

*****3-DIGIT 857
 S101903 D08 0103 275
 BARRY MISHKIND
 2033 S AUGUSTA PL
 TUCSON AZ 85710 7905

Is Your Public File in Order?

Jack Layton does alternative inspections. He has seen his share of problems.

Page 25

Armstrong's Legacy

The landmark Alpine tower helps save TV in New York.

Page 8

Radio World

The Newspaper for Radio Managers and Engineers

October 24, 2001



INSIDE

ENGINEERING

▼ IBOC Q&A: Dick Fry answers common questions.

Page 21



▼ In Florida, new facilities for a radio reading service.

Page 14

STUDIO SESSIONS



▼ We try out a Yamaha DAW; Bruce Bartlett explains surround-sound mic techniques and ARP helps the Grease build a studio.

In This Issue

A MESSAGE FROM HANK

▼ A lucky reader in Illinois wins a Henry Engineering DigiStor II Multi-Message Digital Audio Recorder.

Page 4



Potential XM customers will see this kiosk in retail locations.

XM Rollout Underway; But Will Consumers Sign Up?

by Leslie Stimson

WASHINGTON The companies that have developed satellite digital radio for the United States have what some observers see as the unfortunate luck of rolling out their new service during this fourth quarter, hoping to take advantage of consumer electronic sales during the holiday season.

Question of timing

Planning for the rollouts took place long before the Sept. 11 terrorist attacks. Now, economic forecasters believe the attacks on the World Trade Center and the Pentagon plus the prospect of military conflict have undermined the confidence of consumers and investors. Whether the economy recovers in time to boost the nation's fourth-quarter retail sales, and the fortunes of the fledgling satellite radio industry, remains a question.

See XM RADIO, page 5

NEWS ANALYSIS

FCC Reduces Data Bugs

by Naina N. Chernoff

WASHINGTON Engineers and attorneys who use the FCC's Consolidated Database System report marked improvement in the software.

Members of the Association of Federal Communications Consulting Engineers and the Federal Communications Bar Association say they've seen progress in solving some of the problems associated with the database and its electronic filing capability.

The groups believe CDBS will continue to improve.

"I believe that the FCC's staff is carefully considering our comments and suggestions, and implementing changes as their resources allow," said Joe Davis, a partner at Cavell, Mertz & Davis Inc., who also served as AFCCE president until June 2001.

"Some progress has been made, and we are doing what we can to prompt further needed improvement."

Since the database was launched in 1999, users have criticized CDBS because of its inaccurate records, causing a headache for the consulting engineers who use the database to generate technical studies (RW, May 23). Other

See CDBS, page 3

Continental Electronics

AN IDT COMPANY

816R Series FM Transmitters

Known throughout the world as the best performing, most reliable FM transmitter.

Now available through select RFS offices!

800.733.5011 www.contelec.com



NewsBytes Now
 Every Business Day
 at www.rwonline.com

◆ NEWS WATCH ◆

RTNDA Faces \$2 Million Loss

WASHINGTON The Radio-Television News Directors Association faces a potential \$2 million loss for this year, half of its annual revenue, because it cancelled its annual convention in September. The event had been set to begin in Nashville the day after the terrorist attacks.

In a letter to registrants, exhibitors, sponsors and others, RTNDA President Barbara Cochran said its leaders were working with the association's insurance company to see how much of the loss could be recovered.

Canceling the show "was the proper course to take," said Cochran. "The news professionals and others who would have attended the convention turned to their most important duty, serving the public in a time of great crisis."

"The performance of television, radio and Internet journalists in the days after Sept. 11 should make us all proud and confirm the importance of the news media to our democracy."

ERI Plans Growth

CHANDLER, Ind. ERI will add a 15,000-square-foot production facility at its Indiana headquarters to handle

increased business.

The RF supply company says it has increased staff in its structural division, where it has seen an increase of 33 percent of workload.

"Our next expansion will be to increase the office facility by more than 20 percent to accommodate our administrative staff increases in HR, sales, customer service and engineering," said Scott Beeler, director of worldwide sales.

"We have also designed and built a new filter lab with in the existing facility. This lab is much larger and will allow complete assemble of the filter/combiner system with in the lab."

Pirate Awaits Sentencing

WASHINGTON Sentencing is set for Dec. 12 for a Virginia man convicted of operating an FM station without FCC authorization.

The FCC Enforcement Bureau said the U.S. District Court in eastern Virginia convicted Khalid Kubweza in September for operating an unlicensed FM radio station on 91.7 MHz from his Richmond residence.

Previous commission and court actions had failed to deter Kubweza from operating his unauthorized FM radio station from his home, said the FCC. The agency and the U.S. Marshals Service searched Kubweza's home and seized station equipment used in the trial.

Operators of illegal, unlicensed broadcast stations may be subject to civil penalties of up to \$11,000 per violation and criminal fines of up to \$100,000 or up to one year in prison or both.

Index

FEATURES

Speaking of Speaker Cable by Steve Lampen	7
Radio Legacy Saves N.Y. TV by Frank Beacham	8
Florida Reading Service Upgrades With CAT-5, WireReady System	14
Workbench: Whose Standards Are Being Compromised? by John Bisset	17
Ready for FM IBOC? Here's a Q&A by Richard J. Fry	21

GM JOURNAL

Is Your Public File In Order? by Jack Layton	25
Radio Shows Its Mettle In Time of Crisis by Harry Cole	25
Tom Peters: The Weirdoes Will Win By Ken R.	26
Conrad's House Knocked Down by Laura Dely	26
Radio Broadcasters Do Right by Mark Lapidus	28
Mrs. Jones — And Mr. Jones Too by Ken R.	31
Bayliss Roast Postponed to Spring by Laura Dely	36
Pederson Is New NRB President by Laura Dely	36

STUDIO SESSIONS

A Studio Built In Only 13 Hours? by Alan R. Peterson	39
AW4416 Right for Indy Producers by Alan R. Peterson	39
Surround-Sound Mic Techniques by Bruce Barlett	40
Product Guide	46

BUYER'S GUIDE

Console Line Gains Following by Mark W. Persons	49
Harris Moves Cox to Digital by Dom Bordonaro	49
Logitek Makes 'Virtual' a Reality by David Lawrence	50

OPINION 62

BIG EASY

TECHLINE STUDIO FURNITURE

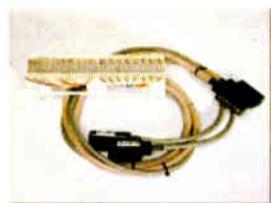
Easy to INSTALL — Easy to AFFORD!

- machine-tapped rack rails
- built-in top and bottom ventilation
- removable doors
- punchblock enclosure available
- compatible with Wheatstone Wiremax System
- available with type 66 or Krone™ blocks
- modular design for variety of configurations
- both standup and sitdown heights
- above counter turret accessories
- fast installation
- generous wireways
- built-in levellers



STARTS at \$2900

Available options include
prewired punchblocks



OUR HIGH-STYLE TECHLINE STUDIO FURNITURE

boasts uncompromising **QUALITY** tailored to the **TIGHTEST BUDGETS**, with all the features a well-designed studio calls for. **A TRULY COST-EFFICIENT SOLUTION FOR YOUR NEXT STUDIO PROJECT!**

 **Wheatstone Corporation**
tel 252-638-7000 / fax 252-635-4857 / sales@wheatstone.com / www.wheatstone.com

copyright © 2001 by Wheatstone Corporation

CDBS

► Continued from page 1
users have reported difficulty in filing mandatory applications using CDDBS.

One senior engineer in the commission's Audio Services Division said the division has been working hard to address users' concerns in the last few months. An ad-hoc committee from AFCCE has been meeting with division representatives once a month. A similar committee from FCBA has been meeting with the division whenever problems arise as well.

Improvements

Among the improvements on which the Audio Services Division staff has been working is rewriting software to ensure that attachments to electronically filed applications can be viewed; instituting 15 to 20 data validity checks to guard against inaccurate data from getting into the database; and checking whether current records contain accurate information.

The FCC engineer said the division also refined the way the system works. For example, FCC staffers now confirm that attached sales agreements can be viewed before sending out a

public notice.

Through a series of validity checks, the division has searched all AM and FM database records for inaccurate data in a variety of fields including frequency, channel, service codes, station class, status, height, coordinates and subsidiary coordinates.

The staff has also checked different types of information contained in engineering records including tables to

make sure each table contains legitimate values. The division is conducting spot checks on a day-to-day basis to check that records are archived properly.

Normally, validation of each application catches missing or mistyped information, the engineer said, but these checks were established to make sure the information makes sense.

One engineering consultant, who

asked that his name not be used, said the division is making great strides despite a lack of resources.

"The errors are not showing up as often," he said. But the FCC still needs additional money and manpower, he said, and without such resources, eliminating the errors will take "a long time."

AFCCE's Davis is pleased with the progress of the ad-hoc committee.

continue until the remaining issues are resolved. After the improvements are complete, he said, CDDBS would be a valuable tool for submitting and reviewing FCC files for AFCCE members as well as others.

Complications

"As with any large project, there are complications that have to be defined and solved," Cooper said. "However, AFCCE firmly believes that CDDBS eventually will be a 'can't live without' service from the commission's Mass Media Bureau."

FCBA committee members expressed a similar sentiment about the support they've gotten from the division.

"From my vantage point, they've been open and tried ways to remedy problems," said Dennis Corbett, attorney at Levanthal, Senter and Lerman. "The FCC is not running from the problem."

Corbett said the FCC has been responsive to FCBA's concern since it started to make electronic applications mandatory last year. When the FCBA questioned the mandatory electronic filing of Forms 301, 314 and 315, the FCC agreed to phase in the electronic capability, he said.

More recently, FCBA members met with the division to discuss the use of federal regulation numbers on applications, which is a common piece of information asked for on mass media and wireless forms. Corbett said there has been some confusion over what is required on the different forms and the system is not uniform for each FCC database.

That is one thing that might be solved in the future when the FCC contracts one contractor to do all of the work on its database (a plan already in place for the next fiscal year, said an FCC source).

In order to limit any problems to the various databases that might result from the plan, he said, the commission is taking steps to ensure a smooth transition.

The FCC is not running from the problem.

— Dennis Corbett

"I think it has been very helpful for the consultants to hear from FCC staff regarding the continued development of the CDDBS and electronic filing," he said. "In turn, I believe our feedback and comments to the FCC staff have been helpful in their efforts to make the system work better."

Davis said the committee discussed three issues in particular with the division: electronically filed exhibits/ attachments that are missing despite successful uploading; error checking when data is electronically filed; and the validity of engineering data that is contained in the database. The FCC said it has resolved or is close to solving many of the problems associated with these issues.

Due to the error checking ability of the software, Davis said, there have been some "bugs" that prevented CDDBS from accepting an application due to missing data, even the data is not required for a particular station. However, he said, the division staff has been responsive to correcting the problem.

AFCCE President Charles Cooper, a partner with duTreil, Lundin & Rackley Inc., said the meetings would

NEWSWATCH

Sirius Names Ledford To Engineering Post

NEW YORK Sirius Satellite Radio has a new senior vice president of engineering, Michael Ledford.

Ledford was formerly the head of automotive strategy at Wingcast, a joint venture between Ford Motor Co. and Qualcomm developing advanced wireless vehicle applications. Ledford will oversee engineering operations, including receiver manufacturing programs.

Prior to Wingcast, Ledford was executive director of Telematics at Ford, with global responsibility for the development of advanced communications and information services.

"Mike's extensive automotive industry experience will assist us in working even more closely with our OEM partners," said Sirius Chairman and Chief Executive Officer David Margolese.

LPB Opens New HQ

CONSHOHOCKEN, Pa. LPB Communications Inc., owner of LPB, Fidelipac and Omnitronix brands, has opened a new headquarters just west of Philadelphia.

LPB President Tom Spadea stated, "We have been anticipating this move for the past year and are looking forward to having all our operations under one roof."

Spadea expects the move will better serve customers and will prove cost-effective. The new building allows LPB employees to test multiple high-power transmitters at the same time thanks to more available electrical power at the site.



Foreground: LPB's New Quarters

More innovative solutions...



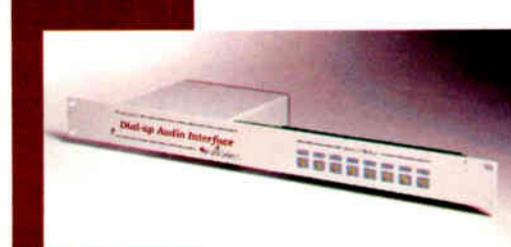
Thermal Sentry III
monitors transmitter operating temperature
analog output for remote monitoring
programmable alarm output with relay
front panel adjustments and LED display
two air temperature sensors included
indicates failed or clogged ventilation system
early warning for antenna icing conditions

el tsn-3



Time • Temperature • ID
time and temperature delivery for automation
60 seconds of user recordable storage
automatically varies message delivery
professional male announcer voice
temperature in Fahrenheit or Celsius
battery backed AC synchronized clock
digital message storage - no moving parts

model tti-2



Dialup Audio Interface
perform unattended remote broadcasts
DTMF operated controller with relay outputs
fully programmable output on any key press
momentary and/or maintained relay outputs
four logic inputs with programmable output
balanced audio input and output with ALC
seven DPDT relays and one 4PDT relay

model dai-2

innovative solutions

Sine Systems

nashville, tennessee • 615.228.3500 voice • 615.227.2393 fax-on-demand • www.sinesystems.com

Don't Toss Those Carts Just Yet

Recently I asked whether you are still using carts.

"We still use carts, and probably will until the tape is no longer available," wrote Tom Taggart, who runs two stations in West Virginia.

"Why? For one thing we are live 24/7, hence no advantage to have hard-drive automation. The equipment is cheap, and much more reliable than an 'all-eggs-in-one-basket' hard-drive system," he said.

"I just traded \$100 in expenses and time — a two-day trip to New Jersey to pick up some used equipment — for a couple of Delta players. And if one cart, or one player dies, it is certainly less of a crisis than if the software (or operator) gets confused, or the computer crashes.

