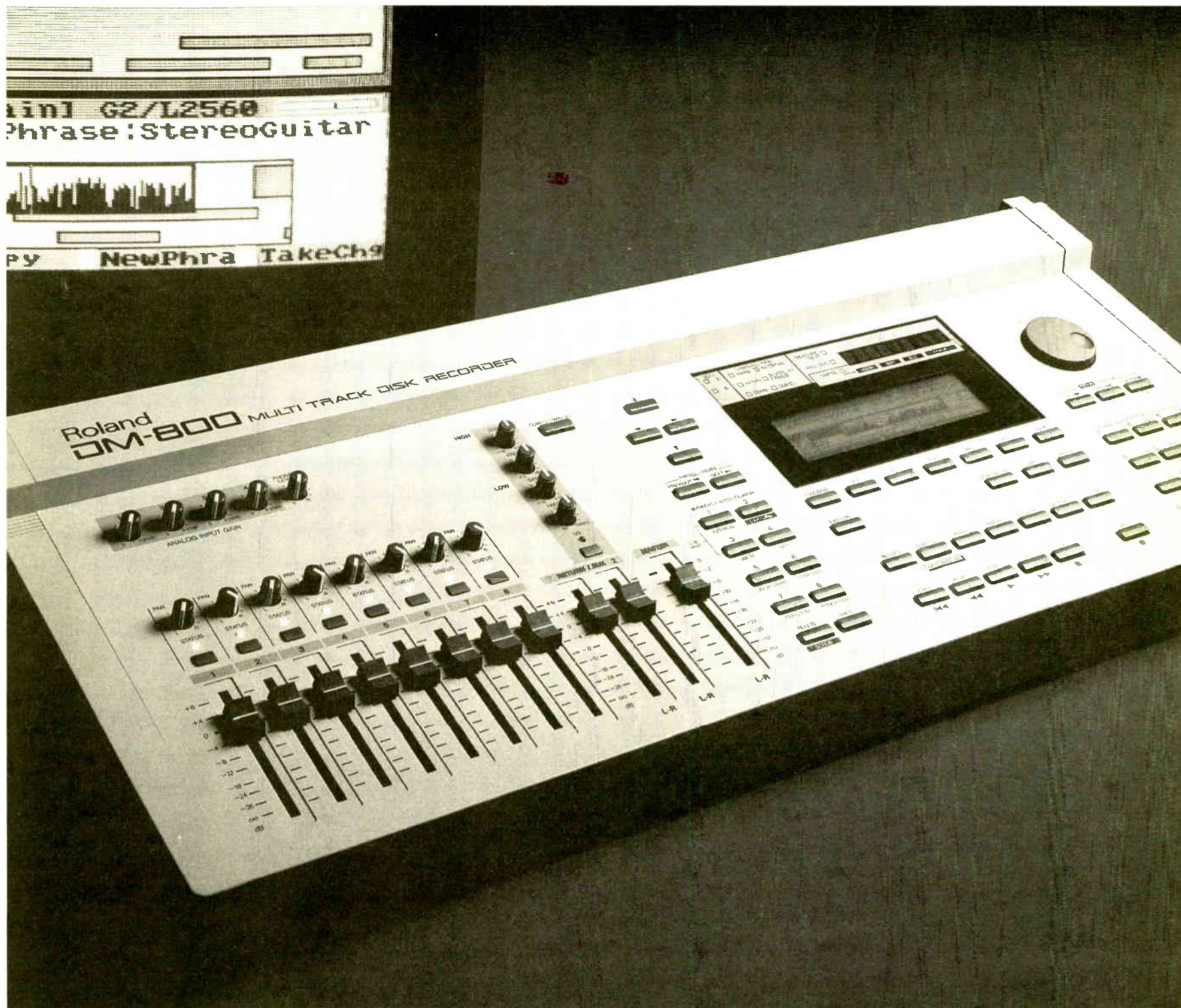
Phone: 800 . 426 . 8434

Fax: 800 . 231 . 7055

BSW
BROADCAST SUPPLY WORLDWIDE
7012 27th Street West Tacoma, WA 98466

*Limited to stock on hand

Circle (158) On Reader Service Card



The Power Studio From Roland

The new DM-800 provides power, speed, portability and reliability like no other system available.

Power Eight discrete tracks with 100 layers per track. 12 channel automated mixing and EQ. Time compression and pitch correction. Nondestructive, full featured editing. Sub-frame accurate SMPTE sync. Optional ADAT, DA-88 or RS-422 interface.

Speed The DM-800 is easy, fast and quick to learn, using powerful hardware controls with tape recorder style punch in and out. No computer required.

MIDI Support The DM-800 supports MMC, MTC and dynamic functions like tempo mapping, bar and beat editing,

control of external sequencers and trigger mode for instant phrase playback.

Portability All the features and functions you need are contained in a single 12 pound unit. You can literally grab it and take it with you. Uses internal and external SCSI drives. View any level of information on the built-in LCD or plug the DM-800 directly into your video monitor.

Reliability The DM-800 is a completely dedicated piece of hardware with Roland's renowned reliability.

Price Incredible Power. Incredible Price. \$6295.

Call today for your free brochure and video.

Roland®

Roland Corporation U.S. 7200 Dominion Circle Los Angeles, CA 90040 (213) 685-5141 Ext. 756 Fax (213) 726-3267
 Roland Canada Music Ltd. 5480 Parkwood Way Richmond, B.C. V6V 2M4 (604) 270-6626 Fax (604) 270-7174

RadioCafe Provides On-line Meeting Place

by Alan Haber

CHICAGO World Wide Web mania is sweeping the country, so you can be forgiven for not knowing about a neat alternative to exchanging information important to your station.

RadioCafe Online, launched this fall from its Chicago home base, is "an on-line service for radio professionals," according to president Mark Obermeyer. The idea for the Cafe, he said, "is to provide an industry connection," which the Cafe does by offering a variety of targeted services.

Think of the Cafe as something akin to a miniaturized commercial on-line service, albeit one devoted exclusively to the business of radio. The Cafe runs under Windows 3.1, Windows 3.11 for Workgroups and even Windows 95 (in DOS mode). Obermeyer said a Windows 95 version might come along this summer. A Macintosh version is currently in development.

For radio station program directors, sales managers, account executives, promotion directors and consultants, RadioCafe Online has the potential to become a virtual gold mine of useful information. (At present, the Cafe is in the process of being fully stocked with tasty morsels, so pardon the dust as Obermeyer stocks the shelves.) The Cafe, open only to radio professionals by subscription, is a place to exchange playlists, promotion ideas, and sales presentations and establish on-line relationships with industry peers across the country.

After you have registered on line, you are ready to choose from the extensive menu of available areas. Getting on line is a snap, by the way; after a simple installation process, you simply click on the RadioCafe Online icon in the Worldgroup Manager program group. You'll immediately feel familiar with the Cafe's screen layout — it looks just like the display in a Windows program group.

When you connect to the Cafe, you are greeted with a colorful welcome screen. If you have mail addressed to you on the system, an announcements screen pops up to alert you. A simple mouse click places your mail on screen.

The Main System Menu contains, against a nice sky-blue background, the colorful icons that lead to the various areas within the Cafe. You may want to start your session by chatting with other users in real time; a click on the RadioCafe Chat icon will get you in gear. Or, you may want to traverse through some of the Internet Forums represented, which are geared toward station programmers and other more leisurely oriented folk, such as Beatles fans.

You can choose to send private e-mail to Cafe users. You can upload or download files in the file libraries. You can take part in one of the polls or questionnaires being bandied about on line, or even post a poll or questionnaire of your own — results are posted in real time in the form of graphs and stats.

In the Cafe, there is a lot of information you can use, including the weekly Billboard charts for singles, albums, modern rock tracks and dance maxi-singles. The ITN (InTernational News)

Daily Newspaper is available for on-line perusal; it contains today's hot stories, what's up in Washington, entertainment updates, sports news and more. You will also find horoscopes, Star Trek updates and NFL news here.

For those of you in the market for employment, the Cafe's Marketplace houses a listing of available jobs in the radio industry. If you are already gainfully employed, you can also benefit in this area of the Cafe: show prep information is on offer here, as is information on sales and engineering products.

RadioCafe Online may just be getting started, but its potential is enormous

and deserves a look by all radio professionals. Find out more by visiting the Cafe's Web site at <http://www.syn.net/>

Modems up to 28.8 baud are supported. Obermeyer said a variety of special subscription offers are in place. Call him

RadioCafe Online may just be getting started, but it deserves a look by all radio professionals.

radiocafe/. Once you are registered, you can telnet into the Cafe at radiocafe.syn.net, or get in the old-fashioned way — by direct modem connection.

for details and a free sign-up kit, which includes the software necessary to connect, at 312-929-9472, or e-mail him at mao@radionline.com



**There Are Those
Who Believe
Turning 50 Is a
Landmark Event...**

**We Prefer To
Look At It As A
Really Great
Beginning**

- 50 years of innovation in RF technology.
- 50 years of building top quality products which set the industry standard for performance and reliability.
- 50 years of making sure our customers receive the best service.

1946-1996. At age 50 Continental Electronics takes great pride in our history of leadership in RF communications. But just like you have to make constant changes and adjustments in your formats, talent, and studio equipment to remain competitive, we remain committed to looking ahead and providing broadcasters with the

technological advances in RF technology needed to keep them competitive with other communications channels. Our recent acquisitions of TELEFUNKEN Sendertechnik (1995) and Lensa S.A. (1994) enable us to offer a significantly broader range of RF products and increase our advanced RF and terrestrial communications research efforts. So we look back at our first 50 years with pride, but look forward with even greater anticipation to broadcasting in the next 50 years.

Visit the Continental booth at NAB '96 and see where we're taking RF technology to meet your needs today and tomorrow.

For 50 years, Continental Electronics has provided excellence in broadcast transmission products worldwide. Refuse to compromise... call Continental first!



Continental Electronics Corporation

P.O. BOX 270879 • DALLAS, TEXAS 75227-0879 • 214-381-7161 • FAX 214-381-4949

12.95.108

COLE'S LAW

FCC Introduces Tower Registration Rules

by Harry Cole

WASHINGTON So my editor calls me up and says that, for my initial new year piece, the paper would like an update on the FCC's big RF proceeding.

This is the one that could impose new and exciting RF standards, arising from ever-developing ANSI standards relating to human exposure to RF.

This was not an unreasonable topic suggestion. The FCC's RF proceeding first got cranked up almost three years ago, and the comment and reply-comment deadlines came and went more than a year ago. So, I agreed.

The results

Here is my update: nothing has happened. As of this writing, the RF proceeding still sits there, waiting for action. Maybe next year.

But if you were going to be interested in an article on RF/ANSI standards, you will probably also be interested in a piece on the new tower registration rules, which the FCC released at the end of November.

As you may recall, as part of its ongoing effort to streamline its operations, the FCC last year announced that it was considering a drastic overhaul of how it deals with radio towers. Rather than have each broadcast permittee or licensee be responsible for filing information concerning towers proposed or now in use, the FCC proposed to have each tower's owner register each tower structure with the commission.

Additional users of registered structures — lessees, for example — would simply have to reflect the registration identification for the structures in question on their own applications. For the purposes of this article, a tower user or tenant will be referred to simply as "user."

In essence, that is the approach which

the FCC has now adopted. Once it becomes effective, the new program will work something along these lines.

Defining the owner

Each owner of an antenna structure requiring FAA notification will be required to register each such structure with the FCC. For purposes of this program, an owner is defined as "the individual or entity vested with ownership, equitable ownership, dominion or title to the structure."

Two quick observations on this definition of "owner." First, the definition refers to control of the structure, not the land underneath it.

Thus, if you have leased some land and then, pursuant to that lease, you yourself have built a tower on the leased land, you are the owner of the tower structure.

Second, the concept of "equitable ownership" is intended to mean "the party in possession or control of the antenna structure, irrespective of any mortgage or lien on the property or the antenna structure."

So you could be the "owner" even if you technically do not hold clear title to the tower.

Filing process

Registration will be accomplished by filing a separate FCC Form 854 for each antenna structure. Note that in a multi-tower directional array, each of the towers constitutes a separate structure subject to registration. This assumes each of the towers requires FAA notification.

The FCC will permit owners to register electronically, if they wish, although instructions for such electronic registration have not yet been issued.

The schedule for bringing the registration program on line begins July 1, 1996, according to the current thinking. As of that date, all new antenna structures

meeting notification criteria will have to be registered with the commission. But what of all those 75,000 or so existing towers, you ask?

They will be subject to registration over the two-year period from July 1, 1996 through June 30, 1998, with "filing windows" established according to geographic regions. For example, tower owners in Michigan and Montana will have to register their structures between July 1 and July 31, 1996. Similar designated window periods have been announced by the commission for all other states and territories.

Fortunately for owners, the commission will not be charging any fee for tower registrations. The commission expects to

should. Rather, it means if a tower is in a condition that would lead a reasonably bright user to suspect it may not be in compliance, then that user's new obligations kick in.

Problems

The registration program raises some very interesting practical problems for existing licensees. Each tower owner will now be required to give each user a copy of the registration reflecting the tower's specifications. This would include latitude, longitude and height.

The user must then compare that information with the specifications set out on that user's own FCC license. If there are any discrepancies, the user may then be

All new antenna structures will have to be registered with the commission. But what of all those 75,000 existing towers?

incur some administrative costs in implementing its registration program, but expects to be able to recoup those somehow. This may be possible by perhaps offering access to the resulting tower database through a 900-telephone number, or possibly through sale of the database on CD-ROM.

Compliance

Where a structure requires registration, compliance with such matters as the National Environmental Policy Act will be allotted between tower owner and tower user as appropriate. That is, a person building a registrable tower from scratch will be primarily responsible for complying with environmental requirements pertaining to the site at the time of registration, and any environmentally-sensitive aspects of that site.

Users who later mount their antennas on the already-built structure would normally be responsible for RF levels at the site. Once the structure is built, the registered owner will have primary responsibility for maintaining any prescribed painting and/or lighting on the tower.

However, any individual or entity utilizing the structure will bear what is known as "secondary responsibility" for that maintenance if the structure owner is unable to perform the required maintenance. Reasons could consist of bankruptcy, negligence or abandonment, to name a few.

This notion of "secondary responsibility" extends further. If a tower user thinks that its tower might not be in compliance, that user is required to immediately notify the structure owner, the site management company if applicable and the commission, as well as to make a diligent effort to bring the tower into compliance.

This does not mean that tower users will be required to constantly doublecheck the status of the tower's maintenance as owners

required to file an application to bring the terms of its license into conformity with the specs included on the tower registration.

This is not a trivial question. Technological innovations in determining geographic coordinates — mainly through satellite-based global positioning instruments — could give rise to significant differences in latitude or longitude. This in turn could affect determinations of the antenna's height-above-average-terrain (HAAT).

If the HAAT shown on a tower registration differs by more than two meters from the HAAT shown on an AM or FM license, or if the latitude or longitude differ at all, then the radio licensee will have to file a modification application to bring its license into conformity with the registration specs.

This is also true where the height of an AM station's radiator is found to increase or decrease more than two meters. The modification application has to be filed within 30 days of receipt by the licensee of the tower registration from the tower owner.

The good news on this is that affected licensees can file a license application (FCC Form 302) simultaneously with the modification application (FCC Form 301 or 340). No filing fee will be required.

On the whole, the FCC's new tower registration program appears to make a lot of sense. Do not be surprised if its implementation runs into unexpected snags, as is likely to be the case for any undertaking of this scope.

If you have any questions about the commission's new program, you should contact your communications counsel.

□□□

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

ABG is Studio Furniture

"ANY SIZE, ANY SHAPE...
INDIVIDUALLY BUILT TO
YOUR SPECIFICATIONS"

If you're thinking of
upgrading your
facility, you can't
afford not to call us!

FROM
CONCEPT TO
REALITY — ABG MAKES
IT HAPPEN

Please call today for full color brochure.

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

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

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

cServe: 75371.144
internet: support@abg.com
web site: www.abg.com

For 36 years
ABG
Audio Broadcast Group Inc.

[quality]

t h e b e s t s o u n d



[now shipping]



FIELDPHONE®

Broadcast Quality Audio Over One (1) Phone Line

FieldFone™ provides the best audio over one standard phone line. It is the first codec designed for breaking news, sports reporters, on-site promotions, and talk shows.

FieldFone™ is your answer to high quality, bi-directional remote broadcast recording without ISDN lines! Turn your ordinary remote broadcast into an extraordinary broadcast quality event.

FIELDPHONE™ AWARDS

Radio World—“Cool Stuff”

Broadcast Engineering—

“Pick Hit For Radio”

TV Technology—“Mario Award”

Specifications

Frequency Response:	20 Hz to 6.5 kHz
Signal-to-Noise Ratio:	84 dB (ref. +8 dBm)
Distortion:	0.08% THD+N
Data Rates:	28.8, 24, 19.2 and 14.4 kb/s
Line Input:	+21 dBu maximum, 600Ω or >20kΩ, selectable, balanced
Mic Input:	Gain 26 to 73 dB, balanced, 20kΩ
Line Output Level:	0 dBu, nominal
Headphone Output:	+15 dBu, 30Ω, separate level controls for Send and Receive audio
Power:	90-250 VAC, 50-60 Hz
Dimensions:	4.5”H x 11”W x 13” D
Weight:	12 Pounds

FIELDPHONE®

For information and your nearest dealer call:
Tel: 908-739-5600 Fax: 908-739-1818
Fax On Demand: 908-935-2777 Internet: <http://www.musicamwest.com>
MUSICAM USA, 670 N. Beers Street, Building 4, Holmdel, NJ 07733 USA

Circle (169) On Reader Service Card
World Radio History

MUSICAM USA

Studio Sessions

Bringing back
Retro Effects
See page 22.

Equipment and Applications for Radio Production and Recording

PRODUCT EVALUATION

Versatile Philips Sound Enhancer

by Don Jennings

FOREST, Va. The move from analog to digital in broadcasting, studio and music production has not been easy or inexpensive for those of us from analog backgrounds. We purchased our CD players, DAT recorders, and computer-based digital editors and then got down to business.

Not long after that, we discovered the 44.1 kHz CD sample rate was much different from the 48 kHz sampling rate for digital VTRs and consumer DATs. We also discovered the A/D and D/A converter quality in our CD and DAT machines left a lot to be desired.

have one box that could deal with it all.

The Philips Model IS 5022 Sound Enhancer (distributed in the United States by Mackenzie Laboratories) provides the tools to deal with these problems and many others in one relatively inexpensive single rack-space device.

Feature packed

Look at Table 1 on page 20 for the list of features present in the 5022 enhancer. There are plenty to go around.

When it came to testing the 5022, my first interest was the sample rate converter. At Media Technologies, we receive DAT masters from studios and individuals. We transfer these DATs into our workstation for editing, then to recordable CD (CD-R) or digital bin master for cassettes.

Both our digital bin and CD-R use a 44.1 kHz sampling rate, which means DATs formatted for 48 kHz must be converted.

We have found that the Sound Enhancer will take any sampling rate from 15 to 50 kHz and convert it to a rock-solid 44.1 or 48 kHz, depending on the setting of the front panel sample-rate switch.

This also lets us convert CD masters up to 48 kHz for use in video production without leaving the digital domain. As an added benefit, the enhancer's jitter-reduction capability removes clock jitter from the original DAT tape and improves the audio quality in the process.

One project we took on was a 22-year-old bluegrass vinyl LP sent to us

for CD replication and cassette duplication. The budget was low and the record had been badly damaged over the years. Besides having a large number of scratches, it even had mold growing in the grooves!

This was an ideal test for the IS 5022's A/D — D/A converters, scratch suppression, noise filter, bass, treble and spatial modifier.

After we cleaned the record, we played it through a high-quality preamplifier directly into the 5022. The analog signal

the amount of effect applied while in the adjust mode. Once the adjustments were complete, it converted to an audio level display.

The majority of clicks and pops were taken out by the scratch suppressor. We had to compromise between quality audio and the clicks and pops allowed to pass through the unit. Too much scratch suppression degrades the audio quality.

The digital bass and treble controls are cut-or-boost 10 dB types in 1 dB steps. These were adjusted to get the best sound from the vinyl recording.

The noise filter was adjusted to take out some high frequency hiss. This is a second-order digital low-pass filter with a

Product Capsule: Philips IS 5022 Sound Enhancer



Thumbs Up

- ✓ analog & digital I/O
- ✓ stable sample conversion
- ✓ simple operation

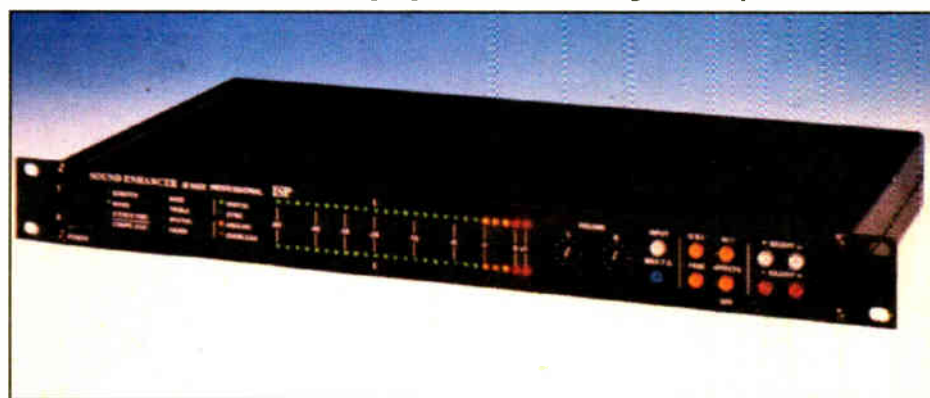


Thumbs Down

- ✓ must switch out other functions when using compressor

For more information, contact Mackenzie Laboratories at 909-394-9007; or circle **Reader Service 9**.

Finally, we began to notice vinyl records transferred to this new digital medium sounded particularly bad due to scratches picked up over the years. Oh, to



Philips IS 5022 Enhancer: A One Box Solution

was converted to 20-bit digital data by the enhancer's high-quality A/D converter.

First, we set optimum levels with the front panel controls. Then we listened to the amount of pops and clicks while making adjustments to the scratch suppression feature.

The 5022's front panel LED bar showed

range from 6 to 16 kHz.

The Spatial feature can widen or narrow a stereo image. This restored some of the stereo size lost in the original LP.

We then engaged the Quantization Noise Imaging (QNI) to noise-shape the signal to 16 bits. The QNI function is very useful for improving the sound of low-level passages in 16-bit digital program material. The quantization noise is shifted out of the audible range resulting in a noticeable improvement in the audio quality.

At last, the fully processed digital audio was sent to the workstation via the enhancer's AES/EBU digital output. Audio was monitored via the D/A converter from the balanced XLR analog output of the enhancer.

The verdict

The final result was excellent. We were able to filter out objectionable scratches, pops and noises while retaining the original sound we were after.

By using a single 5022 Sound Enhancer, we were able to transform an unusable LP into a finished master that greatly satisfied the customer. The project cost was greatly reduced compared to any other processing method we might have used.

While the stereo enhancement feature was not used for this project, we have found that it works surprisingly well. We have tried the stereo enhancement on a number of instruments and mono signal sources and discovered that the stereo effect worked particularly well on small brass and choral groups.

When I started using the 5022, I could
continued on page 18 ►

Analog & Digital A2-D

Audio Measurement System

The affordable instrument
Designed to meet the challenges
of tomorrow's testing needs

- Analog & Digital Generator and Analyzer
- User friendly front panel
- Stand-alone or remote control via RS-232 or IEEE-488
- Portable

We set the standard in making audio testing AFFORDABLE

NEUTRIK AG Liechtenstein Tel: 075 / 237 24 24 Fax: 075 / 232 53 93
 NEUTRIK Instrumentation USA / Canada Tel: 0514 344 5220 Fax: 0514 344 5221
 NCV Germany Tel: 0941 98041 Fax: 0941 99 97 72
 NEUTRIK UK Great Britain Tel: 0983 811 441 Fax: 0983 811 439
 NEUTRIK Zürich AG Switzerland Tel: 01 734 0400 Fax: 01 734 3891

NEUTRIK®

CONNECTING THE WORLD

Circle (65) On Reader Service Card

The Philosophy, Style and Technology Behind Weekend Edition/Saturday

by Rich Rarey

WASHINGTON It is with pleasure we can recognize a belated birthday for public radio.

November 1995 marked the tenth on-air year of NPR's "Weekend Edition/Saturday" (WESAT). Host Scott Simon has been with the program almost continuously since its beginning.

Known for sharp writing and well-produced news pieces, WESAT has developed a very loyal following who appreciate Scott's prose and Dan Schorr's analysis, and enjoy what WESAT creator Jay Kernis called "The promise of public radio."

It is a program in which I learned subtleties of the art of recording.

Aggressive field work

Scott's remote gigs in the first year of WESAT took us across the United States and were always grueling adventures. WESAT's limited travel budget frequently forced us to gather material for five 18-minute full-length radio pieces in five (or less) days on the road.

Sometimes we would return with 30 seven-inch reels of Nagra master tape which the production staff and Scott pared down over several weeks to four or five pieces. This is *real* radio; the very essence of gathering sound. "Sound" being that undefinable sub-

and stories that contain our own sense of excitement will convey some of that to the audience."

Scott asked, "What it is to live in a crack-house, to try to keep a pet in Sarajevo during the war, why the Allies invade a specific place on a specific day or how cicadas make their noise?" On WESAT, he can proceed with some assurance that the audience will be able to share some of that curiosity and intrigue, even if it has



PUBLIC DOMAIN

never occurred to them before.

"At the same time, I accept the fact that my single human interests are limited," Scott said. "The Cubs, the Bulls, country music, salsa, and the occasional novel. Therefore, I am not too proud to rely on the enthusiasm of others."

Enthusiasm

This enthusiasm is what stokes Scott's passion for a certain story.

"When producers come to offer an idea, I often initially respond less to the specific idea than the presence of their enthusiasm. If this story means that much to them, we ought to find a reason

comes from somewhere and stands for something."

With public radio presently struggling for its life and re-evaluating its purpose, there remains the question of Jay Kernis' intriguing "Promise of Public Radio."

"First, being very curious ourselves, we know listeners are very curious. Where conventional news programs are very predictable, NPR stories are based on fundamental questions," Kernis said.

Curiosity

Questions like, what really happened? Why did it happen that way? What caused people to react in the way they did? And what does this event mean to the week's news and larger historical picture, such as the month, week or century?

Second, there is a promise to use radio as best as one possibly can. According to Kernis, "That means telling the stories using all the sounds human beings make: speech, music, activity. Most radio news ignores music and activity. What's remarkable about WESAT is its remarkable sound pieces. Listening is a very pleasurable way to get information and get sense of things."

The program is produced to "help people learn to listen again," said Kernis. That happens in very subtle ways, so musical pieces are added throughout to allow time to digest.

And third, offers Kernis, is a quality of writing that is not found elsewhere. Writing that paints pictures and offers a point of view without prejudicing listeners. Scott does his work, and Kernis would inject a little magic into it.

Kernis said, "When you're in the field or at the computer, that's journalism. When you're on the air, that's show business. There has to be a point to asking a listener to sit with you for two hours."

Coming up with a format clock was easy, according to Kernis. Without having to break much for local material, it allows Scott to be Scott.

Kernis said, "Over the course of two hours, an anchor sits in a vortex of sound that brings listeners the world of the arts, sports and news documentaries. Every week the audience would come along with Scott's adventure, and hear Scott walk the tightrope between a normal interview and one where the newsmaker reveals something of himself."

Kernis said "Weekend Edition/Saturday" is also a program that each week says to the audience, "Broadcasting is still special, radio is special and public radio is special. It's still a place to go where you could hear the world differently."

Differently indeed, and enough said!

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

□ □ □

Rich Rarey was the first technical director of National Public Radio's Weekend Edition. His e-mail address is rrarey@npr.org

People like and respond to a news program that sounds like it comes from somewhere and stands for something.

stance that, when recorded with an interviewer the caliber of Scott Simon, causes listeners to weep, become angry or laugh freely.

Aggressive microphone techniques became the norm. The *sound* was paramount. Whether recording an initiation at the Baghwan Shree Rajneesh enclave (a Sennheiser 416 on a fishpole to get close to the initiates) or the emotional expressions of homeless people being fed by a 13-year-old activist (same mic in a Zeppelin wind cover), the best sound was the ultimate goal.

Quietly and indirectly, Scott demands the best work of engineers who work with him in the field. On those occasions where taking a crew is not practical, Scott ventures out alone.

"I think pretty much from the first, one distinctive trait about WESAT has been that we try to steer by our own internal guidance system," Scott said. "We have proceeded on the assumption that stories or questions any of us find interesting and exciting can be made so for the audience,

to do it. Maybe a bit more than a few other shows, we look for reasons to do stories than not do them."

Scott came to Washington to host WESAT from a correspondent beat in Chicago; a city tie of which he's proud.

"Over the years," he said, "I don't think I have personally heard in letters, phone calls or personal appearances from more than three people who resent our obvious partiality for things Chicago, and cities in general."

For one thing, Scott thinks much of WESAT's audience regards Chicago as a Lake Wobegone; a quirky but fascinating place, entertaining and even lovable, but not quite real.

"I think the audience responds to a group of people who do not try to present themselves as neutral, passionless, and objective," Scott said. "To do otherwise would create a show people feel neutral and passionless about. I have concluded over the years that people like and respond to — and care about — a news program that sounds like it

EASE UP

dbx
166A
COMPRESSOR/LIMITER
EXPANDER/GATE

- Stereo/Mono Operation
- OverEasy® & Hard Knee Compression Modes
- PeakStop® Limiting
- Balanced In and Out
- High Performance

\$349.00

Mfr. List \$549.00

Save 36%

Phone: 800 . 426 . 8434

Fax: 800 . 231 . 7055

BSW
BROADCAST SUPPLY WORLDWIDE
7012 27th Street West Tacoma, WA 98466

*Limited time offer

Sound Enhancer Rescues Projects

► continued from page 18

not resist getting out a razor blade and putting a few slices in a vinyl album from my old collection. I selected a relatively quiet section and put a series of four slices across the album track. This resulted in four very loud pops, essentially making the song unplayable.

The 5022 Sound Enhancer eliminated nearly 100 percent of the pops. While there were some artifacts left over in this rather drastic test, the results were impressive. I have had a great time duplicating this test for many unbelieving clients.

The 5022 also contains a compressor/expander. It is less flexible than some dedicated units, but the compressor works very well for reducing the dynamic range of program material without typical analog pumping.

If the enhancer's compressor is used, the scratch, noise, stereo enhancement and spatial are switched out. The compressor has worked particularly well on some of our television production spots to bring them a consistently loud level.

Simple operation

Surprisingly, the 5022 Sound Enhancer was originally designed with consumers in mind.

For that reason, the complex functions of the enhancer are very easy to learn and use. There are no LCD screens to scroll through or complicated codes or settings to enter. The user simply presses the

Select buttons up or down until the LED of the desired effect starts flashing.

The user then presses the Adjust control up or down to reduce or add to the amount of effect desired. An effects button toggles the effects off or on to compare the original sound to the final processed product.

TABLE 1.

The IS 5022 includes the following functions:

- 20-bit analog-to-digital and digital-to-analog converters
- Sample rate conversion between 44.1 kHz and 48 kHz
- Scratch suppression for removing clicks and pops
- Noise filter (digital variable low pass filter)
- Stereo enhancement for creating stereo from a mono source
- Digital equalization
- Stereo level and balance controls in the digital domain
- Spatial, for widening or narrowing a stereo source
- Jitter removal
- Quantization noise imaging
- Digital fader adjustable from .5 to 11 seconds
- Digital compression and expansion
- Accurate multi-segment digital LED level indicators
- External synchronization
- Transport for subcodes

With a single button, the user can select the sampling rate. One button is also used to choose between analog or digital input.

The enhancer has balanced +4 dB and unbalanced -10 dB inputs and outputs. Digital ins and outs are via AEB/EBU XLR connectors or S/PDIF RCA phono connectors. The unit also has a BNC connector for a word-clock input for synchronization.

Philips has packed a lot of useful tools

into this one rack-space unit. After using it for a month, I find myself reaching for the enhancer on a regular basis to resolve many a digital challenge. The Sound Enhancer's quality is excellent and the combination of so many useful functions in one unit is outstanding.

□ □ □

Don Jennings is vice president of the digital mastering division of Media Technologies Ltd., specializing in CD premastering, digital editing and the preparation of audio-for-digital bin cassette duplication. He can be reached at 804-525-0204.

SHORT TAKE

Taming Hot Multitrack Levels with Symetrix 488

by Alan R. Peterson

WASHINGTON If you are an ADAT or DA-88 user, you know what it is like to hit the clip point and ruin a recording. Digital distortion is never pretty, but on modular digital multitrack (MDM) decks it can get downright ugly.

The obvious solution is to play it safe and cut tracks at low level. This will, unfortunately, cost you in terms of precious fidelity.

There is a better solution. Enter the Symetrix 488 DYNA-Squeeze eight-channel compressor/limiter, designed specifically for MDM users. If you own an ADAT or similar machine, you need this device.

Putting the squeeze on

The 488 takes care of several problems. First, it rides levels on eight channels of audio at once, gently squeezing tracks to the upper end of a recorder's dynamic range.

When an MDM is fed low level audio, bit resolution suffers and sound quality comes across as grainy. When a higher audio level is presented to an MDM, bit resolution is at its optimum point and digital audio is recorded at full fidelity.

The 488 also performs level matching with a single switch. Many consoles can output up to +24 dBV, while the unbal-

are properly zeroed, you may never have to readjust the 488 again.

Analog warmth

An added benefit to the Symetrix 488 is the ability to simulate an analog sound directly to digital. When the threshold control is forced down to -30 dB or below, what prints to tape has the quality of natural analog tape compression.

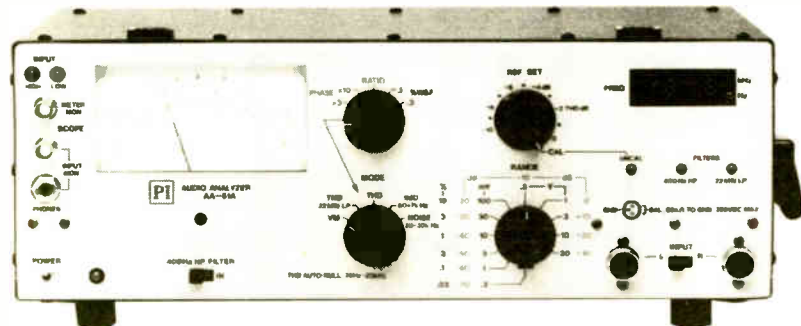
The 488 is useful for more than tape-based MDMs. Any digital audio workstation that can accommodate four to eight simultaneous inputs (such as the Roland DM-80) can use this compressor.

The circuitry inside the 488 is also a model of simplicity. The signal path consists of two op-amps and a single voltage-controlled amplifier (VCA) per channel. Considering a typical automated console can have up to two dozen op-amps and several VCAs between the mic input and bus output, this minimized component count keeps the 488 sounding clean and uncolored.

Performance numbers

Specs for the Symetrix 488 are impressive. A dynamic range of better than 110 dB, a fast compression attack time (1.5 milliseconds) with a nice gradual 1.2-second release and recovery period. Full 20

AA-51A AUDIO ANALYZER NEW \$3770; UPGRADE \$1560



MEASURES:

- ✓ HARMONIC DISTORTION
- ✓ VOLTS
- ✓ dB; dBm (600 ohms)
- ✓ FREQUENCY
- ✓ WOW & FLUTTER
- ✓ STEREO PHASING
- ✓ SIGNAL + NOISE NOISE
- ✓ INTERMODULATION DISTORTION
- ✓ DIFFERENTIAL GAIN OF STEREO CHANNELS

FEATURES:

- ✓ AUTO-NULL THD+N
- ✓ SHIELDED & BALANCED STEREO INPUTS
- ✓ COMPATIBLE WITH NAB TEST DISKS
- ✓ FREQUENCY READOUT
- ✓ SWITCHABLE HIGH-PASS AND LOW-PASS FILTERS
- ✓ VERNIER SET-LEVEL CONTROL
- ✓ HEADPHONE INPUT MONITOR PORT

PLEASE CONTACT US FOR COMPLETE DETAILS

Symetrix 488 Eight-channel Compressor



anced input of an ADAT clips at only +8 dBV. This forces most engineers to run faders only at about one-third overall travel.

A +4/-10 output level switch on the 488 allows you to send full-bore levels into it. The switch drops the output level accordingly to interface with popular MDM machines.

