

\*\*\*\*\*3-DIGIT 857  
 S117298 D08 9802  
 TOM MILLER 159  
 ASST CHIEF ENGINEER  
 KTZR  
 2033 S AUGUSTA PL  
 TUCSON AZ 85710 7905

### Big Rocks, Little Birds

This year's Leonid meteor storm may be the heaviest in recent memory. Is radio ready?

See Page 32

### Special Focus

Recordable media are at the heart of your radio station.

Inside Studio Sessions



# Radio World

The Newspaper for Radio Managers and Engineers

August 19, 1998

## INSIDE

### NEWS

▼ RW gets inside the major expansion at all-digital Radio Free Asia.

See Page 25



▼ Sine Systems is rebuilding in the wake of a tornado and the death of its owner.

See Page 3

### ENGINEERING

▼ You have a tower project in the works. Are you ready for the zoning board?

See Page 29

▼ Not happy about the new automated voice of the NWS? One supplier has an EAS encoder just for you.



See Page 38

### GM JOURNAL

▼ Business is hopping in "Hotlanta." Market Watch.

See Page 43

▼ Amid soot and flames, radio covers the Florida fires.



See Page 43

### STUDIO SESSIONS

▼ RW reviews the Harrison Pro 950, Alesis Wedge and Akai Digital Personal Studio.

See Page 55

Check out RW Online at [www.rwonline.com](http://www.rwonline.com)

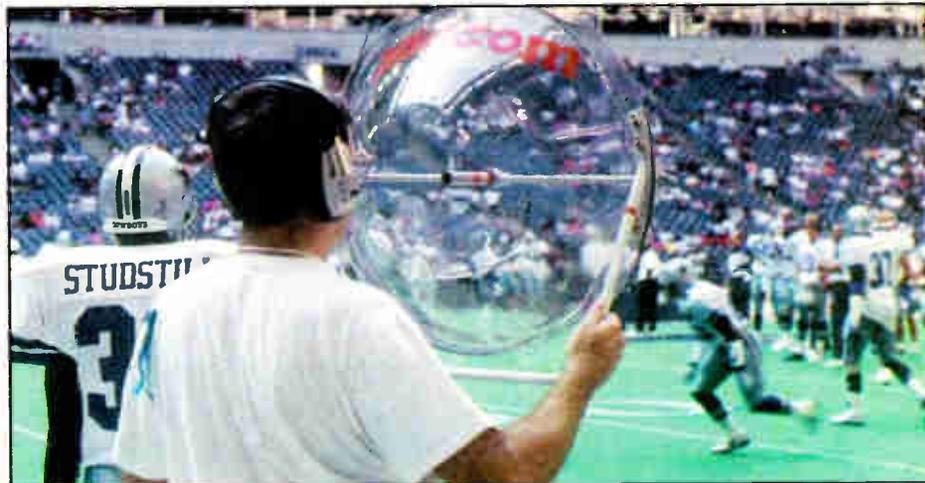
## Radio Puts Big Money on NFL

by Randy Stine

**ARLINGTON, Va.** It's football season again, and as leaves start to turn and pro teams line up for the first snap, radio stations are spending big dollars to bring the sport to their listeners. Stations have spent millions of dollars to secure local broadcast rights to NFL franchises, and they are looking to get their money's worth through extensive live coverage, pre- and post-game shows, and special promotions.

On the national side, Westwood One and CBS Radio Sports have teamed up to share exclusive national radio broadcast rights to the National Football League. This fall marks the first time the networks have joined forces to produce and distribute NFL broadcasts under one banner. CBS Inc. owns 25 percent of Westwood One.

Westwood One/CBS Radio Sports will combine to offer a total of 87 NFL games, broadcast on hundreds of affiliates across North America and the world. Coverage begins with the Washington



Midcom uses several parabolic mics for NFL game coverage.

Redskins at the New York Giants on Sept. 6, at 1 p.m. Eastern time.

Radio stations have the option of taking the Westwood One or CBS Radio Sports coverage. Westwood One games include Sunday afternoon doubleheaders. NFL broadcast rights were grandfathered to Westwood One when Westwood acquired Mutual Radio four years ago.

Westwood has carried on Mutual's tradition of NFL coverage spanning more than 30 years.

The NFL coverage on CBS Radio

See NFL, page 12 ▶

### The Next Generation Digital Console



#### Harris DRC 2000 Digital Radio Console

Harris is proud to introduce the next generation Digital Radio Console, the DRC 2000. Features include a new low profile design that emulates familiar analog consoles, minimizing operator training and on-site installation costs. The DRC 2000 is the world's most advanced digital radio on-air console. Yet, it provides the simplicity of the analog console operation. Best of all, it's ready to ship!

Harris Corporation  
Broadcast Division

1-800-622-0022  
 FAX: 765-966-0623  
[www.broadcast.harris.com](http://www.broadcast.harris.com)



© 1997 Harris Corp.

## New York Tackles EAS Headaches

by Lynn Meadows

**ALBANY, N.Y.** New York, with its rolling wine country, mile-high mountains and big cities, has 62 counties and approximately 18 million people to alert if something goes wrong.

For emergency planning purposes, the state is divided into 32 local areas. The populations of those areas vary from the 7.3 million who live in New York City, to counties with fewer than 1,000 people.

The "Big Apple" actually was one of the easiest parts of the Emergency Alert System plan to complete, according to State Emergency Communications Chairman Robert Hill.

Getting emergency alerts to stations in the rural counties where there can be more cows than people was the real challenge.

See EAS, page 10 ▶

# NEWSWATCH

## Chancellor Buys Into Radio Centro

**IRVING, Texas** Chancellor Media Corp. plans to buy 50 percent of Mexican broadcaster Grupo Radio Centro, Latin America's largest pure-play radio company, for \$237 million. GRC has six AMs and six FMs. GRC acts as the national sales representative and provides programming for a network of more than 90 stations in Mexico.

As part of the agreement, Chancellor and GRC have agreed jointly to pursue opportunities in the

United States Spanish-language radio market. The boards of both Chancellor and GRC have approved the deal. The Aguirre family will retain control of GRC, with Adrian Aguirre continuing as president and chief executive officer. The deal is expected to close in the fourth quarter.

## Naab Named PR&E Head

**CARLSBAD, Calif.** Equipment manufacturer Pacific Research & Engineering

has named Donald Naab as president. Jack Williams previously held three positions: president, chairman and chief executive officer. Williams will remain chairman and CEO.

He stated, "This appointment continues the transition of an engineering founded and managed company to one directed by experienced, professional management with a solid understanding of technology. Don brings to PR&E a successful track record which includes international operations, product development, sales and marketing, internal growth and acquisition integration."

Prior to joining PR&E, Naab was pres-

ident of Hazard Sensing Sector. Naab holds a Bachelor of Science in electrical engineering from the University of Wisconsin and an MBA from the University of Notre Dame.

## Hundt Joins Ascend Board

**ALAMEDA, Calif.** Former FCC Chairman Reed Hundt has joined the board of directors of Ascend Communications, which develops and manufactures wide area networking

See NEWSWATCH, page 3 ▶

# Index

## FEATURES

- The Zoning Board and Your Towers**  
by Tom Osenkowsky 29
- The Best Mic Cables Ever Made'**  
by Steve Lampen 30
- Leonid Storm Could Wreak Havoc**  
by Bill Sepmeier 32
- Workbench**  
by John Bisset 34
- Encoder 2: Making EAS Better**  
by Lauren Darr 38

## GM JOURNAL

- Atlanta Radio Market Booms**  
by Lynn Meadows 43
- I've Seen Fire, Rain: The Florida Inferno**  
by Peter King 43
- Doo-Wop Cop Patrols the Airwaves**  
by Bob Rusk 44
- Promos and the Frequency Figure**  
by Mark Lapidus 51
- Internet Web Radio: Is It Really Radio?**  
by Alan Haber 51
- Group Tunes to Old-Time Radio**  
by Bill Moffett 53

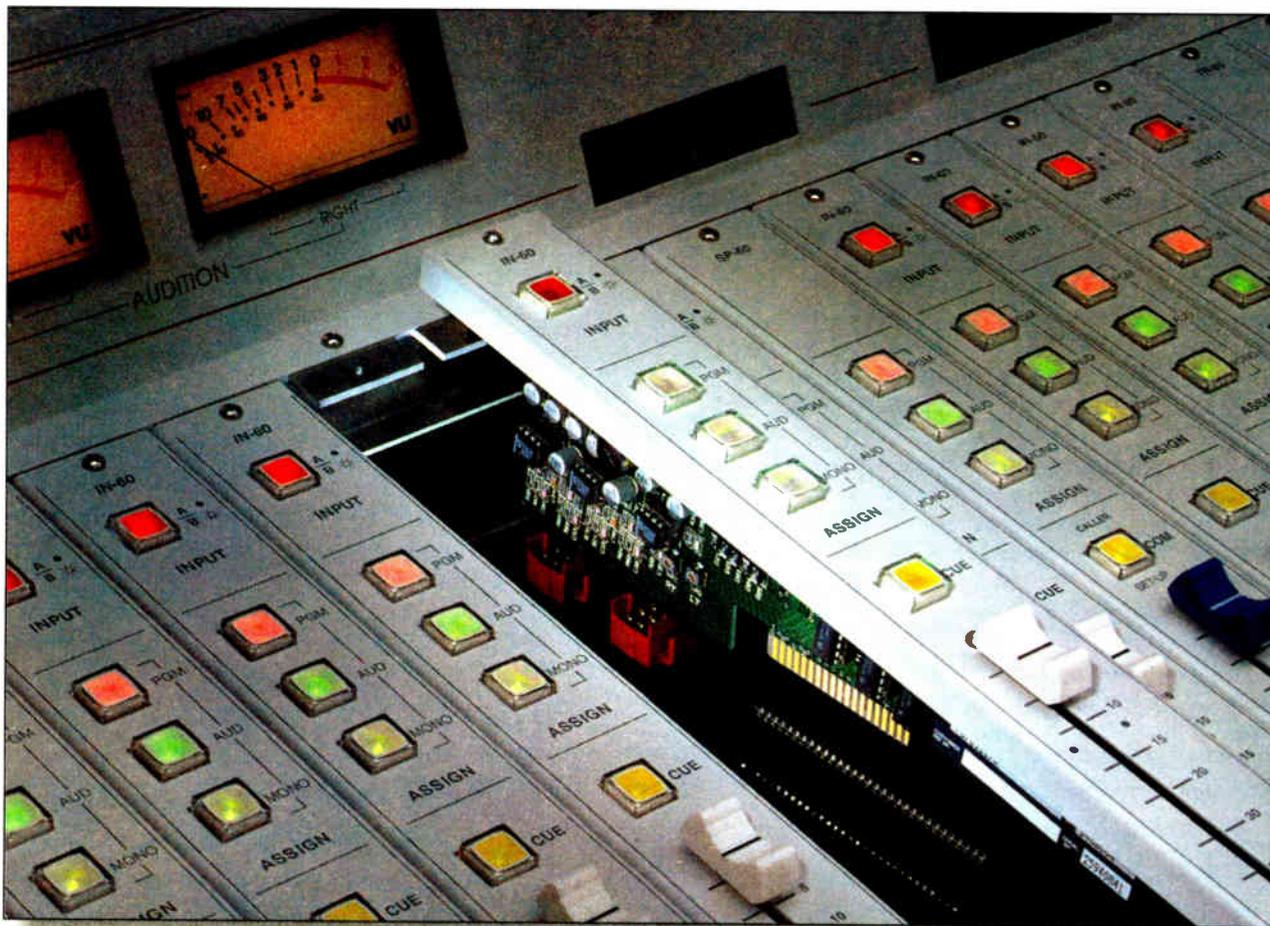
## STUDIO SESSIONS

- Harrison Pro 950: Analog Rules**  
by Sam Caputa 55
- Alesis 'Wedges' Lots of Reverb Into Small Box**  
by Rich Rarey 55
- Akai Digital Studio Fits on Lap**  
by Ed LaComb 63
- Could the V/O Life Be For You?**  
By Travis 63

## FOCUS ON RECORDABLE MEDIA

- Tape or Disk, the Beat Goes On**  
by Alan R. Peterson 56
- Radio Users Speak Up About DAT**  
by Ralph Sanchez 56
- Ripping: Technical, Legal Aspects**  
by Carl Lindemann 58
- DVD: The Future Gets Closer**  
by Alan R. Peterson 60

# 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.

<b>FREQUENCY RESPONSE</b>	
Line (10Hz-20KHz)	±1/10dB
Mic (20Hz-20KHz)	±1/10dB
<b>THD+N (20Hz-20KHz)</b>	
Line, +4dBu	.005%
Mic & Line, +16dBu	.005%
<b>IMD (SMPTE)</b>	
Mic & Line, +4dBu	.004%
<b>DIM</b>	
Mic & Line, +16dBu	.005%
<b>DYNAMIC RANGE</b>	
Line	114dB
Mic	98dB
<b>HEADROOM</b>	
ref +4dBu	24dB
<b>OFF &amp; ASSIGN ISOLATION</b>	
1 KHz	-110dB
20 KHz	-105dB
<b>BUS CROSSTALK</b>	
1 KHz	-100dB
20 KHz	-75dB

600 Industrial Drive, New Bern, NC. 28562  
tel 919/252-638-7000 / fax 919/252-637-1285  
E-mail: email@wheatstone.com

 **AUDIOARTS' ENGINEERING**

**DIGITAL BOX**

## CD Radio Signs Agreements

**NEW YORK** CD Radio has signed more programming agreements, this time with World Radio Network Limited and SUSALUD, a Spanish-language programmer. The London-based WRN presents English language news and public affairs programming from more than two dozen broadcasters worldwide. Under the agreements, CD Radio will carry WRN programming and SUSALUD's 24-hour health service on one channel each of CD Radio's planned 100-channel satellite-to-car subscription service.



## AMRC Builds Program Team

**WASHINGTON** The other licenseholder to provide satellite-to-car digital audio service, American Mobile Radio Corp., has hired another programmer to its expanding staff. Dave Logan, most recently vice president of programming for Sony's SW Networks, has been tapped to work with Lee Abrams, senior vice president, programming and content for AMRC. Logan and Abrams collaborated on programming WLUP-FM Chicago, KFOG(FM) San Francisco and WNEW(FM) New York.

— Leslie Stimson

# NEWSWATCH

► **NEWSWATCH**, continued from page 2 packages for telecommunications carriers and Internet service providers. Ascend President/Chief Executive Officer Mory Ejabet said, "Reed is a true visionary in this industry, having led the effort to free up telecom competition that is today yielding benefits for individuals and business across the United States."

Capstar and Triathlon have approved the deal, which calls for Capstar to pay \$13 in cash per share.

The deal is expected to close in the second quarter of 1999.

## SBE Begins Résumé Service

**INDIANAPOLIS** The Society of Broadcast Engineers has begun a résumé service, designed to put job seekers and employers together.

SBE members may submit five copies of their résumé to the SBE national office in Indianapolis. They will also be asked to complete a questionnaire outlining job preferences, location, and other information.

For \$25, prospective employers may request résumés from the SBE that meet the qualifications for a position they have available. That fee is being waived through Sept. 30 to help get the program started.

For more information, call (317) 253-1640.

## ITU Approves Test Method

**GENEVA** The International Telecommunication Union has approved a new measurement method designed to provide an objective method for assessing audio quality.

Instead of relying on signal-to-noise ratio (SNR) or total harmonic distortion (THD), the new method will enable a continuous, automatic check of audio quality at levels agreed upon between a broadcaster and a network operator.

It also can detect malfunctions in audio coding systems before a circuit is put into service.

Development of the method began in 1994 in response to the rapid convergence of the telecom, broadcast and computer industries.

# Sine Systems Moves Ahead

## Company Moves to Temporary Location Following Dual Tragedies

**NASHVILLE, Tenn.** Employees are re-building Sine Systems following April's twin tragedies of a tornado and the death of company founder John Pate.

The company has moved to a temporary location in the city of Nashville while waiting for a new roof to be built at its former building.

The company is back at full production and shipping capacity, according to company officials. The tech support and repair operations are operating normally as well.

Sine Systems is perhaps best known for its remote control equipment for transmitters. Expanding beyond remote-control equipment, Sine Systems engineers also designed, built and sold an audio switcher for use in Prophet Systems broadcast automation systems.

At the time of his death in April, Pate was sole owner of Sine Systems, which incorporated in 1984.

Two of Sine's employees now co-own the company. Pate left the company to Susan Ford and Marc Pezzolla (RW, May 13).

Ford and Pezzolla hope to move back into the former building by the end of the year. Their timetable is uncertain, because several businesses in the area also are re-building in the wake of the tornado.

Said Pezzolla, "We still get calls from people wondering if we're still in business. Considering the circumstances, things are going well. ... The industry has been supportive." Pezzolla said Sine has received supportive cards and letters from radio stations and other clients.

The temporary address for Sine Systems is: 1204 Demonbreun St., Nashville, TN 37203. The company phone number remains the same: (615) 228-3500.

— Leslie Stimson



Storm Damage at the Sine Plant

# WHAT COMES AFTER DIGITAL?

In the beginning, there were stone axes. Then came fire, the wheel, and the steam engine. Then came analog audio and then digital audio. What comes next?

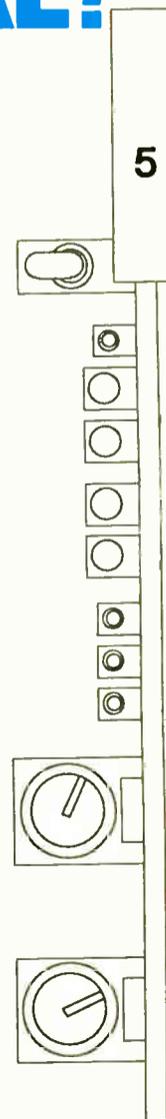
Certainly the stone wheel must have looked to the caveman to be the greatest discovery that ever could be. And to the simple farmer of the 1800's, the steam engine was the most modern contrivance that his mind could imagine. But neither was a terminal technology. Both have been replaced as time marches on.

Digital audio is also not a terminal technology. It is simply where we are now.

Want to know what comes after digital? Call (724) 772-2310 and ask for our white paper "Artificial Intelligence, It's What Comes After Digital". While you're at it, you could also ask for a no-obligation, 10-day demo of COBALT BLUE™, the world's first Neural Network audio processor.

**CLARK COMMUNICATIONS**

221 Commerce Park Drive,  
Cranberry Township, PA 16066-6403  
(724) 772-2310 Voice (724) 772-4770 FAX



# RFA and the New Digital Paradigm

When you walk into the offices of Radio Free Asia on M Street in Washington, D.C., you might think you were in any office in any city. You see many cubicles stretching into the corners on two floors of this building. Employees work the phones; visitors come and go.

But take a closer look at the workstations in those cubicles. Stroll past the Master Control room near the receptionist's desk or the many modular and permanent studios down the hall. And when you bump into an information minister or a dissident from an Asian nation, followed by a pack of journalists, or when you notice the Dalai Lama sitting in a studio being interviewed, you know you're not in Kansas anymore.

RFA is the subject of the first in a series of **RW** articles called *Transition to Digital*, which will look at how radio facilities are implementing digital technology. RFA is a suitable subject. It is a two-year-old broadcast organization funded by federal dollars. Its managers face a considerable task: to collect news and information from sources around the world, create programming for listeners in eight languages, and send it to short-wave transmitters for use by listeners in another hemisphere.

That mission, in itself, is not unprecedented. But the technical staff at RFA set for themselves another goal: to create a true digital, all-access facility, one that is free of so-called "sneaker nets." Here, they said, no one will carry audio media up and down the hallway — not even on computer disks. They decided that files should be handled as easily and quickly as word processing documents, across multiple audio systems.

This is a goal about which radio people have talked for years. Few facility managers have had the resources to achieve it. Radio Free Asia is helping to realize the new paradigm.

Technical Editor Al Peterson and I visited RFA last winter, to discover how the organization works. I returned this summer, in time to see the dust flying during RFA's recent \$2.3 million expansion of its Washington plant. At that time, I sat down

with David Baden and his staff, to ask about the lessons they learned. You can read their answers on page 25.

One of the most important themes



RFA manages its audio flow with the BE AudioVAULT. Bob Susi and Gordon Burnett work in Master Control.

that came through: "A data file is a data file."

"You have to change your mindset when you get over to digital audio," Baden told me. "You have to start thinking, 'This is no longer a standalone tape that's an audio program with squiggly lines that look like a WAV file. It is a data file.' It is no different than dragging an ASCII text file from Word to WordPerfect or any other word processor, as long as you have the tools to convert it or make sure the systems you're running are standard."

Why should we care about the technical plant of a radio facility whose programs can't even be heard on our car radios?

First, RFA has done a tremendous amount of research into its expansion. As my golfing friends like to say, "Go to school on the other guy's putt. Watch and learn." Reading about RFA, you may learn lessons that will help you in your own station or group.

Second, despite its international mission, the facility is based here, in the United States. Third, it's your tax money at work.

For a more detailed inventory of the gear at RFA, and for more photos of the plant, visit our Web site at [www.rwonline.com](http://www.rwonline.com). There you will also find some

impressive examples of the 3D documentation that the Radio Free Asia staff has created to help its technical staff of 40.

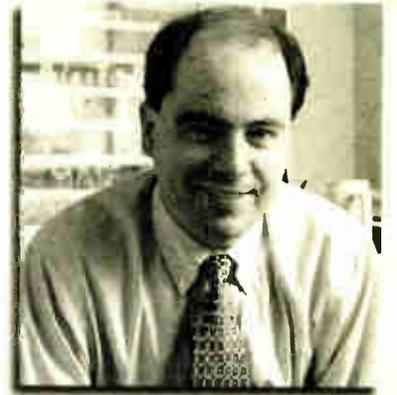
\*\*\*

Then turn to our special *Focus on Recordable Media*, in the Studio Sessions section. Radio Free Asia, we discover, is far from the norm. Al Peterson and his writers demonstrate that removable media like DAT and MiniDisc remain an important part of everyday life at radio stations. Even the old familiar cart is still a presence. Who will buy the last cart tape? We may not find out for a while.

\*\*\*

The attentive reader will know that I am a big supporter of radio equipment suppliers. Here's a tip of the editorial baseball hat to my former coworkers at

## From the Editor



**Paul J. McLane**

Bradley Broadcast Sales. The dealer has completed its move into bigger, better quarters in Frederick, Md.

The company's 16 employees now are working in 10,000 square feet of office and warehouse space, in a facility not far from I-70 and I-270. That's west of Baltimore and north of Washington, about 45 minutes north of the company's previous location in Rockville, Md.

Bradley was founded in 1983 by Ted Veneman, whose family runs a music and pro audio business in the Washington area. The first employee was Art Reed, now the general manager. If you don't have a copy of the company's fine catalog, give them a call at (800) 732-7665. Their new business number is (301) 682-8700 and the fax is (301) 682-8377.

Congratulations, guys.



Bradley staffers pose in their new front lobby.

*Burk puts you in control.*



**ARC-16: The industry standard  
for multi-site transmitter remote control.**

**BURK**  
TECHNOLOGY

Toll Free 1-800-255-8090 • email: [sales@burk.com](mailto:sales@burk.com)

With  
**NEW**  
**AutoPilot**  
FOR WINDOWS

*"It's almost like  
standing in front of  
the transmitter!"*

## READERS FORUM

Letters received are the property of RW, and may be edited for space considerations.

### Effects to the Maxx

Dear RW,  
I wanted to use this opportunity to give a more technically accurate explanation about the audible effect of MaxxBass (RW, April 1).

Rather than "generate" lower frequencies not present in the original sound, MaxxBass actually "reveals" low frequencies that were not audible due to limitations in low-frequency reproduction and perception in average listening conditions.

MaxxBass lets the ears perceive low pitches through higher frequencies — basically higher harmonics — by taking advantage of a psychoacoustic effect known as "the missing fundamental."

The fundamental pitch can be perceived from a series of harmonics that does not include the fundamental. MaxxBass generates these high harmonics, through which

the harder-to-perceive lower pitches are revealed.

Pipe organ builders have been using a similar trick for a long time. When there was no space for long pipes required for very low frequencies, they would use combinations of shorter pipes. The higher harmonics would psychoacoustically reinforce the missing low fundamental tone.

*Meir Shashoua  
Chief Technical Operator  
ksWaves, Ltd.  
Tel Aviv, Israel*

### Mic check

Dear RW,

Regarding Rich Rarey's review of the Earthworks Z30X microphone (RW, July 8): I appreciate the fact that you tested the mic on spoken voice. What sounds good on a lead vocal often is not what we need for voice-overs.

I think the article could have been improved by testing the mic on more than one voice (or by giving us some description of the voice that was used), by comparing it to more than one mic and by more care in his choice of words.

I'm particularly puzzled by his characterization of the U87's "mid-frequency rise in the sibilance range at about 1.2 kHz." Wouldn't most readers agree that sibilance occurs much higher in the spectrum — in the neighborhood of 4-8 kHz? On top of that, I used to own a U87, and I remember it having a bit of a bump at about 400 Hz, but not in the mids or especially in the "sibilance" range.

I'd like to know more about the self-noise issue. What happens when one applies everyday levels of compression?

Ultimately, it seems to me that the editors of RW could help their reviewers communicate more effectively.

*Dan Popp  
Owner  
Colors Audio  
Akron, Ohio*

Rich Rarey replies:

*Mr. Dan Popp is quite correct when he pointed out that sibilance occurs at a higher frequency than 1.2 kHz; the value printed should have been 3.2 kHz, and we apologize for the error.*



Earthworks Z30X Cardioid Microphone

*In Alton's "Audio in Media" (4th edition) sibilance is described as "the stronger, more annoying high-frequency*

## Recording In Progress

As recording technology has improved over the years, products and formats have experienced varying degrees of success. Tape technologies retired transcription disc recording lathes from studios decades ago. The Digital Compact Cassette failed to take off, but MiniDisc is enjoying a second wind. DAT never caught on as a consumer format, but it became popular for archiving radio spots and production elements. Now that anyone can record CDs, the sky has become the limit.

The computer crossover has added several new words to the broadcaster's vocabulary — including burning, ripping, Jaz, MO and Flash RAM — as newer digital devices continue to infiltrate the studio. Hard disks also must now be considered part of the family, with the trend towards networked digital audio retrieval and tabletop "instant" playback devices.

Analog favorites endure. Many radio operations, including a number in large markets, still are cart-based, and may remain so for a while. Meanwhile, clients ask for cassette dubs of their spots. Program directors audition new talent on C-10 tapes. News directors maintain boxes of old reels with interviews and highlights. Those reels may get burned onto a CD-R ... someday.

The five-year death watch for analog tape is running late while the digital transition continues, which means radio continues to enjoy a mix of media formats. Although each offers its own benefits, proponents of each must stay in step with real-world compatibility issues. Can another station play back a dub on a Zip disk? Will the digital delivery company accept your analog reel? Will the AM studio down the hall play back a stereo cart? How long can a recording format last before the next great thing comes along?

This issue of RW includes a Special Focus on Recordable Media, with products as diverse as the selection of formats found up and down the AM and FM dials. The choices are numerous. But for now, the only product we in radio can offer is *sound* (the data part is coming). Whether the audio is digital or analog, the quality of our product must be high. Our audio must be produced in the shortest time possible, and it must be compatible with the outside world.

Any format that hopes to win the support of radio users in the future must meet these basic conditions. At present, there is still a lot to choose from.

— RW

## Write to Us

RADIO WORLD  
READERS FORUM

P.O. Box 1214  
Falls Church, VA 22041

[radioworld@imaspub.com](mailto:radioworld@imaspub.com)

sounds around 3,200 Hz such as 's,' 'z,' 'ch,' and 'sh.'"

White's Audio Dictionary (1987) describes de-essers as operating "only at high frequencies, usually above 3 or 4 kilohertz."

Interestingly, in Borwick's "Sound Recording Practice" (2nd edition), he shows a figure of typical de-essing threshold curves, with the lowest threshold (least amount of signal required to cross the threshold) at about 8 kHz.

The voice we used for the Z30X microphone was "Talk of the Nation" host Ray Suarez. Ray's voice is familiar to millions of listeners, and especially familiar to me, having heard it on mic two hours a day, four days a week, for almost two years.

Regarding the Neumann U87's response, in reviewing the "Frequency Responses and Polar Patterns" page

from the U87 owner's manual, the U87 has a published response that rises +2dB from about 5.2 kHz to 12 kHz. In contrast, the Earthworks Z30X published typical frequency response is flat from 35 Hz to 22 kHz. This correlates the difference in response we heard in our comparison of the two microphones.

As far as Mr. Popp's valid question about the Z30X's self-noise when using "everyday levels of compression," we did not use any compression or processing on our evaluation of the Z30X because the wide variability of compression amounts and range of equipment make such reporting too subjective to be meaningful.

Mr. Popp's everyday compression values might be more or less than ours, and his compressors may be noisier or quieter than ours. In the case of the Z30X, our review mentions that the self-noise is audible only at extremely high, unnatural monitor levels when compared to a U87.

We thank Mr. Popp for his constructive criticism, and will make every effort to make future reviews more valuable.

## Correction

The Richmond Market Watch (RW, July 8) incorrectly identified WKJS(FM), owned by FM-100 Inc., as an oldies station. The station has been rated in two books as an adult urban contemporary station. FM-100 also owns urban contemporary WSOJ(FM) and contemporary gospel station WREJ(AM).

A letter in the July 22 Reader's Forum stated that Anita Bonita worked at WNEW(FM). It should have read WNEW(AM).

## Radio World

Vol. 22, No. 17 August 19, 1998

telephone: (703) 998-7600  
editorial fax: (703) 820-3245  
e-mail: [radioworld@imaspub.com](mailto:radioworld@imaspub.com)  
Web site: [www.rwonline.com](http://www.rwonline.com)

The editorial staff can be contacted at the phone extensions listed below.

- Paul J. McLane** ..... Editor  
ext. 117
- Sharon Rae** ..... Managing Editor  
ext. 126
- Alan Peterson** ..... Technical Editor  
ext. 135
- Leslie Stimson** ..... News Editor/  
Washington Bureau Chief  
ext. 129
- Brian Galante** ..... Assistant Editor  
ext. 146
- Thomas R. McGinley** ..... Technical Advisor
- Stevan B. Dana** ..... Publisher/CEO
- Carmel King** ..... Chief Operating Officer  
ext. 157
- Robert "Skip" Tash** ..... Associate Publisher  
ext. 160
- Marlene Lane** ..... Editorial Director  
ext. 128
- Alan Carter** ..... Editor in Chief (International)  
ext. 111
- T. Carter Ross** ..... Editor (International)  
ext. 137
- Christine Joaquim** ..... Managing Editor (International)  
ext. 138
- Rogelio Ocampo** ..... Latin America Managing Editor  
ext. 121
- Marguerite Clark** ..... European Editor
- Linda Sultan** ..... Editorial Assistant  
ext. 141

**Contributors:** W.C. Alexander, James Careless, Harry Cole, Troy Conner, Ty Ford, Alan Haber, Harold Hallikainen, Mario Hieb, Peter King, Mel Lambert, Mark Lapidus, Dee McVicker, Lynn Meadows, John Montone, Rich Rarey, Bob Rusk, Randy Stine, Tom Vernon.

Radio World (ISSN: 0274-8541) is published bi-weekly by IMAS Publishing (USA), Inc., P.O. Box 1214, Falls Church, VA 22041. Phone: (703) 998-7600, Fax: (703) 998-2966. Periodicals postage rates are paid at Falls Church VA 22046 and additional mailing offices. POSTMASTER: Send 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 Giselle Hirtenfeld, P.O. Box 1214, Falls Church, VA 22041; (703) 998-7600; Fax: (703) 998-2966. Copyright 1998 by IMAS Publishing (USA), Inc. All rights reserved.

—PRINTED IN THE USA—

**Next Issue of Radio World  
September 2, 1998**

# Fisher's Ham Beefs: Food for Thought

A letter to the editor on the topic of ham radio, published in our May 27 Readers Forum, elicited numerous responses. Many readers obviously feel strongly about this topic. The following is a sampling.

Dear RW,

Shame on **Radio World** for publishing Burt Fisher's scathing attack on amateur radio. His opinion is skewed, and all of his statements are incorrect or taken vastly out of context.

The average age of today's ham is less than 50 and, actually, since the FCC no longer reports date of birth in the amateur license database, it's difficult to gauge the median age of licensees. Amateurs are surfing on their own 'nets faster than 56 kb.

Sure, the average conversation on 2m or any other amateur band may sound droll to the uninitiated, but just wait until there's a civil emergency, disaster or public service event ... the channels hop with productive, valuable and even critical activity.

Public service is still one of our tenets. Time and again we have come to the aid of local, state and federal agencies in time of communications need when the wired and wireless infrastructures fail due to overloading or disaster.

Amateur emissions may be a culprit in RF interference, but more likely than not, the real offender is cheap, mass-produced consumer electronics with little to no protection from unwanted signals, amateur or not.

James S. Kaplan  
Sales Engineer  
EDX Engineering Inc.  
Eugene, Ore.

Dear RW,

I take strong dislike to the comments spewed out by Mr. Burt Fisher about ham radio becoming a "vast wasteland." Mr. Fisher seems to have a strong dislike of the

ham radio hobby for whatever reason he can muster. I am a broadcast engineer, and have been one ever since college. More importantly, I have been a licensed ham (amateur) operator for over 14 years, as N1GPP. I have been a radio hobbyist for over 30 years. And I am NOT "50 years old," I am 38. Much of my broadcast radio knowledge came from my years as a radio

**Time and again we have come to the aid of local, state and federal agencies in time of communications need.**

— James S. Kaplan

hobbyist and as a ham.

Those frequencies (145-148 MHz) Mr. Fisher mentioned are in the "2-meter band." These are probably the most active frequencies in the ham bands because that it is the place where new hams are trying for the first time to use their "voice privileges." If you got your voice privileges, that first "QSO" (conversation) would be the hardest one. Plus the fact that two-meter equipment is probably the easiest to buy and easiest to set up makes these frequencies very active.

I started my first QSOs on 2 meters in 1985. I have since upgraded to the General Class license and use many other parts of the spectrum that my license provides for me. It is because of my years as a ham that I have gained so much knowledge used in my daily life as a broadcast engineer.

Cell phones are great, if you can pay for the airtime. The only interference I receive in my location is from light dimmers, cell-phone towers and intermod from TV and radio stations. The commer-

cial interests have enough spectrum as it is. Public service? Don't make me laugh. This all comes down to the almighty dollar.

Many a person's life has been saved through the efforts of ham radio. The beauty of it is, you don't have to pay for the airtime to do it. When cell-phone sites become inoperable due to a major

disaster, what do you have left?

Sure, there are some bad operators (LIDs) who try to spoil the integrity of the ham service. Then again, there are some TV and radio stations out there who don't deserve a license renewal. But this is a money-driven economy, folks, and smut sells.

I am proud to be a broadcast engineer and also proud to be a licensed amateur. By the way, my ham hobby also helped me regain my ability to speak after suffering a major stroke, seven years ago (at the age of 31). For me, it was a life-saver.

Congress has better things to do than listen to the rantings and ravings of some disenfranchised former ham radio operator like Mr. Fisher.

Many engineers in the broadcast industry are also hams. I am sure that many of them feel the comments made by Mr. Fisher deserve their rightful place ... in the dumpster.

Peter Q. George  
Whitman, Mass.

Dear RW,

I felt the writer of the comments implying ham radio frequencies should be used for something productive may not have had the privilege of seeing just how productive those bands can be. Almost everyone in radio I have talked with, was positively influenced by their encounter with ham radio. Many a young person became interested in the field of radio via their exposure to different aspects of amateur radio.

Thirty years ago as a young boy I became fascinated with the concept of speaking at a distance through the use of radio. What would grow into a lifelong interest with radio was developed by the many hours I spent listening to amateurs all over the world.

Antennas, preamps, wideband RF amplifiers, class A, B and C amplifiers, impedance matching, on-air protocol, receiver design and even how to balance a family around radio. All these and more were the center of many discussions before ever graduating from high school. None took place in a formal setting, just an eager kid listening and asking lots of questions.

Since then, I have had the privilege of introducing several youngsters to analog circuits and theory via the avenue of radio. And how they took off! Doing what? Pursuing and earning their ham license so they could talk to others far away, building antennas, learning circuit

theory, building RF power amps from scratch, and the list goes on. These have been pre-high school kids learning skills we all need in the future workplace and using their access to the various ham bands to discover the success of their efforts.

It's a matter of investment for the long haul. Two other areas for consideration could be the present and real economic impact of amateur equipment suppliers and the valuable services amateurs still provide on a voluntary basis in communities all over the country.

Steve Meng  
RF Engineer  
Cincinnati

Dear RW,

Hams for quite some time have not had much know-how. This is not something that just happened yesterday; I have been licensed since 1970 and when I first came on the air as a youngster, one of the first things that I noticed was all the politics and rhetoric. What I expected was engineers, technicians and craftsmen, not politicians. Some hams feel it is better to look good than be good. I remember in 1970, how right away all hams were the smart ones and took a lot of pride in CB bashing. Radio operators bashing radio operators as if there were not enough people bashing us already.



Robert Stout

Even today I talk to various fellows on the ham bands that have been licensed since the early 1930s and these people stir up more trouble, hate and discontentment than you can imagine just for the sport of it. Are these people in the hobby for the purpose of advancing its science and for the dissemination of knowledge? I don't think so. And guess what — they were not born yesterday.

I would like to see the FCC step back and take a good look at the situation. We have hams with nothing but bad attitudes, we have hams that can't put on a PL-259, we even have extra-class hams that don't know what a PL-259 is.

Robert Stout  
Engineer  
Madison, Wis

Dear RW,

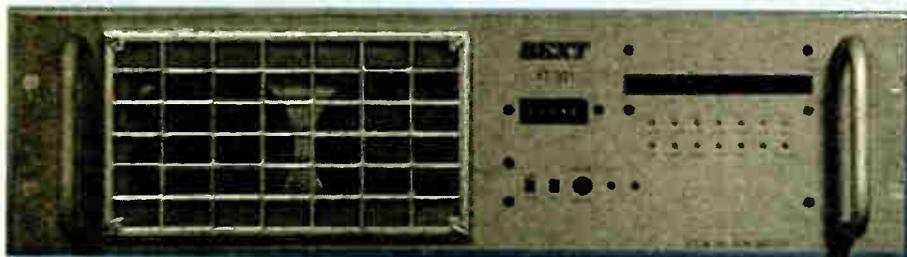
Why the misleading comments degrading amateur radio were even printed is a mystery. Fisher appears to be operating from some hidden motive and not because of a pure concern for efficient spectrum utilization.

Fisher states, "They cause interference to other services (like your TV) and they erect large towers and, guess what, there is nothing you can do about it."

As a broadcaster who erects many  
See HAM BEEFS, page 20 ►

## So Many Watts

## So Little Space



300 W model XT 301 pictured

The high power exciters from Bext: Practicality, Efficiency, Performance, Reliability & Built-In Stereo Gen. Option all in one small 5 1/4" unit (3 rack spaces)

Call for your BEXT catalog with FM Antennas, Exciters, Amplifiers, Transmitters, Translators, Boosters, STL's, or view it on-line!

**BEXT** The Low Power Leader  
619-239-8462 • FAX: 619-2398474  
www.bext.com • mail@bext.com

Circle (105) On Reader Service Card

# Hit the Road

## Remote broadcasts have never been easier!

Sometimes it's impractical to install a special circuit like ISDN for a one-time remote, and often your RPU just won't make it. However, a plain telephone line is usually available and the HotLine delivers up to 10 kHz, two-way audio, on just one dial-up line. Want to sound great from anywhere, anytime? Hit the road with a Comrex HotLine.

"I didn't have to do my usual routine of pulling a muscle contorting my radio antenna to avoid (RPU) interference."

Courtesy of WHMP-UMass



Courtesy of WEKS-The Bear

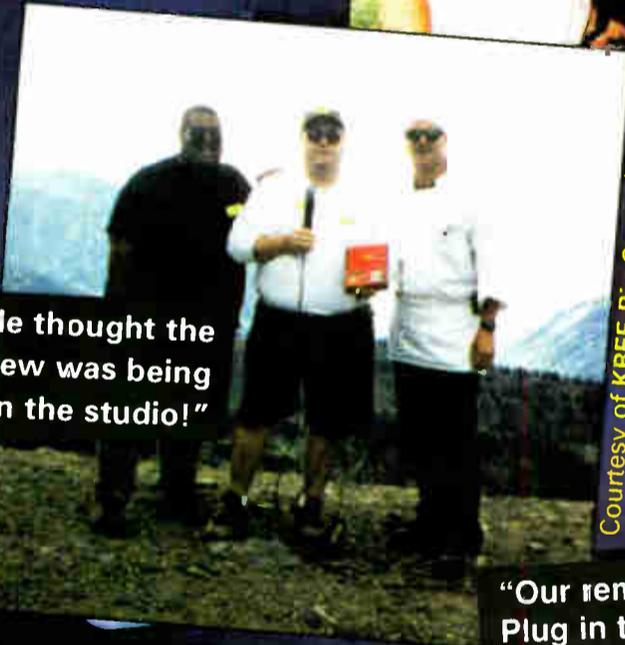


Courtesy of KTNN



Courtesy of Middleburg Broadcasting Network

"The HotLine helped them sell 60 (cars). They could not believe the clear signal from 252 miles away!"



Courtesy of KBEE-Big Steve Kelly Show

"People thought the interview was being done in the studio!"

## ...with the Comrex HotLine.

"Our remotes are brainless. Plug in the HotLine, dial the network, and go on the air! It's that easy!"



Courtesy of Jason Gant — Ask the Computer Doctor Show



**COMREX**  
We make great connections

**800-237-1776**  
[www.comrex.com](http://www.comrex.com)

COMREX Corporation, 65 Nonset Path, Acton, MA 01720 USA Tel: 978-263-1800  
Fax: 978-635-0401 Email: [info@comrex.com](mailto:info@comrex.com) Fax-on-Demand: 978-264-9973  
Toll-free: 800-237-1776 in N.A. or 0-800-96-2093 in the U.K.

Circle 931 on Reader Service Card

# Engineer John Hoffman Appreciated

by Bob Rusk

**NEW YORK** John Hoffman is remembered by his friends and colleagues as a "technical technician" who worked in virtually every area of radio and television engineering.

Hoffman, who had recently retired after 29 years with the NBC network, died in February of cancer. He was 54.

Hoffman began his professional radio career with NBC in his native Chicago, where he worked at WMAQ(AM) and WMAQ-FM, now WKQX(FM), which were then network owned-and-operated stations.

Jim Powell, now vice president of entertainment production operations, NBC Television, Burbank, Calif., said, "He was there when I came to the stations in 1973. He worked on studio maintenance and construction and was also a board operator."

Hoffman did "virtually everything" at WMAQ-AM-FM, said Powell. His other duties included transmitter maintenance and responsibility for the FM automation system. "A lot of engineers have fond memories of John," said Powell. "He was very well-liked."

At NBC Television in New York, Hoffman was an engineer in the broadcast and network operations department, where he developed on-air systems software and

**Hoffman also helped create an early online area targeted at the broadcast industry.**

Local Area Network administration for automation and new technologies. He had vast experience in video production, video tape computer editing, field remotes, and audio post production, according to long-time colleague and NBC video tape engineer Katherine Salvio.

"When I met John, he was working on audio in the post-production edit rooms," said Salvio. "Then he went into computer systems, working on development and support. He was instrumental in tailoring the software needs for Automatic Record and Playback Systems, a robotic system for commercial playback."

Pat Adams, president of computer consulting firm DB Unlimited, wrote computer programs with Hoffman. Adams said, "We were both night owls. He would call me at 2 a.m. and say, 'I need a routine to do this.' So I'd tell him to go out and have some dinner and that I would have something up to him when he got back home. He would also come over to my place and set up modems and other access to services for me."

Adams said, "It's not that either of us couldn't do these things on our own, but each was faster at certain things. One of the projects we worked on together was a program to schedule all of the broadcasts for the satellites. There were routines in there that I hope I never have to write again. John's knowledge made it possible to complete this. He was brilliant and

made a major impact, even though he didn't have a higher education. He was one of the innovators."

## A founder

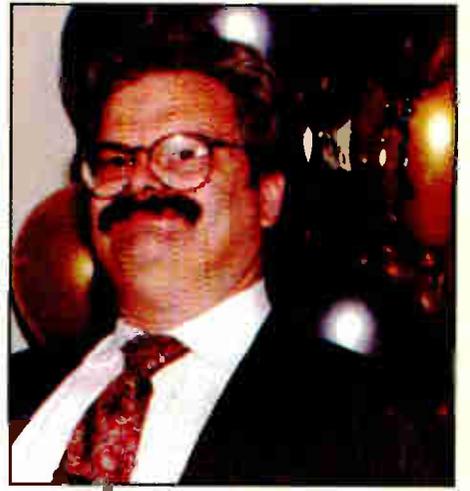
Hoffman was a founder of the Broadcast Professionals Forum on CompuServe, one of the first online areas specifically targeted for the broadcast industry. "John was involved very early on in working with telecommunications and helping engineers communicate more effectively," said Terry Baun, immediate past president of the Society of Broadcast Engineers.

Baun said, "SBE owes John a real debt of gratitude for getting us started on the road to electronic communications. It was under his direction that we first got started with our own electronic communications efforts on CompuServe, which

led directly to the interlinked bulletin board network and then eventually to the Web services we now have."

Hoffman spoke at numerous SBE gatherings and distributed CompuServe software "so he could get more engineers involved in the process," Baun said. "When I was doing some presentations on bulletin boards, I would simply call John and tell him that I wanted to do a demonstration for SBE. He would give me a special number and I'd be able to use that free number to sit on CompuServe for as long as I wanted. He was always very, very helpful. He wanted to promote better communication among all engineers. That's what John was all about."

Even toward the end of his life Hoffman was planning for the future at NBC, said Matthew Kolasa, an ARPS supervisor at the network. "We



John Hoffman in 1993

took a couple of road trips and talked a lot. At one point we were discussing the integration of computers and broadcast technology," Kolasa said. "He talked about software he was

See HOFFMAN, page 21 ►

## CBC Reviews Radical Changes

by James Careless

**OTTAWA** Seven months after overhauling its two English-language radio networks, the Canadian Broadcasting Corp. has reviewed its progress, and pronounced it "good."

The changes — which saw CBC Radio and CBC Stereo rechristened Radio One (news and information) and Radio Two (classical music and arts programming) in January — were the result, at least in part, of a 25-percent budget cut, and the loss of Peter Gzowski and Vicki Gabareau, top CBC stars.

### Coping with cuts

To cope with the government-imposed cuts, and to preserve regional programming in its noon-to-2 p.m. and 4 p.m.-to-6 p.m. time slots, the CBC fired some staff and reorganized the rest into teams. Essentially, the different regional program slots are shared among these teams.

"This involved making a large transition from the kinds of programming they did before and the staffing levels they had before to a much more integrated team approach throughout the day," said former CBC producer Hal Doran, who now covers broadcasting for the Ottawa Citizen newspaper.

"So you might have a program on in the afternoon that used to have four people working on it; now only one person works on it. The rest of the programming comes by satellite or from people working in other shows."

Some local shows were also eliminated, with their air slots being filled by other programs. For example, the "Radio Noon" broadcast that originally served only the Ottawa capital region now covers the entire province of Ontario, including Toronto.

Based on audience numbers, the changes have gone over well, said Alex Frame, director of programming for CBC Anglophone Radio.

"The noon hour period across the country has more or less held steady," he said. "The 4 p.m.-to-6 p.m. period is showing a bit of growth. Morning drive — 6 a.m. to 9 a.m. — continues to be very, very strong for us. But that is a part of the day that we did not really change."

### Objectives of review

Still, the "base-line review," as it is called, is "not being done against audience figures," said Doran. "It is being done against the objectives of the programs."

The review involves comparing local programming with the national programming "template," assessing the mix of local and national features, "journalistic rigor," pacing and how the presenters sound on-air and other issues.

According to Frame, judging success in this manner is difficult.

"We have really escalated our ability to deliver information throughout the day, but we have not had the same opportunity to pay attention to the design and character and characteristics of the programs," he said.

"In some places you want to look at how strong our journalism is," said Frame. "In other cases you want to take a look at how strong our presenting is, and (in) others it may be a question of pacing."

Given the depth of the changes, Frame said things have gone pretty well for CBC Radio. In particular, he credited the willingness of unionized employees for being more flexible in their job functions and the move to digital desktop editing for the smooth transition.

He said that technology — such as the Dalet digital desktop audio editing system — "allowed us to make the staff reductions we had to make and to minimize the impact the cuts would have on our programming."

### Employee views

Doran said he has followed the review process closely, especially the impact of the changes on CBC employees. He said CBC management "claim that most people are

**Technology allowed us to make the staff reductions and to minimize the impact the cuts would have on programming.**

— Alex Frame

pretty comfortable with how that integration has gone ... I suppose that if you are still employed, you are going to be pretty happy with this process too, because at least it saved your job."

However, he said he still wonders if CBC Radio will be able to maintain its hold on its audience share.

"In some cases — in smaller locations — listeners do not have a choice, because the CBC provides the only radio service," said Doran. "However, in large cities, there are a number of other stations to listen to."

In Ottawa, for example, private station CFRA(AM) has made serious inroads into the CBC's news audience since switching its format to news-talk.

Traditionally, when it came to serious, in-depth regional and local news coverage, CBC Radio has had an advantage over commercial stations. Today, however, "the private news-talk outlet in a major city might have 15 reporters," Doran said. In contrast, "CBC might have three."



## Zephyr Is Everywhere

Look around. Everyday, there are more signs that Zephyr is everywhere. So, if you've ever thought about remote broadcasts or linking up with other studios, there's never been a better time to act than now. Zephyr has quickly become the standard, with many thousands already in use.

Zephyr is number one among radio stations and studios. It is the best sounding, lowest cost way to send high-quality audio over ISDN. Once programmed, anyone can Auto Dial ISDN calls. Not sure what to do next? Press the help button for simple instructions.

Zephyr is full-duplex for two-way transmission. And you don't have to worry about what codec is on the other side — with Layer 3, Layer 2, and G.722, Zephyr can adapt to any place you want to send your audio. With Zephyr, the whole country—even the world—is your studio. Just look for the signs...



- The ideal solution for remote mixing and broadcasts, ad hoc networks, recording sessions, voiceovers, distribution of commercials, backup to satellite and microwave links, and many other applications.
- Designed by Telos specifically for broadcast audio applications over ISDN.
- Optional AES/EBU digital audio input/output module with sample rate conversion.
- Clean, uncluttered front panel for simple operation. Full metering, call duration timer, headphone jack, and mic/line inputs.
- Built-in input protection limiter. When your talent screams, your audio doesn't distort.
- Zephyr has an integrated ISDN terminal adapter designed for the non-technical operator. You can even place a standard voice-grade call to a Plain Old Telephone Service (POTS) telephone.

**Telos Zephyr: The Best Way to Hear from There™**



Telos Systems • 2101 Superior Avenue • Cleveland, OH 44114 • Tel: +1.216.241.7225 • Fax: +1.216.241.4103  
E-Mail: • [info@telos-systems.com](mailto:info@telos-systems.com) • <http://www.telos-systems.com>

Telos Systems, the Telos logo, Zephyr, and The Best Way to Hear From There are trademarks of TLS Corp. Other trademarks are the property of their respective holders.

See Us At the ABG Southeast Expo

Circle (2) On Reader Service Card  
World Radio History

# New Ownership Affects EAS

► EAS, continued from page 1

Up until late 1996, emergency planners had the use of a private satellite system to reach the nooks and crannies in the mountains and other sparsely populated areas. When the state did not renew the contract with the satellite owner, emergency planners had to weave their EAS web around mountains and into sparsely populated areas serviced by only one or two local radio stations.

Along the way, planners encountered EBS primary stations that had been 24-hour operations but are now daytime-only and no longer eligible to be the local primary station under EAS. Other stations were under new management that did not want their stations to be the local primary anymore.

As in other states, planners in the Empire State struggled with the rapid consolidation taking place in radio.

Said Hill, "It was like trying to juggle Jell-O ... half the stations in the state were sold to somebody else. They changed call letters. Changed location. Changed ownership. Engineers were moved out of the state. I lost area chairmen. It was difficult."

## All-hazards radio network

In New York, the local fire department or county sheriff's office can generate an alert, as can the highest elected official. But stations cannot generate an EAS alert on their own.

Said Hill, "If a station hears on its own that there is a tornado, they can put it on their newscast. The EAS equipment is saved for the government."

But he stressed that the system is not a way for government officials to seize the airwaves and do whatever they want for emergencies.

**If the tornado hits at three in the morning, you can have the best system on earth but nobody's going to hear it.**

— Robert Hill

Government alerts typically are generated by a phone call to the local primary station. The National Oceanic and Atmospheric Administration Weather Radio, however, triggers a high percentage of EAS activations.

"That has become the all-hazards radio network," said Hill.

Five NWS offices service New York. Four are in-state: Buffalo, Binghamton, Albany and New York City. An office in Vermont services the eastern part of New York.