"Also, until recently, my PD was unhappy with the sound quality of early software run on slower processors. This is less of a concern with the newer Pentium processors. A Celeron is now in use in our

production studio using Sound Forge."

Another vote for carts comes from Al Gordon, assistant program director and music director for Talkline Communications Network.

It's a Jewish media company that brokers time on WMCA(AM) and WPAT(AM) in New York, as well as other radio and TV stations around the world.

"I do a weekly contemporary Jewish music program on WMCA, complete with jingles, phones and contests in a top-40 style presentation. We were using carts up until a few weeks ago, when WMCA and sister WWDJ(AM) moved facilities.

"I really miss them. WMCA is totally automated, and we and maybe a couple of other brokered programs remain live out of a separate control room feeding into the master control room. We are on WMCA from 9 p.m. Saturday until 6 a.m. Sunday, and I do the 2-6 program," Gordon said.

"Our new system for the spots is a computer that you click on the appropriate spot or audio and it comes up on a pot on our new digital board, where one can digitally change the inputs on the pots.

"This is all well and good, and I must admit pretty tight if I know where I am going next; however, loading the audio in is no picnic. Since our spots change very rapidly by season (the next upcoming Jewish holiday sale, for example), I found it very easy to dub audio onto carts and just reach for them as my log dictated to me.

"Now, another story — I still need to dub my jingles from reel into the computer, but the reel-to-reel is not in the control room as yet. I do, however, have turntables that I can still use; a lot of my old Yiddish songs are on vinyl.

"Hey, I may be running the only turntables in New York!"

Well I don't know for certain, Al, but I'm betting there are other platters still spinning somewhere in the Big Apple. Good luck getting up to speed with digital.

The topic of engineer safety has prompted responses. Among them is an e-mail from Buc Fitch, who writes about the National Electrical Code for Radio World.

"Glad to see you revisit the topic of safety," he wrote. "Since most station complexes employ only one tech type, and since that one tech type often leaves in a huff, many folks take over their new CE duties with *no* knowledge of the plant.

"Many years ago, I was almost tossed across the room when I came upon 120 volts AC on the terminal strip connection of the squelch relay external contacts on the back of a STL receiver.

"This was the 'always on' control voltage from the FM transmitter used as fail-safe — no STL, no FM trans on. What idiot would run 120 volts in this manner without marking same and placing a contact shield over the wires associated with this circuit?"

"You're right, we work in a danger-

From the Editor



Paul J. McLane

ous business."

Please be careful out there. To adopt a saying from my radio newsroom days: We want to write *for* you, not *about* you.

Radio World is 25 years old next year. But Comrex has done even better. The company celebrated its 40th anniversary this summer with a barbecue for employees, family and friends.



John Andrews of Comrex helps celebrate the company's 40th.

John Cheney founded Comrex on June 23, 1961. It has made notable innovations in wireless microphones for TV ENG in 1973, frequency extension for audio over telephone lines in 1978 and a broad family of codecs today.

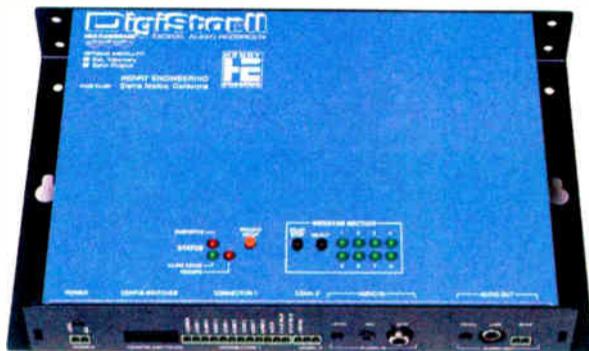
Congratulations to all who have made Comrex a success. 🌍

Our Silver Sweepstakes prize this issue is a Henry Engineering DigiStor II Multi-Message Digital Audio Recorder.

It can store up to 8 minutes — 16 optionally — of monaural audio with a bandwidth of 6.5 kHz. Multiple modes make it suitable for lots of applications: network news delay, station or translator ID and spot insert, message-on-hold, news and actuality lines, call-in phone information, you name it.

Eight messages can be played in any order. One-time or repeat play, automatic sequencing and message "stacking" are among the features. Messages can be individually recorded or changed, and are stored even if power is off. Recording and playback are via local or remote control. Its auto-coupler allows DigiStor II to be connected to a phone line for auto-answer message playback. It's another great product from a company that specializes in them. Retail value: \$795.

Our winner is Robert W. Seaberg of Wheaton, Ill., the owner of Seaberg Communications Service.



Which Transmitter Control System is Right for You?

- Front Panel Display
- Site-to-Site Control
- 16 - 64 Channels
- Studio Control with Flexible Communications



ARC-16

- 85 Sites
- 8 - 256 Channels / Site
- Built-in Macros



GSC3000

- Single Site Solution
- 16 Channels
- Built-in Macros



VRC2500

Burk is proud to add the GSC3000 & VRC2500 to our product line, giving you more choices with our continued high level of support.

BURK
TECHNOLOGY

Phone: 1-800-255-8090
Email: sales@burk.com
www.burk.com

XM Radio

► Continued from page 1

"We'll have to see how consumer confidence is," said XM Satellite Radio President and CEO Hugh Panero.

XM slowly has begun rolling out its service and expects it to be available nationwide by Nov. 15. Rival Sirius Satellite Radio plans a nationwide launch this quarter.

XM Satellite Radio began service in Dallas/Ft. Worth and San Diego and had 400 subscribers on Sept. 25. Panero said those early subscribers could actually hear the service a few days before that.

XM thought those customers might want to hear its news channels in the days after the attacks.

Key markets

Because XM delayed its launch by two weeks due to the terrorist attacks, it planned to accelerate part of its service plans to have receivers available by Oct. 18 in the southeast as well as the rest of the southwest.

Key markets that XM, receiver manufacturers and consumer electronics retailers have targeted for early sales include Los Angeles, Denver, Atlanta, Miami and New Orleans. These markets have relatively youthful populations and good consumer electronics sales history.

Alpine, Sony and Pioneer expect to have a combined 100,000 AM/FM/XM receivers shipped to retailers in time for the holiday shopping season.

The nation had been in an economic slump as summer drew to a close. But many analysts expect the dip to deepen due to the terrorist attacks as consumers hold off on big purchases this holiday season.

When asked by Radio World how economic factors might affect the sale of XM's service and its receivers in Q4, Panero said XM's service was a good product before the attacks and still is. He said the company has to move forward aggressively.

"To recede now would be a mistake," he said.

Still, XM has scaled back projections to 50,000 customers by the end of this year, down from the 100,000 it had projected in April. The company expects to have 4 million subscribers by 2004.

A potential satellite problem spooked some analysts in September. Boeing told XM and other clients of a potential long-term issue regarding the solar array output power on the 702 class satellites.

Reflectors that are supposed to focus light on the satellites' solar panels are degrading faster than expected. The satellites had been expected to last about 12 years before the problem was revealed.

XM said this issue will not affect receiver reception quality and insurance is likely to cover premature satellite failure. Now, the satellites are performing above their specified power levels. Boeing expects the satellites would not fall below those specs before "the latter half of the decade."

While nothing can be one for the satellites in orbit, Boeing said the problem would be addressed before XM's ground spare is finished.

XM has enough money to operate through the rest of its nationwide launch in November and a little beyond that time, but it needs to raise about \$200 million more by the end of 2002, according to filings with the Securities and Exchange Commission.

Panero said that may be difficult, but

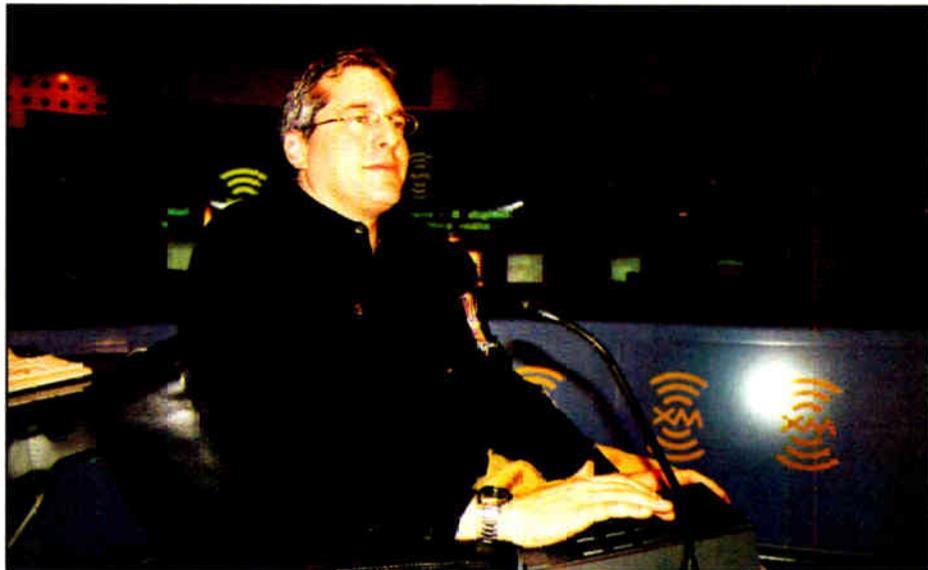


Photo by Leslie Stinson

In XM's Broadcast Operations Center, President/CEO Hugh Panero presses a button to launch XM's service in two markets.

he said the company has several strategic investors and he believes "the markets will come back."

Public investors own 40 percent of XM. Key investors include Clear Channel Communications (8.5 percent), General Motors Corp. (5.6 percent) and Honda Motor Corp. (2.3 percent).

Other factors

Consumer confidence is not the only factor that could affect the new product rollout.

Morgan Stanley Dean Witter analyst Vijay Jayant said success depends on how many automakers are committed to installing satellite digital radios in cars.

General Motors Corp. has invested some \$120 million in XM. It plans to offer XM radios as factory-installed options in two models of 2002 Cadillacs. Those cars will ship to auto dealers in November, said Dan Murphy, XM vice president, retail marketing and distribution.

Most of the retailers offering XM radios have dedicated kiosks and displays.

Murphy said although this holiday season will be "challenging," he said consumer electronics sales weather many economic downturns. He cited strong CD sales during Operation Desert Storm as an example.

Go Wild With Features, Or Stick to the Basics

Alpine, Pioneer and Sony are offering a total of 24 models of AM/FM/XM radios. They feature block text on backlit displays, which show the XM channel name and number, the artist name and song title.

Alpine is selling six XM-ready car headunits. Prices range from \$350 for Model CDA-7873, which features the hybrid amplifier and dual-color display, to the CVA-1003, which incorporates a flip-up, 6.5-inch LCD monitor. This model lists for \$1,100.

To receive XM's signal, these models need an Alpine XM tuner module that lists for \$280.

See SATELLITE RECEIVERS, page 6 ►



Sony's 'Plug and Play' XM Digital Receiver

RADIO SYSTEMS • MILLENIUM CONSOLES

604 Heron Drive, Bridgeport, New Jersey 08014
(856) 467-8000 voice (856) 467-3044 fax www.radiosystems.com



Disaster Relief
From now until the end of the year, Radio Systems will donate \$100 for every console sold to the American Liberty Partnership.

SMART CHOICE

- ✓ **EXCELLENT VALUE**
The bottom line is that Millennium consoles work because their performance, look and sound present the best console value around.
- ✓ **PROVEN**
Over 500 broadcasters use more than 3000 Millennium and RS series consoles to stay on the air every day. Most users who have bought one of our consoles bought another.
- ✓ **FULL FEATURED**
You can buy options for a Radio Systems console - but you don't have to! From full remote control to complete monitoring, Millennium consoles work right out of the box!
- ✓ **GREAT LOOKS**
Millennium consoles are beautifully styled with glowing soft-touch keypads and rich mahogany side-panels. And, owners can even inexpensively update their older consoles to a Millennium model.
- ✓ **GUARANTEED**
Our consoles come with the best warranty in the business with 2-year no charge overnight parts delivery to keep you on the air.
- ✓ **EASY INSTALLATION**
Make an afternoon out of installing your next console - not a career! These boards almost seem to wire and install themselves.
- ✓ **SUPERB ENGINEERING**
These boards have the low noise and distortion specs that you need to compete with digital alternatives. And full DC control and modular construction keeps the performance clean and repairs a snap for the life of the console.



DIGITAL NEWS

Germany Sees Analog 'Sunset' By 2015

BERLIN The German chancellor has named an analog "sunset date" for his country, putting to rest some doubts about the German government's commitment to digital radio.

Chancellor Gerhard Schroder said 2015 "is the latest date for the current analog radio to be replaced by digital radio."

The WorldDAB Forum welcomed Schroder's news, saying the analog sunset places digital radio "firmly" on Germany's political agenda.

The forum is a consortium of broadcasters, manufacturers and transmission providers that promotes the adoption of the Eureka-147 form of DAB.

DAB services reach a potential 65 percent of the German population now. German DAB proponents expect that figure to rise to 85 percent by 2004.

General Motors To Offer OEM XM Radios

WASHINGTON On the heels of XM Satellite Radio's expected debut on Cadillac Seattles and DeVilles this fall, General Motors Corp. will offer XM in more than 20 models in the 2003 model year.

In November of this year, GM will offer XM as a factory-installed option on 2002 Cadillac DeVilles and Seattles. Beginning next fall, the start of the '03 model year, the XM option will expand to more than 20 models throughout the GM lineup. Specific brands and models will be announced closer to introduction.

GM has a 5.6 percent ownership stake in XM. Public investors own 40 percent of the company.

Customers with GMAC financing can choose to include the XM subscription in their car payments rather than see a separate bill for XM's service.

Porsche Offers Both XM, Sirius Options

XM Satellite Radio and Sirius Satellite Radio have distribution agreements with Porsche Cars North America to offer the satellite services to Porsche customers.