For anyone who has ever wrestled with setting a compressor or limiter "just right," the Symetrix 488 is a model of simplicity. A single knob sets the threshold of compression across all eight channels and an output trimmer matches the signal from the console to the recorder.

Set the 488 for light compression, then turn up the output trimmer until you are right under the clip point. That is all there is to it. When the console and recorder

Hz to 20 kHz response in and out, with less than .05 percent THD. Broadband output noise checks in at -90 dBu.

Except for the dancing gain reduction lights and the hot, clean levels to your MDM, you would never know the 488 was there.

The Symetrix 488 DYNA-Squeeze is priced at \$579 retail, which works out to roughly \$72 per compressor. That is a very small price to pay for the potential improvement to your recordings. If your station or multitrack project studio has an ADAT, DA-88 or offshoot, you should give serious thought to the DYNA-Squeeze 488.

For more information and a list of dealers in your area, contact Symetrix at 206-787-3222, or circle Reader Service 107.



Potomac Instruments, inc.

932 Philadelphia Ave., Silver Spring, MD 20910
Phone 1-301-589-2662 • Fax 1-301-589-2665

LINE-OUT

Monitor Placement for Accurate Mixing

by Bruce Bartlett
with Jenny Bartlett

ELKHART, Ind. Using great speakers does not guarantee accurate sound. You have to place them properly for best results; something you rarely see in many radio station production rooms.

Speaker placement has a major effect on the sound you hear. If you put your speakers in the corners of a room, for example, this makes them bassy. What happens when you monitor through them?

Chances are you will compensate by turning down the lows in the announcer's mic. But then the announcer's voice will sound thin on most other speakers.

Suppose you mount the monitors on a wall. Wall reflections will put peaks and dips in their response, and you will hear tonal colorations. If you dial in some EQ

to compensate, your recording will sound funny on a flatter system.

It is vital to place monitors correctly. Here are some suggestions.

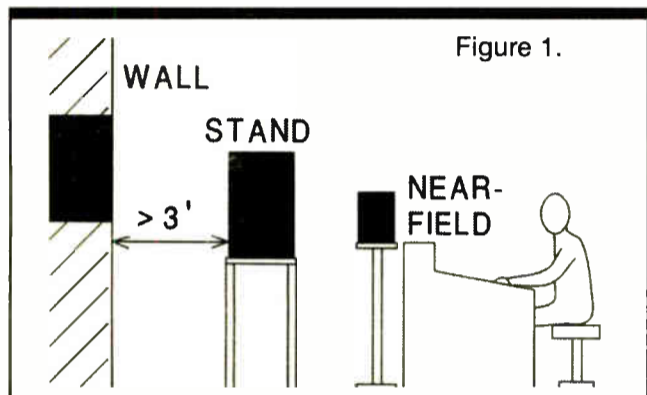


Figure 1.

to compensate, your recording will sound funny on a flatter system.

It is vital to place monitors correctly. Here are some suggestions.

Large monitors

You may want to use large monitors built into the walls or a few feet from them. With this arrangement, everyone in the control room can hear the speakers loudly and clearly, and you will get deep bass.

The closer a loudspeaker is to the walls, ceiling, or floor, the more bass it produces.

Why? If you put a speaker in the middle of a room, it radiates low frequencies in all directions (or into "full space").

But if you put the speaker against a wall, the lows are concentrated into half the space. This boosts the lows by 3 dB.

Putting a speaker in a corner gives the most bass because it concentrates the lows into one-quarter the space. The highs are not much affected by speaker placement near a surface because high frequencies radiate mainly out front. Check the speaker instructions for recommended placement relative to the room surfaces.

There are several ways to install large monitor speakers, each with pros and cons. An easy way is to put them on shelves or platforms against a wall. Unfortunately, this can degrade the frequency response.

Low-frequency sounds radiating around the speaker reflect off the rear wall, are delayed, and combine with the direct sound in front of the speaker. This results in phase cancellations or a comb-filtering effect.

Proper mounting

See Figure 1. A good way to prevent rear-wall reflections is to flush-mount the monitors in the wall. They should be mechanically isolated from the wall by foam rubber, fiberglass insulation or rub-

ber shock mounts. That prevents sound from traveling through the wall and ceiling to the listener before the direct sound arrives through the air.

If flush-mounting is impractical, you can weaken the wall reflections by placing the speakers at least three feet from the rear wall and four feet from the side walls.

Mount the speakers at ear height or slightly higher so the sound path is not obstructed by the mixing console. For best stereo imaging, align the speaker drivers vertically and mount the speakers symmetrically with respect to the side walls.

Place the two speakers as far apart as you will be sitting from them, or about eight feet. Aim the speakers toward you, and sit exactly between them.

Many control rooms can be improved by putting thick absorbent material on the walls behind and to the sides of the speakers. Use acoustic foam or six-inch-thick fiberglass insulation covered with muslin or burlap.

A number of benefits are derived from this, including clearer sound, better stereo imaging and depth as well as flatter response.

You will also notice less boominess and ringing, sharper transients and an overall better translation of mix to other speakers.

Although large monitors have deep bass and play loud, they can be a pain. Large speakers are expensive, heavy, difficult to install and are affected by the acoustics of the control room.

To avoid this hassle and expense, consider using a pair of nearfield monitor speakers. A nearfield monitor is a small, wide-range speaker typically using a cone woofer and a dome tweeter.

You place a pair of them about three feet apart on top of the console meter bridge, or on stands, about three feet from you. Again, refer to Figure 1.

Nearfield monitors
This method, devised by audio consultant Ed Long, is called nearfield monitoring. Because the speakers are close to your ears, you hear mainly the direct sound of the speakers and tend to ignore the room acoustics. So the speakers sound about the same in any environment.

When using nearfields, you may not need much acoustical treatment in your control room. Nearfield monitors sound very clear, need little or no equalization and provide sharp stereo imaging.

Nearfield monitors are designed for close listening. The woofer and tweeter outputs sum to flattest response about one meter away.

This type of monitor is meant to be used several feet from walls. That is, there is enough full-sounding bass when placed far from the walls. Because nearfields are small, most of them lack deep bass (below 70 Hz). But you can add a sub-woofer to hear all the lows in your mix.

How do you place nearfields? On top of the console meter bridge, or just behind the mixer on stands. The latter is best

because it prevents sound reflections off the mixer that can color the sound. Nearfields should be at least two feet from the wall behind them, or you will hear too much bass.

Speakers have the most highs on axis, and sound duller off axis. So you can control the amount of treble by how much you toe-in the monitors. If the speakers sound dull, aim them at you. If they are too bright, aim them straight ahead. Do not cover the tweeter with tissue paper in an attempt to tame the highs because the tissue puts dips in the response.

Golden triangle

For best imaging, the speakers and listener should form an equilateral triangle, as in Figure 2.

Try to mount the speakers so that the tweeters are at eye height. Orient the speakers vertically to get the most uniform dispersion in the horizontal plane. Horizontal placement, though, works almost as well.

If the speakers are not magnetically shielded, keep them far enough from

your computer monitor to avoid distorting the picture.

If you are using small multimedia speakers near a computer, put their front baffles flush with the monitor screen. This prevents sound reflections off the screen surface.

The "sound" of a monitor speaker depends on its placement. What you hear from the monitors affects the quality of

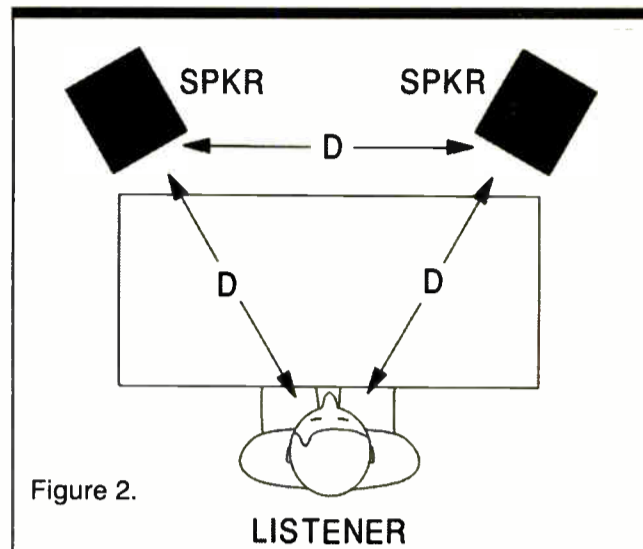


Figure 2.

your recordings, so place the monitors carefully. You will be rewarded with a monitor system that tells the truth.

□ □ □

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

COMPETITION SOUNDS PRETTY GOOD THESE DAYS.

NEW PROCESSOR.

THEY DID THAT WITH A NEW PROCESSOR?!?

unity
the world's best-sounding FM & AM processors

CUTTINGEDGE

TEL: (216) 241-3343 • FAX: (216) 241-4103 • E-MAIL: INFO@CUTTINGEDGE.ZEPHYR.COM

Return of Retro-Production Tricks

Part I of II

by Alan R. Peterson

WASHINGTON If you got into radio production towards the middle of the 80s, you missed out on some interesting audio production tools. Some have been overlooked for so long a time, their use today would almost be considered revolutionary and even a little "retro."

Therein lies the fun. Sure, your station sank a bundle into a new workstation. Your sound effect and music libraries are second to none. The multiprocessor in the rack can do 12 simultaneous effects and go direct-to-digital into the workstation.

You have the best-equipped room in the market, but you want more. That is why retro effects would be fun for you to experiment with. Very few others are using them right now.

Retro-recording

Retro is very "in." If you do not believe that, you probably also missed out on the recent tube-gear revival and have never listened to an all-70s formatted station.

Some devices and techniques that once were the big magic tricks of record producers eventually made it to the station level, but not all.

This was due in part to expense, the limitations of technology at the time, or because the effect simply fizzled and

died. The good news is, many are still available and remain lots of fun to mess with.

Leslie speakers

Give a spin to "Time is Tight" by Booker T and the M.G.'s and listen to the organ part. Grab "Human Wheels" by John Mellencamp or "Blue Jay Way" by the Beatles and listen for the fluttering, warbling quality of the vocals.

This effect was accomplished by a Leslie speaker; a tradename for a brand of loudspeaker that uses a rotating directional horn to create a vibrato effect. See Figure 1.

The horn is acoustically coupled to the

speaker and spun by a vari-speed motor. Doppler and phasing effects occurring inside the speaker cabinet create the watery, three-dimensional sound we hear on these recordings.

Even though Leslie speakers are normally an adjunct to electronic organs, the Beatles sent vocals and guitar tracks through Leslies. Thirty years later, it is still a compelling effect.

Many multi-effect devices have a rotary speaker simulator included, creating the sound with a mix of delay, resonance and panning. While satisfactory, vocals sent through a genuine close-miced Leslie sound huge and very retro.

Cost and size are significant issues; aftermarket Leslies are not cheap, nor are they easy to move. Once in awhile, you may find an old home electronic organ up for grabs at the local Goodwill or Salvation Army thrift shop, usually for a song. Many have rotating speaker devices which behave the same

as genuine Leslies.

If you find one that works and they want less than \$75, get it. The speaker assembly and tube amplifier alone could be worth much more. Solder a Line In jack ahead of the amplifier to feed external signals and you are in business.

Ring modulators

Radio science-fiction shows and early television depended on ring modulators to create alien monster voices.

The device is variously known as a sideband modulator, four-quadrant multiplier or balanced modulator, but the concept and sound remain the same. Speech goes in one plug and a wildly-modulated robotic signal comes out the other.

Those quacky detuned voices heard on ham sidebands give you an idea of the sound of a ring modulator.

The name is a matter of debate. Musicians call it "ring" for the metallic bell-like effect it imparts on sound. Engineers named it so for the ring of matched diodes used in the original design.

For anyone not familiar with the modulator's design or operation, follow Figure 2 to see how it works.

Two signals are sent into the modulator; perhaps a carrier at 1,000 Hz and a modulating signal at 300 Hz. Normally in a mixer, the signals would combine and you would still hear both tones very distinctly. But a ring modulator's output is based on mathematics, not harmonics.

Instead, the ring modulator outputs the

Figure 1.

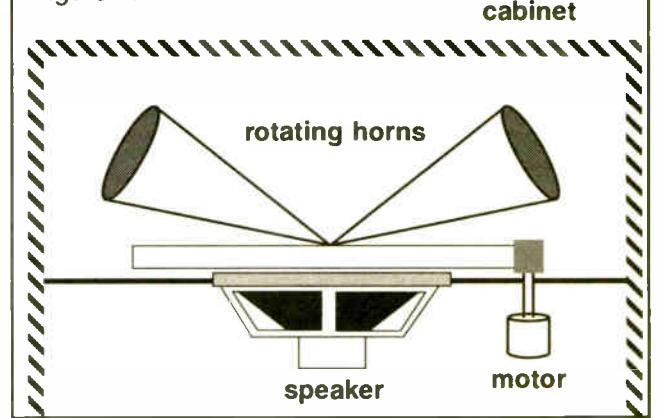


Figure 2.

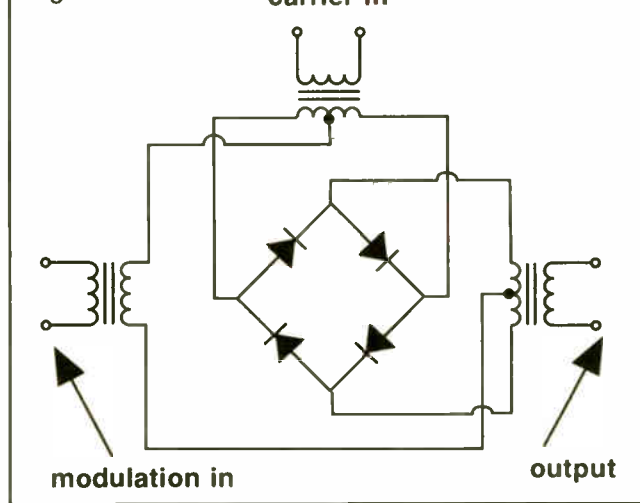
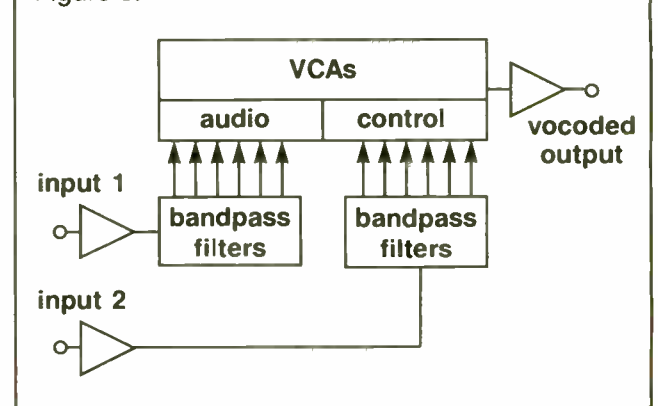


Figure 3.



sum and difference of the frequencies that went in. So the output would appear as 700 Hz and 1,300 Hz.

Obviously a variable input such as speech would swing the output of a ring modulator wildly. For any radio producer looking for that classic Dr. Who mutant alien effect, this is the toy.

A phase-locked loop chip can be used to create a modulator circuit. In fact, author Craig Anderton did so in a fine book titled "Electronic Projects for Musicians" (published by Music Sales Corp.), which may be found at most major booksellers.

Black-box builders can experiment with the basics of ring modulation with the diode and transformer circuit shown here. Put a 555 oscillator on the Carrier In line, add some op-amp circuitry for buffering and line-driving, then go to town.

Vocoding

This effect all but disappeared after Electric Light Orchestra (ELO) stopped producing albums, but is still terrific.

Warm up the turntable and play ELO's "Mr. Blue Sky," Michael Jackson's "PYT" or "Mr. Roboto" from Styx. Rent

the movie "Colossus: the Forbin Project" and listen to the voice of the computer. You are hearing vocoding's greatest hits.

This killer sound is actually 60 years old and was developed by Homer Dudley (honest) for telephone circuitry. The technology was embraced by practitioners of the electronic music movement, and vocoder units were manufactured and sold by Bode, synthesizer pioneer Robert Moog and others.

Vocoding is accomplished by banks of tightly tuned high-Q bandpass filters and voltage-controlled amplifiers (VCAs). Finer resolution of the vocoding effect is achieved with a greater number of filters and VCAs. See Figure 3.

As on the ring modulator, a vocoder has two inputs. One input splits the signal into a number of frequency bands and is fed to the inputs of the VCAs.

continued on page 24 ►

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 122

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 122

Doing business without
advertising is like winking
in the dark...

You know what you are
doing but no one else does!

ATTENTION PROVIDERS!

Promote your services to **Radio World's** 18,000+ 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**.

Step into the Future

If your on-air system is a little out of date, step into the future with Gentner and Harris Allied— your total audio conferencing solutions.

Gentner's TS612 simplifies the process of bringing callers together by putting the controls right at your fingertips. This means a smoother on-air sound with an audience less likely to switch.

The control surface is easy to use. It looks, operates and even feels like an ordinary business telephone.

But it's far from ordinary.

On-air talent can screen a call, transfer it from the handset to on-air, conference as many as four callers together, and lock in a VIP guest.

Thanks to multi-color line status indicators the user can instantly tell who's on the air, on hold, screened or talking to the producer in the other room.

Installation is a snap.

The TS612's dual superhybrid technology provides crisp, clean caller audio with much more flexibility.

With Gentner's SCREENWAIR software and a PC, a screener uses a keyboard and a headset instead of a control surface, and preselects calls for on-air, adding names, comments, city of origin and other information. An additional monitor is placed in the studio where the talent can see who is on screened hold.

NETWORK INTERFACE lets you expand the TS612 system into multiple studio configurations by adding a Network Interface for each mainframe. This provides the communications link between studios for proper management of 12 phone lines.

 **Gentner**

TS612
Multi-Line Telephone System



TeleHybrid
Telephone Hybrid

Telephone calls for broadcast teleconferencing and pro audio applications are made easier thanks to Gentner's TeleHybrid. Simply connect it to your existing telephone to deliver full duplex audio to your console or conference system without the fear of echo or feedback.

The TeleHybrid is the key to simple, great sounding telephone calls on your professional audio system.

Your telephone can be single or multi-line, analog or digital— the TeleHybrid doesn't care. The only requirement is that your telephone have a detachable handset with a modular connector.

The TeleHybrid "installs" between your telephone and its handset. Audio connections

to your equipment are made with XLRs.

With the TeleHybrid, the hassle and expense of dedicated phone lines are a thing of the past. Your regular telephone system becomes your "on-air" system. Anyone in your facility can screen a call or transfer it to the studio or boardroom. Best of all, the TeleHybrid is very affordable.

The future is with Harris Allied for your total audio conferencing solutions by Gentner.

1-800-622-0022 FAX 317-966-0623

 **HARRIS
ALLIED**

PRODUCT GUIDE

Companies with new product announcements for Studio Sessions Product Guide should send them to Radio World, c/o Studio Sessions Editor, 5827 Columbia Pike, 3rd floor, Falls Church, Va. 22041

DM-800 Accessories

Roland Corp. introduced two products to complement the DM-800 portable digital workstation.

The new DM-800 hardshell travel case was specially designed by Roland for transporting the DM-800. The case is form-fitting with a foam-cushioned interior, has locking latches and a shoulder strap.

Roland also introduced the DIF-800 Digital Interface. This allows connection between the DM-800 and tape-based dig-



ital recorders and video editing systems.

For more information contact Roland Corporation at 213-685-5141; or circle Reader Service 15.

Orchid Soundcard

Orchid Technologies has released the NuSound PnP audio card for IBM PC-compatible computers.

The card is in compliance with the new Windows 95 Plug and Play specifications. It features ROM-based wavetable

samples, 16-bit CD-quality sound, three-dimensional audio enhancements and 20 Hz to 20 kHz bandwidth with an 82 dB signal-to-noise ratio. All major soundcard specifications and drivers are supported.

NuSound is available with NuPanel; a front panel option allowing access to volume, I/O jacks and the 3-D intensity effect. The panel fits into a 3.5-inch drive bay.

For more information, contact Orchid Technology at 800-577-0997; or circle Reader Service 131.

News, News, News! Radio stocks up, station equity increasing

By the time you read this, we will probably have a new Telecommunications Bill. Best guess (at least, this is what they had agreed to at press time): ownership limits will not be removed but increased in all market sizes. Here's the current (12/27/95) proposal:

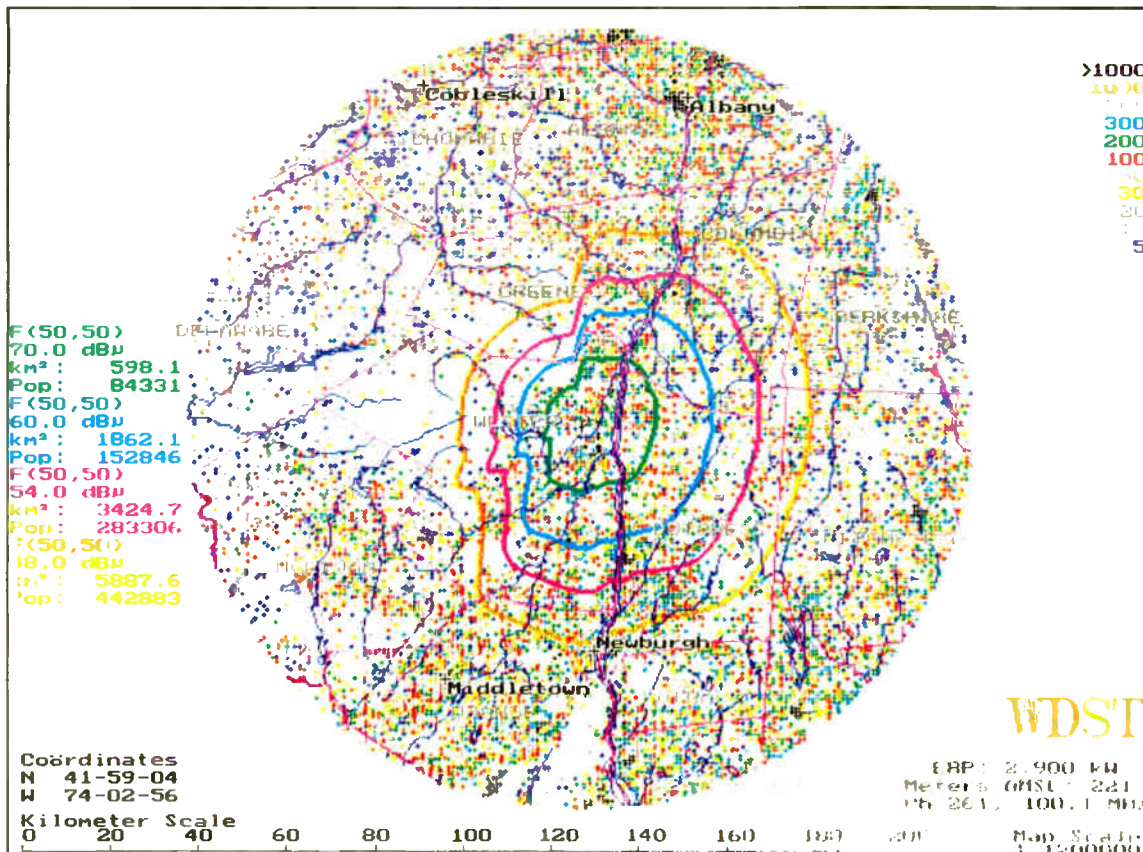
Total Market Signals	Licenses Total	AM or FM Licenses
45+	8	5
30-44	7	4
15-29	6	4
0-14	5*	3

*or half the stations, whichever is less

Given the uncertainty of the political process, why do we at RaadioSoft want to use our advertising space to publish what may have been already renegotiated? Because we have spent lots of time developing a program called DUOPOLY.EXE, and no matter what the FCC does (short of

throwing the ownership Rules out altogether), we're ready for them. We have precalculated contour files of the city grade signals of every AM and FM station in the country, so you can make maps in less time than it took you to read this sentence. If you are considering purchasing, evaluating or selling a radio station — even if you just want to prove to the bank how much your station is now worth under the new Rule — give us a call. Our software is so easy a sales trainee can use it correctly, and faster than just DIALLING one of those pay-'em-every-time-you-call-'em online services! And if you like to plan ahead, or you like to have "Plan B" ready "just in case," our software will help you plan it, and help you file it at the FCC when it all comes together!

***** BROKERS TAKE NOTE *****
AND That's Not All—for users of our popular AMR and FMR programs (and TVR will probably be out by the time you read this), we now have a trio of Population Overlay programs. Like the rest of our routines, they're better and faster. You just draw the contour(s) you want on the screen, hit a key, and the population pops up! What could be easier? Or you can "spray paint" the population density on your map, to find out if that directional really maxes out the listeners. You can even count under our *Shadow Matrix* maps to find out who is the REAL audience for your FM or TV. Here's a typical PopSpray picture below — it took about 600 ms (that's less than one second for you sales trainees) to calculate and draw on the screen.



If you think that looks good on newsprint, imagine it on a computer monitor! And, our programs permit you to rescale and recenter your map any way you like. Call us now at (904) 426-2521 or email pmoncure@america.com to ride the crest of the radio information wave! Radiosoft 120 North Riverside Drive, Edgewater, FL 32132-1716.

If you purchase AMR, FMR, TVR or DUOPOLY by 12/15/95 and mention this ad, we'll deduct \$125 from the price of our Population Overlay.

Tascam Budget Multitrack

Tascam has introduced the entry-level Porta 03 MKII Ministudio cassette recorder. This "scratchpad" multitrack is suitable for producers to test out radio jingle ideas and mixes.

The four-track recorder is a descendant of the original Porta 03 and features increased headroom for better overall signal-to-noise performance. A new color scheme to match Tascam's other audio products has also been adopted by the 03. Suggested retail price is \$259.

For more information, contact Tascam at 213-726-0303; or circle Reader Service 130.

Retro Radio Rides Again

► continued from page 22

The other input is similarly filtered. These outputs are rectified to extract the envelopes of each filter, which are fed to the control inputs of the VCAs.

Essentially, one input modulates the timbre of the other input, having a direct effect on the quality. In all of the above examples, a voice was used to modulate a music track or steady tone.

In radio production, vocoding can be used to imprint a vocal quality onto water or wind sound effects ("the Voice in the Wind"), factory ambience, music pads or even satellite rush noise. MIDI-equipped station studios can do their own ELO effects with a vocoder and a keyboard.

It may be possible to locate an old Bode or Moog vocoder, but be ready to part with lots of money. Korg, makers of a very fine digital audio workstation, made the VC-10 20-band vocoder with keyboard back in 1978. These come on the market from time to time.

PAiA Electronics of Edmond, Okla., has an eight-band vocoder kit available that uses stock op-amps and 570/571 compander chips. It may be possible to obtain two such kits, calculate new RC values for the filters and construct a hybrid 16-band vocoder for finer resolution.

Vocoding should not be confused with talk-boxing or the Sonovox; two effects which will both get their due the next time we look at retro-effects in *Studio Sessions*.

ABOUT THE ONLY THING
IT CAN'T DO FOR
YOUR TALK SHOW HOST IS
MAKE EVERY
CALLER SOUND
INTELLIGENT.



Occasionally, every talk show has to deal with an out of touch caller. But that's probably not the worst of your talk show host's problems. Chances are, your host is also trying to screen calls, conference multiple lines and make smooth transitions to commercial breaks — all while trying to come up with a snappy comeback for the space cadet on line 3. That's why we've updated the old talk show phone with the TS612. All the important functions are clearly marked and the phone lines color coded to make on-air decisions hassle free. Want to screen calls? Press **SCRN**. Want to conference up to four lines? Press



THE TS612 HANDLES
UP TO 12 PHONE LINES.

CONF. Don't want to lose a very important caller? Press **VIP**. Your host can even call for pastrami on rye while on-air some caller explains the finer points of cloud-watching. The point is, the TS612 is simple, versatile and lets your host concentrate on the show rather than the phone system. To find out more, call us.

 **Gentner**

1 - 800 - 945 - 7730
OR 1 - 801 - 975 - 7200

Circle (34) On Reader Service Card

Running Radio

Your Resource for Business, Programming & Sales

Jock Reunion
Rocks
Windy City
See page 29

Designing a Beautiful Web Site

by Alan Haber

ALEXANDRIA, Va. Before we get going with another 12 months worth of web slinging, I'd like to send a huge and hearty Happy Cyber-New Year to one and all from deep within the considerable, ever-busy confines of the Haber Space global headquarters!

Fresh start

Along about Dec. 1, you probably started thinking about clearing the decks, so to speak, and looking at your life from a fresh perspective come Jan. 1, right? You made a list of resolutions you plan to keep to both simplify and enhance your life, didn't you? C'mon, fess up!

Well, I did the same thing, except my personal life is so incredibly perfect, I didn't have to make up a list of resolutions for that. But I did jot down a few resolutions for my radio pals out on the World Wide Web. I thought these little tidbits would give you food for thought — something for you Web veterans to

think about the next time you take a look at your site with an eye toward improving and enhancing it, or, for you latecomers to the wonderful world of the WWW, something to think about before you commit to your station's little piece of cyber-heaven.

So, here we go, in no particular order of importance. And, by the by, feel free to e-mail me with any resolutions you've made, and I'll share them with your fellow Haber Space readers in the months to come:

1. Keep the size of your graphics down to a minimum — long wait times while graphics load limit repeat visits to your site.

2. Update your site as often as possible — daily, if you can. The more current and new information you offer, the more traffic you'll get.

3. Don't include welcome messages from your program or music director, or anyone else from

your station, on your home page — unless, of course, that person has something really interesting and useful to say, and you're offering audio on demand. And, even then, think about it; sound

files can get awfully big, and long wait times while sound files load can drive away visitors.

4. Limit the use of backgrounds on your site pages. Granted, a lot of the backgrounds out there are pretty cool, but they're so cool they often overwhelm text and make it unreadable. Better you should create a custom background that is unobtrusive than make your visitors' eyes pop out of their sockets as they're trying to read about your station.

5. Make sure every link on your site leads to something. Too often, I see links that lead to absolutely nothing; this creates a bad impression on your visitors.

6. Don't say your site is "under construction." If you haven't finished a particular

page, don't enable the link to it from your home page; simply say Coming Soon. Many times, a site winds up being "under construction" for what seems like a lifetime, and you wind up promising more to your visitors than you deliver.

7. Don't be afraid to be different. Information about your station and its activities is important to your visitors — that's why you want people to come to your site in the first place. But just slapping information on your site isn't the way to excite anybody — be creative, and a little irreverence probably wouldn't hurt, especially if your station's a modern rocker! Hey, go wild!

8. Make your site as interactive as possible. Online contests, surveys and other input-oriented activities are key to your site's success, and a handy way to collect statistical information about your visitors

continued on page 34 ►



MANAGER'S NOTEBOOK

Boost Staff Morale with Compensation Facts

by Sue Jones

BURKE, Va. Here are two tips for the end of the year and the beginning of the new year to help boost morale and continue to build your staff into an effective team.

Benefit Statements

As you tally this year's expenses and plan next year's budget, think about one of your largest expenses — employee compensation. When people are asked about their annual earnings, they usually respond with their base salary. If you think about your compensation from the station, it is usually your annual salary amount. Rarely do people think in terms of the complete compensation package. Full compensation packages often include, but are not limited to, some of these examples:

- Health/Dental Insurance
- Pension/Retirement Plans
- Paid Sick Leave
- Company Contributions to Social Security
- State and Federal Unemployment Insurance
- Performance Bonuses (Sales, Ratings, Goals)
- Trade Deals (Travel, Furniture, Clothes)
- Life Insurance
- Annual Leave and Paid Holidays
- Short/Long Term Disability Insurance
- Workman's Compensation

Many benefits are purchased in group plans to reduce the overall costs. If an individual purchased the same health and dental insurance provided by the station, the price for that individual's coverage would be significantly higher than the station's costs.

If the costs of these benefits were added up for each employee, it would be a substantial amount added to the person's overall compensation package. Usually

these benefits average 20 to 30 percent or more of an employee's annual salary.

Employees usually do not consider these benefits as additional income.

Often times they consider them "entitlements." Everyone knows that Social Security and Medicare are deducted from their salaries. However, many employees do not realize that their employer is matching the social security and medicare contributions.

Letting your staff know the full value of its compensation by providing an individualized list of their benefits can be a real eye opener.

Prepare individualized statements for each employee listing the annual salary and all of the costs of the benefits. Include employee contributions and the station's contributions. However, add all of the contributions and costs provided by the station to get the total benefit value. Ideally this statement of benefits should be included in the last pay envelope of the year. But, it can be just as effective if it is distributed at other times of the year. If you want to minimize the discussion by the employees at the station, you could mail it to their home addresses.

Preparing this statement of benefits for employees gives management a clear idea of the total compensation package for each employee. You may discover that the benefit package varies widely from employee to employee especially in bonuses and trade items. This statement of benefits task can be a guide for a more equitable distribution of special compensations depending on an employee's contribution to the station's success, years of service, and level of responsibility.

Benefit statements also give management an opportunity to provide additional benefit/income/compensation for staff members

continued on page 34 ►

"ITC's AUDIO SWITCHERS have been kept a secret TOO LONG!"

I found the best Audio switcher on the market at ITC. Designed for complex radio applications, it's what I've been looking for all along... ITC's Switcher is the choice...hands down! P. S.

Paul Strickland
Director of Engineering
Service Broadcasting

ITC's Audio Switcher...
A secret kept too long!
Call for yours today:
(309) 828-1381

Another ITC Audio Management Tool.

International Tapetronics Corporation
2425 South Main Street, Bloomington, IL 61702

HARRY S. HEADPHONE

stars as ACE RADIOMAN in

TRIUMPH ON THE AIRWAVES

He flew far above the competition!
Ace RadioMan knew he
had to have the best... *OTARI*



FEATURING

- ★ Random Access Disk Recorders
- ★ DAT Recorders ★ Tape Recorders
- ★ CD Changers ★ Mixing Consoles
- ★ MiniDisc Recorders

team
OTARI ★



AN
OTARI[®]
PRODUCTION

Otari's ★FULL LINE of audio ★STORAGE,
★MANIPULATION and ★DELIVERY SYSTEMS
gives you the ★TOOLS TO SOLVE your station's
audio problems at reasonable cost. And Otari's legendary
★RELIABILITY means these problems stay solved!
Call your Otari dealer or 415-341-5900 for information.
And don't forget to ask for a large poster of this ad!

Otari Corporation U.S.A.
Phone: (415) 341-5900, Fax: (415) 341-7200
L.A. Sales: (818) 972-3667, S.E. Sales: (615) 255-6000

Otari Inc. Japan
Phone: (81) 4-2481-8626, Fax: (81) 4-2481-8633

Otari Deutschland GmbH Germany
Phone: (49) 2159-50861, Fax: (49) 2159-1778

Otari Singapore Pte., Ltd.
Phone: (65) 284-7211, Fax: (65) 284-4227



B-10 Broadcast Console



RADAR Disc Recorder



MX-50II Tape Recorder



DTR-8 DAT Recorder



MR-10 Mini-Disc Recorder/Player



CDC-600 CD Changer

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

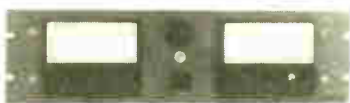
THIS MONTH'S SPECIAL
16 TRACK DIGITAL WORK STATION
COMPLETE WITH PENTIUM
COMPUTER AND AMAZING
SAW SOFTWARE!!!
READY TO USE - \$3,299

— You Know We Know Radio —
Toll-Free 800-438-6040
FAX 704-889-4540

READER SERVICE NO. 204

TWO NEW ADDITIONS TO THE COAXIAL DYNAMICS WATTCHMAN® TRANSMITTER PROTECTION SYSTEMS

Models 81081 and 81082 with 15 30/60 kw Meter Scales



NEW!
4-1/16 and 6-1/8
series line sections
and elements to
add to our exciting
line-up

WATTCHMAN—protects your transmitter and transmission line system. A permanent 19 inch rack installation used with any dual socket line section 7/8", 1-5/8", 3-1/8" and elements (additional) to monitor CW, TV, and FM power. Model 81070 features two easily read meters to monitor both forward and reflected power. The reflected meter provides a front panel adjustable set point which controls the trip level for fast transmitter shut down and alarm. Abnormal load conditions quickly cause transmitter shut down in less than 15 milliseconds including control relay. Both visual and audible alarms indicate system malfunction. Contacts provided for remote alarm and reset switching. Contact us for your nearest authorized Coaxial Dynamics Representative or Distributor in our World Wide Sales Network.



COAXIAL DYNAMICS, INC.