Stanley Levine, warning coordinator meteorologist who works out of the Buffalo NWS office said, "On the whole, EAS is working very well."

When serious flooding occurred in Wyoming County, he said, the information flowed from Weather Radio to crawling across the local television station within seconds.

In October, the Buffalo NWS office will upgrade its equipment with a console system that includes voice automation. He envisions the new system — which will be installed nationwide — could

save several minutes in an emergency.

The quality of the automated voice has not met with universal satisfaction from listeners and users accustomed to the human voices of the NWS.

Anyone interested in hearing the automated voice being considered for the new system should visit the Web page at [www.nws.noaa.gov/oso/oso1/oso12/crs.htm](http://www.nws.noaa.gov/oso/oso1/oso12/crs.htm) and scroll toward the bottom of the page.

During ice storms that pelted Jefferson and Lewis Counties in January, Levine said, EAS codes were not used in warnings because the office knew about the storm about eight hours ahead of time.

The ice storm began on a Wednesday evening in January. It left six counties with about six inches of ice and took down literally thousands of telephone poles.

At the request of the local emergency management office, local LP1 station WTNY(AM), Watertown, issued a civil emergency alert, telling people to stay indoors or face arrest.

Forever Broadcasting, which owns WTNY and three other stations in Watertown, lost four towers in the storm.

"The broadcasters were good broadcasters. They got on the air and they stayed on with generators and they kept the people informed on where to go and how to get help," said Hill.

Hill took over EAS planning in June 1996. He said he told broadcasters, "If you become legal with the law, your system will run. That's it. It's as simple as that."

And when 39 tornadoes ripped through the state one stormy May day this year, Hill said, he got calls from skeptics amazed that the system worked.

But behind the scenes that evening, one could find proof that human error

continues to be a real part of EAS, and that sometimes human intervention is the only cure.

Dave Groth is the Local Emergency Communications Chairman for the Hudson Valley, vice president and director of engineering for the two local LP1 stations and owner of Radio Engineering Services Inc.

Watching the storm clouds form that evening, he turned on his Weather Radio just in time to hear the tornado warnings. Then he turned on LP1 WPDH(FM) to make sure it aired the warning. In New York, stations are advised to forward tornado, hurricane and flash flood warnings automatically.

When he heard no alert, he called the station. The operator told him the printout showed the warning had been issued by the NWS with an expired time. Groth, who does contract work for the Albany NWS office, requested another activation.

The new activation carried the wrong county code, so WPDH again did not activate automatically. The third attempt was flawless, and about 17 of the 28

nearby stations aired it.

The good news here, Groth said, is that when tornadoes came to town, almost every radio and television station ran the warning. The bad news is that if he had not caught the Weather Radio alert, no one would have been warned.

"That was very alarming to me," he said.

Human error is the Achilles heel of the EAS system. One group of nine stations had all of its EAS decoders set for manual operation up to and during the tornadoes. However, the stations were



unattended that evening and because no one was in the studios when the tornado alert came, the alarm never aired.

"We have yet to find anybody who has had defective equipment," said Groth. Glitches typically are human mistakes.

Elsewhere, a listener wrote to her local newspaper saying that in order to hear about a tornado in Port Jervis, she had to tune to a Poughkeepsie radio station, almost 60 miles away. Her local station kept playing music.

In fact, the opposite also happens: A local station will air an alert, but many locals will be listening to a station 60 miles away that does not necessarily carry alerts for emergencies in their town.

In the Hudson Valley, Groth is trying to remedy that by making more stations carry fewer alerts. For instance, Albany country station WGNA(FM) technically is only required to carry alerts for three counties, but 10 are programmed into the EAS encoder/decoder.

He said the idea is that if a listener hears an alert on one radio station, no matter where she tunes, she will get the message.

## Out in the boondocks

Hill acknowledged that it is impossible to alert 100 percent of the people.

"Everyone is not near something that will alert them," he said.

Officials in one county recently asked him if the local tests could trigger the fire horn in the county.

Said Hill, "If everybody is asleep and the tornado hits at three in the morning and nobody's listening, you can have the best system on earth, but nobody's going to hear it."

The state depends heavily on radio to deliver emergency messages, even more so than it does television or cable, because the first thing to go down in a storm are tree limbs that knock down phone lines and cable systems.

Hill has a satellite TV system and learned of the recent tornadoes while watching the Weather Channel, based in Virginia.

"On my screen, there's no emergency alert system for satellite delivery. Most of the rural people in the farm country in this nation listen off of satellite. And there is no answer to that."

## The Big Apple

With 7 million potential listeners, New York City radio stations are selective

about when they activate EAS. Bill Krause, chief engineer of WABC(AM) and local area chairman, said the system is working "pretty well."

WABC is one of the LP1 stations.

Krause agreed that EAS implementation must be harder in rural areas. For one, there are fewer stations and they are more spread out. In New York City, he said, the chief engineers are all pretty much on the phone with each other at least once a month. If there is a problem, they get on the phone and settle it.

"I think the rapport between the chiefs in the city is quite good," he said.

Most activations so far have been tests. If there is a toxic spill, he said, the news media would report on it and police and firefighters would be on the scene instantly. And the city does not have a lot of bad weather, aside from the occasional hurricane.

Also, Krause said, the city population is very dense. If something happens in Staten Island, people in the Bronx and Yonkers do not necessarily want to be alerted too. As a result, for an activation to occur, it has to be the result of a wide-spread emergency.

He, too, sees the prospect of human error.

"Every once in a while somebody goofs and forgets to send an End of Message code," he said. With so many operators on duty, many go six months before having a chance to activate EAS. By that time, it is hard to remember every step.

■ ■ ■

*This is one in a series of articles about state-level implementation of EAS. How has EAS performed in your state? Tell us about it. Send e-mail to [radioworld@imaspub.com](mailto:radioworld@imaspub.com)*

# SONY MINIDISC

## JUST CAPTURED

## SOME AMAZING

## SOUNDBITES.

Sony's MiniDisc has knocked the seen-it-all, heard-it-all experts at Radio World right on their ears. They've called it a "serious contender" and "clearly superior to tape." And they've recommended MiniDisc for applications ranging from news and documentary recording to client voice tracks, phone calls, traffic reports and airchecks.

Sony created MiniDisc with an unequalled combination of advantages. It's digital. Recordable. Portable. Instantly accessible. Easily editable. Virtually unshockable and incredibly durable. And Sony offers MiniDisc in everything from super-small field recorders to multi-track machines and professional MD cart recorders.

So do yourself a favor. Call 1-800-635-SONY, extension MiniDisc. And find out why the radio industry is tuning in to Sony MiniDisc.



**SONY**

[www.sony.com/proaudio](http://www.sony.com/proaudio)

© 1998 Sony Electronics Inc. All rights reserved. Reproduction in whole or in part without written permission is prohibited. Sony and the MiniDisc logo are trademarks of Sony. All quotes from the December 24, 1997 and January 7, 1998 issues of Radio World. Reprinted with permission.



### MDM-X4MKII Multi-Track Recorder

Sony's MDM-X4MKII Multi-Track Recorder is the digital studio-in-a-box with phenomenal editing, layering and track-bounce capabilities.



### MDS-B5 Recorder

Radio World declared that our MDS-B5 Professional MD Cart Recorder "continues in the tradition of the Sony MDS line and proves itself to be a quality performer."



### MDS-B6P Player

The MDS-B6P Professional MD Cart Player is the playback-only version for on-air DJ use.



### MZ-B3 Portable Recorder

Our MZ-B3 drew raves: "Not only is it 'bullet-proof' reliable and compact, but it is the only portable MD model available with built-in microphone and speaker."



### MZ-R30 Portable Recorder

The Sony MZ-R30 Portable Recorder is "excellent" and "should be considered seriously by audio professionals," according to Radio World.



### MDS-JE520 Recorder

The Sony MDS-JE520 is the affordable solution for general studio recording and playback.



### MDW-74 and the PRMD-74

Nothing beats the Sony MiniDisc.

# NFL Booth, Field Coverage

► NFL, continued from page 1

Sports includes games on Sunday, Monday and Thursday nights. Also, complete playoff coverage will be a major



asset to the CBS package.

Larry Michael, vice president of sports programming at Westwood One/CBS Radio Sports, said combining all resources under one umbrella this year is

a way to produce a better product. "This allows us to take the best of both networks and create a much better broadcast. Most importantly, we'll be serving both networks out of a central studio in Arlington, Va.," he said. The whole package is tied together by Tommy Tighe, the main radio studio host.

No major changes in broadcast teams are planned for this fall. Michael said, "Just about everyone is back in the booth, with Howard David and Matt Millen anchoring the games on Monday nights."

What will be different is an improved sound for the CBS broadcasts. Michael said, "We will be doing more in ways of stingers, beds and production elements not heard on CBS Radio games before." CBS Television football broadcasters will be freed up to offer commentary on the radio side.

Shawn Pastor, director of sports for affiliate relations at Westwood One/CBS Sports Radio, said, "The response has

been very positive from affiliates. Being able to offer two separate packages is a bonus because it adds some flexibility to scheduling the games." Current Westwood One and CBS Radio affiliates will have right of first refusal. If affiliates decline the football coverage, games will be offered to non-affiliated stations in that market.

According to Pastor, preliminary num-



bers show that more than 400 stations will opt for the CBS Radio Sports package of NFL games, while more than 200 stations



plan to carry the Westwood One Sunday doubleheaders. The Westwood One/CBS Radio Sports packages are strictly barter system. "No money changes hands. Stations agree to carry the games and national commercials. In return, they get their local avails," Pastor said.

Local affiliates must agree to carry pre- and post-game shows along with the game broadcast. In exchange, they will be allowed 21 30-second avails for Westwood One games and 15 avails per game for CBS Radio Sports broadcasts.

See NFL, page 19 ►

## Flagship Radio Stations for the NFC

	Arizona Cardinals	KIDR(AM) 740 / KHTC(FM) 96.9	Phoenix, Ariz.
	Washington Redskins	WJFK-FM 106.7	Manassas, Va.
	New York Giants	WOR(AM) 710	New York
	Dallas Cowboys	KVIL-FM 103.7	Highland Park-Dallas
	Philadelphia Eagles	WYSP(FM) 94.1	Philadelphia
	Green Bay Packers	WTMJ(AM) 620	Milwaukee
	Tampa Bay Buccaneers	WQYK-FM 99.5	St. Petersburg, Fla.
	Minnesota Vikings	WCCO(AM) 830	Minneapolis
	Detroit Lions	WXJT(AM) 1270	Detroit
	Chicago Bears	WMAQ(AM) 670	Chicago
	San Francisco 49ers	KGO(AM) 810	San Francisco
	Carolina Panthers	WBT(AM) 1100	Charlotte, N.C.
	Atlanta Falcons	WGST(AM) 640 / WKLS(FM) 96.1	Atlanta
	New Orleans Saints	WWL(AM) 870	New Orleans
	St. Louis Rams	KSD-AM-FM 550 / 93.7	St. Louis

As of June 15. Source: NFL

## Flagship Radio Stations for the AFC

	New England Patriots	WBCN(FM) 104.1	Boston
	Miami Dolphins	WQAM(AM) 560	Miami
	Buffalo Bills	WGRF(FM) 97.6 & WEDG(FM) 103.3	Buffalo, N.Y.
	New York Jets	WFAN(AM) 660	New York
	Indianapolis Colts	WFBQ(FM) 95.1	Indianapolis
	Jacksonville Jaguars	WOKV(AM) 690	Jacksonville, Fla.
	Pittsburgh Steelers	WTAE(AM) 1250	Pittsburgh
	Tennessee Oilers	WGFX(FM) 104.5	Gallatin, Tenn.
	Cincinnati Bengals	WKYN(AM) 1160 / WUBE-FM 105.1	Cincinnati
	Baltimore Ravens	WJFK(AM) 1300	Baltimore
	Kansas City Chiefs	KCFX(FM) 101.1	Harrisonville, Miss.
	Denver Broncos	KOA(AM) 850	Denver
	Seattle Seahawks	KIRO(AM) 710	Seattle
	Oakland Raiders	KTCT(AM) 1050	San Mateo, Calif.
	San Diego Chargers	KFB(FM) 100.7	San Diego

As of June 15. Source: NFL

# PORTABLE ONE

## DUAL DOMAIN

**True Dual Domain Audio Testing at an Attractive Price Point**

- Comprehensive analog audio analyzer
- True digital domain analyzer with -140 dB residual noise
- Independent analog & digital audio generators and analyzers
- Generate and measure interface jitter
- Digital interface analyzer
- View AES/EBU status bits
- Loudspeaker monitor for digital & analog signals
- Internal save and recall of 30 test setups

**Audio precision**  
 Audio Precision  
 PO Box 2209  
 Beaverton, Oregon 97075-2209  
 Tel: (503) 627-0832; Fax: (503) 641-8906; US Toll Free: 1-800-231-7350  
 Email: techsupport@audioprecision.com; Web: www.audioprecision.com

# THE CLEAR SOLUTION IN CELLULAR REMOTES

from MARTI® - The Remote Experts

**W**hen you can't use your POTS or line of sight technology, you could be "cell casting" with the MARTI™ cellular remote products.

Cellular remotes give you the flexibility to set up a remote instantly any where there is cellular coverage. The Cellcast has a full 3 watt cellular transceiver for those hard to reach spots. The lightweight Talk★Port™ is portable and ideal for the reporter covering that fast breaking story.

## Better Remote Mixing



For superior mixing on site, the remote mixer features

4 mic channels and 2 aux inputs, peak limiter, and squelch/ mute switching, plus a lot more. AC or battery powered for up to 10 hours.

# MARTI®



**FREE Shure® BG1.1 Mic with purchase!**  
**Call Now to Order 1-817-645-9163**  
**Or contact your favorite MARTI distributor.**

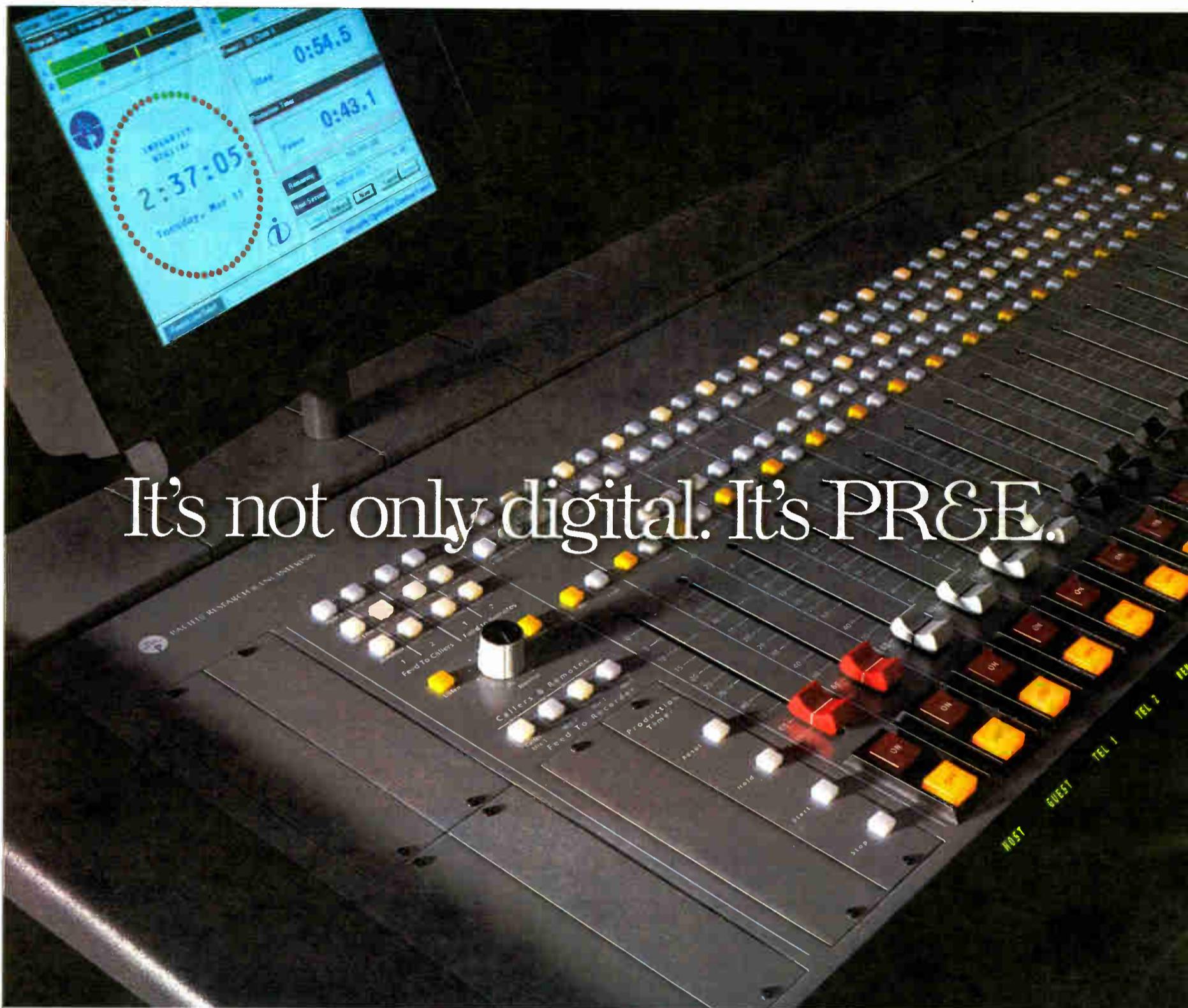
**Guaranteed Next Day Shipment**

**Need Solutions?**  
[www.bdcast.com](http://www.bdcast.com)

World's #1 On Reader Service Card

**BE**  
Solutions for  
Tomorrow's Radio





# It's not only digital. It's PR&E.

Now you can get digital technology and PR&E reliability in the same console. Integrity.<sup>™</sup> It's the first digital on-air board that also speaks fluent analog. All 16 inputs can handle analog signals. Ten can also accept digital inputs at any sample rate. So you can deal with the hodge-podge of equipment in real-world studios. A unique architecture also guarantees a level of reliability other digital consoles can't match. So you can rest assured your signal will stay on the air.

What's more, you get on-board DSP voice processing, remote or local configuration controls, and channel-specific remote control connections. And you can set, save and recall each board configuration at the touch of a button for seamless transitions from show to show.

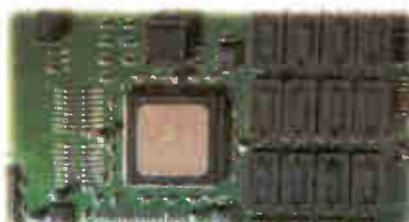
For a brochure, call us at 760-438-3911, visit [www.pre.com](http://www.pre.com) or e-mail [sales@pre.com](mailto:sales@pre.com)



*The LCD displays audio levels, time-of-day clocks, session status and event timers with a Windows<sup>®</sup> interface to powerful configuration management and session-based features.*



*Integrity's difference is more than just digital. It also offers four special-purpose buses to provide automated mix-minus for telephone and remote feeds, each with IFB.*



*Integrity uses an array of state-of-the-art floating-point digital signal processors to perform its mixing, routing and other functions.*



*Each fader has a 10-character alphanumeric display. The display changes when another audio source is assigned, which can happen either manually or at a preassigned time.*



PACIFIC RESEARCH & ENGINEERING

Circle (80) On Reader Service Card  
World Radio History

**BUSINESS DIGEST**

Report business news to: Radio World  
P.O. Box 1214, Falls Church, VA 22041  
or FAX: (703) 998-2966

**Media Merger  
Mania Continues**

**NEW YORK** In the first half of 1998, the aggregate value of media mergers and acquisitions approached — and may have exceeded — the aggregate merger and acquisition total for 1997, which was \$77.7 billion. The figures come from media investment bankers Veronis Suhler & Associates. Of the \$910 billion value of mergers and acquisitions reported by The New York Times for the United States in the first half of this year, approximately 8 to 12 percent was in media transactions.

The surge in 1998 was credited in large part to AT&T's purchase of TeleCommunications, Inc. for a reported \$37 billion plus another \$11 billion in assumed debt.

Also driving the merger surge are "healthy revenues in virtually all segments, improved earnings, continued growth in the economy, low interest rates and a still-strong equities market," said John Suhler, president and founding partner of Veronis Suhler.

Radio deals generated substantial transaction flow last year. The largest was Westinghouse Corp.'s acquisition of American Radio Systems for \$2.6 billion, followed by the purchase of Evergreen Media by Chancellor Media for \$2.6 billion, and the Hicks, Muse, Tate & Furst acquisition of SFX Broadcasting for \$2.1 billion.

The figures are in a Veronis Suhler report that analyzes all publicly traded media transactions for a five-year period (1993-1997). The report includes subscription video services, radio, TV, newspapers, consumer magazines and interactive digital media.

**Routing, Switching Line  
Sold by Gentner**

**SALT LAKE CITY** The Gentner Communications line of audio routing and switching products will now be manufactured and marketed under the Audio Visual Resources Patching Systems label. The Assembly Connection and AVR Communications Group purchased Gentner's inventory of audio patch panels in July for an undisclosed price.

The Assembly Connection has been the primary manufacturing arm for the product line. It also manufactures cable for both the broadcast and professional audio industries.

Former Gentner sales representative Patrick Carter is owner and president of AVR, which will take over the sales and marketing support for the product line in North America. For questions about warranties or other needs call (801) 266-4972.

Other Gentner product lines are not affected.

— Leslie Stimson

**You  
Read  
It  
Here**



**Five Years Ago**

Five potential digital radio systems were submitted to the Electronics Industries Association Digital Audio Radio Subcommittee for consideration as a possible U.S. standard, but the system that has garnered the most publicity is not among them.

USA Digital's Project Acorn, a consortium of broadcasters including Group W and Gannett Broadcasting, said it will not submit its in-band, on-channel system for testing at this time because of broadcaster opposition to the EIA testing process.

— "Acorn Out of EIA Tests"  
Jan. 20, 1993

**Ten Years Ago**

NBC's recent sale of its radio networks, and now its plans to sell off its O&O stations, are signs of how far the mighty have fallen ... The rest of the industry should be reading these signs carefully for guidance on what the next few decades will bring. Equipment vendors will have to cultivate more individual and small group owners instead of ...

"thinking big." Trade associations will have to do likewise, recognizing that their future strength will not come from a few very big players, but from many smaller players with diverse interests.

Editorial  
Feb. 15, 1988

**Fifteen Years Ago**

The FCC's decision to eliminate operating and maintenance logging requirements ... will become effective on Sept. 19, 1983. All logs currently on file at stations must be kept for two years after date of entry and broadcasters are still required to maintain current EBS logs.

— "Regulatory News" column  
Sept. 15, 1983

# We've Got Your Remotes Covered

Comrex has unique products to handle any dial-up situation you find yourself in. Whether you choose the popular HotLine POTS codec for standard dial-up lines, the brand new Vector, a complete 15 kHz remote solution for POTS lines, or the low-delay Nexus 15 kHz codec for ISDN applications, you're assured the digital quality and bullet-proof reliability Comrex is known for. And for a limited time, BSW is offering special pricing on the HotLine, Nexus and Vector. So relax and give us a call - we've got you covered.



COMREX  
Vector



COMREX  
Nexus



COMREX  
HotLine  
and HotRack

Visit us at the NAB Radio Show Booth #1140

## Call us Today 1 800 426 8434

Fax: 800.231.7055 Website: www.bswusa.com

*Equipment Solutions To Keep You Number One*



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

# 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.

**Now, Switch and Distribute AES/EBU Signals Easily With The AES-200**



The AES-200 Digital Audio DA/Switcher

**Features:** Two Input Digital Switcher  
AES/EBU Compatible  
Two Independent Outputs  
Full Remote Control and Status

**Uses:** Feed Two Digital Exciters  
Switch Main/Alternate Digital Paths  
Digital Dubbing

**bdi** Broadcast Devices, Inc.  
5 Crestview Avenue  
Peekskill, NY 10566  
Tel. (914) 737-5032 Fax (914) 736-6916  
Email: Broadcastdevices@worldnet.att.net

READER SERVICE NO. 26

## No tricks, no magic! INFO-IN-A-BOX!

Digistor is the quick and easy way to make information available via telephone. Load your message into DigiStor's digital memory and plug into a phone line!

It's great for: • **CONCERT INFO**  
• **WEATHER/SKI REPORT**  
• **MESSAGE-ON-HOLD**

Fax-on-demand:  
**626.355.4210**  
Doc #107

**HE HENRY ENGINEERING**

We Build Solutions.



Plays message once, or auto-repeat.  
Up to 8 1/2 minutes of audio storage.

**HENRY ENGINEERING**  
503 Key Vista Drive  
Sierra Madre, CA 91024 USA  
TEL (626) 355-3656 FAX (626) 355-0077  
<http://www.henryeng.com>

READER SERVICE NO. 104



If lightning strikes on your tower are causing equipment damage and lost air time - the cost of a Stati-Cat system may be recovered during your first lightning season.

**AFFORDABLE - RUGGED LIGHTNING PROTECTION**

The *Stati-Cat Lightning Prevention System* provides a continuous, low-resistance discharge path for the static electric charge on tall structures. DISSIPATION POINTS ARE 1/8" STAINLESS STEEL RODS (not wires) ground to needle sharpness.

**Cortana**  
Corporation Inc.

Write or call toll free for a free brochure!  
P.O. Box 2548, Farmington, N.M. 87499-2548  
888-325-5336 FAX 505-326-2337

READER SERVICE NO. 52

## EQUIPMENT FINANCING

**FIRSTCORP**<sup>SM</sup>  
First In Equipment Leasing

- Specializing in Studio & Transmission EQ
- Lease-to-Own Financing
- 100% Financing
- 24 Hour Response
- Creative Financing
- Self-Funded Transactions



**BEN WEINGARTEN**  
(800) 810-8434

(714) 727-7400 FAX (714) 727-7473

READER SERVICE NO. 72

## DIGITAL ANTENNA MONITORS

In-Stock-Available for Immediate Delivery



Price US\$2600.00 2 Towers  
Will operate with any remote control equipment.



Price US\$1950.00 2 Towers  
For AM directionals with studio located at transmitter site.

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

**GORMAN REDLICH MFG. CO.**

257 W. Union St. Athens, Ohio 45701  
Phone 740-593-3150 • FAX 740-592-3898

READER SERVICE NO. 25

**Pack, Rack or Stack'em!**

Call or write for free detailed brochure.

### NANOAMP SERIES™

Mono and Stereo Mixers and Expanders  
MX100, MX200 & MXS100 Three Input Mic/Line Mixers  
XP100 & XPS100 Four Input Companion Expanders



- Low noise Mic/Line switchable Inputs
- Phantom Power • Independent headphone and Balanced line outputs • Bright 3 color LED meter • XLR connectors
- External power or battery operated • UL & CE Markings

**AUDIO TECHNOLOGIES, INCORPORATED**  
328 W. Maple Avenue, Horsham, PA 19044  
Tel: (215)443-0330 • (800) 959-0307 • Fax: (215)443-0394 • <http://www.atiguys.com>



READER SERVICE NO. 130

## Take Control Via Telephone



List \$399.00

### DC-8A Dial-up Remote Control

- Control, monitoring and programming via touch-tone telephone
- Control 8 relays and monitor 8 status/pager alert inputs
- Activate up to 3 pagers with the pager alert function
- Beep tones for input and relay status
- Relays retain prior state on power loss and restoration
- Configure relays for latching, interlocking or sustained closure as long as the associated key is pressed
- Auto answer with programmable access code, number of rings and defeatable CPC control (unit hangs up when caller hangs up)
- "Busy" input disables auto answer feature
- Built-in audio hybrid with front panel audio level controls allows you to send and receive audio while controlling the unit
- LEDs for DTMF detection, Off-hook status, ring signal and power
- All input and output connections via screw terminals

Check out our web site for product information, list pricing and a list of distributors!

Voice: 360 . 428 . 6099  
Fax: 360 . 428 . 6719

**BROADCAST TOOLS** inc.

Internet: [www.broadcasttools.com](http://www.broadcasttools.com) E-mail: [bti@broadcasttools.com](mailto:bti@broadcasttools.com)

READER SERVICE NO. 51

# Non-Coms Trade Marketing Savvy

by S. D. Yana Davis

to enhance membership and underwriting efforts. from individuals and businesses, conference sessions drew large and atten-

**WASHINGTON** For years, non-commercial stations have become be more savvy about fundraising — where to get those dollars, and how to obtain more. Declines in federal and other public funding for non-coms during the last decade has forced public radio to invest resources in finding and keeping both individual contributors and business sponsors or underwriters.

## Development conference

More than 500 public radio fundraising and other station executives gathered here July 16-18 for the Public

With many stations now dependent for as much as 90 percent of revenue tive audiences of pubcasters, eager to learn any new techniques that might

**Many university licensees are now being asked to generate surplus (revenues) and return it to the universities.**

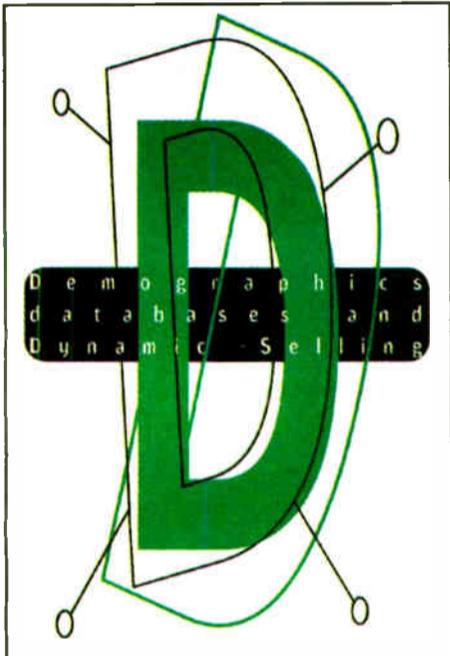
— DEI President Douglas Eichten

result in increased revenues.

Session topics ranged from major giving to effective use of donor databases to hands-on training for underwriting sales representatives.

“(The) conference really drove home to me that we must start thinking out of the box (to generate new revenue),” said Paul Damberg, development director at KUMD-FM, Duluth, Minn. Damberg said sessions helped him identify new revenue streams that his station could initiate.

“Most striking to me is (learning) the public radio audience has enormous potential (in marketing) for a business or corporation,” stated Nelson Hurst, director of corporate development for Wisconsin Public Radio in Madison. He said he “picked up several ideas worth using in ... underwriting sales.”



Conference Program

Radio Development and Marketing Conference, sponsored by The Development Exchange, the Corporation for Public Broadcasting, National Public Radio and Public Radio International. Attendance was higher than last year's 430, according to conference organizers. Attendees included station general managers, development directors, and underwriting sales managers.

In his opening address, Corporation for Public Broadcasting President Robert Coonrod told attendees to “look at what you're already done. Through your hard work, membership (contributions) are up ... (and) you and your colleagues have reacted to the problem of reduced federal funding with creativity and high energy.”

The Development Exchange provides expertise on development and marketing for about 250 member non-com stations; much like the services the Radio Advertising Bureau provides for its commercial radio members.

## University licensees

DEI President Douglas Eichten said, “Many university licensees are now being asked to generate surplus (revenues) and return it to the universities,” pointing out how tight finances have become for many non-coms. To help stations meet revenue pressures, Eichten pointed to DEI's on-going telephone consultation for members, a regular newsletter highlighting fundraising success at member stations, and some CPB-funded projects



M A Y B E Y O U R E M E M B E R M E ?

I'm Mrs. Braverman—you know, Daniel's mother.

Daniel is my son in radio who makes these gorgeous consoles.

They do everything and sound wonderful!

Three years ago I made everyone **SUCH A DEAL** with my son's consoles.

That was my first advertisement for Radio Systems.

Back then, we sold plenty.

But of course what everyone really wanted to know—

“Am I really Daniel's mom?”

Such a question!

**I'm back!**  
**With a beautiful new console!**

So now they're bringing me back—

to show you their new fancy Millenium model.

But I say, millenium schmillenium.

We should all live to be one hundred and twenty.

Me, I love the new soft bright buttons.

And the mahogany wooden sides.

And guess what?

**This new console is AN EVEN BETTER DEAL!**

It's more than \$1000 dollars less than the old one.

*Better and cheaper.*

*So what are you waiting for already?*



**radio SYSTEMS**

601 Heron Drive, Bridgeport, New Jersey 08014  
(609) 467-8000 | fax : (609) 467-3044 | www.radiosystems.com | e-mail: sales@radiosystems.com

# ABG Prepares for 1998 Show

by Brian Galante

**DURHAM, N.C.** The North Carolina office of Audio Broadcast Group is preparing for its sixth annual radio equipment show. The one-day show is an opportunity to get a handle on the latest products from several manufacturers and catch up on timely issues at the forefront of the industry.

The ABG Equipment Expo takes place on Tuesday, Sept. 15, from 9 a.m. to 8 p.m. at the Radisson Governor's Inn, in Durham, N.C. Admission is free. For information, call ABG at (800) 369-7623.

Audio Broadcast Group opened its

southeast branch in North Carolina six years ago. To Cindy Edwards and John George, sales managers for the southeast office, it was apparent that an equipment show was a necessity for that area of the United States.

### Regional draw

"I could see right away that a lot of the engineers on the East Coast were not able to go to the NAB or the radio shows," said Edwards. "I thought it might be a good idea to have a small equipment show, invite some man-



The Radisson Governors Inn

ufacturers, and see what kind of attendance we could get."

In six years, the Expo has gone from the basement of a small dome, to a slight-

## Exhibitor List

- 360 Systems
- Aphex Systems
- Audio Broadcast Group
- Broadcast Electronics
- Burk Technology
- Circuit Research Labs
- Comrex
- Crown Broadcast
- Cutting Edge
- Davicom
- Dielectric
- ENCO Systems
- EV
- Fidelipac
- Gentner
- Gepco
- Intraplex
- Jampro
- Nautel
- MUSICAM USA
- Orban
- Radio Systems
- Roland
- Symetrix
- Tascam
- Telos Systems
- TFT
- Wire Ready
- Yamaha

## "I Won the Marconi with Scott"



"I do like to give credit where credit is due and acknowledge Scott Studios as a major player in my daily broadcasting battle. The time I now have to devote to preparation, and the ease of operation of the Scott System, has helped me increase show professionalism."

**Bill O'Brian - KRKT, Albany, Oregon**  
**Marconi Small Market Personality of the Year - 1997**

## "We Won the Marconi with Scott"

The 1996 winner of the Marconi Major Market Air Personality of the Year Award *also* uses Scott Studios' touchscreen digital audio system! Still another Scott Studios user won the Country Music Association "Station of the Year" award in 1997! The Scott System can help *your* stations sound better!

**Mac Hudson & Irv Harrigan - KILT FM, Houston, Texas**  
**Marconi Major Market Personality of the Year - 1996**



## "Scott has Improved our Product"



"We were very eager to 'go digital' last Fall, and compared different systems. Our decision to go with the Scott System was one we *all* felt good about. I'm confident knowing the comfort level of our different departments who use the system is high. Our Scott System has improved our efficiency and the quality of our product."

**Michelle Mercer, PD - KPWR FM, Los Angeles**

Tom Koza, Chief Engineer, top rated afternoon personalities "The Baka Boys" surround Program Director Michelle Mercer

### More Stations got Scott Systems in the past 12 months than bought most other systems in the past 4 years!

Most managers, air personalities, program directors *and* engineers prefer the Scott System. That's why *more* radio stations get Scott Studios' than any other digital audio system!

It's a fact: over 1,700 radio stations have 3,800 Scott digital workstations, including *major* groups like CBS, Chancellor, Disney/ABC, Clear Channel, Emmis, Citadel and many more.

Scott Systems are best due to:

- the friendliest user interface;
- uncompressed digital audio;
- 3 products--Good, Better & Best.



Circle (3) On Reader Service Card



**Scott Studios Corp.**  
 13375 Stemmons Freeway, Suite 400  
 Dallas, Texas 75234 USA  
 (972) 620-2211 FAX: (972) 620-8811  
 8 0 0 7 2 6 8 8 7 7  
**(800) SCOTT-77**

ly larger hotel, to the present location at the Radisson in Durham. The generously sized ballroom allows for approximately 30 exhibitors, as well as a large table for meals. Exhibitors now book for the ABG Equipment Expo up to a year in advance.

While the show is engineer-friendly, it is certainly not limited to technical folks. "It is mostly a show for engineers, but we get a lot of production people, a lot of programming people, and a lot of general managers and station owners," she said. "Many times, the owners of small stations will bring their contract engineer along."

The event showcases a variety of products, from transmitters to microphones to phone line systems. Attendees can expect a less hectic pace than at the bigger shows.

"They (attendees) expect to be able to talk to the manufacturer," Edwards said. "If they have problems or questions, they can do hands-on work."

Because the ABG Expo takes place before the NAB Radio Show, some manufacturers will choose to introduce their products in Durham, she said.

"We expect to see two or three products introduced, if they're ready."

ABG also has arranged several sessions. One promising panel will feature representatives of Aphex, Cutting Edge, Orban and Circuit Research Labs talking about audio processing. After each completes his or her presentation, an open panel discussion will follow.

Other sessions include a discussion on digital mixing for voice-over production, courtesy of Yamaha; a program by Roland concerning the company's new VS-1680 24-bit digital workstation and SP-808B Groove Sampler with D Beam; and a demonstration by Comrex of its soon-to-ship Vector POTS codec. The Roland VS-1680 and the Comrex Vector both earned Cool Stuff Awards from the editors of Radio World at NAB '98.

In addition, each attendee will leave with a "goodie-bag" with literature from exhibitors, as well as items donated from several manufacturers.

# Stations Use Game Sales Appeal

► NFL, continued from page 12

Some stations have agreed to carry all of the games on both networks. "Nearly 30 percent of our affiliates have agreed to that. For them it will be wall-to-wall football. The only coverage they'll miss out on are blackout games," Pastor said. NFL blackout rules prohibit a Westwood One/CBS Sports Radio affiliate from tak-

their games originated on FM stations.

NFL games are a big deal for the stations that carry them in each market. WXYT(AM) is going into its third year of owning the local broadcast rights to Detroit Lions games. WXYT Director of Creative Services Doak Breen said, "The Lions bring a great deal of excitement to the radio station. Thanks to the strong



Redskins Radio Pre-Game Show in 1996 for WJFK-FM, Manassas, Va.

ing a game that will be broadcast in the home team's market by that team's flagship station. Blackout rules are meant to protect the listener levels of the home team's radio outlet.

## Hot property

Stations can take advantage of the massive marketing appeal of pro football in many ways.

"NFL and college football broadcast rights are the end-all, be-all right now in sports radio," said Rick Scott, president and CEO of Scott & Associates, a sports talk consulting firm in Seattle. "Unlike professional baseball or basketball, there is a natural built-in passion for NFL games. Stations can build their whole broadcast week around a game on Sunday," he said.

Snagging those NFL broadcast rights is not necessarily easy, but they can pay dividends. "Broadcast rights fees have gone up dramatically for the NFL. That can't be said for baseball and, in most cases, the NBA," Scott said.



Local broadcast rights to carry NFL games are steep. "They can run from \$2 million on the low end, up to \$5.5 million a year for major markets," Scott said. If a station's management cannot afford million-dollar rights fees, there are other ways to get a station involved. "Many of my clients don't carry the games themselves, but they'll do pre- and post-game shows from locales near the stadium. That way a little bit of the NFL glamour can rub off on your station," he said.

Scott believes the trend of NFL games on FM will continue. "Of all the sports, I think football is the best suited for FM," he said. "Fans seem to like it. And FM radio likes the fact that you only have one game a week, and that's on the weekend when music stations have a harder time drawing a good cume."

Of the 30 NFL teams, half will have

economy and Barry Sanders, WXYT has been very pleased with the relationship." Sanders is a superstar running back for the Lions.

At WXYT, Lions broadcast rights mean more than just a game on Sunday. "For home games we make it almost a week-long event," said Breen. Games are preceded by a three-hour pre-game show, and followed by a one-hour post-game. "That's where we recoup a lot of our expenses."

The station's promotional campaign is a takeoff on the Lions marketing campaign. "They say, See it! Believe it! We say, Hear it! Believe it!" Breen said. The Lions Football Network is heard on 40 radio stations in Michigan.

## America's team

In these days of live coverage on FM, and with sophisticated competition from television and the Internet, the technical demands of radio football coverage has changed. Perhaps at one time, a typical big-market broadcast could rely on two guys with mics in a booth with a mixer. But consider the case of the Dallas Cowboys radio broadcasts.

Mike Simpson, president and chief executive officer of Midcom, Inc., said, "We're under contract to handle everything for the Cowboys and flagship station KVIL-FM except hire the announcers." Midcom is based in Dallas and provides all the engineering set-up and support for Cowboys radio broadcasts.

The Cowboys boast more than 120 affiliates in 14 states and the United States Armed Forces Radio.

Midcom has what it calls its ISDN NFL Co-Op. "We have nine teams that belong to it. We have ISDN lines in all 30 NFL stadiums. Those nine teams can come in and use a line and not have to worry about ordering new ones every week," said Simpson. The ISDN agreements are made with the radio stations owning local broadcast rights, except for one case.

"The Jacksonville Jaguars do all of their broadcasting in-house, so our deal is directly with them," he said.

Simpson said the week of a Cowboys

road game is a long one. "We have a van full of 1,700 pounds of equipment to get to the game site. It's really a traveling road show." The van will leave for that weekend's NFL city on Wednesday or Thursday, depending on location. "I'll fly in and test the ISDN line

on Friday and then meet the equipment van on Saturday and we'll get set up," Simpson said.

The equipment is rack-mounted on two separate four-foot racks. "We use an AMEK 24-input mixer console that we've heavily modified for our two-way and talkback capabilities," Simpson said. From his operator's seat, Simpson can talk with the producer, booth announcers and field reporters.

For microphones, Simpson uses Beyer DT-290 Series headsets with condenser mics. "We've found that the condenser mics give us the best sound," he said. "Plus, we have eight separate wireless microphone paths from the field up to the booth." Four of those are used for parabolic field mics and sideline reporter mics. "We use a 360 Systems Instant Replay in the booth to play sound bites and interviews during the game," Simpson said. All commercials are inserted at the main studios at KVIL.

## Wireless umpire

In the 1990s, fans want to hear the grunting and crunching coming from the line of scrimmage. "The umpire, standing behind the defensive line, is usually wearing a mic to catch the ferocity of the game and the quarterback's signal call," said Simpson. The NFL maintains control over the mic and will kill it after a play is done.

"Some of those conversations on the field are not for public consumption," he said.

Simpson finds ISDN to be virtually maintenance-free. "We were the first to



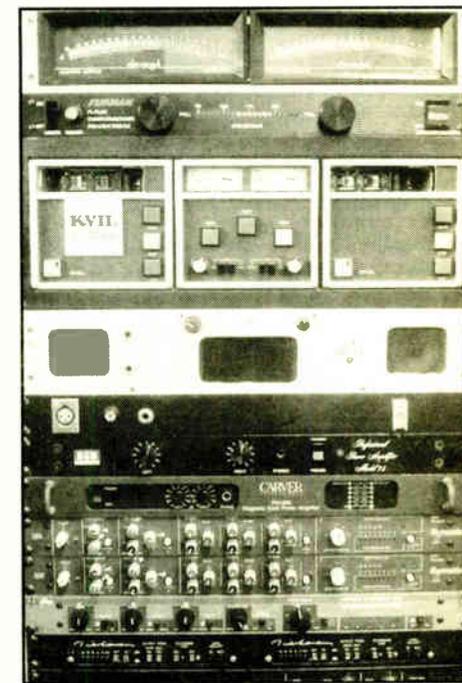
try anything stereo with it back in 1993," he said. "It was so expensive at the start it was prohibitive. Now you can get a line for a month for 45 bucks."

The biggest problem these days is getting the right ISDN installed. "There are so many applications for ISDN now. Say there are 151 kinds, well 150 of those won't work for you," he said. Once installed properly, the consistency of ISDN is impressive,

Simpson said.

Midcom uses MUSICAM USA Prima 120 or 220 codecs.

With eleven people in the booth for a Cowboys broadcast, room for equipment and people is at a premium. "We'll have three announcers, a producer and assistant, two spotters, a stat man and two engineers. It's tight."



KVIL Game Coverage Equipment

Simpson's advice to the NFL? "In new stadiums, build the radio booths bigger. We don't travel to games with just a Mackie mixer anymore."

## 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 • OEVON, 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.

# Ham Radio Operators Speak Out

► **HAM BEEFS**, continued from page 6

really large towers, and who has been accused more than once of causing TV interference, I appreciated the support given my recent fight against a restrictive county tower ordinance by the local amateur fraternity. They showed up in great numbers at one hearing, while many broadcasters could not be bothered.

Furthermore, as one who works in both the broadcasting and cellular industry, I can state with certainty that contrary to Fisher's assertions, cell phones have not "replaced the need for most emergency ham communications in this country." Weather-related disasters frequently disable cellular sites, and those remaining functional are overloaded beyond their capabilities.

Amateur radio has been incorporated into our EAS Local Area Plan, and indeed played a crucial part in EAS operations during Hurricane Fran.

The suggestion that the ARRL is a powerful lobby is bizarre. The ARRL does not have the kind of money that our Washington politicians pay so much attention to. The reason amateur radio has gained exemptions from restrictive tower ordinances is because public service is not a myth, but a reality, and our government leaders know this for a fact.

*W. D. Fawcett*  
Chairman

Shenandoah Valley EAS Committee  
Harrisonburg, Va.

Dear RW,

Fisher wrote that radio amateurs hams are not utilizing the amateur bands for the purposes they are intended for, ad infinitum. I disagree.

Although I have only been a licensed ham for one year, the two local ham radio clubs I belong to are very progressive — programs are presented at each meeting applying new technologies to amateur radio, and emphasize preparedness for public service to the community through

such activities as field day.

Yes, there are some hams who prefer to stick with traditional technologies, which is their prerogative. Besides, if it works for them, and does no harm to the ham community, what's the problem? Other hams are actively involved in utilizing new technologies, and that, too, is fine.



Jaime Allyn Ananko

I would like to say from personal experience that cell phones have not replaced the need for most emergency ham communications. Many areas do not have cell phone service or roaming capability. Often the terrain blocks out cell phone signal coverage in many areas. Interesting that Mr. Fisher is annoyed with amateur towers but not cell phone towers!

There have always been those with Mr. Fisher's viewpoint ready to down and take away frequencies from the amateur service. However, amateur radio has produced many individuals (past and present) with technical capabilities to apply to the commercial and non-commercial broadcast services.

I feel the majority of amateurs do utilize the amateur bands for their designated purpose and still have fun in the

process, and instill an atmosphere of experimentation characteristic of amateur radio. I am proud to be both a radio amateur and a broadcast engineer, and have found that many amateur radio principles have been helpful in my professional broadcasting practice.

*Jaime Allyn Ananko*  
Broadcast Engineer, WEZX(FM),  
WEJL(AM), WBAX(AM), WQFM(FM)  
Scranton, Pa.

Dear RW,

Much of what was in Burt Fisher's letter cannot be denied. However, he has featured only the negative aspects of the case. Consider:

1. Cellular and standard phones are subject to massive failures. In an emergency, there is no way to limit their use (short total shutdown) and give emergency traffic priority. Amateur radio has control and can provide emergency power to assure that emergency traffic can be handled.
2. He talks of the trivia on the amateur bands but implies that cellular phones are productive. My scanner pre-dates the 800 MHz ban. It doesn't take much listening to determine that cellular phone conversations are nearly all trivia.
3. Amateurs use relatively good communication procedure when called for in

generously.

6. Burt takes a poke at amateur radio antennas. He must be unaware of the hundreds of satellite and public service antennas that are proliferating on our landscape. The latter are also immune to local control.

Enough for the negatives. Amateur radio needs improvement and this can be achieved through the amateur radio publications and organizations including the ARRL. Why stir up the public and the commercial side in an effort to destroy amateur radio?

*George Wilson*  
Marstons Mills, Mass.

Dear RW,

Ham radio continues to be an incredible resource and service to the community. I was convinced of this by the response of the ham community here in north Georgia in March of this year.

On the morning of March 20, a tornado ripped through north Hall County not far from where I live. The National Weather Service failed to detect an F3 tornado that left 13 dead, over 100 injured, and caused millions of dollars in property damage. The amateur radio service was quick to respond to those in need by providing valuable communications in the aftermath of the tornado.

If Mr. Fisher believes cellular phones have eliminated the need for other forms



Tornado Damage in Hall County, Ga.

emergencies (telephone lines down, cellular service disrupted, etc.). They can handle traffic in an orderly manner. Imagine for a moment what the cellular phone service would sound like during an emergency.

4. When Burt became an amateur, electronics must have been much simpler than they are today. Even then the exams had been standardized to eliminate the examiner's bias.

Circa 1950, essay-type answers were eliminated. During and since World War II, the body of knowledge needed to become an expert in electronics/communications has expanded many hundreds of times. At least the current exams require prior exposure to the science, and further, to the legal and procedural aspects of radio.

5. Apparently productivity in Burt's view means the commercial sale and maintenance of equipment. Although amateur radio cannot match cellular phone sales, at \$300 to \$5,000 for basic radios, not counting antennas, test equipment and other ancillaries, amateurs do contribute

of communications, he is mistaken. When the tornado came through Hall County, the cell systems were quickly overloaded and useless. The local amateur UHF repeater was used to make emergency "phone patches." An emergency "net" operated on the VHF repeater.

Ham operators provided communications for cleanup and recovery efforts, damage assessment teams, and the Red Cross. I took the opportunity to help by providing communications from a Red Cross mass care unit. We delivered food and water to people who had lost their homes and to cleanup and public safety workers. Ham radio was very important in the support of these efforts.

Sure, one can tune across the ham bands and hear some silly conversations. But when a disaster strikes, hams prove time and again to be a valuable service to their communities.

*Marty Passmore*  
Chief Engineer, WVEV-FM  
Cumming, Ga.

## Honest AM Improvement



The 235 is a no-nonsense, full-function AM audio processor. It features slow, "gain-riding" AGC, 3-band average level compression coupled with variable equalization, and an asymmetrical peak controller combining fast limiting with variable clipping depth. Strict NRSC compliance is guaranteed by specified pre-emphasis and overshoot-compensated low-pass filtering.

You'll find the 235 very easy to set up and use. Front-panel controls and indicators make local operation a snap, and the built-in RS-232 port and our simplified software enable computer or modem remote control if desired.

Your preferred broadcast equipment supplier can arrange a demo at your station. Phone, fax or check our website for complete technical details.

**Model 235 — \$1800**

**Inovonics**  
1305 Fair Ave. · Santa Cruz, CA 95060  
TEL: (408) 458-0552 · FAX: (408) 458-0554

www.inovon.com



Circle (29) On Reader Service Card

INTERNATIONAL UPDATE

# Battle for Bandwidth in Tokyo

by Magda Kowalczyk

**TOKYO** Does it seem like competition for radio frequencies is tight in the United States? Come to Tokyo, where a shortage of frequencies in Tokyo is wreaking havoc for established and aspiring broadcasters alike.

Under current broadcasting law, FM stations in the Japanese capital are only allowed to operate between 76 MHz and 90 MHz. But the relatively flat topography of the region causes radio transmissions from various stations to jam one another.

The frequency clutter is aggravated by high-power transmissions from Tokyo Tower, FM stations in nearby prefectures and television signals.

**Several applicants**

The Post and Telecommunications Ministry has determined that the 1 MHz of the spectrum between 88.3 MHz and 84.3 MHz is the only spectrum segment open for use by new broadcasters in Tokyo.

Yoshihiko Kanbayashi of the Bureau of Telecommunications for the Kanto region said some parts of the 1 MHz bandwidth are already in use.

"I think it will be very difficult to allocated frequencies to the seven applicants on the waiting list," he said.

One of the seven stations on the waiting list, FM Setagaya, is a joint venture launched last February by the local government in Setagaya and a private company.

Although the applicants plan to use the station as a local emergency broadcasting station, it is at the bottom of the waiting list and therefore is unlikely to win a license.

A public relations spokesperson for FM Setagaya said, "The backers of this project are upset and angry. We spend 1.4 million yen (about \$9,840) each month on the project. They should not be telling us now that we cannot get the license."

The spokesperson also noted that the station is taxpayer-funded, and the funds invested thus far will be lost if no license is granted.

**FM crowding**

The reality of FM crowding in the Tokyo area became apparent in July 1997 when FM Edogawa began test transmissions on 78.5 MHz. The transmissions were jammed by a commercial station in nearby Yamanashi prefecture that broadcast on a first-adjacent frequency.

Officials initially thought there was enough room to accommodate both stations.

The debut of FM Edogawa was delayed for four months until Nov. 30, 1997, when it began broadcasting at its newly assigned frequency, 84.3 MHz.

The Post and Telecommunications Ministry began denying applicants for new frequencies in September 1997, in part due to a fear that more problems would arise in Tokyo and its neighboring prefectures.

Researchers at the state broadcaster, Nippon Hoso Kyokai (NHK), are looking to develop a new system that would allow broadcasters to make use of smaller spectrum blocks, however it has yet to be introduced.