Porsche expects to offer subscription satellite radio in 2003 as an option for the Porsche 2004 model year vehicle line.

Porsche Cars North America Inc. is the exclusive Porsche importer for the United States and Canada. Porsche employs some 200 workers who provide Porsche vehicles, parts, marketing and training for its 204 dealers in North America.

Sirius in 2002 BMWs

NEW YORK BMW of North America will offer Sirius satellite radio service as an option to new car buyers beginning in the second quarter of 2002.

Sirius radios will be available in some BMW 3 Series, 5 Series and X5 vehicles.

BMW owners expressed the strongest desire to include satellite radio in their next new car of all car owners surveyed, according to a JD Power 2000 Automotive Emerging Technologies Study.

Shoestring RDS

Model 701 - \$390

GIVE YOURSELF AN RDS/RBDS PRESENCE IN 5 MINUTES!

With our simple, very affordable "Mini-Encoder," your station can immediately begin transmitting the most important radio-data IDs, service flags and text messages. Use any PC to enter your call letters or "street name," format identifier, translator frequencies and scrolling ads or promos. The 701 locks to any stereo generator and works into any FM transmitter.

Don't let your station be skipped-over by the new generation of 'smart' radios that have finally arrived. At \$390 there's no excuse for waiting to put RDS/RBDS to work for you right now.



Inovonics
1305 Fair Ave. • Santa Cruz, CA 95060
TEL: (831) 458-0552 • FAX: (831) 458-0554
www.inovon.com • e-mail: info@inovon.com

Patriotism Aloft

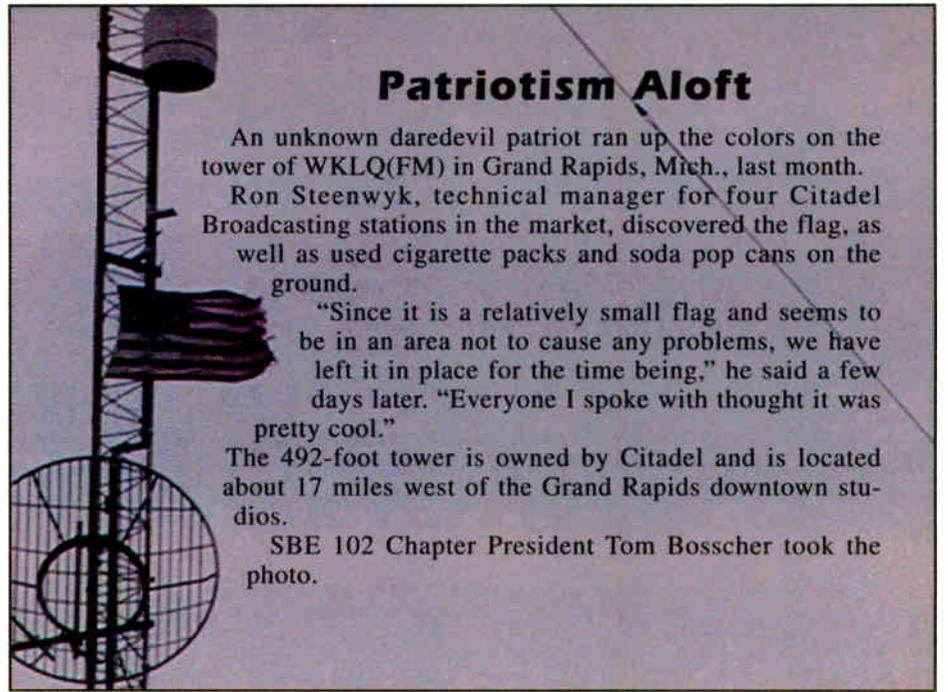
An unknown daredevil patriot ran up the colors on the tower of WKLQ(FM) in Grand Rapids, Mich., last month.

Ron Steenwyk, technical manager for four Citadel Broadcasting stations in the market, discovered the flag, as well as used cigarette packs and soda pop cans on the ground.

"Since it is a relatively small flag and seems to be in an area not to cause any problems, we have left it in place for the time being," he said a few days later. "Everyone I spoke with thought it was pretty cool."

The 492-foot tower is owned by Citadel and is located about 17 miles west of the Grand Rapids downtown studios.

SBE 102 Chapter President Tom Bosscher took the photo.



Mobile DRM DAB System Unveiled At IFA Show

BERLIN The consortium Digital Radio Mondiale has given radio listeners the chance to hear its digital AM system live via mobile reception. Approximately 100 people sampled DRM's newly developed, near FM-like sound during listening tours in a presentation car at IFA 2001, Germany's largest consumer electronics show, held in late summer.

Tour participants heard six radio stations broadcasting live via DRM, five of them on medium-wave/AM (including single-frequency network) and one of them on shortwave.

Tour equipment came from DRM members and supporters — Deutsche Telekom AG provided the network and vehicle, and coordinated transmissions; Telefunken SenderSysteme Berlin demonstrated transmitters; Fraunhofer IIS-A showed receivers; and Radiostroy RTV provided antennas.

Attendees also saw a Fraunhofer DRM-prototype "kitchen radio" receiver with multimedia capabilities. It offered medium-wave/AM programming plus pictures, text and airline schedules.

DRM is an international consortium of 70 broadcasters, network operators, manufacturers and researchers. DRM members have joined forces to create digital radio for the broadcasting bands below 30 MHz.

— Leslie Stimson

Satellite Receivers

► Continued from page 5

Pioneer has 16 XM-ready headunits. Pioneer XM head units range from \$225 for the KEH-P601 and KEH-P6010, both cassette head units, to the DEX-P9, a single CD tuner that lists for \$1,280.

Pioneer has an XM receiver that lists for \$240 that connects to any Pioneer XM-ready headunit. The Pioneer Universal XM Receiver allows the driver to receive XM on existing radios and lists for \$300. The Pioneer XM-ready headunit and receiver combination package lists for \$450.



Pioneer Model DEH-P7300

Consumers will need an additional antenna on their autos to receive the satellite signal. Several roof-mount and glass-mount XM auto antennas are available for \$80 to \$120.

Sony has produced several "Plug and Play" units that can be removed from a "docking sleeve" in the car and plugged into a home or office stereo system.

The Sony DRN-XM01C lets drivers receive XM service on any car radio that has a cassette slot. The package, which includes an antenna, lists for about \$300. With an accessory kit, drivers can use the DRN-XM01C car unit in the house. The kit includes a home cradle, remote, antenna, audio cord and AC power adapter. The kit lists for \$149.

Clarion, Jensen, Kenwood and Panasonic plan to sell AM/FM/Sirius receivers through retailers by the end of the year.

— Leslie Stimson

WIRED FOR SOUND

Speaking of Speaker Cable

Steve Lampen

We've been talking about speaker cable and have covered resistance and capacitance in past columns, which are also posted at www.rwonline.com.

There was a little error in the previous column of Sept. 12. It was a Web address to a chart that shows cable distances and losses at standard speaker impedances and for 70-volt distributed systems.

The correct URL is <http://bwcecom.belden.com/catalog/TechInfo/TechSpeaker.htm>

Now let's discuss inductance, impedance and skin effect.

Inductance

Inductance is the ability of a wire to store the magnetic field of a signal. This is most important at low frequencies, because sending DC down a wire produces an electromagnet, with an unchanging field.

We are talking about music and voice signals, so these would be "changing" signals.

Inductance is the opposite of capacitance, so the effect on frequencies also is opposite. A capacitor running at a certain frequency produces "capacitive reactance." The same frequency with an inductor produces "inductive reactance."

Inductance can be affected by several factors. The first is the size of the wire itself — the bigger the wire, the larger the inductance. This is most often cited by those considering speaker cables.

As mentioned in a previous column, the most popular size, at least among the "high-end audio" crowd, is 10 AWG. This is a hefty wire size.

So inductance is a major consideration, right? Well, no.

If you've ever played around with inductors, coils and transformers, you will be aware that it takes a lot of wire to make even a small inductor. Even then, you have to wind the wire up to increase the inductive effect.

A straight conductor has only microscopic amounts of inductance. In fact, a 10 AWG wire, such as in 10 AWG zip cord, has only about 0.06 microhenries of inductance per foot. This is why you will never see the inductance listed in almost any wire and cable catalog.

The effect of capacitance, capacitive reactance, is much more prominent. Because inductive reactance and capacitive reactance cancel out, capacitance always is the winner.

This is why capacitance is more often mentioned in a wire and cable catalog and inductance is not.

No subject is more misunderstood, especially among the high-end audio crowd, than impedance.

Impedance really is a combination of resistance, capacitance and inductance in a cable. So why isn't the impedance of a cable, like a speaker cable, mentioned in any catalog?

All cable has an impedance. It's just that, at analog audio frequencies, impedance is not important.

Veteran readers of this column will know where I am going next: a discus-

sion of wavelength.

Unless a cable is a quarter of a wavelength at the frequency of interest, the impedance doesn't mean anything.

For instance, the wavelength at 20 kHz, arguably the highest frequency you can hear, is 15,000 meters or nine miles. A quarter-wavelength is 2-1/4 miles. Even if you consider 1/8th wavelength to be the critical distance, that requires a cable over one mile.

You must also factor in the quality of the insulation or velocity of propagation. So let's say you choose a very bad PVC, one that has a 50 percent velocity. You're still talking about a

cable that is over half a mile long before the impedance means anything!

The graph in Fig. 1 on page 22 shows why.

Resistance affects the total impedance until the cable gets to a frequency where resistance has no effect.

Then only the inductance and capacitance are left, and this impedance is then stable out to the gigahertz.

The impedance of the cable, once it has settled into a single value, is called the "characteristic impedance." This does not occur until one is well into the megahertz, so this does not apply to any analog audio cable.

But does audio cable have an impedance? Sure it does. But it is changing from a very high number (infinity at DC, 0 Hz), to the characteristic at 10 MHz or so. So, if

See LAMPEN, page 22 ▶

Matrix-

QUITE POSSIBLY THE LAST CODEC YOU'LL EVER BUY.



THE CODEC FOR THE FUTURE

Your remote equipment toolbox may already include ISDN and POTS codecs plus a slew of other stuff. Now they are talking about high speed GSM digital wireless — and coming soon...3G.

The Matrix's modular approach is designed with this future in mind. The core of the Matrix's flexibility revolves around full access to its powerful coding engine through easily inserted modules and upgradeable flash memory. Whatever may be coming down the communications pipeline, the Matrix is ready.

THE CODEC FOR TODAY

WIRELESS

- 5 kHz real-time, full duplex audio on GSM wireless phones
- Up to 10 kHz real-time, full duplex audio on HSCSD GSM
- 15 kHz real-time, full duplex audio on portable Inmarsat terminals (with optional ISDN module)
- 15 kHz nonreal-time, "Store and-Forward" feature may be used on many mobile circuits
- Optional battery kit delivers power for up to 7 hours

ISDN*

- Layer III for 15 kHz at 64 kb/s
- G.722 for wide compatibility with other codecs
- Turbo-G.722 for 15 kHz with only 6 mS of delay
- Layer III transmit with G.722 return to reduce delay
- 1200 baud ancillary data available
- Fully international terminal adapter works worldwide

POTS

- 15 kHz full-duplex audio on a standard telephone line
- Available in portable or rackmount versions
- Modular design enables use on future circuits
- Will work at data rates as low as 9600 baud
- "Store and Forward" allows 15 kHz, nonreal-time audio transmission at any data rate

Comrex Corporation, 65 Nonset Path, Acton, MA 01720
 Tel: (978) 263-1800 Fax: (978) 635-0401 Toll Free: (800) 237-1776 in North America
 Email: info@comrex.com www.comrex.com



Correction

The story "A DAB Call for Action" in the Sept. 26 issue misquoted figures in a speech given by Robert Struble of Ibiqity Digital Corp. at The NAB Radio Show.

The text should have quoted Struble as saying, "We have spent close to \$100 million on development to date. XM and Sirius have both spent already over \$1 billion on their development to date, and have both announced \$100 million marketing campaigns to support their rollout."

Radio Legacy Saves N.Y. TV

Frank Beacham

Radio pioneer Edwin Howard Armstrong's legacy to New York City came full circle on Sept. 11, the day the World Trade Center collapsed. Shortly after, a new generation of broadcasters realized that a tower built by the visionary in 1937 would save over-the-air television transmission in the shaken city.

When the massive antenna mast atop the north tower of the trade center crumbled into rubble, the on-air signals of most major New York City broadcasters went with it. Unable to quickly relocate to the crowded spar at the peak of the Empire State Building, the broadcasters

turned to what has become a broadcast landmark: Edwin Armstrong's tower on the Palisades Interstate Parkway in Alpine, N.J.

Among the stations installing antennas on the Alpine tower in the wake of the disaster were WNBC, Channel 4; WABC, Ch. 7, WPIX, Ch. 11 and WNET, Ch. 13. However, in the scurry to get back on the air, few realized the irony of choosing Armstrong's historic mast, once the site of America's first FM radio station.

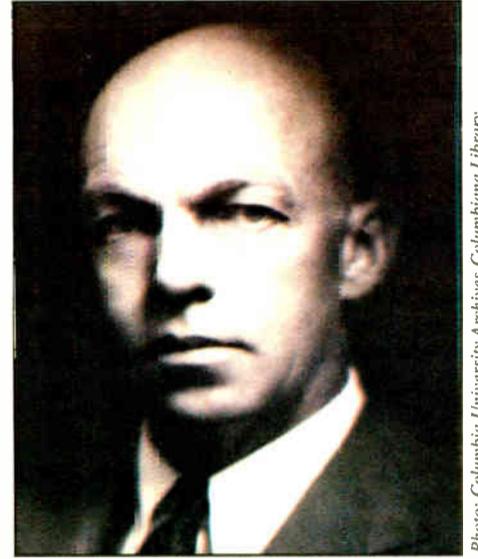
History

"The idea of NBC ending up there ... it's kind of ironic, isn't it? Maybe Armstrong is turning over in his grave,"

mused Jerry Minter, a veteran radio engineer who knew the inventor of FM radio.