15210 Industrial Parkway • Cleveland, Ohio 44135
(216) 267-2233 or 1-800-COAXIAL • Fax: (216) 267-3142
Service and Dependability... A Part of Every Product

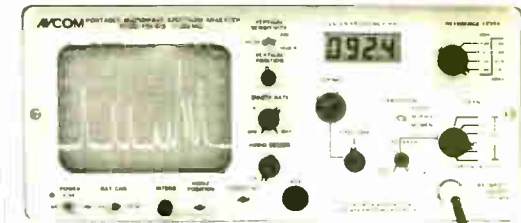
READER SERVICE NO 101

NEW EXPANDED COVERAGE

AVCOM's PSA-65B Portable Spectrum Analyzer 1-1250 In One Sweep MHz!!

AVCOM's newest Portable Microwave Spectrum Analyzer, model PSA-65B, has an expanded frequency range from less than 1 MHz to 1250 MHz, for the amazing price of \$ 2930

AVCOM's new PSA-65B is a low cost general purpose spectrum analyzer that's loaded with features and options. The PSA-65B covers frequencies thru 1250 MHz in one sweep with a sensitivity greater than -95 dBm at narrow spans. The PSA-65B is ideally suited for 2-way radio cellular, cable, satellite, LAN, surveillance, educational, production and R&D work. Options include new 1250 MHz frequency extenders, BNG-1000A tracking (noise) generator, audio demod for monitoring, log periodic antennas, carrying case (AVSAC), and more. For more information, write FAX, or phone



AVCOM

500 SOUTHLAKE BOULEVARD
RICHMOND VIRGINIA
804-794-2500 FAX 804-794-8284

Receive brochures ON-LINE via AVCOM's new AVFAX.
Call from your fax and be ready to receive. 804-379-0500

READER SERVICE NO. 151

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 50

Digital Audio, Analog Audio, Communications and Computers ... It's Easy as ...



Please visit us
on the
World Wide Web:
www.abg.com

Since 1960, production and broadcast professionals have turned to ABG for solutions. As the world has changed, so have our products, and so have we. From cutting edge digital production gear to the latest designs in custom studio furniture to ISDN telecommunications gear, ABG stays ahead of the game so you can concentrate on what you do best. You create the messages ...you move the world...we'll give you the tools to make it possible.

Please call today! ABG ... your single source solution.

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

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

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
cServe: 75371,144
internet: support@abg.com



For 36 years

ABG

Audio Broadcast Group Inc.

READER SERVICE NO. 203

AXS (Ax'-sess)... Jocks Love It!

AXS is an entirely new approach to digital audio controllers. It starts with superb audio using the premium quality opt-X™ system. AXS is easy to learn, easy to use, and powerful beyond words.

AXS is a modular design that begins as a simple cart replacement and grows to any combination of CD, hard disk, satellite or specialty programming with ease.

AXS has all the sophisticated feature options including device independent multi-channel background audio record and replay. Macro programming makes tough to run event sequences easy. Software drives a powerful programmable real time IOMAP.

Jocks love AXS: A fast 99 page, 28 button Jock F/X panel that can be time linked and remote wired is standard.

Use a software driven four-channel stereo audio switcher with on-screen control or the powerful eight-channel dual-buss routing switcher, or include both if you wish. AXS is controlled through a trackball, touchscreen, keyboard, buttonbox, telco or remote modem.

AXS Systems...

From \$6000.00 using your 486 computers and hard disks.

READER SERVICE NO. 75



AXS

The Management

800-334-7823 • 817-625-9761
FAX 817-624-9741

P.O. Box 1-36457 Fort Worth, TX 76136
1700+ Stations • Our 14th Year

World Radio History

Attention Advertisers!

Reach over 18,000 readers!
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 on
rates and deadlines,
Fax Christopher at

1-703-998-2966

or call

1-800-336-3045

.....

Jock Reunion Rocks Chicago's WJMK-FM

by Alan Haber

CHICAGO "Hello, everybody," said one of Chicago radio's favorite sons, Dick Biondi, as he kicked off a night of memories over Chicago oldies station WJMK-FM. "I want to ask everybody here in the reunion hall, 'How about a little noise, so Chicago will know you're all here?'"

The response was expectedly automatic and cheerful; hundreds of hands were waving and feet were wiggling above the floor. The cheers came fast and furious. Before the night was through, a guy and his gal became engaged, "Lassie" star June Lockhart stopped by and a lot of memories surfaced.

Reunion time

"We're going to be here until midnight tonight," said the man who was once

Bits of classic Chicago rock 'n' roll radio airchecks played throughout the evening.

called "The Screamer." "Let me tell you who's going to be on the air with us," he said, and sputtered through a who's who list of Chicago jocks: Del Clark, Bob Hale, Art Roberts, Clark Weber, Ron Riley, Bernie Allen, John Records Landecker (WJMK's weekday morning man) and Bob Sirott.

"Whatever you do, hang around and enjoy," said Biondi, his microphone pointed directly at his mouth. "Leave your radio on — this will be like old times, because you're going to be hearing a lot of great memories."

The occasion was WJMK-FM's second oldies reunion (the first was held in 1985, the year after the former jazz outlet WJEZ-FM became oldies 104.3, WJMK). Biondi was the ringleader for this celebration of Chicago rock 'n' roll radio (he is on WJMK 7 p.m. to midnight weekdays, and 2 to 6 p.m. on Saturdays).

The Chicago Cultural Center, which houses the Radio Hall of Fame and the Museum of Broadcast Communications, was the place for this big-time group rock 'n' roll radio hug. More than 600 Chicago radio fans of all ages turned up during the five-hour broadcast.

Crocodile rockers

Del Clark was one of Chicago's rock 'n' roll radio greats. Clark's resume lists berths at such Windy City stations as WJJD, WBEZ and WCFL, and stints at two stations in New Orleans — WJMR and WTIX.

Now a writer for the Grand Rapids Press in Grand Rapids, Mich., Clark was thrilled to be back in Chicago. He said that rock 'n' roll was simpler in the old days than it is today.

"The DJ approach was different," he said. "We were told be quick, be fast, get the record on, play the music, don't talk too much. Now, today, the guys can ... do bits, pick up a telephone and call

somebody and talk to them, but in those days, they wanted 13 records an hour, 20 commercials, and there was no way to do it if you talked too much."

Clark has many fond memories of being in Chicago radio, including doing the record hops out in the neighborhoods.

"I loved the neighborhoods of Chicago. I still like to think of (Chicago) as a neighborhood, not just a big city," he said.

Bob Hale, best known for hosting the Clear Lake, Iowa, stop on the 1959 Winter Dance Party Tour, which featured the final performances of Buddy Holly, Ritchie Valens and the Big Bopper (and directly preceded "The Day the Music Died") said the defining Chicago radio moment for him was when he received a call from WLS(AM), asking him to come work there.

Hale's fondness for Chicago radio (he is currently an announcer/producer at WJJD(AM), WJMK's sister station which features Howard Stern in the mornings) is genuine and true. "Every so often, I run into people who came

to record hops," he said. "I enjoyed those record hops immensely, because I got out to meet the people."

McCartney memories

Bits of classic Chicago rock 'n' roll radio airchecks played throughout the evening. A phone conversation from the 1960s between WLS jocks Ron Riley and Art Roberts and Beatle Paul McCartney resonated over the airwaves. The big question for McCartney: Was he going to marry Jane Asher, his sweetheart at the time?

Roberts, now general sales manager at KKUS-FM in Tyler, Texas, spent time on WLS, WCFL and WKQX while in Chicago; he also toiled on the airwaves at KLIF in Dallas and the mighty WKBW in Buffalo, N.Y., among other stations.

Meanwhile, Clark Weber, a Chicago rock 'n' roll radio veteran, with stints at WLS, WCFL, WMAQ, WIND, and WJJD (he is currently on WAIT in Crystal Lake, Ill.), reminisced about one of those, well, moments it seems every DJ has experienced at one time or another.

A young man had come up to Weber "at a record hop in Michigan, and said, 'Would you listen to this record and tell me if it's any good?'" said Weber. "I listened to it and I said, 'Kid, that's the biggest piece of garbage I ever heard in my life.' His name was Tommy James, and the record was 'Hanky Panky' (a number one record for two weeks in July, 1966). So, I did not have a great ear."

Weber said that radio has been very good to him. "I've enjoyed it," he told the crowd in the Chicago Cultural Center. "It's been a great ride, and I'm eternally grateful for what radio has given me and my family. I've made a lot of friends. People tonight have come up and said, 'My gosh, you were a part of

my entire life.' That's quite a compliment, to be that intricately involved with people."

Eternal

At one point during the evening, Ron Riley told Dick Biondi that he is just like the Energizer Bunny — he keeps going and going. The same could be said for the litany of Chicago rock 'n' roll radio greats who shared the airwaves with the Screamer this night — among them WLS alumnus Brant Miller, currently the weekend weather-caster on WMAQ-TV in Chicago.

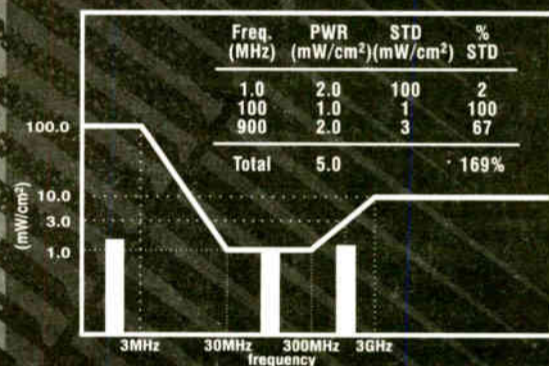
The good feelings that permeated the Chicago Cultural Center this night, as the great Chicago rock 'n' roll radio DJs reminisced with each other and signed autographs for their fans, will never die.

"I think that there's something magical about radio," said WJMK program director Kevin Robinson. "It's a one-on-one medium. It's something that you can take anywhere with you. ... I think that radio, because of its portability and its ability to reach out and grab you — there's this magic about it."

A magical night, indeed.

Shaped Probes

Ease RFR Compliance



Shaped probes sum all signals weighted per the IEEE/ANSI standard



• Measure all emitters at once with results in "Percent of Standard"*

• Models:
300 KHz - 2.7 GHz E-Field
300 KHz - 40 GHz E-Field
300 KHz - 200 MHz H-Field

• RMS detection even in complex, multi-signal environments
The combination of a shaped probe and Narda's revolutionary microprocessor-based Model 8718 survey meter greatly simplifies the task of making RFR surveys

* IEEE/ANSI C95.1-1991

For more information, call: (516) 231-1700.

Or write: 435 Moreland Rd., Hauppauge, NY 11788

Need information now? Call Narda's FaxBack 1 800 4NARDANY (462-7326)

Request Document #1113

LORAL
Microwave-Narda

PRODUCTION LIBRARIES GUIDE

These companies create and distribute production music libraries and sound effect collections for radio production. Contact each for a demo and licensing information at the number given.

ABC Sound
125 West End Avenue
New York, NY 10023
212-456-5621; fax: 212-456-5623
Contact: Arthur Burns

ABC Sound is a dynamic digital audio production facility with a full range of SFX and stock music as well as creative designers to apply them.

Aircraft Production Libraries
162 Columbus Ave.
Boston, MA 02116
800-343-2514; fax: 617-542-7222

80 Cds and growing. Aircraft Production Libraries and specialty packages; "Rock Sweepers," "American Music Series," "Ads up for Commercials." No scraps, just fresh stock music.

Associated Production Music
6255 Sunset Blvd., Ste. 820
Hollywood, CA 90028
213-461-3211; fax: 213-461-9102
Contact: Connie Red

9 libraries/over 1200 CDs, personalized broadcast package, music search services, 10 new CD releases monthly, KPM SFX library (700+ effects).

AVDeli
1137 N. Osborne Blvd.
Racine, WI 53405
414-632-8610; fax: 414-632-5527
Contact: Joe Kelly

Leading production libraries for Alternative, Rock, Country, CHR and Urban Radio. All on CD.

Capitol/OGM Production Music
6922 Hollywood Blvd., Ste. 718
Hollywood, CA 90028
800-421-4163; fax: 213-461-1543
Contact: Curt Kendall

Home of the award-winning OGM production music for easy contemporary

programming. Frequently updated. Plus the new OGM Premium line. Sound effects available.

Catspaw Productions Inc.
560 Dutch Valley Road
Atlanta, GA 30324
404-876-2287; fax: 404-881-8409
Contact: Larry Melnick,
VP entertainment sales
"The Roto Tiller in the Garden of Audio" providing everything from two major voiceovers (Doug Paul and John Willyard) to hot original music.

Dave Dworkin's Ghostwriters
2412 Unity Ave. N.
Minneapolis, MN 55422-3450
612-522-6256; fax: 612-522-6256
Contact: Dave Dworkin
Production music and effects. Buyouts on CD with a 30-day money-back guarantee. \$88-\$749.

DeWolfe Music Library
25 W. 45th St.
New York, NY 10036
212-382-0220; fax: 212-382-0278
Contact: Andrew Jacobs
250 CD music library which encompass all styles of music for use in radio commercial works. Bonus, 16 CD SFX set available as buy-out.

Dimension Music & Soundeffects Inc.
P.O. Box 992
Newnan, GA 30264-0992
800-634-0091; fax: 404-253-9388
Contact: Rex M. Bell
Dimension has expanded its music selections to over 70 CDs. Also available is our holophonic soundeffects library and two CDs of electronic effects. Call for a demo CD.

Dorgan Belle Music Productions Inc.

8009 Forest Trail
Dallas, TX 75238
214-340-4389; fax: 214-340-4388
Contact: Sally Dorgan Potts
Affordable commercial jingle campaigns for radio stations and advertising agencies. Production facilities in Dallas and Nashville. For demo cassette, call.

Energetic Music
P.O. Box 84583
Seattle, WA 98124-5883
Contact: Monty Smith

FirstCom Music
13747 Montfort Drive, Ste. 220
Dallas, TX 75240
800-858-8880; fax: 214-404-9656
Contact: Andrea Bergeron
The original pick and choose library—you do not pay for music you do not need. Ask about or 25 percent exchange privilege for new releases.

Hooks Unlimited
200 Old 63 S., Ste. 103
Columbia, MO 65201-6081
314-443-4155; fax: 314-443-4016, e-mail
HooksCHooks.com
Contact: Bernie Grice,
President
Hooks Unlimited, "The world's premier music hook service," provides hooks which accurately represent the music, are digitally produced, consistent in length and clear sound.

ITEX Media
10300 S.W. Greenburg Road, No. 370
Portland, OR 97223
503-244-4673; 503-245-0748
Contact: John A. Holmes
There is no cash fee for the purchase of the library. All we ask in return is a credit with your station or company.

K. K. Kreative Concepts
36 New Market Dr.
Delaware, OH 43015
614-363-7344; fax: 614-363-5826
Contact: Kurt S. Kaniewski,
"Kreative" Director
Write and produce "Kreative" radio commercials... write and produce harder edge commercials like concert spots, race track spots, car dealer spots, etc.

Media Jam
P.O. Box 5372
Louisville, KY 40255
800-536-6007; fax: 502-239-9200
Contact: Brian Curella
Station ID jingles, voice-liners, production library.

Metro Music Productions Inc.
37 W. 20th St.
New York, NY 10011
800-697-7392, 212-229-1700;
fax: 212-229-9063
Contact: Joanne Morse
A powerful contemporary production music library. Music ranges from cutting-edge urban to rock, jazz, blues, dramatic themes. Metro also offers custom music for promotion, news, sports and show opens.

The Music Bakery
7522 Campbell Road, Ste. 113-2
Dallas, TX 75248
800-229-0313; fax: 214-414-3160
Contact: Donna Gallagher

The Music Bakery's CDs are packed with brilliant compositions, using plenty of real acoustic instruments played by professional studio musicians. "The highest quality, royalty-free buy-out available, period."

Music Source
615 East Pike
Seattle, WA 98122
206-323-6847; fax: 206-323-6896
Contact: Jim Wolfe
Hot Trax-country-volume one-a library CD of hot "new country" trax. A must for every country station, "Sounds like Garth Brooks band without Garth."

Network Music Inc.
15150 Ave. of Science
San Diego, CA 92128
619-451-6400; fax: 619-451-6409
Contact: Mr. Ken Berkowitz
Network Music Library-140 volumes of music on CD with monthly new releases-plus Sound Effects, Sockwave, Brainstorm, Primrose and Classical Libraries to choose from.

Non-Stop Music Library
915 W. 100 S.
Salt Lake City, UT 84104
800-554-6462; fax: 801-531-0346
Contact: Susie Davis
We proudly feature the newest, high-end production library in the industry and concentrate on the latest sounds and recording techniques to produce our CDs.

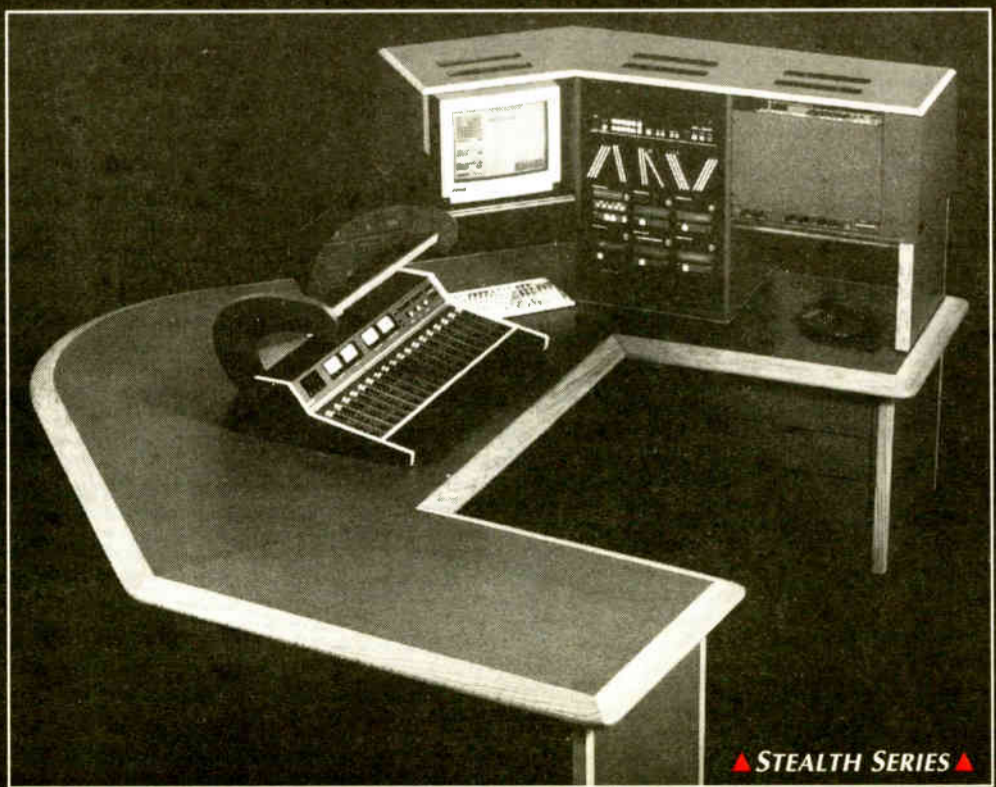
O Boy! Productions
1498 Harbert Ave.
Memphis, TN 38104
800-789-OBOY; fax: 901-278-7722.

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



Contact: Tom Lonardo
Production music, libraries, custom jingles, music for film radio & TV.

Omnimusic
6255 Sunset Blvd., Ste. 803
Hollywood, CA 90028
213-962-6494; fax: 213-962-4556
Omnimusic supplies 112 CDs of music and SFX to production media. Licensing available on annual blanket (unlimited use) and, per production. SFX on a buy-out basis. Bi-monthly releases.

Radio Potato Inc.
1926 Stoneway
Grapevine, TX 76051
800-468-6874, 817-481-4453; fax: 817-488-6177
Contact: Mike Fuller, Marshall Such
Radio Potato provides radio stations around the world with production elements, PD movie drops, sounder packages for News/Talk/Sports and a full service production library called "The Spud."

Radio Today Productions
1776 Broadway, 4th floor
New York, NY 10019
212-581-3926; fax: 212-459-9343
Contact: Tom Shovan
Ambush, news/talk production library; Continuous CLimax, CHR production library. All libraries updated every two weeks on CD with new material.

Signature Music Inc.
15312 S. Calumet Rd.
Chesterton, IN 46304
800-888-7151, 219-921-0205;
fax: 219-921-0704
Contact: Joanne Mullin
30 CDs; acoustic and electronics. One-time payment lifetime license or annual lease, 6 CDs of 30s & 60s (378 cuts) plus logos, transitions & stingers. New demo CD available.

Sound Ideas
105 W. Beaver Creek Rd., Ste. 4
Richmond Hill, ON L4B 1C6 Canada
905-886-5000; fax: 905-886-6800
Contact: Brian Nimens
Producer of the world's largest commercially available SPX library on CD and Sound Ideas music library; introducing the Twentieth Century Fox sound effects library and MIX II.

Steel Works
101 Marshall Ave.
Floral Park, NY 11001
516-328-1587; fax: 516-328-1587

Contact: Ben Steel, owner/producer
Custom song parodies/music tracks/jingles/movie & TV drops/voiceovers.

Techsonics
709 Shadowfield Ct.
Chesapeake, VA 23320
804-547-4000; fax: 804-436-5928
Contact: Steve Peppos,
Executive Producer
7 different libraries, for IDs, sweepers and music: Turbo Techsonics, Chainsaw One, Primo Promos, Earthquake Techsonics 2 The Music Library, Rock Flash and House Jamz.

Thompson Creative
4631 Insurance Ln.
Dallas, TX 75205
214-559-4086; fax: 214-521-8578
Contact: Ben Freedman

Thompson Creative is one of the world's leading suppliers of station ID jingle packages for all formats.

TRF Music Inc.
747 Chestnut Ridge Rd.
Chestnut Ridge, NY 10977
800-899-MUSIC, 914-356-0800;
fax: 914-356-0895
Contact: Mr. Ken Gilman
TRF has been a leading source of music used in television, radio, film and multimedia productions, offering over 50,000 selections from 4000 discs of production music.

Valentino Production
and Sound Effects Libraries
500 Executive Blvd.
Elmsford, NY 10523
800-223-6278, 914-347-7878;
fax: 914-347-4764

Contact: Tom Valentino
The Valentino Production Music Library is a 74-CD collection produced for broadcasters and licensed on an annual basis. The Valentino Production Sound Effects Library is a 44 CD collection and is sold on a buy-out basis. Both libraries have a no cost CD-ROM multimedia reference disc for either the PC or Mac platforms which has a 15 second clip of every music selection and listings for both libraries.

See related stories, pages 38 and 43.

Getting your
network
up and **running**
doesn't take a
rocket scientist.

Or does it?

Radio and rocket science. If you never exactly thought the two belonged in the same sentence, consider this: our satellite services can help you get your network underway. That's because in addition to providing satellite space segment, we can also supply a **transportable uplink**. Our C-band, Single Channel Per Carrier space on Galaxy IV allows you to control all your network broadcasts from **a single location**. Plus, it's known for its reliability and flexibility, providing digital or analog audio. And, it's all brought to you by the **radio-only experts** at NPR Satellite Services. You don't have to be a rocket scientist to see the benefits. Call us today at (202) 414-2626.

NPR Satellite Services.
Link up with us.

635 Massachusetts Ave., NW., Washington, DC 20001-3753 • (202) 414-2626

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!

NEW !!!

Digilink III-

**4 x the power
& On Sale !!!!**



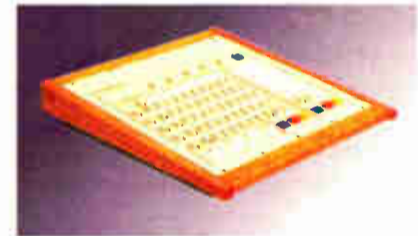
- **The #1 selling Digilink II has a new big brother !!!**
- **Digilink III has 4 times the processing power of Digilink II with...**
 - **Triple play capability (DL2 is dual play)**
 - **Dual audio outputs for On Air and Cueing (DL2 has one)**
 - **Do On Air & Production from a single workstation !!!**

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

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

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

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



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

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

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



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

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

in some areas, call (970) 224-2248

Sale !!!

DL3-600

\$7,995

(a \$9,995 value)



arrakis
SYSTEMS INC.

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

Audio Consoles

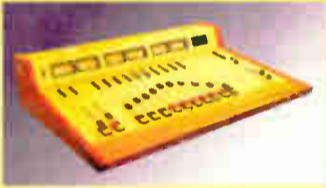
The stand-out #1 leader in reliable, high performance, digital ready consoles for radio, Arrakis has several console lines to meet your every application. The 1200 series is ideal for compact installations. The modular 12,000 series is available in 8, 18, & 28 channel mainframes. The 22000 Gemini series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

1200 Series Consoles



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

12000 Series Consoles from \$3,995



22000 Series Consoles from \$6,995



Digital Workstations

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

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

Satellite Automation



CD Automation



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



Digilink & Trak*Star Workstations

Studio Furniture

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

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

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

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

Desk*Star studio furniture systems



Modulux studio furniture systems

Complete systems...

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

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

Sony Worldwide Networks
Manhattan, New York



Enhance Your Web Site

► continued from page 26

which you can use for direct mail and other marketing projects.

9. Include advertising on your site. Increase your station's revenue on-line! But don't be obtrusive about it. Web surfers generally have an aversion to commercialism on sites (or anywhere on the Net, for that matter). Instead, come up with clever ways to present advertising. Make your visitors crave your advertising messages.

10. Have fun. Plan properly. Consider every element of your site so you can achieve maximum benefit from it. Be good business people and have a terrific success. But, most of all, have fun. That's really the key.

This month's Neat-O site is neat-o to the max! Alternative/modern rocker WOXY-FM 97X in Oxford, Ohio, has constructed a great on-line home that's one heckuva mean fighting machine! Right up front on the home page, visitors are hit with the station's cosmic message: "Those who have heard already know ... for those who haven't, seeing is believing: 97X ... the Future of Rock and Roll." A neat touch is that the 97X logo emblazoned on the page changes color as you read this message.

Clicking on the logo brings you to the next page, which features a great site graphic that puts the 97X logo at the foot of Stonehenge. A list of station awards and achievements follows. At the bottom of the

page is a nice, mappable graphic in the form of a guitar neck, on which visitors can click to go to various pages on the site, including 97X Excellent Stuff, a place to purchase station apparel; and 97 Xtras, which offers, among other things, a downloadable list of the Modern Rock 500 from Memorial Day 1995 and a 97X screen saver. Visitors can also find out about 97X and e-mail the station from here.

This is a great site, well worthy of Neat-O status! Check it out at <http://www.woxy97x.com>.

Well, I've got to start cleaning up from my New Year's party. It seems I invited all the messier people I know this time around, but I forgot to ask some of the cleaner cyber-citizens I know to come! Time to get scrubbin'! Anyway, keep the e-mail coming to zoogang@ix.netcom.com.

Happy New Year!



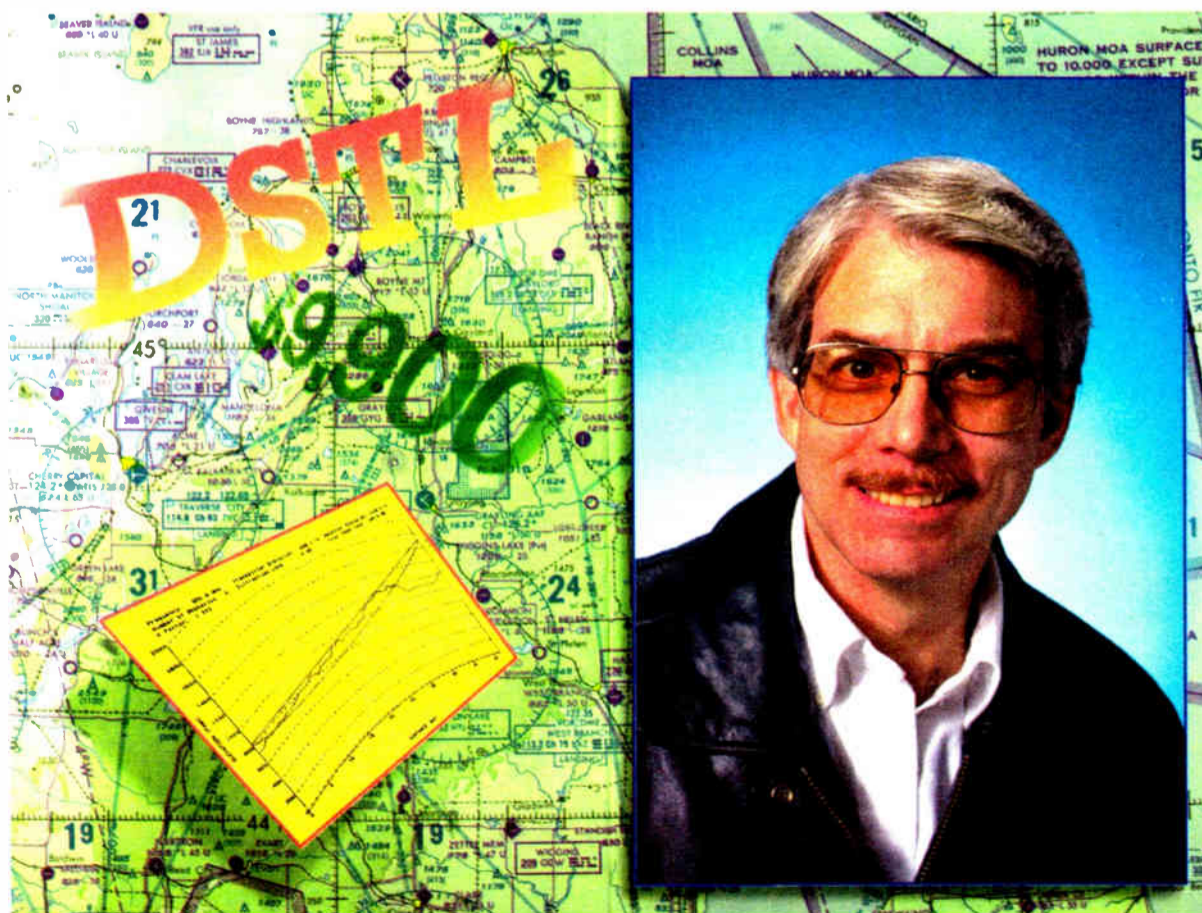
Three years ago, I installed my first DSTL[®] on a challenging 46-mile path at one of my stations in Michigan. Because of that success and many others since, I now consider it my problem solver. With its new, lower price, all my clients can afford the best. For about the price of an analog STL, they get a complete digital STL solution.

Michael Bradford, Consulting Engineer

For a no-obligation demo, call 800-DOLBY-RF (365-2973).

Experience for yourself what Michael's talking about.

**THE ONLY THING THAT
DOLBY COULD DO
TO IMPROVE THEIR
DIGITAL STL IS
LOWER THE PRICE.
AND THEY DID.**



That's right, we lowered the price of our 2-channel DSTL, including a digital stereo generator, to \$9,900. And who doesn't want digital connectivity? Digital AES/EBU input and output modules are now available. If you want to double your STL's capacity, a four-channel DSTL with a digital stereo generator is \$10,900.

Dolby Laboratories Inc. 100 Potrero Avenue, San Francisco, CA 94103-4813. Telephone 415-558-0200. Facsimile 415-863-1373. Dolby, DSTL and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation ©1995 Dolby Laboratories Inc. 595/10776

Circle (187) On Reader Service Card **World Radio History**

Boost Morale, Build Team

► continued from page 26

at a lower direct cost than salary compensation. If managed correctly, this compensation package could exceed a competitor's higher salary offering. So this managed compensation benefit package may help management retain the best talent and prevent them from moving to a competitor or to another market.

From the employee's perspective, a benefit statement is an annual accounting of his or her full compensation. It reminds them that they receive benefits of considerable value above their base salary. If an employee is considering leaving your station for a higher salary, a benefit statement helps put his or her total compensation into perspective. Staff members may be less likely to leave for an additional \$5,000 in salary if they know the benefit package has a \$8,000 to 15,000 value. If your station is the only one in the market that provides this periodic benefit accounting, your position as a fair and generous employer is further enhanced.

Pay-stub statement

Another vital item that employees and management often forget to discuss is the importance of customer satisfaction especially when revenue is up and so are the ratings. You love it when the sales team exceeds its revenue quotas for all quarters of the year. But bringing in the revenue is just the beginning of a successful and profitable station.

Once the account has been established and the air time purchased, it is up to the rest of the team to deliver high-quality advertising at the designated times. This combined effort makes satisfied advertisers. However, advertisers are only part of the customer base that has to be satisfied.

The targeted listening audience must be equally as content with the programming and promotions. If the ratings drop, so do the number of advertisers. All staff members contribute to the continual effort to keep satisfied customers/listeners.

To continually remind your employees of the importance of customer/listener satisfaction, place a statement on all pay check stubs such as: "This pay check is brought to you courtesy of a satisfied customer/listener." A colleague of mine, Russ Roseman, offered an alternative statement: "This pay check is brought to you courtesy of a satisfied customer/listener, who we must keep satisfied."

A statement similar to one of these is a reminder every payday that each employee's performance has direct impact on delighted advertisers/listeners, which is the source of his or her salary.

Implementing either of these ideas or both can get your station off to a fresh start for the new year.

□ □ □

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

PIONEER PROFILE

Detroit Station Committed to News

by Barry Mishkind

TUCSON, Ariz. In 1920, choices were limited for the few radio enthusiasts who owned receiving sets. Most transmissions were from commercial stations involved in sending and receiving private messages. Amateur stations operated sporadically and usually with low power.

That low power level, coupled with the typical crystal detector sets of the time, generally limited reception to stations within about 25 miles. Thus, when the 200-meter (1500 kHz) spot on the dial crackled to life in August 1920, it was indeed something special for residents of Detroit.

Historical moment

The new sounds came from the Detroit News, which had opened 8MK with a series of concerts, leading up to what may have been radio's first newscast on Aug. 31, 1920.

Licensed the next year as WBL, then changing in 1922 to WWJ, 8MK was clearly one of the pioneer stations in the United States, if not the world.

It was 8:15 p.m., Aug. 20, 1920, when Frank Edwards first leaned into the transmitter mouthpiece and announced, "This is 8MK calling."

After a musical program was transmitted, Edwards called out, "How do you get it?"

Interestingly, unlike today, some of the listeners in 1920 had their own transmitters and called back, "It's coming in fine" and "We're getting everything loudly and distinctly." Talk about listener feedback!

Of course, this did not come about by accident. It all started in 1902 when William Scripps, son of Detroit News founder James Scripps, became interested in the experiments of local wireless enthusiast, Thomas Clark.

Convincing his father to offer Clark financial assistance, William continued to be interested in radio and eventually acquired a 20 W DeForest OT-10 transmitter and license from the Department of Commerce.

The Detroit News decided to put the necessary resources behind the fledgling station so that it would be more than a curiosity. News and weather copy came directly from the editorial department at the paper. Top-level talent was hired. The paper began printing the station schedule on the front page each day.

With such a commitment, it is no wonder that WWJ became synonymous with innovation, being the first, or among the first in many categories of broadcasting.

The list is long. In its first two years, WWJ introduced sportscasts, live symphony music, the first radio orchestra, religious broadcasts, the World Series, a wedding and more. There was even a special music broadcast for a local dance party on Sept. 4, 1920.

Some of the most famous names in the country began their radio careers on WWJ, including Fanny Brice, Will Rogers and Fred Waring and the Pennsylvanians.

Over the years, WWJ continued to innovate. Play-by-play sports, broadcasts from an airplane (1928), university

courses, a part in the first coast-to-coast network broadcasts and entry into FM and TV broadcasting went into WWJ's history books.

However, from inception to present day, WWJ has been known for its news product. From the pioneering news and election returns in August 1920 to today, WWJ has put a lot of resources into its coverage.

Already by 1922 the station had provided links to other cities isolated when sleet cut the phone wire. Local papers were able to go to press by receiving reports over the air.

WWJ also helped find a missing 13-year-old boy en route to St. Louis, locating the young boy in Ohio.

Response to finding the boy led WWJ to offer its facilities to the local police. Receiving sets were placed in precinct stations, and later in other cities within WWJ's coverage area. This in turn led to the first police radio station, KOP, and early efforts to communicate with a moving car.

Last fall I was delighted to acquire a copy of a book printed in 1922. "WWJ — The Detroit News" is a fascinating look at how the station itself viewed the infant industry.

The book starts with the station's first

The 200-meter (1500 kHz) spot on the dial crackled to life in August 1920.

two years of activity, and includes pictures and descriptions of the radio facility, the staff and newspaper plant. The book included WWJ's schedule, as well as a list of other stations on the air in early 1922.