■ ■ ■

*Magda Kowalczyk, a free-lance writer, reports on the industry for Radio World from Luxembourg.*

## Hoffman Was Online Pioneer

► HOFFMAN, continued from page 8 designing that could be used to tie together each unit of NBC, so we could control the entire network operation —



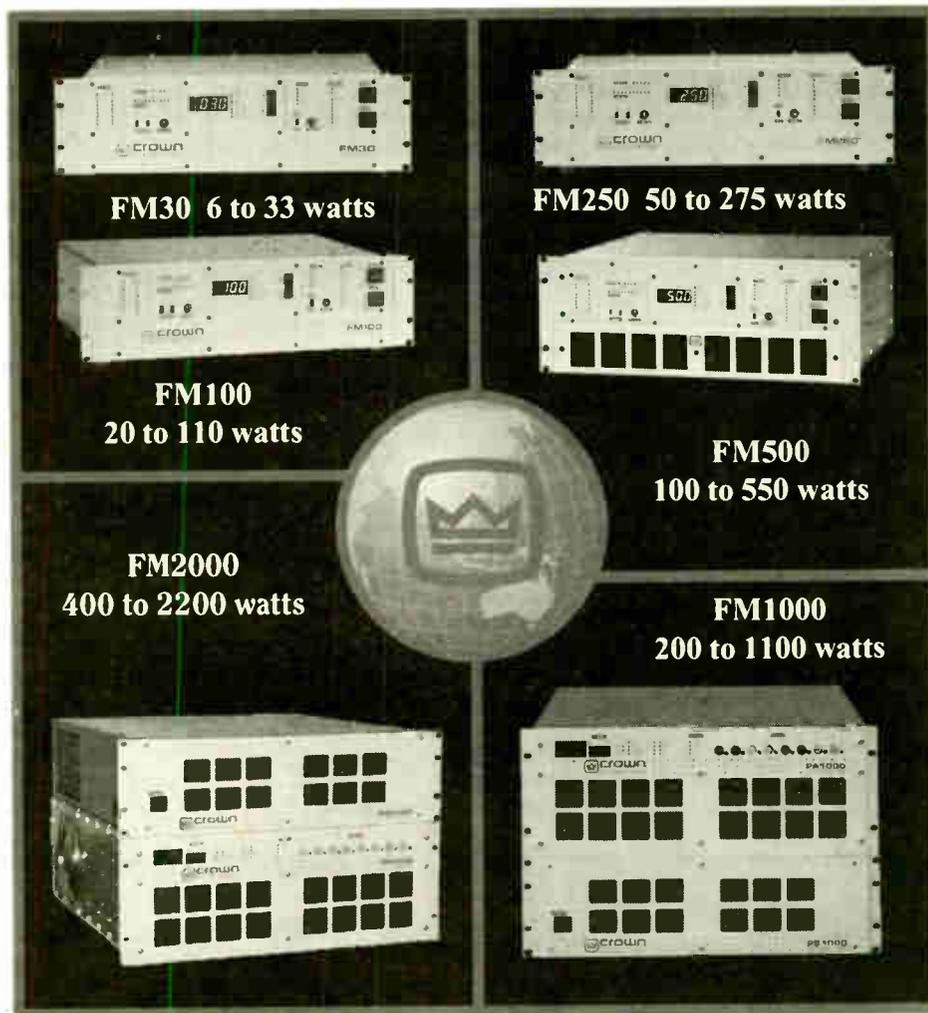
Hoffman in 1974

including Burbank — from New York."

Developing new technology was Hoffman's favorite activity. Salvio said that Hoffman even worked on such projects on holidays. "He never took holidays off," she said. "His job was his holiday. He enjoyed his work so much. John was most comfortable sitting in front of a computer with a can of Coke."

Hoffman is survived by a brother and sister.

# A World of Possibilities. . .



- Fully integrated, *solid-state* transmitters, exciters, translators, and satellators engineered to provide broadcasting *confidence*.
- Highly *efficient* and *reliable* power amplifiers *innovatively designed* to be lightweight and compact.
- Custom configured* and *delivered within days!*

**Give Us a Call When Your World Depends on Ours!**



1718 W. Mishawaka Road, PO Box 1000, Elkhart, Indiana, U.S.A. 46515-1000  
 Phone: 800-294-8050 or 219-294-8050; Fax: 219-294-8222  
 Email: broadcast@crowintl.com; Internet: www.crownbroadcast.com

Circle (55) On Reader Service Card

# '98 NAB Marconi Nominees Announced

**WASHINGTON** One hundred radio stations and personalities have been selected for the NAB Marconi Awards competition.

The winners in each category will be announced on Oct. 17 at the NAB Marconi Radio Awards Dinner and Show in Seattle. The event, featuring syndicated talk show host Tom Joyner, will mark the end of the 1998 NAB Radio Show.

An independent task force selected the final nominees in 20 categories. This month, NAB member radio stations will receive a profile booklet of the nominees and two ballots to be submitted by the station general manager and program director. Ballots should be returned to KPMG Pete Marwick in Washington, D.C. by Sept. 14 for tabulation.

Here are the nominees:

## Legendary Station of the Year

KRLA(AM), Los Angeles  
WAOK(AM), Atlanta  
WBAP(AM), Dallas/Fort Worth  
WBZ(AM), Boston  
WCBS-FM, New York

## Network Syndicated Personality of the Year

Paul Harvey, ABC Radio Networks, Dallas  
Don Imus, Westwood One Radio Networks, New York  
Tom Joyner, ABC Radio Networks, Dallas  
Rush Limbaugh, Premiere Radio Networks, New York  
Howard Stern, CBS Radio, New York

## Station of the Year By Market Size

**Major Market Station**  
KING-FM, Seattle  
KLVE(FM), Los Angeles  
KYXY(FM), San Diego  
WBZ(AM), Boston  
WRFG(FM), Atlanta

## Large Market Station

KBNA-AM-FM, El Paso, Texas  
KFRG(FM), San Bernardino, Calif.  
WMJI(FM), Cleveland  
WTKS(FM), Orlando, Fla.

WTMJ(AM), Milwaukee

## Medium Market Station

KASE(FM), Austin, Texas  
KKOB(AM), Albuquerque, N.M.



The NAB Marconi Award

KUZZ-AM-FM, Bakersfield, Calif.  
WIVK-FM, Knoxville, Tenn.  
WNNK-FM, Harrisburg, Pa.

## Small Market Station

KBHP(FM), Bemidji, Minn.  
KRKT-FM, Albany, Ore.  
WAXX(FM), Eau Claire, Wis.  
WKCQ(FM), Saginaw, Mich.  
WOOZ-FM, Harrisburg, Ill.

## Personality of the Year By Market Size

**Major Market Personality**  
Renan Almendarez Coello, KSCA(FM), Los Angeles

Kidd Kraddick, KHKS(FM), Dallas  
Randi Martin, WASH(FM), Washington  
Scott Paulsen & Jim Krenn, WDVE(FM), Pittsburgh  
Mike Roberts, WVEE(FM), Atlanta

## Large Market Personality

Bob Conners, WTVN(AM), Columbus, Ohio  
John Lanigan, WMJI(FM), Cleveland  
Joey Mitchell, KRAK(FM), Sacramento, Calif.  
Mike Murphy, KCMO(AM), Kansas City, Kan.  
Jim Philips, WTKS(FM), Orlando, Fla.

## Medium Market Personality

Jeff Beck & Jeff McKee, WRXL(FM), Richmond, Va.  
Tim Burns & Sue Campbell, WNNK-FM, Harrisburg, Pa.  
Joe Condon, WROW/WYJB, Albany, N.Y.  
Brent Johnson, WTCB(FM), Columbia, S.C.  
Tom Kinard, WJMX(AM), Florence, S.C.

## Small Market Personality

Terry Bell, KKAJ-FM, Ardmore, Okla.  
Reid Holsen, KELO-FM, Sioux Falls, S.D.  
David Hughes & Dexter, WUSY(FM), Chattanooga, Tenn.  
John Murphy & George House, WAXX(FM), Eau Claire, Wis.  
Curt Teigen, KZZY-FM, Devils Lake, N.D.

## Station of the Year by Format

**AC**  
KYXY(FM), San Diego  
KKCW(FM), Portland, Ore.  
WLHT(FM), Grand Rapids, Mich.  
WTCB(FM), Columbia, S.C.  
WWMX(FM), Baltimore

## Adult Standards

KVFD(AM), Fort Dodge, Iowa  
WHBC(AM), Canton, Ohio  
WMMB(AM), Melbourne, Fla.  
WQEW(AM), New York  
WORD(AM), Daytona Beach, Fla.

## CHR

KDWB-FM, Minneapolis  
KHKS(FM), Dallas  
KKRZ(FM), Portland, Ore.  
WVAQ(FM), Morgantown, W.Va.  
WZYP(FM), Athens, Ala.

## Country

KASE(FM), Austin, Texas  
KFKF-FM, Kansas City, Mo.  
KFRG(FM), San Bernardino, Calif.  
WTQR(FM), Winston-Salem, N.C.  
WUSY(FM), Chattanooga, Tenn.

## News/Talk/Sports

KGO(AM), San Francisco  
KKOB(AM), Albuquerque, N.M.  
KWOA(AM), Worthington, Minn.  
WCCO(AM), Minneapolis  
WDEL(AM), Wilmington, Del.

## Oldies

KHYL(FM), Sacramento, Calif.  
WBIG-FM, Washington, D.C.  
WGRR(FM), Cincinnati, Ohio  
WJMK(FM), Chicago  
WOMC(FM), Detroit

## Religious/Gospel

KKLA-AM-FM, Los Angeles  
WAVA-AM-FM, Arlington, Va.  
WCRF(FM), Cleveland  
WLOK(AM), Memphis, Tenn.  
WMCU(FM), Miami/Ft. Lauderdale

## Rock

KATT-FM, Oklahoma City  
KLOS(FM), Los Angeles  
WBCN(FM), Boston  
WFBQ(FM), Indianapolis  
WFYV-FM, Jacksonville, Fla.

## Spanish

KGBT-AM-FM, McAllen, Texas  
KIWI(FM), Bakersfield, Calif.  
KLOK-FM, Monterey/Salinas, Calif.  
KOVE-FM, Houston  
WSKQ-FM, New York

## Urban

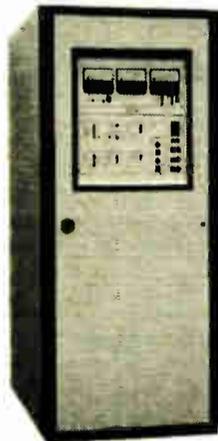
WJTT(FM), Chattanooga, Tenn.  
WMCS(AM), Milwaukee  
WUSL(FM), Philadelphia  
WVEE(FM), Atlanta  
WZAK(FM), Cleveland



Audio Broadcast Group Inc.

NAUTEL offers solid state AM broadcast transmitters from 1,000 watts to 300,000 watts and higher, solid state FM broadcast transmitters from 3,500 watts to 20,000 watts and a digital FM exciter. NAUTEL AM and FM transmitters offer high overall efficiency, unique redundancy and reliability features and over 27 years of solid state design experience.

ABG is proud to represent NAUTEL Solid State Transmitters.



**XL12**  
**12kw AM**  
**Transmitter**



**FM-5**  
**5 kw FM**  
**Transmitter**



## In the Great Lakes Region:

### JACK CONNERS

Toll Free: 800-999-9281  
FAX: 616-452-1652  
E-mail: jconners@abg.com

## In the Southeast Region:

### JOHN GEORGE

Toll Free: 800-951-7443  
FAX: 803-951-3123  
E-mail: jgeorge@abg.com

For a quotation or additional information about our solid state AM and FM transmitters and digital FM exciter, please contact Jack or John today.

**"We're the #1 FM ~~all~~ music station in Philly, probably because the Omnia completes our all-digital studio. Now, our sound is so loud, so clear...very well-defined with absolutely no grunge.**

**And the Omnia is one thing that my PD and I agree on. It's definitely a keeper."**

*Russ Mundschenk, Chief Engineer,  
WBEB 101.1 FM, Philadelphia, PA*

Russ dared to go where his competition isn't. Yet.

The all-digital Omnia.fm processor from Cutting Edge delivers all the clarity and precision of digital, with the fullness and depth of analog. You have rock-solid peak control. Positively no grunge. And loudness that blows the suits right out of their... well, suits.



Demo the Omnia in your station for 60 days\*. We think everyone will agree that the Omnia makes your station sound better than ever. If not, you have a money-back guarantee from Cutting Edge. Call us at 216 (241)-3343 or the Omnia dealer in your area. Because this is where you want to go. Just ask Russ.

Omnia. The promise of digital...*delivered.*

*Guess what! Just 6 months after we installed the Omnia.fm, the spring Arbitron says we're the #1 station in Philly. Period. Thanks, Cutting Edge! We're celebrating at B-101!  
Russ*



**CUTTINGEDGE**

2101 SUPERIOR AVENUE CLEVELAND, OH 44114  
TEL: + (216) 241-3343 FAX: + (216) 241-4103  
E-MAIL: [INFO@NOGRUNGE.COM](mailto:INFO@NOGRUNGE.COM)  
[WWW.NOGRUNGE.COM](http://WWW.NOGRUNGE.COM)

\*Demo requests must be submitted as a purchase order.  
Terms are available from your Omnia dealer listed below.

Audio Broadcast Group 3685 Roger B. Chaffee Blvd. Grand Rapids, MI 49507 Tel: + (616) 452-1596 Fax: + (616) 452-1652 e-mail: [support@abg.com](mailto:support@abg.com)  
Bradley Broadcast Sales 7313G Grove Road Frederick, MD 21704 Tel: + (800) 732-7665 Fax: + (301) 230-6526 e-mail: [info@bradleybroadcast.com](mailto:info@bradleybroadcast.com)  
Broadcast Supply Worldwide 7012 27th Street West Tacoma, WA 98466 Tel: + (800) 426-8434 Fax: + (800) 231-7055 e-mail: [info@bswusa.com](mailto:info@bswusa.com)  
Crouse-Kimzey Company P.O. Box 155999 Fort Worth, TX 76155 Tel: + (800) 433-2105 Fax: + (972) 623-2800 e-mail: [sales@proaudio.com](mailto:sales@proaudio.com)  
Radio Communications Unlimited 5509 Barrington Collewah, TN 37363 Tel/Fax: + (423) 396-3743

Circle (107) On Reader Service Card

# The Power of Digital. The Future of Radio.

## Step-up to the future with In-Band On-Channel Digital Radio

For more information on In-Band On-Channel digital radio visit booth #646 at the NAB Radio Show, October 14-16 at the Washington State Convention & Trade Center in Seattle, call 410-872-1530 or visit our website: [www.usadr.com](http://www.usadr.com)

**USA**  
**DIGITAL**  
**RADIO**

*A Sound Investment In Quality*

## DIGITAL BUSINESS: Going Digital

Beginning with the introduction of compact discs through the conversion of cellular service and television broadcasting, the world is going digital. These historic events plus the competitive pressures from new satellite-delivered digital audio services will necessitate the transitioning of terrestrial broadcasting to a higher quality digital signal. The issue for the entire radio community in transitioning to digital is to select the approach that best meets listener expectations while maximizing current broadcasters' assets.

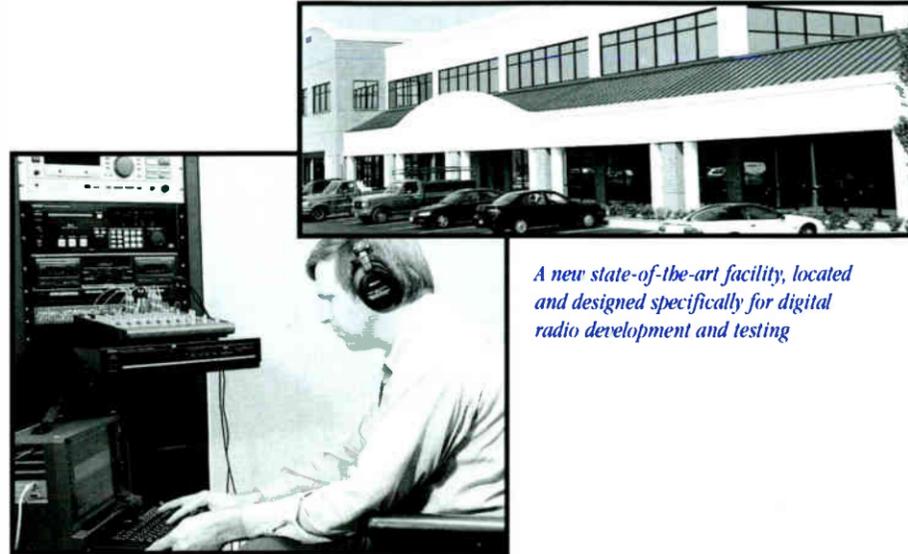
### The benefits of digital radio...

USA Digital Radio's In-Band On-Channel (IBOC) technology allows broadcasters to provide superior CD-quality sound and enhanced data services to listeners using the existing AM and FM spectrum. Additionally, IBOC broadcasting eliminates multipath, interference, and noise. Since broadcasters retain their current spectrum and dial locations, listeners will know exactly where to find their favorite radio stations in an IBOC digital world. And, with USA Digital Radio's simultaneous analog and digital (or hybrid) approach along with our commitment to keep station conversion costs reasonable, we anticipate a smooth transition for broadcasters. Listeners will enjoy local broadcast content, superior CD-quality sound and the benefits of new robust data services.

**The issue for the entire radio community in transitioning to digital is to select the approach that best meets listener expectations while maximizing current broadcasters' assets.**

### Technology today at USA Digital Radio...

As the world leader in In-Band On-Channel (IBOC) technology, USA Digital Radio's IBOC development program is well underway. We have begun transmitting with an experimental license on FM 93.5 in the Baltimore/Washington area in the Hybrid IBOC mode (simultaneous analog and digital waveforms). Initial lab testing and system verification of the complete IBOC system are in progress, and field tests will follow later this year. Contracts have been awarded for prototype hardware and test efforts to Xetron Corporation, BittWare Research Systems,



*A new state-of-the-art facility, located and designed specifically for digital radio development and testing*

and Fraunhofer Institut für Integrierte Schaltungen (IIS). Xetron is supporting USA Digital Radio in the AM development efforts, and has provided custom RF

exciter and receiver prototype hardware for test efforts. BittWare's custom processor hardware is being integrated into prototype exciters and receivers for extensive lab and field tests. Fraunhofer's AAC audio compression technology is providing CD-quality audio for our IBOC system.

### Beyond technology at USA Digital Radio...

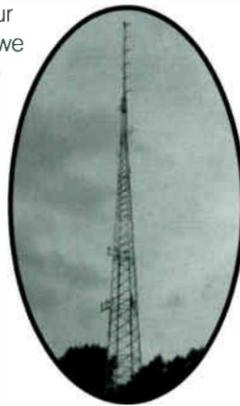
Several key activities are in progress that go beyond technology. They include regulatory initiatives on both the domestic and international fronts, support of the transmitter and receiver manufacturing sectors, ongoing broadcast industry support and business initiatives necessary to insure a successful IBOC implementation. We are currently working with leading transmitter and receiver manufacturers to plan for this digital technology deployment.

### A smooth transition period for everyone...

The conversion from analog to digital is expected to begin sometime in the year 2000. And, with USA Digital Radio's hybrid IBOC DAB system, the shift can take as long as necessary, allowing a comfortable transition period for both broadcasters and listeners.

### Protect your future with USA Digital Radio...

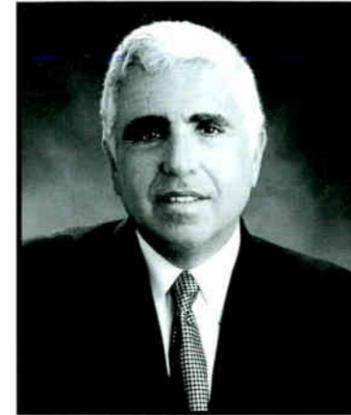
USA Digital Radio has invested heavily in developing technology that will enhance the listening experience, while providing the smoothest possible analog to digital transition. And, as we progress toward the implementation of our IBOC DAB system, we will continue to keep the radio industry informed of our progress.



*USA Digital Radio tower On-the-Air from WARW, Washington, DC*

## CONTINUED SUCCESS FOR RADIO INTO THE NEXT MILLENNIUM

*An Interview with Mel Karmazin*



*Mel Karmazin, President and Chief Operating Officer, CBS Corporation*

Mel Karmazin was named President and Chief Operating Officer, CBS Corporation, on April 7, 1998. In that post, he is involved with all aspects of the Corporation's media business. Mr. Karmazin came to CBS in January 1997 as chairman and CEO of CBS Radio through a merger of Westinghouse/CBS and Infinity Broadcasting, where he had served as President and CEO since 1981.

### Question: What is your view of the future of radio?

**Mel:** Radio has always been and continues to be a successful, powerful, and dependable medium for reaching the masses. I am excited about radio's future, and remain very bullish on its prospects. A smooth transition to digital technology will only increase our opportunities.

### Question: Will there be a consumer demand for digital radio?

**Mel:** If you look at recent technological advancements in related consumer oriented industries, it shows that consumers are rapidly adopting digital based products. We believe enhanced audio quality and data service capabilities being built into the In-Band On-Channel system will drive consumer demand.

### Question: When do you think it will really happen?

**Mel:** My understanding is the roll out will begin in the year 2000. But the transition period needs to be long enough to accommodate the economic considerations of broadcasters and consumers. We clearly do not want a roll out that puts excessive financial pressure on either.

### Question: What is CBS's relationship to USA Digital Radio?

**Mel:** CBS is the general partner and major investor in USA Digital Radio. Back in 1991, CBS made a decision that broadcasters should protect their radio assets by becoming involved in the digital conversion process. The USA Digital Radio partnership was formed to develop the technology. The reason for this partnership was clear. We wanted broad-

casters to play a key role in defining their destiny, and not be held hostage by technology imposed on the industry by those who don't understand the unique needs of radio.

### Question: What factors will CBS consider as it contemplates the transition to digital?

**Mel:** CBS is a major player in the radio industry, and we look at digital radio as one more reason why radio has a great future. The transition to digital, for both AM and FM, will allow us to remain at the forefront of broadcasting technology by providing CD-quality audio and enhanced data services. However, the transition period must be realistic, and the associated conversion costs must be reasonable, for broadcasters and consumers.

### Question: What can be done to ensure that broadcasters will embrace digital technology?

**Mel:** USA Digital Radio needs to work closely with broadcasters at every step to develop and roll out the technology. A smooth transition period is necessary to protect the economic interests of all broadcasters. This, and only this, will ensure broadcasters embrace digital technology.

## Digital Profiles: Glynn Walden



*Photo by Paul J. McLane, Radio World*

*Glynn Walden gives a keynote address to the American Radio Manufacturers Association discussing how broadcasters and listeners will benefit from the transition to digital radio.*

*As Vice President of Engineering for CBS Radio, Glynn Walden directs major corporate projects for CBS radio stations, and is the broadcast engineering technical consultant to USA Digital Radio on its IBOC DAB development program. Previously Mr. Walden was the Director of Engineering for CBS and Westinghouse Broadcasting where he worked on capital projects including station power increases, facility consolidations and relocations. He served as the Engineering Manager for KYW, and has been an active industry voice advocating technical improvements, protections of the FCC allocations rules, and AM improvement.*

*In 1991 he helped found USA Digital Radio, a consortium of broadcasters developing In-Band On-Channel (IBOC) technology. For his pioneering work in the development of the AM IBOC prototype system, he was awarded the George Westinghouse signature of excellence award in 1993.*

*Mr. Walden began his radio career in Miami Florida at WEDR-FM as its first Chief Engineer. He later held the position of Chief Engineer at WWOK AM/FM and WCMQ AM/FM. He designed broadcast equipment, and taught electrical technology courses at Miami Dade Community College. Glynn holds a BSEE from Florida International University, is a member of IEEE and AES, and frequently speaks and presents technical papers at trade shows and conferences.*



USA Digital Radio  
8865 Stanford Boulevard  
Columbia, Maryland 21045

## SOUND BYTES

The USA Digital Radio Newsletter

We are looking for your input. Contact:

David Salemi,  
Marketing Director and Editor-in-Chief  
8865 Stanford Boulevard, Suite 202,  
Columbia, Maryland 21045  
410-872-1533, 410-872-1560 fax,  
salemi@ibocradio.com  
www.usadr.com

## What is IBOC DAB?

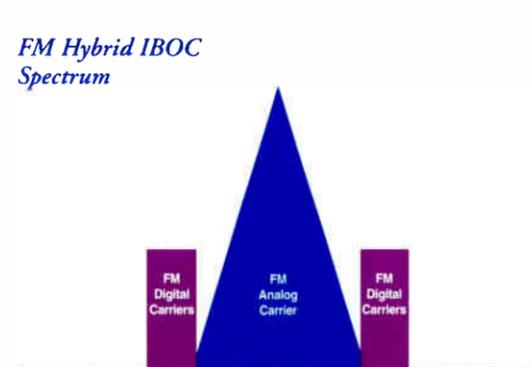
**In-Band On-Channel Digital Audio Broadcasting (IBOC DAB)...** is the addition of digital audio signal to the current analog audio transmission. The digital signals are on the same AM & FM channel assignments as current analog stations (i.e. 680 AM, 106.5 FM etc.).

**Hybrid IBOC...** is the transmission of a digital program signal simultaneously with the analog on the same channel.

**All-Digital IBOC...** is the digital signal which remains when a radio station eventually drops its analog transmission and boosts the power of the digital signal.

## The Benefits of IBOC DAB...

- No new spectrum required for AM or FM IBOC DAB
- Exclusive IBOC DAB system allows existing broadcasters to keep current dial positions in a digital world
- No new towers or transmitter site leases needed for IBOC DAB broadcasting
- Digital compact disc sound quality for FM stations and "FM like" sound quality for AM stations
- New robust data services for listeners



## Come Hear The Difference



Visit USA Digital Radio at  
**The Radio Show**  
held by the  
**National Association of Broadcasters**  
Seattle, Washington  
October 14-17, 1998  
Booth 646

# SOUND

The Latest News From  
USA Digital Radio

# BYTES



August 1, 1998

## WELCOME TO THE WORLD OF DIGITAL RADIO

### IN THIS ISSUE

- An exclusive interview with Mel Karmazin, President and Chief Operating Officer of CBS Corporation on the future of digital radio



- Going Digital
- What Is IBOC?

...And to the first edition of Sound Bytes, USA Digital Radio's quarterly newsletter. Through this forum, we will keep the radio world, broadcast community, and listeners abreast of the developments and progress of digital radio. In particular, we will focus on USA Digital Radio's In-Band On-Channel system, from its beginnings, through its testing and regulatory processes, to its implementation.

Established in 1991, USA Digital Radio is a partnership of CBS Corporation, formerly Westinghouse, and the Gannett Corporation. We have assembled engineers and scientists from leading-edge digital technology arenas and from major engineering universities with the purpose of developing a smooth, low cost transitional path for both AM and FM digital broadcasting.

Since the partnership's beginning, USA Digital Radio has been developing an In-Band On-Channel system that meets the needs and expectations of the entire broadcast community, from the broadcaster to the listener. We are the inventors and world leaders in AM and FM In-Band On-Channel Digital Audio Broadcasting, and hold key patents on all fundamental aspects. In-Band On-Channel will allow broadcasters to transition to digital radio while keeping their present station dial locations. And with USA Digital Radio's technology, broadcasters can transition with little or no disruption to current analog operations.

As with the rest of the world, radio is going digital. The implementation of digital radio will bring with it the highest quality

sound ever heard on both AM and FM stations. And with digital radio comes robust datacasting, allowing listeners to receive significantly more data than current FM subcarriers can accommodate.

As we continue to test and roll-out our digital radio system and to publish this newsletter, we encourage input from the broadcast community. In future issues, look forward to articles and interviews addressing your issues and concerns. We are thrilled to be part of this historic change to the radio industry, and pledge our complete support to make digital radio a success for everyone.

I look forward to receiving your input and keeping you apprised of our progress as we continue on the exciting path to a digital radio future.

Robert J. Struble  
President and Chief Executive Officer  
USA Digital Radio



## Come Hear The Difference

Visit USA Digital Radio  
at NAB's  
**Radio Show**  
Seattle, Washington  
October 14-17, 1998  
Booth 646

TRANSITION TO DIGITAL

# The Radio Free Asia Buildout

For the last two years, in an office space formerly occupied by National Public Radio in downtown Washington, Radio Free Asia has originated news, information and commentary for consumption by listeners halfway around the world — listeners whom the U.S. government believes do not have access to all and free news media.

Now the technical operations department of RFA has completed a substantial upgrade to the facility, as part of a doubling of airtime and staff this year.

RFA saw its annual budget increase from \$10 million to \$26 million in fiscal 1998. Part of that money went for the purchase of a transmission facility in Saipan. But part of it stayed in Washington, helping to pay for larger, more sophisticated studios for the native speakers who collect the news and broadcast it back to Asia. The funding helped to expand the hours of existing broadcasts, and to add an eighth service, Cantonese.

From a crowded temporary basement work space nicknamed "the bunker," Director of Technical Operations David Baden and his staff of 40 expanded the physical plant and implemented ambitious digital improvements to a facility they had installed only two years earlier.

The staff is pushing the boundaries of what constitutes a large, effective digital audio management system for radio. To cite just one example, RFA now is networking 30 Orban Audicity workstations in Washington via a LAN. By the end of 1998, the staff hopes to have seven more workstations, located in its Asia offices, networked via Internet WAN.

As completed, the RFA plant in Washington encompasses 11 Production studios, 18 Mini Studios, one Master Control and a large office work area with specially outfitted computer workstations.

That translates into a lot of gear, including a total of 235 workstations running Broadcast Electronics AudioVAULT, 32 Audicity workstations and 31 Yamaha digital mixers. And that doesn't include equipment at RFA offices abroad.

RW Editor Paul J. McLane discussed the project with David Baden, who was joined by Marty Martin, former deputy director of technical operations and now consultant to RFA, and Bill Eldridge, acting deputy director of technical ops.

Note: Radio Free Asia also is making creative use of 3D computer-aided design and graphics tools to document its facilities. For a look at documentation created by RFA, as well as staff bios and more photos of the newly expanded facility, go to [www.rwonline.com](http://www.rwonline.com).

**RW:** What were your technical goals and philosophies as you set out to expand RFA's facilities?

**Baden:** What we tried to do is start up an all-digital facility. We had two concepts in mind. The first one was an entirely digital signal from the microphone to the transmitter, and the second thing was what we call an integrated desktop. The ultimate goal was to allow every user at the desk to have access to every digital system, and at the same time never go back to the analog process.

We wanted to make it as simple and

user-operable as possible. We don't have, for instance, a staff of technicians in every studio. The broadcasters record themselves and do their own production work. For technical support, we average about two people per floor per shift, watching six studios. We like to think of it more as sort of an audio help desk.

We also want to make everything compatible as far as being able to go to any suite and pull up any program, or edit it from any station. And we wanted to elim-



Marty Martin watches language servers in Master Control.

inate any kind of media whatsoever. We also wanted to use off-the-shelf technology as much as possible.

All-digital and all-access. That was pretty much what we achieved in this expansion.

We are going to end up with 179 Edit Stations, and 21 more in reserve for future use; six Master Control digital stations; 18 Mini Studio stations; and 11 Studio stations. This is all off the AudioVAULT. We also have 32 Audicity workstations on site. We have worked with Orban, and we have it set up so the Orban can export into the BE. (Ed. Note: Orban Version 2.0 software allows networking, including file transfer and WAV file interchange; it allows users to connect single or multiple Audicity workstations to Windows 95 or NT file servers.)

We have nine or 10 language services that will be operating out of here — eight now, and two more planned. The language services can record their programs in any studio or Mini Studio, and later access their audio files for editing from any workstation in the facility.

**RW:** Walk me briefly through the path after master control.

**Baden:** From master control we feed from RFA over a T1 to the International Broadcast Bureau, the engineering transmission organization for all U.S. government-funded broadcasting. We feed to the IBB Network Control Center in southwest Washington, D.C. They then put our signal up over their satellite systems and get it out to the transmitters.

**RW:** Any advice for a manager planning to build or improve a facility right now?

**Baden:** Have a vision of the facility as an interactive whole and work to integrate all aspects of the operation. The PC used as a word processor on the desktop is the same machine that is used to edit digital audio. Never look at the facility as information systems, administration and broadcast. It is all one system.

Also, don't buy vaporware. We tried

to avoid it at all costs. That is how we ended up with the Yamaha 02R and 03D digital mixers. When we were looking, at the 1996 NAB show, a lot of manufacturers were saying they had digital consoles, but nobody was actually shipping. Yamaha was the only one in the under-\$10,000 price range. They were shipping the 02R.

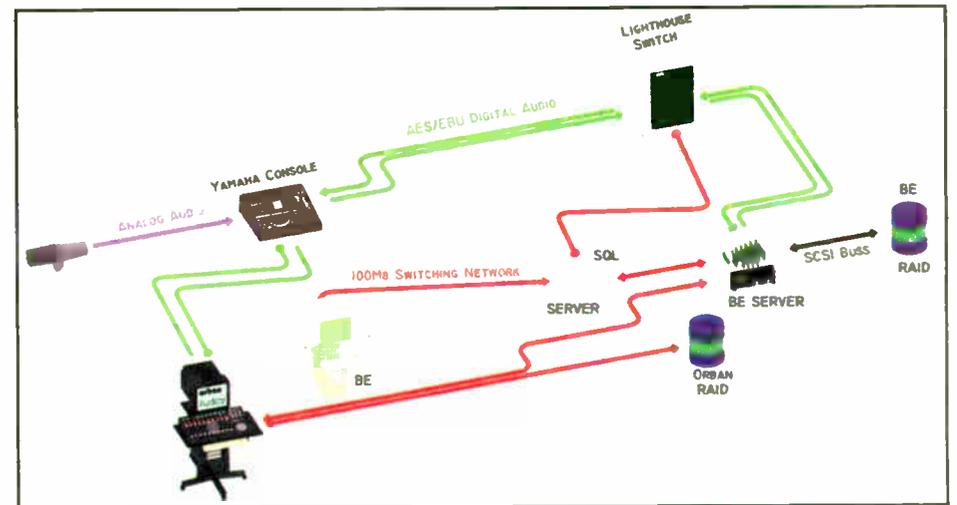
**RW:** The 02R is one of the key pieces of equipment on your list ...

**Baden:** For all studio production, it is a Yamaha console. In the Mini Studios it is an 03D, and the main studios it is an 02R.

If you have been into radio broadcasting, it looks a little imposing. It is not a real on-air live board, it is like a concert board.

**RW:** The preset "scene" memories are a powerful benefit.

**Baden:** If you walk down to any of the studios you will see that the presets look



Sample Documentation of the RFA Audio Management System

the same in all of the studios, so it was easy for people who didn't have any experience just to walk in. It's like a virtual patch thing.

For a little bit extra, we could buy a Z-Systems 8x8 Detangler. It pretty much took care of AES/EBU distribution problems. The Yamaha would have only one digital main output, but with the Detangler we could make it several. As far as control of the lights and speaker muting, we found a company in the Czech Republic called MediaTech that makes a programmable MIDI controller that runs off the Yamaha. It costs less than \$1,000.

**RW:** You came on board with Radio Free Asia when it started just two years ago ...

**Baden:** I was originally working for

Radio Free Europe and had just come back to Washington from the Prague relocation, in which Radio Free Europe moved from Munich to Prague. I was in charge of all construction there, including the broadcast facilities.

I came on board with Radio Free Asia on July 1, 1996. We moved to this building when it was an empty shell in August. RFA occupied a small temporary space on Connecticut Avenue in the Radio Free Europe/Radio Liberty office. The first Mandarin broadcast went on the air in September of 1996 from there. During the initial buildup, I had two staffs going: one at 2025 M Street doing the facility, and one at 1201 Connecticut, training new broadcasters and getting the initial broadcast off the ground. On November 22 of 1996, this facility was on air.

We didn't wrap up details for this expansion until about the second week of May of this year. We did our first integration of new into old and expanded to the fourth floor in June, and we expect to be done here by August 15.

**RW:** And by the time you are done ...

**Baden:** We will have gone from eight studios to 11 full studios, and from seven "remote stations" to 18 Mini Studios.

The former remote stations were glorified production centers in cubicles. Originally we built them as a place the staff could go to do a little bit more complex editing than your typical desktop user. But as in most facilities, the studios at peak times are full, so people started throwing microphones in there and started recording at their desks, which is lousy quality. And from that developed the idea of sticking it all in smaller studios, and calling them Mini Studios.

**RW:** Let's talk about the workstations.

**Baden:** Our total PC stations are running

around 250. It is your typical Microsoft bundle desktop: Microsoft Word, Excel, Access, the Office Professional group, e-mail and Internet access. We have a TV/video card, so there is TV at every desktop. We have language integration for the language services word processing. We use Nexus NewsWire for processing of incoming news agencies. We run AudioVAULT on almost every desktop.

**RW:** A user of this is typically a producer? Can they produce their audio there?

**Baden:** It is anybody from a reporter to a producer to ... everybody. They can produce their audio feeds from there, if it exists on the server. They cannot record there.

We have gone away from a hardware house monitoring system to basically a

See RFA, page 26 ▶

# RFA's Digital Days

► RFA, continued from page 25

streamed audio system, a Web audio house monitoring system. We are using the Telos Audioactive for that. So everybody has an Audioactive player.

All of the PCs have two sound cards because we are all-digital coming off all of our systems, like the AudioVAULT system, to the desktop. So we have Zefiro AES/EBU sound cards in the PC, as well as a standard Soundblaster-compatible card.

You can record in any studio, but you can sit at your desk and edit your program. Because the house monitoring system is now Web-based, you can pull off that into the studios, because the Audioactive is an

MPEG-based system, too.

One of the things Bill Eldridge is working on is true digital audio drag-and-drop across *everything*. We want to drag under an Explorer-type window digital audio files between the BE AudioVAULT, Orban Audicy and the Audioactive house monitoring systems.

It is the future idealized functioning. Right now you can access each of the audio systems from your desktop, but only within itself. The Audioactive player plays Audioactive files or streams, the BE AudioVAULT opens AudioVAULT files, and so on. There is an interchange between the digital audio files, but this now involves "exports" and "save-as"

type conversions. Our ultimate goal is the ability from any audio applications system's player/editor to be able to browse the entire network and all the various digital audio files and be able to open the one needed.

**Eldridge:** The setups we did before RFA, we had separate facilities for everything — a house monitoring system, a logger, a Web audio site, a recording/editing system. Now we have access to all of these via fairly standard office networking from a standard PC. The typical producer can sit at his or her desk and with one click access a TV program, check the daily newsfeeds, use BE audio editing, pop up the in-house monitor via the Web, or write a Word document and send e-mail. The tech staff can perform backups, restore audio and schedule programs



## Radio Free Asia

**Mission:** To broadcast domestic news and information in eight languages to listeners in Asia who do not have access to full and free news media.

**Languages:** Mandarin, Tibetan, Burmese, Vietnamese, Korean, Lao, Khmer and Cantonese.

**HQ:** 2025 M St., N.W., Washington  
**Offices:** Hong Kong, Tokyo, Taipei, Phnom Penh, Dharamsala, Bangkok, Seoul

**Transmission:** Shortwave

**Staff:** 160 Employees

**Budget:** \$28 million. RFA is a private, nonprofit corporation funded by an annual U.S. federal grant

Source: Radio Free Asia

from their own desktops. We obviously need more inputs and programs of various types to do these things, but as far as functionality goes, the average PC in 1998 can handle all of this.

Once you take the attitude that "everything's data," you then start wanting all the conveniences in audio that are there in a standard office network. Linking in the Audioactive with the studio Orban with the BEs is the final glue.

**RW:** What is the most important thing RFA has accomplished technically?

**Eldridge:** Dave has altered the expectation of the radio station, to say that we are not bound by traditional radio equipment, we're mostly bound by making it easiest for a broadcaster to do his or her show. So we're using alternative consoles that people would not usually use in a radio station, but we've automated them. We can do MIDI downloads of console preset configurations in case somebody messes up the settings for it. We have a lot of equipment more oriented towards a traditional recording studio, using it to produce radio programs.

The other thing is essentially getting the program everywhere where you want to be. Having the program follow you, rather than you having to push the program around, so we don't have people who are splicing tape or carrying spools of tape upstairs. Slowly but surely integrating things like databases of programs in with the audio itself, and allowing people to monitor what's going on from their desktop via the Web, of the program we're putting out at that moment up in Master Control. And ultimately, letting our remote bureaus and stringers transfer from their systems via the Net directly into our editing and broadcast facilities, so what we have becomes a self-serve worldwide studio.

**RW:** Integrating key systems is a big job.

**Eldridge:** When we started off, Orban and BE had already made this deal where Orban could write into the BE system, directly in. Now, this is one-to-one. We've been asking lately for four-to-one

See RFA, page 27 ►

## Feel the Pulse of Radio @ THE NAB RADIO SHOW



**Sam Zell**

Chairman, Jacor Communications & Keynote Speaker



**Bill Kennard**

FCC Chairman  
Chairman Kennard will make his first ever address to The NAB Radio Show this year at the annual Chairman's Breakfast.



**Dr. Laura**

Premiere Radio Network's internationally syndicated talk show host & Radio Luncheon Speaker



**Lowry Mays**

Chairman & CEO of Clear Channel Communications will be honored as the winner of the 1998 National Radio Award.



**Tom Joyner**

Fly Jock of ABC Radio Networks & Host of this year's NAB Marconi Radio Awards Dinner & Show

### Today's Challenges, Tomorrow's Opportunities Featuring:



**Frank Wood**

Secret Communications Moderator



**Dan Mason**

CBS Radio



**Larry Wilson**

Citadel Communications



**Mark Mays**

Clear Channel Communications



**Lew Dickey**

Cumulus Media

See you in *Seattle*

October 14-17

Seattle, Washington

1 9 9 8

To register or for more information visit our website at [www.nab.org/conventions/](http://www.nab.org/conventions/) or call 1.800.342.2460!

► RFA2, continued from page 26  
compression and that's been a little bit slower coming. But it's finally all been worked out, so they are now talking to each other. BE's new FTP interface AVExplorer, and Orban's work on Windows domain networking for the Audicity, promise even better integration in the near future.

**RW:** *They're giving you a lot of support.*  
**Eldridge:** This started in a curious way. We were getting complaints about slow Jaz and network transfers. We had a couple of machines in the basement that hadn't been installed, so I started looking at how the systems could be improved in basic ways: move from 486 to Pentium, PCI bus, a fast wide SCSI adapter, a 100 Mbit network card, and so on. I strung cables between an Orban and a new Pentium we had, since the Orban still required some of its on-board controllers, and started checking out bottlenecks and performance. The Orban rep showed up about this time, and though we had obviously voided our warranty, Orban was intrigued that a customer was willing to work with the stuff, help in the development cycle and give them feedback.

Orban had started on this path, and it just sort of pushed them to complete things quickly — to move on to the network version and, you know, they started seeing how nice it is if you can put all of your files up onto an NT server — or what I'm pushing for the next step, a Linux file server. Then you can move from studio to studio and your files are up on the server, and you're basically portable at that point.

Even if you're recording things on a Jaz drive, it's going back to that tape paradigm. You're always "sneaker-netting" your recordings around. The idea of having a nice network is *use* the network so all you need when you walk into a studio is the paper of what your story is. Your story follows you from studio to studio.

**RW:** *What do we need to do as an industry to make design of a facility like this easier a couple of years down the road?*

**Eldridge:** I've done everything pretty much through standard Unix features — serial ports, fast buffered file systems, crontab scheduling, Unix sockets — basically dragging the data from a serial port out through a Unix socket to another machine, which is how World Wide Web and FTP or any other Internet machine works. And just scanning the new files every once in a while to automate the layout of the HTML.

Now I'm using the language Python. There are a number, like Perl and Java and so forth, that can do similar stuff, that basically have links into standard Web programs like Apache. So the pieces are already there.

It's hard to use those kind of tools on Windows because it is less oriented towards automation and it's harder to pipe these pieces together. My biggest hope is that people will start paying more attention to the Linux world and other Unixes. Linux is free and it tends to outperform things anyway, while giving you more control of the process.

**RW:** *What about the news handling system, and the multilingual problem?*

**Eldridge:** Our newsfeeds are now completely digital. We have some old dot-matrix printers to make our newsroom look traditional, but in practice, we just have a news program on each desktop.

We're using NewsWire2000 from Nexus, similar to what we had at Radio Free Europe, which lets the broadcasters access the news server across the Net, catch the news as it comes in, search for keywords, cut-and-paste, and so on.

Fonts and languages is a difficult issue. Our newsfeeds are currently all in Roman alphabet, so it doesn't affect us there, but we have eight language services to support with word processing, e-mail, Web access ... they're always finding a new site on the Web that they can't read, or getting a piece of e-mail with a different font.

We started out dealing with this using Gamma Unicode (8-bit international font) support, which was then picked up by Unitype, and this has been about 50-percent successful, which is really quite good, considering. Some services still use the most common non-Unicode (7-bit only)

fonts because that's what all their colleagues use, other fonts are really hard to get to look right, multikey combinations need to be the same pattern that writers are used to, character based input is difficult, and a host of other problems. This will get worse as we do more with the Web, but there's more support for it in new software and versions of Windows.

**RW:** *Let me name a product and you tell me why you picked it.* Broadcast Electronics AudioVAULT.

**Baden:** I guess you can consider it the cart machine of the world. It is unfair to say just the cart machine, but it is like the anchor point. It is a cart machine in a sense that all the final production is pretty much put there in cart form that can be queued up on their playlist and go to air, or play to air by a talent who is reading the news.

It is a server-based system, and the way we have it set up now with dynamic assignment, pretty much anybody can edit across servers from any workstation. It is one of the pivotal pieces here.

**RW:** *Orban Audicity.*

**Baden:** The Orban Audicity is one of the most intuitive digital workstations, in my opinion. We have 10 tracks. It has a really easy user interface that people pick up really fast. It is just a powerful tool.

**Martin:** Our broadcasters find this a very easy multitrack editor to learn and use. For RFA that means the bottom line is not only more productive but quality programs. We've been working with Orban and we will soon have our Washington Audicitys networked with a center RAID

See RFA, page 28 ►



## Broadcast Solutions

Does your station sound as good as the audio at the studio? Continental can help you achieve that quality throughout your transmission chain. Whether you're building a new station, upgrading your existing station or consolidating, Continental can put it all together. From the microphone to the antenna Continental has the expertise to build a first class facility that will be reliable for many years.



**Transmitters Antennas Exciters**  
**Microphones DAT Players Consoles**  
**Studio Furniture Headphones**  
**Amplifiers Monitor Speakers**  
**CD Players STLs Remote Controls**  
**EAS Transmission Line RPU**  
**Dehydrators Modulation Monitors**  
**Audio Meters Processors**  
**Test Equipment Telephone Interface**  
**Buildings Installations**  
**Power Conditioning SCA Equipment**  
**Systems Integration**

Put the Continental team to work for your group. With over 50 years of broadcasting experience Continental has built facilities throughout the world, ranging in power from watts to megawatts.



**Continental Electronics**

**A Sound Investment in Your Stations' Future...**



**Continental Electronics Corporation**

P.O. BOX 270879 • DALLAS, TEXAS 75227-0879 • 214-381-7161 • Fax 214-381-3250

**800-733-5011**

Visit our web site — <http://www.contelec.com>

# Expanding at RFA

► RFA, continued from page 27

so the Orban files can be accessed from any of our studio locations.

Orban's service and support is the best we receive from any of our audio vendors.

**Baden:** We started the R&D work on the networked system just to see if it could be done, but Orban carried the ball and implemented it.

**RW:** *The Lighthouse switch.* (Ed. Note: The switch is sold by BE under the brand name AudioPOINT.)

**Baden:** It is the switch of the facility, our main switch. We like the Lighthouse because it has AES/EBU in and analog in, so you can take analog feeds in and feed them out as digital, or digital feeds in and feed them out with analog.

Also, we plan to run a SQL server behind that. SQL for Structured Query Language. It's a database type. When you log on to an AudioVAULT workstation, you are either recording a file, and the Lighthouse will make an assignment to a random server, or else you are playing/editing a specific file, and the SQL server searches for that file and lets the Lighthouse know which BE server it is on. The Lighthouse controls the workstation connection to the server where the file resides.

It is a 256-by-368 switch and that is big enough to handle our facility. Actually, we *thought* it would be big enough, but we were just downstairs debating buying some extra boards for it. Switches are like memory and disk space. You never have enough.

A great product and first-class support.

**RW:** *What is the Cajun switch?*

**Eldridge:** We bought the Cajun Switch (by Prominet, now bought by Lucent), to let us do more of our audio operations across our LAN. Each of our Cajuns provides 100 switched Mbit ports and four Gbit ports, with a total backplane throughput of 23 Gbits, which handles a lot of 1.8 Mbit audio streams. More important, the switch is low latency and has practically zero lost packets, which is essential when doing real-time audio across the Net.

**Baden:** The things that we consider an integral part of this whole facility, most audio people wouldn't even think about.

**RW:** *What kind of processing would I find in each of these rooms?*

**Baden:** For processing we use pretty much what is built into the Yamaha mixer and the Orban Audicity. There is a virtual processing bank in the Audicity, so who needs more than that?

We had other vendors that should get special mention. Zefiro makes a great sound card. Summit Computer is a local company that built some of our first audio servers, which have been bullet-proof for two years. PC Home Computer Specialist is another small, local company. They did a great deal of network cabling for us.

**RW:** *Put a capital figure on the expansion project.*

**Baden:** About \$2.3 million, to include furniture, the actual studio walls, five new production studios, 18 Mini Studios, all the furniture sets for that, all of the expansion in master control, the digital switch, the Lighthouse, expansion in the

servers, additional Orban workstations. That also includes PC expansions, all of the workstations. I believe we added another 150. That also includes the software for that, and the contract labor.

**RW:** *Are there a lot of custom things that the computer vendors have done for you?*

**Martin:** I would say vendors saw the ultimate marketability for a lot of the ideas we brought to them.



From Left: Bill Eldridge, Marty Martin and David Baden

For example, the AudioVAULT now has the capability for dynamic assignments, where you can pretty much jump on any server on the fly. You have freed up this bottleneck of single-server limitation. That is certainly marketable. Before, you were limited to a direct workstation-to-server correlation, like almost a one-to-one physical connection. Breaking free enables us to run over 200 workstations so we can better use our resources.

Now we see eight servers as one server with this type of environment. Then we have the best quality audio possible, because we can switch the digital audio, which is a direct connection from the BE into any one of our stations. So we don't have to worry about dropouts and pops.

**RW:** *Describe the program material in general, is it mostly spoken word? News and entertainment?*

**Baden:** The news is obviously spoken word in Asian language. We don't do straight music programs, it is mostly news and information. The feature pieces tend to have a mix of music and sound actualities, outside bureau and stringer feeds, a mix.

The system total for the AudioVAULT would be about 4,200 hours of what we call work disk space. That's where people make the programs every day and put them together and record them. Once they are done working on the piece, it goes to the broadcast server, where we have 800 hours of storage space. That is on the BE side. I haven't really added it up on the Audicity side because we are still growing with that.

**RW:** *What are the problems involved in digital audio compatibility? Are you running house sync?*



**Martin:** That is exactly right.

There are two problems: one is with leveling. The PPM scale, the digital scale you have about -50 dB to zero, and zero is top. There appears to be no real manufacturer standard for optimum audio that is being followed. If you buy a device from Tascam or Denon, you can buy a cheap one and you are going to find optimum audio coming out of it at one level. You buy a better model, and all of a sudden now it's ... *different*.

Because all the equipment has AES/EBU in it, some people are allowing for head space. So you'll find that, going between devices in the studio, you can drive the audio into the red, producing cracks and pops, like they used to do on analog devices. What you find, if you are playing back or recording to a device, it is too hot, and pretty much what we are seeing is about -6 dB difference between some of the devices. If you are going in the other direction, it is too low. This specific example is what we have between the Orban Audicity and BE AudioVAULT — in this case, the BE has the headspace.

You have to have a good console in

the middle of this thing, and you have to constantly be aware of the fact that you have all of these differences. Every now and then you have to try to recalibrate everything because the levels will go off.

**Eldridge:** The other big concern is digital sync. It's pretty much mandatory in a large facility like this — any loss of sync becomes either a loss of signal or an audio artifact.

If you were building a single room, you could sync to one piece of equipment; for example, the Yamaha console can sync to any of its AES/EBU inputs or a word clock sync. But we still ran into problems syncing the consoles to Master Control and the rest of the studio equipment with the consoles. They basically demanded a single absolute reference everywhere to work right.

We solved this with an Aardvark system using a word clock and AES/EBU sync running throughout the building. Another bump we discovered was signals that were synced correctly, but the status bit in the AES/EBU signal was announcing a different sampling rate.

**RW:** *You have 40 people on your technical staff?*

**Baden:** We started out with about seven, grew to 20 and now we are up to 40. Unlike most operations, we handle everything technical. We do the studios, the networking, computer desktops, the IS facility and the entire broadcast facility, all as one.

We set it up this way rather than create two departments, like an IS department and a broadcast operations department, because once we start with digital, we have PC technicians working on both sides, facing the same problems. At the same time, we handle the master control staffing and all the production support and assistance, and also do the training.