The incongruity stems from a series of events beginning in the 1930s that helped define American broadcasting. The 102-story Empire State Building, opened in 1931, was at the time the tallest building in the world and a natural place to install broadcast antennas. Its 1,250-foot peak, conceived as a mooring for dirigibles, was soon converted to an antenna mast.

Early on, the Empire State Building's 85th floor became a hotbed of broadcast activity. It was home to RCA's experimental television station, which began broadcasting shortly after the skyscraper opened.



Edwin Armstrong

Eventually, "Empire" became home to nearly all of New York City's television stations, remaining so until completion of the 110-story World Trade Center in the early 1970s.

Empire's 85th floor was also home to Edwin Armstrong's FM radio laboratory. By 1935, it was clear that Armstrong's "staticless" FM system worked well. Perhaps too well. RCA chief David Sarnoff, claiming he needed the space for television, ordered Armstrong — who wanted to begin an FM broadcasting service in New York — to remove his equipment and vacate the Empire State Building.

"Sarnoff was very much worried that since one FM station could pick up another that they would be relaying (programming) instead of using the telephone lines in the NBC network," recalled Renville McMann, who began his engineering career with Armstrong at age 14.

"More than being threatening to AM radio, FM was threatening to the networks, which at the time were largely under the control of RCA and NBC."

Armstrong's eviction from Empire left the inventor undeterred in his quest to bring high-fidelity FM radio to New Yorkers.

Feud

After purchasing 11 acres in Alpine that overlooked the New York metropolitan landscape, Armstrong built a 425-foot, three-armed steel tower in 1937 and soon launched the nation's first FM radio station.

It was a spectacular project, both in its visionary foresight and scenic beauty.

"The view from that magnificent tower is unbelievable. You can see out to the tip of Long Island. It's a great piece of technological real estate," said Tom Lewis, author of "Empire of the Air: The Men Who Made Radio," a 1991 history of radio broadcasting.

Armstrong's independent FM radio venture, however, would lead to a legendary feud with rival David Sarnoff. After World War II, with the launch of commercial television on the horizon, a lengthy patent battle ensued between Armstrong and Sarnoff's RCA and NBC network. It would eventually consume Armstrong.

"Sarnoff started stealing the patents. In early television equipment, RCA paid a royalty for the picture component, but they decided not to pay a royalty on the audio component, which was the invention of Armstrong," said Lewis. "What Sarnoff did to Armstrong was just awful. Just inhuman."

See ARMSTRONG, page 12 ►

radio world

* * * Sneak Preview * * *

For the first time in history, Radio World. Look for your copy of the Radio World's 2002 Industry Sourcebook & Directory.

January 2002: For the first time in history, Radio World readers have the opportunity to weigh in with their collective opinions about the products that affect their daily lives.

Introducing

The 2002 Radio World Readers' Choice Awards & Sweepstakes

Radio World

2002

Sourcebook & Directory

Look for your copy of **Radio World's 2002 Industry Source Book & Directory** during the first week of January.

Inside you'll find a ballot that lists new radio broadcast products in 12 categories. Vote for your favorite product in each category.

After you cast your vote, your name is automatically entered in the Readers' Choice Sweepstakes and a chance to win one of 26 great products from our sponsors.

Watch for your copy of the **2002 Sourcebook & Directory** coming in January.

Get ready to vote for your favorite products and win!

CLEARLY NOT FOR EVERYONE

Your Grandmother is certainly a very nice lady, but a Porsche is probably not her ride.

It's the same with processing: Some people should stick with the conservative stuff. Give them something too fast and they just won't know what to do with it.

Frankly, the new Omnia-6 is probably not for them. It's just too potent, too flexible.

On the other hand, maybe you are the sort who can run a fast machine. Who loves the thrill of smooth power. Who revels in the admiration of others.

Omnia-6 - if you can handle it.

6
fm



Omnia
A Teles Company

www.omniaaudio.com

North America: +1.216.241.7225

Europe: +49.81.61.42.467

Omnia is used in 4 of 5 leading stations in New York, 2 of the 3 top stations in Los Angeles and 5 of 6 of the most listened to stations in the US. It's on the leading stations in Paris, all of the BBC's FM stations in the UK, and the number one stations in Canada, Ireland, Germany, Finland, Australia, India, China, Denmark, and Sweden.

◆ MARKETPLACE ◆

Products for the Radio Broadcast Professional
Mail info and photos to: RW Marketplace, P.O. Box 1214, Falls Church, VA 22041

AEV Reaches an Xtreme

Xtreme is an audio processor from AEV. A five-band digital audio processor, it uses nine 24-bit Motorola DSPs for processing its radio algorithms. Each is capable of as much as 80 million instructions per second. The unit has 20 format presets, user-customization, daypart automation and AES/EBU input and output. It is available in FM, AM and TV versions. A wide LCD graphic display aids in set-up, adjusting and programming operations.

For information, contact the company in Italy at +39-051-663-47-11 or visit www.aev-usa.net.



DEPENDABLE.
RELIABLE.
CAPABLE!

Pick Any Three

MAESTRO

When it comes to reliable hard disk digital systems, major stations come to Computer Concepts. **Maestro** helps radio stations sound better (and make more money).

Jocks love Maestro! It's *really* easy-to-use. Studios are paper-free and tape-free. All the audio and info that jocks need is at their fingertips: songs, spots, live copy, news, weather, sports and up-to-the-minute logs.

Maestro gives jocks the ultimate in control. Jocks easily shuffle music and spots as needed. Maestro also runs news, talk, satellite, live and voice tracked music formats flawlessly.

Distant City or Local Voice Tracker

Computer Concepts *invented* pre-recording music shows, and we've done it *right* for years! Voice Tracker is even Computer Concepts' registered trademark! Jocks hear songs in their headphones while they talk up intros. If timing isn't right the first time, it's easy to slide your Voice Tracks around to adjust music timing. Voice Tracker works well locally and for distant city transfer over WAN, VPN or Internet.



Industrial Hardware

Maestro uses the most robust industrial back-plane computers in pullout rack drawers with non-proprietary digital audio cards. Now, and for years to come, you'll be *glad* you got Maestro!

 **Computer Concepts Corp.**
8375 Melrose • Lenexa, Kansas 66214
Phone 1-800-255-6350 www.ccc.fm

StratosAudio Pushes System for Interactive Radio, Inks Deal With Audemat

StratosAudio hopes to have its first interactive broadcast radio installations in place by the end of the year.

The company has patent-pending technology that promises to allow radio listeners and mobile phone listeners in the United States, Europe and Asia to purchase music and other content and respond to ads and talk shows at the press of a button. It is headquartered in Los Angeles.

The company also signed a partnership deal with Audemat as its preferred technology provider for the use of broadcast testing equipment.

The CEO of StratosAudio, Kelly Christensen, said, "We plan to use the Audemat FM_MC4 with Goldenear to evaluate reception quality, and also for monitoring purposes we will use Goldeneagle FM with TCP/IP capabilities in working with our broadcast partners."

The chief technology officer and part-owner of StratosAudio is Barry Thomas, who is familiar in radio circles from his past engineering work with AMFM Inc., Comedy World Network and other companies.

For more information contact StratosAudio in California at (626) 289-0770 or via e-mail to info@stratosaudio.com, or Audemat in Virginia at (866) AUDEMAT or send e-mail to s.lion@audemat.com.

**News Updates
Every Business Day**



<http://www.rwonline.com>

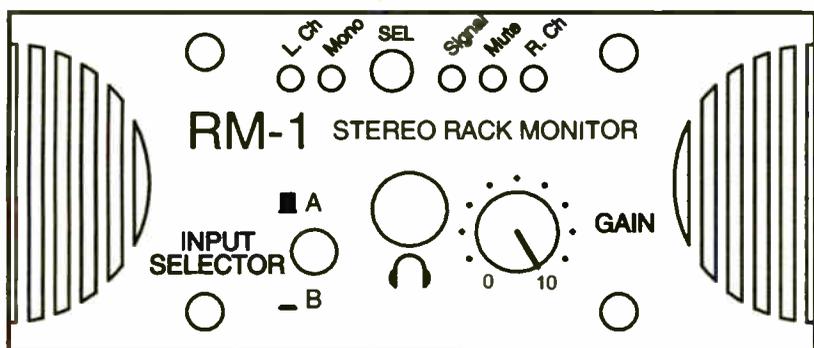


Insert Tab A



How to Monitor in a Tight Situation

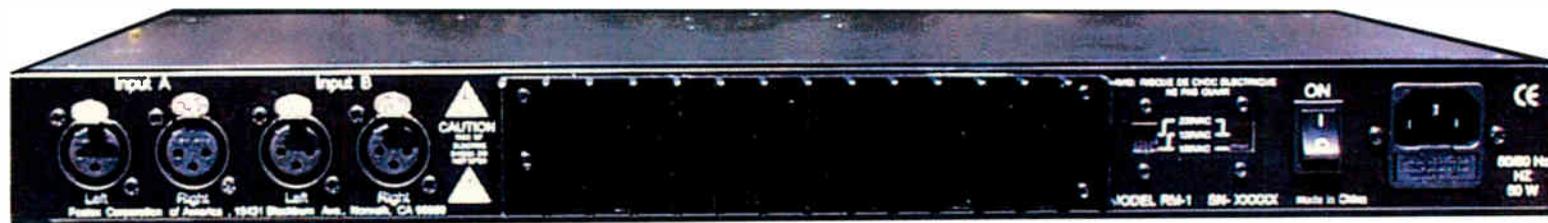
The new RM-1 is the ideal solution for monitoring needs in tight industrial environments. It's the perfect speaker for machine rooms, VTR monitoring, surveillance, mobile and stationary control rooms, theme park applications or any other situation where monitoring is needed and space is tight.



Features include:

- Dual Stereo Inputs with independent volume controls.
- Switchable Matrix (L/R/Mono/Stereo) with high intensity multi colored LED's which tally the mode selected.
- Signal Presence/Amplitude Indicator.
- Balanced and Unbalanced I/Os.
- Universal Stereo Headphone jack with ample volume for noisy machine room environments.
- Fully shielded to prevent interference with video monitors or VTR tape machines.

The RM-1 employs a unique new driver technology that results in outstanding frequency response, considering the limited space enclosure. This revolutionary transducer was developed by Foster Electric, the parent company of Fostex America.



Fostex

www.fostex.com 15431 Blackburn Ave. Norwalk, CA 90650 • 562.921.1112

Armstrong

► Continued from page 8

Along with Lee de Forest, Armstrong is recognized as one of radio's great pioneers. Among his contributions are the invention of the regenerative circuit (1912); the superheterodyne circuit (1918); the superregenerative circuit (1920); and the wideband frequency modulation system that became known as FM radio.

Armstrong's wideband FM system offered improved noise properties and delivered significantly better performance under adverse weather conditions, said McMann. RCA promoted an alternative design, but the engineering community was in wide agreement that it violated Armstrong's patents.

"Sarnoff was trying to block FM and trying to block Armstrong. Making him go broke was as good a way as any other," said McMann. "RCA effectively chose to violate his patents and not pay him."

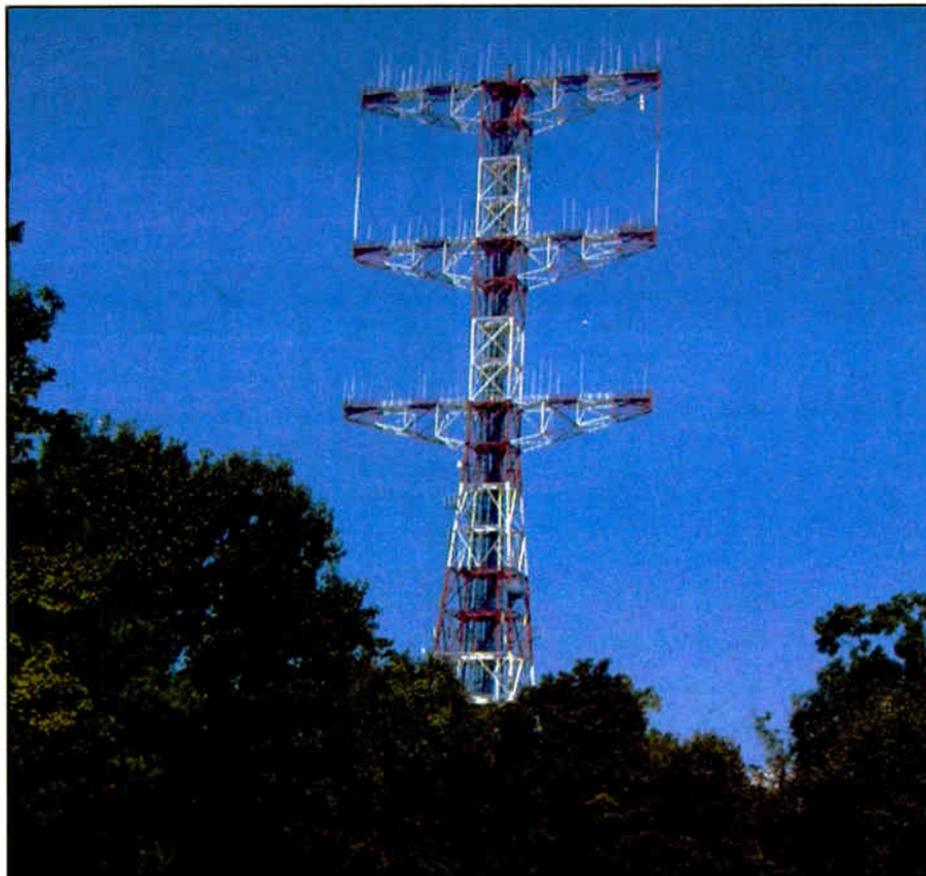
History revisited

In 1954, Armstrong, financially devastated and under family pressure to end his long legal fight with Sarnoff, dressed in a suit and overcoat with scarf and gloves and jumped to his death from his New York City apartment.