The chapter "Behind the Scenes" is especially interesting to modern broadcasters. Discussing studio construction, the book explains that the studios were made "echo proof" by special "walls and ceilings, padded with felt two inches thick."

Friar's cloth was hung over the walls and doors, to "deaden all sounds save those to be transmitted." And the "newer type" of microphone was described as "much like a bronze mantel clock, except that it has no dial."

The resulting vibrations were said to be "impressed on the transmitter, which then projects them through the ether ... on errands of intelligence and entertainment."

Apparently they had no liner cards in those days!

New concepts

Some of the new concepts that had to be taught to performers seem almost comical today. Many were spooked by the lack of applause or laughter when they finished their part. Others had to learn there was no need for formal dress to talk or sing on the air.

Also described was an enunciator device which the engineer could illuminate to prompt the performer to move farther from the mic, speak louder, softer or stop.

Also most interesting were the chapters explaining in 1922 terms how radio worked, including instructions on how to build "Elementary, Intermediate and Advanced

receivers." Diagrams and parts lists were included. An elementary radio might cost \$8, an advanced one would be \$100.

For safety, a pictorial section on antennae gave advice on installing lightning arrestors. There was even a question-and-answer section to help anyone wanting advice on how best to receive WWJ.

For a station to publish such a book in 1922 shows the commitment to broadcasting on the part of the Scripps and the Detroit News. It is a wonderful look at the beginnings of our industry. And viewed from a modern vantage point, the 75-year history of WWJ truly befits such a pioneer.

If you or your library or any information broadcasting, please share this. I would appreciate anything that illuminate the pioneer stations and the trailblazers who built them, as well as suggestions on interesting subjects for future columns.

Books, newspaper clippings, old licenses, ratecards, EKKO stamps, radio guides, even photocopies are of great help. Send them to Barry Mishkind, 2033 S. Augusta Place, Tucson, AZ, 85710. The information will be added to the OLDRADIO infobase, and eventually donated to an archive open to all.

□ □ □

Barry Mishkind can be reached at 520-296-3797; or barry@broadcast.net via the Internet. You can find his home page at <http://www.broadcast.net/~barry/>

RFR Personal Monitors

Solve Shared Site Problems



- Models to cover:
 - 150 KHz—30 MHz
 - 50 MHz—1000 MHz
 - 50 MHz—2500 MHz
 - 1 GHz—50 GHz
- RMS detection even in complex multi-signal environments
- Alarm threshold varies over frequency range to match IEEE/ANSI standard

For more information, call: (516) 231-1700
Or write: 435 Moreland Rd., Hauppauge, NY 11788
Need information now? Call Narda's FaxBack 1 800 4NARDANY (462-7326)
Request Document #1115

LORAL
Microwave-Narda

CLEAN UP



SONY TCDD8 PORTABLE DAT RECORDER

- Ideal Field Recorder
- Up to 4 Hours Recording Time
- 2 Speed Cue/Review
- Anti-Shock Transport

\$677.00

Mfr. List \$799.00

Save 15%

Phone: 800 . 426 . 8434

Fax: 800 . 231 . 7055

BSW
BROADCAST SUPPLY WORLDWIDE
7012 27th Street West Tacoma, WA 98466

*Limited time offer

Circle (27) On Reader Service Card

NAB's John David: Looking Out For Radio's Continued Growth

by Alan Haber

WASHINGTON John C. David, senior vice president of the National Association of Broadcasters' radio division, will celebrate his seventh anniversary with the NAB this April. He joined the association in 1989 as Vice President of Broadcaster Congressional Relations.

David kicked off his radio career at age 13, reading weather forecasts on KLCO(AM) in Poteau, Okla. After receiving a bachelor's degree in radio/television communications from Oklahoma State University, he settled into a six-year berth at one of the powerhouse top-40 radio stations of the 1960s, the 50,000 W KOMA(AM) in Oklahoma City.

At KOMA, David hit the bricks as nothing less than a "screaming DJ," complete with prerequisite reverb surrounding every syllable he uttered into the station's microphones. (He remembers using a Hammond organ spring to get the effect.) David has fond memories of his time at the top-40 giant. "We had a great night time signal — we went into about 22 states at night," he said.

David gravitated into radio station ownership when he left KOMA, purchasing KFSB(AM) in Joplin, Mo. "I decided that I was probably more qualified to be a manager/owner than I was to be a top air personality," he said. David was an owner for 17 years — he also owned KIXQ-FM in Webb City, Mo. and KDBQ-FM in nearby Pittsburg, Kan.

Working hard to ensure that future NAB conventions keep up with the trends that are driving the radio industry, David has assembled a committee, comprised of broadcasters from all sized markets, that will meet to discuss ideas for future convention sessions.

"It's exciting for us to come together and hear the different things that broadcasters from around the country are interested in pursuing and learning more about," he said.

On the occasion of National Radio Month, David sat down with *RW's* Alan Haber to discuss the many facets of the great landscape that is radio.

RW: What do you think about the relationship between radio and the Internet?

D: I find that what radio stations are doing right now is trying to establish a presence on the Internet. I have talked to some people who say, "I'm there, but I'm not sure how I'm going to make money with it," and they're looking at it as a new revenue stream.

The most complete Web pages that I've seen are actually selling merchandise and providing another value added benefit to advertisers. ... I think (the Internet) is a sexy thing right now. It is something that looks like you're onto the information superhighway. But the biggest question, I think, is after people understand what it is, how do they make money on it? I think there are a lot of opportunities we haven't uncovered yet.

RW: These days, the buzzword continues to be digital. We're almost at the

point where digital radio will be a reality and it will start to come into the marketplace, affect the radio industry and affect listeners.

D: It's already affected the radio station through production and how we do business. From accounting and billing systems to production studios. Music is on compact disc. Everything is digital now. Mostly, anybody that buys equipment anymore that's not digital is not getting set for the future.



John David

RW: One of the things we know about technology is that it never stops progressing. Consider digital radio: Eventually something's going to come along that supplants it; it will be bigger and better and have more bells and whistles and so on. There may be stations that say, "We don't want to switch over to DAB — we just want to continue doing what we do right now, because you're always saying that we have to get involved, but two years down the line something else comes along and we have to spend money for that." What do you say to stations that might think this way?

D: Well, as you know, there are applications to deliver satellite digital radio. I think that's one of the biggest threats to our industry today. The FCC is leaning towards approving a standard in an already allocated spectrum for it, so they're not going to hold that back.

We're assuming with in-band, on-channel technology that this will be a much more efficient system. It will be less expensive to operate, provide better coverage and will also be a better signal or sound.

It will do away with the (FM) multiplexing we have problems with and also give more technical parity to AM stations. So from a technical standpoint of especially AM stations, I can't see any reason why they wouldn't want to go that way, because that's been part of the problem. You play the same song on AM, you play the same song on FM, they do sound different. But the tests that I've heard with digital AM

are far superior to the signal now. For that reason alone, I don't see why we would not want to move in that direction.

RW: There were some interesting statistics in the NAB National Radio Month media kit — radio reaches 98.8 percent of teenagers (12-17) weekly, 95.5 percent of persons 12-plus weekly. During TV prime time, 61.7 percent of adults listen to the radio. Four out of five adults listen to radio in their cars weekly. Those are pretty impressive statistics. Does this say radio is doing its job?

D: I think so, because radio has the ability to adapt very quickly, and it's not as expensive to adapt to a different format. Certainly you can't make it, especially in larger markets, if you don't have an audience. And if you don't have an audience, you're not going to do business and so forth. It just follows. So you're going to adjust, and we've adjusted over the years.

RW: Do you think radio stations are as creative as they should be today in areas such as programming and selling the stations to advertisers? Have stations had to become more creative because of all the competitive factors in their marketplaces?

D: Well, I think the answer is, yes, they've had to become more creative. (One) of (NAB's) biggest requests is "Where do I get new ideas?" I'm talking from the expense side to the promotion side to the sales side and the programming side.

I used to say I was one of the best thieves in the world — (I'd) always go out and try to steal ideas and adapt them to my market. I think you have to network — a lot of people are networking a lot more than they used to. Even in the small market deal that we're doing now — we have got a deal called Swap Shop, and it's one of our most popular publications here at NAB. It is full of ideas that we've gleaned from stations and they love it. It's about four pages a month, and it's geared for small markets that don't have the budgets to go after big promotion ideas. They adapt them to their market. So, yeah, they're hungry for ideas, hungry for sales promotions, hungry for audience promotions.

RW: How do smaller stations, which traditionally have to work harder because they may have a lot of competition or limited operating capital, stay afloat? Is it basically the same as it is for a larger station?

D: It's basically the same, without as much professional assistance, if you will. You don't have the income to support a lot of big research firms that tell you exactly what you should play on your radio station. You have to come up with sometimes homemade research, and you have to have a gut sometimes for your market. That's why it's important, I think, for people to be involved with their market from an overall community standpoint — to find

continued on page 41 ►

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.

MATCHBOX II IS BEST FOR DIGITAL

with its HI-GAIN mode for Power-Mac* and other digital editor sound cards

NEW!!



Get MATCHBOX II to convert your Power-Mac* audio to *balanced* professional levels!

Only MATCHBOX II has *programmable gain* that's optimized for digital editor sound cards.

15,000 units in use worldwide!

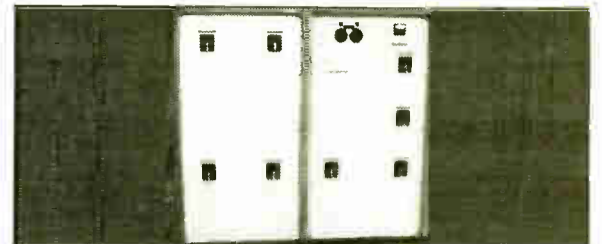
HE HENRY ENGINEERING

TEL (818) 355-3956
FAX (818) 355-0077
FAX-on-Demand Doc #120 (818) 355-4210

- ◆ HI-GAIN mode for digital editors
- ◆ All four outputs adjustable
- ◆ Pro-grade gold-plated RCA jacks
- ◆ Over 110 dB dynamic range
- ◆ Self-contained power supply

* Power-Mac is a trademark of Apple Computer

READER SERVICE NO. 179



- 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. 97

Eimac Factory Rebuilds

Have your Eimac tube **REMANUFACTURED** by the trusted original manufacturer.

- Eimac Quality
- Original Specifications
- Factory Testing
- New-Tube Warranty

Call us: **CPI**
Eimac Division
San Carlos, CA., USA
(800) 414-8823 or
fax (415) 592-9988

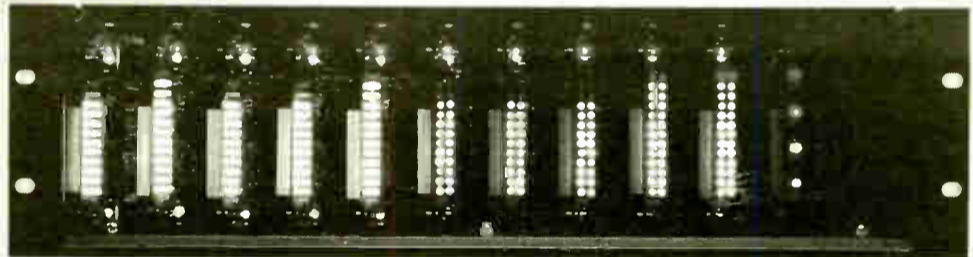


Available through
Richardson Electronics
(708) 408-2200



READER SERVICE NO. 155

Pull Listeners with the Finest Audio



The System 1000 Modular Audio Package

- Mono & Stereo Line Level Power DA™s
- Single & Dual Mic-Pre Power DA™s
- Remotely Controlled Daughterboards
- Mono & Stereo Card Edge Metering
- Redundant Power Supplies
- New - Instant Installation

The System 1000 delivers the absolute finest performance! All line level and mic-pre DAs use *Power DA™* outputs for a signal that just won't quit. Daughterboards provide remote gain and mode control, tone, voice overs, reverse IFB, and more. 10 additional modules, from a 4x4 mixing router to a 10 channel loss of audio alarm, make the System 1000 the tool for *your* needs. Like NPR and SMN, do wonders for your sound by investing in the finest. Call Rory Rall today.

Benchmark
...the measure of excellence!™

BENCHMARK MEDIA SYSTEMS, INC.

Phone 800-262-4675, FAX 315-437-8119

READER SERVICE NO. 25

UNIVERSAL SCPC

XE-1000



SCPC BROADCAST AUDIO RECEIVER

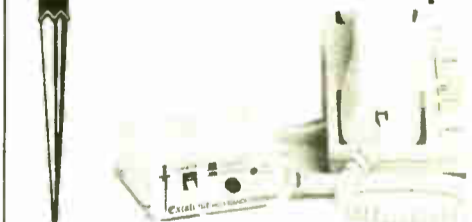
New, affordable, frequency-agile receiver, direct channel entry by keyboard, selectable companding 1:1, 2:1, 3:1, wide/narrow bandwidth, de-emphasis selectable, 950-1450 MHz, line output 600 ohms, muting, transponder agile, LNB power supply, 50-channel memory, full baseband output, high-quality audio. 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. 45

World Radio History

Excalibur Electronics HC-1 Handi-Coupler



Here is the simplest, quickest, most convenient way to connect audio to a telephone. The HC-1 connects in series with the handset of any phone using modular connectors. *No* connection to the phone line is needed. Press the front panel button and external audio is available on separate send and receive 1/4" TRS jacks on the rear panel. Release the button and the handset is once more connected for normal use of the phone. Nothing could be simpler!

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

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

READER SERVICE NO. 129

Voiceover Talent Is Key to Success

Several Well-known Talents and a Newcomer
Discuss the Importance of a Strong Image Voice

by Alan R. Peterson

WASHINGTON Voiceover talent is every bit as important to station image as music research, commercial production, a clean airchain and entertaining personalities.

"It is giving the station an identity, setting them apart from the competition," said Reeves. "Even small markets are putting emphasis on having a station voice. I think they see it as a necessary complement to a jingle package, or in some cases, replacing a jingle package."

Immediacy and reasonable cost justifies having a voice talent for a station, especially when it comes to impromptu or time-critical station promotions.

A well-crafted format with the right image voice spells success. By the same token, a format with an inappropriate voice can be jarring and awkward.

Why would a voiceover announcer be essential to a station's success? After all, stations pay plenty to the hired voices on-premises now.

Several well-known talents and a newcomer offer up their own voices on the subject.

Randy Reeves is heard on stations in New York, Philadelphia, Boston and over a dozen other cities.

Immediacy and reasonable cost justifies having a voice talent for a station, especially when it comes to impromptu or time-critical station promotions where speed is the priority.

Station identity

According to Reeves, "A station faxes me something at lunchtime today, and they can have it on the air lunchtime tomorrow. It's telling the whole story of the station; it becomes the entity that people recognize the station for."

How does a station decide a voice is right

for them? Reeves said, "Once they get a demo tape, they see the range you're capable of. Generally, they're not going to call and try to push you into something that you are not. They're talking to you in the first place because you fit parameters that they already had in mind."

Randy Thomas is the station image voice for WNIC-FM, Detroit, and KCBS-FM, Los Angeles, among many others. You know her best for her "Hooked On Phonics" radio spots.

"In the business of radio, image and perception are everything," said Thomas. "Disc jockeys come and go but an imaging voice is something that maintains the integrity of the image of the radio station."

Thomas' repertoire is varied. Her client list has included news-talk WROW-AM in Albany, N.Y., and she recently picked up KFMB-FM in San Diego, Calif.

Images

"On WROW I had a bit more of an authoritative voice, but still warm and friendly," she said. "I can do a heavy voice, with a little more attitude — edgy, I suppose."

Thomas is heartened by the fact many stations are opting for a female image voice. "I think it projects a feeling of warmth, sincerity, fun ... whatever it is that particular station is imaging."

What if a station has an in-your-face, high-energy format? What can be done when warmth and sincerity are not part of the equation?

Thomas said, "I think they have to choose the voice very carefully. It is a long-term relationship if they do it right."

Obviously it takes a versatile set of pipes to be a voiceover talent, but appropriate technology needs to come into play as well.

Lots of voiceover talent cut tracks to analog tape. Randy Reeves says many of his stations want strictly "voice-only" tracks that they can assemble themselves. In that respect, tape is the ideal format.

As Reeves puts it, "I do offer DAT



Randy Thomas

service, but for the production I'm doing for stations now, it's doing a great job."

Darla Coop of the Coop Group in Indianapolis is a new entry to the radio voiceover industry. Her past experience with radio and TV booth-announcing influenced her decision to use the Digidesign Session 8 recorder/editor.

"I can send material out on two-track analog or DAT; whatever a station requires," said Coop.

Some voiceover services have adopted ISDN and Switched-56 lines for real time delivery of tracks. Bumper Productions of Nashville, Tenn., and Sean Caldwell of Philadelphia are among the major players using instant transmission technology.

The stakes are high for large and major markets, yet stations in smaller markets find a strong voice to be a great help.

"Small markets have latched on to it so much because it brings them an out-of-market experience," said Reeves. "They get a bigger-market sound by letting 'the voice' have a lot of airtime. In weaker periods, like weekends and overnights, they can write sweepers with lots of personality and load up on those."

Any station, regardless of market size, needs to have its product researched, adjusted and fine-tuned. A station image voiceover talent is the final topping to the sonic sandae. Without it, the product is incomplete.

□ □ □

Randy Reeves can be reached at 770-645-2707. Randy Thomas can be reached at 818-985-2728. Darla Coop can be reached at 800-910-3244. Bumper Productions can be reached at 615-646-8800. Sean Caldwell can be reached at 610-640-5899.

AEV
CELEBRATES AN
UNPRECEDENT
OUTSTANDING
WORLDWIDE
SUCCESS!

Radio Stations from all continents
enthusiastically praise EXCLUSIVE FM as an
extraordinary and absolutely exclusive event!



AEV Exclusive FM
AUDIO PROCESSOR

ASK FOR IT,
the whole world is asking for it.



ELECTRONIC BROADCAST EQUIPMENT

AEV
ITALY
Phone
39 + 51
950249
950350
Fax
950201

FM STUDIES

- ◆ **SPACING/INTERFERENCE**
determines channel availability
- ◆ **DETAILED INTERFERENCE**
short-spaced commercial studies,
educational FM studies
- ◆ **DISTANCE TO CONTOURS**
plots projected coverage
- ◆ **POPULATION COUNTING**
determine potential audience
- ◆ **COVERAGE MAPS**
signal coverage, zip code boundaries,
ethnic- demographic data, loyal
listener locations

Visit Our Home Page At:
<http://dataworld.com/>



Established 1971

800-368-5754 FAX: 301-656-5341
e-mail: Info@dataworld.com

From 10 kW to 1 Megawatt, nobody even comes close.

Proven quality and unmatched power.

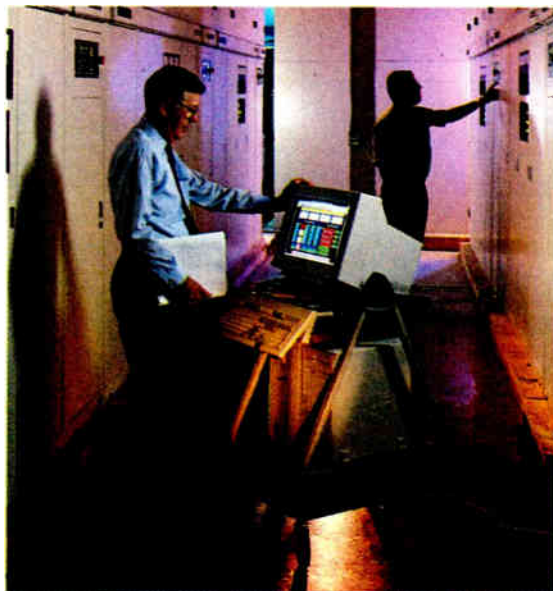
For nearly a decade, Harris has raised the world standards of reliability, efficiency and power for medium wave transmitters. With solid state power amplifier modules delivering an MTBF of 6 million hours, typical AC to RF efficiency to 86 percent and a signal that sounds like FM, Harris DX transmitters have proven to be the choice of more than 600 broadcasters around the world.

To meet the demands of the global market, Harris provides DX transmitters at all power ranges from 10 kW to 1000 kW. In fact, with our 1995 International Broadcasting Award-winning DX 1000, Harris is *the only company in the world that can deliver — and has delivered — a 1-Megawatt solid state AM transmitter.*

Digital is here now, with Harris.

As the only transmitter proven

to be capable of digital medium wave broadcasting, Harris DX Transmitters have been used for every on-air In Band/On Channel AM DAB test to date. And, because DX is the only medium wave transmitter compatible with both analog *and* digital transmission, while meeting IBOC DAB standards, Harris stands alone in its ability to meet your broadcasting demands today, while preparing you for tomorrow.



Experience that serves you well.

Broadcasters worldwide rely on the vast experience and resources of Harris. From medium wave to FM, UHF, VHF, satellite and wireless cable networks, Harris has repeatedly proven its ability to help clients get the most out of their facilities and their budgets.

And that's a matter of record, too.

So, why settle for coming close, when Harris can take you all the way? For more information, just call Harris.

HARRIS CORPORATION BROADCAST DIVISION

US and Canada
TEL: +1 217 222-8200
FAX: +1 217 224-1439

Elsewhere
TEL: +1 217 222-8290
FAX: +1 217 224-2764



Lombardo's Music: New Year Magic

by Richard W. O'Donnell

PORT RICHEY, Fla. Guy Lombardo has been gone for quite a while now; he died in 1977. New Year's Eve still does not seem the same without him.

For almost a half-century, Lombardo, a small man with a large talent, welcomed one and all to the new year — first on the radio, and later on television. His mid-night programs became an annual event.

Midnight music

Without a doubt, this coming New Year's Eve the gentleman with the big baton will be remembered fondly by many who danced to his midnight music

way back when and will treasure the memory forever.

The Canadian musician has often been called Mr. New Year's Eve. In fact, a humorist once claimed Guy Lombardo invented New Year's Eve.

"It all started back in the early days of radio," Lombardo once said. "Radio was young in the early '30s. We were all so much younger. Those were the depression days, yet it seems to me now life was so much more exciting and interesting."

Lombardo and his Royal Canadians were featured on CBS back in 1932 on a show sponsored by Robert Burns Cigars. It was one of many radio shows Lombardo would have over the years.

The band's appearances at New York's Roosevelt Grill on New Year's Eve were quite popular. Somebody — the identity of whom has been lost in the sands of time — decided Lombardo should host a New Year's show on the radio from Roosevelt Grill.

rather than musical instruments. My father won out. He insisted we play instruments because 'music is life's lightest load.' Football, hockey and baseball were not encouraged, but piano, drum, guitar and violin lessons were a must.

When he was 12, Guy had a three-piece band.

"We played at neighborhood strawberry festivals, and ladies' lunches," he said.

By the time he was 19, Lombardo's band



Lombardo (right) and the Original Royal Canadians

At first it was supposed to be strictly a local show built around music and interviews from nearby Times Square, which was jammed with people. But the idea proved to be so appealing that the show caught on with other stations in the limited national radio network they had in those days.

The rest, as they say, is history. Lombardo's New Year's Eve shows became a part of our way of life.

The orchestra leader had a rule: musicians were not allowed to drink until

was up to six members, and the Royal Canadians were on their way to fame and fortune. Naturally, the band grew in size. It was a tightly knit group formed around a dozen or so musicians from Canada. They included brothers Carmen, Liebert and Victor. A younger sister, Rosemarie, was a vocalist with the band during the '40s.

In 1927, when he was 25, Lombardo met his wife-to-be, Lilliebell, while appearing at a Lakewood, Ohio, roadhouse.

"Know how I met her?" said Lombardo. "A cat had kittens at the roadhouse, and Lilliebell went over to look at them. I saw her standing there, and went over and introduced myself. I was 25 at the time, and living it up pretty good. Boy, I needed a good woman. Lilliebell was the good woman for me."

Lombardo rated his meeting with Lilliebell as the "greatest break" of his life.

Big break

Two years later, there was another great break. Lombardo's Royal Canadians were hired to play at New York's Roosevelt Grill on New Year's Eve. It was the beginning of an association that lasted until 1962, when the musical group started another long-running New Year's engagement at the Waldorf Astoria.

The New Year's shows at the Roosevelt Grill were broadcast over the radio. Television was added in the late '40s. Lombardo once said, "Sometimes I think we had the most fun of all at those depression New Year's. Everybody was poor together."

The Royal Canadians were famed for their "reedy style," as one critic put it. The group stuck to the tune, and never ventured far afield.

"Our style is simplicity itself," Lombardo said, "Or maybe it isn't so simple. The whole idea is to sing with the instruments, to orchestrate the human voice. When we take up a new number, my brother Carmen will say: 'Let me see the lyrics, what the man is saying.' Then

continued on page 46 ►



Rosemarie and the Lombardo Brothers

after midnight, and never on the bandstand. However, on New Year's Eve, the rule was bent a bit. Once the new year had arrived, champagne was sipped between numbers; but not too much of the bubbly.

"My father was born in Lipari, Italy, and operated a very successful tailor shop in London, Ontario," Lombardo once told an interviewer. "Being Italian, he insisted all five of us take music lessons.

"Naturally, my brothers Liebert, Carmen, Victor, Joseph and I wanted to play sports

The control you need, the price you like.



Symetrix 528E Voice Processor

The 528E is a voice processor that performs six separate functions simultaneously; eliminating the need for separate voice processors. Microphone pre-amplification, de-essing (sibilance removal), compression/limiting, downward expansion, parametric EQ, and voice symmetry alignment are all functions performed by the 528E from Symetrix.

The 528E's compact yet easy-to-use design allows for ease of storage and maximum control. Separate LED meters monitor mic gain and dynamics gain making adjustments quick and easy. As a dedicated single-channel voice processor, the 528E delivers the same processing power found in an entire recording studio signal chain. Although the 528E is called a "Voice Processor," it can also be used to transform any signal, vocal or otherwise.

Revered as the choice for broadcast voices, the 528E gives you all the power for a fraction of the cost.

Features

Works with any microphone. Great for both voices and effects.

Enhances vocal intelligibility. Reduces off-mic noise.

Increases perceived loudness. Reliable, proven design.

Order today!

1-800-622-0022

 HARRIS

© 1996 Harris Corp.

Circle (56) On Reader Service Card

World Radio History

NAB's David Discusses Trends

► continued from page 36
out what their audience is thinking.

It's utilizing your staff for a lot more duties than just saying "You're the news director." You also may be the person who comes up with ideas for promotions, or you may be the sales manager who is a good announcer. You wear different hats in the smaller markets. The management has to put those talents together because you don't have a staff of 55 people - you have staff of 15 to 20. It's the same radio signal in a radio, so you have to make it sound like it's local, and you have to be creative with it, and it's not an easy deal.

RW: Talk radio is a hotly-debated topic. What do you think about the state of talk radio today?

D: Well, I think it's been very healthy for a lot of markets, especially for some AM radio stations, and it's helped bring back some of the AM stations around the country to the forefront. I think there are a lot of personalities that are developing in talk radio — syndication has helped stations that are using talk syndication programs. It was originally thought of as being a very cost-intensive format, and the syndication availabilities have helped it to be less cost-intensive at the local level.

RW: What do you think about all the controversy over talk radio? Do you think it's OK for talk show hosts to do all the kinds of things that some people find objectionable?

D: Well, I guess maybe I'm too close to the forest, because I see some of the talk radio show hosts as being show people, and they're trying to develop controversy on their programs because that develops ratings. The average listener I'm not sure understands that, and maybe thinks that the host is that passionate sometimes about a subject. I think that we started out with a few talk show hosts — now we've got many of them, and it's a very popular format. It's something that people can interact with on the radio, and I think it's healthy for the radio industry to be able to let people communicate with others on a one-to-one basis like that.

RW: What about the issue of free speech? Should people be able to say anything they want on talk radio?

D: I guess I come down on the traditional side of radio there. I don't necessarily agree that you should be able to say anything; however, I think that good taste and community standards are certainly something that all operators should be cognizant of. But I would defend the right for free speech

and I'm a very big advocate of that.

RW: How much of radio is business and how much is creativity and reaching out to listeners?

D: I think it's a mix. The business follows the creativity. You have to have the business to afford the creativity.

RW: Do you think that the radio personalities who are the most successful at what they do on the air are the ones who are

speaking to one listener rather than the mass audience?

D: Yes, no doubt about it. I don't relate to somebody, when I'm sitting in the car alone, who says, "Hey, gang." You know, there's no gang in the car with me, and there's no everybody with me. There's just me. And staying away from those terms I think is a very positive move for a radio personality, to realize that we're not sitting around the radio in a semi-circle listening to the Jack Benny show anymore.

It's not a family deal as much as it is a personal situation.

RW: How important is it for a station to have a sense of community?

D: Well, it's our biggest argument against the delivery of satellite — satellite digital audio radio. A satellite is not going to be able to provide localism, and if I'm driving in a state and I need to know the road conditions, I'm not likely to find it out from a satellite that's broadcasting to every market in the country with 30 or more signals. I'm going to find it out from the local radio station that has roots

in that community and in that state and knows the people who are involved, knows how to contact them, and knows how to get the information on the air, because that's what I'm going to look for at the time.

Besides, I think we need to remember that radio stations are businesses also, and they support the businesses that are in that community. And the businesses support them because they bring customers to their places of business through their advertising. The health of that community is also helped by radio stations because they create commerce for the community.



The original Shure FP32 set the standard in field production for portable stereo mixers. Now, with the new FP32A, you can count on getting even less. Noise, that is...30dB less! In fact, the FP32A is so quiet and improved that it's perfect for use with DAT and other digital recording media.

Professional Mixing You Can Take Anywhere.

The Shure FP32A is a 3-input, 2-output portable mixer specifically designed for:

- remote audio recording
- electronic field production
- electronic news gathering
- location film production

The FP32A weighs just 3.5 lbs and is only 2-1/4" H x 6-3/8" D x 7-1/4" W in size.



With 8 hours use from two 9V alkaline batteries — or powered by any 12 to 30 VDC source — the FP32A goes wherever you do. And since it's from Shure, you can count on its durability and ruggedness.

So Many Features In So Little Space.

You get all the features of the original FP32 plus:

- 48V phantom power
- pop-up pan pots
- input level LED indicators
- mix bus jack and cable
- headphone mode switch
- mixer/monitor switch
- adjustable peak output LEDs
- stereo link for inputs 2 and 3
- more than 30 other new features and improvements

So go to your nearest dealer and pick up an FP32A. Once you use it, you'll see why we're making so much noise about something so quiet.

For the Shure FP dealer nearest you, call 1-800-25-SHURE.

SHURE®

The Sound of The Professionals®...Worldwide.

Circle (162) On Reader Service Card

Hall of Fame Unveils New Studio

by Keith Clark

NILES, Mich. With 1995 marking the 75th anniversary of radio, it is fitting the Radio Hall of Fame has recently been outfitted with a new studio showing just how far broadcast technology has evolved.

Visions

Located in the Museum of Broadcast Communications (MBC) in downtown Chicago, the Radio Hall of Fame pays tribute to industry giants like Jack Benny, Edgar Bergen and hundreds of others. The studio is called the Lynne "Angel" Harvey Radio Center, after the wife of legendary broadcaster Paul Harvey.

It is more than a mere exhibit. It is an actual working facility that hosts several weekly programs as well as visiting broadcasters from around the world. The studio can also accommodate a live audience of several dozen people.

The genesis for the updated studio began earlier this year when MBC/Hall of Fame President Bruce DuMont contacted John Grayson, president of Graysonics in Evanston, Ill., regarding improvements for the on-air telephone system.

During the discussion, DuMont told Grayson of his hopes to someday replace the vintage 1960s facility with the state of the art.

"Bruce had several goals for a modern

facility," said Grayson. "Not only would it serve as an exhibit, but would be a working studio for live radio theater, it would offer more polish and capability for syndicated programs already being produced there and it would be a place that broadcasters from all over the world could use for remote broadcasts."

Greater dreams

However, the first order of business remained the telephone system. Grayson contacted Gentner regarding the possible donation of their new TS612 phone system for the studio, a request graciously fulfilled by the company.

Encouraged by this success, Grayson

began plans to renovate the entire studio. A call to Broadcast Electronics of Quincy, Ill., was the first step. They agreed to donate a new BE Mixtrack modular console that would be the keystone of the effort.

A proposal for an entirely new studio was submitted to the MBC board of directors, who accepted it and also agreed to help underwrite affiliated costs, such as minor construction and new carpeting. Grayson also recommended that an engineer from the Chicago market be tapped to head the technical side of the project.

Eventually, Bill Maylone, chief engineer of WNUA-FM Chicago and his assistant, Bob Fukuda, agreed to take charge. Now, the rest of the equipment had to be procured.

"It was very rewarding when word of this project got out," Grayson said. "The response from manufacturers was absolutely great. We actually started to get calls, unsolicited, from several companies who wanted to get involved."

With the studio in use every day, there was a very small window of time available to complete the effort. Grayson also noted that the historic Chicago Cultural Center on Michigan Avenue, which houses the MBC and Hall of Fame, offered a few surprises that slowed the process.

"At times, a four-hour project turned into a three-day one," he said. "For example, in mounting the loudspeakers for the live audience, we found that the planned anchors wouldn't hold in the 100-year-old material of the ceilings. We ended up making adjustments to match each loudspeaker's situation."

Another challenge was to assemble a facility that could accommodate virtually any type of radio format and provide a wide range of playback media. The museum offers a huge resource of archival material that is available for use but has not yet been set to a standardized format.

"The studio was designed with the idea that it could facilitate any format or production," Grayson said. "We also used open-ended architecture so they won't run out of room when they want to add new technology."

Open for business

The project was completed on schedule, in plenty of time for the gala celebration marking the 75th Anniversary of radio that included the 1995 Hall of Fame induction ceremony. These festivities were broadcast live nationwide on the Radio Hall of Fame network.

With its live accoutrements and technical capability, the new studio will provide numerous benefits not just to the MBC and Radio Hall of Fame, but to the community at large. In addition to hosting more than 200,000 visitors each year, it is a perfect venue for broadcasts, and also as a site for SBE meetings and other industry trade organization functions.

"This has been a very rewarding project to be involved with, largely because it is tremendously beneficial to a very large number of people," Grayson said.

A number of major manufacturers participated in the project through generous donations. Alphabetically, they include: ADC, Air Corp, Apex Systems, Arrakis, Broadcast Electronics, Connectronics, Denon, Durrough, Gentner, Gepco, Hafler, Huff Co., ITC, Klipsch Professional, Littlite, Mackie Designs, Omnimount, Radio Design Labs, Shure, Superscope Technologies and Switchcraft.

The complete list
of reasons **not** to
integrate your station
with advanced digital
software from
Computer Concepts.

A partial list of
reasons why
you **should**.

- Integrated for peak efficiency, each area of your station operates better than ever before. Talent, managers, producers and engineers all enjoy instant communications.
- Complete on-air audio and information control with Maestro™.
- Comprehensive digital multitrack recording, editing, and mixing environment with StudioFrame™.
- Instant access to news as it breaks with Newsroom™.
- An end to cart-clutter with touchscreen control of sound FX, music beds and more with Cartrack™.
- System flexibility. Choose one or two components, or a complete system, and expand any time.
- Prompt, personal service, day and night.
- Reliable performance. Computer Concepts is proven in stations like yours.

Want
the full list?
Please call
today.



Computer Concepts
CORPORATION

8375 Melrose Drive, Lenexa, Kansas 66214 • Phone 800-255-6350 • Fax 913-541-0169

Shop Around for the Best Produced Sound

by Ty Ford

BALTIMORE A number of years ago I got my first AM/FM radio with an auto-scan tuner. I remember noticing how easy it was to jump from one station to another.

Auto-scan circuitry has come a long way since then. Now when I hit the button, the tuner locks on to a station just millimeters — not inches — up the dial.

The point is, there is a lot more competition on the dial. The greater the competition, the more difficult it is to differentiate your station from the rest of the crowd. And as radio continues to evolve into a commodity market, differentiation becomes more difficult.

If you are sharing formats with other stations in the market, the problem is even worse. It is difficult to step back and take a fresh look or listen to how your station is positioned in context with the rest of the dial, but you have to do it.

Especially when it comes to commercial production music.

Secret weapon

Your announcers make some difference, as will a jingle package, but what about the most fragile part of your listeners' experience, your spot breaks?

One of the best-kept secrets of really successful program directors is the attention they pay to the total produced sound of the station. Yesterday it was called "that indefinable something special" that pulled together a station's sound and made it

including ProMusic, Cambium Development, Hollywood Edge and the AirCraft Music Library helped to better define the marketplace.