**RW:** *Is there anything similar to this facility? The closest thing might be other government-funded broadcasters ...*

**Eldridge:** Not at all. We've talked to BBC, they're interested in what we do, but they've basically met a lot of resistance in being able to innovate as much as we've done. We were all at Radio Free Europe before, and we've gone a long way since then. The Voice of America hasn't even touched this stuff.

As far as I'm concerned, anything that I've heard about, we're way ahead of.

■ ■ ■

*This is one in a series of articles about U.S.-funded broadcast organizations.*

## The Gear of RFA

Here is an overview of other important equipment in place at Radio Free Asia. A comprehensive list is available at [www.rwonline.com](http://www.rwonline.com)

Aardvark Facility Wide World Clock  
AES/EBU Sync System  
Acoustic Systems Modular Studios  
(for 5 Production Studios, 18 Mini Studios)  
Bay Networks Mix of 100M Hubs and 100M  
Switching to Desktops (250 Ports)  
BSI Streamer Software WAV Logger w/Scheduler  
Software (x4)

Denon DN-1100R MiniDisc Recorder (x10)  
Denon DN-2500F Dual CD Player (11)  
Denon DN-T620 CD/Cassette (x20)  
ESE Master Clock System (w/40 digital slaves)



RFA uses more than two dozen Yamaha digital consoles. See text.

Furman IT1220 Power Isolation Transformer (x11)  
i.e. Electronics Finalizer Digital Signal  
Processor (x4)

Megadrive RAID's 54G (x8)  
Northeast Communications Concepts Studio  
Furniture (New Studios)  
PBX NEC 2000 Telephone Switch  
Shure SM7 Microphones (x70)

Syntrillium CoolEdit '96 Software (x25)  
Syntrillium CoolEdit Pro Software (x2)  
Tascam DA-30MKII DAT Recorder (x12)  
Tascam MD-801R MiniDisc Recorder (x30)  
Telos 100 Delta Digital Hybrid (x22)

Telos One Digital Hybrid (x20)  
Telos Zephyr ISDN Interface Codec (x6)  
Timplex Time Division Multiplexor (x1)  
Wohler AMP-1A Powered Monitors (x10)  
Z-Sys 32x32 AES/EBU Digital Router (x3)

# The Zoning Board and Your Towers

Tom Osenkowsky

Towers have become a sensitive issue these days. With the development of cellular telephones, PCS devices, 900 MHz pagers and digital television, there is great demand for tower space.

In most cases, the erection of a tower requires the approval of the local zoning board or zoning board of appeals. There are two occasions in which an engineer may be called upon to testify before a local zoning board: when a station wishes to erect a new tower, or when a station desires to replace an existing tower.

It's wise to be familiar with the questions that are likely to arise.

## Do you conform?

The degree of difficulty of your application approval will be determined by a number of factors. The foremost will be



Photo by Alan R. Peterson

whether a tower fits into the current zone category of the property you propose to use. Is the tower a conforming or non-conforming use?

If it is a nonconforming use, the degree of difficulty may increase. It may be necessary to obtain a variance for placement of a tower on the property you wish to use. This will involve the zoning board of appeals. These concerns are best handled by a local attorney with a proven track record and one who is experienced in such matters. In some jurisdictions, applying for an extension of a nonconforming use cannot be argued by financial concerns alone.

For example, a licensee may wish to replace an existing tower with a taller tower. The licensee may not present financial issues as the sole argument for the proposal. Be prepared to present evidence of terrain obstruction, multipath reflections and other factors that necessitate a taller tower.

## Focus on service

Limit the scope of the problems to the local community. Remember, local residents may not look favorably on a tall tower constructed so that the station can gain revenue from distant communities. This would represent a financial argument. Focus on your station's service to the local community, such as news coverage, charity events sponsored by the station, and other such activities and how an improved technical facility will aid in those efforts.

Neighbors and town residents may raise several concerns about the construction of a tower. Here is a list of common concerns relating to towers in general:

1. *Radio Frequency Radiation, or RFR.* Most non-technical people are misinformed about RFR. There are several lay-person books in print on the topic of "radiation" and its negative effect on health. The radiation is in the form of AC power lines, radio transmitters, microwaves, etc. Most people are afraid of being radiated to the point of ill health. When discussing RFR topics with lay persons, it is best to completely refrain from using the word radiation. You can substitute "signal" or other suitable word. The word radiation many times is taken out of proper context by non-technical people so it is best left unspoken.

The best approach to RFR concerns is to have a prepared RFR analysis in hand. For FM stations, I prefer to use the FMMODEL computer program, free for download from the FCC Web site at [www.fcc.gov](http://www.fcc.gov). FMMODEL incorporates measured antenna performance data from the U.S. EPA study in its calculation algorithm. This program is useful because it is in the public domain.

You should also explain that for any FCC broadcast application, the licensee must calculate the RFR levels and state to the FCC that the levels are in compliance with all applicable rules. If any RFR level is not in compliance with the FCC

rules, the licensee must state what measures will be in place to protect the public, i.e. fencing, appropriate signs and so forth.

It is also helpful to have a brief synopsis of the FCC rules and/or Bulletin No. 65 from the FCC Office of Engineering and Technology in handout form for the zoning board to examine. Remember, your RFR analysis will determine predicted levels of radiation in relationship to maximum allowable limits, not whether these levels are safe or not. That determination has been made by the U.S. government. If you are asked whether the levels are safe, you should refer that question to the government. If someone disputes the safety of the established RFR limits, ask what medical or biological evidence

See ZONING, page 33 ▶

# MAKE THE SWITCH TO HERO STATUS

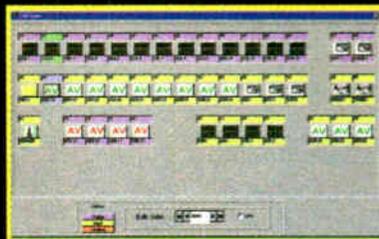
## SAVE TIME & MONEY WITH AudioPOINT®

If you're building new studios, or consolidating into one location (and who isn't?), routing audio is expensive. But you can be a Hero just by installing an AudioPOINT DSP-based routing switch. It's the only one that mixes analog and digital sources on the same matrix and eliminates external A/D, D/A converters. Plus no more costly cabling, patch bays or distribution amps. That saves money. AudioPOINT is easy to install, maintain, and it's more reliable than traditional routing solutions. Even its windows-based configuration and control software is easy to manage. So, to switch from "overworked engineer" to "money-saving Hero," contact Broadcast Electronics today.

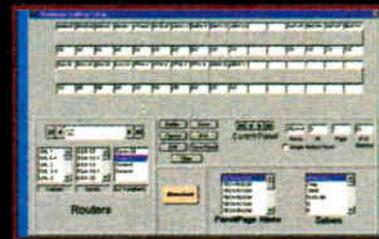
- Analog/Digital/MADI inputs & outputs
- Expandable from 32x32 to 1024x1024 channels
- Allows mixing, summing and tone generation/signal analysis



Rotary Remote Control Panel



Customizable Edit Suite Panel



Hardware Button Set-up Panel

**Need Solutions?**  
[www.bdcast.com](http://www.bdcast.com)  
 or (217) 224-9600



Solutions for Tomorrow's Radio



© 1998 Broadcast Electronics, Inc. BE emblem and AudioPOINT are registered trademarks of Broadcast Electronics, Inc.

## WIRED FOR SOUND

# 'The Best Mic Cables Ever Made'

*If You Plan Carefully, Good Clean Microphone Audio Need Not Cost You a Lot of Money*

**Steve Lampen**

*The first two parts of this series on choosing microphone cable are available at [www.rwonline.com](http://www.rwonline.com)*

This is the third part in a series on understanding the construction and parameters of microphone cables. In past columns, we have mentioned ruggedness and noise immunity, with a few side tracks into balanced lines, loop area and quad designs. There are two parameters

left to discuss: self noise and performance.

## Self noise

Microphone cables are different from almost any other cable for one interesting reason: They are intended to be used while in motion. And no cable is in motion like a mic cable, especially in the hands of many a pop or rock singer trying to belt one out to the audience.

No triax camera cable or video coax goes through the gyrations of a mic cable

in their applications. It is therefore extremely important that such a cable not generate any noise of its own — i.e. self noise.

This noise can be heard easily as snap, crackle and pop coming out of the line where no such noises enter the microphone. These noises can be generated internally by the cable in a couple of ways.

First, the various layers — twisted pair, spiral or braid shield, and jacket — are moving with every flex of the cable. This means their relationship, i.e. distance between them, is changing. This means that capacitance between the two

wires in the twisted pair is changing. This can be easily heard. Often, mic cables are tightly jacketed, or have nonconductive elements added to help prevent such motion. But "packing" the cable makes it stiff. And, seeing that flexibility is a major selling point, more than a few manufacturers just hope you won't notice the noise, but hope you will like the flexibility.

The second type of noise is "triboelectric" noise. This is generated by the various layers rubbing against each other and generating voltages. This often is described as "piezo-electric" and is based on the crystalline structure of the material. Unfortunately, the cheaper the material, such as PVC, the lower the triboelectric noise. This means simply that poor-quality constructions often have low-noise. (Guitar cables are a prime example of low-quality cables constructed specifically for low noise.)

But you don't necessarily have to choose between good performance and low noise.

One way of reducing triboelectric noise is to add a layer of conducting material between the elements of the cable. Therefore, you will often see a carbon-filled plastic, or carbon-filled cotton woven layer, between the braid and the pair. Its purpose simply is to short out those voltages generated within the cable and prevent them from appearing as noise at the output of the cable.

It is easy to test a mic cable for self-noise. Just get a reasonably long length, say 20 feet, terminate one end with an appropriate resistor (150 ohms), put a mic connector on the other end and plug it into a mixer/amp/speaker, so you can hear the results. Just whip that cable on a hard surface, step on it, or roll it with your feet. You will know right away whether your cable choice is noisy or not.

## Performance

Perhaps you are puzzled that performance comes last on the "important parameters" list for microphone cables. But when you consider the other parameters, it makes sense. If the cable is not rugged enough and falls apart, if it is prone to pick up noise in its surroundings or generate noise itself when used, it really doesn't matter how good its electronic performance is.

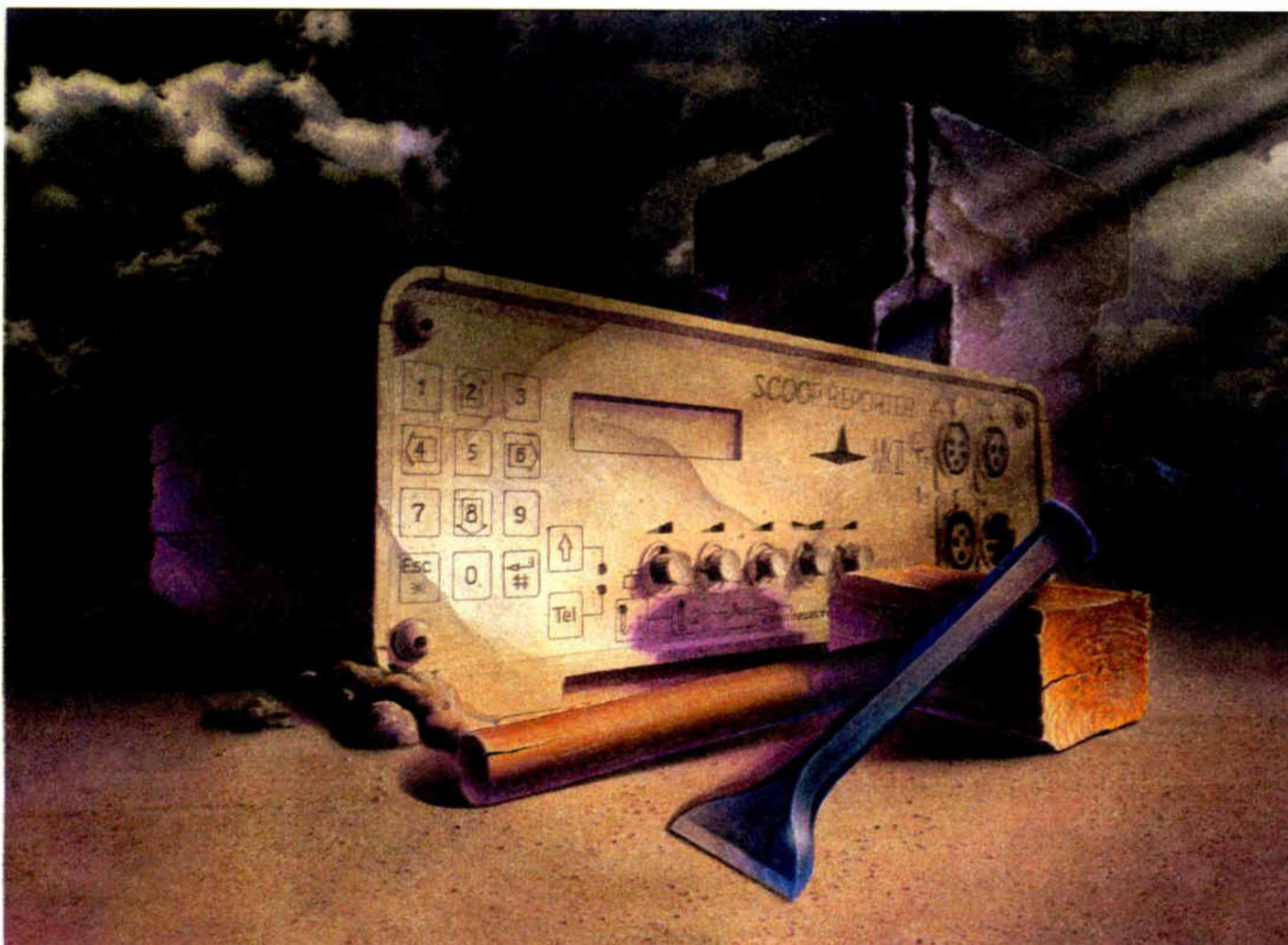
Only when those parameters are considered, and steps are taken to reduce their effects, can performance come into play. And performance, in analog audio microphone cable, takes two forms: capacitance and resistance.

Capacitance stores signal energy running on the cable. Whenever you have two metal conductors, separated by a nonconductor, you have, by definition, a capacitor. So in any microphone cable (or any audio cable, for that matter) which is a twisted pair, i.e. two conductors separated by insulation, you automatically have capacitance. The unfortunate thing about capacitance is that it is "frequency dependent." That is, the effect changes with frequency. Capacitance absorbs high frequencies more readily than low frequencies, and it responsible for the majority of loss in the traditional "frequency response curve" associated with cable.

While Figure 1 does not have actual numbers attached to it, those numbers ("frequency response" or "attenuation")

See LAMPEN, page 31 ►

## A.E.T.A. SCOOP REPORTER MKII P.O.T.S. CODEC



## Rock Solid Remote Connections.

Are your remote connections important? You bet they are! Keep your live feed active with the highest standards possible. Use the new Scoop Reporter MKII manufactured by A.E.T.A. This new generation of P.O.T.S. (Plain Old Telephone Standard) codec supplies rock solid quality to all of your remote connections.

Tired of long delays in your remote? User-selectable delay modes down to 150 ms that are a standard feature on the



*The Scoop Reporter MKII by A.E.T.A. available exclusively from Harris.*

Scoop MK II offer you a choice when it comes to bidirectional communications.

When news feed and remote broadcasts are important to your organization, get the Rock Solid

Solution. Why risk it? Try the Rock Solid A.E.T.A. Scoop Reporter MK II codec today.

Call Harris for information and special pricing.

**HARRIS CORPORATION  
BROADCAST DIVISION**

TEL: 1-800-622-0022  
FAX: 765-966-0623

[www.broadcast.harris.com](http://www.broadcast.harris.com)



**HARRIS**

*A new world of broadcast solutions*

► LAMPEN, continued from page 30

can be obtained from a cable manufacturer or can be roughly calculated by using the capacitance rating for any particular cable at any desired length.

### The effect of capacitance

The three curves are intended to represent the performance of three different plastics, each of which has less capacitance (from poor to better to best). How flat the response is — or how far out it goes until it starts to drop off in level — is determined by two major factors: the length of the cable and the frequency of interest. For most specifications, 20 kHz is considered the highest frequency of interest. But you can pick any frequency you wish, if you disagree!

The amount of energy (signal) stored is based on the quality of the plastic or other insulation chosen for the twisted pair. Each material has a number, the "dielectric constant," which describes how good the plastic is. In a given construction, with a given amount of plastic on each wire, and the distance between the two conductors, you will have a specific amount of capacitance. It is easy to measure the capacitance between them.

If, for instance, you use PVC, for a standard construction, you will get a capacitance of around 50 picofarads per foot. But, you might be thinking, this is a very tiny amount of capacitance! Yes, but you don't have microphone cables one foot long, you have them dozens, even hundreds or thousands of feet long. And the capacitance *adds up along the length*. This is why a short cable can be low quality, and you will probably be fine. But a long cable is much more critical and your choice of materials is important.

This is also why you should transition from a microphone cable to another type of cable (line-level or snake cable) as soon as practical, because you can get better performance from line-level or snake cable for considerably less money than microphone cable. Only the part that will be in motion while in use needs to be microphone cable.

### Expensive experiment

I had a friend once who got a job at a high-tech video production company. He called me excitedly one day to tell me that his predecessor had wired the entire place up with star-quad microphone cable. And he was right to be excited, because he pulled it all out, replaced it with line-level cable (at *one-fifth* the price) and had thousands of dollars of star-quad mic cable, for his studio applications, or his field trucks, for free!

If you use polypropylene instead of PVC inside the cable, you will have a capacitance around 30 picofarads per foot, less than two-thirds the value of the PVC. This means that such a cable could go 67 percent farther before it got to the same loss value as the PVC construction.

If you get mic cable made with polyethylene, you could get down to 25 pF/ft, or could go 100 percent farther than PVC. And then we have the ultimate: foamed PE. There are microphone cables out with capacitance of 12.5 pF/ft, one-quarter the value of PVC. These could go 300 percent farther than PVC.

These super-low capacitance cables

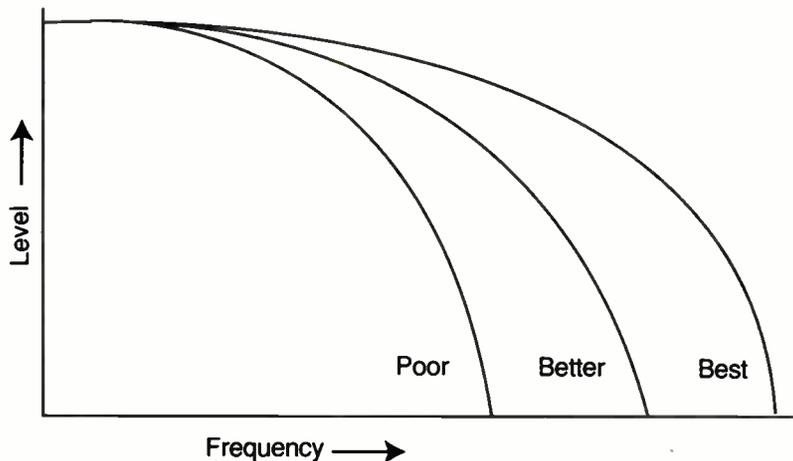


Figure 1

arguably are the best microphone cables ever made, because they offer the flattest

frequency response of any cable. And the reason they came into existence is not

because of analog audio, but because of digital audio. They are digital audio cables (because digital need super-low capacitance) but are assembled in the high-flex designs, with braid shields, like regular mic cable. Sort of the best of both worlds!

Our next column will be the fourth and final chapter in our microphone cable saga. We will look at microphone cables for the new generation of digital microphones, and analyze existing and new designs to work in the digital realm.

■ ■ ■

Stephen H. Lampen is the author of "Wire, Cable and Fiber Optics for Video and Audio Engineers" (McGraw-Hill) and is the technology development manager at Belden Wire and Cable. You can reach him via e-mail at [steve.lampen@belden.com](mailto:steve.lampen@belden.com)

## Industrial Strength Digital Audio Delivery

Digital Audio Delivery systems are now recognized as a must for every broadcast facility. But few systems provide the features, flexibility or reliability required to maintain profitability in this demanding and fault critical application, nor the support mechanism to maintain them.

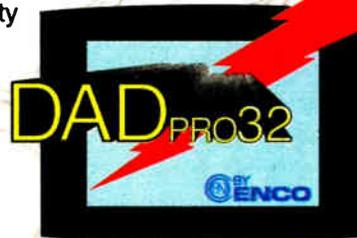
The ENCO DAD<sub>PRO32</sub> Digital Audio Delivery System is simply the most powerful On-Air & Production system available. Based on the already widely accepted and mature DAD<sub>PRO</sub> product, but now optimized for the Windows NT<sup>®</sup> operating system, DAD<sub>PRO32</sub> is unique in its uncomplicated user interfaces and adaptability to any format, yet harnesses the power and reliability of proven technology.

- Intuitive On-Screen User Interfaces that are immediately familiar to operators. Optional Touchscreen makes Live Assist operation quick and easy.
- Complete On-Air flexibility for Live Assist, Automated, or Satellite Programmed operations, with transparent transitions between modes. Seamless Segues and Voice Tracking provide a continuously "Live" image.
- Powerful Production and Call Processing capabilities, including Graphic Cut & Paste Assembly Editing. Automatic Recording features are included for catching network feeds.
- Interfaces to all Music and Traffic Scheduling and Billing systems.

- Features full 32-Bit Processing and True Multitasking capabilities. Many third party programs, such as Multitrack Editors, Wire Capture systems and Word Processors may be directly embedded into DAD, or operated on the same Workstation.

- Inherent support of Global Wide Area Networking, for sharing of data between multiple facilities. Ancillary products are available for Store Forward operations and remote management of unmanned downlink sites.

- Operates on commonly available "off-the-shelf" computer hardware and network architecture, utilizing any of a wide variety of redundancy configurations.
- DAD is an outright purchase, and there are no monthly licensing fees. Free software upgrades are provided for the first year. ENCO technical support is legendary as the best in the business.



Digigram  
POWERED

Call Your DAD Dealer or ENCO For Complete Information or Demo

Check Out The ENCO Web Page At:  
[www.enco.com](http://www.enco.com)

**ENCO**  
SYSTEMS, INC.

24555 Hallwood Court, Farmington Hills, MI 48335 USA  
Tel: 800-362-6797 or 248-476-5711  
Fax: 248-476-5712 • [www.enco.com](http://www.enco.com)

## SATELLITE NEWS

# Leonid Storm Could Wreak Havoc

*The Annual Meteor Shower Could Be Huge This Year. Will Radio Satellite Service Suffer?*

**Bill Sepmeier**

Every fall, around Nov. 17, watchers of the night skies get a special treat — the Leonid meteor shower. Seeming to originate from the constellation Leo, hence the name, tens of thousands of mostly tiny bits of cosmic detritus light up the skies, as the earth passes again through the tail-track of the comet Tempel-Tuttle, much to the delight of millions below, who need but look up for

this free celestial fireworks show.

Tempel-Tuttle orbits the sun once every 33.3 years, and when the track is fresh, the annual Leonid showers often become full-fledged meteor storms. The numbers of meteoroids in the stream are determined by calculating something astronomers call the zenithal hourly rate, or ZHR. In an "off-year," when the comet is out in the inky depths somewhere, this number seems to average between 1,000 to 10,000 — that's 1,000

to 10,000 meteors per hour.

Back in 1833, one of the most active years ever recorded, the ZHR was up past 100,000 per hour. In 1966, the last time Tempel-Tuttle passed by, the ZHRs were above 150,000, or more than 7,000 times the normal meteor shower flux!

That's a lot of little sand particles in an area generally pretty free of them, and because the duration of the earth's intersection with the main meteoroid stream lasts for about five hours, the sum can easily run up into the millions.

It is impossible to predict the intensity of the 1998 or 1999 Leonid, because

there are few accurate means to measure the stream's content until we hit it. But the general consensus of astronomers is that we should be in for quite a show. Some experts say that the coming November 1998 Leonid might provide a very nice warm-up for '99; some say that this year's event will be *the* show.

No matter which year ends up the winner, everybody agrees: When it comes to satellites, there is cause for concern.

## Risk to radio

Because a lot of radio stations these days use off-premise network programming in the evenings as they operate unmanned at night, many radio people will have plenty of time to wander outside and take a leisurely look up at the Leonid storm. If your station is one of these unmanned wonders, I suggest you bring your cooler and lawn chair down to the plant, where you will be close by. Why?

**There's a lot of business up there in birdland, and not a lot of backup.**

Well, beyond the normal chance that a communications satellite will be hit by a stray piece of space spooze, the professionals who calculate such things have increased their estimates of the chances of taking a hit on Nov. 17, 1998, and again in 1999, and again in the year 2000, by more than 1,000 times "normal."

M. Beech, P. Brown, J. Jones and A. R. Webster co-authored a paper called "Meteor Storms: An Assessment of Satellite Impact Probabilities," which is available on the Net at [http://leroy.cc.uregina.ca/%7Eastro/Leonids/Leo\\_2.html](http://leroy.cc.uregina.ca/%7Eastro/Leonids/Leo_2.html)

They write, "From an historical perspective we might expect a ZHR of a few tens of thousands at storm maximum and a storm duration of about five hours. Under these circumstances a fluence  $\sim 10^{-5}$  meteoroids/m<sup>2</sup>, to a limiting mass of  $10^{-8}$  kg, may be realized. With this fluence, an impact probability of  $\sim 0.01$  percent will result for spacecraft with an exposed surface area of 10 m<sup>2</sup>. The present on-orbit U.S. Space Command satellite catalogue contains about 8,000 objects of which some 6 percent are functional satellites. At a limiting mass of  $10^{-10}$  kg and a fluence  $\sim 10^{-5}$  meteoroids/m<sup>2</sup> we might expect five to 10 functional satellites to be hit by Leonid meteoroids during a storm (assuming an average spacecraft area of 20 m<sup>2</sup>)."

## Come again?

Whoa! Say that again, guys?

"We might expect five to 10 functional satellites to be hit by Leonid meteoroids during a storm."

That's what I thought you said! OK, this includes all of the satellites in orbit, including LEOs, MEOs and GEOs, military and commercial, but still, that's a lot of potential hell to be raised within a five-hour window!

William Cooke of the Marshall Space  
See SATELLITE, page 35 ►

**Prophet Systems—**  
what have you done for me lately?

We've gotten a great deal of press coverage in recent months.

First, Prophet Systems signed a huge contract with Capstar.

Then we joined them as their first non-station acquisition.

Recently, Prophet Systems closed a major deal with Jacor.

*But what does that mean for you?*

### Latest and Greatest Technology

We have the experience, the people and the financial backing necessary to take a great product line and move forward in great leaps. Take the AudioWizard CFS32™ out for a test drive at the Fall show in Seattle and you'll see our point. This 32-bit Graphical User Interface combined with our powerful database engine and WAN capabilities makes for one authoritative digital audio system.

### Tech Support

Our superior tech support has actually been the deal-maker in some recent contracts. You can count on us. (You can check out our client list at: [www.prophetsys.com](http://www.prophetsys.com))

### Your bottom line

Let us show you how you can recoup your investment, just like the big boys.

### Productivity

Our systems are user-friendly—you can probably be up and running in a matter of days. But to show you all the power and flexibility, we've created the PSI Training Academy, a state-of-the-art educational facility. Get hands-on experience under the supervision of broadcasters who have relied on the AudioWizard for their bread and butter.



*Together, let's make great radio.*



'nuff said!!



# Radio World

Please fill out contact information. Then circle the Reader Service numbers on the right that correspond with the advertisements or articles that you would like to receive free information on. **THIS IS NOT A SUBSCRIPTION CARD.**



Signature \_\_\_\_\_ Date \_\_\_\_\_

Please print and include all information:

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ ZIP \_\_\_\_\_

Telephone ( ) \_\_\_\_\_ FAX ( ) \_\_\_\_\_

E-mail \_\_\_\_\_

## FREE PRODUCT INFORMATION! X41

August 18, 1998 Issue

See Ball November 18, 1998

001	027	053	079	105	131	157	183	209
002	028	054	080	106	132	158	184	210
003	029	055	081	107	133	159	185	211
004	030	056	082	108	134	160	186	212
005	031	057	083	109	135	161	187	213
006	032	058	084	110	136	162	188	214
007	033	059	085	111	137	163	189	215
008	034	060	086	112	138	164	190	216
009	035	061	087	113	139	165	191	217
010	036	062	088	114	140	166	192	218
011	037	063	089	115	141	167	193	219
012	038	064	090	116	142	168	194	220
013	039	065	091	117	143	169	195	221
014	040	066	092	118	144	170	196	222
015	041	067	093	119	145	171	197	223
016	042	068	094	120	146	172	198	224
017	043	069	095	121	147	173	199	225
018	044	070	096	122	148	174	200	226
019	045	071	097	123	149	175	201	227
020	046	072	098	124	150	176	202	228
021	047	073	099	125	151	177	203	229
022	048	074	100	126	152	178	204	230
023	049	075	101	127	153	179	205	231
024	050	076	102	128	154	180	206	232
025	051	077	103	129	155	181	207	233
026	052	078	104	130	156	182	208	234

### Type of Firm (check one)

- D. Commercial AM &/or FM Combos
- A. Commercial AM station
- B. Commercial FM station
- C. Educational AM/FM station
- E. Network/group owner
- F. Recording Studio
- K. Syndicators/Radio Station Service Providers
- G. Audio For Video (TV Station/Teleprod Facility)
- L. Consultant
- M. Ind. Engineer
- N. Delivery Service (Internet/Cable/Satellite)
- I. Mfg. Distributor, or Dealer
- J. Other \_\_\_\_\_

### Which Classification Best Describes your Job Function?

- A. Owner/President
- B. General Management
- C. Engineering
- G. Sales
- H. Programming/News
- J. Promotion
- K. Production Mgt or Staff
- F. Other \_\_\_\_\_

### Purchasing Authority

- A. Authorize/Make Final Decision
- B. Evaluate/Specify/Recommend
- C. No Purchasing Authority

### Equipment/Services Purchases In the Next 12 Months (check all that apply)

- A. Transmission, STL/RPI
- B. Antennas, Towers, Cable
- C. Audio Processing Delays
- D. Telco, Codecs, Remote, Field, Audio
- E. ADS/RBDS & Subcarrier Equipment
- F. Delivery Systems & Satellite Equipment
- G. Digital Editing & Production
- H. Live Assist, Automation
- J. Consoles, Mixers, Cabinetry
- K. Headphones
- L. Microphones
- M. Monitors/Speakers

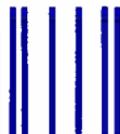
- N. Studio Audio Sources & Switching
- O. Syndicated Programming
- P. Test, Monitoring & Remote Control

### Equipment Budget For Next 12 Months

- A. Less than \$25,000
- B. \$25,000 - \$99,999
- C. \$100,000 - \$249,999
- D. \$250,000 - \$499,999
- E. Over \$500,000

For faster service, fax card to 703-820-3310

**FOR FASTER SERVICE FAX  
TO: 703-820-3310**



**NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES**

**BUSINESS REPLY MAIL**

FIRST-CLASS MAIL PERMIT NO 3068 FALLS CHURCH VA

POSTAGE WILL BE PAID BY ADDRESSEE



**Radio World**  
**PO BOX 1214**  
**FALLS CHURCH VA 22041-9808**



Fold Here

**For Faster Service  
Fax to  
703-820-3310**

**Tape Here**

# Don't Let NIMBYs Get You Down

► ZONING, continued from page 29

they have to offer in defense of their claim and what qualifications they may have in that area.

## Towers, not ovens

Distinguish your frequency(s) from microwave. Microwave is a definition for frequencies above 1 GHz (1000 MHz). AM, FM and TV broadcast signals do not fall into this category, although some broadcast auxiliary services do. The term "microwave" appears to be quite sensitive, no doubt due to the association with microwave ovens. A brief distinction of which frequencies pass through the human body and which are absorbed by the body may be given, if necessary. Use quotations from printed texts and be brief. Remember, your expertise is in electronics engineering, not medicine or biology.

2. *Aesthetics.* Many neighbors adopt the "not in my backyard" attitude. Define the need for the tower(s). Describe what steps you may be taking to make the tower(s) aesthetically unobtrusive. This may involve painting the tower gray, if painting is not required by the FCC or FAA.

Consider any lighting requirements. Strobe lights will be the most obtrusive to neighbors. They can cause severe illumination on foggy days where the strobe

5. *FAA and aircraft concerns.* Prior to applying to local zoning, you should have an FAA "Determination of No Hazard" paper in hand. It would also be preferable to have an FCC construction permit in hand as well. If any concerns over air safety are raised, you should point out that the FAA is the government agency charged with that responsibility and they have determined that the structure will have no impact on air safety.

6. *Property devaluation.* If possible, gather information about property values adjacent to other tower sites. Hire a licensed, local real estate agent to accompany you at the zoning hearing to address this issue.

7. *Radio, television, consumer electronic equipment interference.* Broadcasters are responsible for interference they cause to certain consumer electronic devices within the station's blanketing contour. For further information on blanketing interference see C.F.R. FCC 73.14, 73.88, 73.310 and 73.318. If an existing tower is being replaced with a taller tower for an FM station, point out that the antenna will be farther away from any point on the ground and that the effective radiated power will be lower, thus reducing the possibility of interference.

It is not advisable to volunteer that

strikes to his FM antenna, installed a lightning top hat dissipater on his tower. Nearby broadcasters were relieved from lightning strikes ever since. The antenna farm was near a reservoir, and all towers were usually struck two to three times per season.

## Use what you've got

Offer free or leased space on the tower to the town or city for police, fire, ambulance and municipal services radio repeaters. If tower space is at a premium, a combiner can help. A combiner allows multiple transmitters in the same frequency band to operate from a single antenna. In this scenario,

two antennas are required, one for transmit and the other for receive. Be certain that your zoning application states that the town will benefit from the tower.

Zoning doesn't have to be a nightmare. While an engineer may see the application as straightforward, the zoning board and neighbors may not be technically inclined and must be persuaded that your proposed construction will result in a benefit to them and not cause any harm.

■ ■ ■

*What is your experience with tower zoning? Do you have battle stories or tips to share? Send them via e-mail to radioworld@imaspub.com or mail them to the address on page 5.*

*Tom Osenkowsky is a frequent contributor to RW.*

## You can take certain steps to help make your experience with the zoning board a more pleasant one.

lights reflect off the fog or low clouds. Beacon lights that are obtrusive can be shielded with a special shield designed for this purpose — i.e., not shining into someone's bedroom. Be sure to obtain FCC and FAA approval prior to installing such devices.

3. *Collapsing towers.* Obtain a statement about this topic from the tower manufacturer or state-certified Professional Engineer. Most towers have more than one guy anchor point. This usually makes a fully outward collapse unlikely. If your land boundary is insufficient to accommodate a full collapse, then it will be necessary to describe how neighbors will be reasonably protected.

4. *Protection of children and the general public.* Describe how the tower will be fenced. Even "cold" towers should be fenced in, to protect against vandals, unwanted climbers and children. Fencing will no doubt be a requirement of your insurance carrier. I recall a 1,000-foot television tower which was climbed by a 16-year-old girl. She hung an American flag off the top of the tower because some boys at school said she didn't have the guts to climb the tower. She proved them wrong!

broadcasters are not responsible for interference to all consumer devices; rather, it is wise to stipulate that any interference complaint will be investigated by the broadcaster in the interest of good public relations. Complaints of interference by existing stations to new homes in the area may be addressed in legal terms as the owners "moving to the nuisance."

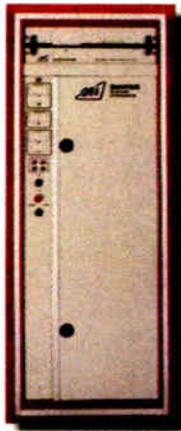
## Documentation

Before appearing before a zoning board, you should present your attorney with a brief listing of your qualifications and credentials. Be thorough and sure to include any certifications (SBE, NARTE, etc.) that you may have earned, evidence of prior professional testimony, number of years employed as an engineer, plus any other relevant information. Your attorney also will need a site plot plan depicting property boundaries, location of proposed tower(s), guy anchors and ground system. The plan should also show any access road(s), location of utility poles, underground lines, pipes, underground or above-ground fuel tanks, buildings, and generator.

Point out the positive aspects of the tower(s). Nearby residents may benefit from having a "lightning rod" nearby. I recall one client who, after numerous



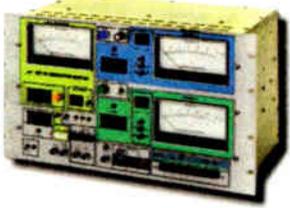
## And You Thought You Knew Us.....



**Solid-State  
and  
Single Tube Transmitters**



**Low Power Transmitters**



**Modulation Monitors**



**Digital STL / TSL Systems**



**Pre-Built Modular Transmitter Sites**

**For More Information Call Us Toll-Free At (800) 334-9154**

QEI Corporation  
One Airport Drive, P.O. Box 805  
Williamstown, NJ 08094  
e-mail: qeisaless@qei-broadcast.com

Toll-free Sales (800) 334-9154  
Fax (609) 629-1751  
Emergency Service (609) 728-2020  
Web Site: <http://www.qei-broadcast.com>

# Workbench

Radio World, August 19, 1998

## When Your Speaker Doesn't Show

John Bisset

What do you do when your SBE presentation cancels at the last minute? Does the phrase "The show must go on" sound familiar?

We were pretty excited to have an "organizational manager" come to talk about time and priority management, particularly given the hectic lifestyle of today's broadcast engineer. When our speaker called to cancel, suffering from severe laryngitis, our SBE program chairman, Dan Ryson, chief engineer at WJFK-FM, decided we would have an open forum discussing each engineer's organizational techniques. We heard some pretty neat ideas. Keep this idea in the back of your mind, should you ever have a speaker cancel at the last moment.

Eric Hoehn from WETA(FM) related a story he found on the Internet. A professor was trying to get time management across to his students. Taking a bucket, which represented an individual's time, he began to add several big rocks, which represented "big" items — career, family, faith, community service. Pebbles were then poured into the bucket, representing smaller issues, which filled up more space in the bucket. Finally, sand was used to fill the rest of the void (the minutia of life).

His point was not so much in filling the bucket with "things," but that the order is important. You can't fill a bucket

with big rocks if it's already filled with pebbles and sand. Some excellent food for thought!

★★★

Ed Bukont, chief engineer at WWZZ(FM), suggested sending voice mail or e-mail messages to yourself to

**Oops! Your scheduled SBE speaker is sick. Don't sweat. An open forum might turn out to be one of your best programs yet.**

serve as reminders for important tasks. Even when you are traveling in the car, pick up the phone and leave a voice mail message to yourself to prevent something from slipping through the cracks.

Most of us carry business cards. Write on the back of them and then line them up on your keyboard or desk to ensure that tasks aren't forgotten.

These same messages can also be stored in microcassette recorders or in electronic organizers that interface to the computer.

★★★

Bob Clinton, CE at WHFS(FM), has used a spreadsheet to document all his phone calls as well as progress on monthly report-related items. Searching for key words makes the spreadsheet concept ideal in either locating phone numbers or names that may be forgotten. For exam-

ple, if you've entered a name of a company that services generators, you can search on the word "generator" if you can't remember the name or number.

★★★

In the midst of heavy remote season, Dan Ryson shared his "secret" to remotes without a hitch. He combines a database and word processing to generate form letters to all involved. The database includes due dates, SPIDS, contact names, venues, phone numbers and

addresses, allowing Dan to generate letters and memoranda to all involved with a remote. Communication is the key, and the power of the computer can help by keeping everyone informed.

★★★

Another useful idea from the open forum: Keep a list of tasks posted on the engineering door. This serves two functions. First, it will help keep you "on task." Second, and more important, it gives the staff an idea of all the work you have to do. You may be less likely to be called upon to assist with menial tasks if your "things to do" list covers a page of items of much higher priority.

This also works in adding tasks. If someone wants something done, add it to the list. They can see and understand that others are before them. This helps eliminate the "snap your fingers for an engineer" syndrome.

As the remote discussion continued, Frank Fealy of Radio One reminded us of an appropriate phrase: "Lack of planning and forethought on your part does not constitute an emergency on my part."

Amen!

■■■

John Bisset, a district sales manager for Harris Corp., has worked as both a chief engineer and contract engineer for more than 20 years. Reach him at (703) 323-8011. Submissions for this column are encouraged, and qualify for SBE recertification credit. Fax your submission to (703) 323-8044, or via e-mail to [jbisset@harris.com](mailto:jbisset@harris.com)

**SINE SYSTEMS**  
Innovative Solutions

Voice: 615-228-3500  
Fax: 615-227-2567  
Fax-On-Demand: 615-227-2595  
Web: [www.sinesys.com](http://www.sinesys.com)

# RFC-1



**Dial-Up Remote Control:** Control and monitor your transmitter from any telephone with the famous RFC-1: the world's most affordable full-featured dial-up remote control. It speaks to you with a natural human voice! It can also telephone you to report out-of-tolerance conditions and can automate transmitter power/pattern changes. It is expandable to 64 channels and has many optional accessories.



**You Must Remember This**

In 1962, when astronaut John Glenn rocketed into orbit on Friendship 7, you might have heard the news on this radio. The REALTONE TR-1088, sized to fit in a shirt pocket, came along at the end of the era of fancy construction. Competition would drive prices down to a point that did not allow elaborate cabinets.

Note the stylized V8 symbol, which tied in nicely to America's love affair with cars. (The unit, however, was made in Japan.) The station frequency showed through the top of the figure 8. The battery-operated radio has an eight-transistor chassis and a chrome fold-out stand on the back.

This is one in a series of photographs in RW featuring classic and less well-known radios. The pictures and descriptions are by collector Bill Overbeck, president of the Delaware Valley Historic Radio Club, who has made every effort to



ensure accuracy. Contact him via e-mail at [billradio@aol.com](mailto:billradio@aol.com) or through RW.

# 5,000 Meteors Per Hour, or More

► SATELLITE, continued from page 32

Flight Center says the encounter circumstances for the upcoming 1998-2000 period are very similar to those of 1865-1866.

## Head-on collision

"Based on records of that time, we may expect Leonid rates on the order of 1,000 meteors per hour for the years 1998 and 2000 (provided a storm occurs), with a peak rate of 5,000 meteors per hour in the early morning of Nov. 18, 1999," Cooke states. "The worst-case scenario is to assume a rate equal to the 1966 storm, or 150,000 per hour."

Spacecraft operators are taking the event seriously, because they've never gone through a full-fledged Leonid storm before. (Remember, the last one was in 1966, and there were relatively few artificial satellites in orbit back then!)

Additionally, Leonid meteors are very fast, with typical velocities of 70 km/sec, thus spacecraft can be struck on trailing edges. The reason is that particles from Comet Tempel-Tuttle move in a retrograde orbit about the sun, so the earth collides with them "head on." Nearly microscopic particles, traveling at the velocity these puppies will be traveling at, can "sandblast" a solar panel enough to render it inoperative, and, according to the estimates above, space will probably be thick with them during a Leonid storm. So there is little reason to be laughing.

## Orbital dependency

Further, spacecraft might be damaged not by the "sandblasting" of particles but by the buildup of excess plasma, or static electricity, caused by the proximity of and bombardment by so many particles. This type of excess charge could damage critical control computers and other systems required for spacecraft positioning and operations, and has been the cause of spacecraft failure during other meteoroid bursts in the past.

As we all know, having experienced the recent loss of Galaxy IV, there's a

lot of business up there in birdland, and not a lot of backup ready to take over in the event of a loss. GE Americom plans to reorient satellite solar arrays to minimize panel exposure to the meteoroid stream. PanAmSat and Hughes will likely do the same on the satellites that can be adjusted in this manner.

## Safety precautions

GE Americom engineers have estimated that such repositioning should reduce the probability of a particle collision with any one of their satellites to approximately 1 in 100,000. GE goes on to say, however, "The effect of any such particle collision would vary

depending on the actual size and velocity of the particle and the point of impact on the satellite."

If the ZHR of the coming storm equals the 150,000 of 1966, then GE's odds of 1 in 100,000 don't look so good. While none of the spacecraft operators are saying so, there may be some scheduled service interruptions on some types of spacecraft, as managers take action to minimize the possibility of particle collisions with sensitive components. Networks will have to work closely with satellite operators and affiliates to ensure that they are covered in the event preventive measures interrupt normal programming.

Nobody really knows how the satellite industry will fare. Nor will they be able to predict the 1999 storm better after the 1998 "run-through." The stream will be completely different when the planet passes through it a year later, due to the influence of the solar wind during the interval.

All the industry knows is that the coming Leonid storms probably are a bigger potential problem for them than Y2K, and that there's not really a lot to be done about them but wait, ice down a six pack, and head up to the roof to watch the fireworks.



*Bill Sepmeier is a systems engineer, communications network consultant, free-lance writer and public speaker. You can reach him via e-mail at bill@mountainmax.net*

## CONSOLE YOURSELF. NOW, THE ONLY THING EASIER THAN USING AN AUDITRONICS CONSOLE IS ORDERING ONE.

Discerning engineers across America and Canada have always known an Auditronics console delivered premium audio and worry-free technology at an affordable price. Now, get any Auditronics console delivered just as reliably from over 21 Auditronics distributors in the U.S. and Canada.

Don't worry. An Auditronics console distributor is nearby. Call one today and relax.

### AUDITRONICS

#### Auditronics NuSt+r Digital Console

The first and only digital console you'll ever buy.

#### Auditronics Comet Console

Completely re-engineered and better than ever.

#### Auditronics 2500 Series Console

Fully featured, modular design at a value price.

#### Auditronics 210 Series Console

For on-air or production, this work horse works.

### Need Solutions?

[www.bdcast.com](http://www.bdcast.com)

or (901) 362-1350

©1998 Broadcast Electronics, Inc. BE emblem is a registered trademark of Broadcast Electronics, Inc.



Solutions for  
Tomorrow's Radio

### AUDITRONICS CONSOLE DISTRIBUTORS

**MIDWEST**  
Audio Broadcast Group  
Grand Rapids, MI  
(616) 452-1596

**Broadcast Richmond**  
Richmond, IN  
(317) 966-6468

**RF Specialties of Missouri**  
Kearney, MO  
(816) 628-5959

**SOUTHEAST Broadcasters**  
General Store  
Ocala, FL  
(352) 622-7700

**RF Specialties of Florida**  
Valparaiso, FL  
(904) 678-8943

**SCMS**  
Pineville, NC  
(704) 889-4508

**Audio Broadcast Group**  
North Carolina Office  
(800) 369-7623

**SOUTH CENTRAL Audiomedia Associates**  
Covington, LA  
(800) 544-2636

**Crouse-Kimzey Company**  
Grand Prairie, TX  
(972) 660-6100

**Continental Electronics**  
Dallas, TX  
(214) 381-7161

**Giesler Broadcasting Supply, Inc.**  
Houston, TX  
(713) 774-3314

**RF Specialties of Texas**  
Amarillo, TX  
(806) 372-4518

**SOUTHWEST RF Specialties of California**  
Santa Barbara, CA  
(805) 682-9429

**Caughill-Palitz, Inc**  
Honolulu, HI  
(808) 941-3618

**NORTHEAST RF Specialties of Pennsylvania, Inc.**  
Pittsburgh, PA  
(412) 733-1994

**Steve Vanni Associates, Inc.**  
Auburn, NH  
(603) 483-5365

**NORTHWEST RF Specialties of Washington**  
Seattle, WA  
(206) 546-6546

**CANADA AVR Communications Ltd.**  
Calgary, Alberta  
(403) 251-0707

**AVR Communications Ltd.**  
Scarborough, Ontario  
(416) 297-9377

**Caveco Equipment Ltd.**  
Scarborough, Ontario  
(416) 438-6230

**Marketing Marc Vallee**  
Quebec, Ontario  
(514) 227-1828

## Moving? ...

Don't leave us!

Send us by mail, fax, or e-mail your future address, along with your current one (with the date when your new address goes into effect)

to: Circulation, RW,  
PO Box 1214  
Falls Church, VA 22041  
or by

fax at: 703-998-2966  
e-mail: [rwcirc@imaspub.com](mailto:rwcirc@imaspub.com)

Changes of address take  
four weeks to process.  
Thanks!



**STOP . . . LOOK . . . & LISTEN TO THE FUTURE OF RADIO . . . ARAKIS SYSTEMS INC.**

Technology and Price Breakthrough

# NEW- Your Complete Digital Solution!!!

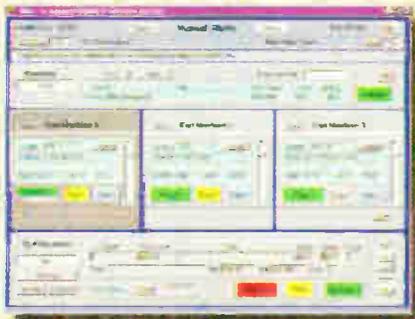
Perfect Cart machine replacement: play, stop, pause, loop, link . . .

Perfect for Live Assist: Jingle Box, Phoner Editor, & much more . . .

Perfect for Automation: Voice Over Recorder, Segue Editor, & more . . .

From the #1 manufacturer of Digital Workstations in Radio !!!

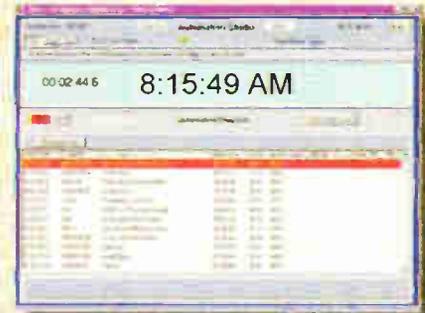
**Live On Air  
\$495**



**Live Assist \$1,995**



**Hard Disk Automation  
\$2,995**



(includes Live Assist software)

**Cart Machine Control  
\$750**



Triple Play &  
Record

**Jingle Box Control  
\$1,195**



Optional Front \$495



## DL4 Digital Audio Engine

\$2,995 (24 hrs ~2,000 spots)

\$5,295 (105 hrs ~ 2,000 songs)

The DL4 is a technology & price breakthrough !!! More reliable and 1/4 the price of comparable products, the DL4 is NOT a PC computer with sound card in it. The DL4 is in fact a digital audio appliance that is controlled by Arrakis LCD control panels, jingle boxes, and Windows 95 PC computers. If the PC fails, your audio library is still available !!! Expandable from 3 Plays & 1 Record to up to 96 Plays & 32 Records, the DL4 fits any size station's needs. You can even use your favorite PC based digital editor for production with the DL4 On Air !!! Call TODAY to find out how little it will cost for you to SAVE money and move into the 21st century !!!

Arrakis Systems inc. (970) 224-2248 [www.arrakis-systems.com](http://www.arrakis-systems.com)



USER REPORT

# Encoder 2: Making EAS Better

Lauren Darr

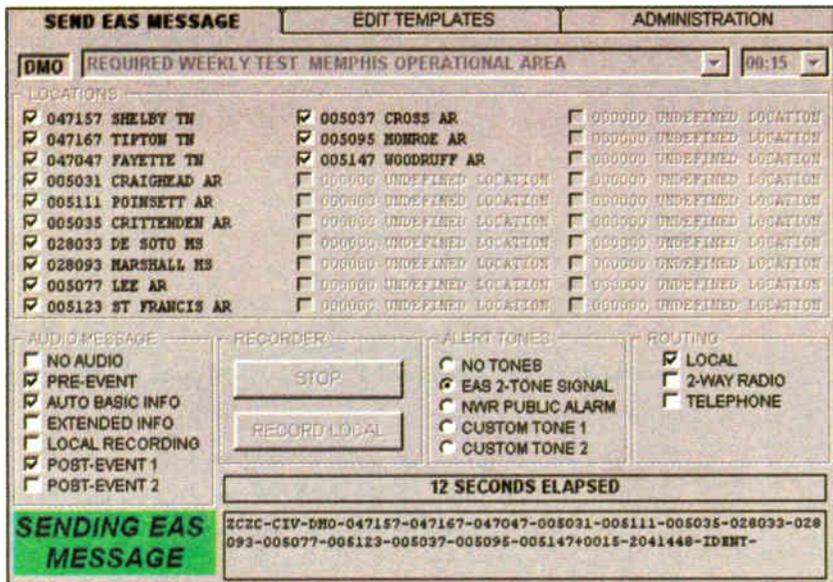
WYPL(FM) in Memphis, Tenn., is among the first in the country to put a new EAS product from Multi-Technical Services on the air.

Over the last several weeks, our station has been testing products called the MTS Encoder and Encoder 2, both of which are versatile, software-based EAS encoders designed for the origination of

directly from NOAA Weather Radio.

Terry said, "This software has come along at an important time."

He said plans by the National Weather Service to replace human voices with synthesized speech will rely on technology that is more than 20 years old. WYPL staffers have played samples of the new NWS audio to focus groups, seminars and storm-spotter classes, with discouraging results.



The Encoder 2 sends an RWT from WYPL.

EAS messages by emergency management personnel as well as broadcasters.

"This new product could become the most exciting new tool to be developed for the EAS broadcaster since the medium became operational some 18 months ago," General Manager Steve Terry said.