"I would give my life to turn back to the time when we were so happy and free," Armstrong wrote in a suicide note to his wife.

Armstrong's widow, once Sarnoff's personal secretary, continued her husband's legal proceedings over the patents. Eventually, the courts validated Armstrong's position, establishing him, not RCA and NBC, as the legitimate inventor of key FM radio technology and the sound system used by analog TV.

Jerry Minter remembered Armstrong's funeral. "Sarnoff sat behind me. I'd never met him, but he shook hands with me and everybody there. When it was over, he just stood there looking stunned as we all walked off. He was very upset. I think he felt responsible."



Alpine Tower in New Jersey

When Armstrong designed his Alpine tower, he anticipated using it one day for television, recalled Minter. "But because of the feud between Armstrong and Sarnoff, it didn't come off. Now, we are reliving that history."

As Armstrong's associates contemplated the historical implications brought on by the World Trade Center disaster, their memories raced back to happier times at Alpine—especially those of Armstrong's daring penchant for climbing the great steel structure.

"He was utterly fearless on the tower," remembered McMann. "He used to climb the tower for exercise. But when it came time to come down, he would step into a bucket attached to a cable controlled by an electric winch and have himself lowered to the ground. He recognized that winch was very dangerous, but did it

anyway. Ten thousand dollars wouldn't have gotten me in that bucket. I was leaving my fingerprints in the steel."

Today, the tower is owned by Charles Sackerman and operated by the Alpine Tower Company of Montvale, N.J. Before the recent disaster, it was home to a variety of communications services for government and industry and to WFDU, a radio station operated by Fairleigh Dickinson University in Teaneck, N.J.

Now, for the first time in its history, Alpine is hosting television transmitters.

"The site has ideal topography for VHF

and UHF transmission. It's high, doesn't have close structures and there are no reflections. It has everything you'd like to have for a transmitter shack," said John Turner, president of Turner Engineering Associates of Mountain Lakes, N.J.

"The top of the tower is roughly the height of the Empire State Building. It favors the northern counties. People in New Jersey and Long Island won't see much difference. They may even get better pictures."

Another of the great historical quirks of the Alpine antenna relocation, noted Turner, is that for some stations, the era of analog television broadcasting may very well end on the same tower where FM broadcasting began.

"WNBC's move to the Alpine tower completes a full circle in broadcast history," said Lewis. "It's a great irony that this magnificent tower that Armstrong built in 1937 is now saving the bacon of NBC and other New York broadcasters in 2001."

McMann agreed. "Armstrong was technically brilliant. Many of his ideas were truly great. He came up with solutions that others of us would not have considered. He was head and shoulders above any other engineer I've ever known. I don't think Sarnoff knew how to turn on and off the lights. He'd been a telegraph operator, but he was no engineer."

For supporters of Edwin Armstrong, a man who died thinking he was a failure, the events of September 2001 are still another validation of his genius.

"Not only the building of that tower, but every time you touch a television or radio you touch an invention of Edwin Howard Armstrong," said Lewis.

"I bet you can find few people at NBC today who even know who Armstrong was. But the ultimate irony is they wouldn't be getting a paycheck today had it not been for him." 

MARKET PLACE

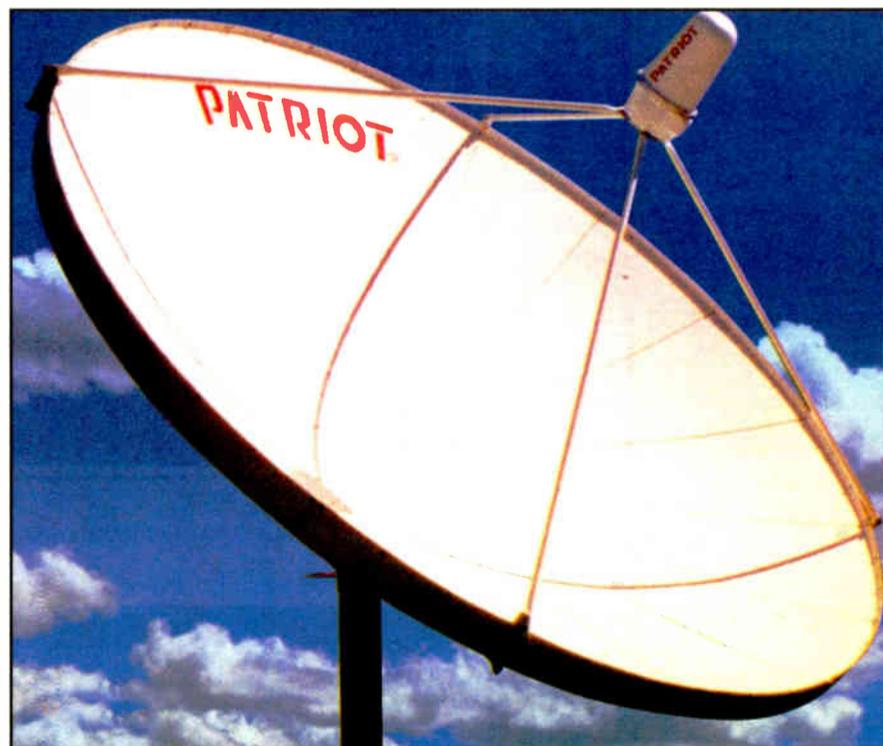
Patriot Aims for the Stars

Patriot Commercial Antenna Systems offers a line of antennas that support broadcast-related operations.

At the NAB Radio Show, it touted its Prime Focus line, including solid commercial antennas of 4.5, 3.8 and 3.1 meters, available with various mounts.

Patriot also offers off-set antennas, receivers, LNBS, de-icing systems, dish covers and other accessories.

For information contact the company in Michigan at (800) 470-3510 or visit www.sepatriot.com.



3.8 Meter Prime Focus Antenna



You can measure...
with the best monitor and the most accurate test set.

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

BELAR www.belar.com (610) 687-5550
ELECTRONICS LABORATORY, INC.
LANCASTER AVENUE AT DORSET, DEVON, PENNSYLVANIA 19333
Call or write for more information on Belar AM, FM, Stereo, SCA and TV monitors.

Innovation begins with a fresh lock.
How are we doing so far?

Telos

www.telos-systems.com/smartsurface



SmartSurface, Telos and the Telos logo are registered trademarks of TLS Corporation. Copyright 2001, TLS Corp.

World Radio History

Florida Reading Service Upgrades With CAT-5, WireReady System

New reading service facilities are up and running at the WGCU(FM)/WMKO(FM) Radio Reading Service, part of Florida Gulf Coast University in Ft. Myers, Fla.

According to the International Association of Audio Information Services, three new reading booths and a master control facility were equipped through a \$23,000 Community Development Block Grant.

The radio reading service was founded in 1983 as part of the University of South Florida's public broadcast service WUSF. Glenn Sabatka was the first manager and still serves in that capacity.

The service now provides round-the-clock service to 1,200 individuals and 115 nursing homes and adult-living facilities.



Glenn Sabatka sits in front of the radio reading service control console with the CartReady system to the right.



Jeff Highsmith, shown in a reading booth, assisted in the wiring of the studios.



Sabatka reads a sign, engraved in Braille, that commemorates a grant to the reading service.



\$289.00

- Mic Input
- Mic/Line Input
- Headphone jack
- Balanced Line Output

FlipJack

Operates with most hand-held cell phones that have the standard 2.5 mm hands-free adapter jack.



\$245.00

- Mic/Line Input
- Aux Input
- Balanced Line Output
- Headphone jack

CellJack

Operates with Motorola bag type cell phones.

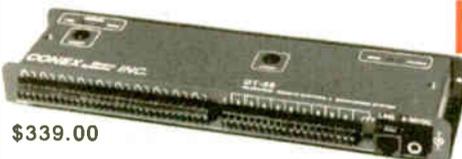


\$349.00

Operates with Motorola bag type cell phones.

- 2 MIC/LINE Inputs
- AUX Input
- Balanced Line Output
- Level Indicator
- 2 Headphone Jacks

CellJack II



\$339.00

DT-55 Telephone Remote Control

- Control 10 Relays ... Momentary, Latching or Interlock
- Monitor Logic State Of 10 Inputs
- Simple Dial-Up Connection

The studios were equipped with digital gear and are automated with a new WireReady CartReady audio system. The console is a refurbished Harris Medalist 8. New equipment includes a Middle Atlantic rack, Alesis One speakers, Sony CDP-XE400P CD player, Marantz PMD-502 dual cassette deck and Broadcast Tools audio switcher.

The installation was performed by Hal Kneller, director of radio engineering at WGCU Public Broadcasting, with help from Jeff Highsmith.

Kneller said, "We wired all of the audio with CAT-5 cable, except mikes. It was my first time using this for audio, and so far, it has worked out fine."

He said the station recently installed a new Harris ZD20CD solid-state 20 kW transmitter. "Using the Modulation Sciences Sidekick SCA generator and the new transmitter, we see no main-to-sub crosstalk at all, and the SCA receivers now have less 'white noise' and considerably better audio quality.

"I honestly can tell no loss on the main channel as a result of the SCA signal — we run 8.5 percent injection — and with the better AM noise and bandwidth performance of the new transmitter, the radio reading service quality is at least equal to or better than the average AM radio out there."

CONEX ELECTRO SYSTEMS

1602 Carolina St. P.O. Box 67 Bellingham, WA 98227
360-734-4323 FAX 360-676-4822 EMAIL conex@conex-electro.com

FOR MORE INFORMATION

1-800-645-1061

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

www.conex-electro.com

"It's rock solid."

Ron Crider of Radio Colorado Network has some pretty cool things to say about BSI's digital automation...

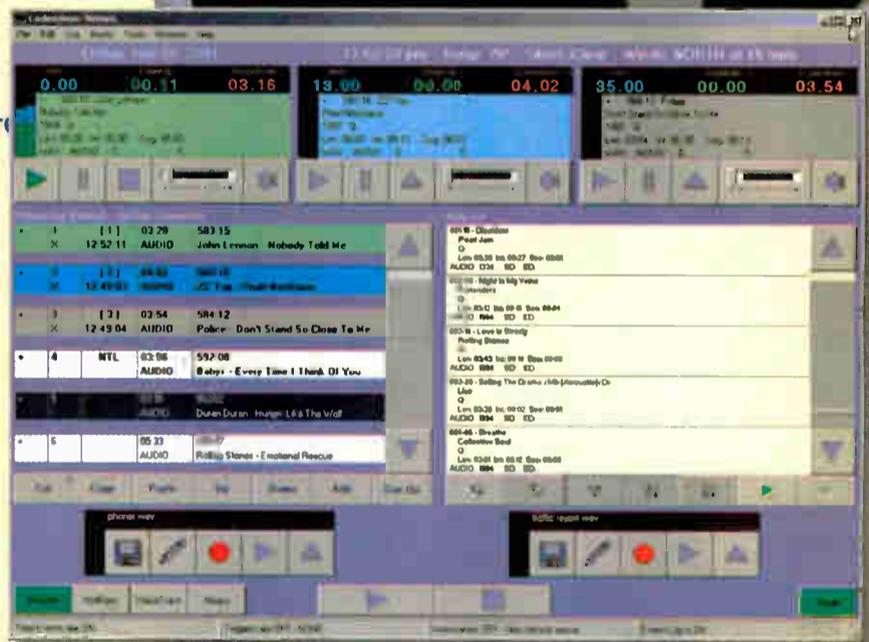
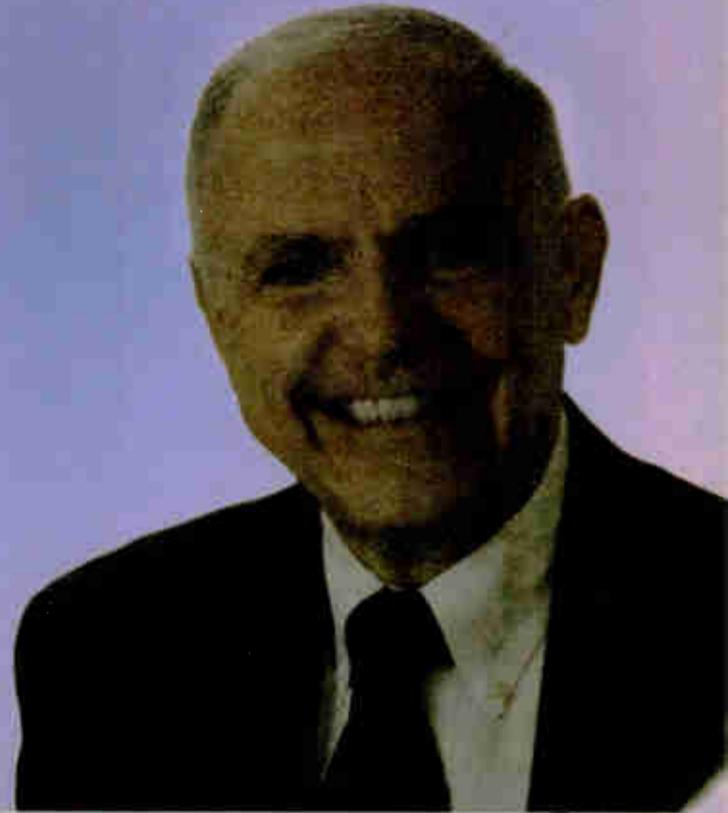
August 21, 2001

Broadcast Software International
1925 Bailey Hill Road, Suite A
Eugene, Oregon

Seldom do I take the time to write a letter to a manufacturer praising a product. In the case of BSI, this note is long overdue. January of this year, I installed BSI's digital automation to operate AM 1060 KLMO Denver/Longmont. The reliability using Windows 2000, "well it's rock solid". The multi-tasking is the best. We have numerous delayed programs, as well as live joins to 14 different satellite receivers every day. BSI has done a job above and beyond our expectations. The WebConnect permits our Indianapolis News Department to e-mail our weather reports as well as our local news directly into BSI's digital automation program without an operator here in Colorado. The temperature is frequent and always correct. Our imagination seems to be our only limitation to what we can do with BSI's digital automation. Since KLMO coming on line, we have installed another BSI automation program on KWYD Colorado Springs for its Christian format and are now installing BSI's digital automation to operate the entire Radio Colorado Network.