In Boca Raton, Fla., Promusic's Mike Spitz said that the Promusic library has in excess of 1,400 CDs of music. This amounts to approximately 1,700 hours of music from baroque to be-bop and everything in between.

"We're releasing about 10 CDs a month," said Spitz. "We also offer a vast selection of ethnic and specialty music."

Promusic has CDs available for review at no charge. The library is not radio-specific, but they have a number of discs in the library with just 30s and 60s for radio stations.

According to Spitz, "We make all of the cuts available by annual blanket or needle-drop or, on a 10 minute production for example, we can negotiate a flat fee for use of an unlimited number of cuts from any of our libraries. There is also the 'Big Whoosh!' (\$129); a production element disc for radio and TV stations full of effects, stingers, fly-bys, jingles, tingles and drone beds."

In addition to the Sound Ideas, Mega Disk and Multimedia SFX (CD-ROM) sound effect libraries, Promusic also represents the Digifffects sound effects library.

"They have a five-disc set called the 'Power Pack,'" said Spitz. "The first two discs are sounders and elements. The next two discs are your basic sound

to the '50s and '60s. These are all new tracks, not remixes or outtakes from its other libraries.

"We sell by subscription (annual blanket license) depending on broadcast market size," said Greenberg.

At Hollywood Edge, Scott Whitney said they have just released a new CD called "Musical Sound Effects and Stingers" (\$99.95).

"It is perfect for radio and TV," said Whitney. "There are 99 cuts like sweeps, stings, beds, accents, sequenced effects, sustained effects, environmental, one-shot and animal sounds. We also have a 10 CD set, 'Premiere Edition II' (\$495), which adds 10 new disks to the existing 20 CDs of the series."

Sonic selection

These include modern and historical military and aircraft sounds, household, hi-tech science and medicine, industrial equipment, Foley, cars-trucks-motorcycles and a sports sounds CD. The sports CD, for the first time, includes football game sounds; crowds, pads hitting pads, player grunts, coaches reactions and referee whistles.

Hollywood Edge has a 10-disc set of animal sounds planned for this coming year. Looking to the future and multimedia, Whitney said, "Our Premiere Edition is now available on CD-ROM as Mac AIFF files. Also, the 'Best of Hollywood Edge' set will be available as AIFF or .WAV files."

At Cambium Development in Scarsdale, N.Y., partners Ed Manning and Bud Kroll have already stepped into the future. Cambium provides "Sound Choice," its royalty-free music library on CD-ROM, two to date.

"We made this for the multimedia author who may be using Powerpoint, Astound, Adobe Premiere and Q-Media, not the TV and radio audience," said Manning. "These are high-quality recordings played live, even though we use some samples and synthesizers."

Cambium sells direct; \$69 for each CD ROM, both for \$123. The first disc holds 29 titles and the second has 28.

"Each disc offers a choice of classical, jazz, rock, new age and contemporary," said Manning. "Each main selection is about a minute long and each selection has two to four bumpers. The shorter versions serve specific functions like introduction, interlude, finale and stingers."

To accommodate multimedia authors with disc space problems, each musical selection comes in six different .WAV formats, from 11k/8-bit mono to 22k/16-bit stereo, plus two different MIDI file formats (Standard and General). In addition, all main theme selections come as standard CD Audio.

"The software is Windows-based and enables easy audition of the music," said Manning. "You can select by category, tempo or key words. You can also add your own keywords. Mac users can save the files as AIFF files for export to a Mac system. The software also allows you to shorten the .WAV files and fade them out or loop them. Our files were born to loop."

Although there is a notice inside the CD liner that restricts the use of music for broadcast, Manning said that is a remnant

of an old policy that no longer exists. Broadcast use of Cambium's Sound Choice is allowed □ □ □

For more information, contact the following companies. ProMusic, 6555 N.W. 9th Ave., Suite 303, Fort Lauderdale, FL, 33309 (800-322-7879).

AirCraft Music Library, 162 Columbus Ave., Boston, MA 02116 (800-343-2514).

Hollywood Edge, 7060 Hollywood Blvd., Suite 1120, Hollywood, CA, 90028 (800-292-3755).

Cambium Development, Inc., P.O. Box 296-H, Scarsdale, NY 10583, (800-231-1779).

Deciding which ones to buy means you have to know how to tell the good from the bad.

identifiable even through the spot breaks.

Today this is called the "holistic approach."

Subliminal programming? Not really. Although the cumulative effect of increased production values can be subtle to the average listener, attention to the right details can definitely enhance the listening experience. If you want your listeners to make the right kinds of qualitative judgements about your station, you have to use quality ingredients.

The "buy-em-by-the-bag" approach is guaranteed to result in aural heartburn. That is why having a good production music and sound effects library is important.

Sounds pretty easy, right? If only that were so. There are about 60 companies selling music and sound effects. Deciding which ones to buy means you have to know how to tell the good from the bad. You also need to know how many different compositions you get for your money.

Getting four different versions of the same theme is nice, but because you cannot use them for competing sponsors, they may not be as useful as four different beds. If the melody is too strong, it may force you to use the "minus-melody" or rhythm track, providing there is one.

Too much MIDI and over-synthesized sounds, antiquated arrangements and performance styles sound cheesy. It only takes a little cheese to go a long way.

A random calling of several suppliers,

effects and the fifth has cartoon effects. That sells for \$270 and it's a buyout."

At AirCraft Music in Boston, there are 18 studios in operation at its two facilities in Boston and New York.

According to AirCraft's Paul Greenberg, "We usually have eight to 10 titles per CD, all with the various edits. We have designed every CD to accommodate a wide variety of uses; 30s, 60s, extended lengths and minus-melody mixes. The Speed Search feature puts all of the 30-second versions at the beginning of each CD."

Accommodating

The Co-Pilot feature lets users customize the music by mixing out individual musical elements drawn from the full mix (drums on left, bass on right or keyboard on left, guitar on right). These elements can be used separately or together, with or without the minus-melody mix. The Connecting Flight feature provides liner notes inside each CD that suggest other cuts in the library that are similar in sound or style.

Greenberg said the main Aircraft library consists of 71 CDs.

"In addition, we have a sweeper ID package for Rock Radio, 'Ads Up,' which is music edited to 60-, 30-, 10- and five-second lengths in a four CD set specially designed for radio."

Aircraft also has the "American Music Series," which consists of seven CDs of period music from the revolutionary period

Anything Better?



Electro-Voice®
635A

HARRIS

© 1995 Harris Corp

Circle (148) On Reader Service Card

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.



Pristine SYSTEMS INCORPORATED

DIGITAL ON-AIR SOLUTIONS

- Feature Rich Live Assist and Walk Away
- On-Line Redundancy...No Black Box
- The Best Integrated Play List Scheduler (Music & Breaks) & On-Air Playback
- Dolby AC2 Overlapping Hard Disk Audio
- Music on Hard Disk and/or CD Jukeboxes
- Provide Computers/Players & Save \$\$\$ or Buy/Lease From Us

WEST/INT'L **310/670-7500**
FAX 310/670-0133


EAST **803/370-2400**
FAX 803/370-2314

READER SERVICE NO. 21

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. 51

THE COST EFFECTIVE ALTERNATIVE TO MANUFACTURER SERVICE

SERVICE, REPAIR & CALIBRATION

- STL's • RPU's • TSL's
- Exciters • Optimods
- AM/FM Monitors
- Remote Control Systems

SPECIALIZING IN EQUIPMENT BY

- Belar • Marti
- Moseley
- McMartin
- TFT
- And others...

WE ALSO PROVIDE


Free, over-the-phone technical assistance
STL loaner/rentals
PCL 505 Certification



2198 Hubbard Lane, Grants Pass, OR 97527


(541) 471-2262

READER SERVICE NO. 127



THE CELLULAR DIFFERENCE

- Easy to Use
- Reliable
- Cost Efficient
- Portable
- Flexible



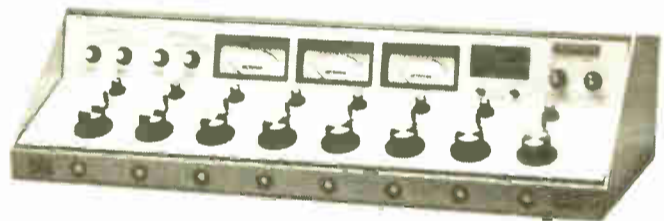
Technology & convenience combine to bring you on-the-spot remote broadcast capabilities with excellent sound quality. Cellular transceiver, frequency extender, and mixer all in one! Powered by Ni-cad rechargeable batteries or AC power supply — utilizes cellular technology or land lines.

For more information call
1-800-852-1333

READER SERVICE NO. 104

For over 20 years . . .

You still want 'em!



8 Rotary pots . . .
traditional reliability,
90's audio!

We still build 'em!

The **DURABLE AC-8 Console** also available with 6 and 10 channels.

Only from . . .

AUTOGRAM CORPORATION
Plano, Texas (800) 327-6901

READER SERVICE NO. 175

The best way to squeeze a great sound through a telephone line...

Zercom CORPORATION



You don't have to settle for less than the best!

The 'Max-Z' 4 channel remote console

P.O. Box 84, Zercom Drive
Merrifield, Minnesota 56465-0084
218/765-3151-Fax 218/765-3900

Available through all major dealers

READER SERVICE NO. 152

Attention Advertisers:

Radio World

Combine Direct Mail With Advertising in a Total Marketing Package!

.....

RADIO WORLD reaches **18,000+** equipment buying prospects. The list can be customized for your specific needs. Select by geographic region, firm type, occupational breakdown or other sub-divisions.

Call **Christopher Rucas** at
800-336-3045
for more information!

OFFBEAT RADIO

Network Sports Digital Delivery

by Dee McVicker

PHOENIX By the time the next Super Bowl rolls around, One-On-One Sports Radio Network will be sporting a new satellite digital teleport to serve as a Midwestern uplink for its sports talk programming and the programming of potential clients.

In doing so, the sports network will be making an end-run around more traditional satellite delivery methods, and at the same time, will be getting into the satellite delivery business.

"In addition to uplinking our programming to our affiliates, other networks will be able to uplink from our Chicago facility," said One-On-One Sports director of marketing Carolyn Phillips.

One-On-One Sports is a sports talk radio programming service that reaches over 7 million listeners a week via satellite, predominantly males between the ages of 25 and 54. It also provides broadcasting coverage to spectators on-site at sporting events using low-power transmission and special receivers, which are rented by spectators.

In the past few years, One-On-One Sports has covered the Indy 500, Churchill Downs, the Brickyard 400 and over a dozen professional golf tournaments. In addition, it has done play-by-play radio coverage of sporting events, including exclusive rights to the World Cup USA '94 soccer championship matches.

New system

The sports network has been sending its programming over ISDN or Switched 56 to a SEDAT teleport in New Jersey for uplink to over 300 affiliates. Early in 1996, the network will have completed construction for the VirteX StarGuide II transmission system, a new digital delivery system using the MUSICAM algorithm, and will be sending its programming from its new teleport in Chicago.

StarGuide II is a multicarrier, bandwidth-on-demand system that is capable of efficiently delivering 40 monaural (20 stereo) channels by aggregating unused portions of transponder space, a cost effective means of renting satellite space. One-On-One Sports is expected to see

substantial savings, for the network and its clients, and improve the quality of audio as a result.

"Our quality right now is 7.5 kHz for an audio channel, which is OK for talk. But with the new system, our frequency response could be 20 kHz, although realistically we'll probably roll it off to 15 kHz," said Jerry Heckerman, One-On-One Sports chief engineer. This extended frequency response will open up programming opportunities for One-On-One Sports, such as the ability to uplink concerts and do more short-form programming, he said.

Affiliate services

A benefit One-On-One Sports will gain by using the VirteX StarGuide II is the ability to feed information to its affiliates. Liners and commercials can be addressed individually to stations, or blocks of stations, along with the main programming channel.

Also key to the delivery system is its satellite receiver, which will be found in almost a third of the stations in the country — the 3,500 or so stations accessing

Infinity Broadcasting and its programming affiliates Westwood, Unistar and Mutual.

The VirteX receiver was chosen by Infinity Broadcasting in early 1995 for its new audio store and forward system, a system jointly developed by VirteX and Infinity called MUSICAM Express. The MUSICAM Express concept is that stations will be able to receive a single pipeline of compressed audio that winds its way from programming service to satellite to studio and finally to the transmitter without decoding.

continued on page 46 ▶

WORKBENCH

Real Tips for Solving Those Reel Problems

by John Bisset

SPRINGFIELD, Va. Not everyone has cast away his or her reel-to-reel machines in favor of the hard-drive based systems, so these two tips for Otari reel-to-reels should be useful. The brake drums on Otari MX5050s have a matte-like finish. After repeated use, this finish is transferred to the brake bands, glazing them with a black finish. As the glazing continues, the brakes actually grip more, so the braking action is no longer a smooth operation. At this point, it is customary to replace the bands as the felt gets coated.

While ordering some replacement bands recently, Otari technicians recommended also replacing the brake drums. We first tried the machine after replacing only the bands, and then after replacing the drums. Braking performance was indeed improved with new bands and drums.

★ ★ ★

We have a client that has an Otari 8-track machine. Recently, it developed a popping noise when the various channels were punched in and out. The noise was most noticeable when there was no audio on that track. The problem turned out to be the dip-type record relays. Replacements are readily available from Otari (415-341-9504) for \$8.70. However, the relay is an ARROWMAT, number RY2DC087, stocked by most electronics suppliers.

Otari recommends replacing all of the relays, because the process is time consuming, and if one relay has

failed, others will soon follow.

★ ★ ★

Kandy Clark at Broadcaster's General Store has been a mainstay for MCI parts, as well as service tips, over the years. Next time you crawl under your JH-110B to set the offset nulls, look at the Analog Torque Board for two 1 Megohm resistors. One resistor is attached from pin 2 to pin 6 on IC-4 and the second is connected to the same pins on IC-10. Some of the newer machines have these resistors already in place. If yours doesn't, you'll want to add them — they stabilize the nulling of the offsets. While under the deck, you might also consider replacing both of these ICs with TL081 opamps, to further improve stability.

★ ★ ★

We have had several tips about maintaining Continental FM transmitter gating cards, where most of the problems are traced to dried electrolytics. Some of the more bizarre symptoms of bad gating cards are blown control supply and exciter fuses, as well as tripping of the HV breaker. A good diagnostic tool to have is a capacitance meter. It's useful to check the three capacitor pairs on each board. On one board, we measured a 10µF capacitor at 4µF. Before replacing the errant cap, we measured the replacement. It read 7µF, even though 10µF was stamped on the side.

When replacing the capacitors, the most important consideration is the match of the value of the capacitors in each of the pairs. This is more important than the absolute value. The tolerance should be kept within a few percentage points. Continental has offered upgraded gating

cards for several years now. The newer cards have no capacitors in the timing circuits, so reliability is improved. For older transmitters, some minor rewiring is required. The net result is that either the new cards or the old cards can be used. The cards cannot be mixed, however, which means if you buy the new gating cards, you must buy three at a time. The new gating cards cost \$295.00 each. For more information, contact Continental Field Service at 214-388-5800.

★ ★ ★

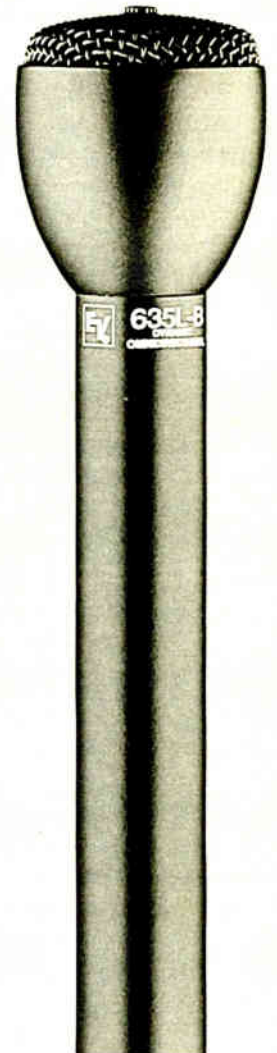
As engineering duties continue to tie our hands, getting free time for things like transmitter site inspections becomes more of a dream than a reality. With cold weather, the importance of maintaining pressure in your transmission line becomes more important. Phartronics has built a device that will help you monitor that line pressure. For under \$200, the Phartronics Pressure Sensor Interface will provide a precise, linear DC output that varies according to line pressure.

Installation is simple — the nitrogen feed to your transmission line is broken and a "T" is inserted so a sample of the gas can be fed into the PSI-V3. The unit will handle up to 14.5 psi, giving a zero to 4.5 volt dc output. Low or high pressure limit alarm switches give a go-no go indication. The PSI-V3 will actually display your line pressure, helping to catch problems before they start. Using the lower and upper limit alarms found on most dial-up remote control systems, a fool-proof line pressure monitoring system can be provided.

□ □ □

John Bisset is a principal with Multiphase, a contract engineering firm based in Washington, D.C. He can be reached at 703-323-7180. Fax submissions for the Workbench column to 703-764-0751, or through America On Line at wrwbench@aol.com. Printed submissions qualify for SBE Certification credit.

Bigger is Better



Now
Interview Length
The NEW Electro-Voice
635L

Actual size shown

1-800-622-0022

 **HARRIS**

© 1995 Harris Corp

Circle (210) On Reader Service Card

Magical Midnight Music

► continued from page 40

we know how to phrase the tune. You can't just play a note, you have to make it say something. You don't play for other musicians, you play for people. That's the whole secret of our band."

The orchestra didn't adopt "Auld Lang Syne" as its theme until the '30s, while doing the radio show sponsored by Robert Burns Panatella, a cigar company. Since Robby Burns, the poet, had written "Auld Lang Syne," the sponsor suggested it might be nice if Lombardo adopted the musical version of the poem as a sign-off for the program. The orchestra leader enjoyed

playing the song so much, he made it his theme song. For years, "Auld Lang Syne" has been a traditional favorite at New Year's gatherings all over the world.

Lombardo quit playing the violin — the musical instrument his father insisted he learn to play — in 1930, when his duties as front man for the band made it impossible for him to sit in with the musicians. By then the band was on the road 47 weeks a year — mostly one-night stands in towns, large and small, in the United States and Canada. In many communities, Lombardo's visit was an annual event, heralded weeks in advance by town fathers to gain much needed funds for favorite charities or local projects.

The orchestra leader was a speedboat racing enthusiast. He won the Gold Cup in 1946, and the President's Cup and Silver



1927 Band

confessed. "We're a clannish family. After all, entertaining is what we do for a living."

Once, Guy Lombardo was asked why he

continued to travel with the Royal Canadians when he was financially secure. "I plan to keep on playing until they put me underground," he said. "What else would I do? It's beautiful, beautiful, and I wouldn't change a minute of it. Listen, doctors and lawyers see people when they're in trouble, or sick and dying. We see them at happy times — anniversaries, weddings, birthdays, when they're on dates.

"Or on New Year's. Sure it's a gag, but when

people say 'When Guy Lombardo goes, New Year's Eve goes with him' — well, I just love it!"

Guy Lombardo died on Nov. 5, 1977 at the Methodist Hospital in Houston, Texas. A few weeks prior to his death, the 75-year old musical great had been hospitalized following open heart surgery. He had apparently recovered when he suffered a relapse, and was rushed to the

hospital, where he died.

At the time, the Royal Canadians, under the direction of Liebert and Victor Lombardo, were appearing in Bedford, N.H., 2,000 miles away. It was reported, at the exact moment Guy Lombardo died, his musicians were ending up their performance by playing "Auld Lang Syne."

Digital Delivery

► continued from page 45

One-On-One Sports affiliates share the VirteX receiver in common with Infinity affiliates.

"They will be on the same satellite using the same receiver, so both affiliates will be able to switch between programs," said Caryn Beemer with VirteX.

MUSICAM was developed by CCS Audio Products, a company purchased by VirteX in February and now known as MUSICAM USA.

"The timing was perfect on this," said Heckerman. "We wanted to go with a standard that was the new world standard all the way around, and I think that's what this system is."

One-On-One Sports acquired the C-band license for the new teleport in October, after passing rigorous and complex studies that indicate its new teleport system will not cause microwave interference terrestrially, and began construction in December.

"We're shooting for sometime after the new year to have it up and running," said Heckerman.

The teleport will be one of the few of its kind and is expected to take a huge hunk out of the engineering budget for One-On-One Sports, tallying as much as a half million dollars for initial construction. Added into the cost is full system redundancy and a backup plan that exceeds most industry standards, according to Heckerman.

Two transmitters, two modulator exciters and a 25 kW UPS system with a backup 50 kW generator are just part of the redundancy plan, he said.

When complete, the network's affiliates will be able to access One-On-One Sports programming from the same satellite as before, and get a better quality signal in the process, according to Heckerman.

□ □ □

Dee McVicker is a freelance writer and regular contributor to Radio World. She can be reached at 602-545-7363, or via e-mail at roots@primenet.com



Lombardo Brothers and Kenny Gardner (standing)

Cup in 1952. From 1946 until his retirement from the sport in the '50s, he was the reigning national champion.

A millionaire, his investments, including real estate and oil properties, were handled by four family-owned corporations. He lived with Lilliebell in a waterfront home in Freeport, Long Island, when not on the road with his band. "We rarely entertain," he once

I DARE YOU!

I dare you to try my FM FlexiMod on your station. I introduced the FM FlexiMod to broadcasters in April and the response has been fantastic! Over 97% of those who tried the FlexiMod added it to their processing chain. They discovered what high-tech composite processing can do for a station's sound.

I will be glad to send you a brochure and white paper that tries to use words to describe what improvements are possible over conventional composite processing, but a demo is the only sure-fire way to make a believer out of you. Join the 97% who sound cleaner and louder than they did with their old processor.

The FM FlexiMod is the best investment you can make in the sound of your station. It is not a re-hash of old processing ideas. Its distortion-cancelling, signal-enhancing circuitry is unique and unavailable in any other processor.



CIRCLE THE BINGO NUMBER
OR CALL ME TODAY FOR MORE INFORMATION.

You have nothing to lose but flat sound, grunge, and distortion.

BECOME A BELIEVER!

Sincerely,
Jim Somich
Inventor of the FM FlexiMod
(216) 546-0967

Manufactured by MicroCon Systems Ltd. and sold by leading equipment dealers.



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 (81) On Reader Service Card

Circle (98) On Reader Service Card
World Radio History

USER REPORT

Fluke's Meter Scopes Out Problems

by Randy Finch
Senior Engineer
KSL(AM)

SALT LAKE CITY When radio broadcasting equipment fails for even a few seconds, the interruption in service can annoy thousands of listeners and cost a radio station hundreds to thousands of dollars in lost advertising. Keeping a station on the air means working near radio transmitters that emit kilowatts of RF energy — energy that can wreak havoc with electronic test equipment.

As an engineer whose job it is to maintain radio transmission equipment at KSL(AM) Radio, a news station in Salt Lake City, I know the problem well. Working near one of the station's 50,000 W AM transmitters, test equipment is doused with an RF field strength of 10 V per meter — enough energy to generate several hundred volts of RF noise in extension cords used to power test equipment.

If you even stretch a 50-foot extension cord around the station, you can easily pick up 50 volts of RF noise. In fact, you cannot tie an AC-powered scope's ground to a circuit ground in the transmitter because the noise currents induced at the connection might bring the transmitter down.

Virtually immune to noise

Fortunately, KSL engineers now use a test tool that provides a visual view of problematic signals and is well-shielded against the effects of noise. The ScopeMeter test tool from Fluke Corporation combines a digital storage oscilloscope and a digital multimeter in a handheld unit. The portable, battery-powered instrument can be operated without an AC power cord and is therefore virtually immune to electrical noise.

Once I was called to solve a problem with a KSL transmitter located on the salt flats near the Great Salt Lake. A fault in a sensing circuit for the transmitter's three-phase power supply was causing the transmitter to shut down intermittently.

The problem, first occurring just once a month, was now occurring several times a day. The transmitter would turn off for 10 seconds and then turn itself on again. When that happens in the middle of a commercial, the station has to run the commercial again and that gets rather costly.

The fault could have been caused by a loss of audio or power or maybe the exci-

tor circuit was going down. To find the source of the fault, I knew I needed to observe signals in the transmitter circuits just before the transmitter failed. That meant capturing the signals with a storage oscilloscope which, before obtaining a ScopeMeter, was an impossible task because my benchtop storage scope required an ac power line.

With ScopeMeter, I found that I could not only observe signals near the working transmitter, but I could make floating measurements as well — measurements where the

scope's ground is not connected to a circuit ground. You can use a single probe to take measurements directly across components. This really cuts down on the noise you pick up because there are virtually no ground loops in your connections.

At the transmitter site, I set up the meter for single-shot mode. I wanted to check a signal at the input of an operational amplifier. The amplifier is part of the transmitter's protection circuitry; it senses the output voltage from the power supply and shuts down the transmitter when a power supply problem occurs. When all is well, the amplifier's output sits at 0 V; if the power supply's output voltage fluctuates, the amp's output

jumps to -15 V.

I left the meter to monitor the sensing circuit overnight. During the night, the transmitter failed and the meter captured and stored a signal from the sensing amplifier on one of the meter's channels and from the power supply voltage on the other.

Returning the next morning, I viewed the stored waveform. The voltage had jumped from 0 V to -15 V. But when I used the meter to view pre- and post-trigger events on stored waveforms, I saw something else: The power supply voltage was bouncing all over the place. It would jump to 0 V for three milliseconds, then back to -15 V for 10 milliseconds, then back to 0 V. And it was ringing like crazy.

The millisecond-wide duty cycles of the signal reminded me of switch bounce — the repeated voltage fluctuations that occur when the contacts of a mechanical switch bounce together and apart for a short time after the switch is closed. Intermittent failures are sometimes caused by temperature changes. Plus, there is a certain amount of vibration in the transmitter circuits due to the power supply cooling fans.

I moved the meter's probe to a test point

farther back in the protection circuitry. Not much later, the transmitter failed again and I had another stored waveform to analyze. After repeating this process several times, I traced the fault to a corroded connection in the sensing circuit. The vibration from the power supply fans was causing the connection to open. This

would cause the protection circuit to "think" that the transmitter had lost part of its power supply circuit, so it would shut down the power supply.

Though success in radio is most often measured by the size of the listening audience, saving seconds in lost air time and hours in troubleshooting time can help keep a radio station on the air by improving its bottom line.

For more information from Fluke, contact Hans Toorens in Washington state at 206-356-5379; or circle Reader Service 128.



Fluke's ScopeMeter combines a digital storage oscilloscope and a digital multimeter.

Quantum FM

Solid State

Solid Reliability

from



- Proven reliability
- Maintenance-free FET technology
- Self-contained modules with own power supply regulator
- Compact size reduces shipping costs, allows affordable air shipment
- Power levels between 300 Watts and 6 kW
- Modular design offers buy-only-what-you-need affordability and convenience



For the same price you pay for a tube transmitter, you can now have a superior solid state FM transmitter with high-power, advanced technology exciter and cableless combiner. The modular design of QEI's QUANTUM-Series FM transmitters offers the advantage of buying only the amount of power you need...and means that you can upgrade to higher power levels whenever you're ready.

QUANTUM from QEI—the people who have been designing and building solid state transmitters longer than anyone else in the industry.

You need to know more! Call Jeff Detweiler today toll free (800) 334-9154.

QEI Corporation
One Airport Drive • P.O. Box 805
Williamstown, NJ 08094

Tel (800) 334-9154
Fax (609) 629-1751

24-Hour Service Hotline
(609) 728-2020

USER REPORT

CRL Simplifies Digital Audio Tests

by **Dennis J. Martin**
Chief Engineer
KBIG(FM)

LOS ANGELES Traditional analog signal tracing techniques — like a bridging amplifier or high-impedance headphones — are useless in the digital domain. Although an oscilloscope can display a digital audio signal, it cannot diagnose specifics or even point you in the direction of potential problems.

Enter the DAA-50, a digital audio link analyzer/monitor from **Circuit Research Labs (CRL) Systems**. In a package that is slightly larger than a pager and

weighing just 5 1/2 ounces (with alkaline batteries), the DAA-50 is a pocket-sized, comprehensive digital analysis tool. This single device decodes audio data according to AES/EBU, IEC 958, S/PDIF and EIAJ CP-340 interface standards. The result is a display of two-channel status and interface information including error detection. Four sets of color-coded legends allow eight multifunction LEDs to display 29 signal parameters.

The input is 110 W balanced and accepts a level range from 200 mVp-p to 3 Vp-p (20 Vp-p maximum). Connection is through a 3.5 mm (one-eighth-inch)

TRS stereo phone jack — two supplied cables adapt it to XLR for AES/EBU applications or an RCA connector for S/PDIF tests.

Simple switching

The RCA cable unbalances the input, as expected, and contains a 1 mF non-polar capacitor in series with a 237 W resistor. The RC network, in parallel with the unit's 110 W input, provides the proper 75 W termination for consumer interfaces. That makes switching between professional and consumer equipment as simple as changing the input cable.

Three slide switches control operation of the DAA-50: Power On/Off, Channel/Interface Status and Error/Frequency. When the Channel/Interface Status switch is set to Channel, the unit automatically determines whether the serial data stream is professional or consumer while the Error/Frequency switch selects Channel 1 or 2 for display. Channel status information is typically the same for both channels,

Validity, Confidence, CRC Error, Parity Error, Bi-Phase Coding Error or No Lock; only one error is displayed at a time. The validity bit, which appears in time slot 28 of the subframe, is logic 0 if the audio sample word can be converted to an analog audio signal.

Confidence is a good measure of the relative quality of the signal — if the received data eye opening is less than half a bit period, the link does not meet digital audio interface standards and causes the flag to be generated. A parity error will occur if even parity is not decoded (an even number of ones and zeros in time slots 4 through 31 of the subframe).

In the Frequency position, separate LEDs display standard sampling rate frequencies of 48, 44.1 or 32 kHz ± 4 ; or 48, 44.1, 44.056, or 32 kHz ± 400 ppm. If the frequency is within the range of 25 to 55 kHz, but outside ± 4 percent of the three standard frequencies, the Out-of-Range LED will illuminate.

Valuable tool

A useful feature of the CRL DAA-50 is its analog output from an 8x over-sampling, 16-bit D/A converter (DAC) accessed via a 3.5mm TRS stereo phone

Harris Broadcast Division Technical Services Department

Ron Oler, CBRE
 PO Box 1487
 3712 National Road West
 Richmond, IN 47374 USA

Telephone (317) 962-8596
 Fax (317) 962-8961

Dave Burns
 Studio Products

RE: Electro-Voice 7100 Audio Power Amplifier

Dave,

I recently tested the new E/V 7100 Amplifier and must admit, it is a top notch amp with a middle notch price. The following evaluation may help us to sell this product to our customers.

Description: A high quality amp that delivers the same punch as a D150 but only uses as much rack space as a D75 and costs even less than the latter.

Max Output: 220 Watts channel @ <1%thd+n into 8 ohms, 1Khz sine wave. Unit does not become hot to the touch even when ran at the above spec for several minutes.

Overload Protection: Relay drops out the audio section. Was able to blow the AC main fuse several times on the bench while testing the overload protect.

Clipping indicators on front panel are very conservative. I noted that they would illuminate well before the output signal actually began clipping (10dB left to go.)

The overall construction is well thought-out and should prove easy to repair if a problem does occur.

Regards,
 Ron....




Electro-Voice 7100 Audio Power Amplifier

1-800-622-0022

 **HARRIS**

-Advertisement-

© 1996 Harris Corp.

Circle (40) On Reader Service Card

Switching between professional and consumer equipment is as simple as changing the input cable.

especially in stereophonic mode.

When the professional data format is recognized, seven LEDs individually indicate if the signal is an audio program; whether emphasis is CCITT J.17, 50/15 ms, 0 ms (none), or if emphasis information is not available; if the C9 bit is set; or if a cyclic redundancy check (CRC) error has been detected.

Audio and non-audio signals are interpreted from bit 1 of byte 0 of the 24-byte channel status signal. The C9 LED displays the status of bit 1 in byte 1, which identifies its mode (single-channel, two-channel, or stereophonic).

The CRC LED, which is updated every 192 samples, illuminates if the calculated byte does not match the channel status block byte or when a block boundary changes (when samples are removed during editing). Since the DAA-50 does not conceal or correct CRC errors, some early digital audio products that are not fully compliant with the AES/EBU standard may display occasional errors.

Helpful LEDs

If operating in the consumer channel status mode, five LEDs indicate whether the data is audio or non-audio, if it is copyrighted, pre-emphasized or is an original work. A special LED is labeled Ig CAT, which is an abbreviation for Ignorant CAtegory.

In certain cases, the generation status may not be known (signals from A/D converters for example). The Serial Copy Management System (SCMS) defined two category codes to cover such circumstances. If "general" or "A/D converter without copyright information" is detected by the DAA-50, the Ig CAT LED will light.

Setting the Channel/Interface Status switch to Interface allows you to then select Error or Frequency. In the Error mode, separate LEDs indicate No Error,

jack — a level control is provided. Primarily designed for headphones as low as 8 W, it is not intended to function as a lab-reference DAC. The DAC can still be a valuable tool in analyzing analog anomalies. The specifications state a bandwidth of 30 Hz to 20 kHz, +0, -3 dB; and THD+N of 0.070 percent at 1 kHz.

Using a CBS Records CD-1 Test Disc and a Sound Technology 3200B, we measured a response of -2.66 dB left, -2.37 dB right channel at 31 Hz; and -2.94 left, -3.06 dB right at 20 kHz, referenced to 1 kHz. THD+N was 0.0424 left, 0.0502 percent right at 1 kHz, which increases at low and high frequencies; maximum output was >1.6 VRMS. Separation exceeded -45 dB and phase was +0.8, -1.7 degrees across the band; and SNR measured >84 dB (in a 22 Hz to 22 kHz bandwidth, unweighted, average detection), and >88 dB A-weighted. (The DAA-50 was adjusted for an output level of 1.00 VRMS into 600 W resistive using a 0 dB CD reference signal.)

We did ascertain during testing that the analog output is never de-emphasized. So, in the case of 50/15 ms emphasis, expect a >6 dB rise in level at 10 kHz and above.

The device operates on two AA batteries. Alkalines are said to last more than three and one-half hours. Ni-Cd batteries and an AC adapter are supplied; the batteries are charged whether the unit is on or off. Power On and Batt Low LEDs are provided.

A surprising product from a company that has long specialized in audio processing, the DAA-50 Digital Audio Link Analyzer/Monitor from CRL Systems may be destined to become the workhorse that the Simpson 260 VOM was during the early days of radio.

For more information from CRL, contact Valerie Hummer in Arizona at 800-535-7648 or 602-438-0888; fax: 602-438-8227; e-mail: crl@crlsystems.com; or circle Reader Service 30.

GET FAT

modulation sciences

STEREO
maxx

AUTOMATIC WIDTH LIMITING

WIDTH DEPTH DIFFUSION

IMAGE WIDTH

OVER LEVEL

R CH BAL

LVL ADJ

BYPASS

GET LOUD

modulation sciences inc.

GAIN IN OUT PILOT TRIM

NORM OL POWER

GET LEGAL

modulation sciences
modminder
digital

PEAK MODULATION ONE MINUTE COUNT

PEAK WEIGHTING OVERMOD

AUDIO FAILURE

100 0

DN UP

THRESHOLD SETTING

GET FAT with StereoMaxx®

When everyone in town is processed to the max, what's left? The answer is StereoMaxx, a Spatial Image Enlarger that turns your listeners' Volkswagens into Cadillacs and their living rooms into concert halls. With StereoMaxx in your air chain, other stations will sound flat, dull and lifeless. Call us for a free demo tape!

GET LOUD with the CP-803

Add up to 6 dB more loudness with the CP-803 Composite Processor. The CP-803 works with your existing audio processing to give you the maximum modulation the law allows, with no ringing or overshoot. Installed at your transmitter site, the CP-803 will make your entire air chain sizzle.

GET LEGAL with FM ModMinder®

When you need accurate modulation measurement, you need ModMinder. With accuracy within 1 percent, FCC-approved ModMinder ignores brief audio peaks and often lets you increase modulation – legally. Internal calibration guaranteed for two years means you'll know where 100 percent is, right out of the box!

Used together or separately, MSI products keep you at the competitive edge. Learn how to excel in your market. Circle our Reader Service number, call your authorized MSI dealer, or contact the FAT, LOUD & LEGAL authority...

modulation sciences, inc.

12A World's Fair Drive • Somerset, NJ 08873 USA
Voice (908) 302-3090 • Fax (908) 302-0206
Toll Free in USA (800) 826-2603

PRODUCT EVALUATION

Measuring RFR with Model 8718 from Narda

by John Bisset
Principal
Multiphase Consulting

SPRINGFIELD, Va. Radio frequency radiation (RFR) surveys are performed for a variety of reasons. The result of such a survey is to obtain a true understanding of the RF environment. Using calculations to determine RFR compliance only provides an estimate of the field strengths. By actually measuring the RF levels, the true levels are known and the most cost-effective strategy to affect compliance can be made.