The two models allow a station to air prerecorded EAS alerts using the voice of its own weather talent. FCC Part 11-certified software has enabled WYPL to strengthen its EAS image by using its own professional talent to announce the message rather than forwarding alerts

"We've been told by our listeners that the new NOAA Weather Radio-synthesized speech will be extremely difficult to understand. We will not be putting it on our air. With the Encoder 2, we can relay all alerts in human voice, easier, quicker and more accurately," Terry said.

### Prerecording

Lyn Williams, president of MTS, said, "We knew for EAS to be effective at a local level, there needed to be a more user-friendly encoder and interface."

A key feature of Encoder and Encoder 2

is flexibility. Users can predefine an unlimited number of event scenarios that include the event type, duration, locations, message options, alert tones and output routing. EAS encode and end-of-message tones are added to each event automatically, virtually eliminating the chance for station lock-up due to a missed EOM.

Encoder allows the on-duty operator to select from the preset event scenarios and originate the EAS messages. It will also attach a local audio message, if desired, to the EAS header and EOM codes.

Encoder 2 has all of the features of Encoder, but allows a station to prerecord its EAS messages by recording specific WAV files that collectively form a predefined EAS custom message. Encoder 2 allows WYPL to play a pre-event message before the EAS codes, such as its news bulletin theme music, with a program interruption message. Terry said this prepares the listener to receive the impending emergency message.

The Encoder 2 then selects several prerecorded WAV files that are combined to make up a basic event message. This message consists of the nature of the alert, followed by the counties or areas affected and the time of expiration. The operator then can optionally record and attach a "local recording," which can be a more definitive message describing the exact location of an event or any other specifics that cannot be pre-recorded.

The station operator then can attach "extended information" to the message. This extended information normally is a prerecorded "call to action statement" consistent with the type of alert. The software also creates a detailed log of all events. The log can be retrieved quickly for viewing, or sent to a printer.

Encoder 2 has other broadcast-oriented features that will allow a station to prerecord up to two post-event messages that would play immediately after the

**Product Capsule:**  
Multi-Technical Services  
Encoder & Encoder 2

**Thumbs Up**

- ✓ You can attach a funding credit announcement to EAS message
- ✓ Allows for the airing of a Prevent Message
- ✓ Win95 program, multiple screen displays using multiple SVGA monitors/cards
- ✓ Audio files recorded at a minimum sampling rate of 11 kHz

**Thumbs Down**

- ✓ Win95-based (32-bit) program, will not run on older laptops using 3.11
- ✓ Screen colors are not adjustable
- ✓ Requires CD-ROM drive for installation

For more info, contact MTS in North Carolina at (919) 553-2995, via e-mail to lyn@mts-comm.com or circle Reader Service 5.

programming philosophy. Its slogan: "The Info Hub of the Mid-South."

Webb said, "We use a post-event message that says, 'This concludes this special Emergency Alerting System bulletin from the WYPL newsroom. Please stay tuned to your weather authority and StormScan for the latest information from WYPL.' To be able to pull up an EAS event, from beginning to end, and have it all assembled and ready for air in seconds, for our operators, it has been very effective."

Skip White, a software developer for MTS, said the inclusion of a second post-event message is to allow stations to sponsor the warning announcement. This feature is useful for stations that wish to provide credit for underwriters of EAS announcements, as allowed by Part 11 Rules.

### Tiered access

Terry likes the ability to tier operator access to the software's functions. He said station engineering controls the administrative functions, while the station's production manager has access to template modifications and to EAS activation controls, as do all on-duty operators. Because the audio files that come with the software are recorded at 11 kHz/ 8-bit quality, he said, many broadcasters will want to re-record them. Terry suggests 16-bit to reduce the noise floor, and 22 kHz mono for fidelity.

Williams said MTS would encourage the average user to route the Encoder 2 audio output through the station's existing EAS decoder/encoder, such as the MTS 3000D. The station's Sage EAS system has responded flawlessly to alerts routed through it from the

Encoder 2. Terry now is able to control WYPL's EAS system via Encoder 2 from anywhere within range of the station RPU system and/or via a telephone line. This allows WYPL to issue EAS alerts

See WYPL, page 42 ▶



Governor Don Sundquist and Steve Terry of WYPL congratulate each other at WSM(AM) Nashville, the PEP station for Tennessee, after the governor signed off on the state EAS plan.

Encoder's issuing of three EOM tones. Jeff Webb, production manager for WYPL, said the station uses this feature to tell listeners to stay tuned to their "weather authority" for additional information. This fits in with the station's pro-

**How much would you pay for this response?**

>100dB S/N • 2.5 mile line driver • Ground/Lightning isolation  
90-day satisfaction guarantee. 3 year parts and labor warranty.  
2 channels for less than \$1,650.  
[www.kci-dfw.com](http://www.kci-dfw.com)

Knight's Communications Inc., 2219 West Broadway, Fort Worth, Texas 76102 800-880-5061

Circle (210) On Reader Service Card

# Optimize Your CD Control With Denon

■ Control Terminals  
RS-323C/422A,  
D-Sub 9 pin, D-Sub 25 pin

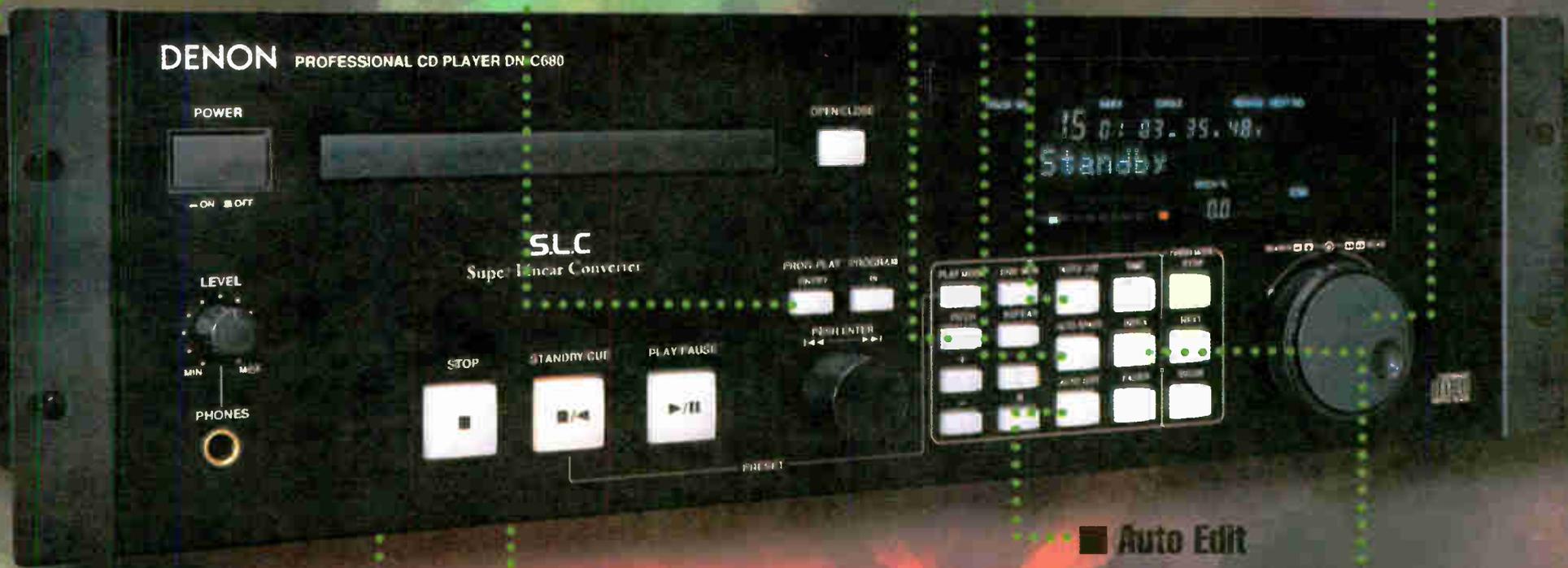
■ Programmable  
Play Mode

■ Pitch Control

■ Auto Space

■ Auto Cue

■ Jog/Shuttle Wheel



■ Auto Edit

■ Index Search



**P**rofessional audio applications require professional tools—particularly in demanding digital studio environments. The Denon DN-C680 CD player is engineered to provide the *ultimate* in flexibility and performance for broadcast and post production facilities. Offering a multitude of features, including programmable play mode, jog/shuttle wheel, auto edit, auto space and optional [SMPTC](#) kit, the DN-C680 provides the optimum solution for programmable CD playback.

Denon Electronics, 222 New Rd., Parsippany, NJ 07054, (973) 575-7810  
Denon Canada, Inc., 17 Denison St., Markham, Ontario, Canada L3R 1B5, (905) 475-4085  
Labrador, S.A. de C.V., Zamora No. 154, 06140 Mexico, D.F., (52-5) 286-5509

Visit our web site: [www.del.denon.com](http://www.del.denon.com)

Circle 1159 on Reader Service Card  
World Radio History

**DENON**  
The First Name In Digital Audio

## Products for the Radio Broadcast Professional

Mail info and photos to: RW Marketplace, P.O. Box 1214, Falls Church, VA 22041

### Toroid Isolation Transformers

**Toroid Corp.** introduced an international version of its ISO-BOX series of ready-to-plug-in enclosed hospital-grade isolation transformers.

Like its domestic sister product, the International ISO-BOX uses a toroidal transformer with all the advantages of toroidal construction, including low weight, low magnetic strayfield, low mechanical noise, low losses, high efficiency and cool operating temperature. Housed inside a sturdy white finish



aluminum enclosure, the unit includes three standard power ratings of 300, 600 and 1000 VA. The power entry module contains a power switch, line filter and dual current-limiting fuses located on the short side of the enclosure. This allows the transformer to be mounted in places with little or no headroom to spare. This design has selectable input voltages of 115 or 230V.

The international (W) series come with all required US/Canadian and International safety standard approvals, including UL2601, CSA C22.2, No.601.1, EN 60601-1, EN60742, and IEC601-1. The three international models carry the CE marking.

For more information, contact **Toroid in Maryland** at (410) 860-0300; fax (410) 860-0302; or circle **Reader Service 31**.

### Test Probes From Fluke

Two probes have been added to the **Fluke Corp.** family of digital multi-meter test tool accessories.

The Fluke 80K-15 electronic air cleaner test probe is an accessory which extends the voltage measurement capability of most DMMs up to 15 kV and is intended for measuring output voltages in low energy environments. Special plastic body construction provides the user with isolation and protection from the voltage being measured, and a



heavy-duty grounding clip offer a secure ground connection.

The 80K-15 probe provides an accuracy of  $\pm 2$  percent when used with a voltmeter having an input impedance of 10 Megohms. With the probe's 1000:1 division ratio, a standard DMM will read 1V for every 1,000 volts measured at the probe tip.

The Fluke i2000flex current probe is a flexible, AC current probe recommended for current measurement on large and difficult-to-reach conductors. The specialty probe is accurate up to a 2,000 A AC current measure-

ment rating.

The i2000flex has two switchable ranges: 200 and 2,000 A. The output signal in the 200 A range is 10 mV/A; in the 2000A range, the signal is 1 mV/A. The probe includes a BNC connector, making it suitable for use with any oscilloscope, power analyzer or Scopemeter test tool having a compatible BNC input connector.

For more information, contact **Fluke in Washington** at (425) 347-6100; fax (425) 356-5116; or circle **Reader Service 57**.

### Microwave Filter Co. Bandpass Filter

The model 12218 bandpass filter from **Microwave Filter Company** passes the frequencies of 28.16 to 28.37 GHz and suppresses lower sideband



interference and unwanted carriers contained in the output of the mixer in LMDS transmitters.

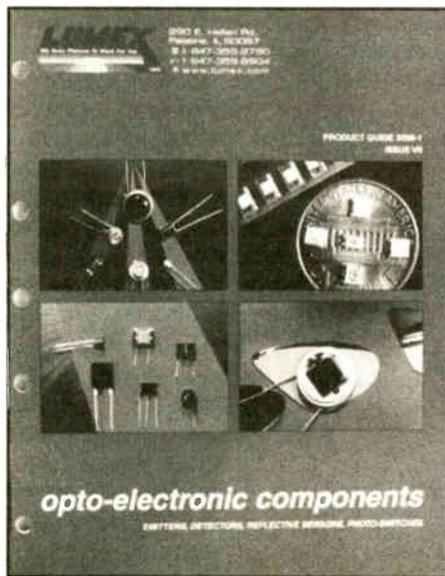
The unit has a passband loss of 1.5 dB maximum (1.0 typical) with a return loss of 16 dB minimum. Also included is a stopband attenuation of 60 dB minimum from 27.45 to 27.66 GHz and 30 dB minimum at 27.91 GHz. Input level is -10 dBm maximum, operating temperature is 0 to 50 degrees Celsius and humidity is 99 percent, non-condensing.

The model 12218 comes standard with WR28 cover flanges. Other filter models up to 40 GHz are available, and additional units are available for both portions of the U.S. LMDS bands.

For more information, contact **Microwave Filter Company in New York** at (315) 463-1467; fax (315) 463-1467; or circle **Reader Service 83**.

### Opto-Electronic Catalog

**Lumex** is out with a new 44-page product selection guide for its component-level opto-components.



The Opto-Electronic Components comprehensive guide will assist designers of emitter-sensor systems in remote control, motion detection, medical diagnostics, gas and fluid analysis and office automation systems in locating the correct opto-components to meet their application requirements.

The new Lumex catalog features over 200 different products, including IR emitting LEDs, photo diodes, photo transistors, photo-Darlington transistors, PIN photo diodes, photo interrupters, photo reflectors and photoresistive cells. Each product description includes detailed opto-electronic as well as mechanical specifications.

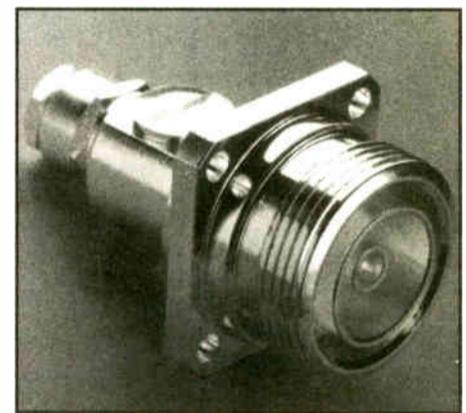
Also included in the catalog is a detailed application matrix providing a comprehensive cross-reference between 38 specific applications and nine families of opto-components.

For more information, contact **Lumex in Illinois** at (847) 480-7787; fax (847) 475-3426; or circle **Reader Service 109**.

### Din Connectors

New from **Bomar Interconnect Products** is the 7/16 Din Series of high-power broadcast connectors.

With the addition of this new series, Bomar's lines now consist of connectors ranging from sub-miniature through the new large-size 7/16 Din Series. Conforming to DIN 47223 and designed to minimize signal distortion from intermodulation, these connectors are ideally suited for a wide range of broadcast applications including entertainment, GPS, paging and cellular sys-



tems. The 7/16 Series includes a broad array of configurations, allowing for tremendous flexibility in system design.

The new connectors feature strong power-handling capabilities along with a nominal impedance of 50 ohms. They additionally boast a low reflection factor of up to 7.5 GHz, voltage rating of 2,700 VRMS and an insulation resistance of 10,000 Megohms. The connectors may be ordered with silver, gold or nickel plating.

For more information, contact **Bomar in New Jersey** at (973) 347-4040; fax (973) 347-2111; or circle **Reader Service 135**.

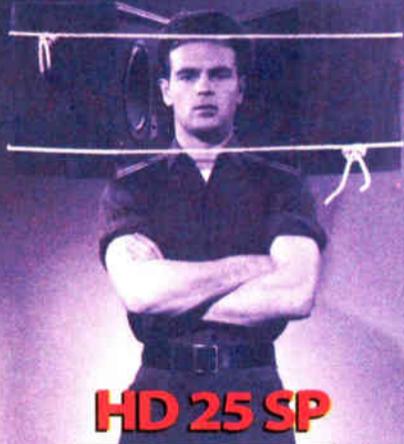
**Need to find a supplier fast?**

Visit [www.rwonline.com](http://www.rwonline.com)

Think of Them as Reference Monitors You Can Wear

When you need to hear exactly what you've recorded... nothing more, nothing less... then only Sennheiser's HD 25 SP will do. Excellent isolation, with clear, accurate reproduction are the trademarks of these reference-quality headphones. Plus, they're MUCH more comfortable than wearing speakers.

Your project studio is incomplete without the HD 25 SP. Check them out today at your local Sennheiser dealer.



**SENNHEISER**

6 VISTA DRIVE, P.O. BOX 987, OLD LYME, CT 06371  
TEL: 860.434.9190 • FAX: 860.434.1759

IN CALIFORNIA: 4116 WEST MAGNOLIA BLVD., SUITE 100, BURBANK, CA 91505 • TEL: 818.845.7366 • FAX: 818.845.7140  
IN CANADA: 221 LABROSSE AVE., PTE-CLAIRE, PQ H9R 1A3  
TEL: 514.426.3013 • FAX: 514.426.3953

# How much are eight miles worth ?

Plenty, if you are a AM broadcaster. What if your station could get out another eight miles of coverage? What would it be worth to you? The audio processing that you use plays a big part in the coverage of your station. Are you getting all the coverage area that you can ?

New audio processing from CRL can maximize the coverage area of your station. Our tri-band Limiter design delivers extra sideband and modulation energy to your listeners' radios. Our patented NRSC-1 filtering gives you the tightest peak control of any processor on the market. The result is an average of eight miles of additional coverage area compared to older processing equipment (average at 1200 kHz with 1 Kw power).

We manufacture the largest assortment of AM processing products on the market. Instead of only one or two processor choices, we offer 7 different AM systems. With thousands of systems in use, it's no wonder that we are the leader in AM processing technology. Plus our systems start at less than half of what the competition charges. How much is eight miles of additional selling penetration area worth to your station ?



**AM 4 MONO PROCESSING SYSTEM**

## New Coverage Area



**AM160 AM STEREO PROCESSING SYSTEM**

Broadcasting in Stereo ? Moving to the expanded band ? Our matrix stereo AM systems deliver up to 6 dB better envelope (L+R) loudness than the competition. That translates into full reception range on all mono radios. Our patented matrix processing circuitry provides full stereo depth and fidelity that sounds almost as good as FM. Eight out of ten stations that broadcast in stereo use CRL audio processing.

How many miles will a new CRL audio processing system give you? It's easy to find out ! We have a demo program available through our dealer network. Ask us for the details. In just a few weeks you could have better coverage and loudness, plus a larger selling penetration area. Can you afford not to use a CRL AM processing system ?



**MBL-100 NEWS/TALK PROCESSING SYSTEM**

Old Coverage Area



Circle (211) On Reader Service Card

**Old Coverage Area**

# A Software Solution to EAS

► WYPL, continued from page 38  
five to 20 minutes faster than relaying them from NOAA Weather Radio.

It is not uncommon, Terry said, for the NOAA radio transmitter in his area to put out mismatched audio and text message alerts. He also said that on several occasions, station staff has had to call local NWS officials to notify them that they are not issuing EAS tones with their alerts. WYPL has become more dependent upon the station's reception of the NWS "Emergency Managers Weather Information Network" weather product. EMWIN is the new NWS free weather wire. WYPL has been testing it over our subcarrier for the past 10 months. WYPL

routes this GOES 8 satellite-delivered data stream through its 67 kHz SCA so that staff can have access to warning information, both at the studio and in their homes.

"We have spent the past 18 months promoting EAS and our developed 'StormScan' product," Webb said. "The station has attempted to educate residents of Memphis that when weather moves into our area, they should take WYPL with them to their place of safety."

On the emergency management front, Paul Luke of Alert Technologies Corp., which is a dealer of MTS products, has been working with the

Tennessee Emergency Management Agency and has recommended that Encoder 2 be installed in its emer-

tests directly to WSM(AM), Tennessee's PEP station. Luke also has made presentations to several county agencies throughout Tennessee and Mississippi.

"All of the counties that we've visited have expressed a strong interest in

**We've been told by our listeners that the new NOAA Weather Radio-synthesized speech will be extremely difficult to understand.**

— Steve Terry

gency operations center (EOC) so it can issue Tennessee required monthly

constructing countywide EAS warning systems with Encoder 2 serving as the EOC's main controlling system, especially now that consumer EAS receivers are becoming available," Luke said.

In DeSoto County, Miss., Luke said, officials liked the ability to use Encoder 2 to control their new county siren system. Williams said Encoder 2 allows an agency to prerecord any type of tone or data paging streams so that an EOC simultaneously can activate sirens as well as the EAS system through the local LP-1 and LP-2 stations.

Luke said county authorities have been encouraged to obtain an MTS EAS auto answer unit for installation at each LP station in their area. This box allows a phone line, either cellular or terrestrial, to be connected to an audio input of the station EAS decoder, thus allowing alerts to be forwarded even though the station may be operating in an unattended mode.

Williams said this box complements new EAS support devices, including a new EAS telephone/radio interface. The EAS T/R connects to the audio output jack of an Encoder 2-installed computer. The device provides an adjustable mic-level output and push-to-talk keying for two-way or RPU radio linking, along with an RJ11 jack for connection to a phone service. The combination of these two devices with Encoder 2 allows an EOC to send EAS alerts to the LP stations via two separate paths.

Luke said he runs the Encoder 2 software on his 486 laptop. He said the program requires that your computer have a CD ROM drive for software installation and he has found it difficult to run the program with some PCMCIA audio cards. Thus, he recommends using a laptop that contains an on-board 16-bit sound system. Terry said when he and Whit Adamson, executive vice president of the Tennessee Association of Broadcasters, described the new software to state Governor Don Sundquist, he was amazed at how quickly and easily he could generate and send emergency messages statewide, in a matter of seconds.

Sundquist signed off on the Tennessee EAS plan at a ceremony in March. According to Adamson, the governor was excited that his communications director could now carry Encoder 2 on a laptop and be able to issue EAS messages on his behalf from any location throughout Tennessee.

■ ■ ■

Lauren Darr is coordinator of volunteers at WYPL. Reach her at (901) 725-8833.

## Which would you rather carry on your next Remote?

**ALL THIS**

**ROADRUNNER**



**Your one box remote broadcast solution!**

When you're rushing off to your next remote you don't want to lug around a lot of equipment. RoadRunner from MUSICAM USA gives you:

- A 3-channel mixer
- Built-in ISDN Terminal Adapter with integrated NT-1
- MUSICAM® MPEG Layer II, Layer III and G.722 for total compatibility
- Internal power supply or external battery

All in one box.

See Us at AES  
San Francisco

**Performance, price and portability — RoadRunner outdistances the competition every time**



**MUSICAM USA**

MUSICAM USA  
670 North Beers Street, Building 4, Holmdel, New Jersey 07733 USA  
Tel: 732/739-5600  
Fax: 732/739-1818 • Fax On Demand: 732/935-2777  
Email: sales@musicamusa.com  
Internet: <http://www.musicamusa.com>

Prices shown are published manufacturer's list prices as of 3/1/98



MARKET WATCH

## Atlanta Radio Market Booms

Lynn Meadows

Welcome to a modern-day boomtown. From the sounds of it, radio sales managers in Atlanta could take off Monday and Tuesday of every week and still be rolling in revenue. The picture is that rosy: the market, ranked 12th by Arbitron, is ranked tenth in revenue, according to BIA. Radio revenue predictions for 1998 range from \$205 to \$245 million

"This is a market where everybody wants in and nobody wants out," said David Dickey, president and general manager of family-owned Ring Radio. As a result, no one group truly owns a huge piece of this southern pie.

Several top-20 groups have properties in the market, including CBS Corp., ABC Radio, Jacor Communications, Chancellor Media, Cox Radio, Susquehanna Radio and Jefferson-Pilot

helping them achieve those goals.

There are not a lot of format duplications in Atlanta. ABC Radio pro-

grams its two FMs, WKHX and WYAY, with country music. On the FM band, there is one modern rock station, WNNX(FM), owned by Susquehanna, and one classic rock station, WZGC(FM), owned by CBS.

One station sales manager noted that

See MARKETWATCH, page 52 ▶



The Atlanta City Skyline

depending on the source.

On top of that, the market is "under-radioed." In 1997, according to BIA Publications, the number of "viable" FM stations in the market was 13 — just two more than 56th-ranked Richmond, Va.

More good news: The Atlanta population is skewed toward young professionals with lots of disposable income. Plenty of restaurants, clothing stores and car dealerships dot the landscape eager to lure spenders into their establishments. And, with plenty of undeveloped land surrounding it, Atlanta has room for continued growth.

The final sweet piece of the puzzle for radio is that — because of the growth — the city's workers face the longest commute of workers in any major city in the country. Could this be heaven for sales reps?

Communications. Chancellor and Susquehanna each own only one station in the market.

Barry Reed, sales manager for Chancellor station WFOX(FM), said the goal is for Chancellor to own more here, but that is unlikely to happen unless the group buys another group.

"Arguably, it's one of the most desirable markets in the country," said Reed. "This is just a great progressive growth market." Oldies formatted WFOX reaches the baby boomers of 35-54 who are homeowners and have the highest income in the market.

Reed was quick to point out that despite these ideal conditions, life in Atlanta is not just about taking orders for spots over the phone. He said WFOX reps still grow their business by learning what customers' marketing goals are and

FIRST PERSON

## I've Seen Fire, Rain: The Florida Inferno

The 1998 Fires in Florida Test the Endurance And Creativity of Radio Journalists

Peter King

It's cloudy, gray and raining — normally nothing to get excited about — but Central Florida is getting its first heavy rains in months. With any luck this is the tail end of a long dry spell which contributed to the burning of nearly half a million acres of land in Central and Northern Florida, a story that dominated the news for several weeks in late June and early July. It was a time for radio reporters to show their best stuff ... and shine they did, at the network and local level. For CBS News, it was a team effort, with no

fewer than six reporters contributing to the network's radio coverage. Long days and tons of driving were routine, not just for our team but for journalists from ABC, NBC/Mutual, AP, NPR and local stations.

Lay of the land

Geography was the greatest challenge, as the blazes were spread out over such a wide area that it was impossible for any single reporter to get a handle on every detail. Instead, what we did was to try to send snapshots and individual stories that fit in

See FIRE, page 49 ▶



Photo by Craig Bailey, Florida Today

Firefighters monitor a brush fire in north Brevard County, Fla. The blaze would later consume dozens of homes in the area.

Give them what they want to hear



Shaping Knowledge

## UPI Broadcast

Flexible for broadcasters. Tailored for listeners.

- Funny, Ready-to-air Morning Show Prep
- State News
- Local Weather
- Sports
- Breaking National and International News
- Business and Consumer News

Everything you need for all the formats you feed.

800.503.9993

bavery@upi.com www.upi.com

UNITED PRESS INTERNATIONAL

Member of the UPI Group

PERSONALITY PROFILE

# Doo-Wop Cop Patrols the Airwaves

Bob Rusk

During the week, he wears the uniform of the Key West Police Department in Florida. But on Sunday mornings, Officer Chris Gough steps out of his patrol car and into the studios of oldies station WWUS(FM) in nearby Big Pine Key, where he is the host of a doo-wop show.

"Glad to have you inside the 'Doo-Wop Shop' with me," he told listeners on a recent installment, after spinning "Such a Night," a 1954 classic by Clyde McPhatter & The Drifters.

Gough, known on the air as the Doo-Wop Cop, got the job after making his radio debut in the Florida Keys as the police voice on public service announcements aired by WWUS. He then approached station General Manager Bob Soos about doing an airshift. Soos was receptive to the idea and thought that a liberal dose of doo-wop ditties, with finger-snapping harmonies, would be a hit in the Keys.

"When he asked if I'd be interested in doing the show, my response was, 'In a minute! That's my favorite kind of music,'" Gough, 41, said. A native of Staten Island in New York, he began listening to the music in the early 1970s, when a Sunday night "Doo-Wop Shop" on WCBS-FM caught his ear.

In the intervening years, Gough has become a walking encyclopedia of doo-

wop history. While the music, with its roots in rhythm and blues, has been popular since the 1950s, Gough said the term "doo-wop" was first used in about 1970 by New York DJ Gus Gossert.

phrase 'doo-wop' a lot," Gough said. "He's the one who gave it the name. Before then there was not a given name to that style of music."

Gough enjoys passing tidbits of history



Chris Gough, the Doo-Wop Cop

"He worked at WPIX(FM) — now WQCD(FM) — and would talk about how the background singers used the

on to the listeners. After playing "Work With Me Annie," a 1954 hit by Hank Ballard & The Midnighters, he announced, "They didn't get much radio play back in those days, because their songs were very suggestive for that era. They were very popular in record stores, though."

All of the music Gough plays — a mix of slow and uptempo songs — comes from his personal collection. "Doo-wop by its nature is slow, but I try to program at least one up-

the air name Chris Conway. His first full-time gig was 3,000 miles away, at KOHI(AM) in St. Helens, Ore. When the station was sold, Gough accepted an offer to host the evening show at KSWB(AM) in Seaside, Ore., where he did double duty as music director.

Wanting to return to the East Coast, Gough left radio in 1987 for a career in law enforcement. His first assignment was as an officer in Stratford, Conn. He then transferred to trendy Key West.

Gough moved to Florida for the tropical weather. But it turned out the area is also a doo-wop hot spot. When a concert featuring the legendary Cadillacs and other doo-wop acts from the 1950s was held in a Miami suburb, it was advertised on his show. "You'll see some great bands!" he enthusiastically said in one of the live-copy spots.

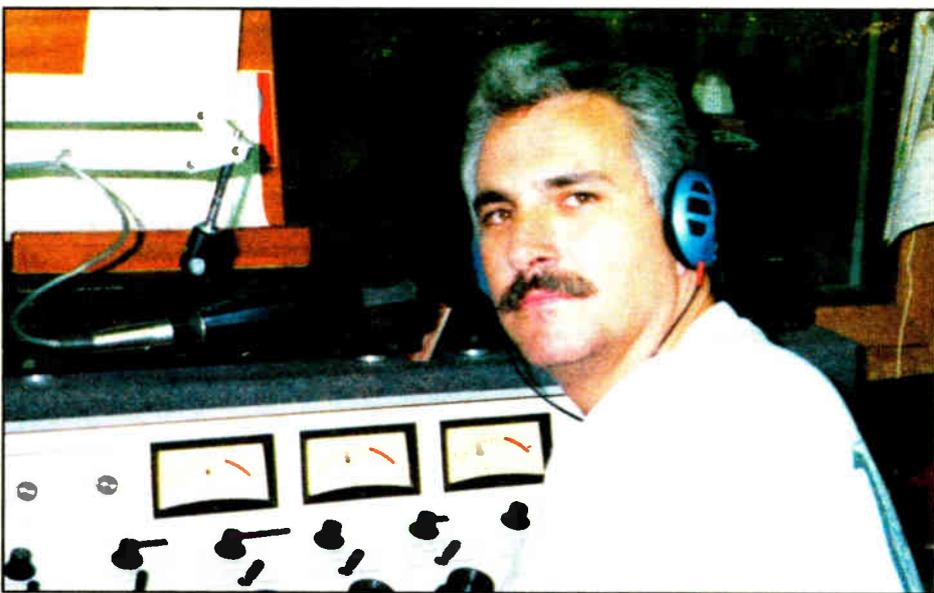
The appeal of the music crosses demographic lines, which surprises Soos. "You would think that doo-wop would attract an older audience," the general manager said. "But there are school kids who listen to it, too," he said.

That popularity is money in the bank for the Crain Communications-owned station. With 12 minutes of breaks per hour, the "Doo-Wop Shop" is sold out, according to Soos. "That's usually the best test of success," he said.

School teacher

Some of the kids who listen to the show are Gough's students at Horace O'Bryant Middle School. As the Key West DARE officer, he teaches a course on drug prevention. Gough wanted to bridge the gap between police and children, so he brought his passion for radio to school and helped the students put on a closed-circuit station; it is heard over the audio portion of the school video system. Now he hopes to put on a "real radio station."

If the school district is receptive, he said, he hopes to help it apply for an FM license.



Gough sits at the board at WWUS(FM).

tempo song per three-song set," he said.

"I also play some modern doo-wop by groups such as the Nylons or 'The Longest Time' by Billy Joel. Manhattan Transfer has done a lot of stuff, and even Boyz II Men has done a couple of songs that could be classified as doo-wop." He features one modern song on each show, which has aired from 9 a.m. to noon on Sundays since its debut in 1995.

Gough is no newcomer to radio, however. Inspired by the New York personalities he listened to in his youth, Gough attended the Connecticut School of Broadcasting. He then landed a part-time air shift at WICC(AM) in Bridgeport, Conn., using

"I would teach radio as an elective course for eighth graders," he said.

With that kind of hands-on training, perhaps Gough will inspire the next generation of doo-wop cops. "I was thinking more along the lines of the next Imus or Howard Stern," Gough said with a grin. "But who knows. I might be able to inspire someone to enjoy doo-wop as much as I do. That would be neat."

Bob Rusk is a frequent contributor to RW.

Chris Gough and Bob Rusk worked together at KSWB(AM) in Seaside, Ore., in the 1980s.

RELIABILITY WITH LIFETIME WARRANTY

EDUCATIONAL CIRCULAR SERIES

Model	Bays	Power	Gain	Price
MP-1	1	600W	-3.3	\$250
MP-2	2	800W	0	\$680
MP-3	3	800W	1.4	\$980
MP-4	4	800W	3.3	\$1,280
MP-2-4	4	2,000W	3.3	\$1,820
MP-3-5	5	3,000W	4.1	\$2,270
MP-3-6	6	3,000W	5.2	\$2,740

LOW POWER CIRCULAR SERIES

Model	Bays	Power	Gain	Price
GP-1	1	2,000W	-3.1	\$350
GP-2	2	4,000W	0	\$1,350
GP-3	3	6,000W	1.5	\$1,900
GP-4	4	6,000W	3.4	\$2,600
GP-5	5	6,000W	4.3	\$3,150
GP-6	6	6,000W	5.5	\$3,700

MEDIUM POWER CIRCULAR SERIES

Model	Bays	Power	Gain	Price
SGP-1	1	4,000W	-3.3	\$690
SGP-2	2	8,000W	0	\$2,690
SGP-3	3	10,000W	1.4	\$3,595
SGP-4	4	10,000W	3.3	\$4,500
SGP-5	5	10,000W	4.1	\$5,300
SGP-6	6	10,000W	5.2	\$6,100

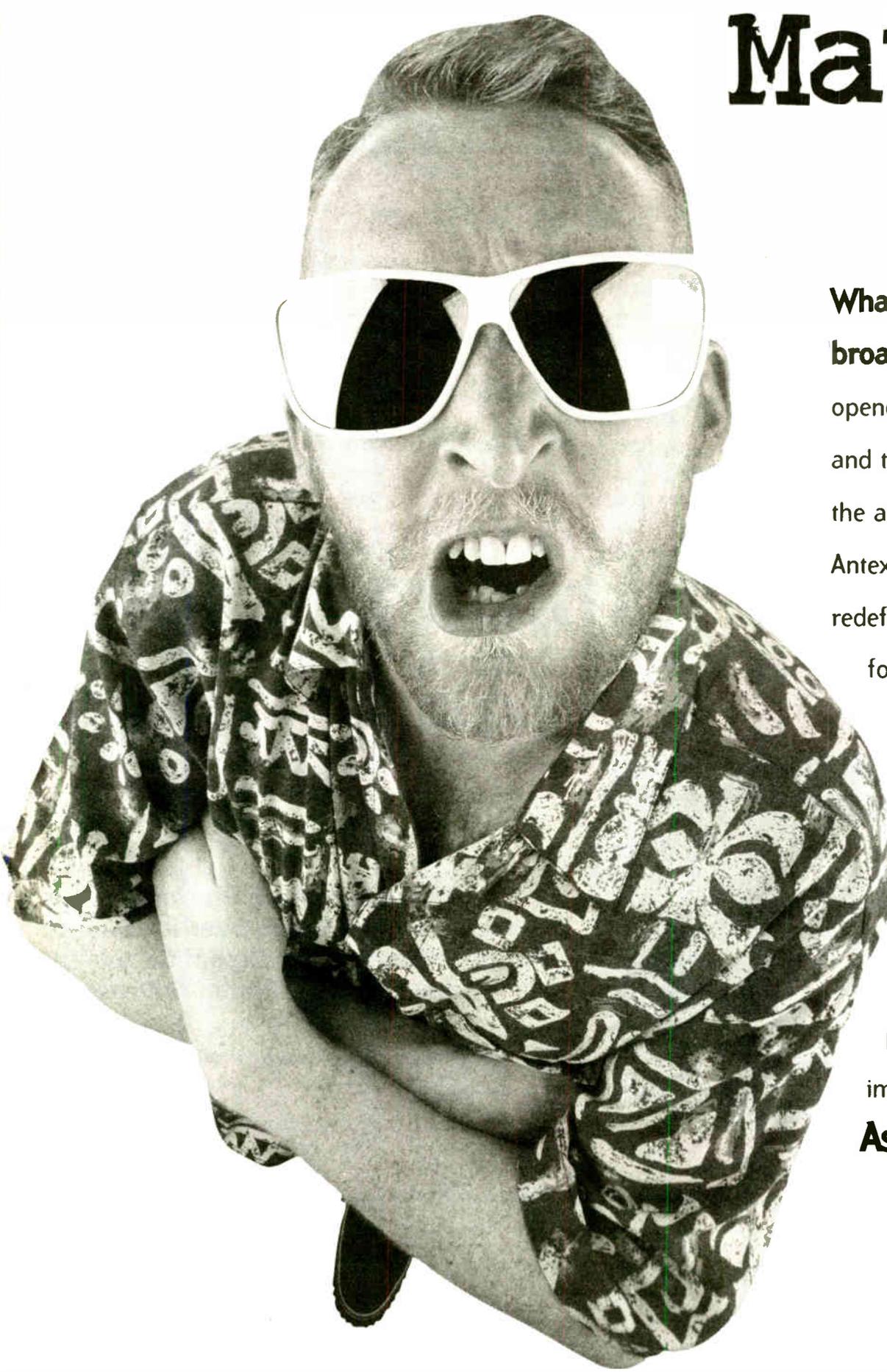
The antenna array... frequency. For powers up to... please, make the... the specific configurat...

OMB also Manufactures:  
 FM transmitters  
 TV transmitters  
 FM and TV Links  
 TV antennas  
 Medium power FM antennas

OMB America  
 3100 NW 72 Ave #112  
 Miami, Florida 33122  
 Phone: 305-477-0974  
 Fax: 305-477-0611  
 Toll free: 888-OMB4USA



# Does <sup>it</sup> Really Matter?



**What kind of soundcard does your digital broadcast system use?** It's a critical matter. For openers, even with a new production suite, transmitter and the latest satellite links, the audio quality that hits the air is only as good as your soundcard. Fact is,

Antex soundcards have continuously redefined PC-based digital audio quality



for more than a decade. Antex

offers field-proven technology that exceeds expectations. Plus, Antex cards provide all the most popular compression formats for digital broadcast. Ask people who know. The industry's most respected software and hardware developers and manufacturers have Antex plugged in. And they show it. So you see, it's important to know your soundcard. It matters.

**Ask For Antex.**

**ANTEX ELECTRONICS**  
NEVER LOSE SIGHT OF SOUND.

1125 West 190<sup>th</sup> Street, Gardena, California 90248  
310-532-3092 · 800-338-4231 · [www.antex.com](http://www.antex.com)

Circle (212) On Reader Service Card

The best digital broadcast systems use Antex Audio. Do you?



Prophet Systems, Inc.

Scott Studios

rds



World Radio TECHNOLOGIES INC.

Come see the SMART™, POTS codec; Talk•Port™, micro-cellular remote link; and the Cellcast®, cellular remote broadcast unit in our booth at the upcoming ABG Equipment Expo.



From *MARTI™* -  
The Remote Experts



Solid State  
AM and FM  
Transmitters



WireReady NSI



NewsReady<sup>32</sup>

Win 95/98/NT Newsroom  
**MusicReady**  
Music On HD Automation  
**ControlReady**  
HD Satellite Automation

Includes 24-hour 800 Support,  
Free Upgrades, Training and Setup.

56 Hudson Street, Northboro MA 01532  
(800) 833-4459 • (508) 393-0200  
FAX (508) 393-0255  
www.wireready.com sales@wireready.com



New from  
Comrex!



Vector  
POTS  
codec

15 kHz  
two-way audio  
on one phone line.

Call ABG for details and pricing!

Together, we can reach the world.



FM exciters, transmitters, translators, RF amplifiers



**Dielectric**  
A Unit of General Signal

For all your FM needs  
Antennas...Combiners...  
Filters...Switches...  
Transmission Line...

For information contact:  
Matt Leland  
1-800-341-9678

email: matt.leland@dielectric.com

Digital Transmission Systems

STL, TSL and Intercity Links  
Audio, Voice and Data



**Intraplex**

Call 877-INTRAPLEX or visit  
<http://www.intraplex.com>



**TFT** INC

- BTSC, AM & FM Modulation Monitors
- Digital STLs
- EAS

Great Products Since 1970  
Customer Service 24x7

3090 Oakmead Village Dr.  
Santa Clara, CA 95051  
Toll Free (877) CALL-TFT (2255838)  
Fax (408) 727-5942

TRANSMITTER REMOTE  
CONTROL SPECIALISTS

**BURK**  
TECHNOLOGY

For more information,  
contact us at:  
800-255-8090  
or email  
sales@burk.com

NEW  
**AutoPilot**



**Manufacturers Descend**  
Experience the newest technology from the  
manufacturers at Audio Broadcast Group!

**30 Exhibitors !**

Call &  
Register  
Today!  
800 369-762

• Product  
Demonstrations

• Great Manufacturer  
Give-Aways!

• Technical Advice  
and Expertise

• Power Packed  
Registration Bags

**Session Topics**

EAS Does It Work For You?  
Digital Mixing for Voice Over Production  
Panel Discussion on Digital Consoles  
Introducing New Digital Editors  
And more!



Circuit Research  
Labs, Inc.

Quality Audio  
Processing for AM,  
FM and TV



Complete Site Control  
Solutions for Radio and  
TV transmitters, studios  
and other facilities.

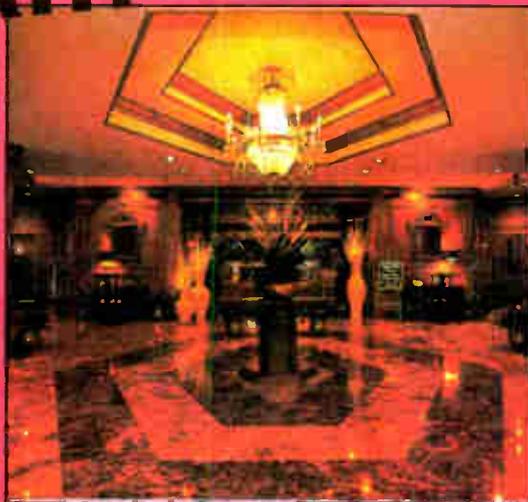
Call us toll free:  
1-877-DAVICOM (1-877-4266)  
www.davicom.com



# OPTIMOD

## and on Durham

the most popular  
regional trade show.



Radisson Governors Inn  
Durham, NC

### What, Where and When?

Free Admission

Complimentary Breakfast, Lunch and Dinner

September 15, 1998

9 AM to 8 PM

Radisson Governors Inn in Durham, NC

To register call Cindy Edwards  
Audio Broadcast Group at 800 369-7623



Analog and  
Digital On-Air  
Consoles by

**FIDELIPAC**



Digital Cart  
Machines



www.fidelipac.com



Audio Cables

- Multi-pair • Single-pair
- Speaker • Microphone
- Guitar/Instrument
- Digital Audio

Connectors

- ADC • Neutrik
- Switchcraft • EDAC

Quality Audio and Video Cable Products

Improving the Way the World Sounds<sup>SM</sup>



**Aphex Model 2020 FM Pro**

Louder • Lower Noise • Less Distortion • No Grunge

**APHEX  
SYSTEMS**

11068 Randall Street, Sun Valley, CA 91352 U.S.A.  
818-767-2929 • Fax: 818-767-2641 • http://www.aphexsys.com

ntner Roland<sup>®</sup> TASCAM



CUTTINGEDGE



Complete  
RF System  
Solutions

Antennas & RF Systems, Inc.

916-383-1177 • 916-383-1182 (fax)  
WWW.JAMPRO.COM

# 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.

**ERI**<sup>®</sup>  
ELECTRONICS RESEARCH, INC.



- Structural Analysis
- Tower Reinforcing

(812) 925-6000  
7777 Gardner Road  
Chandler, Indiana 47610  
Home Page: [www.ERInc.com](http://www.ERInc.com)

READER SERVICE NO. 77



## AM is Dead, Is Dead

If you think your AM is dead or on life supports ...

### Think Again!!

Southern gospel music is the ER for your AM station

- A growing format (check out *USA Today* April 7, 1998)
  - Amazingly loyal listeners (Adults 25-54)
  - Provable Arbitron Success
  - Built-in Advertiser Demand

Solid Gospel is southern gospel music satellite programming offered 24 hours 7 days per week. We can save your station from death.

Call our ER specialists today!  
(800) 742-3969

Cash and/or Barter



A Quality Music Service of Reach Satellite Network

READER SERVICE NO. 24

A Broadcast Industry

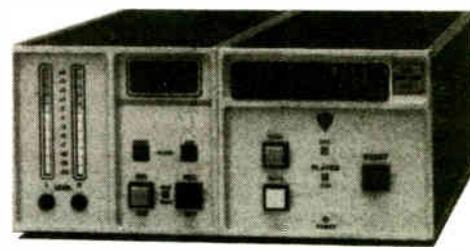
# BEST BUY

Cartridge Recorder / Reproducer  
Mono R/P                      Stereo R/P

## \$1550      \$1800

(F.O.B. Factory - U.S. \$)

### RELIABLE / RUGGED PROFESSIONAL DESIGN



DL Series

## AUDI-CORD CORPORATION

1845 West Hovey Avenue  
Normal, Illinois 61761 USA  
Phone 309-452-9461  
Fax 309-452-0893

Available Through Your Regular Distributor

READER SERVICE NO. 129

## SAVE \$ ON THE BEST LINES OF

### Audio Processing, Consoles, STL...

FOR NEW & EXPERIENCED

# BROADCAST

# RICHMOND

WE CARE ABOUT YOUR BUSINESS

Tel 765-966-6468 Fax 765-966-5505  
E-mail: [broadcast@infocom.com](mailto:broadcast@infocom.com)  
[www.broadcast-richmond.com](http://www.broadcast-richmond.com)

## The DTMF-16 TouchTone<sup>®</sup> Decoder



### Inexpensive & Convenient Control

- Decodes all 16 DTMF tones.
- Bridging input & high current opto-isolated outputs.
- Jumper selectable beep-tone acknowledges commands.
- Momentary or Interlocked Latching output modes.
- Two tone decoder & anti-falsing filter improve reliability & versatility.
- Silencer option completely removes DTMF tones from its adjustable, balanced output.

The DTMF-16 is perfect for interfacing networks to your automation, controlling remote satellite receivers, repeaters, etc. Connect it to an audio source and its outputs will operate whenever there's a tone. With a list price of only \$199, the compact, light & rugged DTMF-16 can be put almost anywhere to provide the remote controls that you need. For more info, contact us or your favorite broadcast supplier.

### CircuitWerkes

3716 SW 3rd Place  
Gainesville, Florida 32607  
(352) 335-6555 / fax 352-380-0230  
<http://www.circuitwerkes.com>



TouchTone is a registered trademark of AT&T.

READER SERVICE NO. 76

## FM TRANSMITTERS 10W \$950....25W \$1,100

Composite Input, Type N Output, Frequency Agile



# PRICE REDUCTION

CALL (toll free) 888-411-5174  
FOR DETAILS

# PTEK

READER SERVICE NO. 103

## Shively Labs

Signal and Coverage  
Are What It's All About.  
Be Sure With Shively!

- Superior Engineering
- Multi-Station Solutions
- Filters & Combiners
- Translators
- Reliable Pattern Studies
- B-LINE Coax
- NEW Lindenblad Antenna

FM & TV Antennas  
and Related RF Equipment

because ...  
it pays to be heard!

P.O.Box 389, Bridgton, ME 04009 USA  
Tel.: (207) 647-3327 FAX: (207) 647-8273  
1-888-SHIVELY e-mail: [sales@shively.com](mailto:sales@shively.com)  
Web: [www.shively.com](http://www.shively.com)  
- An Employee-Owned Company -

READER SERVICE NO. 50

# Disaster Coverage

► FIRE, continued from page 43  
between the hard facts of how many acres had burned and how many areas were endangered.

Property damage was minimal for the first several days, and there were no deaths — unusual for any disaster story — but what made it compelling was the nature of the beast.

## Ash for miles

You could feel the smoke in your lungs and eyes from miles away, even in an air-conditioned car. Gray and white ash was falling from the sky for miles around. Fires were blazing along heavily traveled roads like I-4 and I-95, creating visibility problems comparable to the thickest fog I've ever seen. With a shift of the wind, fires raging out of control — away from homes — could change directions quickly. When they did, lives, homes and businesses were endangered.

For this reporter, covering it was made easier thanks to several factors. For

Volusia County deputies threatened to arrest reporters who tried to speak with residents on their way out. Got some tape anyway, and while others wondered why I was leaving so quickly, I headed back to file live shots and tape, almost studio quality, thanks to the HotLine.

The sound possibilities were endless. Evacuees, emergency personnel, fire-rescue people, volunteers, just plain folks trying to help out, along with aircraft, fire engines and pumpers, bulldozers, sprinklers, nat sound of the crunchy underbrush (one resident told an AP wire reporter it sounded like he was walking on cornflakes!), burning foliage, and, finally, rain.

One of my pieces profiled a homeowner desperately trying to protect his house with a garden hose and sprinkler, with the flames less than a half mile away. A roser of people evacuating with some of their precious belongings: "Vans filled with boxes of pictures and clothes, a dog sitting in the front seat and a cat sitting on a

individual CBS affiliates, bringing their listeners deeper into the fray. Rob spent a lot of time in Flagler County, which was evacuated for several days.

Milford, a radio veteran who has worked in several large markets, said, "Fifteen years ago, this story would have been crawling with at least five radio reporters from Jacksonville and five more from Orlando dying to feed the nets. Now it's dozens of satellite and microwave TV trucks ... and a handful of radio guys." He said he and ABC's John Belmont were the only radio reporters at a key Flagler county news conference, although he did see representatives from NPR in several other places.

Rob and his vintage Sony TCM-260 cassette deck made it through the week-end without melting. Two CBS News television correspondents also helped the radio side; Byron Pitts and Lee Cowan filed often and faithfully, helping to fill in the gaps and provide information from different locations while Barry, Rob and I were headed elsewhere. Several reporters from our Orlando TV affiliate WKMG-TV filed voicers and rosers for the radio network as well.

ABC News correspondent Steve Taylor spent more than two weeks in Northeast and Central Florida; for five days, he was joined by correspondent/anchor John Belmont, when "all hell broke loose, tens of thousands were evacuated and the story approached biblical proportions," said ABC General Manager of Operations Chris Berry.

Engineer Chris Tobin traveled with Belmont. The pair used an Inmarsat satellite phone, which gave them the ability to transmit ISDN-quality audio from

virtually any location. Belmont and Taylor also used HotLines, and a three-watt cellular "bag phone" that enabled them to get a more powerful signal than others with weaker phones.

"Steve and John divided their assignments, and that enabled us to effectively cover different angles," Berry said. Like CBS's Bagnato and myself, ABC's crew used Sony MiniDisc recorders and shotgun mics for much of their newsgathering. Berry said Taylor spent most of his time covering the "harder" aspects of the story, and did dozens of two-ways with ABC affiliates. "We used Belmont to put a human face on the story, and add a broader overview," he said.

## Local angle

How did local radio do? WNDB(AM) is a Daytona Beach news-talk station, covering all of Volusia and parts of Flagler and Brevard Counties. News Director Rory O'Neal spent many long days camped out at the Volusia Emergency Command Center and traveling around the area, chasing stories not just for his station but for three FM music stations owned by parent corporation Black Crow Broadcasting. During major evacuations, all four stations simulcast emergency information round the clock for several days; Rory and reporter Mike Roberts were there, but air personalities, talk-show hosts and people who usually weren't on the air contributed to the effort. Through all of this, Rory found time to file several pieces for CBS.

Jacksonville news-talker and CBS affiliate WOKV(AM), a 50-kW powerhouse, used its news and talk staff as

See FIRE, page 54 ►



Photo by Tim Shortt, Florida Today

Frank McCrany stands near the remains of his trailer in Florida. Next to it are the ruins of the new home he was moving into when the fires broke out.

example, the Volusia County Emergency Operations Center near Daytona Beach set up a small media workroom where I could plug in my Comrex HotLine and laptop computer and establish a base of operations. I was able to speak with emergency personnel and get updates from them quickly. And because of the central location, I could venture into some of the fire zones to interview smoke-eaters and residents, then return to file good-quality sound, after sending deadline material via cell phone.