I have been in broadcasting for 40 years. The BSI systems are cutting edge, easy to operate, and reasonably priced.
Thank You BSI.

Ron Crider
President
Radio Colorado Network



What did we do to inspire this kind of loyalty?
Download our software and try it for yourself.

Broadcast Software International

www.bsiusa.com 888-bsiusa1



The Only Static You'll Get Is From The Caller On Line 1

You may get a lot of noise from an opinionated caller, but your show sounds crystal clear to the radio audience. That is if you have a Gentner Broadcast Telephone System from Harris.

Although the system's console looks like an ordinary telephone your talk show host will see the difference immediately. Not only is the sound incredibly clean and crisp, the system includes

two built-in digital hybrids so you can conference up to four on-air callers

simultaneously. And each one will be heard loud and clear. Even Mr. Cranky on line 1.

Which brings us to another important point.

Gentner Broadcast Telephone Systems have multi-colored line indicators so your host knows who's on the air, who's on hold, who is talking to the producer and who has been screened. Plus, the host can screen calls off the air while other callers are on the air. So if the guy on line 1 isn't a good fit for today's show – he's history.

There's much more to know, of course, including Gentner's 6 or 12 telephone line capabilities, available software to customize a system to your specific requirements, and network solutions that let you connect multiple studios.

To learn all that a Gentner Broadcast Telephone System can do for your operation, contact your local Harris representative.

Gentner



next level solutions

SERVICE

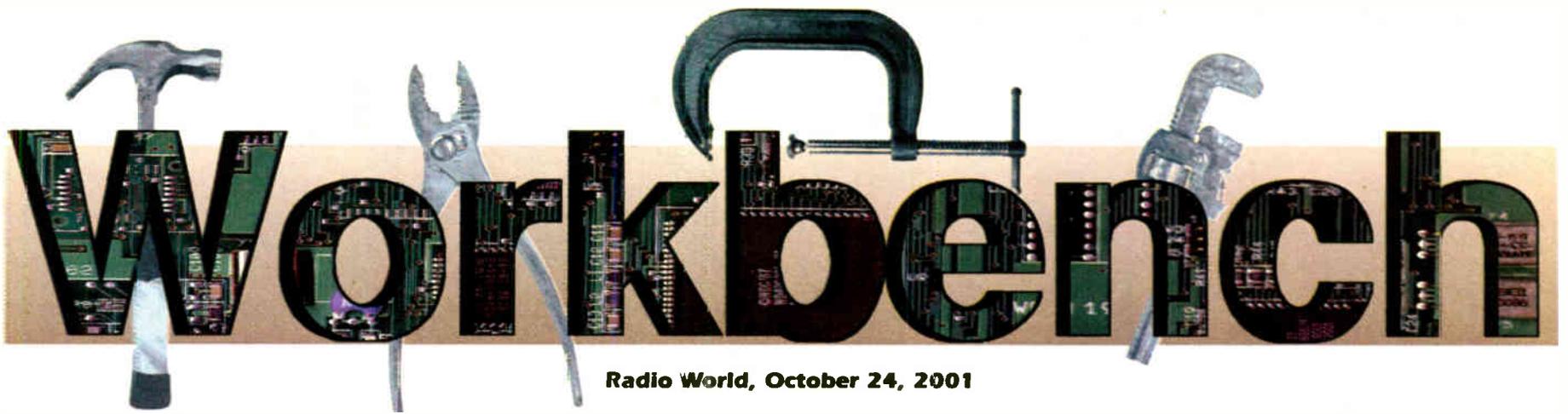
SYSTEMS

AUTOMATION

TRANSMISSION

www.broadcast.harris.com

HARRIS



Radio World, October 24, 2001

Whose Standards Are Being Compromised?

John Bisset

As I inspected a site where a bush hog operator had bent a guy wire anchor, I thought of how such an accident could be prevented by simple marking of the wires at the anchor base plate.

Tom Moyer at Antenna ID Products has just the product: Guy Wire ID Marker Guard. It's an 8-foot bright yellow plastic sleeve equipped with night reflective marking. The sleeve slips around the guy wire up to 1 inch in diameter and secures easily. A set of

inch guy wires. Also sold in sets of three, this package is less than \$300.

Antenna ID Products prepares a variety of tower marking products, including RFR signs and Exposure Guidelines signs. Visit the Antenna Site Store at www.antennaid.com

★ ★ ★

Not only is a clean and simply designed site important, but just as labeling and identifying antennas and coax lines are important, so is labeling equipment within your site.

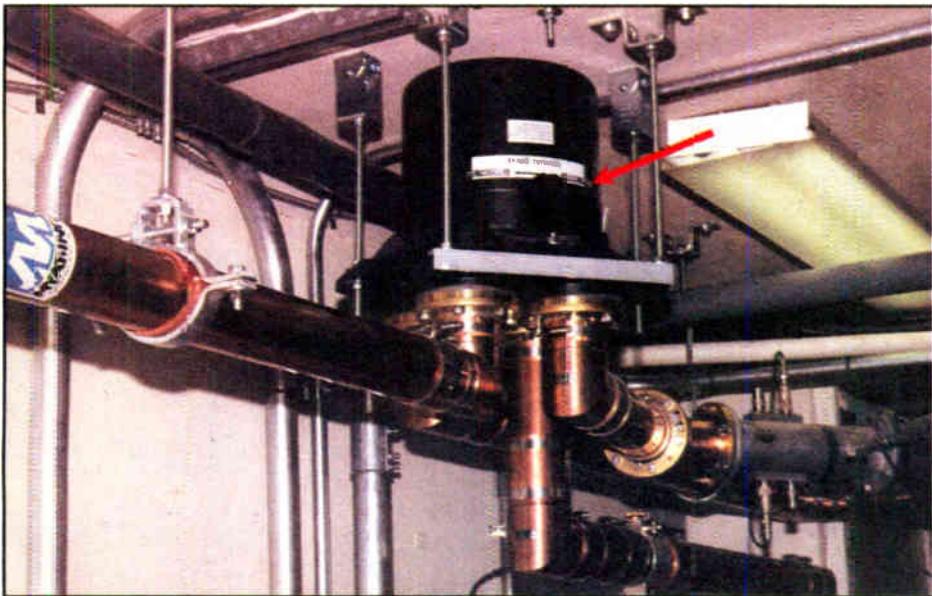


Fig. 1: A Brother P-Touch labeler or similar device makes labeling quick and professional.

three markers is less than \$100.

The company also sells Guy Wire Marker Balls, which are a pair of 12-inch-diameter ball halves that bolt together to form a brightly colored ball on the guy wire. Hardware is supplied, and the balls will fit up to 3/4-

Take Mark Bohnett's installation at WESM(FM) in Princess Anne, Md. He was sure to identify things like the coaxial transfer switch, even so far as to labeling the "manual drive" control so that an arrow directs the knob operation to select the appropriate

transmitter.

As seen in Figure 1, a Brother P-Touch makes the labeling quick and professional.

Why is such labeling so important? If an RF transfer occurs, there's no question which transmitter is being switched into the antenna if the switch is marked properly.

A few years ago, I was called into a station that was off the air. It had no operator's handbook, and worse yet, nothing was labeled in the transmitter room.

In his effort to switch to the backup transmitter, the operator worked the transfer switch twice. The backup transmitter was running fine — into the dummy load. The switch pointer showed "Position 2" but the operator hadn't a clue what Position 2 meant.

A clear label on the switch control knob, as well as on the transfer indicator pointer, as Mark has done, will eliminate confusion.

By the way, look at the heavy-duty bracing Mark used to support the

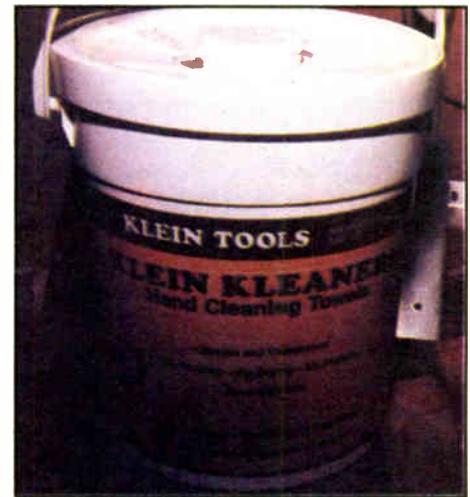


Fig. 2: Pre-moistened towels keep hands and tools clean — and the bucket doubles as a handy work stool.

While you're in the transmitter building, invest in a bucket of cleaning towels, like the Klein Tools "Klein Kleaners" shown in Figure 2.

Guy wire markers and custom device labels can make your job easier and your station safer.

switch. These switches aren't light, and need proper support to prevent line flexing when the switch is turned.

These pre-moistened towels are great for keeping hands and tools clean.

Plus, the bucket makes a good See WORKBENCH, page 18 ►

★ ★ ★

Dependable Modulation Monitors for AM & FM

520 AM Mod-Monitor

- Built-in, tunable preselector for accurate off-air measurements
- Easy-to-read, peak-hold modulation display
- Alarm and RS-232 data outputs
- Companion active antenna option



530 FM Mod-Monitor

- Off-air operation with 8 station presets
- High-resolution displays for deviation, audio, pilot, RF signal and multipath
- Accurate and affordable



Download full spec sheets at www.inovon.com

Inovonics
1305 Fair Ave. • Santa Cruz, CA 95060
TEL: (831) 458-0552 • FAX: (831) 458-0554
www.inovon.com • e-mail: info@inovon.com

MARKET PLACE

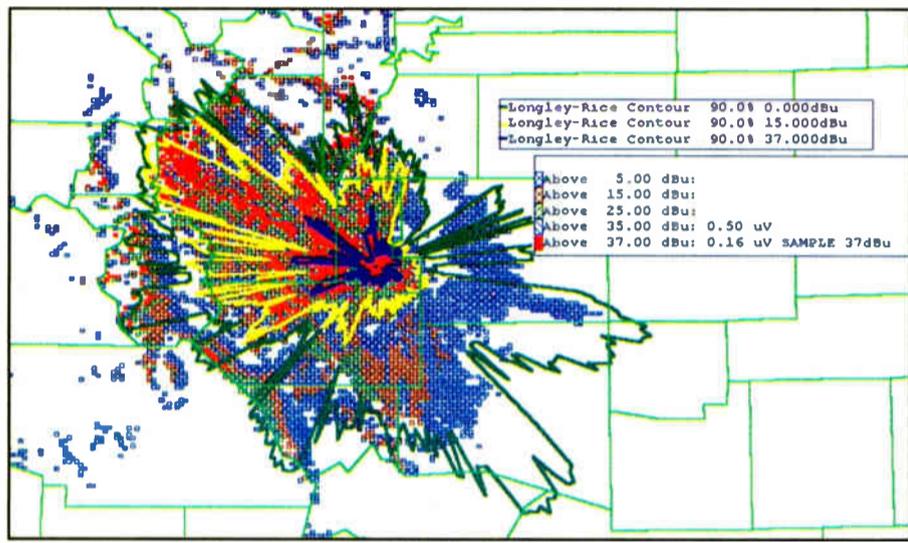
RF Engineering Software Released

Version 4.4 of the Terrain Analysis Package for Windows 9x/NT(4.0)/W2K has been released by SoftWright. The RF design software consists of 24 modules that, when combined, bring a broad capability of RF system design to a personal computer. The Basic Mapping Module handles path terrain profiling. For more sophisticated RF studies, the user adds an RF Facilities Module and one or more of 22 application-specific TAP 4.4 modules.

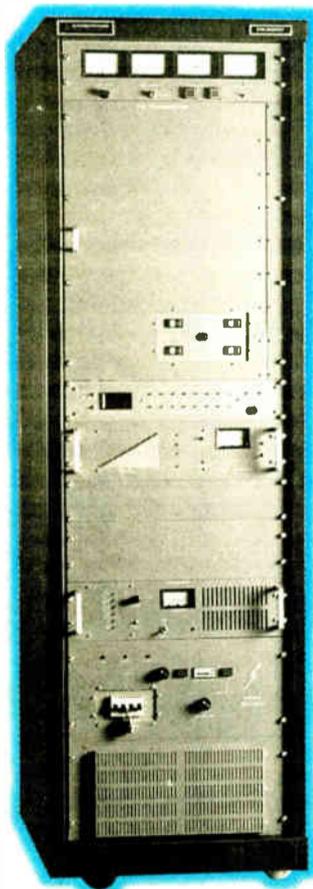
TAP is used to perform evaluation of existing or proposed radio transmitter sites, coverage predictions for TV and FM broadcasting, ITFS, PCS, SCADA, WLL, microwave, cellular, paging and two-way radio system design. It is used by a variety of industries to provide reliable security communication, control and wireless voice and data communication links for systems.

The new Terrain Analysis Software has been put into operation in the U.S. Departments of State and Justice.

For information visit www.woftwright.com and click on TAP 4.4 Released, or call the company in Colorado at (303) 344-5486.



ARMSTRONG FM Transmitters



Engineered for Reliability

- ▲ Power Levels from 1kW to 30kW
- ▲ High Efficiency, Grounded Grid Single Tube Design
- ▲ Wideband Quarter Wave Cavity for Lowest Synchronous AM
- ▲ Solid State Driver with Patch Around Capability
- ▲ Optional Automatic Power Control & VSWR Foldback
- ▲ Motorized Tuning Controls
- ▲ Advanced Overload & Protection Circuitry
- ▲ Automatic Re-start After Power Failure
- ▲ INEXPENSIVE!



ARMSTRONG
TRANSMITTER CORPORATION

4835 N. Street • Marcellus, NY 13108 • PH: 315/673-1269 • Fax: 315/673-9972
E-mail: info@armstrongtx.com • www.armstrongtx.com

Workbench

► Continued from page 17
makeshift stool to keep from sitting on a cold concrete floor as you do work behind an equipment rack.