Since OSHA has — and has demonstrated — the authority to use the ANSI/IEEE RFR standard for enforcement actions, preparing an RFR survey and developing a safety plan is an important consideration for broadcasters.

In considering RFR survey instruments, the means of measurement detection is important. Narda instruments operate using either patented, compensated diode or thermocouple detectors. Both of these sensors provide "square law" detection, which provides an RMS average of the signals being measured. Instruments using simple diode detection, with no compensation, will indicate field strength readings that are higher than the actual strengths in multisite applications. Modulated signals compound the problem by increasing the error.

Less expensive upgrade

One of the more recent entries in making RFR measurements is the Narda Model 8718 Survey Meter. This microprocessor-based meter is compatible with all of Narda's existing 8700 series probes, making the upgrade to a more

powerful survey meter less expensive. The 8718 is light weight and can be strapped to the hand or arm.

Unlike previous Narda models, which used an analog meter for display and required adjustment of rotary-type switches and adjustment controls, measurements using the 8718 are displayed on a back-lit four-line LCD and controlled via a 22-key membrane keyboard. The one-button-touch for auto-zeroing the instrument is particularly handy — especially if you are on a tower.

While you are on that tower, you do not want to lose the battery. Although the 8718 is small and light weight, it provides about 40 hours of use for each battery charge.

The on-board microprocessor permits logging and storing of any data point with a time/date and reference number stamp and a continuous logging feature can be set to log at a user-defined rate. The Model 8718 also features an RS-232 input/output as well as a chart recorder output.

One of the concerns in mapping or surveying an unknown area is the potential for user and instrument overexposure. The 8718 has a built-in audible probe overload alarm as well as an adjustable multilevel audio signal that is proportional to field strength. Should the instrument be located in an excessive field, the alarm protects both the probe and the operator.

Perhaps the best feature of the 8700 system is the broad frequency response of both electric and magnetic field probes. A unique feature of Narda's 8700 system is the ability to interchange any model, any serial number probe with any model,

any serial number meter and still maintain total calibration.

Patented probes

Although Narda sells both electric and magnetic "flat" response probes, its patented shaped probes are ideal for facilities with more than one type of transmitter.

A shaped probe takes into account the frequency of the emission(s) being measured and "weights" it according to the applicable emission standard

for that frequency or group of frequencies. The 8718 then displays the measured emissions as a percentage of the applicable exposure standard.

An FM station, for example, may be leasing tower space to two-way, paging and cellular customers. A "flat" response probe cannot easily show if a standard has been exceeded because it cannot ascertain whether the majority of the energy is in the range where 100 mW/cm² is the limit or where 1

mW/cm² is the limit. Narda's shaped probes "shape" the response to correlate with the exposure standard with respect to frequency.

Although the 8718 is the top of the line from Narda, lower cost models, along with a complete line of personal exposure monitors are available.

For more information from Loral Microwave-Narda, contact the company in New York at 516-231-1700; or circle Reader Service 89.

USER REPORT

MSI Minds Modulation

by Herb Squire
Director of Engineering
Interstate Broadcasting

NEW YORK WQXR-FM is in a unique position in the New York City radio market. As a classical station in an aggressive, highly competitive market known for its heavy processing and loudness wars, we need to maintain a strong presence on the dial.

At the same time, a wide-ranging audience of astute listeners demands that our broadcasts retain the dynamics and high quality of the music. For that reason, we use processing sparingly.

Several years ago, when Eric Small of Modulation Sciences (MSI) introduced a new concept in modulation monitoring that he said would give stations an edge without violating FCC rules, I was interested.

Astounding results

WQXR-FM became one of the first stations to try out MSI's FM ModMinder. Eric and I took it up to the Empire State Building and I was astounded at what ModMinder showed me.

At the time, we had one subcarrier and our conventional monitor showed us right at the edge of the 105 percent modulation we were allowed. When we switched to ModMinder, we went down to about 80 percent. Needless to say, I was sold.

ModMinder

brought about a shift in the way stations measure modulation. Previously, modulation monitors measured peaks of two cycles of 10 kHz or less. The FCC Rules, however, allow up to 10 cycles of 10 kHz. The more rapid response of conventional monitors read brief peaks as over-modulation.

In contrast, ModMinder ignores brief peaks and gives a more accurate reading of a station's modulation. The ModMinder allowed us to increase modulation without the kind of processing that would destroy the dynamics of the music.

ModMinder confirmed what I had felt all along: the dynamics, especially short, high-frequency transients in the music, were showing up as overshoots on other modulation monitors. Interestingly, when we put ModMinder on the air and were able to increase our modulation, some of our listeners thought we had increased our power.

ModMinder was easy to set up and use and

was reliable from the start. I have it set up to read peaks by remote control through a modem. Now I can be anywhere and check on our modulation. The ModMinder also has an excellent modulation failure alarm that is not just a silence sensor, but verifies the loss of dynamic range as well. This means that telco tones or hum, noise or hash from a failed STL will not give an erroneous signal to the alarm circuit.

Little impact on modulation

Subcarriers also have less of an impact on modulation when measured with ModMinder. This is because subcarriers interleave with peaks of program material. What this means in practical terms is that, with ModMinder, subcarriers have little or no impact on total modulation.

The ModMinder software, while displaying peak information, also accumulates this data. It shows modulation density and is a visual aid for tailoring your processing. For classical music, that is very important because it allows me to quickly change the processing for the sound we want. It lets me set it and forget it. ModMinder also lets you look at another station's audio and compare it with your own. Ah ... no wonder they sound that way.

It would be nice to see MSI add options to ModMinder that would allow us to selectively look at the pilot and subcarrier insertion levels, although the overall composite signal is

ModMinder brought about a shift in the way stations measure modulation.

the most important reading.

The extra modulation ModMinder allowed was important to us because WQXR-FM is surrounded by two high-energy stations — WPLJ(FM) and WQHT(FM) — both of which play heavily processed music and have signals that are dense and loud.

Brutal, audio-destroying processing is not an option to us, especially with a listening audience of professional musicians, composers and performers who call the Big Apple their home and WQXR-FM their radio station.

Every dB we can use to maximize our dial presence is a distinct advantage. FM ModMinder allowed us to be louder and preserve the dynamics of classical music at the same time.

For more information from Modulation Sciences, contact the company in New Jersey at 800-826-2603; fax: 908-302-0206; or circle Reader Service 205.



**53rd Annual
National
Religious
Broadcasters
Convention &
Exposition
February 3-6, 1996
Indianapolis, IN**

- ❖ 200 Exhibiting Companies
- ❖ 40 Top Notch Educational Sessions
- ❖ TV Producers Showcase
- ❖ Prominent Speakers
- ❖ Best in Gospel Music & Entertainment

Call Today To Register:
(703) 330-7000 Fax: (703) 330-7100
7839 Ashton Avenue
Manassas, VA 22110
E-Mail: dkeith@nrb.com

USER REPORT

RFC-1/B from Sine Talks Back

by **Charlie Osgood**
**Vice President/
 Chief Engineer**
North Country Radio Inc.

CONWAY, N.H. North Country Radio's WMWV(FM) installed a **Sine Systems RFC-1/B** dial-up remote control unit three and a half years ago. Our classic hard-wired remote control was in great shape, but we had been hit by telephone rate hikes that amounted to almost \$100 per month. The move to the RFC-1/B allowed the station to escape the burden of telephone company fees, and move to a more modern set of capabilities.

Since then we have learned to love the unit. It has been totally reliable and we have not had one instance of lost air time due to remote control unit failure. Our experiences may be of interest to someone contemplating the virtues of installing a Sine Systems dial-up transmitter control system.

Split personality

The RFC-1/B features a split personality. On one hand, it can be simply programmed by a non-technical user so that it is up-and-running in a relatively short period of time. The connections to the relay panel are straight forward and installation is easy. The documentation is especially thorough, including both a well-written spiral-bound "Software Instruction Book" and a similar "Hardware Instruction Book."

On the other hand, once the unit is installed and operating, with a little

effort the RFC-1/B can be programmed to become a highly sophisticated remote control unit that enables a great deal — I am tempted to say limitless — amount of customization. Alarms may be restricted by time of day; phone numbers may be creatively assigned; and automatic Action Sequences may be constructed for manual or automatic triggering. Up to eight relay panels may be connected to the RFC-1/B to provide a total of 64 channels of monitoring and control.

The effect of the original voice is that of having a friend with a distinctly foreign accent.

When North Country Radio added a second FM station, WBNC(FM), this past October, we purchased an additional relay panel to expand to 24 channels of remote control capability. At the one mountaintop site we now have the main RFC-1/B control unit, three RP-8 relay panels and an optional RS-232 interface that feeds a local printer. Altogether, the one system controls two separate FM stations, including two main transmitters and one backup transmitter: a

remote pickup repeater, with metering of incoming signal level and control of the RPU transmitter; EBS gear that is located at the site; and metering of ancillary parameters such as STL signal strength, reflected power from FM antennas and transfer switch status.

The RFC-1/B features an easy learning curve for the studio operator. He or she calls the transmitter site by telephone and, after a user-determined number of rings, the remote control unit answers with the word "enter." Using the telephone keypad, the operator then punches in a security code and is able to control transmitter functions and take telemetry readings.

Reading the telemetry

To read the telemetry for a channel, the number of the channel (for example 0-3) is entered on the keypad. The remote control unit then announces the reading for the channel together with an appropriate unit such as volts, amps or watts.

WMWV's unit has been around long enough so that it features the original voice — the remote control unit actually constructs words out of fragments of speech. The resulting speech has a halting, mechanical sound that has led WMWV staffers to christen the unit "HAL" (after the computer in the movie 2001: A Space Odyssey). The effect of the original voice is that of having a friend with a distinctly foreign accent. When you first meet him, you have to listen carefully to

continued on page 53 ►

LISTEN UP



**FOSTEX
 6301B
 POWERED SPEAKER**

- Compact Size
- Powerful Amplifiers
- 1/4" Input
- Rugged Metal Enclosure
- Internal Power Supply

\$159.95

Mfr. List \$200.00

Save 20%

Phone: 800 . 426 . 8434

Fax: 800 . 231 . 7055

BSW
 BROADCAST SUPPLY WORLDWIDE
 7012 27th Street West Tacoma, WA 98466

*Limited time offer

USER REPORT

Dorrough Test Set Smooths Edges

by **Al Parker**
SAG Productions

HICKSVILLE, N.Y. In the world of audio and video production, I am, to be sure, a "small-fry." However, even little guys need to produce big sound. The customer's level of expectation is just as high for those creating spots for local mom and pop businesses as it would be for major studios producing tracks for internationally-known corporate giants. Thanks to thousands of hours of exposure to mega-buck, multitrack sound in movies, television and radio, even casual listeners are capable of detecting rough edges.

Dorrough Electronics is in the business of ironing-out the rough edges. I have long been impressed with its loudness monitors. The monitors are almost magical in their ability to show me the fullness of sound. They provide not only a quantitative measure of sound levels, but also qualitative information. Recently I have added another Dorrough product to my arsenal — the Stereo Test Set 1200. With this one user-friendly unit, I can instantly monitor levels, balance, crosstalk and even signal-to-noise ratios.

After unpacking the unit, the first thing I noticed was that it is aesthetically

beautiful and rack-mountable. The aesthetics are not supposed to be important, but we all know that good design is first revealed through visual appeal. Like all Dorrough products, the Test Set 1200 is very easy on the eye.

Easy to adjust and set

The white and yellow markings against the dark grey cabinet are very readable. The large, light-grey function knobs have distinctive black indicator arrows against a yellow field. All adjustments and settings are easy to carry out — even in subdued lighting.

The rear panel of the Test Set shouts experience. Dorrough provides the most desired methods of interface. Left and right channels can be fed with XLR connectors or through a parallel barrier strip. A set of M-XLR connections provides a convenient method to loop-through. The back panel also sports a line level, one-fourth-inch stereo output for connection to a scope, etc.

Another nice feature is a front-mounted, amplified stereo headphone jack. I found this to be a great convenience for setting up preliminary levels.

Once all connections are made, it is time to plug in the unit. This is always the best part of installing any

Dorrough product. Dorrough has apparently spared no expense in time and effort to create the most readable, attractive meter faces in the industry.

Hooked up, plugged-in and glowing, the 1200 was ready. The front panel controls consist of a 30-step range attenuator, high/low range selector and a function control. The function control selects stereo monitoring or a sum/difference function.

Of course, the dominant features on the front panel are the two large relative loudness-to-peak modulation meters. The meters indicate ascending signal levels from left to right via an array of LEDs. The LEDs are laid out in an arc, analogous to the familiar mechanical movement. I find this configuration more compatible with my field of vision than linear designs. The curvature provides more information in less horizontal space. Ergonomics are always front-and-center, suggesting that the designer is also a user.

There are two backlit scales on the 1200: a dB scale with one dB increments from -36 to +3 dB and a separate scale for modulation from zero percent to 125 percent. For those who have not used the Dorrough meters for average signals, read the

continued on page 55 ►

USER REPORT

FMSA-1 Reliable, Accurate at Orban

by Robert Orban
Chief Engineer
Orban, A Harman
International Company

SAN LEANDRO, Calif. Last year, Orban began designing a new DSP-based stereo encoder, the 8208. Our design goals included greater than 70 dB separation from 30 to 15,000 Hz and de-emphasized left- and right-channel noise better than 90 dB below 100 percent modulation. Although we had several of Belar's older FMS-2 stereo monitors in production test, we knew that these units could not reliably measure specs this good.

Although the FMS-2 has a separation

floor of approximately 75 dB, this is highly dependent on the unit's alignment, which relies on a properly adjusted stereo generator. What we needed was a unit with even better specs that had stable alignment and did not require a known good stereo generator as a reference.

When we heard that Belar had developed a new stereo monitor using DSP demodulation, we were very excited. Finally, we could obtain a stereo demodulator that was sufficiently accurate to truly measure what our new stereo encoder design was doing.

The DSP demodulator meant that separation was determined by software-based mathematical calculations and would

therefore not drift.

The FMSA-1 is part of Belar's Wizard system of microprocessor-controlled, DSP-based FM monitors. The FMSA-1 can be driven by the Belar FMMA-1 modulation monitor or directly from a stereo encoder. It is a 1 3/4-inch-high unit with a simple user interface consisting of three large LEDs: a multimeter and left and right channel modulation. The user interacts with the system through two sets of up-down keys — one scrolls through the unit's menus and the other adjusts system parameters such as the amount of time the unit holds a peak after detecting it.

The system will measure total modulation, L+R modulation, L-R modulation,

pilot injection and pilot AM modulation, all in percentages. The system measures left-channel modulation, right-channel modulation, stereo separation, L+R modulation, L-R modulation, main-to-sub and sub-to-main crosstalk, total modulation, pilot injection and 38 kHz subcarrier level, all in dB. Any measurement in dB can be flat or have de-emphasis applied to it.

The unit has a single composite input and several outputs. The main audio outputs are XLR balanced +10 dBu. Internal jumpers select flat, 75-microsecond or 50-microsecond de-emphasis. Test outputs are unbalanced BNCs, once again with jumper-selectable de-emphasis. Scope outputs automatically gain range in two ranges and have de-emphasis that follows the de-emphasis you have chosen for the measurement you are presently making. An AES/EBU digital output with

continued on page 54 ►

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.



Econco
REBUILT POWER TUBES



*Approximately One Half
the Cost of New*

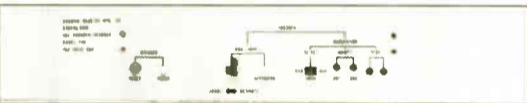
3,000 Hour Unconditional Guarantee

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. 76

EBS EQUIPMENT



Model CEB Encoder-Decoder	\$540
Model CE Encoder	\$375
Model CE with Stereo Option	\$405
Model CD Decoder Only	
(REQUIRED FOR LPTV)	\$320
Receiver can be supplied to drive Decoder.	\$100

- Encoder FCC Type Accepted •
- Decoder FCC Certified •
- Exceeds FCC Specifications •

All interconnections to the EBS equipment are made through a barrier terminal block. No special connectors necessary. In stock—available for immediate delivery.

GORMAN REDLICH MFG. CO.
257 W. Union St.
Athens, Ohio 45701

Phone 614-593-3150 • FAX 614-592-3898

READER SERVICE NO. 206

**The CircuitWerkes TeleRadio
Remote Controlled Listen Line**



You can find out what's on the air in all of your markets without ever leaving your chair!

With the TeleRadio and a phone, you are ready to check up on your station *and* all of your competitors in real-time. You'll never have to get another station air-check plus you can punch around the dial as if you were right there. When the TeleRadio answers, its internal radio begins playing down the line to you. You control the tuner with the buttons on your phone. The TeleRadio is the next best thing to being there yourself.

The TeleRadio features include:
Ten random memory presets.
Remote scanning, tuning, band change & memory set.
Remote controlled external audio jack lets TeleRadio double as a standard coupler for IFB, etc.
List price is just \$689.

CircuitWerkes
6212 SW 8th Place
Gainesville, Florida 32607
(904) 331-5999 / fax 331-6999

READER SERVICE NO. 208

**REMEMBER THE CORTANFOLD-
ED UNIPOLE ANTENNA?
WE STILL MAKE IT WITH THE
SAME HIGH QUALITY MATERIALS
AND WORKMANSHIP.
IT FEATURES...**

- **BROAD BANDWIDTH** for better sound.
- **GROUNDING ANTENNA** for lightning and static electricity.
- **ELIMINATES ISOCOUPERS** in VHF and UHF antenna lines.
- **BEST ANTENNA FOR DIRECTIONAL ARRAYS.**

Also
DETUNING SYSTEMS FOR ANYTHING THAT DISTORTS YOUR AM COVERAGE PATTERN: TOWERS, POWER LINES, TANKS OR ANY METAL STRUCTURE.

FOR INFORMATION CALL, FAX OR WRITE:

nott ltd.
4001 La Plata Hwy
Farmington, NM 87401
Phone 505-327-5646 Fax 505-325-1142

READER SERVICE NO. 68

**Affordable Custom
Broadcast Furniture**



Delivered and installed by

**STUDIO
TECHNOLOGY**

TEL: 800-676-0216
FAX: 610-296-3402

2 Pennsylvania Avenue, Malvern, PA 19355

READER SERVICE NO. 47

Backtalk from Sine Systems RFC-1/B

► continued from page 51

understand his words. However, once you know him, his speech seems perfectly clear.

The same goes for the original voice of the RFC-1/B. You simply have to get used to it. However, the effect is off-putting for newcomers and especially nonbroadcast types who may be monitoring a station at off hours. In currently produced units, the voice of the RFC-1/B has been improved using digital technology to store actual words.

One of the most useful characteristics of the RFC-1/B is its ability to monitor up to eight telemetry channels and initiate an alarm call if predetermined limits are exceeded. In our configuration, we have the upper and lower power

“dump” of the unit’s programming — a convenience when working with advanced programming options.

Each channel is able to provide readings that are directly proportional to the input sample (linear mode). The channels may also be set to provide readings that are logarithmically proportional to the input voltage (for direct power measurement, for example) or may calculate indirect power utilizing a user-provided efficiency factor.

What are the downsides of the RFC-1/B? Now that touch-tone service has become almost universal, it would be useful if the RFC-1/B could dial out

without the delay of a pulse-generating chip. In addition, the lack of a digital display on the control unit means that telemetry calibration must be done by making an adjustment, listening to the new reading and repeating as necessary.

Better recognition

It would also be very helpful if the unit could recognize a telephone company busy signal. At present, the RFC-1/B simply calls out and waits for a DTMF tone response from a given phone number. It cannot distinguish between the line continuing to ring without an answer and the line having a busy tone on it.

Altogether, I have found the Sine Systems RFC-1/B to be a cost-effective, reliable unit that has provided an enormous amount of flexibility in a compact package. The initial effort invested in learning to program the advanced features of the unit has been more than offset by the power of the RFC-1/B’s features and the ability to manipulate almost any aspect of the unit’s operation — from the telemetry settling time to incorrect security code lockout time. For someone contemplating a dial-up remote control unit who feels that there may be growth in the future, the RFC-1/B may be an ideal solution.

For more information from Sine Systems, contact John Pate in Tennessee at 615-228-3500; or circle Reader Service 197.

In currently produced units, the voice of the RFC-1/B has been improved using digital technology to store actual words.

er limits of each FM transmitter on the alarm, together with a reflected power alarm, an EBS alert alarm and others. By setting the remote control unit to call if the output power of the transmitter drifts lower than 92 percent or greater than 103 percent, we can be sure of never exceeding FCC limits of 90 to 105 percent. The RFC-1/B is able to calculate power by the indirect method using a user-programmed efficiency factor or can work with direct power measurement.

Another absolutely delightful feature is the unit’s ability to execute complex Action Sequences that may be triggered by a single command. For example, WMWV has an Action Sequence that turns off the main transmitter plate voltage, operates a motorized transfer switch and then turns on the plate voltage of the backup transmitter.

Crisis situations

In crisis situations, the operator just has to enter one command. The likelihood of off-air time due to operator error is reduced and the transition from main to backup transmitter is greatly simplified. In addition, the ability to execute action sequences can be of great help to stations striving to meet EBS/EAS requirements during unattended operation.

The RS-232 option allows the RFC-1/B to feed data from the remote control unit to a local printer or even to a remote printer. We have the port feeding a printer at the site that prints a complete set of readings for all channels at noon each day and records the status of all channels immediately prior to calling out with an alarm condition.

Having hard copy of all of the alarms that the unit has produced has been invaluable in tracing intermittent problems and also in interpreting sometimes less-than-precise trouble reports from studio operators. The RS-232 option also makes it possible to print a complete

April 14-18, 1996

Exhibits: April 15-18, 1996

Las Vegas, Nevada USA

A REVOLUTIONARY EXHIBITION

As the communications industries continue to converge, it becomes even more important for you to keep up with the latest technologies and trends. NAB '96 will help you do just that.

See, compare and discover revolutionary equipment, products and services for broadcasting, audio/video production, post-production, telecommunications and multimedia from more than 1000 exhibitors!

KEEP UP WITH THE EVOLUTION

In addition to the Exhibition, NAB '96 offers over 250 educational seminars and workshops in 10 concurrent conferences. From management, legal, programming and sales/marketing issues, to more technical issues relating to broadcast engineering, teleproduction, telecommunications, and multimedia — the NAB '96 conferences will provide you with real-world solutions for all your business needs.

YES! Send me information on NAB '96

FAX THIS COMPLETED FORM TO: +1 202/429-5343

Attending Exhibiting

Name _____ Title _____ AM FM

Company _____ Call Letters _____

Address _____

City _____ State _____ Zip _____

Country _____

Phone _____

Fax _____

E-Mail Address _____ E-Mail Service _____

RW You can also receive information from:
Fax-On-Demand — dial 301/216-1847 from the touch-tone handset of your fax machine and follow the voice instructions.
World Wide Web — <http://www.nab.org>

For more information on attending, call 800/342-2460 or 202/775-4970
 To learn about exhibiting at NAB '96, call the NAB exhibit sales team at 800/NAB-EXPO or 202/775-4988

TECHNOLOGY UPDATES

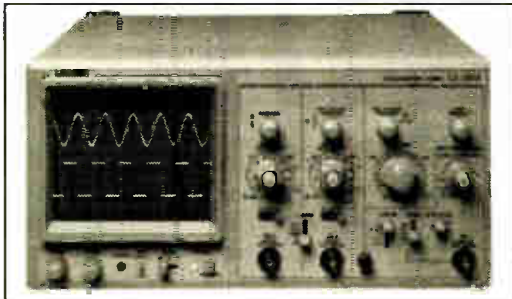
LEADER

LS 1020 Oscilloscope Meets General Purpose Bench And Field Needs

HAUPPAUGE, N.Y. The Model LS 1020 from Leader Instruments is a 20 MHz, dual-trace oscilloscope designed to meet general-purpose bench and field needs. The LS 1020 features a maximum sensitivity in both channels of 0.5 mV/div and a maximum calibrated sweep speed of 50 ns/div.

Vertical mode selection offers Ch1, Ch2, Chop, Alt and Add (subtract with Ch2 inverted) while H time

base selections range from 0.2 ms/div to 0.1 μ s/div in 20 steps with continuous sweep speed control. An X 10 magnifier shortens the time base by a factor of 10 to yield a maximum



observable speed of 10 ns/div.

Trigger coupling includes AC, RF

reject, DC and TVH and V settings while the trigger source selector sets source triggering to Ch1, Ch2, Alt, power Line and External. Auto triggering is standard with continuous control of trigger level and variable Holdoff to view complex pulse trains.

XY operation is standard with 1 MHz X-axis bandwidth and less than three degrees phase difference between X and Y at 100 kHz. Also included are Ch1 output and Z-axis modulation.

For more information from Leader, contact the company in New York at 800-645-5104; or circle Reader Service 142.

HALLIKAINEN & FRIENDS

DCR200 Uses Web-like Language

SAN LUIS OBISPO, Calif. The DRC200 from Hallikainen & Friends uses a sort of hypertext markup language (similar to what is used on the World Wide Web) to allow the user to design an infinite variety of user screens and log formats for transmitter control.

The DRC200 updates screens with new site data as it arrives (there can be up to 254 sites in a system). A significant change in the status of a site is transmitted to all sites in the system.

While the web uses text files with the extension .html, the DRC200 uses .scr

files. Using tag definitions such as these, a user screen (or log print) can include analog and status information from multiple sites.

Also included in the .scr file are Key Definitions. These tell the system what to do when an operator hits a particular key on the system keyboard. Keys may bring up other screen files (similar to following an html link) or send a command to any site in the system.

Similar Mouse Definitions allow complete system operation with a system mouse. Clicking on one area of the screen may turn on a transmitter, another may bring up a help screen and another may bring up detailed parameters on a particular transmitter.

For more information from Hallikainen & Friends, contact the company in

California at 805-541-0200; Website: <http://slonet.org/~hhallika>; or circle Reader Service 77.

TEKTRONIX

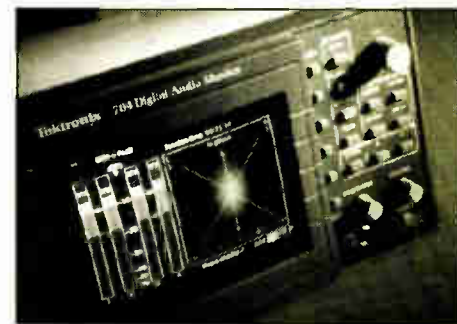
Digital Audio Monitor Uses Interpolation To Calculate Audio Levels

BEAVERTON, Ore. The Tektronix 764 Monitor is the only digital audio monitor to employ interpolation to calculate audio levels. Unique and highly intuitive session, channel status and phase display screens, combined with a built-in CRT and VGA port, give the 764 Monitor a comprehensive display capability.

The 764 Monitor operates as an

audio phase and level meter and as a digital data monitor, making it ideal for both conventional and advanced quality assessment tasks. For production staff in broadcast, post production, recording, sweetening and editing, mastering and duplication facilities, the 764 Monitor provides a full, on-line monitoring solution. It also serves as a setup and calibration tool for technicians.

A powerful and unique feature of the 764 Monitor is its ability to compile statistics associated with an audio passage. Called the Session Screen, this powerful display shows, in a single screen, key data including session time, highest true peak, highest reading, number of clips and mutes, invalid samples, parity errors, code violations, active bits, DC offset and the sample



rate the 764 Monitor is measuring. The Session Screen logs and flags these characteristics automatically, performing unattended QC.

For more information from Tektronix, contact Heather Wyse in Oregon at 503-627-4697; or circle Reader Service 96.

FMSA-1 Shines at Orban

► continued from page 54

48 kHz sample rate and a pilot output are also included.

Belar designed the FMSA-1 to connect to the FMMA-1, permitting combined remote operation with the DOS-based Wizard 2.0 software. Presently, Belar does not offer remote software for the FMSA-1 when it is used as a stand-alone monitor. Because of this, we did not evaluate Belar's software with the FMSA-1, although we have successfully used earlier versions of it with the FMMA-1.

Invaluable tool

The FMSA-1 proved invaluable to us as we developed and tested our 8208 stereo encoder. Belar specifies the FMSA-1's separation floor at 80 dB, 10 to 15,000 Hz. Its noise floor is specified at -90 dB below 100 percent modulation (de-emphasized) and main-to-sub and sub-to-main crosstalk at -80 dB.

Most people have little notion of how hard it is to achieve 80 dB stereo separation in a system. For example, the signal path must be flat and approximately ± 0.002 dB from well below 5 Hz to 53 kHz to pass such a signal. This requires extraordinary care in the design of every aspect of the circuit.

We were able to achieve our goal of greater than 70 dB separation as measured on the FMSA-1 from 20 to 15,000 Hz. Many mid-range frequencies actually measured greater than 80 dB. We have seen the FMSA-1 demonstrated at trade shows meeting its 80 dB

specification with a special laboratory-tweaked Belar stereo encoder driving it, so we have reasonable confidence that the unit meets its 80 dB spec.

Only if the FMSA-1's front-end amplifier or analog-to-digital converter had a frequency response error that was equal and opposite to that of the Belar stereo encoder would this demo fail to prove that Belar's spec was met, and we consider this unlikely.

We also measured separation by connecting the two inputs of our Hewlett-Packard 3562A Dynamic Signal Analyzer to the left and right test outputs of the Belar and making a frequency response measurement to get a swept separation curve. We used the swept sine mode of the H-P, using its tracking generator as a signal source for the stereo encoder. This technique resulted in slightly better separation measurements that we obtained directly from the Belar's front-panel readouts because the H-P applies narrow-band tracking filters to its inputs, rejecting noise that would otherwise contaminate the reading. When you are trying to read separation in the 70 to 80 dB range, this noise can compromise the separation measurement unless it is filtered out.

At first we had problems meeting our 90 dB signal-to-noise specification because of a slight ground loop hum in the measurement setup — we were reading approximately -87 dB. However, by inserting an Orban CIT-25 composite isolation transformer in the composite signal

path between the Orban 8208's output and the FMSA-1's input, we were able to break the ground loop and read 91 dB de-emphasized signal-to-noise ratio.

We tried measuring the harmonic distortion of the 8208 connected to the FMSA-1. From the main output, de-emphasized, using an Audio Precision System 1, we measured approximately 0.01 percent THD from 20 to 2000 Hz. Above 2 kHz the measured distortion started to rise because the desired signal declined along the de-emphasis curve while the noise floor stayed constant.

The distortion we were measuring was mostly noise, so the measurement increased with frequency to about 0.05 percent at 15 kHz. Repeating the measurement without de-emphasis and using the test output, we read about 0.017 percent from 20 Hz to 4 kHz. This declined to about 0.013 percent above 5 kHz and consisted of noise.

Moral of the exercise

The moral of this exercise is that it is very difficult to measure THD this low in an FM stereo system. The best way to do it is to put a spectrum analyzer on the FMSA-1's test outputs and calculate the root-sum-square of the observed harmonics. This way, you separate the true harmonic distortion from the noise floor.

In trying to measure sub-to-main and main-to-sub crosstalk, we also observed that we were measuring mostly noise because these are wide-band measurements in the FMSA-1. Once again, a spectrum analyzer can distinguish true crosstalk components from the noise floor.

Gripes? We have very few. We would

have liked to have been able to drive the FMSA-1 from a wider range of input levels. At the moment, the FMSA-1 can only accept input levels from 1.0 to 2.0V rms. Perhaps a future revision of the DSP software could implement a tracking filter in crosstalk and separation test modes that would reject noise and only read the actual signal components. Additionally, the version 1.0 Operating Manual is a bit on the slim side, with schematics but no principles of operation or alignment instructions.

The FMSA-1 is an enormous improvement over the older Belar FMS-2. We were able to verify all significant Belar specs except for the 0.01 percent harmonic distortion spec, where we were close and where the disparity was probably due to slight amounts of noise being added to the readings.

The FMSA-1's performance advances the state-of-the-art in FM stereo decoding and monitoring, particularly with regard to long-term stability. Ever since the old Optimod-FM 8000A, I have put a caveat in our operating manuals regarding the trustworthiness of stereo monitor separation measurements because of problems with long-term drift.

Finally, we have an instrument that is more reliable than the old standby oscilloscope baseline flatness separation measurement. We have since bought several more FMSA-1's for production tests at Orban and they have proven to be reliable and accurate.

For more information from Belar, contact David Hirsch in Pennsylvania at 610-687-5550; fax: 610-687-2686; or circle Reader Service 83.

Dorrrough's 1200 Irons Rough Edges

► continued from page 51

value of the leading LED in the row of consecutively lit, color-keyed LEDs. Peaks are simultaneously indicated with lightning speed as a single LED rides ahead of the pack.

Sophisticated lab instrument

For those who like their loudness meters in an elegant package, the system could be used simply to measure audio levels. To do so, of course, would be a waste. Behind those meters beats the heart of a sophisticated laboratory instrument. The nice part is that you do not have to be a scientist to exploit its many facets.

High on the list of potential uses for the Test Set 1200 are quality assurance tests. Consistency may be the hobgoblin of small minds, but inconsistency is certain-

Now, disconnect the mixer from the left input of the Test Set 1200. After setting the range selector to low, adjust the range attenuator to re-establish the 0 dB reading.

The difference in the two readings is your level of left channel cross-talk. Just reverse the procedure for the right channel. I regret to say that some of the equipment in my studio gave me some pretty nasty surprises.

Another function of the Dorrough Model 1200 involves azimuth adjustments to recording and playback equipment. This is why the Dorrough can save time, money and heartache. Though space does not suffice it to say,

I was able to correct very subtle misalignments. By feeding in a tone and tweaking as I watched for a peak on the left/sum meter and minimum deflection in the sum/diff. mode, I could minimize phase error substantially. I had carried my Tascam 32 Reproducer back from Japan without realizing how the plane trip had played havoc with head alignment.

Worth its weight in gold

The Test Set 1200 can verify a system's noise floor, test the quality of stereo material and even prevent dreaded center channel build-up. In the end — considering the explosion in high quality televi-

sion where complex multitracking material incorporating music, sound effects and dialogue must be crammed into two channels or mono — the 1200 is worth its weight in gold.

As you add layers to your mix, click the 1200 into the sum/diff. mode and watch the mono content build up your mixer to the extreme left and right to see how easily that center channel can overwhelm the discreet stereo material.

This, and much more, are revealed by the rugged 1200. I did not know I needed an oscilloscope until I had one. Now I cannot imagine life without a scope. The Dorrough 1200 Test Set is also an indispensable tool for the audio professional.

For more information from Dorrough, contact Kay Dorrough in California at 818-998-2824; or circle Reader Service 49.

After unpacking the unit, the first thing I noticed was that it is aesthetically beautiful and rack-mounted.

ly the gremlin of broadcasting. The need for a precision instrument to achieve repeatable, consistent parameters cannot be overestimated.

For example, the 1200 can show system gain almost instantly by feeding in a test signal at minimum level, setting the function control to stereo, the high/low selector to low and adjusting the range attenuator for a meter reading closest to 0 dB. Simply note the value the range knob is pointing to, crank the test signal to maximum and readjust the range attenuator to re-zero the meter; again taking note of the scale value. The system gain is the difference between the two values.

Another easy test instantly reveals left/right polarity and phase compatibility. First measure the system gain and adjust the channels for equal left/right gain. Feed a mono signal into both channels, set the function switch to sum/diff. while adjusting the range attenuator and/or high/low control until you get a left meter reading of -6 dB. Crank the function control to stereo and then back to sum/diff.

Notice the difference on left and right meters. If the polarity is the same, you will notice a 6 dB increase on the left meter and no reading on the right meter. If the readings are reversed, one of the channels has reversed polarity. If both meters light up, there is a problem with phase response. What could be easier?

Easy test

A feature I find very useful is an easy test for cross-talk. Feed a test signal into the device to be tested (e.g., mixer) with equal left and right levels into the Model 1200. Set the function control to stereo and the range selector to high while adjusting the range attenuator to achieve a meter reading of 0 dB.

After noting the value on the range attenuator scale, disconnect the right channel signal feed line to the mixer.

Looking for the ultimate affordable digital STL solution?



Look No Further!