That worked for a couple of days, until an Ormond Beach subdivision was evacuated in the middle of morning drive, and that area became the center of attention. I headed to a church-turned-Red Cross-shelter hoping to catch evacuees. No dice, it was too soon; but I lucked out in another way: a sympathetic maintenance manager allowed me to set up shop in his office, much like I had in the emergency center, meaning I could head out, get sound, then bring it back to file on the HotLine instead of using my cell phone. The endangered subdivision was only a few miles away.

On the way, a huge helicopter was making repeated runs to one fire zone, dropping its load of chemicals and water, then refilling and returning. The repeated flybys gave me several chances to record my rosers (radio on-scene reports) with the chopper sounds in the background before heading to Plantation Pines, where

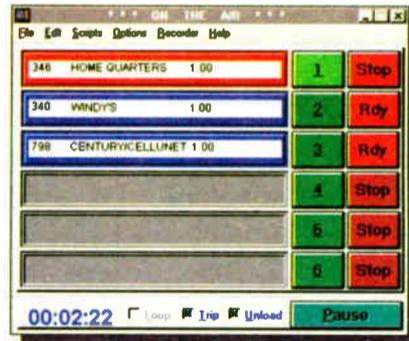
child's lap." An observation outside the church-turned-shelter led to one descriptive lead-in: "The sign says this building is normally a smoke-free facility ... but there's no such thing here this week, you can smell and feel it everywhere, including deep inside this church ..." And during one drive home, I stuck my cell phone out the window to transmit the sound of some much-needed rainfall, which was used in a Bill Whitney opener that asked, "Is it fire or rain?"

## Cheers for the chief

Instead of lighting his own barbecue at home, CBS Radio Washington Correspondent Barry Bagnato spent his July 4th weekend covering the Florida inferno. His highlights included "Hearing the cheers for the Ormond Beach Fire Chief and convoy in one subdivision where fire crept within a few feet of houses, but none were lost. Spending hours with a volunteer sheriff's crew in Brevard County as they delivered supplies to the fire lines. The Brevard Animal Shelter, where a zoo of stranded creatures had developed — and the volunteers who turned out to feed and treat them." All were stories that helped personalize the situation for listeners.

Orlando free-lancer Rob Milford took time off from his "real" job to provide CBS Radio with live and taped reports over the holiday weekend. He also did more than two dozen "two-ways" with

## The Easy Choice !



Time	Cart	Title	Artist	Length	Intro	End	Type
16:33:43		News		03:00			L/T/M
16:33:48	DALIVE			03:11			L/T/M
16:36:48	WMI7	Longes Set		03:11			VTR
16:38:59	M12	Armageddon R	Daf Leppard	04:54	:22	F	MUS
16:41:53	WMI7	Voice Track 1		00:05			VTR
16:41:58	M17	Party Town	Gloria Fy	02:48	:06	C	MUS
16:44:46	WMI7	Today's Best Music		01:00			ZIN
16:44:54	M09	Listen To Heart	Tom Petty	02:48	:11	C	MUS
16:47:42	DALIVE			01:00			COM
16:50:42	WMI7	1 BM/W art		00:06			ZIN
16:50:48	M04	Dance The Night	Van Halen	02:47	:13	F	MUS
16:53:35	WMI7	Voice Track 5		00:05			VTR

# CartWorks MHD

## "Music-on-Hard-Drive"

The much requested CartWorks MHD digital audio system brings Music-on-Hard-Drive within reach of most broadcasters. Not only is it affordable, but it's designed after the original CartWorks friendly user interface. We've eliminated the need to spend a fortune for Music-on-Hard-Drive and computer wizards to operate it.

- ✓Overlapped Audio
- ✓In-Context Voice Tracks
- ✓Any Music Scheduler
- ✓Live or Automation
- ✓Easy to Operate
- ✓Affordable
- ✓Reliable

Prices start at **\$9,995** Complete !

For information call: 1-800-795-7234 Or visit us on the web: <http://www.cartworks.com>

# 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**

**THEY ARE BACK!**

**SINGLE PLAY  
TECHNICS CD PLAYERS**

**#SLPG-480 WITH RACK MOUNT  
ONLY \$179**

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

READER SERVICE NO. 23

## Fits In Even "STINGY" Budgets!



DOZENS  
SOLD!

The hot new "DELUX"™  
quality built  
SPACEWISE system!  
BASIC SYSTEM \$1555!  
FULL SYSTEM \$2840!

**GENERAL FEATURES:** Basic system consists of main counter top and two PC system pedestals ... then you add on what you need from there, such as racks and shelf wings or talk table wings for a full system.

**USER FEATURES:** Two PC system base pedestals ... heavy rack rail systems with easy access standard ... passive ventilation systems throughout ... adjustable shelves ... wiring block backplane ... customizing ... quick installation.

**DURABILITY BUILT IN:** Top counters are two ply 1 1/2" thick with quality name brand laminate with protective 1 1/2" solid wood trim raised on the outside perimeters. Plus ... generous vertical and horizontal solid wood trim and recessed kickboards.

**SPACEwise® Broadcast/Furniture**

CALL 800-775-3660

Visit our web catalog: [www.spacewise.com](http://www.spacewise.com)

"The Broadcasters Furniture Store"

READER SERVICE NO. 49

## 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. 75

## Designed for Broadcasting! MINI-MIX 8A



**\$2499  
List**

12 Stereo Inputs    2 Stereo Outputs  
2 Dedicated Mikes    1 Mono Output

Service & Affordable Quality for Over 28 Years

**AUTOGRAM  
CORPORATION**

1500 Capital Avenue    (972) 424-8585  
Plano Texas 75074-8118    1-800-327-6901  
FAX (972) 423-6334  
[info@autogramcorp.com](mailto:info@autogramcorp.com)

READER SERVICE NO. 20



## 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. 46

## LEASING

START UPS  
TURNAROUNDS  
**\$100,000  
TO  
\$1,500,000**

**CALL TODAY..617-267-2900**

**BOSTON FINANCIAL & EQUITY CORP.  
20 OVERLAND STREET  
BOSTON, MASSACHUSETTS 02215**

READER SERVICE NO. 22

REMEMBER THE **CORTANA**  
FOLDED **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 & static electricity,
- **ELIMINATES ISOCOUPERS** in VHF & 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. 48

## REMOTE JACKPOT

with a **COMREX HOTLINE**

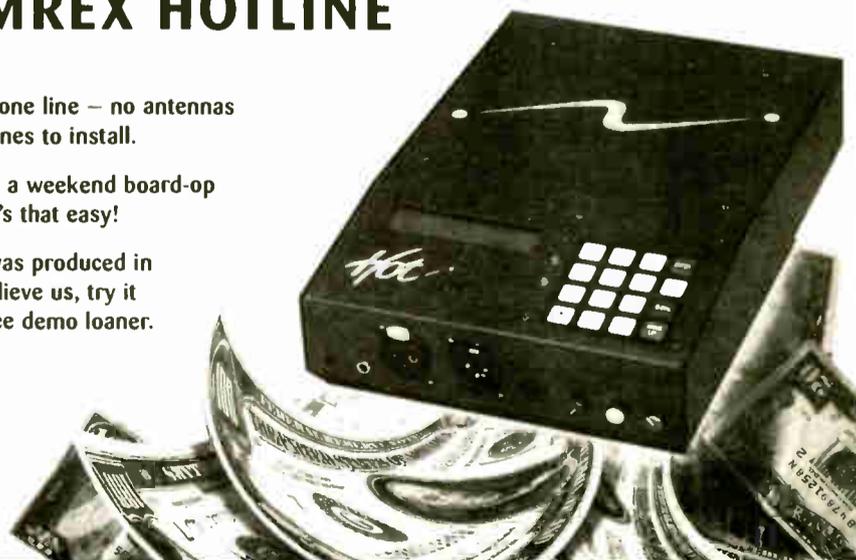
- Uses one plain old telephone line – no antennas to set up and no digital lines to install.
- Save on staff – even a weekend board-op can use a HotLine. It's that easy!
- Sounds amazing, like it was produced in the studio – but don't believe us, try it for yourself! Call for a free demo loaner.

**COMREX**

We make great connections

**800-237-1776**

<http://www.comrex.com>



COMREX Corporation, 65 Nonset Path, Acton, MA 01720 USA Toll-free: 800-237-1776 in North America email: [info@comrex.com](mailto:info@comrex.com) Fax-on-Demand: 978-264-9973

READER SERVICE NO. 102

PROMO POWER

# Promos and the Frequency Figure

Mark Lapidus

Advertisers understand that radio is a frequency medium. The more spots they air, the better the results. Agencies buy cost per point for a reason. They want to reach the most people for the least expense. They practice the frequency concept much more consistently than most broadcasters because immediate return on investment is expected. See ... there's something even our advertisers can teach us!

It seems that more and more often, programming and promotion managers either neglect or deny the frequency principle. Ask your managers how many times a promo must air on your radio station to reach a member of your audience three times in one week in a specific demo — you will likely receive an embarrassed shrug as a response. Even if you receive a definitive answer, does it reflect current book or is it a statistic plucked from last year's numbers? Without accurate ratings information, scheduling promos is a guess. Those that schedule using the proper frequency will see better results. Who knows, you may even be wasting precious inventory by airing too many promos each time!

Once you've learned your "three frequency," you may apply it to the rest of your on-air elements. Let's say you're airing a listener comment about your station: "I love 98X 'cause they play The Pumpkins and Alice In Chains ... I don't

have to sit through Zeppelin to get the music I want to hear." By using your "three frequency" you can decide how many times this should air. If you knew for a fact that playing this 45 times over a week would cause an 18-34 year-old to hear this eight times, is that a good thing?

Let's apply the frequency concept to a few more on-air elements:

**Interviews** — Most interviews in music radio continue to be long-form oriented. Depending on your competitive situation this could be damaging. This is perhaps why few band interviews occur anymore on big stations. PDs are tired of hearing Joe Singer go on and on about nothing in afternoon drive while the competition is playing wall-to-wall music. A different approach is to record the interview and then edit into short pieces. Take these pieces and insert them prior to that artist's songs throughout the day. By airing these with frequency, more listeners will hear them.

By recording interviews, you can eliminate the worst parts. There's no question that at times you may have nothing to air, but it's still worth the effort for core artists. Another advantage to this approach is that it permits you to promote the feature with surety

and frequency! No more promoting an artist interview with someone who doesn't even show up. Now you can



you tracking the frequency to assure that the nonprofits you highlight will get results? You could approach the March of Dimes and guarantee them so many announcements per month if they highlight something you're doing in their next newsletter, mailed to 200,000 households in your community.

**Music** — It may be interesting to see how many times you have to air a song to get a three exposure on your station.

**Schedules on a Sister Station** — Again, I encourage you to air promos as "commercials" on a sister station for your activities (leaving out call letters). Be sure to do a reach and frequency run for your target.

Finally, let's not forget that time spent listening is created not just by getting people to listen longer. There may be more to gain by motivating your listeners to tune in more times per week. Using the proper frequency in promotion will help accomplish this task. No doubt you've seen the bumper sticker that says, "Radio people do it with frequency." Perhaps that statement can be applied to even more broadcasters after this article!

Mark Lapidus is president, Lapidus Media. For marketing and programming consultation, call (703) 383-1805 or e-mail lapidus@erols.com

record Martina McBride on Monday and promote a Martina Monday the following week!

**Morning Show Bits** — How many times can your morning team get away with airing a great bit in one morning? How many times should a bit be aired over a month? This topic deserves at least some discussion. Some have great bits they never air twice. A good slice of humor is a terrible thing to waste. Typically, most will guess incorrectly just how many times something can air before one listener even hears it twice.

**Public Service Announcements** — Are

CYBER HOUSE

## Internet Web Radio: Is It Really Radio?

Alan Haber

If it is indeed true that you are what you eat, then you are — I mean, I am — the Internet.

Things have changed a lot in cyberspace since I last visited with you, but we're not so far removed from Haberspace that we can't meet each month in this space on a similarly common ground.

It's just that the stakes have changed for radio stations like yours, even if you don't see it yet. Consider, for example, that there were around 56 stations Webcasting about two years ago (now, according to the BRS Web Radio site, there are 1,431. That's like a 4 million percent increase, right?

Or a grandiose exaggeration. But a pretty impressive bump-up nonetheless. No, you say? You don't see the benefit? Well, you must be at one of those stations that does too much research about the Internet ... one that spends too much time thinking and talking about it, and not enough time doing something.

Be creative

Some of those stations are right about certain things. Listen, for example, when they say that local advertisers won't benefit from out-of-town listeners. They're right.

But what about your national accounts? Go on, throw caution to the

wind and find a way to split your commercial streams. Get your national and local, accounts to sponsor areas of your Web site. And if none of that works, try something else. Be creative.

Okay, end of sermon. Well, almost: the art of trying something else is why the Internet continues to grow. You know how you always hear that radio sounds the same everywhere you go? That music stations play it way too safe with their playlists? (Come on, 'fess up.) According to the BRS site, there are 117 Internet-only radio stations. I believe each and every one of them knows full well what people are saying, and they're doing something about it, pumping all kinds of targeted formats to listeners — formats that over-the-air stations tackle only in fringe timeslots, if at all.

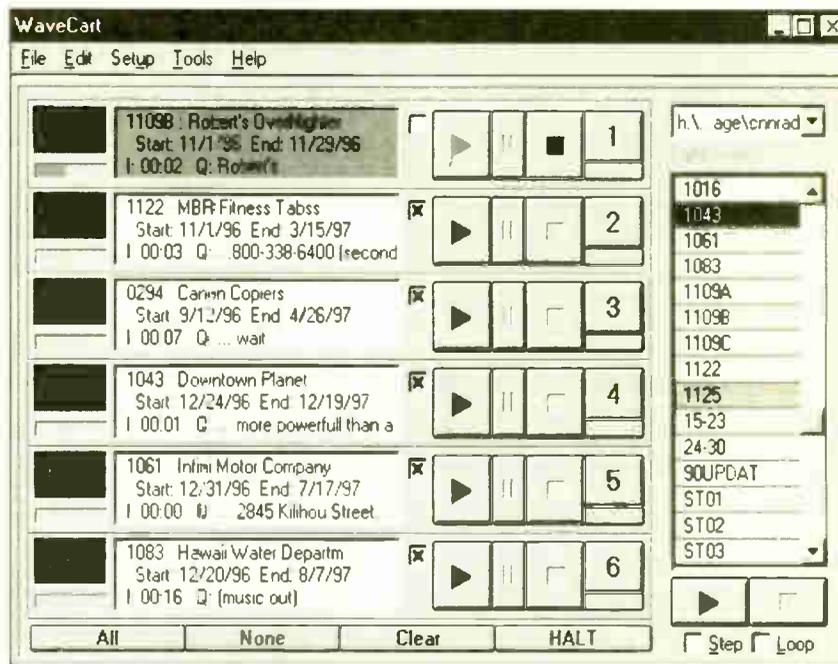
These entrepreneurial Webcasters see their windows of opportunity and run with them. Like Tracy Barnes, president of Internet-only, heavy metal HardRadio, which has been banging heads, so to speak, since Dec. 31, 1995.

In May, HardRadio logged 2 million streaming media connections. Barnes joked that "could be one guy hitting us 2 million times," but then he said, "We know better than that." So do I, and so do you.

Listeners connect to the hard-rocking audio stream directly through their RealAudio and NetShow players, as

See CYBEF, page 54 ▶

## On-Screen Cart Machine



Yes... it's true. An easy-to-use on-screen digital cart machine that runs on a regular PC. WaveCart uses standard or compressed WAV files. Thanks to our exclusive RapidFire® technology, playback is instantaneous. Rotating cart & overlap capability. WaveCart comes with its own digital audio editor. Up to ten on-screen decks. Windows 3.1 or 95.

24 HOUR FREE TECH SUPPORT

888-BSIUSA1

Only \$249

Try Before You Buy.

Download Actual Software!

www.isa.com

BSI Broadcast Software International

# 'Hotlanta' on Top

▶ MARKETWATCH, continued from page 43 there are seven urban stations in the market. However, Val Carolin, general sales manager for CBS-owned WVEE(FM) and WAOK(AM), said the urban stations are targeting specific niches within the African-American community.

About 26 percent of the population in the city is black. For years, said Carolin, there was only one FM station serving that population. Today, he said, the market has matured to include formats like urban oldies and urban R&B.

WVEE(FM) "V-103" is the number one urban station in the city, as rated by Arbitron. BIA reports revenue for the station was \$21 million in 1996, higher than any station in the market. The station is nominated for several Marconi Awards.

Sister station gospel-formatted

## Atlanta Radio Snapshot

Market Rank: 12  
Revenue Rank: 10  
Number of FMs: 18  
Number of AMs: 36



Estimated Revenue 1994: 149,500,000  
Estimated Revenue 1995: 173,600,000  
Estimated Revenue 1996: 192,900,000  
Estimated Revenue 1997: 222,200,000  
Estimated Revenue 1998: 242,200,000

Revenue Growth:  
'91-'96: 12.1%  
'97-'01: 8.2%

Local Revenue: 78%  
National Revenue: 22%

1996 Population: 3,582,200  
Per Capita Income: \$17,118  
Median Income: \$37,976  
Average Household Income: \$46,099

Source: BIA Research

WAOK(AM) is nominated for Legendary Station of the Year. The two stations are marketed together.

Carolin described himself as the new kid on the block and said the success of the stations amazes him. Atlanta, he said, is a boomtown because there are so many advertising categories "going through the roof" and so much money for consumers to spend.

Dickey and his family bought their Atlanta stations back in 1992 — just in time to watch the city grow. Back in 1992, the radio revenue total was about \$111 million, less than half what observers expect this year.

Ring Radio owns urban contemporary station WALR-FM. The station airs "The Tom Joyner Morning Show," which came in second in the 25-54 demographic in the Spring 1998 Arbitron book. The group also owns WALR(AM) and WFOM(AM), Marietta, which simulcasts gospel, and WCNN(AM) — a station involved in an LMA with Cox Radio.

The group launched its gospel format for WALR(AM) about four months ago. "Glory 1340" has since quadrupled in ratings, said Dickey, who admits the station did not have very high ratings before the format change. Gospel music is growing in popularity, said Dickey, especially in the southeast.

Christopher Murray, general sales manager for urban station WHTA(FM), has been in the Atlanta market for the past three years. Prior to that, he worked in several other markets in the southeast. Radio One owns WHTA and the urban oldies station WAMJ(FM) in Atlanta. WAMJ went on the air in December.

WHTA "Hot 97" is in the top 10 in the 12+ demographic and top three in its target demo, which is 18-34. Murray is proud of the numbers, especially because Hot 97 is a Class C3 FM. Its prime competitor is V-103.

Murray called Atlanta a "very solid, above-average market," but added that in

radio markets like New York and L.A., heavy competition may make stations put out a better product.

"If you have three or four people

WKLS(FM) "96 Rock." The group also operates the Georgia News Network from Atlanta and serves Georgia news via satellite to 110 affiliates state-wide.



Photo by Atlanta Convention and Visitors Bureau & Kevin C. Reese

with the same product, you have to be sharper," he said.

Cox Radio owns heritage station WSB(AM) along with WSB-FM and jazz station WJZF(FM). WSB(AM), with its news/talk/sports format, is always at the top of the charts. Explains a rival station executive without bitterness, WSB has "a little something called the Braves."

WSB is also the voice of the Atlanta Hawks, the Braves and the University of Georgia Bulldogs And, as anyone who watches World Series and the winning Braves can attest. Atlanta is a big sports town. The city, of course, played host to the biggest sporting event in the world during the 1996 Olympic Summer Games.

Jacor-owned WGST(AM) was the official licensed station for the Olympics, with a first shot at Olympic news, said Neville Bhada, programming and promotions assistant for WGST. He said the designation was a huge enhancer. Indirectly, the Olympics did affect the market by adding more listeners.

WGST was the first station licensed in Georgia. Bhada said. Cross-town rival WSB managed to get on the air, however, two days before WGST back in 1922.

Today, WGST simulcasts its news/talk on WGST(FM) for greater coverage of Atlanta. In addition to WGST-AM-FM. Jacor owns the light AC station WPCH(FM) and AOR

Bhada said one of the unique aspects of Atlanta radio is that formats do not change frequently. "When there is a format switch, it is big news," he said, adding that WPCH has held its format for 25 years; 96 Rock has been a rock station more than 20 years.

Atlanta radio can draw the crowds. WFOX, for instance, delivers the Ultimate Oldies Concert at the Georgia Dome every May. Past headliners include Tommy James and the Grassroots, Gary Puckett, Little Richard and Johnny Rivers. A festival and concert in one, the event brought more than 42,000 fans out this year, said Reed.

V-103 has what it calls "Unity in the Community Events." Among others, the Unity in the Community Events include Easter egg hunts, the "Jingle Bell Jam" in December and "For Sisters Only" held in September. V-103 started "For Sisters Only" as a woman-oriented show eight years ago. Today, the convention is more family-oriented.

By year's end, three more stations are expected to become a part of the Atlanta market and start competing for local listeners and the big money in town. Stations in nearby Macon and Athens are upgrading their facilities, and Radio One has a Class A construction permit to sign on at 102.5 MHz.

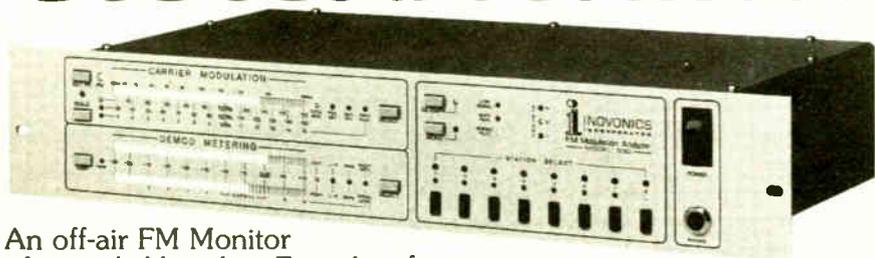
## Atlanta Radio Market Overview

Stations	Owner	1997 Est. Station Revenue in \$mil.	Format	Winter 1998 12+
WSB(AM)	Cox Radio	24.0	Nws/Tk/Spts	11.0
WVEE(FM)	CBS	24.0	Urban	8.7
WSTR(FM)	Jefferson-Pilot	15.2	Top 40	8.3
WKHX-FM	ABC Radio	18.5	Country	6.6
WNNX(FM)	Susquehanna Radio	13.0	Modern Rock	5.9
WSB-FM	Cox Radio	14.0	Soft AC	5.7
WPCH(FM)	Jacor Communications	18.0	Soft AC	5.6
WALR-FM	Midwestern Broadcasting	12.0	Urban AC	5.5
WHTA(FM)	Radio One	7.0	Urban	4.7
WKLS(FM)	Jacor Communications	14.0	AOR	3.8
WFOX(FM)	Chancellor Media	12.5	Oldies	3.6
WZGC(FM)	CBS	11.5	Clsc Rock	3.5
WYAY(FM)	ABC Radio	10.0	Country	2.9
WJZF(FM)	Cox Radio	6.0	Jazz	2.4
WGST-FM	Jacor Communications	3.5	News/Talk	2.2
WAMJ(FM)	Johnson Broadcasting	NA	Urban	2.2
WAOK(AM)	CBS	2.5	Gospel	2.1
WGST(AM)	Jacor Communications	7.5	News/Talk	1.9
WQXI(AM)	Jefferson-Pilot	1.5	Children	0.8
WCNN(AM)	Cox Radio	3.0	News/Talk	0.5
WPLO(AM)	Prieto, Teresa	NA	Spanish	0.3
WALR(AM)	Midwestern Broadcasting	NA	Urban AC	0.1



Stations are ranked in order of Arbitron Winter '98 12+ ratings. Copyright 1998 The Arbitron Company. May not be quoted or reproduced without the prior written permission of Arbitron. Other information provided by BIA Research through its MasterAccess Radio Analyzer Database software.

## A Best-Value FM Mod-Monitor



An off-air FM Monitor of remarkable value. First-class features and outstanding performance have made the Model 530 a favorite the world over. Check these product highlights:

- Accurate, high-resolution bargraph metering of carrier deviation and demodulated program audio; pilot, subcarrier and residuals. Meter also displays signal strength and multipath distortion to aid antenna alignment.
- Pushbutton tuning with 8 station presets for "comparative market evaluations."
- Rear-panel outputs for composite MPX and balanced program audio; plus remote peak flasher, carrier-loss and program-loss alarms.

### MODEL 530 FM MODULATION MONITOR

**Inovonics, Inc.**

1305 Fair Ave., Santa Cruz, CA 95060 USA  
TEL: (408) 458-0552 • FAX: (408) 458-0554

www.inovon.com



# Group Tunes to Old-Time Radio

Bill Moffett

A group of radio programmers has joined with musicians, record company reps and folklorists to produce a conference on the old-time music of the south.

"The purpose is to get expanded radio airplay and thereby bring traditional music into the next century," said John Lilly, organizer of the Old-Time Music & Radio (OTR) Conference, which was held in early June.

Radio show hosts who program old-time music — which instrumentally usually consists of fiddle, banjo and guitar — can easily feel like a splinter group within a splinter group. Although Nashville-style country music is enormously popular on radio, the historical roots from which it grew are long-severed. One of those roots, bluegrass, has a trade show and awards ceremony each year drawing thousands of industry people and fans. But even bluegrass is far better known than its most prominent root: the old-time music that flourished in the early part of this century in the southern Appalachians.

"A national gathering renews a sense of community," Lilly said.

## Carry on

Although not well known, this music is far from dead. Young musicians in all parts of the country carry on the tradition, but few can make a living from it. And none become famous. Old-time music roots can be found in the post-war sound of Hank Williams Sr. and Grand Ol' Opry musicians, in the folk music revival of the 1960s, in today's Americana and lots of places in between.

"There are so many ways that traditional music has been played, the only way left was to play it traditionally," said Mike Seeger, conference attendee. Around 1960, Seeger founded the New Lost City Ramblers, originally an urban-based band that learned its repertoire from old-time sources.

Since many attendees were volunteers from noncommercial stations with little budget for conferences, OTR picked its site and time carefully. Mount Airy, N.C., is a wellspring for old-time music. Renowned fiddler Tommy Jarrell and dozens of other luminaries of the music came from the area. WPAQ(AM) has been broadcasting old-time and bluegrass music (and paying its bills) since 1948. And the conference ended just as the two-day Mount Airy's Old Fiddlers Convention began. Many conference attendees put away their notebooks and tape decks and took out their musical instruments.

Lilly, editor of West Virginia's Goldenseal magazine, has been organizing the conference biennially since 1994. Mount Airy's Surry Arts Council did the hosting work, while the North Carolina Humanities Council and the North Carolina Arts Council provided funding. OTR brought about 80 members of the old-time music community together. Representatives of small record companies met the programmers who play their releases. Performers met festival organizers. And everyone shared an interest in the history of the music that the folklorists provided. In addition, a few hundred local residents came for an evening concert and the keynote address.

The conference keynote speaker was author and musician Hal Cannon of the Western Folklife Center of Elko, Nev., and host of "Voices of the West Radio" for Public Radio International. But even a keynote speaker at the OTR Conference never moves far from music; Cannon concluded his talk by singing some songs for the audience.

A conference session dealt with educating a radio audience about old-time music, which ranges from modern-sounding vocal harmonies to five-decade-old banjo bangin' and fiddle sawin'. The former can hold an audience but doesn't probe the depth of the music; the



When OTR attendees take a break, they do so with instruments in hand.

latter is deep but makes the audience stretch. Leda Hartmann of WUNC(FM) in Chapel Hill said of her cultural reports, "It's a mixture of the two. I'm taking the listener by the hand and asking them to walk with me to explore this."

Andy Ridenour and Larry Groce, both of West Virginia Public Radio's

"Mountain Stage" program, contributed to a session on doing live performance radio. Groce said a show's producers should allow the talent they invite to have a wide berth: "Welcome the guest and get out of the way."

Kelly Epperson's station, WPAQ in Mount Airy, has had a big helping of live radio since it first came on the air in 1948: preaching and music. "Our weekly live 'Merry-Go-Round' program has aired since the mid-1950s," Kelly Epperson said. Rounder Records is putting out a CD of the best of "Merry-Go-Round."

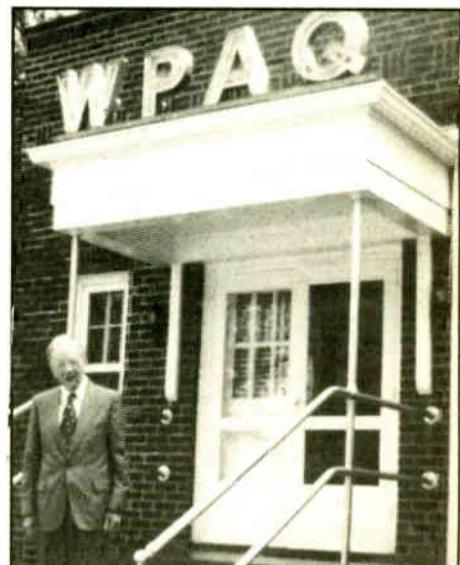
WPAQ was founded by Kelly Epperson's father. Ralph Epperson noticed a lack of bluegrass and old-time music programming on the air even though the music was quite prominent in the area. While giving a station tour, he explained his original promotion plan: "I wanted visual exposure: the station doing live remotes from events around town, deejays emceeding local shows, bands playing at the station. I wanted to make everyone into a press agent for the station."

No one programs an Old-Time Top 40. Some show hosts don't repeat a specific track of music for months except by listener request, so record keeping is important. In a session on playlists, Steve Gardner of WXDU(FM) in Durham suggested that record companies put a track on each CD that provides information about the CD: track titles, times, etc.

Programmers could copy this to their computers and use it to report airplay and comments back to record companies. If the provided CD track is in an industry-standard format, the information could also go to tracking services.

Lynn Davis, husband of the late country singer and banjoist Molly O'Day and

himself a performer, recounted to a session on radio pioneers about his family's first radio. "When anyone got a radio in those days, they would hire a man to come out from town to tune it. He came to the house, cracked his knuckles, and



Ralph Epperson stands in front of his station in Mount Airy, N.C.

began to work. Just like you'd hire someone to play the fiddle for a dance, you hired someone to play the radio."

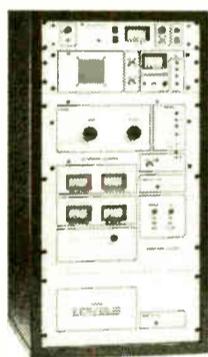
By drawing the community together, OTR left attendees with a sense that their work on behalf of old-time music is valued. Although John Lilly has stepped down from organizing OTR, a new group of volunteers has committed to another conference in June, 2000. For information, write OTR, P.O. Box 292414, Dayton, OH 45429.

Bill Moffett is a free-lance writer based near Philadelphia and host of "Country, Bluegrass and Old-Time Music" on WDVR(FM) in Sergeantsville, N.J. Reach him via RW.

## Superior Broadcast Products

Quality Products at Reasonable Prices

### FM Transmitters



High Performance Solid State Exciter  
Solid State IPA Amplifier  
One Year Limited Warranty  
Factory Service  
On site check out by factory personal

1,000 watt .....	\$5,990.00
2,500 watt .....	\$11,990.00
5,000 watt .....	\$19,990.00
10,000 watt .....	\$22,990.00
15,000 watt .....	\$27,990.00
20,000 watt .....	\$32,990.00

#### 20 Watt Solid State Exciter - \$995.00

#### Solid State FM Transmitters with Digital Exciter

120 watt .....	\$2,500.00	2,000 watt .....	\$12,900.00
300 watt .....	\$2,990.00	3,000 watt .....	\$19,990.00
1,000 watt .....	\$7,990.00	5,000 watt .....	\$29,990.00

#### FM AMPLIFIERS

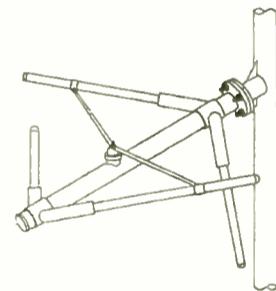
100 watt.....	\$ 995.00
300 watt.....	\$1,790.00
500 watt.....	\$2,990.00

#### FM STL

Both Transmitter  
and Receiver  
\$3,500.00

### FM Antennas

All Power Levels 500 watts  
to 20,000 watts per bay



Single Bay as Low as \$395.00

- \* RF Coaxial Patch Panels
- \* FM Combiners

#### FREQUENCY AGILE

FM TRANSLATOR  
\$2,500.00

17194 Preston Road, Suite 123-297 • Dallas, Texas 75248 • Ph: 972/473-2577 • 800/279-3326  
Fax 972/473-2578 • 800/644-5958 • E-mail: sbp@pulse.net • web-site: www.sbpjj.com

# Listeners Connect to Web Radio

► CYBER, continued from page 51

well as by clicking on the "Tune" button on the HardRadio Web site. About 95 percent of listeners listen with RealAudio, said Barnes. Well, that should come as no surprise, since Real practically owns the player market, but watch NetShow closely in the coming year.

There are no DJs on HardRadio. There are liners and such that inject what Barnes calls "that crazy heavy-metal attitude" into the station. There are no commercials, but don't think this Webcaster is operating anything but a "radio" station. "Give me the definition of a radio station," said Barnes. "That's what we ask people who say, 'Oh, it's an Internet station, it's not real radio.' A definition of a radio station is playing music for entertainment and that's what we do."

But how does DJ-free and spot-free make a "radio" station? Doesn't that go against what we all know as "radio"? "All the jock-free and the commercial-free comes from researching the 'net,'" Barnes said. "People didn't want jocks

and they didn't want commercials." In fact, he said, "They said that they wanted jocks only if they ... knew what they were talking about."

Which is half the game, of course. The other half is advertising. How can we make money from Webcasting, you ask? Well, Barnes said HardRadio is making money off the ads that are sold on the station's Web site. A little profit is being realized.

"We're still in basically build-it-and-they-will-come mode," he said.

About two-and-a-half years into a five-year business plan, Barnes thinks that advertising acceptance of the Internet "is growing by leaps and bounds." And he's convinced that Webcasting is going to work. "We've looked at histories of entertainment," he said. "The same thing was said about cable."

Webcasting, he said, is a new delivery medium, still in its infancy.

"Look back at when radio itself started. You had all the hobbyists listening and building their own radios and it was very slow to take off."

Barnes is in all-things-Net for the long haul. "We do have some opportunities to go into different methods of distribution," he said, "but we'll always have our Internet site because that gives us an international pipeline."

Now, you may not think that an international pipeline is one of the things your station needs, but you might as well have one if you're going to be on the *global* Internet. Really, what choice do you have? Think beyond your local coverage area. When you're Webcasting, the *world* is your oyster.

The growth, admittedly slow but certainly sure, of format-specific Internet-only stations that cater full-time to fans of Indian, Hawaiian, acid jazz, Pink Floyd and Jimmy Buffet music shows that there is interest among programming providers in going after such (at least at present) *narrowcast* targets.

If you are going to do an Internet-only radio station, you might as well look in the direction of artists and musictypes with strong fan bases that aren't being

served adequately elsewhere.

But if you're a traditional, over-the-air broadcaster, you're probably not going to be going the Internet-only route any time soon. No matter — keep your eyes (and ears) on HardRadio and, say, the all-nature sounds, all-the-time Webcast from NetRadio. Think about all those people with their noses against the proverbial grindstone, working hour after blessed hour, stress-free thanks to the calming rhythms of chirping birds and waterfalls. Then think about revenue derived from banner ads and tie-in CD sales.

Then go and do something.

## URL Check

HardRadio  
<http://www.hardradio.com>

BRS Web Radio  
<http://www.web-radio.com>

Nature Sounds  
<http://www.netradio.net/newage>

## STATION/STUDIO SERVICES

**630**  
Sound Effects  
on CD - \$99

60 day money-back  
guarantee! Call Ghostwriters  
at 612-522-6256 or write to:

Ghostwriters

2412 Unity Ave N., Dept RW,  
Minneapolis, MN 55422

For complete track listings, go to  
web site: <http://radio-mall.com>

READER SERVICE 98

1012 hit songs from 1980-1995  
1229 hit songs from 1954-1969  
545 hit songs from the 70's  
819 Kickin' Country Hits  
on CD for Only \$499 each

(per set plus shipping)

For complete track listings

NOW go to web site:

<http://radio-mall.com> or

Email: [mediamall@aol.com](mailto:mediamall@aol.com) or

Phone or FAX Ghostwriters at

1-888-852-4747

For radio broadcast only!

READER SERVICE 19

## Radio Station Data Base

Only \$149!

Addresses, Formats, Phone, FAX  
Market Size, Ratings & More!

Also: Group mailing to  
GMs, PDs, SMs & CEs.

**The Radio Mall**  
1-888-852-4747

TOLL FREE

READER SERVICE 45

## The Mix

10 CD's of Buy-out Music,  
Production & Sound Effects  
Only \$495

60-day money-back guarantee!

Over 1200 tracks! 7 CD's with hundreds of :30  
& :60 music beds. 2 CD's with hundreds of lasers,  
stingers, whooshes, news & feature elements; &  
1 CD with 300 genuine sound & cartoon effects.

For complete info NOW go to web site:

<http://radio-mall.com> or Email: [mediamall@aol.com](mailto:mediamall@aol.com) or  
Phone or FAX Ghostwriters at: 1-888-852-4747

READER SERVICE 98

## Radio

Satellite Delivered  
Radio Programming

Tel: 954-735-4070  
Fax: 954-735-0370

READER SERVICE 71

Are you reading  
someone else's  
copy of Radio World?

If so why not apply for your  
personal subscription?

Simply complete the  
subscription card & return  
it to us! You'll never have  
to risk missing an issue of

**Radio World**

## 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, extension 154.**

# Blazes Burn, Stations Serve in Florida Fires

► FIRE, continued from page 49

well. News director Frank Powers said his staff used phone and field sound to provide updates every half hour, sometimes more often. "In between," he said, "our talk hosts were good conduits of emergency information, often talking with emergency officials and evacuees to provide relevant information."

When massive evacuations were ordered on July 3 in Flagler, he said. "The bones in our skeleton crew started rattling!" The holiday weekend was forgotten; Powers said he and morning co-anchor Shayna Lance made several field trips to cover the blazes, but he also relied on CBS stringer Milford, who called with reports throughout the weekend.

In Orlando, news-talk WDBO(AM), an ABC affiliate, used its own reporters and those of co-owned WFTV-TV for emergency information and news, running live reports through 10 p.m. and simulcasting continuous coverage from WFTV during the overnight hours on July 2 to July 5. Afternoon anchor and Managing Editor Mike Wallace said they were short-handed, with several reporters on vacation.

Wallace said WDBO was plugged in directly to the offices of Governor Lawton Chiles, whose staff requested special assistance from the station because many of the evacuees were headed to the Orlando area. The station provided emergency information and aired several live hits with the governor during the crisis. They also had frequent updates with Flagler County Sheriff Bob McCarthy, who was able to let displaced constituents know that "they had a pretty good chance at their homes being saved." Assistant PD and talk show host Eileen Byrne coordinated the live shots, which often preempted syndicated programs. Sports Director Scott Anez helped anchor the

station's coverage.

Wallace said the biggest reward came from Brevard County, where reporter Erin Kotecki was staked out. "Erin became the eyes and ears for many residents who stayed near our news vehicle to find out the latest information ... we just received a letter signed by a hundred of them thanking her for her help in keeping them informed. It doesn't get any better than that!"

At Orlando-based Florida's Radio Network, News Director Larry Spilman said his crew burned up the phone lines while Tallahassee Bureau Chief Matt McCloud was camped out at the state's emergency operations center up north. Dozens of affiliates air FRN Newscasts, which consist of a two-minute "A" block and a sixty-second "B" block; Spilman said most of the "A" block was filled with fire news during the crisis. Like the bigger nets, FRN also provides correspondent reports and actualities during hourly "conference calls" via satellite. Like the big boys, Spilman said he got help from his affiliates, namely WOKV(AM) Jacksonville and WPGS(AM) Mim, which he said provided excellent eyewitness accounts from the heart of the fire zones.

It's a pleasure to step outside again without breathing in smoke. My car is no longer covered with gray and white ash, and even though my \$10 sneakers are now gray instead of white, they're still wearable. The fires are all but gone, and the journalists who covered this story can feel proud of the job they did to help their Florida listeners ... and to tell the rest of the world about what was happening.

■ ■ ■

Peter King is a reporter for CBS News Radio, based in Orlando. He is a regular contributor to RW. Contact him at [Pkingnews@aol.com](mailto:Pkingnews@aol.com).



## Harrison Pro 950: Analog Rules

Sam Caputa

There are obviously many issues and directions to consider in the design of your studio facility. Tape vs. tapeless is pretty much a non-issue with the digital audio production and delivery systems available today. However, the choice of analog vs. digital console architecture still seems to have many of us wavering on the fence.

This past February, we completed a facility rebuild to relocate two of our three FM stations for Emmis-St. Louis. Our facility was already tapeless using the Scott Studios audio storage system

and the Innovative Quality Software SAW multitrack digital editors.

We decided to remain with analog architecture for our replacement consoles. After comparing features, layout and performance — and of course, price — we installed three Harrison PRO 950 consoles for combined main production, post production and on-air backup use. To date, this has proven to be an excellent choice.

### Left to right

The features and layout of the PRO 950 were the main reasons that we chose it for our applications. The audio flow of

the entire console from left to right is basically mic and line inputs to stereo sub-masters to masters and monitors. Mainframes are available from 16 to 36 positions. This allows up to 28 combined mic and line input modules plus up to four stereo sub-masters, two stereo masters, four Aux sends (mix-minus) and

The four mix-minus auxiliary sends provide further functionality. Aux 1 feeds the phone hybrid system while Aux 2 feeds the house routing switcher to develop a mix-minus IFB for remotes and ISDN usage.

Aux 3 and 4 have been modified to feed separately adjustable post-fader left and right audio to the effects processing loop. This configuration provides maximum flexibility for produc-



Harrison Pro 950 Console in Action in St. Louis

separate monitoring for the control room and up to two studios. Metering is custom-selectable, using either 30-segment LED or VU pointer meters to measure any or all of the sub-master, master and monitor busses.

The configuration we use is a 28-position mainframe with three mic and 12 stereo line inputs, two stereo sub-masters and two stereo masters. We use ten 30-segment LED meters to measure all sub-master, master and control room monitor busses simultaneously.

Stereo master No. 1 (P1) is routed directly to the Scott Studios digital audio system terminal. Stereo master No. 2 (P2) routes to a distribution amp which feeds the DAT, cassette and reel recorders.

Sub-master No. 1 (G1) routes directly to the SAW digital workstation, while sub-master No. 2 feeds the house routing switcher for on-air backup, routing to other studios and exporting via ISDN.

tion allowing the ability to do up to four simultaneous operations. By the way, the modification to the module was a simple one to make.

This gives you a good idea of how flexible and versatile this modular, multi-bus console is.

### More features

The input modules all have switchable insert points for outboard processing, switchable high-pass (100 Hz) and low-pass (10 kHz) filters and switchable three-band adjustable EQ.

A nice feature on all modules is a panel-mounted input gain control and separate four-segment LED meter that measures the pre-EQ audio to each module. This is very handy for eliminating input overload distortion, especially on mics and network or other imported feeds.

Faders are manufactured by P&G and all potentiometers and switches are of

See HARRISON, page 61 ▶

### PRODUCT EVALUATION

## Alesis 'Wedges' Lots of Reverb Into Small Box

Rich Rarey

When our editor told us that we were to review something called "The Wedge," we shuddered. It sounded like something suitable for use as a pillow.

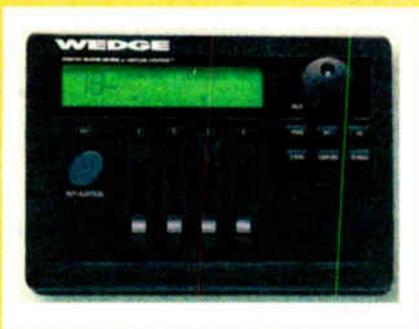
When the Alesis Wedge arrived here at National Public Radio, we quickly changed our opinion. The Wedge turned out to be a powerful, easy-to-use reverb and processing box with plenty of built-in effects and plenty of adjustments, all tucked into a compact package. By the way, the case is rectangular and not pie-shaped. The "wedge" shape appears when looking at the unit on profile.

Its footprint is only 9-3/8 by 6-5/8 by 2 inches, or about the same size of the control heads offered on competitors' products. Priced at \$499, the Wedge is a big package for the money, suitable for outboard use with a workstation, as a primary effects box for small studios or as a nice addition to

one's personal toolkit.

All audio I/O, power and MIDI connectors appear on the rear panel. The substantial line-lump power supply feeds 9 VAC 600mA to the Wedge.

Our complaint with other "typical"



Alesis Wedge Reverb

reverb/processor devices is that they are anti-intuitive and difficult to use and adjust. The Wedge solves this by gently sloping its top panel for a better

See WEDGE, page 61 ▶

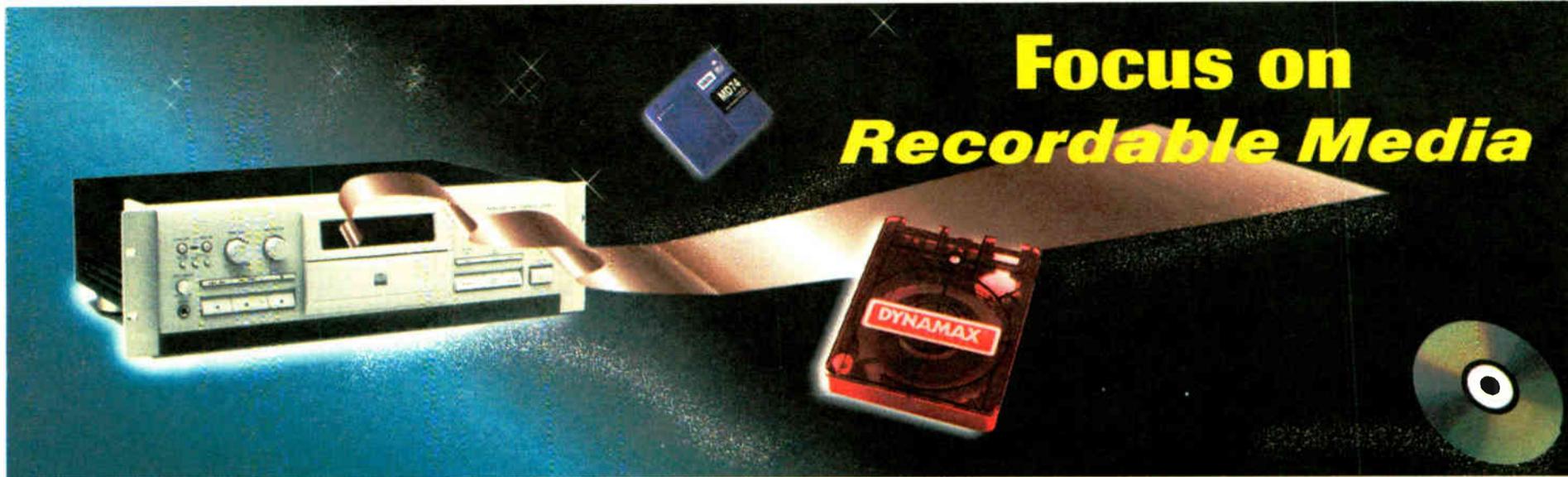


# MACKIE®

## Professional Audio Systems

www.mackie.com

# Focus on Recordable Media



## Tape or Disk, the Beat Goes On

Alan R. Peterson

Just as changes are happening everywhere else in radio, there are new developments in recordable media for radio.

Devices that were once the province of the computer industry are now turning out in force for broadcast, including hard drives, Jaz discs, and PCMCIA cards. The MiniDisc has gained ground on the DAT in some circles and, to a lesser extent, so has CD-R. DVD is visible in the rearview mirror and a whole new analog tape formulation is poised for release by Quantegy.

Speaking of analog, cassettes are still with us and reports on the demise of carts have yet to come true.

### Heart of the cart

To the delight of many traditional broadcasters, analog cartridges refuse to give up. Two companies are still turning out cart machines — Audi-Cord and Fidelipac — and brand new cartridges can still be bought.

Nobody sounds more surprised by this than David Strode of Fidelipac when he told *RW*, “Yeah, we still sell tape and I don’t know why!” More confident is Nick Krassowski, president of Audiopak, who last year told *RW* his company would produce “the last cart ever made.” That last cart has yet to be built.

“Digital is making inroads, no question,” said Krassowski, “but we will make the last cart. The ITC and the AA4 carts are as good as they are going to get, and they are still available.”

Krassowski realizes carts are a declining market, “but for folks who want to hang onto analog, we will not abandon them.”

Strode said Fidelipac is doing about 10 percent of the tape business they had done five years ago. The tape itself is not an issue, but rather the plastic costs.

“For our injection molders to do an effective set-up and run, they have to run off 10,000 cartridges, or a three-month supply,” Strode said. “I am still amazed that people still buy tape. As long as we have tape we will still load carts, but very soon we will stop selling bulk tape to domestic dealers.” A typical Fidelipac 70-second cart now costs between \$4.50 and five dollars.

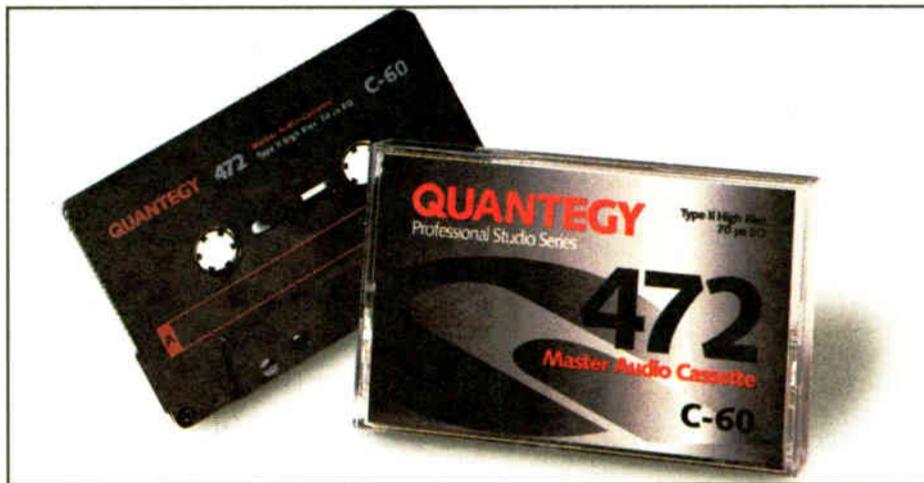
Fidelipac still sees a number of CTR-10 cart recorders going out the door, especially after an NAB show. Strode said, “People right on the edge of buying automation systems will buy one more recorder and a couple of players, just to keep them going for another year.”

The cart machine analogy has been ported over to the new Fidelipac DCR-

10 recorder/player, a random-access player that uses removable Iomega Zip discs. Air talent find it familiar to use

than half of what a cart machine’s DC motor would cost.”

Zip drive implementation is also now



For job searches and commercial demos, cassettes are still preferred.

while offering a degree of safety and security.

“Familiarity is nice,” said Strode, “but there is the security that you can take the disk out and carry it with you. If that hard drive crashes, you lose it. And there isn’t a body alive that cannot walk into a computer supply store and buy a Zip for less

available on workstations made by Roland and on the 360 Systems Instant Replay. Iomega Jaz drives have been available on the E-mu Darwin workstation for two years. The newest product in the Jaz line is a 2 GB removable disc, capable of storing more than three hours of linear 44.1 kHz, 16-bit audio.

## Radio Users Speak up About DAT

Ralph Sanchez

*As noted in the article “Tape or Disk: The Beat Goes On,” DAT continues to be a popular format for archiving radio audio. Here, author Ralph Sanchez talks to stations about their use of DAT and where the format is going.*

In the realm of audio media for radio, what do we have? Most stations are currently a hybrid of tape and tapeless technologies, both digital and analog, including recordable CD, reel, analog cartridges and analog cassette tape.

Hard to believe, but it has been 12 years since I started using DAT at a small station in Lincoln, Neb. The first time I heard about it, I could only imagine two hours of digital audio on a single tape, for the price of a good-quality analog pancake.

I spoke with Don Mueller, for 13 years the operations manager for WFMT(FM), Chicago, a classical/fine arts station. I also spoke with Claudia Russell, operations manager for news/talk/jazz and NPR affiliate WVPE(FM), Elkhart, Ind., and Jeff Smith, traffic manager for the nine-sta-

tion Nebraska Public Radio Network.

In my brief chat with these radio professionals, I gleaned some interesting perspectives.



DAT is still the leader when archiving audio.

Mueller uses DATs of different lengths — mostly 90s and 124s — and purchases 7,000 Quantegy DATs per year. DAT was implemented at WFMT

Broadcasters weighing the pros and cons between DAT and MD see the scale tip seemingly in favor of MiniDisc for several reasons.

MD machines can be obtained inexpensively: one DAT deck can cost the same as three to four MD devices. Jocks can randomly access cuts on MD, perform rudimentary editing and add titles to cuts rather than rely on track numbers. Pickup heads on MD machines may go soft, but DAT machines must similarly track head-hours and are subject to errors and dropouts caused by tape flaking and creasing. Slight misalignment can also prevent a tape made in one DAT recorder to properly play in another.