Contract Engineer Bruce Blanchard keeps these Kleenex at all of his contract sites, and shares this tip with *Workbench* readers.

★ ★ ★

With winter weather just around the corner, so comes the yearly static problem.

We've used static mats with mixed results. I've heard of engineers resorting to carpet tiles, with the anti-static black backing, but Ron Castro at KRPQ/KMHX has given up on mats, carpet or linoleum under rolling chairs in the control room. His reason: the life expectancy of a typical mat under 24/7 use was a mere 30 days.

What's the solution? Ron had a flooring company install industrial-grade parquet wood flooring tiles where the chairs rolled around, and he hasn't had a problem since.

By the way, this was 10 years ago!

Another solution to consider is granite. Mike McCarthy of McCarthy Radio Engineering points out that its properties don't allow conduction, and installation is about the same as a wood floor. Granite tiles will outlast wood and not require periodic recoating.

Use caution in selecting such stone tiles if your floor flexes. In Ron's second floor studio location, the floor flexes, and granite, slate or marble tiles would crack.

Some might ask about sound reflections. But because such a small area is treated with the wood tiles — perhaps only 4 feet square, depending on your control room layout — the sound reflection effect is negligible.

★ ★ ★

What do you do when your high-power AM transmission line fails and you need to get back on the air? You run a temporary line, right?



Figs. 3 & 4: The engineer tried to keep this transmission line off the ground, top, and secured the splice kit with duct tape, above. Unfortunately these temporary fixes were made 10 years ago.

One engineer did. Figure 3 shows an effort to keep the line off the ground as it snakes to the tower. The engineer went on to secure the splice kit with duct tape, as seen in Figure 4. Undoubtedly he was working with little or no budget, under pressure to get the problem fixed.

So what's the problem? This was over a decade ago. Now the splice leaks and the line won't hold power.

This temporary fix became permanent, and though it lasted for 10 years, the issue could have been averted if the problem was corrected properly the first time.

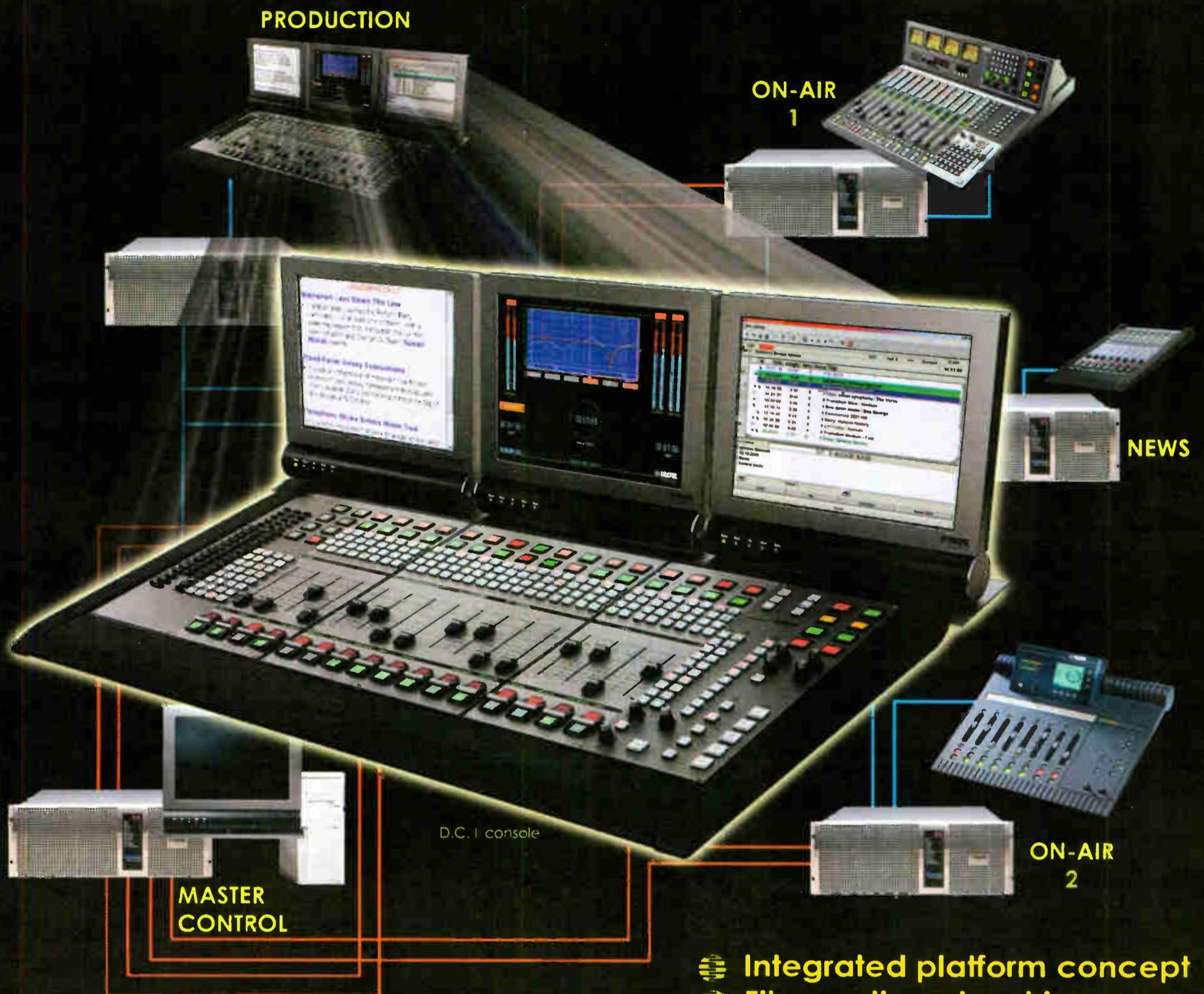
I still wonder how the bush hog operator avoided the line, but then judging from the small trees growing in the tower field, realize there was no bush hog operator. There was nothing but neglect.

These pictures reinforce the importance of conducting a thorough engineering "due diligence" prior to a purchase. The also pictures are a reminder of the problems we can sow, sometimes unwittingly, by compromising our standards to please upper management's urgency.

John Bisset has worked as a chief engineer and contract engineer for more than 30 years. He is a district sales manager for Harris Corp. 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 send e-mail to jbisset@harris.com.

Our Secret is Behind the Scenes!



- Integrated platform concept
- Fiber optic networking
- Any audio source, anywhere

KLOTZ DIGITAL's unique VADIS Platform provides the perfect solution for facilities searching for the ultimate in digital audio integration. From single studio build-outs to new mega-facility operations, KLOTZ DIGITAL provides a cost effective and time saving option to traditional analog and digital facility installations. *Our secret is behind the scenes.* Fiber optic based, the VADIS Platform integrates all audio functions, combining operator tasks, reducing the need for

traditional wiring, and paving the way for effortless future expansion. And, the elimination of a central router means distribution of "any audio source anywhere at any time!"

Compare the costs for yourself. When it comes to savings, quality and performance...nobody even comes close. That's why the most sophisticated and technologically advanced facilities throughout the world choose KLOTZ DIGITAL.

KLOTZ DIGITAL GERMANY Phone: +49-89-45672-300

KLOTZ DIGITAL FRANCE Phone: +33-1-48874681

KLOTZ DIGITAL ASIA Phone: +60-3-5193233

KLOTZ DIGITAL AUSTRALIA Phone: +61-2-95186795

KLOTZ DIGITAL
5875 Peachtree Industrial Blvd.
Blcg. 340
Norcross, Georgia 30092
Phone: +1-678-966-9900
www.klotzdigital.com

World Radio History

 **KLOTZ**
DIGITAL

Rhapsody in Blue.

.....
**Digital Core
Routing System**
.....

.....
**Scalable Up to
4,096 Channels**
.....

.....
**Digital & Analog
24 Bit I/O**
.....

.....
**Mix Multiple
Inputs to
Any Output**
.....

.....
**IFB-Talk to
Remotes**
.....

.....
**Integrated
Intercom
Functions**
.....

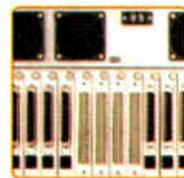
Introducing the new 32KD Digital Audio Network from Sierra Automated Systems.

This modular, digital-core routing system processes more audio, routes more signals, and provides more user control than any other system in its class.

Routing, mixing, signal processing, IFB, mix-minus, and more, run simultaneously without conflict. All this functionality is readily accessible via PC, mixing boards, or dedicated control panels. And the performance? Like music to your ears.

For more details about the impressive capabilities of the 32KD, give us a call or visit our web site.

SAS. Doing more for radio. Again.



ETWORK



**SIERRA
AUTOMATED
SYSTEMS**

818-840-6749
sasaudio.com

Ready for FM IBOC? Here's a Q&A

Richard J. Fry, CPBE

With testing and evaluation of Ibiqity Digital's in-band, on-channel digital audio system underway, the authorization of AM and FM IBOC transmission in the United States may soon become a reality. Many stations wishing to add IBOC as soon as possible to their present operation are planning for the additional equipment needed.

But there seems to be a general lack of information available about the configurations and choices for adding IBOC to existing transmission systems, and perhaps applying more so to FM than AM.

Let's consider some of the questions facing IBOC planners. Information in this article is based in part on questions posted on the popular Broadcast.net Web site by Tony Clark of Trinidad Broadcasting and the responses of the writer of this article.

1. When adding FM IBOC to my system, will I need more power for the analog transmitter than I use now, and if so, how much?

This will depend on the method of combining the analog and digital (A&D) components.

Your licensed, analog ERP should not change. If you keep your present analog transmitter, use your existing antenna, and install a standalone digital transmitter, you will need an A&D combiner. This combiner will have some loss for the analog input: around 10 percent seems to be a likely amount. Your standalone analog transmitter will need enough extra TPO to make up for that loss.

The A&D combiner also will have a significant loss to the digital component: possibly 10dB. So for proper ERPs, the digital transmitter will need to be rated for around 10 times the power needed to meet the authorized A-to-D ratio at the antenna connection.

The "common-amplification" type of IBOC transmitter that generates air-ready analog and digital components together eliminates the external combiner and its losses. If using this configuration, the analog output power would be the same as you use now, and IBOC power would be about one-tenth of that needed for high-level combining, given the same antenna system.

2. Is any software available to help plan FM IBOC RF systems?

The author of this article has written a program called FM Planner that allows easy calculation of A&D TPO for common amplification and high-level-combined systems, has lookups for exact line loss, antenna gain, testing for coax power handling and VSWR headroom at system TPOs, power density analysis and plot, etc.

Some of the broadcast equipment manufacturers and distributors are using the program, and will be glad to work with stations to help them define the right parameters.

3. Will an existing analog FM transmitter be able to pass FM IBOC too, and if so, at what percentage of its rated analog power?

It will if it has been designed or can be modified for common amplification. Some of the new solid-state FM transmitters are expected to be able to gener-

ate the A&D components of FM IBOC and supply them in a spectrum-compliant, combined form at a single output connector.

The power rating for the analog and IBOC outputs of a transmitter capable of common amplification will depend on the transmitter design as well as the IBOC peak-to-average ratio, the ratio of analog power to IBOC power and the spectrum mask for the total signal. These factors are still under development and/or test, and then will need FCC acceptance.

Depending on the factors mentioned in the last paragraph, certain new transmitters rated for common amplification may need an additional high-level filter after the transmitter to shape the digital output spectrum to fit within the FCC mask. The TPOs (A&D) of a transmitter needing such a filter will have to be increased to overcome the loss of that filter.

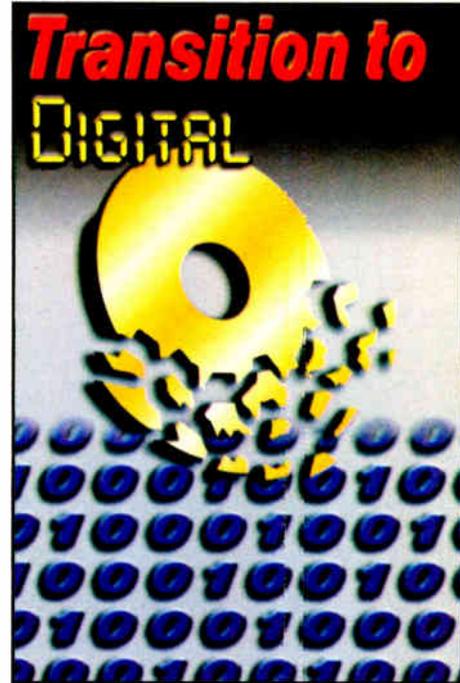
average analog power. The peak-to-average ratio of FM IBOC also is not firm, but is expected to be around 6 dB.

It is unknown yet whether the FCC will license the digital ERP component in terms of its peak or its average value. If analog TV is an example, it will be the peak value.

Note that if a high-level spectrum-shaping filter is required, it may change the peak-average ratio of the digital component generated by the IBOC transmitter, so transmitter sizing, ERP calculations and FCC filings may need to account for this.

6. What audio processing and exciter program input configuration will be used for FM IBOC?

One configuration that has been proposed is for a single, unprocessed program feed from the studio to be split into two identical outputs, each of which will con-



sary, and routed to the antenna for broadcast.

In systems using separate analog and IBOC transmitters, the exciters will drive the appropriate, separate RF amplifiers, which then will connect to a high-level combiner/filter and single antenna system.

The sketch in Fig. 1 outlines the basic system blocks needed for common amplification and high level combining, as described above. Thanks to Harris' David Agnew for his helpful comments on this subject.

7. Can I use my existing FM antenna for IBOC?

FM IBOC (and the best FM analog, for that matter) requires low system VSWR across the channel with symmetric characteristics for the two sidebands.