Moseley

Moseley Associates Inc.
111 Castilian Drive
Santa Barbara, CA 93117
Voice (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." ▼

MARKETPLACE

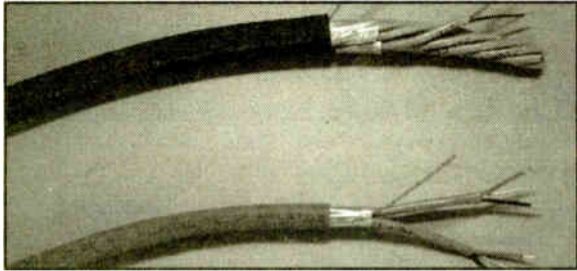
Recently Introduced Products for the Radio Broadcast Professional

Audio Cable Outer Jacket Compound

New from Gepco International is Gep-Flex, a highly flexible outer jacket compound for the 618 (22 gauge) and 724 (24 gauge) series multi-pair audio cable.

Designed for indoor or remote applications, Gep-Flex provides increased flexibility while still retaining the UL listed-type CM rating required for permanent installation.

For more information from Gepco, contact the sales department at 800-966-0069; or circle Reader Service 38.

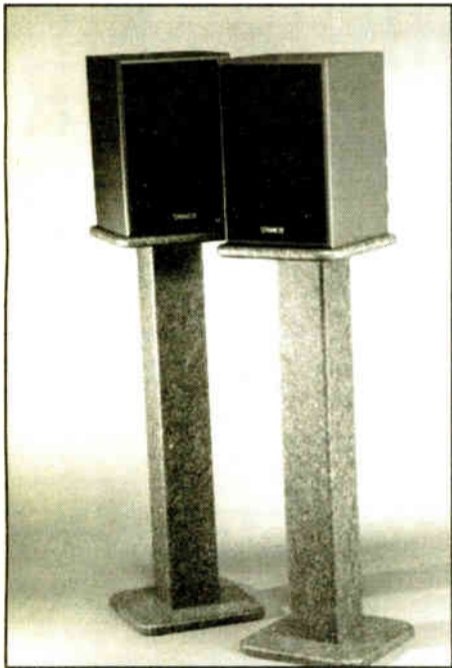


Speaker Stands

Speaker stands specifically designed to support reference monitors in studio applications are available in heights of 36 and 42 inches from RaXXess. The stands are constructed of three-fourths-inch particle board and feature a four-inch square centerpost that may be filled with sand for acoustic decoupling.

One-foot squares on both the top and bottom of each stand are able to accommodate virtually any near- and mid-field monitors.

For more information from RaXXess, contact the company in New Jersey at



201-389-1712; or circle Reader Service 136.

Two-hundred CD Changer

The DN-1400F from Denon holds and plays 200 CDs and features a dual transport design. The dual design eliminates the dead time normally caused by CD selection and allows simultaneous playback from the two transports for monitoring/cuing.

The DN-1400F may be controlled from either a single Mac or Windows-driven PC and is only slightly larger than the space occupied by 200 CDs when stored in their jewel boxes.

For more information from Denon, contact Mark Kaltman in New Jersey at 201-575-7810; or circle Reader Service 160.

Digital Input Selector

Wohler Technologies has introduced the DSS-8 digital input source selector for its AMP-1A and AMP-2 powered stereo audio monitors. The DSS-8 uses a rotary switch to select any one of eight AES/EBU digital audio inputs for D-A conversion and high-fidelity reproduction through the monitors' built-in amplifiers and speakers.

For more information from Wohler Technologies, contact Carl Dempsey in California at 415-589-5676; fax: 415-589-1355; or circle Reader Service 59.

Satellite Receiver

Modern satellite receivers provide increased reliability and performance by using a low-noise block (LNB) converter

at the antenna instead of an LNA followed by a down-converter. The Ariel receiver from Satellite Systems uses an LNB to take advantage of new technology but maintains compatibility with the Fairchild Dart 384 modules. Any transponder on the satellite can be selected with the fully-synthesized tuner without changing crystals or tuning oscillators for a new frequency. The receiver can be controlled from a remote location.

The Ariel features five card slots for flexibility and expansion. Cards such as the Voice Cue, McGurdy Data Decoder, Dual Audio and the SEDAT Decoders can be interchanged between the Fairchild Dart 384 chassis and the Ariel chassis. Because each subsection of the receiver is on a separate plug-in card, the system is easy to troubleshoot if failures do occur. Replacement modules can be sent overnight to get back on the air quickly.

Existing SA or Fairchild receivers can be upgraded for use with an LNB by installing the Ariel L-band demod.

For more information from Satellite Systems, contact Cristy Carothers in Colorado at 719-634-6319; or circle Reader Service 90.

Digital Reverberator

The PCM 90 digital reverberator from Lexicon features a range of versatile reverberation programs. Dual-processor architecture allows for flexibility in



reverberation quality and control.

The PCM 90 ships with 250 all-new presets designed with real-world applications in mind. Banks and rows are labeled logically and clearly to find desired sounds by scrolling through the presets.

For more information from Lexicon, contact the company in Massachusetts at 617-736-0300; fax: 617-891-0340; or circle Reader Service 174.

SCPC Receiver

The SCPC-1000D from Avcom is a single channel per carrier satellite receiver for residential and light commercial applications. The SCPC-1000D allows owners of both C- or Ku-band TVRO systems to receive SCPC feeds with excellent audio fidelity. Features on SCPC-1000D include 100 programmable memory channels, LNB drift compensation (LDC), LNB offset error compensation (LOE), digital frequency lock (DFL), automatic frequency control (AFC) and a universal expander that works well with audio feeds with 2:1 and 3:1 compression.

The SCPC-1000D also has selectable intermediate frequency (IF) filters with bandwidths of 400 and 100 kHz for optimum reception of wide and narrow band SCPC programs with smaller dishes. The backlit, microprocessor-controlled LCD shows tuning frequency, LNB offset error, preset channel and signal strength. Also displayed are DFL, squelch, AFC, and audio bandwidth selection.

For more information from Avcom, contact the company in Virginia at 804-794-2500; fax: 804-794-8284; or circle Reader Service 134.

Phono Cartridges

Shure has introduced a new line of phono cartridges featuring four new models and two from its previous line. Each comes with a diamond-tipped stylus and all necessary mounting hardware.

The SC35C cartridge is designed for DJ and broadcast use and works with tone arms requiring a tracking force of four to five grams while its stylus assembly is rigid enough to withstand punishment inflicted by back-cuing.

For more information from Shure, contact the company in Illinois at 800-25-SHURE (74873); or circle Reader Service 100.



People, Appointments And Promotions

John Barlett has been promoted to the position of general manager for Tapscan's worldwide strategic development unit. Barlett's responsibilities now include overseeing international sales and marketing expansion and domestic strategic relationships with data suppliers, outside service providers and rep firms.

Modulation Sciences has named John Patton to the position of executive vice president. Patton has taken over sales and marketing and will head up new product concepts and development as

well as general business management for all TV and radio products.

Jack S. Kenney has been appointed to the position of president and C.E.O. of Quantegy, Inc. Kenney has taken over the position from Thomas J. Wheeler, who has resigned to pursue other business interests.

Shadow Broadcast Services (SBS) has appointed Jack L. Woods to the position of president and general manager. Woods was previously executive vice president

of sales and marketing for SBS.

Bill Harland has joined Andrew Corp. as the product line manager in the broadcast products business unit. Harland's responsibilities will include identifying new product and export opportunities and assisting customers with the transition to HDTV.

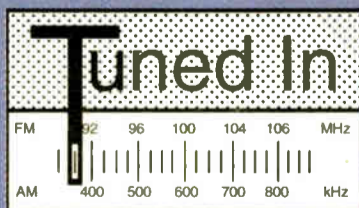
Patterson Broadcasting has named Bert Goldman as the company's group director of engineering. Patterson will be based in Savannah, Ga., at Patterson stations

WCHY-AM-FM and WYZK(FM).

JBL Professional announced the promotion of Marc Spector to the position of director of marketing communications. Spector now assumes complete responsibility for the development and implementation of all brand-building JBL Professional marketing communications programs.

Company News

CCA recently supplied a high-power DAB-compatible FM broadcast transmitter to AT&T. The transmitter provides the necessities for broadcasting IBOC or IBAC DAB signals along with standard FM analog.



Broadcast Equipment Exchange

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

AMPLIFIERS

Want To Sell

Crown D150A in gd cond, \$250. K Thomas, Rebel Recording, 5565 Radio Lane, Jacksonville FL 32205. 904-388-7711.

Want To Buy

Marantz mdl 1 audio consolette preamp, single or pair & mdl 6 stereo adapter. P Chance, 215-574-8147.

ANTENNAS/TOWERS/CABLES

Want To Sell

Jampro 2-bay 10 kW FM, tuned to 102.3, BO; approximately 100' of unshielded solid wire 8-conductor cable, BO. T Butler, WCVR, Randolph VT 05061. 802-728-4411.

Jampro JHCP-10 on 94.1 MHz in working cond when removed, BO. J Sands, KJMZ, 2340 Paseo del Prado #204, Las Vegas NV 89102. 702-868-7222.

Phelps Dodge FMP-HP-7 antenna, pole mount hardware, \$1500. B Caithamer, WMBI, 820 N LaSalle Dr, Chicago IL 60610. 312-329-4304.

3" HELIAX STANDARD COAXIAL CABLE

50-Ohm, unused, cut to length. Priced below market. Shipped instantly. Call Basic Wire & Cable (NANCY) 800-227-4292 FAX: 312-539-3500

Belden 8412 mic cables (40) w/Switchcraft connectors, mint cond, \$9/ea. B Cuson, Tape-Tracks Recording Std, 2275 Yargerville Rd, Lasalle MI 48145. 313-241-6695.

Tower, 280', 13 sections of 20', 1 section of 10', on ground & ready to ship, matching top beacon also avail, BO. D Lacy, Mtn States Bdtg, Colorado Springs CO. 719-636-2470.

Phelps Dodge CFM-HP-12 12-bay FM bdct antenna rated for 40 kW, tuned for 107.7 MHz, \$3000. M Lout, KNKE Radio, Jasper TX 75951. 409-384-4541.

ERI 404 isocoupler rated at 10 kW, no tuning required, broadbanded to cover entire FM band, less than 1 yr old, \$1200/BO; Harris 3-circuit tower lighting choke in wx proof steel cabinet, like new, \$150. J Haynes, WOZI, 4 Second St, Presque Isle ME 04769. 207-723-4714.

Andrew LDF7 200' with hangers, no connectors, \$1000 FOB Knoxville TN. D Magnuson, 423-525-6358.

Jampro 8-bay high power antenna, never opened; Rohn 90' tower, 35' face. R Tangney, 414-283-4430.

Shively 6813 2-bay w/radomes tuned to 96.1 MHz, used 60 days, BO. D Magnum, WBOG, 1021 N Superior, Tomah WI 54660. 608-372-9600.

Rohn 45 G tower sections, \$125/BO. Rick, KBZO, 1220 Broadway #500, Lubbock TX 79401. 806-763-6051.

Scala 75 ohm FMO antenna, \$200. M Martindale, KVON, Napa CA. 707-252-1440.

Want To Buy

High power 8, 10 or 12 bay antenna on or near 105.9 FM. R Kelly, KXGJ, POB 2537, Bay City TX 77414. 409-244-4170.

Radio tower, 500' needed. Midwest Bible Radio, Sioux City IA, 712-252-4621.

Transmission line 3", prefer flex line, but rigid is OK if you have hangers, must be cheap! R Kelly, KXGJ, POB 2537, Bay City TX 77414. 409-244-4170.

4-bay FM on 104.9 and/or 103.9. B Campbell, KRIG. 918-333-7943.

Yagi antennas, chnl 4, 5-10 element (2) needed; Rohn SSV, sections 6N - 16N. D Magnuson, 423-525-6358.

AUDIO PRODUCTION

Want To Sell

Antex SX-10 digital audio card for PC; Modulation Sciences CP-803 composite processor; UREI 530 stereo graphic EQ. R Lankton, WIKX, 4810 Deltona Dr, Punta Gorda FL 33950. 941-377-1488.

DAP 310 3 band AGC/limiter, good condition, \$250. J Sands, KJMZ, 2340 Paseo del Prado #204, Las Vegas NV 89102. 702-868-7222.

dbx 150X (4) NR type 1, half rack mounts, \$100/ea or \$300/all. J Borden, Handbasket Prod, 2909 S Leger Ave, Milwaukee WI 53207. 414-482-8954.

Lexicon PCM-70 classic reverb, \$1350/BO; 503 expander/comp, \$350; Roland SRV 2000 classic reverb, \$525; Orban 245-E stereo synthesizer/stereo spring reverb, \$175; Altec 352-A vintage audio mixer, Altec EQ's, \$190 ea. T Coffman, Rolltop Music Std, POB 17203, San Diego CA 92177. 619-571-5031.

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 DAT & THE NEW R-CD

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 (55) On Reader Service Card

Nexus 96 point patch bay, 1/4" front & RCA back, 19" rack mount, new, never used, \$200/BO; Russound QT-1 48 point patch bay, mini plug in front & RCA back, 19" rack mount w/12 cables, never used, \$100/BO. J Diamond, Blue Diamond, 290 Chubb Rd, Canonsburg PA 15317. 412-746-2540.

Orban 245-F stereo enhancer;

Shure SE-30 compressor/mixer; Ramko audio D/A, 10 chnl; Modulation Sciences MYB-2 Stereo Max; Audire Cresendo audio power amp. D Kannes, KTAR, 602-234-6347 or FAX 602-266-3858.

UREI 535 stereo EQ, \$350; UREI LA-4A, \$475; Lexicon PCM-70 classic reverb, \$1350; dbx 503 expander/ comp, \$350; Roland SRV 2000 classic reverb, \$525; Orban 245-E stereo synthesizer/stereo spring reverb, \$175; Altec 1950 vintage EQs, \$190/ea. T Coffman, Rolltop Music Std, POB 17203, San Diego CA 92177. 619-571-5031.

360 Systems 16x16 router expansion unit, \$295; Tascam Syncast w/rackmount, \$125. G Wachter, KFYI, 631 N 1st Ave, Phoenix AZ 85003. 602-817-1030.

Dolby A301 2 chnl Dolby A NR, \$250/BO. M Saady, First City Recdg, 213-05 75th Ave, #2L, Bayside NY 11364.

Shure audio master & feedback controller, \$150/both. D Kocher, Digital Sound Makers, 1901 Hanover Ave, Allentown PA 18102. 610-776-1455.

Tascam PB32H patch panel, RCA jacks in rear & 1/4 phone jacks in front w/normals, new in box, \$60. J Haynes, WOZI, 4 Second St, Presque Isle ME 04769. 207-723-4714.

UREI 535 stereo rack mount EQ, like new in original box, Best Offer. L Prezant, Record & Play, POB 412, Tuckahoe NY 10707. 718-548-1623.

dbx 166 stereo compressor, \$350. W Gunn, 619-320-0728.

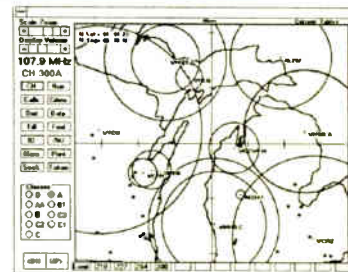
Want To Buy

Neve-API-MXR mic pres, EQs, effects, compressors. T Coffman, 619-571-5031.

Neve-API-MXR mic pres, EQs, effects, compressors. T Coffman, Rolltop Music Std, POB 17203, San Diego CA 92177. 619-571-5031.

BROADCAST ENGINEERING CONSULTING SOFTWARE

Professional software packages for preparing FCC applications and plotting coverage. For Windows and DOS.



- ✓ Prepare concise FCC coverage maps and allocation studies from USGS digital line graph databases
- ✓ Search for AM, FM, and TV channels with professional graphics oriented programs and FCC databases
- ✓ Determine population with US Census databases
- ✓ Plot S.T.L. paths using NGDC terrain databases
- ✓ Tower and airport databases & more!

SoftCommunications

DOUG VERNIER
1-800-743-DOUG (3684)

Internet Access - WorldWide Web
http://www.v-soft.com
email: dvernier@v-soft.com

AUTOMATION EQUIPMENT

Want To Sell

SMC ESP2 automation system, complete & working, 20 source model, (4) R-R, (3) single play cart decks, (5) Carousels & remote keyboard with monitor, \$5K or BO, may part out. B Demat, WPTW Radio, 1625 Covington Ave, Piqua OH 45356. 513-773-3513.

SMC-1977 automation Carousels (4), BO; RSC-50 switchers. B Darling, Syskiyou Country, 316 Lawrence Ln, Yreka CA 96097. 842-4159.

Sono-Mag 350s (7) & 452s (2), BO; IGM communications event controllers (2), BO. T Butler, WCVR, Randolph VT 05061. 802-728-4411.

Arrakis Digilink (2), DL-2's with 3.0 version software, nearly new network cards & software, 7 channel extended switcher, extra power supply, \$6000 ea. J Hutton, Drake Comm, 5409 W Dogwood St, Rogers AR 72758. 501-271-8223.

Format Sentry FS-12C, 48 tray IGM Instacart, (4) R-R ITC PB's, Panasonic CD player, Tandy 1000 SL computer, Tandy DMP printer, Spotmaster RPB cart machine w/tone alert, DRS uninterruptible pwr supply, (2) 6' racks, books & related equip, 2 yrs old, owe \$16,000 but will sacrifice. Terry, 703-647-8493.

Sony CDK006 jukebox, excellent condition with extra tray, \$1200/ Best Offer. Timo, 212-833-4984.

CART MACHINES

Want To Sell

Tapecaster 700-P (2) & a 700-RP carts, BO; ITC PD-II R/P cart; (3) Audi-Cord E11 & (3) E31s, BO. T Butler, WCVR, Randolph VT, 05061. 802-728-4411.

Harris Criterion 90-2 R/P cart deck stereo, \$400; Audicord Series 100's double deck cart machine, mono, \$300. J Franks, WHTH/WNKO. 614-522-8171.

Spotmaster cart winder, great shape, \$200. B Barrett, KZPI, 485 Dover Glen Dr, Antioch TN 37013. 615-399-8059.

ITC Delta - new pinch rollers: Mono playback (2), record/play (2), stereo record/play (1). MOTI-VATED! Spotmaster series 2000 record (1). Wes, 818-798-9128.

Great Prices on original equipment tape heads for ITC, BE, Fidelipac, Otari, Tascam & others!
(804) 984-4255
HE HALL Electronics

ITC record amps, 3 tone, stereo \$350 or mono \$250. W Gunn, 619-320-0728.

Want To Buy

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

COMPUTERS

Want To Sell

Okidata Microline 84 printers (2), BO. T Butler, WCVR, Randolph VT, 05061. 802-728-4411.

Want To Buy

Tandy 6000 HD with at least one floppy drive. Mel Crosby, 408-363-1646.

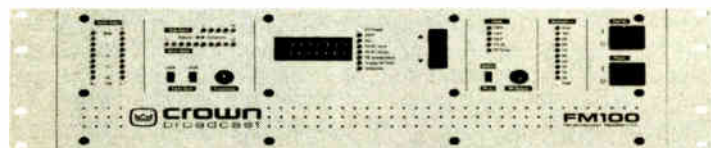
CONSOLES

Want To Sell

BE 150 series 5 chnl mono audio console in gd cond, \$260 +shpg. F Hogan, WGLS, 201 Mullica Hill Rd, Glassboro NJ 08028. 609-256-4311.



706 Rose Hill Drive Charlottesville VA 22901



More than an FM exciter or amplifier, a Crown integrated FM transmitter system combines built-in audio processing and stereo generation in one rugged, compact unit. Each model provides excellent signal quality, ease-of-use and economical long-term reliability with a variety of features including:

- Quick set-up.
- Built-in digital metering and diagnostics.
- 87-108 MHz user-selectable frequency range.
- List \$5995.00**

(804) 984-HALL (4255) Fax: (804) 984-FAXX (3299)

Call us for the Best New & Completely Rebuilt Equipment!

The ONLY Source You Need for: Digital, Pro - Audio, & RF

Please visit our Web Site at www.halls.com

E-Mail us!!!

jonh@halls.com
dwayne@halls.com
rick@halls.com
tech@halls.com

Also Available from Crown
FM Translators
Exciters

CONSOLES...WTS

Fostex 812 12x8x2 mixer with manual, excellent condition, \$800. J Borden, Handbasket Production, 2909 S Loger Ave, Milwaukee WI 53207. 414-482-8954.

Speck mix 16x8x2, manual & power supply, \$800. S Bogart, 817-467-0158.

Tascam 3 16x4 mixer, \$150. J Hill, Earmark Audio, 206-463-1980.

Harris M-90 26 input, gd cond, \$2500/BO. LHS Prod, 914-362-1920.

McMartin B-502 stereo console, 5 pot 10 input stereo in good condition, \$500. J Franks, WHTH/WNK0. 614-522-8171.

Otari 50/50 Bill, 2 track, like new, \$3800; Panasonic 3900 DAT w/controller, like new, \$2250; Yamaha SPX900 effects reverb, like new, \$700. J James, 310-824-4846.

Soundcraft Delta Series modular, 16x4x2 mainframe with (6) mono mic/line, (6) stereo line, (4) sub out & master out modules, 4 years old, good condition, \$2000 +shipping. T Stine, KCGQ, POB 2077, Cape Girardeau MO 63702. 314-335-9099.

Tangent 1202A 12 channel mixing board, slide pots, reverb, pre & post FX send & return, EQ, excellent condition. \$1000/Best Offer. L Prezant, Record & Play. POB 412, Tuckahoe NY 10707. 718-548-1623.

Wheatstone Audioarts power supply with phantom, \$250. D Kocher, Digital Sound Makers, 1901 Hanover Ave, Allentown PA 18102. 610-776-1455.

Gates Yard board, new tubes, \$395. W Gunn, 619-320-0728.

Want To Buy

Spare cards for an Auditorics 110, specifically 1ME & SpF4. Dana Webb, KESY, 4807 Dodge St, Omaha NE 68132. 402-556-6700.

DISCO-PRO SOUND EQUIPMENT

Want To Sell

Complete production studio equipment, \$3500/Best Offer. J Hill, Earmark Audio, 206-463-1980.

FINANCIAL SERVICES

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.

FLEXLEASE, Inc.

LIMITERS

Want To Sell

dbx 503. T Coffman, Rolltop Music Std, POB 17203, San Diego CA 92177. 619-571-5031.

Gentner Phoenix AM audio processor, mint condition with manual, \$1100/BO; Harris AM Solid States-man limiter, good condition with manual, \$125. J Haynes, WOZI, 4 Second St, Presque Isle ME 04769. 207-723-4714.

Orban Optimod 8000A in excel cond, w/manual, \$1795. H Ellington, WKNU, POB 468, Brewton AL 36427. 334-867-4824.

UREI 1178 stereo peak limiter. \$400; Moseley LPT 10. 10W FM exciter w/new tubes & manual, works very well, \$350; Mari CLA 40 compressor/limiter in vgc, \$100. M Martindale, KVON, Napa CA. 707-252-1440.

UREI BL-40 modulimiter, cond unknown, \$75 + shpg. L Fuss, WDTL, POB 1438, Cleveland MS 38732. 601-846-0927.

LA-4A (2), \$475/ea. T Coffman, Rolltop Music Std, POB 17203, San Diego CA 92177. 619-571-5031.

Want To Buy

All types, Gates, RCA, Collins, Altec. T Coffman, 619-571-5031.

Gates, RCA, Collins, Altec, Fairchild, all types. T Coffman, Rolltop Music Std, POB 17203, San Diego CA 92177. 619-571-5031.

Need old, cheap low FM exciter for backup use, tube types considered, \$100-\$300. K Carpenter, Alta CA Bdcg, 3490 Silverbell Rd, Chico CA 95973. 916-893-8926.

Teletronix LA-2A's, UREI LA-3A's & LA-4's, Fairchild 660's & 670's, any Pultec EQ's & any other old tube compressor/limiters, call after 3PM CST, 214-271-7625.

MICROPHONES

Want To Sell

AKG mic power supply, \$50. S Bogart, 817-467-0158.

Countryman Isomax II (2) hypercardioid lavaliers with 50' cable on reel attached, requires 15-50 V phantom power, \$350/pr. E Toline, Audio Etc, 525 W Stratford Pl #280, Chicago IL 60657. 312-975-6598

RCA ribbon velocity mics (several), \$800-\$1400. W Davies, Virgo Prod, 5548 Elmer Ave, N Hollywood CA 91601. 818-761-9831.

Shure Green Bullet harmonica mic. T Coffman, Rolltop Music Std, POB 17203, San Diego CA 92177. 619-571-5031.

Shure SM5B, \$350. J Hill, Earmark Audio, 206-463-1980.

Mackie 1202, \$275; EV RE 38 ND mic, \$300. 206-839-9414.

Sennheiser 421, \$290; Shure SM 57, \$60; Shure green bullet harmonica mic (original). T Coffman, Rolltop Music Std, POB 17203, San Diego CA 92177. 619-571-5031.

EV PL20 (RE20) mics, good condition, \$325; RCA 77DX mics, reconditioned with ew ribbons; Neumann KM84 pair. W Gunn, 619-320-0728.

Want To Buy

Sennheiser 421 mics. V Zandt, WLGm, 15 Walnut Hills, Springfield IL 62707. 217-487-7711.

77-DX's, 44-BX's, WE KU-3A's On-Air lights, recording lights & audition lights. Top price paid. Fast response. Bill Bryant Mgmt, 2601 Hillsboro Rd, G12, Nashville TN 37212. 615-269-6131, FAX: 615-292-3434.

RCA 77-DX's & 44-BX's, any other RCA ribbon mics, on-air lights, call after 3PM CST, 214-271-7625.

MISCELLANEOUS

Want To Sell

Equipment racks, 5-1/2' (2), BO. T Butler, WCVR, Randolph VT 05061. 802-728-4411.

ESE ES-203 count-down timers (2); ESE ES510LR timers (2); ESE ES301-ST timers (2); ESE ES301-BRS timer. D Kannes, KTAR, 602-234-6347 or FAX 602-266-3858.

Mitel SX20 superswitch telephone system, complete with handset, console, upgraded switch system. Handled 6 lines & 20 extensions with operating instructions, working when removed, uses regular single line phones, \$685. F Lauerman, WLST, POB 609, Marinette WI 54143. 715-735-6631.

AUDIO TRANSFORMER MAGIC
9K 600-6
audisar
P O Box 1561, Bellevue, WA 98009
206-454-2040

Circle (109) On Reader Service Card

Tektronix 1441 VIR signal deleator, 1478 chrominance level corrector, both for \$100. D Kerl, 2320 Holiday Dr, Janesville WI 53545. 608-757-9259.

Bud equipment rack, black 18 gauge steel with vented sides & 70" rack space, mint condition, \$125; Ampex operation/maint manuals for MM 1000, MM 1200 & 440-C tape recorders, excellent condition, \$20/ea. B Cuson, Tape-Tracks Recording Std, 2275 Yargerville Rd, Lasalle MI 48145. 313-241-6695.

dbx 900 mainframe with (6) 904 noise gates & a 906 flanger/doubler, excellent condition, \$1100. B Cuson, Tape-Tracks Recording Std, 2275 Yargerville Rd, Lasalle MI 48145. 313-241-6695.

Keepsafer closed circuit TV monitoring system, 1 year old, \$200. B Barrett, KZPI, 485 Dover Glen Dr, Antioch TN 37013. 615-399-8059.

Topaz 12,000 watt true UPS w/batteries, \$1450; audio/video TV modulator, Blonder-Tonge, VHF channels, \$150. G Wachter, KFYI, 631 N 1st Ave, Phoenix AZ 85003. 602-817-1030.

Various inductors for ATU/phasor, \$75/ea. M Martindale, KVON, Napa CA. 707-252-1440.

CSP 5 kW AM dummy load, \$500 + shipping. L Fuss, WDTL, POB 1438, Cleveland MS 38732. 601-846-0927.

Want To Buy

Broadcasting Yearbooks, 1931-1960, old station histories, Blaw-Knox & Franklin antenna literature & pictures. D Hedrick, Pro-Mix Services, POB 496, Panacea FL 32346. 904-926-8000.

Issues of Audio Engineering & Audio magazine from the 1940's, 50's & 60's. P Chance, 215-574-8147.

Phonograph records, 45s, LPs, 78s, transcriptions, most types of music, top prices paid, will travel. Bill Berry, Karavan Bdcg, 1-800-321-2920.

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

MONITORS

Want To Sell

Belar AMM-1 mod monitor. D Kannes, KTAR, 602-234-6347 or FAX 602-266-3858.

Belar RFA-1 RF amp on 107.7, \$275 +shpg. L Collins, WJYY, POB 1923, Concord NH 03302. 603-228-0936.

Belar RFA-2 AM RF amp, new in box on 1340 kHz, with manual, will re-crystal & tune for \$450 or as is for \$425; Belar AMM-3 AM mod monitor, like new, will re-crystal & tune for \$850 or as is for \$825, combine with RF amp, \$1200 re-crystalled or \$1100 as is, like new with manual. J Haynes, WOZI, 4 Second St, Presque Isle ME 04769. 207-723-4714.

Westlake TM-1 time aligned studio monitors with JBL drives, excellent condition, \$1500. B Cuson, Tape-Tracks Recording Studio, 2275 Yargerville Rd, Lasalle MI 48145. 313-241-6695.

RECEIVERS & TRANSCEIVERS

Want To Sell

Wegener receiver, 2 years old, set up to receive pure gold oldies format from SMN/ABC. W Burnsed, WULS, POB 2450, Douglas GA 31533. 912-384-1037.

DISTRIBUTOR DIRECTORY

The following distributors serving the broadcast industry would be glad to help you with any of your requirements.

...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

DIGITAL STUDIO FURNITURE AND COMPONENTS
REAL DIGITAL STUDIOS

BROADCAST PODIUMS
THE BEST REMOTE SETUP IN THE BUSINESS

STUDIO UPS SYSTEMS
SHORT OR LONG TERM, COMPUTER MONITORED

SPACEWISE™
"THE BROADCASTERS FURNITURE STORE"
800-775-3660

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

RadiWorld

5827 Columbia Pike, 3rd Floor Falls Church, VA 22041 • PHONE: 703-998-7600 • FAX: 703-998-2966

Select from these categories for best ad positioning:

- Acoustics
- Amplifiers
- Antennas & Towers & Cables
- Audio Production (Other)
- Brokers
- Business Opportunities
- Cart Machines
- CD Players
- Computers
- Consoles
- Disco-Pro Sound Equip.
- Financial Services
- Leasing
- Limiters
- Microphones
- Miscellaneous
- Monitors
- Receivers & Transceivers
- Recorders
- Remote & Microwave Equip.
- Repair Services
- Satellite Equipment
- Software
- Stations
- Stereo Generators
- Tapes, Carts & Reels
- Tax Deductable Equipment
- Test Equipment
- Transmitter/Exciters
- Training Services
- Tubes
- Turntables
- Positions Wanted
- Help Wanted

Classified Advertising Rates Effective January 1, 1996

	1x	3x	6x	12x
1-9 col inch (per inch)	\$65	62	58	52
10-19 col inch (per inch)	59	56	52	47
Distributor Directory	100	95	90	85
Professional Card	70	64	59	53
Classified Line Ad		\$1.95 per word		
Blind Box Ad		\$15 additional		

To compute ad costs: Multiply the number of ad inches (columns x inches) by the desired rate schedule for your per unit cost. Example: a 3" ad at the 1x rate is \$195, at the 3x rate \$186, at the 6x rate \$174, at the 12x rate \$156, etc.

RECEIVERS/XCVRS...WTS

Collins 6515-1A receiver, 250 kHz-30 MHz, intermittent operation, \$400. D Kerl, 2320 Holiday Dr, Janesville WI 53545. 608-757-9259.

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 4454 FAX: 6081

ICOM IC-W2A VHF/UHF dual band handheld transceiver. R Lankton, WIKX, 4810 Deltona Dr, Punta Gorda FL 33950. 941-377-1488.

Marti DR-10 UHF RPU rcvr, 2 chnl w/decoder board for repeater operation, \$500. M Martindale, KVON, Napa CA. 707-252-1440.

RECORDERS

Want To Sell

MCI PCA2700-0917 PB amps for JH-110 (2); Ampex ATR-700; Ampex AG4400; Ampex R/P amps for AG440 (4). D Kannes, KTAR, 602-234-6347 or FAX 602-266-3858.

AKAI DR1200 with auto locator, 12 channel digital R/P, \$4500/Best Offer. L.H.S. Production, 914-362-1920.

REVOX PARTS/SERVICE

Cassette-CD-Open reel NOS PR99 repros. Capstan resurfacing, ALL BRANDS.

JM TECHNICAL ARTS

30 Music Sq. W. #156 Nashville, TN 37203 (615) 244-6892

Nagra 4.2L sync recorder, very good condition, \$2000; Nagra 4SL stereo sync recorder, very good condition, \$3500. Don, Scales Film Sound, 3142 Market Pl, Bloomington IN 47403. 812-339-4446.

Tascam 38 1/2" 8 trk R-R w/rack mounts & manual, excel cond, \$900. J Borden, Handbasket Prod, 2909 S Loger Ave, Milwaukee WI 53207. 414-482-8954.

DO YOU NEED PARTS FOR SCULLY TAPE RECORDERS ???

SEQUOIA ELECTRONICS
1-(408) 363-1646
FAX 1-(408) 363-0957

Eumig FL1000 rack mount cassette deck, optional transport, Dolby, built in receivers & mic mixing, very good condition, BO; Pioneer RT-1050, 1/2 trk R-R, 7.5-15 ips, portable, excellent condition, \$600/BO. L Prezant, Record & Play, POB 412, Tuckahoe NY 10707. 718-548-1623.

Revox A77 1/4" 1/2 trk stereo R-R's (2), \$300 ea. J Franks, WHTH/WNKO. 614-522-8171.

Otari 1/2" 8 trk w/8 chnl dbx 154 type I NR w/new MRL alignment tape, \$1800/BO. J Hill, Earmark Audio, 206-463-1980.

Otari MX5050QXHD 4 trk, \$1150/BO; Otari MX5050B-2HD 2 trk, \$800/BO. J Hill, Earmark Audio, 206-463-1980.

Teac A3300 R-R, \$100. B Barrett, KZPI, 485 Dover Glen Dr, Antioch TN 37013. 615-399-8059.

CLEAN PATCH BAYS NO DOWN TIME



VERTIGO BURNISHERS AND INJECTORS RESTORE ORIGINAL PERFORMANCE TO YOUR PATCH BAYS

\$34.95 Ea. Please note for additional information and more than 1000 VERTIGO RECORDING SERVICES 12115 Magnolia Blvd. #116 818-907-5161 North Hollywood, CA 91607 fax 818-784-3763

Ampex ATR100 taperecorders for parts. Circuit cards, heads, motors, machine parts, or electronic parts. Call 818-907-5161.

Otari 5050-SHD 8 track 1/2" newly rebuilt, heads have full, life left, \$1800. W Gunn 619-320-0728.

Scully '100' recorders, record/play amplifiers, 8, 16, 24 track heads. Sequoia Electronics, 4646 Hounds-haven Way, San Jose CA 95111. 408-363-1646.

Nagra 4-S stereo sync machine, \$4500. W Gunn, 619-320-0728.

Want To Buy

Marantz CDR610 or CDR600 CD recorder. A Chouffi, Nightshift, 1 Gray Fox Ln, Albany NY 12203. 518-452-0564.

Ampex 440 (2) with remote controls & Ampex stereo mixer, 2 track 1/4", \$900. W Davies, Virgo Production, 5548 Elmer Ave, N Hollywood CA 91601. 818-761-9831.

Pioneer 701, 707, 901, 909 R-R. P McCoy, McCoys Recdg, 1232 Brentwood, Richland WA 99352. 509-627-4098.

R-R record & PB tape machines in good condition, 2-track or 4-track. M Wodlinger, 941-262-1118.

Scully 100 16 track, will pay up to \$2000. B Watkins, Tip-Toe Recording. 513-825-1186 aft 8PM EST.

Tascam 122 cassette decks. V Zandt, WLGm, 15 Walnut Hills, Springfield IL 62707. 217-487-7711.

REMOTE & MICROWAVE EQUIPMENT

Want To Sell

Panasonic Easa-phone KX-T61640 phone switching systems (2), BO. T Butler, WCVR, Randolph VT 05061. 802-728-4411.

TTC XL-10 FM translator, tuned to 94.1 in, 102.3 out, 10 W single output, \$1750/Best Offer; Beiar SCM-2 SCA monitor with 67 kHz crystal, others readily available, \$350; Moseley SCG-8 SCA generator on 92 kHz, great condition, \$550. J Sands, KJMZ, 2340 Paseo del Prado #204, Las Vegas NV 89102. 702-868-7222.

TFT 7601/7610 digital remote control, like new in original box, Best Offer. D Lacy, Mountain States Broadcasting, Colorado Springs CO. 719-636-2470.