In spite of these observations, DAT continues to be preferred by radio.

Sallie Schneider Sauber is production director for WATH(AM)/WXTQ(FM), Athens, Ohio, and a contributor to *RW*. Her station, like many others, archives all production to DAT, but still finds a need to use the old standbys.

“We used to save everything to those big reels,” she said, “Now, everything is on DAT.” Her problem with DAT is the 99-cut limitation. “The counter will go to 99, and on a mix of 30- or 60-second spots, there is a lot of tape left over.”

Sauber owns her own CD recorder, even though she does not use on at WATH or WXTQ. But she does notice

See MEDIA, page 59 ▶

back in the early '90s for archiving as well as program production and trafficking. However, tracking issues with the DAT machinery of the day led him and

his operations team to believe that these would be recurring issues over the long haul, making it unsuitable for archiving.

Tracking is a critical specification with this format. Many user complaints about compatibility issues between manufacturers of DAT hardware provide some evidence of this fact. As for other digital formats at WFMT, MD is used to produce commercials and CD-R is now the preferred choice for archiving.

DATs do not seem to last long at WFMT, and tapes are retired after about eight passes. Mueller said, “When they work, they work fine. But when they don’t, there is almost nothing you can do to save what is on them.”

See DAT, page 60 ▶

For what you'd pay for a day  
in the recording studio...



You can own the studio!



Imagine having the mixing power of the acclaimed Yamaha 02R and 16 tracks of tape-less recording inside your computer. Under the control of popular recording software, the DS2416 digital mixing card—the star component of Yamaha's DSP Factory—gives you 24 mixing channels, more than 100 bands of parametric eq, 26 dynamics processors and two effect processors operating simultaneously with no strain on your computer's CPU.\* Plus 16 tracks of tape-less recording. All for less than you'd pay for a day in the studio. The Yamaha DSP Factory—a virtual studio inside your computer.



These companies have announced support for DSP Factory in their Windows® products. Macintosh software coming soon.  
Visit our Web site @ [www.yamaha.co.jp/product/proaudio](http://www.yamaha.co.jp/product/proaudio) or call us at 800-937-7171 ext. 683 • ©1998 Yamaha Corporation • Yamaha, DSP and DS2416 are registered trademarks of Yamaha Corporation. \*Not all software supports all of DS2416's features.

# Ripping: Technical, Legal Aspects

Carl Lindemann

You may have heard about CD "rippers" on the Internet or in some shareware audio programs you have tried. These programs extract digital content from a CD, bypass the PC soundcard and load it directly onto a hard drive as a digital file. In radio production, it speeds the process of loading music beds into computers, but the potential for piracy and copyright infringement is great.

Here, Carl Lindemann explains the process and addresses some of the legal concerns of ripping CDs.

In the analog era, high-quality bootlegs were hard to come by. Creating illicit LPs required manufacturing capabilities beyond the reach of most would-be audio pirates.

Then, improvements in audiocassettes created a whole industry around making copies of authorized recordings. Still, these dubs were not a major concern to copyright holders because sound quality quickly degraded as copies were made of copies. Second- and third-generation dubs were inferior, and were not seen as a serious threat to the commercial product.

## Wake-up call

This all changed as the digital age dawned. The overnight success of the CD format might have been followed by the widespread acceptance of digital audio

tape. Despite its sonic superiority, DAT failed as a consumer electronics format. The commotion over the ability of DAT to make exact bit-for-bit duplicates of CDs caused an outcry in the music industry. The demands raised by the industry that copy protection be installed in DAT recorders tainted consumer enthusiasm.

And now we have the CD-R.

Not long ago, the idea of making CDs at home seemed utterly absurd. But CD-R is fast entering the mass market as entry-level units drop to the \$300 level.

Unlike DAT units, CD-Rs — and their rewriteable cousins, CD-RWs — are not typically had as a standalone unit, but as a component inside a standard PC. Driven by the proper software, these

mastering software focuses on taking soundfiles from the hard drive and burning them to disc. Audio files produced on a DAW can be placed on CD. Sound extraction from CD to hard drive is not the major concern; creating CD versions of in-house production is. In this respect, copyright issues are not pertinent. However, this is not so with "Rippers."

"Ripper" is cyber-slang for audio extraction software. This transfers CD audio directly to a hard drive digitally, rather than first converting it to audio through your soundcard as recording software would.

CD rippers are in great abundance on the Internet (*An Alta Vista search for*

If you bring in sound from different CDs, the newer "Track 1" will overwrite the old one, because the operating system sees both as having the same name. WinDAC32 allows you to rename files on the fly so they retain their identity.



## Mainstream CD copying software manufacturers have gone out of their way to allay fears in the music industry.

WinDAC32 is shareware. The whole program compressed takes up less than 300 kB and is available off the Internet. The try-before-you-buy version is fine, but has a few shortcomings that make it worth spending the bucks for the "complete" registered version. A four-PC "Studio License" is also offered.

## The legal stuff

Now as to the non-studio uses for this ripper ...

Yes, it is a powerful tool for audio piracy when combined with the proper mastering software. More mainstream manufacturers of CD extraction/copying software have gone out of their way to allay fears in the music industry.

Adaptec's popular CD Creator package is loaded with warning messages. End-users are continually reminded about the importance of respecting and not duplicating copyrighted material. WinDAC32 has a small disclaimer on its Web site that disavows any responsibility for improper use of the product or of CD-R technology.

It is curious to note that the author of WinDAC32, Christoph Schmelnik, devotes as much space to warn off those who would pirate his intellectual property.

CD-R's potential for copyright infringement has raised major concerns with industry groups like the Recording Industry Association of America. It may be that rippers like WinDAC32 will trigger a backlash against the emerging CD-R technology. Similar concerns have plagued DVD. The film industry wants to be sure its material is not duplicated easily. This, along with conflicts over the DVD standard, has hampered the new format's popularity.

Thus far, CD-Rs have avoided such difficulties and are poised to become a new recording standard which may have the potential of eclipsing other digital technologies such as the MD. The enormous installed base of standard audio CD players guarantees a ready market for content recorded to CD-R, both legitimate and illicit.

It is up to you to decide how to proceed.

■■■

The WinDAC32 Web site is at [mp3music.simplenet.com/windac.html](http://mp3music.simplenet.com/windac.html)

Carl Lindemann is the producer of *CyberScene* and a frequent contributor to *Studio Sessions*.

recorders allow much the same capabilities that caused the uproar over DAT.

There are two sides to CD copying: extracting and "burning." Most CD-R

"CD Rippers" came back with many programs such as *Audiograbber*, *CD Worr* and *CDDA 32*. — Ed.)

Among the number of ripper programs available is WinDAC32, a popular shareware product that rips sound from CDs. The DAC stands for Digital Audio Copy. For this purpose, it is fast, simple and effective. You just insert a disc into a CD-ROM drive and pick which tracks you want to extract. The software moves the tracks to your hard drive as standard WAV files.

## What a rip!

As a radio production tool, WinDAC32 is a boon. Ripping music beds from production CDs is a vast improvement over the tedious procedure of loading sound in real time by playing tracks into the system from a standard audio CD player. With the proper CD-ROM reader, WinDAC32 can do much better.

But not all CD-ROMs are created equal, and a drive's data read speeds (up to 32X) do not reflect audio extraction capabilities. Using a Toshiba XM6102b 24X reader with an ATAPI interface, I was barely able to get 1X for audio extraction; ideally, no increase in speed over merely playing in from an audio CD.

The best results were had with a Plextor UltraPlex 32X SCSI drive. Here, audio virtually jumped from disc to hard drive at better than 8X. A one-minute music bed transferred in less than 10 seconds.

WinDAC32 correctly identified these drives as well as the Yamaha 2460 CD-RW recorder linked to the system.

## How it is done

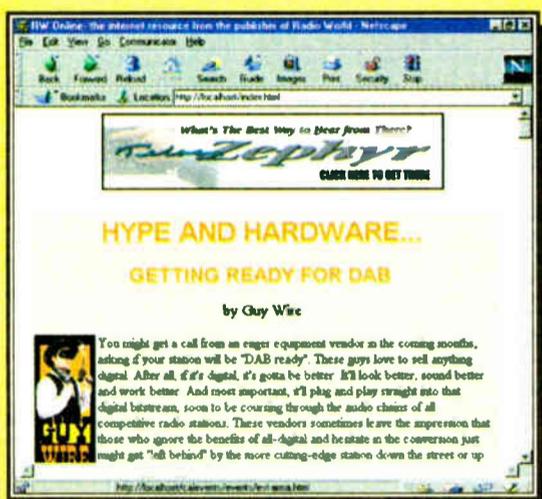
Using WinDAC32 is simplicity itself: highlight files and send them over.

One problem with taking tracks off CDs is that they are usually marked simply as "Track 1," "Track 2," etc. After the files are brought over, you generally rename them to remember what is what.

[www.rwonline.com](http://www.rwonline.com)

**RW Online**

The Internet Source for the Radio Industry



## GUY WIRE

Our masked engineer writes this anonymous no-holds-barred column exclusively for RWOnline.

sponsored by



found only at

[www.rwonline.com](http://www.rwonline.com)

The Official Website of Radio World Newspaper

# Which Medium Is Right for Radio?

► MEDIA, continued from page 56

more material coming into her station on CD-R. "We get new jingles and liners every month and that company offers its product on CD," she said.

Even though Sauber's station uses a computer-based audio storage and playback system, she still finds her stock of analog carts to be a lifesaver. "Our machine went down last week and we had to drag out all the old carts," she said. "We don't dub to cart normally,

mats which will replace DAT eventually. But for location recording, DAT is still a robust format. With a laser-based recording format there is the issue of a laser jumping during location recording. These problems will be overcome and I'm sure laser recording technologies will be the way forward."

Steve Smith of Quantegy observed about DVD, "In five years, DVD-RW would be the playback source for radio automation systems. You are putting

history within two or three years," he said. "A 10.5-inch reel of tape around 15 or 20 dollars would be replaced by a two-hour, digital stereo format for eight dollars. It hasn't happened. A lot of people like doing what they've done and are still using analog tape."

Tape still keeps the Quantegy plant running, even though the product may not necessarily be analog. The company does good business creating ADAT- and DA-88-compatible tapes for modular digital multitrack machines. However, a new Quantegy analog tape — GP9 — is poised for launch at the AES show.

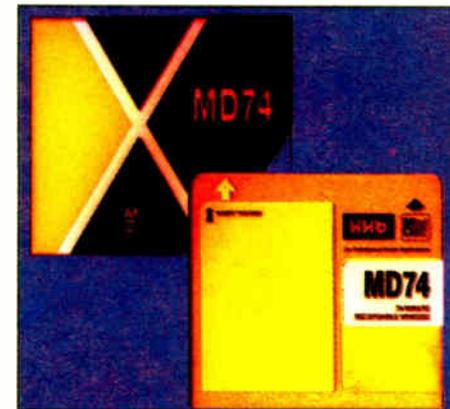
"GP9 stands for Grand Master Platinum, a plus-nine tape," said Smith. The increased pigment and binder keep the oxide on the backing longer than any other type of tape. "After 2,000 passes, we check to see if any debris has come off the tape. We ran GP9 for 13,000 passes and there was zero debris. It holds together incredibly well," he said.

GP9 will only be available in half-inch to 2-inch widths, effectively not suitable for quarter-inch radio use. "For that, Quantegy 499 or 456 is still good for the application," said Smith.

### PC connection

Computer hardware is inexpensive and readily available. The proper hardware turns a garden variety PC into a powerful editor and high-quality recorder.

Besides the popularity of Iomega Jaz and Zip drives, PCMCIA memory cards are gaining interest as a storage medium for digital editors. Two such products at present include the Sonifex Courier and the Nagra Ares recorder, with a similar device on the way from long-time radio favorite Marantz.



Radio is embracing MD even more.

To a lesser extent, computer hard drives can be made to be removable, allowing them to be swapped in and out of other computers. While this is not normally done for radio, it remains an interesting option, especially with the plummeting prices of hard drives — as little as \$300 for nearly 10 GB of storage.

As you can see, the variety of recordable media for radio remains quite diverse. And even though digital audio is driving the radio station of today, the cry of, "I need a 70-second cart" may yet persist for a few more years.



The Nagra ARES digital recorder uses PCMCIA RAM media.

but last week I had to."

Michael Parks, who produces for the five Dame Media stations in central Pennsylvania, uses a mix of media. "We're doing DAT, MD and recently found the way to download our Enco system to a Jaz drive," he said. "We save our production work primarily to DAT — there are three stations using the Enco system and each has a DAT machine. The two stations still on cart have MD recorders."

Strode pointed out a drawback that the lesser-priced MD players must endure. "The consumer format will not stand up in a harsh environment," he said. "The drives, the heads, everything gets knocked out of alignment."

### Optical media

David Beesley, president of HHB, said, "CD-R media is probably at one-third of our DAT sales right now. There is a lot of low-cost CD-R media out there that we don't get the benefit of, as we have a more premium product."

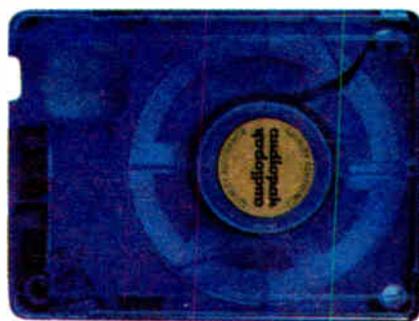
Beesley said HHB is also selling MiniDisc media, both in Data (multitrack) form and for audio players. "It's a product that is substantially rising in volume, but more for television IDs and music insertion than in radio," he said. "It will be big for consumers, and on the professional side it is an easy-to-use, instantly accessible workhorse format for the studio."

One format to watch for is DVD, but more has to be done with it first. Beesley said, "We are looking for for-

five or six hours of audio on a single disc; and with 10 or 15 discs, you have a whole radio station."

### Tape rolls on

Smith noted his company is shipping more quarter-inch analog tape than it ever has.



Still With Us: Classic Audiopak Cart

"But we do estimate, in the last four years, there has been a decline of about 35 percent in quarter-inch reel business, looking at the combination of 3M and BASF, which still have a lot of radio tape in Europe," he said. "Not having 3M in the marketplace anymore has made our business much larger than it would have been, had they still been there." Quantegy is the successor to Ampex, which now also owns the technology and formulations to 3M "Scotch" brand recording tape.

Still, Smith is not complaining. "We projected, once DAT tape came on the scene, that quarter-inch tape would be

# AM

## Transmitters

### Digital Solid State

Every day we live up to promises we made 10 years ago...

"It's basically done everything you said it would. The transmitter is paying for itself all of the time...we're mighty thrilled!"

"Factory support for any product is very important to me and I could not have asked for better support. They are exceptional!"

"That little box outperforms my most optimistic expectations!"

"The move to the Omnitronix solid state transmitter has resulted in a significant decrease in the cost of power, has produced much higher quality broadcast signal, and this has taken away many of our worries of staying on the air."

"IT WORKS GREAT!...We are the loudest and cleanest sounding AM radio station in Atlantic City. I guess you can add us to your long list of satisfied customers."

"There is no question, you folks go the extra mile to see that your customers are satisfied."



...We invite you to join our Fan Club.



## OMNITRONIX INC

Fresh Ideas, Smart Design.

e-mail inquiries: [info@omnitronix-inc.com](mailto:info@omnitronix-inc.com)

113 DICKERSON RD, N WALES, PA 19454 • (800)446-8648 • (215)699-2400 • FAX(215)699-2323

# Radio Continues to Embrace DAT

► DAT, continued from page 59

Smith at the Nebraska Public Radio Network is somewhat less conservative than Mueller. He has spent two or three years following select DAT tapes around the studio, placing a slash mark on the case after each pass and periodically checking error rates using the error

Ideally, there is better technology in today's DAT product than there was in 1986. Wilson said an appropriate environment would be a stable one in the 65 to 70 degree range with a relative humidity no higher than 50 percent, the most important factor being stability.

Steve Smith of Quantegy also believes

very strong, and certainly the Apogee market is increasing." He believes that, because audio-specific CD-R hardware is still relatively expensive, there is not a strong incentive to switch over. He also noted DAT follows a more traditional linear analogy that production personnel feel accustomed to. Nevertheless, he admits that CD-R sales are on the rise.

Smith commented that over half of Quantegy's revenue still comes from analog tape sales, even taking into account the fact that Quantegy took over the 3M tape products. DAT growth has slowed, but there is growth nevertheless. Smith said Quantegy DAT sales are growing at about 10 percent per year, whereas four years ago that figure was 25 percent.

## Field research

Terri Babcock, national sales specialist for tape distributor Video Service of America, estimates about two-thirds of DAT sales are to resellers and non-radio facilities. About one-third of sales are directly to radio stations. Babcock believes DAT sales have been steady for the last year.

A telephone sampling of radio stations in southwest Michigan and northern Indiana revealed this: Of 10 commercial

stations surveyed, five use DAT in their daily production routine. Of those five stations using DAT, three use it only to archive.

Four out of the five stations not using DAT have no plans to implement it in the future. One of the five non-users wants to implement DAT in order to be compatible with local studios and talent. Three of the 10 stations use MD, three use reel — one indicated that reel is there to stay — and eight of the stations surveyed use computer-based automation and/or live assist systems.

## The Future

Quantegy's Smith expects DAT, along with other tape formats, to be viable products for the radio and audio production industries for at least the next five to 10 years.

Whether or not DAT is right for you depends on your needs. Its growth into the production market does seem to be slowing, but the evidence indicates that it will continue to be a viable format in radio operations and it looks as if it is going to be around for awhile.

■ ■ ■

What is *your* station's experience with the DAT format? Tell us about it. Send e-mail to [radioworld@imaspub.com](mailto:radioworld@imaspub.com)

For information about servicing your station DAT machines, read the recent RW series by Jeff Johnson on the Web at [www.rwonline.com](http://www.rwonline.com)

## The shelf life of DAT could be as long as 30 years, contingent on high-quality DAT tapes and ideal environmental conditions.

counter on his Panasonic deck. Smith says, "I have found I get up to 60 reliable playbacks with Sony tapes."

## Retirement

Given the number of tapes in circulation at NPRN, Smith can use a tape for about 1.5 years before retiring it. The in-house recording schedule amounts to about 30 hours per week.

When a traffic tape is retired, it is placed in a box where it gets one final use archiving copies of "Nebraska Nightly," a live, half-hour daily news program.

NPRN also records live classical music performances on new DAT tapes, which are archived after production. The network's performance archive goes back to 1986. Several years ago, I randomly went through some early concert recordings residing there and found that recordings from earlier years had high error rates, even though the recording was made to virgin tape. Tapes recorded in the early '90s and beyond showed a noticeable trend toward less error rates.

To lend some perspective to that particular archive and its aging processes, DAT tapes from the middle to late '80s exhibited high enough error rates to be audible on some tapes.

## Indiana speaks up

WVPE Operations Manager Russell says his station uses DAT for archiving live concert performances and for ENG. An Enco system is the main in-house recording and playback audio system, with almost all electronically distributed programming being taken directly into it.

For removable media, WVPE has stayed with DAT because the staff feels they get the best dollar-per-hour value with it. Russell said they have used Sony DAT tapes, but use mostly Maxell tapes for cost considerations.

Because the station has decided to stick with DAT, Russell would be interested in finding out what the shelf life of a DAT is, and would like to find impartial test results about various brands.

Some believe DAT can last a relatively long time. Richard Wilson of Apogee believes that the shelf life of DAT could be as long as 30 years, contingent on having high-quality DAT tapes and ideal environmental conditions to begin with. Part of his optimism is based on the fact that tape and shell technology keep improving.

DAT to be relatively robust: that the thinner the tape, the more stable it is. The low mass, combined with close bonding at the molecular level, means the medium ultimately does not allow contaminants to be absorbed very easily.

I can go along with the concept of an ever-improving product, but at some point, tape will always be what it is: tape.

Wilson said, "DAT in general is still

# DVD: The Future Gets Closer

To most radio broadcasters, DVD technology remains the stuff of dreams — more the realm of multimedia producers and video rental stores than radio operations. After all, what would radio possibly do with a disc more suited for video playback?

## Potential

Perhaps the sonic possibilities offered by DVD should not be ignored by the radio industry. Not when it is possible to fit a six-speaker experience onto a single disc, encoded in nearly any of the more popular compression formats (PCM, MPEG-2 and Dolby Digital). Extremely high-definition 96 kHz, 24-bit audio is already a DVD

## The sonic possibilities offered by DVD should not be ignored by the radio industry.

standard, as is its 4.7 GB single-layer storage capacity.

At present, the technology needed to author a DVD project is quite expensive — anywhere from \$12,500 to \$40,000 — but is improving as the medium begins to gain acceptance and popularity. Among the companies moving well into the DVD authoring field are Sonic Solutions and Microboards Technology.

In April, Sonic Solutions introduced



Mixing Audio for DVD on Sonic Solutions' Desktop DVD

Sonic DesktopDVD for Windows NT and Macintosh platforms. This production system consists of a single workstation outfitted with Sonic Solutions' DVD Producer authoring software, a drag-and-drop environment for assembling video, audio and graphic elements. DesktopDVD is already in use at General Motors, producing corporate messages with extensive media content.

Again, the drawback to DVD authoring is the cost involved. At \$39,999, DesktopDVD costs as much as a transmitter, if not more.

## Two from Minnesota

Microboards Technology of Minnesota is poised to release two inexpensive authoring software toolkits: DVD Author QUICK will be available in the third quarter, in versions 1.0 and 1.5 for Windows 95 and NT respectively.

Both versions include an authoring editor for assigning audio and video

files via a browse-and-select action; a premastering function to verify and test the DVD file; and a disc output feature to write directly to the medium.

System requirements for DVD Author QUICK are fairly conservative: a 200 MHz PC running Windows 95 or NT, 64 MB RAM and SVGA video card forms the minimum configuration. Specific to the needs of DVD authoring, the computer must also have an 18 GB hard drive, MPEG decoder and a DVD recording device.

DVD Author QUICK version 1.0 for Windows 95 is priced at \$12,500 and version 1.5 for Windows NT is \$15,000.

Sonic Solutions can be reached at (415) 893-8000 or on the World Wide Web at [www.sonic.com](http://www.sonic.com)

Microboards Technology can be reached at (612) 470-1848 or on the World Wide Web at [www.microboards.com](http://www.microboards.com)

— Alan R. Peterson

## Harrison Board Big In St. Louis

► HARRISON, continued from page 55 excellent quality with a good tactile feel. All modules have full switchable output assignment with switchable insert to a stereo pre-fader listen (cue) bus.

Module "on" switches with LED indicators provide either direct- or fader-start machine control and full muting and tally logic. Stereo modules have balance controls and L/R/Mono/Reverse input switching. Mono modules have panpots, — 20 dB pad, phase reverse and line level input.

Output modules have master faders — again made by P&G — for masters, sub-masters and mix minus Aux busses. There are also switchable fixed rate 4:1 compressors on each output bus, which are very handy at times.

### Put it all together

Monitor modules have full source selection of all busses, separate headphone section, switchable mono and mute and fully assignable talkback/slate to all busses and other studios. There is also a tone oscillator assignable from the module or available at a rear-panel XLR connector.

All main audio I/O connections are made on XLR jacks on the fixed rear panel. Patch insert audio and logic connections are via DB-25 and DB-15 connectors, also on the rear panel. A separate rack-mount power supply provides the operational voltages of +15, -15, +5 and +48 volts.

The console is designed for lay-in mounting in a countertop cutout. It is completely modular and custom-configurable. All modules are removable for service, and although Harrison may not recommend it, we have had no problem hot-plugging the modules.

### Final mix

The Harrison Pro 950 consoles are well-liked by all of the staff here. They are complete and full-featured enough to satisfy our most experienced and creative production people, yet clear and straight forward enough to not intimidate our basic air staff and interns.

My past experience with Harrison consoles is that they are durable, flexible and excellent sounding with plenty of headroom. The PRO 950 is no exception and has proven to be an excellent choice for our stations.

■■■

For information, contact Charley White at Harrison by GLW in Tennessee; telephone (615) 370-9001 or circle Reader Service 187.

Sam Caputa is the chief engineer for WKKX(FM) and WALC(FM) in St. Louis.

# Alesis Reverb Takes New Slant

► WEDGE, continued from page 55 view of its controls and generous 5-by-1-inch backlit LCD display.

Four 3-inch slider controls, each with an associated button, are grouped below the display. It is this grouping of "soft" controls that vary everything from effect parameters to input/output levels.

Six buttons, labeled Prog, Util, I/O, Store, Compare and Bypass, take the user through the fundamental systems of the device. When a button is pressed, the display changes to show that parameter's settings clearly.

Labels appear above each of the four sliders that describe what parameter is controlled by that particular slider. Additionally, up to six virtual pages of parameters — four parameters per page — are available for adjustment by repeatedly pressing the Edit button.

The display shows the number and name of the current effect; whether one is in the Preset or User bank of effects; the name of the basic configuration from whence the effect is created; and virtual left and right level meters.

For fundamental system control, the Prog button toggles between the 128 ROM-stored effects and the 128 non-volatile RAM stored User settings. The Util button allows the user to access the dry Defeat mode, where only the processed sound passes through the Wedge. By then pressing the nearby Edit button, the user can cycle through virtual pages to inspect and change MIDI configurations.

The I/O displays the input and output level settings. Each channel's in and out level is adjustable by moving the indicated slider. The Store button saves the current configuration to one of the 128 User memory locations and the user can name the configuration with up to 12 letters, numbers, spaces and symbols.

To make edit "undo" decisions, the Wedge provides a Compare button that audibly compares the original saved setting (either User or Preset) with the changes the user has made.

Finally, a Bypass button mutes the processed audio output. If the dry Defeat mode is on and no unprocessed audio is passing through the Wedge, no audio at all will be passed.

To the right of the display, the click-detented "Value" jog wheel provides rapid changes of parameters. After the Prog button is pressed, turning the wheel will cycle through the 256 effects. The Wedge design is clever in this regard, because no clumsy "take" button needs to be pressed to engage the effect. This makes experimenting with the Wedge easy.

### The magic button

Another nice control is the oversized Tap/Audition button. After an effect is chosen, pressing this button activates the Impulse Audition — a single digital sample of pink-like noise. This sample gets processed through the Wedge, allowing users to hear the results of new settings. This is much easier than evaluating an effect with complex and lengthy program material.

The button serves two other functions. One is as a tap-tempo entry key, whereby pressing the button twice in a song's tempo will automatically shift delay time to follow that tempo. The manual says the button can also be held down to use the input signal as a tap tempo source.

Another function the button performs is automatic input level setting. By pressing and releasing the I/O and Tap/Audition buttons together, the Wedge will self-adjust the input levels for both input channels.

We liked the Wedge right out of the box and used it immediately without reading the 78-page reference manual. Using it was easy, but we found that referring to the manual helped us understand the subtle, well-designed features the device had, such as the auto-level setting, the button combinations to restore the factory defaults (Prog and Bypass together on power-up) and the tap-tempo adjustment.

Inputs and outputs are on quarter-inch TRS jacks, which we routed into our console's patchbay for our evaluation. Our only complaint here was the tangle of four audio lines and one power cable in the back. Obviously a more permanent installation would require wire dressing to keep the plugs in and the cables tangle-free.

The large, easy-to-read display guided us through our playtime. We found by holding down a button associated with a slider, we could use the jog wheel to precisely dial-in a setting. The sliders were quick and efficient but required a slower hand to precisely increment or decrement a parameter.

To understand the kinds of effects and their construction, the manual was very helpful. The 256 available effects each use one configuration, a configuration being one of four types: Single, Double, Dual Mono or Multi-Chain.

These four configurations are found in 28 basic effects, which are edited to become specific Room or Hall types, Flange, Leslie, Plate, Ping-pong, Pitch-change, Delay, or combinations of these effects. Unlike higher-priced and more sophisticated devices, the Wedge has no provision for combining configurations; for rapid radio production, this is a plus as there are no time-consuming internal "patchings" to navigate. The effects you see are the effects you get, although all are extensively customizable.

### Here's the pitch

Of interest and amusement is the Quad Pitch Change effect, where incoming audio can be processed by four independent  $\pm 12$  semitone pitch-changing banks. This effect has panning control, decay control and feedback controls that turn any voice to a thing of angelic beauty or dark tonality.

We put spoken word through the Wedge, and listened carefully to the hall, kitchen, and first-reflection settings, and liked what we heard. Our first thought was the Wedge is a natural for radio theater, commercial production and theatrical production in general, since some effects like "kitchen" and "bedroom" lend themselves to "placing characters" in those locales.

In processing music recordings, we liked adding just a touch of Hall reverb, as well as playing with the mind-bending flange/chorus/modulated effects and reverse gates. The high-pass filters in most effects allow approximate rolloff at the selected frequencies, and are real-time.

The effects are clean and smooth, and easy to use and modify; so much so that we frequently became enamored with exploiting

every possible setting for an effect just for fun. Even "playing" the Tap/Audition button in different effects produced sounds we thought might be interesting from a Techno-Pop point of view.

Overall, we liked the design and architecture of the Wedge; Alesis has made another simple, powerful and affordable device that is fun in operation and use.

■■■

For information, contact Alesis Corp. in Los Angeles at (800) 5-ALESIS or circle Reader Service 161.

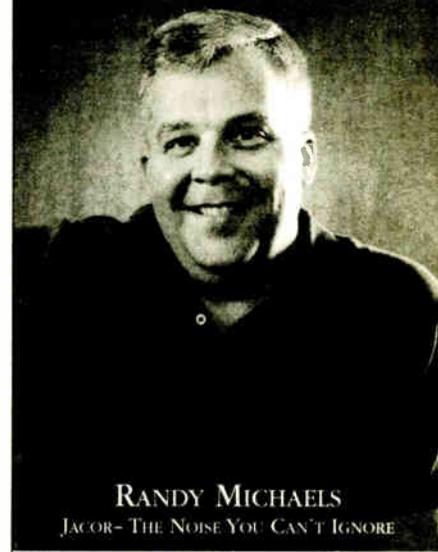
Rich Rarey is the technical director of NPR's "Talk of the Nation" and writes the Public Domain column for RW. He can be reached at rrarey@npr.org

## JOIN US FOR...



## The Event You Can't Ignore!

"DIS" HONORING ROASTEE:



RANDY MICHAELS  
JACOR - THE NOISE YOU CAN'T IGNORE

## OCTOBER 27

THE PIERRE HOTEL  
NEW YORK CITY



RSVP BY  
OCTOBER 2, 1998

FOR TICKET INFORMATION

(408) 624-1536  
email: baylissroast@kagan.com

PROCEEDS TO:  
THE JOHN BAYLISS BROADCAST FOUNDATION  
RADIO SCHOLARSHIP FUND

# 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.

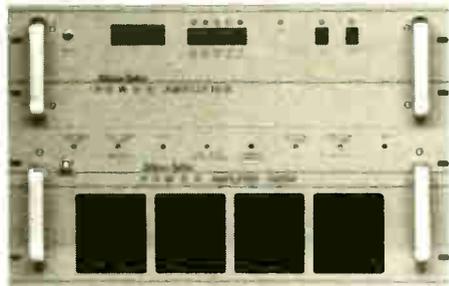


**Silicon Valley  
POWER**  
AMPLIFIERS

The RF People

## FM Broadcast Power Amplifiers

Designed for reliability, durability, & efficiency.



Models from 165 watts to 2.4 KW

- |                     |                       |
|---------------------|-----------------------|
| Solid state.        | Frequency agile.      |
| VSWR foldback.      | Digital display.      |
| Remote operation.   | Easy installation.    |
| Full documentation. | Modular construction. |

**1-800-986-9700**

www.svpa.com e-mail: sales@svpa.com Fax 1-408-986-1438

READER SERVICE NO. 74

# 1000 HITS FOR ONLY \$495!

**Don't waste time dubbing music!**

Halland will dub your choice of 1,000 tracks for only \$495! "HitPick" software lets you pick the songs! We'll dub them to your drive in ONE DAY.

MPEG .WAV files compatible with Arrakis, BSI, Enco, Prophet, Pristine, Smarts, B.E. Audiovault, Register Data, Mediatouch, and others.

Music files can be dubbed to your hard drive, Iomega "Jaz", Syquest "SparQ" or 2.6GB M-O disc.



SM **Let us take the hit!**

800.425.5263 TEL: 626.963.6300  
FAX: 626.963.2070 www.h-b-s.com



Music on CD in stock!  
Song lists on Internet  
<http://www.h-b-s.com>



READER SERVICE NO. 101

## SOUND GREAT — INSTANTLY!

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

### AIRcorp 500PH Microphone Processor



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

**AIR corp**

**Call your dealer**

or call **972-304-0455** or fax: **972-304-0550**

READER SERVICE NO. 128

## Excalibur Electronics HA-1 Hybrid Adapter



The HA-1 Hybrid Adapter allows you to use your favorite broadcast hybrid with almost any telephone — old, new, single line, multi-line, etc. Since the HA-1 hooks up through your telephone instrument's handset connector, no connection to the telephone line is needed. With the HA-1's front panel push-button out, your telephone functions normally. With the button pushed in, the handset is disconnected and your hybrid is now on line; nothing could be simpler or easier. The performance of your hybrid will be the same as it would be if hooked up directly to a C.O. line.

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

READER SERVICE NO. 78



### Has Your Automation Sailed... Without Your Weather?

Face it. An automation system isn't very automated when someone has to manually track and record constantly changing weather. Now, listeners can hear up-to-the-minute weather information in high-fidelity with no staff-intervention what-so-ever. The solution? A **Digital Weatherman™** from **Weatheradio™**! No Equipment to purchase. One low monthly fee includes system, data, and local weather sensors. Interfaces directly to EAS! Used daily by more than 350 radio stations as well as by AccuWeather™, Broadcast Electronics, Citadel, Capstar, Register Data Systems, Smarts Broadcast Systems, and many more. Call today for information!

**DIAL 1-800-728-4647**

**Tom Churchill's  
weatheradio™**

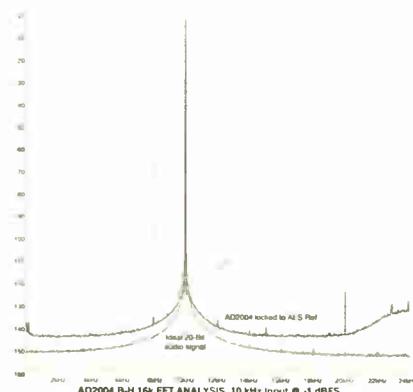
**Do You Want Weather With That?**

**DEMO EXTN 199 SALES EXTN 100**

READER SERVICE NO. 125

## The Perfect Digital Console Interface

The AD2004 A-to-D converter is the cleanest, quietest, most neutral sounding converter available! It was designed for the 20-bit multichannel user who insists on the very finest performance. This device introduces ground breaking improvements in A to D conversion. Analog preprocessing significantly reduces distortion products, while a custom phase lock loop IC all but eliminates jitter induced sidebands, under all operating conditions. The graph shows an FFT analysis with virtually no jitter induced sidebands. Best of all, the AD2004 comes in at the most affordable price of \$2200 for four channels. And now the eight channel AD2008, housed in a full width 1 RU chassis, is available for \$3950. Protect your investment: get next generation performance today with the BENCHMARK converter series. Call Rory Rall today!



Now recording at: The San Francisco Symphony, Telarc Records, Encore Recording, and other notable facilities.

**Benchmark**  
the measure of excellence™

**BENCHMARK MEDIA SYSTEMS, INC.**  
800-262-4675, 315-437-6300, <http://www.benchmarkmedia.com>

READER SERVICE NO. 127

## PRODUCT EVALUATION

# Akai Digital Studio Fits on Lap

Ed LaComb

Whenever I have the opportunity to test a new piece of equipment, my preferred method of attack is to toss the operating manual aside, sit down at the machine and then proceed to test its "intuition factor."

If I can get reasonably up to speed in a few minutes, I will likely give the machine my blessing as being "user-friendly."

That having been said, I hereby pronounce the Akai DPS12 Digital Personal Studio a user-friendly digital multitrack recorder, not to mention a real teaser for those interested in getting their own personal digital voice or



Akai's Laptop Studio, the DPS12

production studio up and running without a visit to the friendly (?) neighborhood banker.

At a suggested retail price of just \$1,499, the Akai DPS12 is a good way to enter the digital world without sacrificing features or your bank account.

## Desk vs. lap

Let us get right to the heart of the matter: The features of this "laptop studio" are as impressive as some of the more sophisticated desktop units.

Six analog inputs feed up to 250 virtual tracks that can be assigned to any one of 12 discrete output channels. The inputs are quarter-inch balanced/unbalanced for flexibility. I did not have the means to measure the S/N, but the unit is predictably very quiet.

The internal software routing allows you to configure the DPS12 to have Inputs 1 and 2 be the main stereo input feed, and then use Inputs 3 through 6 as possible effects/processing returns. There are two stereo sends available on the DPS12, not to mention a host of internal software processing options including reverb, compression, EQ and more.

Internal effects and processing are set up along Send Busses A or B. You control send and return levels under one menu. In the same menu, you also have the choice of sending to outboard gear and returning via the analog inputs.

However, in order to have all the onboard effects goodies, you will need an optional circuit card. If the card is

not installed, the DPS12 will still let you go through the process as outlined, but will let you down in the end with no results. I suppose that is satisfactory, if all you wish to do is practice the procedure.

The readout window in the upper right corner displays the function you wish to observe. Underneath are six soft keys (F1 through F6) that change function for each new window that comes up in the display. A jog/shuttle wheel is directly next to the display.

## Disk options

As for storage, the Akai DPS12 offers three options. The first is to use an internal Iomega Jaz drive to directly record and read from. The second option is to attach an external SCSI hard drive to the DPS12, while the third option allows a combination of the two preceding options.

Regardless of which you choose, you are able to back up your session to DAT using a standard DAT machine. A process similar to what is offered in the Digidesign Pro Tools DATa software allows you to recall your session at a later date and

pick up where you left off.

A standard Jaz cartridge stores up to two hours of 44.1 kHz digital audio. Several hard drives can be connected

**As soon as I got the DPS12 running, I took it over to a local radio station, where I let a buddy of mine take a look at it.**

in a daisy-chain fashion for nearly unlimited storage capacity.

As soon as I got the DPS12 running, I took it over to a local radio station, where I let a buddy of mine take a look at it. He was searching for an inexpensive way to break into digital recording and editing, and the Akai DPS12 was pretty much what he was looking for.

## The basics

The basic tasks are handled with ease. Recording, playback and editing all work as well and as easily as one would expect from a digital audio device. This is where the DPS12 earned my prior blessing as being user-friendly.

One problem I encountered was that I could not figure out how to slide a region of audio around on a track, even though I could perform cut-and-paste

**Product Capsule:**  
**Akai DPS12**  
**Digital Personal Studio**

**Thumbs Up**

- ✓ User-friendly operation
- ✓ Flexible storage media options
- ✓ Optional internal effects
- ✓ Up to 250 virtual tracks

**Thumbs Down**

- ✓ Manual is awkward
- ✓ Tiny display
- ✓ RCA main output

For information, contact Akai Musical Instruments in Texas at (817) 831-9203 or circle **Reader Service 213**.

functions to accomplish the same task. This is an example where it takes a few more steps to execute a command than maybe it should.

It is also an example of the manual not being very helpful in finding the answer. I did say earlier that I like to put the manual aside and work on my own, but even with the book, I found myself stuck in a couple of areas with no explanation of how to pick up and move on.

## User-friendly

The consensus has been the same in the technical newsgroups I have visited on the Internet. Many participants who are Akai users agree that the manual should be as user-friendly as the DPS12 itself.

Subrouting is a little more complicated, but with practice, you will pick it up in no time.

A few things I would like to have seen different on the Akai DPS12 include rethinking the RCA jacks as the main output. Okay, even though most personal gear is unbalanced at -10 dB, a quarter-inch balanced/unbalanced connection would have been a better way to go for me. Ideally, a set of XLR outputs for pro use along with a separate pair of RCA outputs for the home enthusiast would have been preferred.

The monitor screen seems a tad small. Given the overall size of the unit, I guess it would be difficult to make it much larger than it is. Still, after working with the unit all day, I can tell you that you will be seeing stars from looking at the miniature screen.

The operation of the DPS12 is relatively easy, but for many tasks it takes a few extra steps to accomplish the same thing that a high-end workstation would do faster. In those instances, you may find the DPS12 slowing you down in a fast-paced environment. Keep in mind this is, after all, an under-\$1,500 device and there are a lot of products in that particular price range.

If you are interested in breaking into digital, and as you wade through the vast array of options for your personal production studio, give the Akai DPS12 a serious look.

Ed LaComb heads up his own imaging business in upstate New York.

He can be reached at edlacomb@aol.com

Save Your Issues  
of Radio World in  
**Style**



Now there's an easy way to organize and protect your copies of Radio World, the industry's best read newspaper, keeping issues readily available for future reference.

Designed exclusively for Radio World, these custom-made titled cases provide the luxury look that makes them attractive additions to your bookshelf. Each case is sized to hold a year's issues (may vary with issue sizes), and is made of reinforced board covered with durable leather-like material in blue, with the title hot-stamped in gold. Cases are V-notched for easy access and free personalization foil is included for indexing the year.

Cases  
1-\$8.95 3-\$24.95 6-\$45.95

Call Toll Free  
7 days, 24 hours  
1-800-825-6690  
Charge Orders (Minimum \$15):  
AmEx, Visa, MC, DC accepted.

Jesse Jones Industries,  
Dept. 95RW  
499 East Erie Ave.  
Philadelphia, PA 19134

Allow 4 to 6 weeks for delivery  
**SATISFACTION GUARANTEED**

Add \$1.50 per case for postage & handling.  
Outside U.S. (including AK & HI) \$3.50 per case  
(U.S. funds only).

PA residents add 7% sales tax

# Could the V/O Life Be for You?

## Travis

I am happy to be bringing you this series through RW. The voice-over field is different for everyone. Considering the broad differences across the country due to geography and the variety of clients and jobs, there are plenty of topics that actually do apply to all of us. If you have questions, answers, stories, gripes or any other items to share, feel free to drop me an e-mail.

One of the first e-mails I received through this column contained a question I am often asked by radio folks: "I do some voice-over work now, and I was wondering how difficult it is to do this full time."

Difficulty is relative. The honest answer to this question is, "Much more difficult than you would ever imagine." But then, isn't that true of every career?

## Easy to be hard

It is difficult to be a successful disk jockey. It is equally difficult to be a good program director. It can be a bear to be a good chief engineer or account executive.

For me, the most troubling part of all of this is that the best people in any field make it look easy. I am sure there are a few people out there somewhere whose careers — and perhaps their lives, for that matter — really *are* easy, but I do not know any of them.

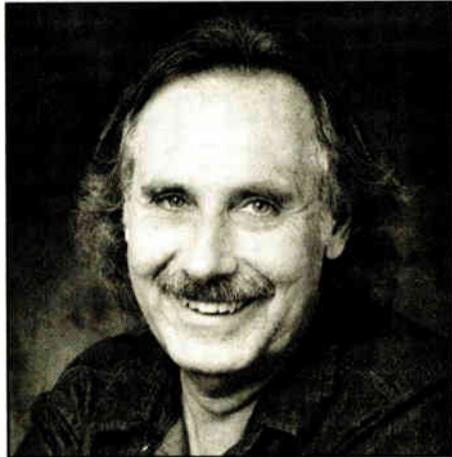
Perhaps the question should really be, "Is it possible for me to 'give up my day job' and do voice-overs full time?"

From my perspective, after observing quite a few individuals who have

Yes, there are unions and agents, but I do not know anyone who has succeeded as an announcer or actor because they got the "right" agent. I do know plenty of individuals who complain that they are not succeeding because they can't get the right agent.

The successful folks I have known have *all created their own careers*.

Yes, the successes in the business have agents. I am extremely grateful for mine. The bottom line is, as a voice-over performer, only you are responsible for your



Travis

paycheck. You are responsible for the product (your talent) and for your marketing (securing your own work).

I have often said that the real difference between working for yourself and working for someone else is that, instead of getting fired all at once, you are fired a little bit at a time. You are always losing customers, usually for

type. Issues like security are much less important to me than the need to feel in control of my life. Other successful voice-over performers I know have said they possess the same characteristics.

## Dip-dip, boom-boom, get a job

Most people are not bold or stupid enough to give up the security that having a real job brings to their lives. Sometimes during the slow weeks, the idea of having an actual job to go to starts sounding pretty good to me. Then, when work picks up again, I wonder how I could have ever thought such a thing.

So my answer to the question,

"Should I go into voice-over full time?" would be based not on a person's talent, but on their personality type. If security were especially important to an individual, I would recommend keeping voice-over as a part-time career.

In other words, regardless of how much talent that person has, it's "Don't give up your day job, kid." Do you really dislike looking for work? Remember, that is the most important aspect of the voice-over business.

On the other hand, if you really need a sense of freedom, if you want to call your own shots, and if you do not mind taking a few years to build a business, then hey, jump in; the water's fine!

■ ■ ■

"Travis the V/O Guy" writes from California. E-mail him at [ttravis@pacbell.net](mailto:ttravis@pacbell.net)

## I have found that talent is a minor factor in determining success in the voice-over field.

attempted to break into V/O work full-time, the answer is a definite yes.

That's the good news. The bad news is, it depends on who you are — your personality type, if you will.

Frequently, when I have been asked the how-hard-is-it question, I have also been asked to listen to someone's demo tape — the idea being that I could somehow determine if the individual had enough talent to "make it in the business."

I have found that talent is a minor factor in determining success in the voice-over field. I know some extremely gifted V/O performers who will never be able to give up their day jobs, just as I know a good number of less-talented individuals who have done extremely well for themselves.

## If the spirit moves you

The most important factor in whether someone can be successful as a full-time voice performer is whether that individual has any entrepreneurial spirit. Almost all voice-over work is freelance. There is no "job," per se, to report to each day. As a voice-over performer, you are an entrepreneur.

reasons that have nothing to do with you. A client moves or changes businesses, or wants a change in style for their projects. So you are always looking for work.

Although we call it "being your own boss," you actually end up with dozens of bosses, all which expect at least the same amount of attention they would get if they were your only boss.

I started my first business while still working full-time at a local radio station. One of the first things I noticed was that my repressed urge to tell my boss where to go went completely away. I became much less critical of the way I felt the station was being run. I realized that this was due to some sort of need I had to control my destiny. I have since learned that I am just not well suited to having my time controlled by others.

Even though I did my best to be a "good" employee at the various jobs I have held, I actually am not. I am not even a good boss, due to my inability to relinquish control.

According to the (ahem) "experts" who study such things, this makes me more of an entrepreneur-personality

Quality  
Selection  
Service  
Price

USED EQUIPMENT

## Buying, Selling or Trading

When you call Harris used equipment department, you get the same great service that you've come to expect from the nation's leading supplier of broadcast equipment.

Harris has the largest inventory of used equipment worldwide.

Each piece of used equipment is thoroughly inspected by Harris' knowledgeable, factory-trained service staff (who have a combined experience of over 30 years) to insure that it meets factory specifications.

And, of course, all used equipment from Harris comes

with a warranty to insure your complete satisfaction.



**Mike Smith,**  
Used Equipment Specialist  
Over 10 years of audio  
experience.

And with Harris' low prices, you can be sure to get the most value for your money.

Whether you're buying, trading, or selling, call Harris for quality, selection, service and price.

**HARRIS CORPORATION**  
BROADCAST DIVISION  
TEL: 800-300-0733  
FAX: 765-962-8961

See a complete listing of our used equipment at  
<http://www.broadcast.harris.com/usedeq/index.html>

**HARRIS**

A new world of broadcast solutions.

© 1998 Harris Corporation

# Radio World Broadcast Equipment Exchange

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

## ACOUSTICS

Want to Sell

### ACOUSTIC FOAM

Broadband Absorbers • Modular Systems  
Sound Barrier • Diffusers • Bass Traps & More!

- ★ Consistent Pattern....No Innies & Outies!
- ★ Long-Lasting....Won't Crumble Like Other Brands!
- ★ 1", 2", 3", 4" & 12" Thicknesses In Stock!
- ★ 12 Vivid Colors In Many Cool & Effective Styles!
- ★ Highly Flame Retardant: Passes California Fire Code!
- ★ Absorbs 60% Better Than More Expensive Brands!
- ★ Best Value By Far! We Double Dare You To Compare!
- ★ Available Through All Major Broadcast Suppliers!

Vibrant New Colors: Teal & Burgundy

USERS: James Taylor, Journey, Sammy Hagar, O'Jays of Smashing Pumpkins, Clint Black, Celine Dion, Doane Perry (Jethro Tull), Dennis DeYoung/James Young/Todd Sucherman (Sly), Spyros Poulos (Madonna, Al Dimeola, Kathy Troccoli, Taylor Dayne), George Terry (Eric Clapton), Andrew Gold, Christopher Cross, Mike Warche (John Mellencamp), Ross Venetta, Sid Row, Mark Lindsay (Paul Revere & The Raiders), Norbert Slowell (D. Patton, Galin Bros., K. Rogers, E. Rabiol, etc.), Mark Farner (Grand Funk Railroad), Toshiko Isoda, The Bellamy Bros., Wayne Tisdale, Nona Hendryx, John Baster (He-Flex), Disney, MUMFORD (A Lawrence Kasdan/Fuchstone Film), Bose, Harpo Studios, Lucaskiss, Silicon Graphics (SGI), Todd-AD, JBL, Quacom, Time Warner Cable, Shore Pelorus Acoustics (FutureDisc, K. Loggins, Skywalker Sound), Steven Klein, Frim, Sr. Eng. @ Criteria Studios (E. Clapton, Bee Gees, A. W. B.) & Studio Designer (Don Was, Kenny G, Yab Yum Entertainment, Larabee), Sear Sound (N. Merchand, S. Colvin), Cassie Oats Prod. (Ft. Little, Temors, Wings, 21 Jump Street, S. Mendes, J. Feliciano), Sound Kitchen (P. Frampton, Peter), Digital Insight, AT&T, NASA, Sony, CBS Sports, NBC Sports, ABC TV & Radio, ESPN, MSNBC, Discovery Channel, Bill Fullon (I Am Weasel/Carlson Network), Boeing, Editel, Berklee College of Music, the Lincoln Center, Investor's Business Daily, ShowCo, Gryland, Music Bakery, Audio, Erlang, WhisperRoom, Hitachi, Toshiba, 20th Century Fox, Universal Studios, MPR, Warner Bros., Polygram, chel Wolfgang Puck, Fruit of the Loom Country Comfort Tour, Manley Audio Labs, Lucant Technologies, 3BITV, Electroplex, Arden, Macromedia, Adaptec, Martin Logan, Crawford Post, Mormon Church TV, Pioneer, Cobra Golf, Carvin, MTX, Silver Dollar City, the voices of McDonald's, Miller Brewing & Sports on Fox and more!

317-842-2800 • Fax 317-842-2780 • 1-800-95-WEDGE  
Web: www.auralex.com • E-Mail: auralex@auralex.com



Circle (234) On Reader Service Card

### AcousticsFirst™

Toll Free 888-765-2900

Full product line for sound control & noise elimination.  
www.acousticsfirst.com

Coax, 1/2", 75 ohm, 2000', never used, BO or will sell pieces at \$3.50/ft. Megastar 702-386-2844.

Rohn 350' 55g tower, complete package on ground w/raze light kit & grounding pkg, you pick-up, \$12,900/BO. Robert, 940-665-5744.

### 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: 773-539-3500

### AUDIO PRODUCTION

Want to Sell

Altec 1592B mixer w/all plug ins, 5x1 VU meter, very clean, \$250; 1607A 5 mic inputs & 70 W pwr amp, \$250; 1589B 2x1 mixer w/on mic pre, \$100. E Davison, 217-793-0400.

Burwen Research DNF1201 noise filter, \$75; MXR dbx type 2 NR, \$25; Aphex Aural Exciter w/Big Bottom, \$100. G Dunn, 925-516-0299.

Digital Audio Labs CardD+ PC soundcard, 6 mos old, like new w/box, manual, discs & warranty, \$400. C Lindemann, 207-676-8525.

### THE NEW YORK STUDIO™

"We Care"

Have a guest in Manhattan? We can be your remote studio

- ISDN 2-WAYS (Telos Zephyr)
- TAPE SYNCHs (Telos One)
- ISDN FEEDS (delivered by messenger within the hour)

Neumann U87's & AKG 414's in a great-sounding space • ProTools • Sony DAT • R-R (Dolby SR) • NAK CR7A • Convenient NYC Location • reasonable rates • great engineers

Audiometrics preamps (3); Harris mono preamp. C Zimmerschied, 660-826-1050.

Sennheiser HD-414 light weight, open-ear design stereo headphones, new pair, \$50, used pair, \$30. J Roper, 812-877-2663.

URE! 541 parametric EQ, working cond, \$500; Dolby 363 SR/A stereo, \$1500; Dolby 361 SR mono, \$400. L Josephson, 212-595-1837 or larry@radioart.org.

### 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 (233) On Reader Service Card

### Want to Buy

Neve, API, Gates, Langevin, Collins, Lexicon & others, mic preamps, EQs, reverbs, delays. T Coffman, 619-571-5031.