WE RENT

TELOS ZEPHYR
CCS "Prima" Codex
COMREX
3-line extender
Frank Grundstein Audio/Video Consultants **610-642-0978**

Switched 56 CSU/DSU for Zephyr & other codex, \$195. G Wachter, KFYI, 631 N 1st Ave, Phoenix AZ 85003. 602-817-1030.

Moseley RLP-4B RPU xmtr (2); Maxitel Norcom remote units (2); Comrex PLX; Comrex RLX (2); Comrex LX-PC power supply; Comrex RRB radio receiver; Motorola Syntor 2 mobile radio; Voter VCM/4RV controller DHE. D Kannes, KTAR, 602-234-6347 or FAX 602-266-3858.

TFT digital telemetry unit 7610-C & 7610-R, \$200. B Barrett, KZPI, 485 Dover Glen Dr, Antioch TN 37013. 615-399-8059.

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. F, St. Paul, MN 55112 (612)631-1338 Member AFCCE

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 AFCCE

GRAHAM BROCK, INC.

BROADCAST TECHNICAL CONSULTANTS
Full Service From Allocation to Operation
AM/FM/TV/AUX Services; Field Work; Antenna and Facilities Design
Over 35 years engineering and consulting experience
912-638-8028
202-393-5133

PC - SOFTWARE

AM FM TV Search Programs
Signal Mapping—STL Paths
RFHAZ—US Census PopCount
FAA Tower—Draw Tower
Doug Vernier
Engineering Consultant
1600 Picturesque Drive
Cedar Falls IA 50613
800-743-DOUG

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.

TELECOMMUNICATIONS CONSULTANTS
Allocation Studies • AM, FM, TV, LPTV • Applications • Appraisals • Inspections • Local & Wide Area Computer Network
Microwave Design • Specialized Computer System Designs
44 Bow Circle #B, Hilton Head Is., SC 29928
803-785-4445 fax 803-842-3371
e-mail: wsimms@IBM.net

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
email: mullengr@aol.com

E. HAROLD MUNN, JR. & ASSOCIATES, INC.

Broadcast Engineering Consultants
AM - FM - TV
WAYNE S. REESE
PRESIDENT
Box 220, 100 Airport Rd.
Coldwater, MI 49036
517-278-7339

Where In The World Are You?

Reach radio professionals worldwide by advertising in **Radio World's** international edition.
Call Simone for information.
1-800-336-3045

T. Z. Sawyer Technical Consultants

AM-FM-TV-LPTV

- FCC Applications & Exhibits
- Experimental Authorizations
- AM Directional Antennas
- High Power Antenna Arrays
- Frequency Studies
- Class Upgrades
- STL Applications
- Station Inspections

1-800-255-2632

FAX: (301) 913-5799 • 6204 Highland Dr. • Chevy Chase, MD 20815

- Terrain Analysis
- FM Studies
- Population Studies
- FCC/FAA Databases
- Contours

Communications Data Services, Inc.
800-441-0034
703-534-0034
fax 703-532-5497
6105-E Arlington Blvd.
Falls Church, VA 22044

HARRIS
PARTS AND TECHNICAL SUPPORT
Now we can be reached online via e-mail.
TSUPPORT@HARRIS.COM
For your parts needs or with any technical problems you're having.

FM TRANSMITTER HELPLINE
24 Hour Emergency Phone Consultation
Specializing in:
• CCA/CSI
• Arcing Problems
• AEL FM Transmitters
MBE Enterprises
Phone: 818-772-8017
Pager 818-604-7925

Tower Sales & Erection
Turnkey Site Development
Installation & Maintenance
AM/FM Broadcast, TV
Microwave Systems,
Antennas & Towers
TOWERCOMM
Communications Specialists
Ben Wall President
6017 Triangle Dr
Raleigh, NC 27613
(919)781-3496
Gen Contractor #25891 Fax (919)781-6454

REMOTE BROADCASTS IN THE U.K. AND EUROPE
Planning remotes from the U.K. or Europe?
we offer a one-stop 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) 181 442 8900
Wired for Sound Ltd., London U.K.



Don't Gamble with your advertising dollars.

Advertise in Radio World and reach 18,000+ subscribers.

Call Simone at 1-800-336-3045 today!

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) 252-8351
FAX: (410) 252-4261

Contact Radio World Newspaper for advertising space availabilities

703-998-7600

P.O. Box 1214 • Falls Church, VA • 22041



REMOTE/MICRO EQUIP...WTS

Marti STL-8 xmtr on 947.0 MHz, type accepted, factory record in 1992, \$800 + shpg; Belar RFA-1 FM RF amp tuned to 92.7, cracked meter but otherwise OK, \$250 + shpg. L Fuss, WDTL, POB 1438, Cleveland MS 38732. 601-846-0927.

Drake ESR1240 rack mount audio/ video C-band receiver, \$275. G Wachter, KFYI, 631 N 1st Ave, Phoenix AZ 85003. 602-817-1030.

Wegener 1806-24 receiver w/decoder. D Kannes, KTAR, 602-234-6347 or FAX 602-266-3858.

RENT IT HERE! Call Steve Kirsch for Details

COMREX 1, 2 & 3-Line Extenders Digital Codes

TELOS Zephyr Digital Phone Hybrids

GENTNER EFT 3100 3-Line Extenders

SHURE PP-410 Automatic Mixers

REMOTE AUDIO PACKAGES

SILVER LAKE AUDIO • 516-763-1776 • FAX: 516-763-1750

SATELLITE EQUIPMENT

Want To Sell

Video Cipher stand alone unit, \$100. D Kerl, 2320 Holiday Dr, Janesville WI 53545. 608-757-9259.

Zephyrus 300 series w/304 mainframe, 322 stereo audio demodulator, 383 fifteen function tone decoder, 391 sat subcarrier rcvr, \$100 +shpg. L Collins, WJYY, POB 1923, Concord NH 03302. 603-228-0936.

Andrew 10 meter dish. R Tangney, 414-283-4430.

UNIVERSAL SPCPC 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

SCPC 15 kHz receivers, some on transponder 3 & 21, tunable demods, some tuneable down converters, Offsat 5 meter UPI downlink disks, negotiable. D Holler, Business News Network, 5625 Centennial Blvd, Colorado Springs CO 80919. 719-528-7040.

Andrew 4.5 meter satellite dish, BO. Don Kolbert, 507-282-0910.

SOFTWARE/DATABASES

Want To Sell

RADIR: THE RADIO STATION DATABASE

11,950+ stations, more accurate than any yearbook & prints mailing labels! Many searches, gives phones/faxes/web site addresses & more. MS-DOS or MAC (tab delimited ASCII) \$129.95 ppd. INCLUDES QUARTERLY UPDATES: 1-800-277-8224
Internet: <http://www.aceinfo.com/bbb/info>

Affordable TRAFFIC & BILLING

PC SOFTWARE for DIGILINK & other popular digital systems. Excellent for non-automated stations, too. Try it for 60 days. No obligation. For demo, call ABA Software
(813) 643-3689

Circle (126) On Reader Service Card

SATELLITE SYSTEMS

Satellite Equipment for Radio

Satellite Systems **repairs** all major brands of satellite equipment, including the Fairchild Dart 384 and Scientific Atlanta 7300. Our **turn-around time averages 24-hours**. Plus, we provide pre-and post-service technical support along with a **90-day warranty** (with exception of shipping charges).

Satellite Systems **sells** Zephyrus SCPC, Jones Satellite Networks, the **Ariel** and other available models. **Just call and ask!**

Satellite Systems, Inc.
615 East Brookside
Colorado Springs, CO 80906
(719)634-6319 Fax: (719)635-8151

Avcom SCS 200 sat rcvr, continuous tuning, 4 presets, discriminator-processor, new, \$350; C.A. C-Band LNA 50 dB gain 3.7 tp 4.2 GHz, 6 mos old, \$50. B Barrett, KZPI, 485 Dover Glen Dr, Antioch TN 37013. 615-399-8059.

STATIONS

Want To Sell

Last chance for fulltime 1 kW AM in Central Virginia, dark, owner retired, excel equip, \$50K cash/BO, real estate avail for lease or sale. G Jones, WODI, Brookneal VA. 804-376-5534 anytime.

Cash for a small AM/FM combo w/ real estate. J Lallino, 718-893-4328.

1 kW AM 1530 kHz daytime, 3.6 acres, nice bldg, partial owner financing, \$155,000. L.L. Williams, Collinsville VA. 540-647-1530.

CARIBBEAN LICENSE AVAILABLE. 5 kW FM and 1530 AM on Saint Eustatius. FM 1 kW and MDS-TV on St. Maarten. Need builder & operator for joint venture. Call Mort at (011-5995) 30100 or FAX 25678.

Want To Buy

Looking for small market FM station in Northeast or Southeast for under \$60,000. M Celenza, 64 Belmont Ave, Plainview NY 11803.

Small prod company wants to buy small FM, no combos, dark OK, preferably in Southwest. Write to: R Mickle, CMS, 131 Fairview Ave, Ponca City OK 74601. 405-762-7515.

STEREO GENERATORS

Want To Sell

Moseley SCA generator, \$150. M Martindale, KVON, Napa CA. 707-252-1440.

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 54701 Fax: 715-835-1151

Want To Sell

5" & 7" plastic tape reels, hubs for 1/4" tape to fit 10.5" reels, BO. J Diamond, Blue Diamond, 290 Chubbick Rd, Canonsburg PA 15317. 412-746-2540.

Audiopak & Fidelipac carts (100 ea), BO. D Hedrick, Pro-Mix Services, POB 496, Panacea FL 32346. 904-926-8000.

Scotch 1200', 7" reels of recording tape, \$1 ea; Ampex 2400' 7" reels of recording tape, \$2 ea. M Gollub, WMJS, POB 547, Prince Frederick MO 20678. 410-535-2201.

Audiopak blk carts (2000), 3-1/2 to 5-1/2 minute lengths, excel cond, BO. D Fitz, WARE AM, 70 South St, Ware MA 01082. 508-764-4381.

Beautiful Music album collection, all new or played once, old standards, most are out of print, 200-300 records, BO. L Prezant, Record & Play, POB 412, Tuckahoe NY 10707. 718-548-1623.

Pams Jingles reference tapes from the years of 1951-1976, available from every radio market in the US, Canada & Europe, call after 3PM CST, 214-271-7625.

Spotmaster TP1B cart winder with timer, \$50 + shipping. L Fuss, WDTL, POB 1438, Cleveland MS 38732. 601-846-0927.

Radio prod facility deleting classic rock library on 7 & 10.5" reels, \$250 +s/h; empty EIA 7.0 & 10.5" reels, \$35 +s/h. D Pulwers, POB 9523, Alexandria VA 22304. 703-578-3014.

A-Line 200 (6), 200 slot cartridge racks, clean, \$50 +shpg; over 300 ScotchCart tape cartridges in gd clean cond, mostly 3.5 min w/pre 1989 country music, \$250/all +shpg. L Collins, WJYY, POB 1923, Concord NH 03302. 603-228-0936.

Want To Buy

Blue AA-3 or AA-4 carts, worn out carts OK, C Leasure, WTBO/WKGO, POB 1644, Cumberland MD 21502. 301-722-6666.

Collector wants stereo station jingles on reels or CD. D Hedrick, Pro-Mix Services, POB 496, Panacea FL 32346. 904-926-8000.

Commercial pre-recorded open reel tapes by RCA, Mercury, Livingston, Westminster, etc, 2-track only, in-line or stacked heads. P Chance, 215-574-8147.

TEST EQUIPMENT

Want To Sell

HP 8614A signal gen 800 MHz, 2.4 GHz works intermittently, \$500; HP2590B microwave freq converter, \$250. D Kerl, 2320 Holiday Dr, Janesville WI 53545. 608-757-9259.

Tektronix 1401A/323 portable RF spectrum analyzer. R Lankton, WIKX, 4810 Deltona Dr, Punta Gorda FL 33950. 941-377-1488.

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

Coming out of retirement in Laredo Texas, mid 50 year old radio operations/production/announcer, FT or PT in So West. Fax 610-647-5121.

Hardworking AT at small stations in large markets seeking FT anywhere in Northeast, have PD, MD, research experience. Bill Webb, 216-932-9118.

Successful GM seeks management position in S.E. for large market, non-commercial. Contemporary Christian Music FM station. Extensive radio exper, great fund raising skills, high integrity, solid staff builder. Send responses to: Radio World, POB 1214, Falls Church VA 22041. Attn: Box #95-12-27-1RW.

Assistant promotion director with college degree & 2 years experience at a Philadelphia top 40 station seeks employment. Willing to relocate. Eric, 610-497-1275.

Broadcast Technician seeking position at AM radio or TV station, reliable, hardworking, will relocate, FCC general license. Jeff, 818-360-2514.

Competent broadcasting graduate w/positive attitude seeking employment w/growing station, have confidence & ambition, willing to relocate & adjust. Kelly, 405-677-0923.

Hard working AT seeks AT or first PD position in Central/Southern Oregon, prefer country or soft AC. Shawn, 503-664-1491 lv msg.

Program Director/AT, country my specialty, seasoned 17 yr pro will consider all areas, all situations. Jay, 407-335-1921.

Seeking an on-air talent who's great at copywriting & production & is a deadly sales weapon. call Jess Diamond. 405-942-8438.

Seeking on-air position, trained, willing to learn, work & relocate if necessary. Brad, 405-631-3538.

Computer-literate CE with 18 years experience in high power FM, directionals, RPU, satellite & DCS programming, seeking stable position in top 100 market. S Boucher, 616-722-9606.

Young workhorse looking for an opportunity. Gd production/copywriting. 3 yrs exper w/board-operations & announcing, want to make the next step. Brian, 313-283-3112.

HELP WANTED

CCA ELECTRONICS SALES ENGINEER

CCA is expanding its Sales Department. If you are a Broadcast Engineer looking to earn more, increase your knowledge and want to stay in touch with Broadcasters, we need to talk. This position requires experience in FM and AM transmitters and broadcast systems. CCA's Corporate Office and Factory is located in metro Atlanta. Send your resume and references to:

Mr. Howard Ginsberg
CCA Electronics, Inc.
360 Bohannon Road
P.O. Box 426
Fairburn, GA 30213
Fax: 770-964-2222
E-mail:

hmngnsbrg@ix.netcom.com
CCA is a drug-free workplace

HELP WANTED

NH CHIEF ENGINEER

Full Time opening
5 Years Experience
5K AM directional, DA-2, Class B FM. Must know digital storage, computers, telephone, RF, all forms of broadcast engineering, design and construction. Send resume to Ray Garon, VPGM, WZID/WFEA
Saga Communications
500 Commercial St
Manchester, NH 03101
or Fax: 603-669-4641
EEO. No phone calls.

Northern Lights Public Radio seeks CE for co-located AM and 2 FMs. Maintenance of studios, transmission systems, satellite downlink, translators. Officially a half-time salary, but additional paid hours are common. Excellent Benefit. Lots of contract work available in market. Apply to: Personnel Office, University of North Dakota, Box 8010, Grand Forks, ND 58202. Or call Tom, (701) 777-2577. AA/EEO employer.

Broadcast Electronics, Inc. (BEI) is a global leader in radio broadcast equipment technology. BEI is currently experiencing rapid growth with its program automation systems and digital audio storage products which require the addition of regional sales managers and customer service engineers.

Regional Sales Manager

Must have three years experience in direct "systems" selling, preferably with products that have a high software content and high user interaction. Effective presentation skills as well as excellent interpersonal and organizational techniques is essential. The ability to interact comfortably with decision makers at all levels is required. Traveling extensively throughout the region is required.

Customer Service Engineer

Assist customers with installation and training, routine operation and troubleshooting of digital storage products and program automation systems. Must have experience in setup, operation and maintenance of personal computers. PC experience should include DOS, Windows and Local Area Networks. Position involves extensive travel in both the US and abroad. Good communication skills are essential.

We offer a competitive salary and comprehensive benefits.

For confidential consideration, please mail or fax resume to Steve Wall, Director of Human Resources:
Broadcast Electronics, Inc.
4100 N. 24th St., Quincy, IL 62301
(217) 224-9607

MARATHON PRODUCTS COMPANY

Audio Cartridge Rebuilding Division

Rebuilding/reloading, like new, all brands, any length up to & including 3.5 minutes, \$1.95 for Standard Tape, \$2.15 ea. for HOLN Tape. FOB out plant, 48 hrs delivery. (New rate effective 3/1/95)

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 (163) On Reader Service Card

TEST EQUIPMENT...WTS

Narda 25223 directional coupler 1.7 to 4.2 GHz w/20 db tap, \$35; Kay 154C sweep generator (delux) 0-110 MHz less marker plug-in, vgc, \$130. J Cunningham, KEOR/KHKC, Rt 2 Box 113B, Stonewall OK 74871. 405-265-4496.

Bird 43 watt meter, 50W slug & 500W slug with case, tuned for FM, \$275; Bird 8201 500 W 50 ohm RF load, air cooled, \$275. B Barrett, KZPI, 485 Dover Glen Dr, Antioch TN 37013. 615-399-8059.

Fluke 8520A 5-1/2 digit precision bench digital voltmeter, \$295; CM-30 Tek polaroid scope camera for 400 series frames, \$95. G Wachter, KFYI, 631 N 1st Ave, Phoenix AZ 85003. 602-817-1030.

Misc spare parts, spring scales, VU meters, cart adj tools, oscillator, dist meter, AC VTVM, patch bays, misc stereo components, BO. L Prezant, Record & Play, POB 412, Tuckahoe NY 10707. 718-548-1623.

Want To Buy

Hickok 650/800 tube tester manuals & literature, scrolls etc. Sony Studios, Timo 212-833-4984.

TRANSMITTERS

Want To Sell

CCA FM-10000D 10 kW FM, no exciter, has spares, harmonic filter, directional coupler & AC panel breaker boxes, Best Offer. D Lacy, Mtn States Broadcasting, Colorado Springs CO. 719-636-2470.

CONTACTORS BY GELECO

Ph: (416) 421-5631
Fax: (416) 421-3880

Gates BC1-J AM transmitter, operating & in good condition, will put on your frequency, \$2500. J Cunningham, KEOR/KHKC, Rt 1 Box 113B, Stonewall OK 74871. 405-265-4496.

PETER DAHL CAN DO JUST ABOUT EVERYTHING A BROADCASTER NEEDS EXCEPT THE MORNING SHOW



**Heavy Duty Transformers
Custom Rectifier Assemblies
Transient Suppressors
DC Filter Capacitors
Three Phase to Single Phase Conversion
TV Beam Power Supplies
24-Hour Tech Support**

(915) 751-2300



Write or Fax for an extensive catalog.
5869 Waycross, El Paso, Texas 79924 • Fax (915)751-0768
E Mail: pdwco@teagle1.com • Internet Address: http://www.teagle1.com/commercial/pdwco/

Circle (8) On Reader Service Card

Gates UHF visual exciter, 90% complete, \$200. D Kerl, 2320 Holiday Dr, Janesville WI 53545. 608-757-9259.

Moseley SCG-4T subcarrier generator; Continental RF exciter switcher. D Kannes, KTAR, 602-234-6347 or FAX 602-266-3858.

RCA BTF 20 E FM transmitter parts including complete PA socket assy, rectifier assy & numerous other parts. R Lan-ton, WIKX, 4810 Deltona Dr, Punta Gorda FL 33950. 941-377-1488.

Collins 5 kW (2), (3) tower phasers, \$150 ea. you pick up. KBAI, POB 1150, Morro Bay CA 93443. 818-466-3468.

Gates BC5P2 5 KW tuned to 1600, works great, \$5000 +s/h. Warren, WAQY, 45 Fisher Ave, E Longmeadow MA 01028. 413-525-4141.

McMartin BA-1K 250, 500, 1000 W AM transmitter, ready to work, \$7000. Luis Rodrigue, WOIZ Radio Antillas, POB 3800, Guayanilla PR 00656. 809-835-3130.

TTC 10 W translators (4). R Tangney, 414-283-4430.

Versa Count power amp, FM 150 W solid state, \$525/Best Offer. Call 516-681-0878.

Gates FM1-C xmtr, operational, BO. Don Kolbert, 507-282-0910.

Harris-Gates FM-10H3 with new exciter in very good condition, some spares; Harris FM-20H3/K mods with new exciter in good condition, some spares; ERI FMS-12 bay high power cycloid style CP antenna with 00' Andrew 3" heliax 90.5 MHz priced to sell. Call 816-628-5959.

QEI amplifiers, exciters and stereo generators. All are reconditioned and are tuned and tested on your frequency. 6 month warranty is included. If you want quality used equipment, call or fax 609-232-1625 and ask for Bob Brown.

Used equipment for sale: Belar SCM-1, Belar RFA-1, Belar FMS-1, Belar FMM-1, Moseley MRC 1600 system, TFT EBS rcvr/generator, Gentner patch panel, and Harris racks. Call Transcom Corp. 800-441-8454 or 215-884-0888.

Want To Buy

McMartin AM/FM transmitter, any model, exciter or stereo modules. Goodrich Ent., 11435 Manderson, Omaha NE 68164. 402-493-1886.

TUBES

Want To Sell

4X150A, 4CX250B, 4-400, 4-1000, 807, 833, 8874, 8877, RCA, Ampere, EIMAC, etc. Westgate 800-213-4563.

D and C Electronics Co.

Lowest Price on Tubes including:

4-1000A/3-1000Z/
8877/4CX250B/833A
4-500/5-500/4-400/
4CX 3500/5CX1500

and much more!
Factory Warranty!

**1-800-881-2374
(904) 688-2374**

Se habla Español
FAX: (352) 683-9595


REBUILT ELECTRON TUBES

Partial List: 6623, 23791, TH150, 6425F, 6427, 8550, 6804, 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**



Svetlana
ELECTRON DEVICES

Quality Power Tubes

3CX2500A3	4CX15,000A
3CX2500F3	4CX15,000J
3CX2500H3	4X150A
3CX3000A7	5CX1500A
3CX3000F7	5CX1500B
3CX10,000A3	572B
3CX10,000A7	5U4G
3CX10,000H3	6550B
3CX15,000A3	6550C
3CX15,000A7	6A57G
3CX15,000H3	6BM8
4CX250B	811A
4CX250BC	833A
4CX250BM	833C
4CX250R	EL34
4CX350A	SV811-3
4CX350AC	SV811-10
4CX400A	TH5-4
4CX800A	TH5-6
4CPX800A	TH6-3
4CX1500A	TH6-3A
4CX1600B	YC130/9019
4CX1600U	8560AS
4CX3000A	SK300A
4CX5000A	SK1300
4CX10,000D	SK1320

- 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.

Broadcasters
Phone: 800-239-6900
205-882-1344
FAX: 205-880-8077

OEMs, Distributors
Phone US: 800-578-3852
Int'l & US: 415-233-0429
FAX: 415-233-0439

Circle (170) On Reader Service Card



Power You Can Trust

Worldwide Power Tube Leadership

- Largest Selection
- Applications Support
- Committed to Quality

Made in U.S.A.

Call 800-414-8823
Int'l. (415) 592-1221
or Fax 415-592-9988



Circle (143) 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 1982 Harris SX1
2.5 kW FM 1978 Harris FM2.5K	1 kW AM 1981 Harris MW1A
2.5 kW FM 1983 Harris FM2.5K	1 kW AM 1966 Gates BC1G
5 kW FM 1969 RCA BTF 5D	5 kW AM 1977 RCA BTA 5L
10 kW FM 1982 Harris FM 10K	5 kW AM 1979 Continental 315-F
10 kW FM 1968 RCA BTF 10D	5 kW AM 1978 Harris MW5A/B
10 kW FM 1971 Collins 830F-1B	10 kW AM 1971 CCA AM 10,000D
20 kW FM 1968 RCA BTF 20E	10 kW AM 1974 CSI T-10-A
50 kW AM Harris MW50C3	50 kW AM Continental 317C

1077 Rydal Road #101
Rydal PA 19046
800-441-8454 • 215-884-0888 • FAX No. 215-884-0738

Circle (35) On Reader Service Card

If you think a new, top quality FM transmitter is expensive... Think Again!



In Powers to 11 KW

- ✓ Reliable Grounded Grid Design
- ✓ Solid State IPA Doubles as Emergency Transmitter
- ✓ Simple Straight Forward Controller
- ✓ VSWR Foldback & Protection
- ✓ Automatic Power Output Control
- ✓ Built-in Line Surge Protection
- ✓ Field Proven Standard Parts
- ✓ **BUDGET PRICED !**

The "ECO Series" ... has ARRIVED!

"The Transmitter People"
Energy-Onix
752 Warren Street, Hudson NY 12534

**518-828-1690
FAX: 518-828-8476**

Circle (116) On Reader Service Card

ADVERTISE
in RADIO WORLD's
Broadcast Equipment Exchange
CALL SIMONE: 703-998-7600



Svetlana
ELECTRON DEVICES

WorldMedia Inc
800-909-6760

3CX15000A7	\$1,800	4CX400A	140
3CX15000A3	1,800	4CX350A/8321	125
3CX10000H3	1,800	4CX350AC	125
3CX10000A7/8160	1,680	4CX250BT/Y497(a)	105
4CX10000A3/8159	1,560	4CX250BM	105
3CX3000F7/8162	660	4CX250BC/8957	105
3CX3000A7	640	4CX250B/7203	105
3CX2500F3/8251	575	4CX250R/7580W	115
3CX2500A3/8161	560	4X150A/7034	105
3CX2500H3	600	5CX1500A	695
4CX15000A/8281	1,395	5CX1500B	695
4CX15000J/8910	1,600	811A	20
4CX10000D/8171	950	833A	90
4CX5000A/8170	880	833C	110
4CX5000R/8170W	880	8560AS	105
4CX3500A	980	TH6-3	1,560
4CX1600B	375	TH6-3A	1,560
4CX1600U	475	TH5-4	560
4CX1500A	650	TH5-6	560
4CX800A	180	YC130/9019	1,600
4CPX800A	215	4-400C	120

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 (14) On Reader Service Card

Want To Buy

4CX3000F7 & 5762 tubes. A Weiner, 97 High St, Kennebunk ME 04043. 207-985-7547.

TURNTABLES

Want To Sell

Russco 3 speed rim drive TT's (2), BO. T Butler, WCVR, Randolph VT, 05061. 802-728-4411.

Technics SP25 (2), \$150 ea; Audiometrics S-220 tone arms (2), \$75 ea; Radio Systems PA-1 preamps (2), \$75 ea. J Franks, WHTH/WNKO. 614-522-8171.

Harris PX-91 (2) stereo preamps; Russco FMSU stereo preamp; Technics SP10MKII; Technics SH-10E pwr unit. D Kannes, KTAR, 602-234-6347 or FAX 602-266-3858.

NEEDLES, CARTRIDGES, BELTS... all major brands including old/obsolete models, one of the largest stocks in the country. Expert consultation. **NEEDLES EXPRESS (800) 358-2030.**

ATTENTION ADVERTISERS!

Radio World

Take note of these
UPCOMING DEADLINES

Deadline for February 7 issue: **January 12**
Deadline for February 21 issue: **January 26**
Deadline for March 6 issue is: **February 9**
Deadline for March 20 issue is: **February 23**

ACTION-GRAM

EQUIPMENT LISTINGS

Radio World's Broadcast Equipment Exchange provides a FREE listing service for radio stations and recording studios only. All other end users will be charged. Simply send your listings to us, following the example below. Please indicate in which category you would like your listing to appear. Mail your listings to the address below. Thank you.

Please print and include all information:
Contact Name _____
Title _____
Company/Station _____
Address _____
City/State _____
Zip Code _____
Telephone _____

I would like to receive or continue receiving Radio World FREE each month. Yes No

Signature _____ Date _____

Please check only one entry for each category:

I. Type of Firm

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
 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

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.
60	ABA Software	126	40	Harris	56
38	AEV SNC	215	43	Harris	148
7	ATI	19	45	Harris	210
32,33	Arrakis	74	48	Harris	40
16	Audio Broadcast Group	43	37	Henry Engineering	179
28	Audio Broadcast Group	203	26	ITC	171
58	Audisar	109	44	J Squared Technical Service	127
63	Audionics	156	57	J&I Audio/Video	55
44	Autogram Corporation	175	60	Marathon Products	163
28	Avcom of Virginia	151	46	Microcon Systems	98
13	BSW	158	49	Modulation Sciences	111
19	BSW	133	55	Moseley	201
36	BSW	27	30	Murphy Studio Furniture	70
51	BSW	80	17	Musicam USA	169
12	Belar	11	53	NAB	—
37	Benchmark Media Systems	25	11	Narda	62
28	Broadcast Devices, Inc.	50	29	Narda	13
4	Burk Technology	32	35	Narda	115
61	CPI	143	31	National Public Radio	193
37	CPI	155	50	National Religious Broadcasters	—
44	Cellcast/Artran	104	18	Neutrik	65
52	Circuit Werkes	208	52	Nott Ltd.	68
28	Coaxial Dynamics	101	10	Orban	213
42	Computer Concepts Corp.	17	27	Otari	86
4	Comrex	51	61	Peter Dahl Co.	8
3	Comrex	154	37	Phasetek	97
13	Conex Electro-Systems	91	20	Potomac Instruments	178
15	Continental Electronics	125	44	Pristine Systems	21
6	Crown Broadcast	165	47	QEI	144
21	Cutting Edge	22	24	Radiosoft	110
38	Dataworld	123	14	Roland Corp.	121
46	Dataworld	81	28	S.C.M.S.	204
34	Dolby	187	41	Shure Brothers	162
62	Econco	14	8	Signal One	113
52	Econco	76	52	Studio Technology	47
61	Energy-Onix	116	61	Svetlana Electron Devices	170
37	Excalibur	129	9	Telos Systems	200
25	Gentner	34	28	The Management	75
22	Ghostwriters	122	61	Transcom Corp.	35
52	Gorman Redlich	206	37	Universal Electronics	45
57	Hall Electronics	99	2	Wheatstone	146
1	Harris	3	64	Wheatstone	176
23	Harris	139	44	Zercom	152
39	Harris	94			

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 check 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
 B. General management E. News operations
 C. Engineering F. Other (specify) _____
 D. Programming/production _____

Reader Service
January 10, 1996 Use until April 10, 1996
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

Copy & Mail to: Radio World, PO Box 1214, Falls Church, VA 22041, or FAX to: 703-998-2966

Advertising Sales Representatives

U.S. East: Skip Tash703-998-7600 Fax: 703-998-2966
U.S. West: Dale Tucker916-721-3410 Fax: 916-729-0810
U.S. Midwest: Sandra Harvey-Coleman317-966-0669 Fax: 317-966-3289
International: Stevan B. Dana+1-703-998-7600 Fax: +1-703-998-2966
Europe: Dario Calabrese+39-2-7030-0310 Fax: +39-2-7030-0211
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.

Ad Production Coordinator Lisa Lyons
Associate Publisher Carmel King
Production Assistants Trina Masters, James Cornett
Production Director Lisa Stafford
Ad Coordination Manager Simone Mullins
Publication/Desktop Systems Mgr Julianne Shannon Stone
Circulation Director Eleya Finch
Classified/Showcase Production Coordinator Vicky Baron
Circulation Manager Steven Bowman
Ad Traffic Coordinator Kathy Jackson
Accounts Receivable Steve Berto

Why Auditronics' 210 console remains radio's virtual standard

The contemporary 210 console contains exactly those features and qualities your on-air people tell us they need to do their best work. Nothing more, nothing less.

The Auditronics 210 has the best record for up-time of any radio console. It just plain works, elegantly, all day, every day, all year, every year.

And, most important in this age of cost concern, we've made our production more efficient, so we can deliver today's 210 console at a price less than that of over a decade ago.

It's no wonder the 210 console continues to be the on-air mixer of choice among quality-conscious broadcasters. Choose the Auditronics 210 for your next console replacement or upgrade. Call 901-362-1350 today for complete information.

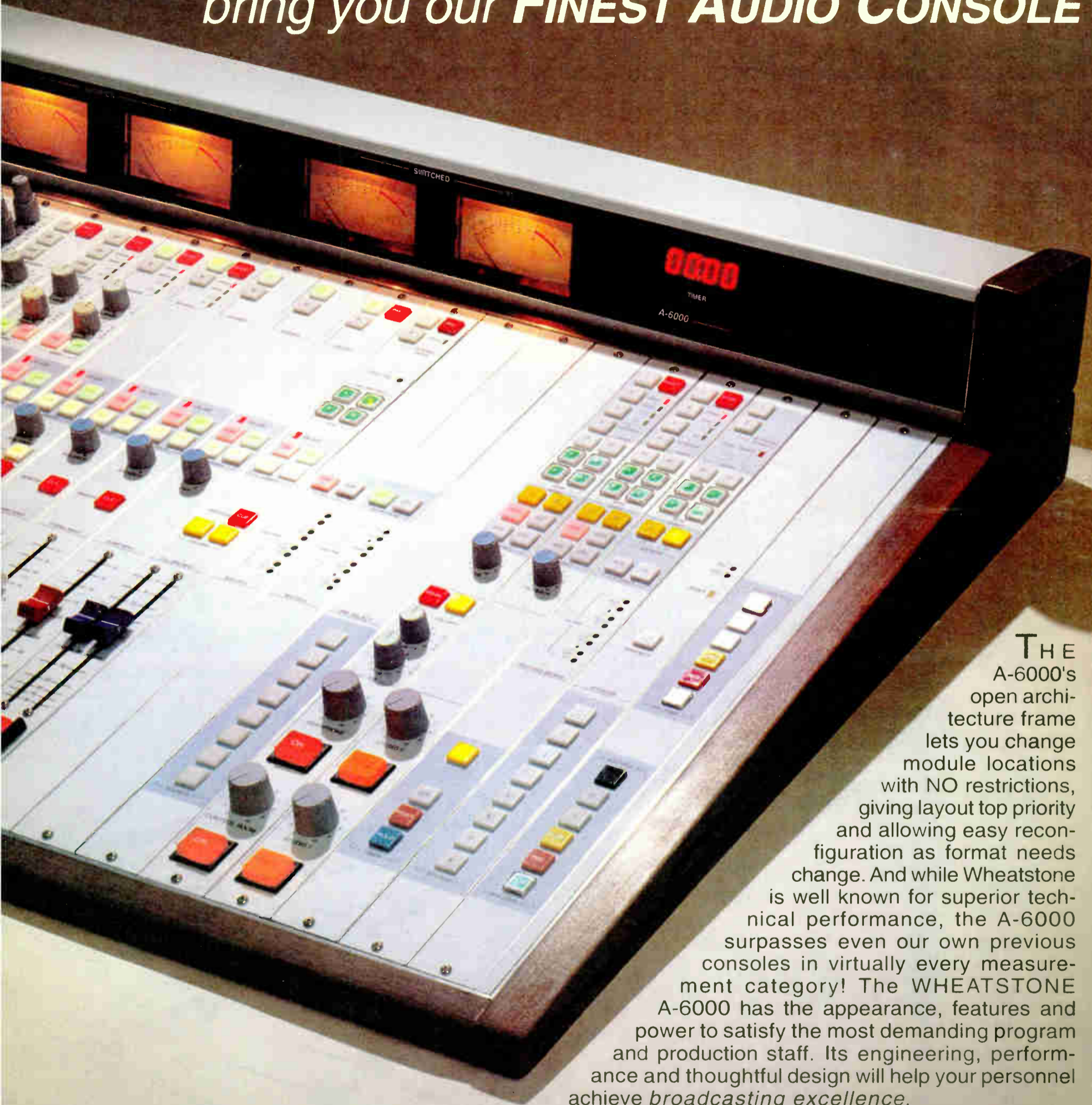
This Auditronics 210-18 in KPFA-Berkeley's on-air studio is one of four 210s in use at the Pacifica Foundation station.



auditronics, inc. 3750 Old Getwell Road, Memphis, Tennessee 38118 • 901-362-1350 FAX 901-365-8629

Circle (156) On Reader Service Card
World Radio History

*We've taken all we know, all you've asked for,
and the very best of today's technology to
bring you our **FINEST AUDIO CONSOLE***



THE A-6000's open architecture frame lets you change module locations with NO restrictions, giving layout top priority and allowing easy reconfiguration as format needs change. And while Wheatstone is well known for superior technical performance, the A-6000 surpasses even our own previous consoles in virtually every measurement category! The WHEATSTONE A-6000 has the appearance, features and power to satisfy the most demanding program and production staff. Its engineering, performance and thoughtful design will help your personnel achieve *broadcasting excellence*.

A - 6 0 0 0 B R O A D C A S T C O N S O L E

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

 Wheatstone Corporation

Circle (176) On Reader Service Card

World Radio History