Neve, Api, Gates, Longevin, Collins, Lexicon & other mic preamps, Eqs, reverbs, delays. T Coffman, 619-571-5031.

WE 753 or 757 speakers, single or pair, will pay \$1500-\$2000 ea. S McDaniel, 1-800-251-5454.

### AUTOMATION EQUIPMENT

Want to Sell

Comstream ARD 200 digital audio rcvr, like new, \$2000/BO. J Lalino, 315-891-3110.

TM Century/Sony Jukebox automation system, TMC 386SX16, (2) TMV controllers, (4) Sony CD Jukeboxes, \$4500. D Magnum, 608-372-98600.

TMC 486 DLC 33 UDS interface; (5) Sony 006 Jukeboxes, \$3000 +shpg. J Lotspeich, 915-533-2400.

### Want to Buy

Media Touch 8 chnl switcher, for older system. J Hart, 501-846-0949.

### BUSINESS OPPORTUNITIES

Want to Sell

PRODUCE Host your own radio show  
Call Ken Sperber 212-760-1050  
Generate hundreds of qualified leads  
50,000 W NYC radio station

### CART MACHINES

Want to Sell

Audicord DLPm, mono, rebuilt, \$650 +shpg. M Butzner, 510-885-3588.

Spotmaster 10 spot, new \$1000; Beaucart triple deck cart player, \$400; 500 various used carts, \$.50 ea. J Lalino, 315-891-3110.

ITC RAM single R/P cart machine, cond unknown, BO. J Francis, 352-732-2010.

### CD PLAYERS

Want to Sell

Mackle 1604 (2) excellent cond w/manuals, \$500 ea. L Josephson, 212-595-1837 or larry@radioart.org.

Pioneer PD-TM 1 & TM 2 CD players (10), 18 disc units. C Zimmerschied, 660-826-1050.

NEC CD530 player, \$50. G Dunn, 925-516-0299.

### CONSOLES

Want to Sell

Harris Stereo 80 8 ch, \$700; BE 150 Series, 8 ch stereo, \$700; Gateway 80 8 ch mono, \$400. J Lalino, 315-891-3110.

Lightning Got You DOWN? Get a SLW Fudget Console 6-18 Channel DYNAMAX On Air Console Next Day Delivery

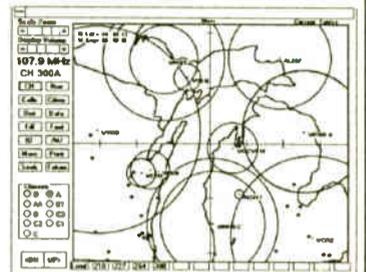
ADM ST Series II 1982 2 mic, 12 line, 2 blank, 16 preselects pgm & mono, provision for aux, original & new faders (28), BO. B O'Neal, 518-785-9061.

Ramko DC Stereo 8 (2), \$375 ea. J Lotspeich, 915-533-2400.

Arrakis 500S stereo 8 chnl, gd cond, 23 inputs, \$900; Harris Stereo 80 stereo 8 chnl, gd cond, \$700. T Toenjes, 785-437-6549.

## 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!

Soft Communications

DOUG VERNIER  
1-800-743-DOUG (3684)

Circle (229) On Reader Service Card

## FINANCIAL/LEASING 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.

FLEX LEASE, Inc.

### LIMITERS

Want to Sell

Sparta 4 chnl mono, no power supply, \$50. F Willis, 850-653-3648.

Gregg Labs 2542 5 bank, blue box, stereo AM Version 2 w/NRSC, \$3000. J Henry, 214-327-5564.

S.W.R. FM Antennas  
Great Antenna Great Price!

HE HALL Electronics (804) 984-4255

ERI 3 bay medium pwr, up to 9 kW per bay, tuned to 98.7, excel cond, BO; Cablewave coaxial 400' 1-5/8" cable w/hardware, excel cond, BO. C Phillips, 423-457-2697.

Phelps-Dodge 2-bay tuned to 94.5, \$1500; Shively 2-bay w/radomes tuned to 96.1, used 3 months, \$4000. D Magnum, 608-372-9600.

HE HALL Electronics  
706 Rose Hill Dr. Charlottesville Va. 22901  
804-984-4255 (Voice) 804-984-3299 (Fax)

This Month's Special !!  
BSI Broadcast Software International  
Broadcast Automation Software  
JUST \$999 List  
Turnkey Systems Starting at \$2995  
Coll or visit our web site for your discount price  
sales@halls.com www.halls.com tech@halls.com

Circle (232) On Reader Service Card

LIMITERS continued...

**EXPERIENCED EQUIPMENT**

Save \$\$\$ on Excellent Quality Used Consoles, STL, Test Gear...

**BROADCAST RICHMOND**

Tel 765-966-6468 Fax 765-966-5505  
e-mail broadcast@infocom.com  
www.broadcast-richmond.com

**Want to Buy**

Teletronics or UREI (LA 2, 3, 4, 1176) Gates, RCA, DBS (160-164) Altec Collins. T Coffman, 619-571-5031.

Teletronics or Urei (LA 2,3,4,1176) Gates, RCA, dbx (160-165), Altec, Collins. T Coffman, 619-571-5031.

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, 972-271-7625.

**MICROPHONES**

**Want to Sell**

Neumann TLM-193, almost new, includes wooden case & expensive Neumann shock mount, \$950. R Schell, 713-978-6868.

OC White mic arm w/riser, \$50. G Dunn, 925-516-0299.

Neumann U47, \$3900; U67, \$3300; U87, \$1800; KM83 or 84 pairs, \$1400; KM88s, \$950 ea; RCA 77DX, \$1200; BK5, \$700; BK1A, \$300. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

**WINDSCREENS**

The Auralex WINDJAMMER 2421

★ Fits RE20, MD421, AKGs, ATs, big Neumanns, etc.  
★ Cost up to 63% less than competing brands  
★ Won't crumble like other brands  
★ Sounds great & available in 6 vivid colors

**1-800-95-WEDGE**

**Want to Buy**

RCA 77 & 44 or other ribbon, dynamic & tube mics. T Coffman, 619-571-5031.

RCA 77 & 44 or other ribbon mics, dynamics & tube mics. T Coffman, 619-571-5031.

RCA 77-DX's & 44-BX's, any other RCA ribbon mics, on-air lights, call after 3PM CST, 972-271-7625.

RCA 77-DX's, 44-BX's, WE KU-3A's On-Air lights, recording lights. Top price paid. Fast response. Bill Bryant Mgmt, 2601 Hillsboro Rd, G12, Nashville TN 37212. 615-269-6131, FAX: 615-292-3434.

**MISCELLANEOUS**

**Want to Sell**

**RF Warning Signs**

9"x 12" \$13.95  
10"x 19" \$19.95

**HE HALL Electronics** (804) 984-4255

Lambda 6 V pwr supply (2); Lambda 15 V pwr supply (2). C Zimmerschied, 660-826-1050.

Motorola 50 W base station, 26.43 MHz, 2 mobiles. C Zimmerschied, 660-826-1050.

Record collection from AM station, 1700 LP's & 4000 45's, misc styles & artists, \$950/all; Heathkit oscilloscope push-pull, \$125. J Googan, 314-239-0401.

RF video dist amp, 4 outputs, \$50; Heathkit IT 3120 transistor/FET tester in/out of circuit, \$75; Tripp Lite power inverter, 100 W, \$50; Precision Series E400 RF sweep generator, AM-FM-TV, \$100. J Lalino, 315-891-3110.

UTC transformers, A21, OEM version of HA100 & HA108, P1 & P12. E Davison, 217-793-0400.

Microphase MP-2030S demodulator, cond unknown, BO; Advanced IP-8 interface, cond unknown, BO; Tellabs 4425 repeat coil, cond unknown, BO. J Francis, 352-732-2010.

**GELECO RD SYSTEMS**

**RF CONTACTORS (25-100 AMPS) PARABOLIC MICS**

416-421-5631  
FAX: 416-421-3880

Record collection from AM station, approx 1700 LPs, 4000 45s, misc styles/artists, \$950/all. J Goggan, 314-239-0401.

ADC TT (Bantam) Patchbays, \$149; TT or 1/4" cords, \$10; new short MRL test tapes, \$229 for 2", 1/4", \$79; Gates dual stereo tube limiter, \$1200; Gates top level, \$595; Allen & Heath GL2 rack mixer, mint, 14x4, \$795; CBS Labs Audimax, \$400 ea; tube pre-amps, \$300-400; MX10 mixers, \$795. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

**Want to Buy**

Manual for Wilkinson AM 1000B xmtr. D Mason, 505-455-3416.

5 kW or larger emg gen, working or not. J Duram, 616-893-7806.

Gates BC5H solid-state audio driver circuit. T Radford, 828-837-4332.

**RADIO/STUDIO LIQUIDATION!** United States Audio Pay's \$Cash for Neve's, Pultec's, Fairchild's, Teletronix, UREI, AKG, Neumann, Altec, API, Langevin 5116/5301, consoles & more! Ph 818-887-6600 Fax 818-887-4700.

**BUY FROM THE LEADER.**

**Fast and Accurate!**

Any way you need them:

- blank,
- punched,
- engraved,
- loaded, even pre-wired!

Call 800-733-9473.

**whirlwind**™

## CONSULTANTS

**EVANS ASSOCIATES** Consulting Communications Engineers

FCC Applications, Design, Field Engineering & Tower Detuning  
Video/Data/Voice • Statewide Networks • Wide-Area Networks

EXPERTS IN:  
TV • AM • FM • ITFS • MICROWAVE • PCS • FIBER

210 S. Main St., Thiensville, WI 53092 (414) 242-6000 FAX (414) 242-6045  
Internet: http://www.evansassoc.com Member AFCCE

**Consulting Communications Engineers EMC Test Lab**

- FCC Applications and Field Engineering
- Frequency Searches and Coordination
- AM-FM-CATV-ITFS-LPTV
- EMC Test Lab-FCC and European (IEC)

**OWL ENGINEERING, INC.**

E-mail: Owleng19@skypoint.com 1-800-797-1338 Fax (612) 785-4631  
8899 Hastings St NE, Minneapolis, MN 55449 (612)785-4115 Member AFCCE

**DON'T GAMBLE WITH YOUR ADVERTISING DOLLARS!**

Advertise in Radio World and reach 18,000+ broadcast professionals.

Call Simone TODAY!  
**703-998-7600**

**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

1-301-913-9287  
FAX: (301) 913-5799 • 5272 River Rd, #460 • Bethesda, MD 20816

**MLJ**  
Moffet, Larson & Johnson, Inc.  
Consulting Telecommunications Engineers

1110 North Glebe Rd, #800  
Arlington, VA 22201  
(703) 741-3500  
FAX: (703) 741-0312  
Member AFCCE

**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**

**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/SOFS)
- 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**

**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**  
www.grahambrock.com

**C.P. CROSSNO & ASSOCIATES**  
CONSULTING ENGINEERS

P.O. BOX 180312  
DALLAS, TX 75218

**AM, FM & TV Broadcasting**

ANTENNA DESIGN, ALLOCATIONS, FCC/FAA

CHARLES PAUL CROSSNO, P.E.  
(214) 321-9140 MEMBER AFCCE

**Don't Gamble with your Advertising Dollars!**

Advertise in Radio World and reach 18,000+ subscribers.

Call Simone at  
**703-998-7600 today!**

**System One Communications**  
Broadcast Constructors & Consultants  
Houston, Texas  
**888-625-5649**

Complete Turnkey Construction  
Antenna Line Testing  
AM Directional Field Work  
AM and FM Applications  
Tower Services  
Studio Designs  
Custom Studio Furniture

We have raised **RFCAD** to a **new level 2.0**

- International enhancements
- Import of multiple terrain data formats
- Biby-D advanced propagation model
- CDS matrix calculation method

RFCAD provides high-resolution propagation results overlaid on seamless rasterized topographic maps. RFCAD has been designed to enable the most efficient and accurate planning, and analysis of RF sites, and systems.  
32-bit application designed for Windows 95/NT™

**800-441-0034**  
www.comm-data.com  
**Communications Data Services, Inc.**

**MONITORS**

**Want to Sell**

Belar mod monitor, \$600; Belar stereo monitor, \$600. J Lalino, 315-891-3110.

Used Mod Monitors, McMartin & Belar. Many to choose from, tuned & calibrated on your frequency, full guaranteed. Goodrich Ent. 402-493-1886.

**RECEIVERS & TRANSCEIVERS**

**Want to Sell**

**SCA RECEIVERS—ALL TYPES**

Will work to meet your receiver needs

Professional / Table / Portable  
Field Strength Meters  
Reading Service / Ethnic / Data

**DAYTON INDUSTRIAL CORP.**  
2237 Industrial Boulevard  
Sarasota, FL 34234-3119  
Tel: 941-351-4454 FAX: 351-6081  
E-Mail: SCARadio@aol.com

Comrex 2-line freq extender, xmtr & rcvr, \$1995 for both ends. Steve Kirsch, 90 S Long Beach Rd, Rockville Centre NY 11570. 516-763-1776.

SCA DECODER BOARD, 67 KHZ & 97 KHZ. TEL: 818-782-5272, EMAIL: PARSIM@MSN.COM.

RECEIVERS & TRANSCEIVERS continued

**C. CRANE COMPANY**

**FREE CATALOG**

**Radio Land**

We offer exceptional radios and receiving antennas, as well as, an extensive variety of radio accessories

WEBSITE: CCRANE.COM

**1-800-522-8863**

**RECORDERS**

**Want to Sell**

**DAT Machine Service**

Digital Audio Tapes

Fast, expert repairs on all DAT recorder brands & models including ADAT and DA-88

Warranty Service on Most Brands

Over 3000 Machines Serviced!

New/Refurbished DATs Available

Compare Our Rates!

**Pro Digital Inc.**

DAT Recorder Service Specialists

(610) 353-2400

ARS 1000 PB decks (2) w/25 Hz detector; Revox A-77 1/4 track R/P w/remote control & rack mount; (2) Ampex 354 deck w/heads & cables. C Zimmerschied, 660-826-1050.

**STUDER REVOX PARTS/SERVICE**

Cassette-CD-Open reel Capstan resurfacing, ALL BRANDS.

**JM TECHNICAL ARTS**

1515 Elm Hill Pike #203

Nashville, TN 37210 (615) 365-9030

Otari 50/50B III 2 trk r-r, like new; Panasonic 3900 DAT rcdr w/remote controller. J James, 415-331-9346.

**DISTRIBUTOR DIRECTORY**

The following distributors serving the broadcast industry would be glad to help you with any of your requirements.

**CORNELL-DUBILIER MICA CAPACITORS**

FROM STOCK

**JENNINGS VACUUM CAPACITORS**

FROM STOCK

**JENNINGS VACUUM RELAYS**

**SURCOM ASSOCIATES**

2215 Faraday Ave., Suite A

Carlsbad, California 92008

(760) 438-4420 Fax: (760) 438-4759

...Some people get hooked on broadcast equipment big time...they think about it...dream about it...talk about it all the time...for example...us...

**RADIO! The beat goes on!**

**CROUSE-KIMZEY OF ANNAPOLIS**

tops in broadcast equipment

1-800-955-6800

ask for Kathleen

kkannapolis@worldnet.att.net

Revox A77 2 trk stereo \$200 ea; (100) 10" plastic empty reels, \$1 ea. J Lalino, 315-891-3110.

**DO YOU NEED PARTS FOR AMPRO CONSOLES & CART RECORDER**

**SEQUOIA ELECTRONICS**

1-(408) 363-1846

FAX 1-(408) 363-0957

TEAC A-3300SX stereo 2 trk r-r deck, 15 & 7.5 ips, gd cond, \$300. J Roper, 812-877-2663.

**CLEAN PATCH BAYS NO DOWN TIME**



**VERTIGO BURNISHERS AND INJECTORS RESTORE ORIGINAL PERFORMANCE TO YOUR PATCH BAYS**

**\$34.95 Ea.** Please write for additional information and order form.

**VERTIGO RECORDING SERVICES**

12115 Magnolia Blvd. #116 818-907-5161

North Hollywood, CA 91607 max 818-784-3763

MCI 2 trk r-r w/roll around stand, cond unknown, pick up only, BO; Revox A77 stereo r-r, working cond, pick up only, BO; (4) Otari ARS 1000 PB in storage several yrs, pick up only, BO. J Francis, 352-732-2010.

Revox A-77 1/4" 1/4 trk, near new cond, \$300. T Born, 315-469-5051.

Tascam DA-88 great cond w/SY-88 SMPTE card & RC-808 remote, \$2550; (2) Nakamichi MR-1, one drags occasionally, one needs a couple of gears & reassembly, \$350/both. R Schell, 713-978-6868.

Teac 1230 r-r, 3 head rcdr, \$75. G Dunn, 925-516-0299.

Ampex 4 trk tube deck, \$2500; stereo 351 (recond), \$1800; Akai Adam, new, digital 12 trk, \$3500; MM1000-16 w/new heads, \$4500; Otari MTR10-4, \$3500; Ampex ATR102s, search to cue, \$495; Ampex locator for ATR or 1200, \$895; MCI 110C-8, \$3.5K; Tascam 85-16 recond w/dbx, rc & loc, \$3K. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

**Want to Buy**

Any portable r-r, 1.5 & 7.5 ips, mono or stereo, must be in working cond under \$300 +shpg. S Vainrib, 205-982-1350.

MCI JH-110 1" 8 track. J Borden, 414-482-8954.

PB & recorders in working cond. A Wilkenson, 423-986-7536.

MCI JH-110 1" 8 trk, A, B or C. J Borden, 414-482-8954.

Ampex ATR100 taperecorders for parts. Circuit cards, heads, motors, machine parts, or electronic parts. Call 818-907-5161.

Ampex PR10 tape recorders. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

**REMOTE & MICROWAVE**

**Want to Sell**

Cellcast unit, cellphone & 4 chnl mixer built in, battery & AC, gd cond, \$1500; Gentner EFT-1000A, gd cond, freq extender, automatic, \$800. G Arroyo, 407-830-0800.

**WE RENT FOR LESS**

Hotlines	FM Exciters
Zephyrus	STL's
Nexus	FM Pwr Amps
Audio	Test Equipment

If we don't have it, we will get it!

**SCMS, INC. (800) 438-6040**

"You Know We Know Radio"

Comrex 1-line freq extender encoder, \$550 +shpg. M Butzner, 510-885-3588.

Desktop remote controls (2) w/manual. C Zimmerschied, 660-826-1050.

Ericsson AF 738 tiny analog cell phone w/extra battery & charger, \$150; (2) Motorola 3 W bag phones w/extra lead-acid battery & chargers, \$100 ea; Motorola RJ11 adapter for bag phones, \$150. L Josephson, 212-595-1837 or larry@radioart.org.

Scala full size rect STL antennas, excel cond, BO. C Phillips, 423-457-2697.

Motron XS-1-100 remote controller from Touch Tones, as new, includes pwr supply, \$150. E Davison, 217-793-0400.

Telos 1x6 rack mount hybrid w/console, auto nulls ea line, excel cond, \$1000/BO. J Raynor, 703-329-1236.

**Remotes from EUROPE?**

WIRED FOR SOUND (London) offers...

**EQUIPMENT • ENGINEERS • EXPERIENCE**

...and Europe's largest Telos rental stock

Tel 01144-181-442-8900 Fax-8901 www.wiredforsound.co.uk

**RENT IT HERE!**

COMREX New! HotLine ISDN Codecs Frequency Extenders

TELOS Zephyrus Digital Phone Hybrids

CCS MUSICAM Prime Codecs

SHURE FP-410 Automatic Mixers

SCOOP REPORTER 7kHz single POTS line codec

**SILVER LAKE AUDIO • 516-763-1776 • FAX: 516-763-1750**

2-line Comrex, used 6 times, \$1000. Tom 1-800-860-9771.

Zephyrus 304 sat rcvr, cond unknown, BO. J Francis, 352-732-2010.

**WE RENT**

**TELOS ZEPHYR**

CCS "Prima" Codecs

Frank Grundstein Audio/Video Consultants

COMREX 3-line extender

610-642-0978

**REPAIR SERVICES**

**PIKE'S PEAK SATCOM**

Dart 384

SA7300 (Dat32)

SCPC Receivers

Repair Specialist

Low Rates

Fast Reliable Service

Buy, Sell, Trade

**Pike's Peak Satcom**

Tel 719-573-0094

Fax 719-573-0095

Circle (230) On Reader Service Card

**SATELLITE EQUIPMENT**

**Want to Sell**

**SATELLITE SYSTEMS**

Satellite Equipment for Radio

**Off the air? Looking for reliable repair service?**

**Rely on us!**

Satellite Systems is respected industry-wide for prompt, accurate service to radio stations and networks.

Whether you have a Dart 384 or Scientific Atlanta 7300/7325 we can repair your equipment.

Pre- and post-service technical support, along with a 6-month warranty.

Turn to the leader in repair, new equipment, used equipment and accessories. We can answer all your questions.

**Celebrating 7 years of providing reliable repair service**

**SATELLITE SYSTEMS**

615 East Brookside Street, Colorado Springs, CO 80906

Phone: (719) 634-6319 Fax: (719) 635-8151

Circle (231) On Reader Service Card

Wegener 1866-212-004-002 addressable 15K 16 MHz rcvr currently set up on Morningstar Network, 6 mos old, excel cond, w/manuals, \$850 shipped. M McConnell, 319-334-9359.

**Want to Buy**

Ariel satellite tone decoder for Ariel sat rcvr. D Morgan, 970-243-1230.

**SCA RENTALS**

**Want to Sell**

Full power Dallas SCA channels available immediately. M Vanhooser, 972-402-9673.

**STATIONS**

**Start your own commercial radio station with only \$5000 or less!**

Yes it's possible & legal. Part 15 of FCC rules allows low power AM radio stations to operate without a license !! Cover an entire town & bill \$1500 a month !! It has been done !! Order the newsletter booklet that tells you all you need to know to get started for just \$29.99. Send check or money order payable to: WCTD Radio, 4 Canal St, Westerly RI 02891 or call 401-348-9222 for more info. FCC Inspected.

1 KW IN OCEAN CITY, MD, for sale or lease. 301-299-5383.

**Attention Hispanic & Portuguese Broadcasters!** A new Southern New England radio station has broker time available for as little as \$75 per hour. Call 401-348-9222 for more details.

**Want to Buy**

Station wanted in Southern New Jersey, AP, CP, LI, non-commercial & dark stations also considered. Fax info to Nancy Winfield at 609-822-0294.

Will pay cash for preferably AM but will consider FM stations in Western United States; CP's, dark or troubled stations OK, also interested in joint ventures. G Guthrie, 801-250-7579.

Will buy your small town AM station in the South or Southwest, on air or off, sick or well for cash or terms. G Humphries, 918-256-7224.

Network looking for stations! dark, brokered, AM & FM, fax details to programming: 954-735-0370.

**STEREO GENERATORS**

**Want to Sell**

BE FS-30, great cond, \$600. E Shipe, 972-495-8122.

**TAPES/CARTS/ REELS/CD'S**

**Want to Sell**

AOR prod library, analogue, LPs, reels & cassettes, 7.0" empty reels boxed, BO. 703-208-4648.

Complete CD Country Music library including Halland CDX & assorted country classic CDs; BRG Country prod library & the Positioners instant ideas CD prod library; Network Music sound effects on 50 CDs; Aware/Music master music scheduling system; (2) CD holders, self standing, ea holds 100 CDs; Box of audio 5 minute cassettes; (2) boxes of 250 ea cassette plastic boxes; box of 5" empty reels & boxes; box of Jewel CD boxes for Denon CD players, would like to sell all for BO, but will consider selling separately. B Stutzman, 717-586-6690.

**TELEPHONE EQUIPMENT**

WE BUY AND SELL BUSINESS TELEPHONE EQUIPMENT. DOMINION TELECOM. 800-998-3281.

**TEST EQUIPMENT**

**Want to Sell**

Audio Controls SA-3050A portable 1/3 octave RTA w/high SPL upgrade & HAL competition scoring option, battery, case & calibrated mics, \$750. R Schell, 713-978-6868.

**Want to Buy**

Mueller Broadcast Design T25-35SA subaudible tone decoder in gd cond. J Francis, 352-732-2010.

## TUBES

### Want to Sell

**D & C Electronics Co.**

**NEW TUBES**

We have the alternatives for all your needs, at the lowest prices, direct from OUR STOCK!!!

**Svetlana**

EIMAC, SVETLANA, PRO-TEK®, EEV and many others.  
(352) 688-2374  
PH: (800) 881-2374  
FAX: (352) 683-9595

**SE HABLE ESPAÑOL WE EXPORT**

VISA/MASTERCARD ACCEPTED

**AMPEREX, EIMAC, RCA, SVETLANA** 4CX250B, 4CX250R/7580W, 4-400C, 3-500ZG, 3CX3000A7, 807, 811, 833C. Westgate 800-213-4563.

## 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 (228) On Reader Service Card

RCA 1620 (10), all test good, \$25/lot. E Davison, 217-793-0400.

## 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, CQS-200

Worn out power tubes purchased

### Vacuum Tube Industries, Inc.

**1-800-528-5014**  
**508-584-4500 X75**

**FOR THE BEST PRICE** & 24 Hr service on transmitting tubes & sockets/parts, new & rebuilt call Goodrich Ent. at 402-493-1886 day or night, FAX 402-493-6821.

## RF POWER

The Best of Two Worlds!



Immediate Shipment from Stock

Se Hable Español

(760) 744-0500 • (888) 744-3500

Fax: (760) 744-1943

e-mail: rfp@rfparts.com



Circle (227) On Reader Service Card



**Svetlana**  
ELECTRON DEVICES

300B (See SV300B)

3CX300A1

3CX400A7

3CX2500A3

3CX2500F3

3CX2500H3

3CX3000A7

3CX3000F7

3CX4500F3

3CX6000A7/YU148

3CX10,000A3

3CX10,000A7

## Quality Power Tubes

3CX10,000H3	4CPX800A	5CX1500B	SV572-3
3CX15,000A3	4CX1500A	572B	SV572-10
3CX15,000A7	4CX1600B	6550C (See SV6550C)	SV572-30
3CX15,000H3	4CX3500A	6AS7G	SV572-160
3CX20,000A7	4CX5000A	6BM8	SV6550C
3CW20,000A1	4CX5000R	6D22S	SV6L6GC
3CW20,000A7	4CX7500A	6L6GC (See SV6L6GC)	SV811-3
3CW20,000H3	4CX10,000D	6N1P	SV811-3A
3CW20,000H7	4CX12,000A	811A	SV811-10
3CW30,000H3	4CX15,000A	812A	SV811-10A
4CX250B	4CX15,000J	833A	TH5-4
4CX250BC	4CX20,000A	833A	TH5-6
4CX250BT	4CX20,000B	8161R	TH6-3
4CX250R	4CX20,000C	8560AS	TH6-3A
4CX350A	4CW10,000A	EF86	YC130/9019
4CX350AC	4CPW10,000R	EL34	SK300A
4CX400A	4X150A	EL509	SK1300
4CX800A	5CX1500A	SV83	SK1320
		SV300B	

### Watch this list GROW!

• Manufactured in Russia's largest power tube factory • Generous warranty based on high quality • Honest prices based on quality at low cost • Check our Stocking Distributors for best price and delivery

[www.svetlana.com](http://www.svetlana.com)

Headquarters: 256-882-1344 Fax: 256-880-8077 • Engineering: 650-233-0429 Fax: 650-233-0439

Circle (226) On Reader Service Card



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	Consoles	Recorders	Tax Deductable
Amplifiers	Disco-Pro Sound	Remote & Microwave	Test Equipment
Antennas & Towers & Cables	Financial/Leasing Services	Repair Services	Transmitter/Exciters
Audio Production (Other)	Limiters	Satellite Equipment	Training Services
Business Opportunities	Microphones	Software	Tubes
Cart Machines	Miscellaneous	Stations	Turntables
CD Players	Monitors	Stereo Generators	Positions Wanted
Computers	Receivers & Transceivers	Tapes, Carts, Reels & CD's	Help Wanted

### Classified Advertising Rates Effective January 1, 1998

1-9 col inch (per inch) \$75  
10-19 col inch (per inch) \$70  
Distributor Directory \$115  
Professional Card \$80  
Station/Studio Services \$175  
Classified Line Ad  
Blind Box Ad

1x	3x	6x	13x
\$75	73	70	63
\$70	68	65	58
\$115	113	110	99
\$80	78	76	68
\$175			
		\$2.00 per word	
		\$16 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 \$225, at the 3x rate \$219, at the 6x rate \$210, at the 12x rate \$189, etc.

## TRANSMITTERS

### TRANSMITTERS

#### Want to Sell

Gates BC5P 5 kW AM xmtr, working when removed from service, some solid state updates & spare parts, \$2000/BO. Kore, 541-747-5673.

### REBUILT TRANSMITTERS

Call **ARMSTRONG TRANSMITTERS**  
PH: 315-673-1269  
FAX: 315-673-9972

Harris MW5B FM 5 kW 1984, night pwr adjustable, working when removed, mostly solid state, \$13,500. J Goggan, 314-239-0401.

**OFF THE AIR? EMERGENCY BACK-UP RENTALS**  
FM Exciters - STLs - FM Pwr Amps - Antennas - Studio & Test Equipment  
SCMS Inc (800) 438-6040  
"YOU KNOW WE KNOW RADIO"

QEI 675 exciter, 20 W, gd working cond, presently on 100.3 MHz w/new manual, \$1000. T Peloubet, 517-631-5583.

QEI Quantum 2.4 kW solid state w/300 W exciter, used 2.5 months, in perfect cond,

\$16,000. D Magnum, 608-372-9600.

Gates BC-250GY 250 W, AM, Circa 1958, gd cond, \$800; Harris BC5HA 5 kW Am on 580, excel cond, \$6000; Harris BC10H 10 kW AM on 1090, gd cond, \$9000. T Toenjes, 785-437-6549.

**BROADCAST EQUIPMENT**  
USED: FM/AM Transmitters, RPU's, STL's, FM Antennas, Consoles, Processing, etc. CONTINENTAL COMMUNICATIONS, 3300 Chippewa, St. Louis MO 63118. 1-800-664-4497 FAX: 314-664-9427.

Harris/Gates BC1G 1 kW for parts or operation, working when removed 7/9/98, \$3500. K Weaver, 864-654-1560.

**Advertise!**  
Call **703-998-7600** for details

# 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.

100 W FM 1985 Harris FM100K	2.5 KW AM 1975 McMartin BA2.5K
100 W FM 1985 Harris FM100K	5 KW AM 1969 Harris BCH5H
1.8 KW FM 1993 QEI Solid State Quantum	5 KW AM 1980 Harris MW-5A
5KW FM 1990 Harris HT5	5 KW AM 1982 Continental 315F
5KW FM 1971 Harris FM5H3	50 KW AM 1978 Continental 317C-1
10 KW FM 1965 ITA 10,000B	50 KW AM 1981 Continental 317C-1
20 KW FM 1977 RCA BTF 20E1	50 KW AM 1981 Harris MW-50B
	50 KW AM 1982 Harris MW-50B
	50 KW AM 1986 Harris MW-50C3

2655 Philmont Ave #200, Huntingdon Valley, PA 19006  
**800-441-8454 • 215-938-7304 • FAX No. 215-938-7361**

VISIT OUR INTERNET SITE: [WWW.TRCORP.COM](http://WWW.TRCORP.COM)  
SEND YOUR E-MAIL REQUESTS TO [TRANSCOM@TRCORP.COM](mailto:TRANSCOM@TRCORP.COM)  
WE NOW ACCEPT VISA AND MASTERCARD

Circle (225) On Reader Service Card

# INCREDIBLE TRANSMITTERS



## TV TRANSMITTERS FM RADIO TRANSMITTERS Including Stereo Encoder

1Watt	\$1,114	1Watt	\$1,138
2Watt	\$1,664	30Watt	\$1,499
4 Watt	\$2,138	300Watt	\$3,174
20 Watt	\$3,880	600Watt	\$5,960
40 Watt	\$5,046	1KWatt	\$8,716
100 Watt	\$6,206	2KWatt	\$11,905
200 Watt	\$9,874	4KWatt	\$20,741
400 Watt	\$13,171		
800Watt	\$18,295		
1KWatt	\$22,900		
2KWatt	\$38,900		

## TAYLOR The Transmitter People

Taylor Bros. (Oldham) Limited, Lee St. Oldham England. Tel: 0161 652 3221, Fax: 0161 626 1736

Used PTEK 500W FM amplifier, \$2950, full manufacturer's 2 year warrentee. Other power amps and exciters also available. 408-448-3342.

### Want to Buy

McMartin AM/FM xmtr, any model, exciter or stereo modules. Goodrich Ent., 11435 Manderson, Omaha NE 68164. 402-493-1886.

Don't Gamble with your Advertising Dollars!

Advertise in Radio World and reach 18,000+ subscribers. Call Simone at 703-998-7600 today!

TURNTABLES

Want to Sell

Technics 1200MK2 (2), as new, \$399 ea +shpg. M Butzner, 510-885-3588.

Technics SP 25 TT's (2) w/base & tonearms; Harris CB-1201 TT w/tone arm & preamp; Russco Quemaster TT (2) on table w/fold up legs w/tonearms & preamps. C Zimmerschied, 660-826-1050.

Technics SP15, \$200; Shure 16" tonearm w/GE & Stanton carats, \$150; Stanton 310 phono preamp, \$50; Esoteric RE-EQ phono, \$200; SAE 5000 pop remover, \$75; Burwen Research TNE 7000 pop remover, \$75. G Dunn, 925-516-0299.

SERVICES

Tower Sales & Erection
Turnkey Site Development
Installation & Maintenance
AM/FM Broadcast, TV
Microwave Systems,
Antennas & Towers
TOWERCOMM
Communications Specialists
Steve Wall
President
Gen. Contractor #25891 Fax (919)781-6454

UTAH TOWER CO.
COMMUNICATIONS
CONSTRUCTION AND
MAINTENANCE AM/FM
CELLULAR, PCS, TV DIGITAL
MICROWAVE ANTENNAS &
TOWERS
SERVING THE WESTERN U.S.
FAX/PHONE (801) 667-3490
CELLULAR (801) 368-4809

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 or www.needleexpress.com.

Advertise!
Call your advertising representative
703-998-7600
for details & deadlines

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
Are you currently a subscriber to Radio World?
Signature
Date
Please check only one entry for each category:
I. Type of Firm
II. Job Function

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



ADVERTISE!

in the pages of RADIO WORLD

Your ad appearing in Radio World's BROADCAST EQUIPMENT EXCHANGE will reach 18,000+ broadcast equipment buying prospects.

For more information, contact Simone Mullins at

703-998-7600

Radio World FREE PRODUCT INFORMATION

Please fill out contact information. Then circle the Reader Service numbers below right that correspond with the advertisements or articles that you would like to receive free information on. THIS IS NOT A SUBSCRIPTION CARD.

Signature Date
Name
Title
Company
Address
City State ZIP
Telephone FAX
E-mail

1 Type of Firm (check one)

- D. Combo AM/FM stations
A. Commercial AM station
B. Commercial FM station
C. Educational AM/FM station
E. Network/group owner
F. Recording Studio
K. Syndicators/Radio Station Service Providers
G. Audio For Video (TV Station/Teleprod Facility)
H. Consultant/Ind Engineer
I. Mfg. Distributor, or Dealer
J. Other

2 Job Function (check one)

- A. Owner/President
B. General Management
C. Engineering
G. Sales
H. Programming/News
J. Promotion
F. Other

3 Purchasing Authority

- A. Authorize/Make Final Decision
B. Evaluate/Specify/Recommend
C. No Purchasing Authority

4 Equipment/Services Purchases in the Next 12 Months (Check all that apply)

- A. Transmission, STL/RPU
B. Antennas, Towers, Cable
C. Audio Procession Delays
D. Telco, Codecs, Remote, Field, Audio
E. RDS/RBDS & Subcarrier Equipment
F. Delivery Systems & Satellite Equipment
G. Digital Editing & Production
H. Live Assist, Automation
J. Consoles, Mixers, Cabinetry
K. Headphones
L. Microphones
M. Monitors/Speakers
N. Studio Audio Sources & Switching
O. Syndicated Programming
P. Test, Monitoring & Remote Control

5 Equipment Budget For Next 12 Months

- A. Less than \$25,000
B. \$ 25,00- 99,999
C. \$100,000 - 249,999
D. \$ 250,000- \$499,999
E. Over \$500,000

X07
August 19, 1998 Issue
Use Until November 19, 1998

Table with 5 columns of numbers (001-035) and 5 rows of numbers (036-210) representing Reader Service numbers.

For Immediate Response, Fax to: 703-820-3310

# EMPLOYMENT

## HELP WANTED

**Radio is changing. Will you join in or watch from the sidelines?**

*Do you know your stuff?*

Prophet Systems, the leader in digital audio broadcast systems, might be the place for you. Opportunities for tech support, programmers, engineers and sales. Great salary and benefits.

Check out listings on the web: [www.prophetsys.com](http://www.prophetsys.com) or call (308)284-3007.



**AFTERNOON AND EVENING OPENINGS T&R** To: Box 348, Mt Vernon OH 43505. EOE.

**CHIEF ENGINEER** needed for 2 FM, 1 AM radio group in Manchester, NH. AM is DA, FM's are Class B and A. Two transmitter sites, one studio location. We need a dedicated professional with experience in RF and studio maintenance, troubleshooting, repair, projects and digital storage. Letter and resume to Ray Garon, Saga Communication of N.E., 500 Commercial Street, Manchester, NH 03101 or Fax resume to 603-669-4641. **No phone calls please.** E.O.E.

**ASSISTANT CHIEF ENGINEER:** AM-FM and 3 state satellite fed networks. For an experienced engineer, this opportunity offers a future and growth potential as present chief nears retirement. Highly respected company. 2-person department. Excellent benefits, some travel with major college sports network. Resume to: Chief Engineer, WIBW Radio, PO Box 1818, Topeka, KS 66601 or email to: [wibwradio@97country.com](mailto:wibwradio@97country.com) or fax to: 785-272-3536. EOE.

**BROADCAST ENGINEER** - 5 stations AM's/FM's. Extensive transmitter and studio equipment and maintenance knowledge essential. Experience needed in satellite receivers. AM Directional knowledge desirable. Full time opportunity. Send resumes to Susanne Mowbray, WSWA, PO Box 752, Harrisonburg VA 22801.

**RADIO BROADCAST ENGINEER: Bliss Communications, Inc.** seeks a Radio Broadcast Engineer to service radio stations in Janesville, West Bend, Wisconsin Rapids and Racine. Individual will be based in Janesville, reporting to VP/Technical Director and will be directly responsible for FCC compliance; station functionality, preparing specifications for capital and technical improvements; equipment upgrades and installations; ensuring technical services satisfy operational needs of the station General Manager. Successful candidate will have three to five years experience or the equivalent and broad exposure to electronics, PC's and current communication technology. Individual must have strong written, oral and presentation skills and be capable of communicating with technical and non-technical personnel. Bliss Communications is a growing family-owned media company that also operates daily newspapers, specialty publications and commercial printing facilities. Competitive compensation package including health, dental, life and disability insurance offerings, 401(k) and profit sharing, in a flexible and progressive working environment. To apply send cover letter, resume and salary history to: VP/HR - RBE, Bliss Communications, Inc., PO Box 5001, Janesville WI 53547-5001 or [MJVilla@gazetteextra.com](mailto:MJVilla@gazetteextra.com).

**Looking for experienced air talent** to fill possible future full time opening. Strong, progressive company. Health, dental, 401K and profit sharing. All responses kept confidential. Respond to: Radio World, POB 22041, Falls Church VA 22041. Attn: Box # 98-8-19-1RW.

## POSITIONS WANTED

**Broadcast pro w/over 20 yrs** exper seeking to relocate in the midwest, exper PD, OM, APD, prod, digital. 715-236-2072.

**ADVERTISE!**  
**703-998-7600**  
**call now!**

**CE/Computer Tech** w/20+ yrs hands on engineering exper seeks CE position in a top 100 market, strong audio, computer networking & RF skills. 704-563-8676.

**Hire young, hot talent** very cheap. Avail, seasoned, believable, affordable jock, news anchor, prod talent, engineer. Alex, 513-777-8423.

**On-Air weather** for your coverage area, live, faxed, email, 24 hours a day, 7 days a week. Chris 606-293-2341 or email: [WX1534@AOL.COM](mailto:WX1534@AOL.COM).

**ADVERTISE**  
**in RADIO WORLD's**  
**Broadcast Equipment Exchange**  
**CALL 703-998-7600**



# 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.
62	Air Corp	128	1	Harris	27
45	Antex Electronics	212	30	Harris	30
36,37	Arrakis	184	64	Harris	36
16	ATI	130	16	Henry Engineering	104
48	Audi-Cord Corporation	129	54	IBN Radio	71
22	Audio Broadcast Group	81	20	Inovonics	29
46,47	Audio Broadcast Group	-	52	Inovonics	15
12	Audio Precision	28	50	J Squared Technical Service	75
2	Audioarts Engineering	1	65	J & I Audio/Video	233
65	Auralex	234	38	Knights Communications	210
50	Autogram Corporation	20	55	Mackie Design	12
19	Belar	157	42	Musicam USA	134
62	Benchmark Media Systems	127	40	Sennheiser/Neumann USA	185
6	Bext	105	50	Nott Ltd.	48
50	Boston Financial & Equity	22	44	OMB America	186
16	Broadcast Devices, Inc.	26	59	Omnitronix	13
13	Broadcast Electronics	54	67	Pike's Peak Satcom	230
29	Broadcast Electronics	4	14	PR&E	80
35	Broadcast Electronics	209	32	Prophet Systems, Inc.	82
48	Broadcast Richmond	-	48	PTEK	103
51	Broadcast Software Int'l (BSI)	10	33	OEI	108
16	Broadcast Tools	51	17	Radio Systems	132
15	BSW	106	48	Reach Radio Network	24
4	Burk Technology	79	68	RF Parts	227
49	Cartworks/DBM	9	67	Satellite Systems	231
41	Circuit Research Labs (CRL)	211	50	S.C.M.S., Inc.	23
48	Circuit Werkes	76	18	Scott Studios	3
3	Clark Communications	53	48	Shively Labs	50
7	Comrex	131	62	Silicon Valley Power	74
50	Comrex	102	34	Sine Systems	183
27	Continental Electronics	158	11	Sony Pro Audio	-
16	Cortana	52	50	Spacewise Broadcast Furniture	49
21	Crown Broadcast	55	53	Superior Broadcast Products	11
23	Cutting Edge	107	68	Svetlana	226
39	Denon America	159	9	Telos Systems	2
50	Econco	46	54	The Radio Mall	45
68	Econco	228	68	Transcom	225
48	Electronic Research Inc.	77	43	UPI	160
31	Enco Systems	56	24	USA Digital Radio	133
62	Excalibur Electronics	78	65	V-Soft	229
16	FirstCorp	72	62	Weatheradio	125
54	Ghostwriters	98,19	71	Wheatstone	37
16	Gorman-Redlich Mfg. Co.	25	72	Wheatstone	38
65	Hall Electronics	232	57	Yamaha Corp.	14
62	Halland Broadcast Services	101			

Production Director	..... Lisa McIntosh	Marketing Manager	..... Heather Harris
Production Manager	..... Jeff Fisher	Ad Traffic Asst./Classified Coordinator	..... Anastacia Stornetta
Publication Manager	..... Jennifer West	Ad Coordination Manager	..... Simone Mullins
Showcase Coordinator	..... Vicky Baron	Circulation Director	..... Sheryl Unangst
Ad Traffic Manager	..... Kathy Jackson	Circulation Manager	..... Robert Green
Desktop Management	..... James Cornett	Accounts Receivable	..... Steve Berto

## Advertising Sales Representatives

U.S. East: Skip Tash	..... 703-998-7600 ext 160 Fax: 703-998-2966
U.S. West: Dale Tucker	..... 916-721-3410 Fax: 916-729-0810
U.S. Midwest: Sandra Harvey-Coleman	..... 765-966-0669 Fax: 765-966-3289
Southwest Sales: Christopher Rucas	..... 415-922-5595 Fax: 415-922-5597
Other Regions: Stevan B. Dana	..... 703-998-7600 Fax: +1-703-998-2966
Latin America: Alan Carter	..... +1-703-998-7600 ext 111 Fax: +1-703-998-2966
UK, Ireland: Phil Guy	..... +44(0)1869-337508 Fax: +44(0)1869-337509
Europe, Africa, Middle East: Raffaella Calabrese	..... +39-2-7030-0310 Fax: +39-2-7030-0211
Asia/Pacific: 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 PO, Box 1214, Falls Church, VA 22041. Unsolicited manuscripts are welcomed for review; send to the attention of the appropriate editor.

## PROJECT ENGINEER

New York, NY

The ABC Radio Network's Engineering Department is seeking a Project Engineer to research, develop and implement capital projects and ensure the successful integration of new projects and technologies into the operation. The position involves directing the work of staff, consultants and vendors as necessary.

Interested candidates must have extensive experience with broadcast-related systems, including studio and transmission equipment, and familiarity with radio and television network operations. Strong broadcast engineering, construction, project management and budgeting skills are also required. Candidates must be detail-oriented and possess a "hands-on" attitude. For confidential consideration, please forward resume to:



Employee Relations ABC, Inc.  
Dept. MW  
77 West 66th Street  
New York, NY 10023

An equal opportunity employer m/f/d/v

## GENERAL MANAGER

Are you an entrepreneur-minded, result oriented Sales or Marketing Manager. If so, we would like you to join us and set-up our US subsidiary, recruit support personnel, set up distribution channel and develop our US sales. We are AETA ([www.aeta.com](http://www.aeta.com)), an international leader in audio compression and data communication technology with a history of industry firsts: first 15kHz ISDN Codecs, first with a 7kHz POTS Codec.

If you have a technical degree and proven sales, marketing and management experience in the field of radio broadcasting equipment, please email your resume in confidence to [cosma@neta.com](mailto:cosma@neta.com). Excellent compensation package. Location in an East Coast city, to be determined.

## Search Extended

### Director of Engineering and Operations BSU Radio Network

The BSU Radio Network has extended its search for a Director of Engineering and Operations to supervise the technical management of the network's three production centers (Boise, Twin Falls, and the Idaho Statehouse) and its transmitter network. Two Chief Engineers and a Broadcast Information Systems Manager report directly to the Director of Engineering and Operations, as well as a large number of student, part-time, and contract technical staff.

BSU Radio operates a network of three program services (news & information, arts & performance, and jazz) over a network of 16 stations and translators throughout southwest and central Idaho. It also operates a Public Radio Satellite System Uplink, and has just installed a quarter million-dollar digital broadcast system.

The successful candidate will have experience in the supervision and training of technical personnel, and will possess exceptional engineering skills. The candidate will also demonstrate strong communication skills needed to represent BSU Radio to administration, the public, and industry professionals. Additional skills in the area of strategic planning and budgeting are preferred. The Director of Engineering and Operations may be called on to fulfill the duties of the General Manager when that staff member is unavailable or on other assignment.

If you have strong RF skills, 5-10 years of progressively responsible experience in broadcast engineering, digital broadcast systems, operations, and management - if you like to travel, climb mountains (many of our transmitter sites are on remote mountain sites above 7,000 feet elevation) - we want to hear from you! A bachelor's degree in engineering or a related field, or SBE Professional Broadcast Engineer certification is required.

Salary: \$50,000-\$60,000 D.O.E., plus a competitive benefits package. Cost of living in Idaho is low, and the quality of life in Boise is superb -- blending major market amenities with hometown friendliness.

Send your resume, a list of three professional references, and a cover letter to: James V. Paluzzi, General Manager, BSU Radio Network, 1910 University Drive, Boise, ID 83725. Deadline for applications: September 25, 1998. AA/EEOE

Sometimes  
we have to  
settle for  
what we  
need...

Wouldn't  
you rather  
Get what  
you  
**WANT?**

We've taken the very **best** technology, components and field engineering input to make this the **FINEST** console available.

The **A-6000** is engineered specifically for major market stations that demand a lot of function and need to lead with technical excellence. It's based on an open architecture mainframe that lets you change module locations with **no** restrictions, giving layout top priority and allowing easy reconfiguration as format needs change.

The **Wheatstone A-6000** has the appearance, features and power to excite the most demanding program and production staff; its engineering, performance and thoughtful design will help your personnel achieve broadcasting excellence.

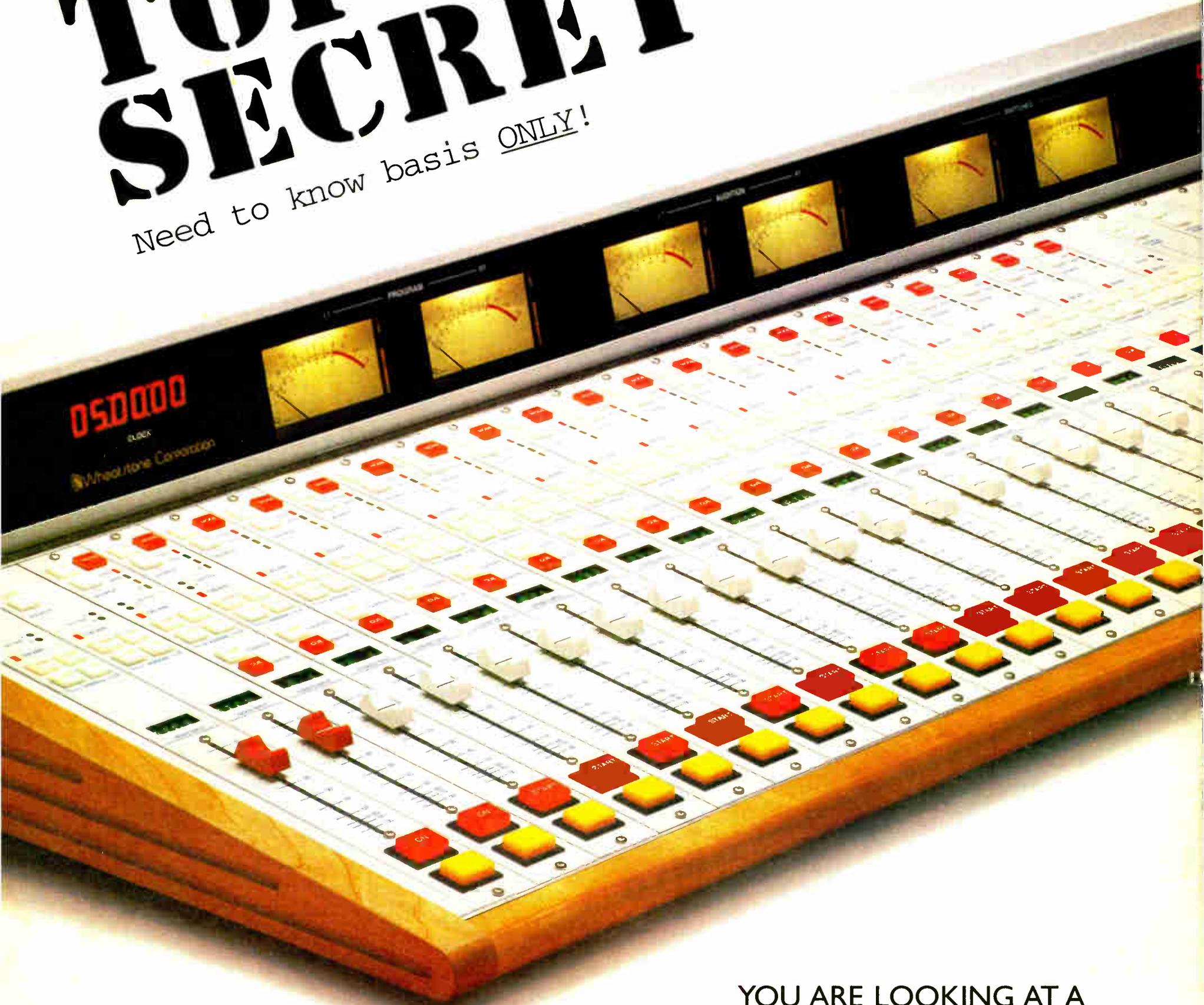
 **Wheatstone**

315-452-5000

Circle (37) On Reader Service Card

# TOP SECRET

Need to know basis ONLY!



## YOU ARE LOOKING AT A **DIGITAL** RADIO CONSOLE

The *latest*. The *BEST*. Yet to the unknowing eye it's identical to the standard analog consoles your staff has been running for years. No keyboards, no TV screens—just straightforward, hands-on controls.

*Think of it:* no retraining personnel, no long drawn out learning curves, no expensive on-air mistakes while your operators “get the feel” of a new technology—as far as they're concerned, it's business as usual.

And since the D-500 can accept and output both digital *and* analog signals, your existing equipment doesn't need to be replaced all at once. You can proceed with conversion at your own pace, according to your own financial timetable.

If you've decided to go digital, let WHEATSTONE help make the switchover as painless as possible. Get in touch with us and find out more!

 Wheatstone Corporation

600 Industrial Drive, New Bern, NC, 28562 USA (tel 252-638-7000)

Circle (38) On Reader Service Card  
World Radio History