An acceptable antenna system might have a measured VSWR of, say, 1.1:1 at the analog center frequency, and preferably be flat, or at worst rise smoothly to a value not higher than 1.3:1 at ± 250 kHz. This level of performance is possible from most FM antennas and transmission lines in good electrical condition.

The center frequency input VSWR of many sidemounted antennas can be 1.3:1 or higher without optimization, so often the antenna system match needs to be adjusted for best performance after installation. This requires someone on the tower at the antenna input matching transformer, a person in the transmitter building with accurate instrumentation, and two-way communication. Optimizing antenna system VSWR would be a good step to take before starting FM IBOC operations.

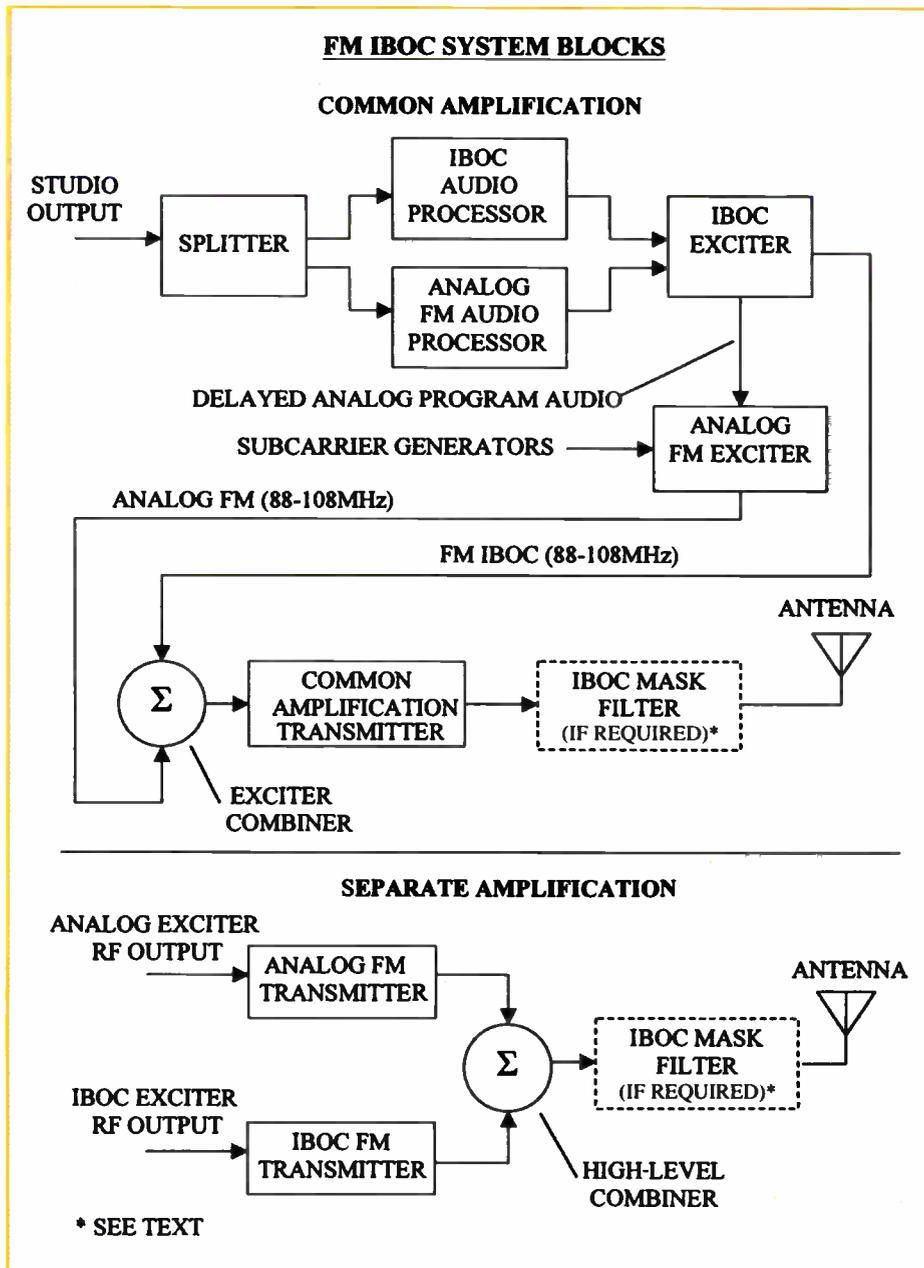
Note that accurately measuring a VSWR value of 1.1 (return loss = 26.4 dB) requires good test equipment using a directional coupler having around 36dB directivity or better. Transmitter metering is designed mainly to protect the transmitter from high VSWRs, and often gives an artificially low or high reading for values of ~ 1.1 VSWR and less.

Separate test equipment with a high-directivity coupler, precision adapters etc are needed to give sufficiently accurate results.

For more on choosing antennas for FM IBOC, see the article on page 12 of the Jan. 17 issue of Radio World.

Richard Fry is a retired FM applications engineer with almost 35 years of service with major U.S. broadcast transmitter manufacturers.

He can be reached via e-mail to rfry@adams.net.



4. What if my present analog FM transmitter cannot be used for common amplification of IBOC?

A separate IBOC transmitter will be needed, along with a high-level combiner (possibly with a spectral filter) to couple the two transmitter outputs to a single transmission line and antenna.

5. What is the ratio of digital to analog power in an FM IBOC signal?

The last value heard is 20 dB, but that could change depending on the current field tests and FCC actions. It is assumed that this ratio is average digital power to

nect through separate audio processors to a separate input on the IBOC exciter.

The program line having processing suitable for analog FM broadcast will be looped in and out of delay circuits in the IBOC exciter to become the program source for the station's analog FM exciter.

The program line having processing suitable for IBOC will be converted into the proper digital format in the IBOC exciter, and output as digitally-modulated RF.

With a common amplification transmitter, the outputs of the analog and IBOC exciters will be combined, amplified together, filtered if neces-

Lampen

► Continued from page 7
 someone says they have "8-ohm speaker cable," you would really have to ask them, "At what frequency is it 8 ohms?" It's a different value at a frequency above or below the one at which the calculations are made.

layer, the "skin" of a conductor. When you are in the megahertz, this can be a serious effect.

This is why, for instance, CATV/broadband cable has copper-clad steel center conductor. At Channel 2 (54 MHz) and above, only the skin of the conductor is carrying the signal. The rest of the wire can be anything: aluminum, steel — it could

There is a simple formula for the skin depth (in inches) for copper conductors:

$$D_{in} = \frac{2.61}{\sqrt{F_{Hz}}}$$

This is a rough formula, but is fairly accurate up into the gigahertz for copper conductors.

What does it tell us about speaker cable, such as a 10 AWG conductor? If you're going to compare this to the diameter of a particular wire, you have to double the skin depth. The diameter is all the way across the wire, and the skin depth appears at "both ends" of the diameter as shown in Fig. 2.

What this means is pretty simple. At 20 kHz, small wires are used completely; that is, the skin depth is equal or greater than the diameter. For a large wire, such as a 10 AWG speaker cable (diameter 0.115 inches), the entire wire is used as a conductor until you get to 2 kHz.

At 2 kHz the signal begins to migrate to the outside of the wire. At 20 kHz, generally the analog audio frequency limit, 68 percent of that 10 AWG wire is being used.

Does that mean we should use hollow wires, or copper-covered base metals? No, in fact the reverse is indicated.

The majority of power going to a speaker is low-frequency power. Anyone who has played with multiple

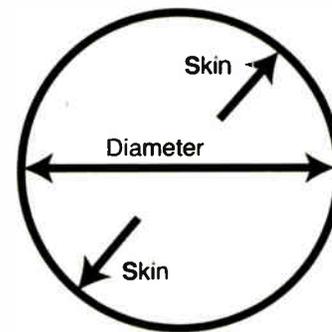


Fig. 2

amplifier setups is aware of this. Much more power is used to drive low frequencies than high.

This table shows the approximate percentage of power:

- Woofer (below 300 Hz) = 65 percent
- Midrange (below 3 kHz) = 30 percent
- Tweeter (above 3 kHz) = 5 percent

Therefore, the cable to the speaker must be all copper because most of the power (i.e., from 2 kHz on down) will want to flow down the entire conductor.

We'll finish our look at speaker cable next time with more exotic specifications such as copper purity, and take a look at basic speaker wiring techniques.

Steve Lampen is technology specialist, multimedia products for Belden Electronics Division in San Francisco.

His book "Wire, Cable, and Fiber Optics for Video and Audio Engineers" is published by McGraw-Hill. Reach him at shlampen@aol.com

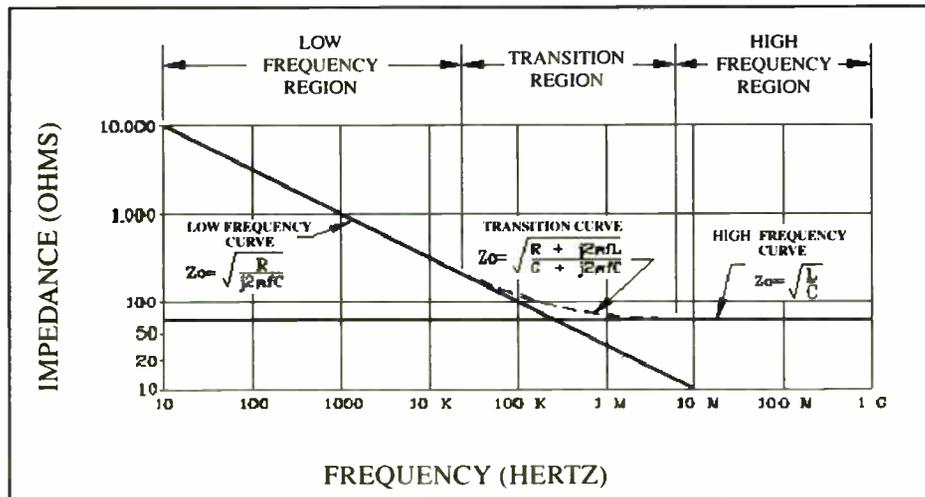


Fig. 1: Resistance affects total impedance until the cable gets to a frequency where resistance has no effect.

So why does resistance have an effect, but less and less as the frequencies on it get higher? The answer is something called "skin effect," our next subject.

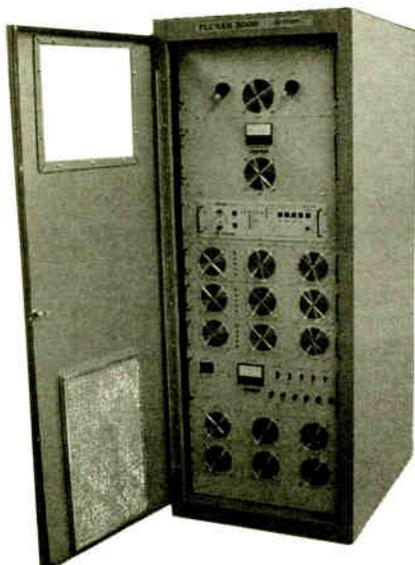
be empty! Steel is most commonly used because it is cheap and it is strong.

How much skin effect is there at analog audio frequencies? I used to say "none," but that's not completely true. After all, even Fig. 1 shows that there is a slope, meaning that less and less of the conductor is being used.

Skin effect

As frequencies go higher and higher, electronic signals begin to move from the whole conductor to the outer

AM Transmitters



Model - Pulsar 5000

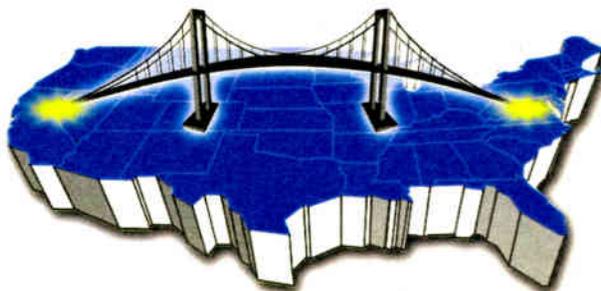
"We Sell Two AM Transmitters Every Week"

- ◆ 250 & 500 watt, 1 KW, 2 KW, 5 KW, 10 KW
- ◆ Solid State PDM
- ◆ 140 % Modulation
- ◆ High Efficiency
- ◆ "They Sound Like FM"

Tele-Link

by Energy-Onix

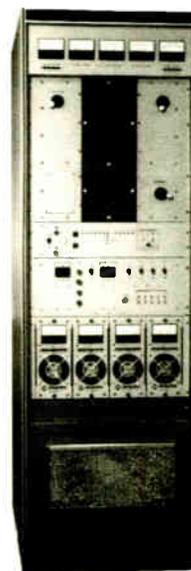
The only stereo quality STL link to utilize the "Free Internet Highway" Standard system provides bi-directional stereo. Versions available with 2, 4, and 8 channel capacities.



Contact Energy-Onix or your Energy-Onix dealer for price & delivery information.

1306 River Street
 Valatie, New York 12184

FM Transmitters



Model - ECO-25

"We Sell One FM Transmitter Every Day"

- ◆ 1 KW to 50 KW
- ◆ Exciters 10 W to 300 W
- ◆ Solid State & 1 Tube models

Toll Free Phone: 888-324-6649
 Fax: 518-758-1476

E-Mail: info@energy-onix.com
 Web page: www.energy-onix.com



ENERGY-ONIX
 The Transmitter People

Burns through SCMS.

And smokes everything that can't.

Introducing the DN-C550R. The professional dual drive CD + CD-R/RW recorder that's heating up the industry. Designed with 90 years of Denon engineering know-how and progressive thinking, the DN-C550R is the luminary of CD technology. This innovative combi-deck incinerates recording obstacles like SCMS and accepts both CD-R/CD-RW data and audio blank media. Leaving you with a huge range of recording and playback options for independent use or in combination. Plus, we stoked it with every feature a professional would expect. The DN-C550R. The hottest CD recorder in the industry.



www.denon.com • Denon Electronics, 19 Chapin Rd., Pine Brook, NJ 07058 (973) 396-0810

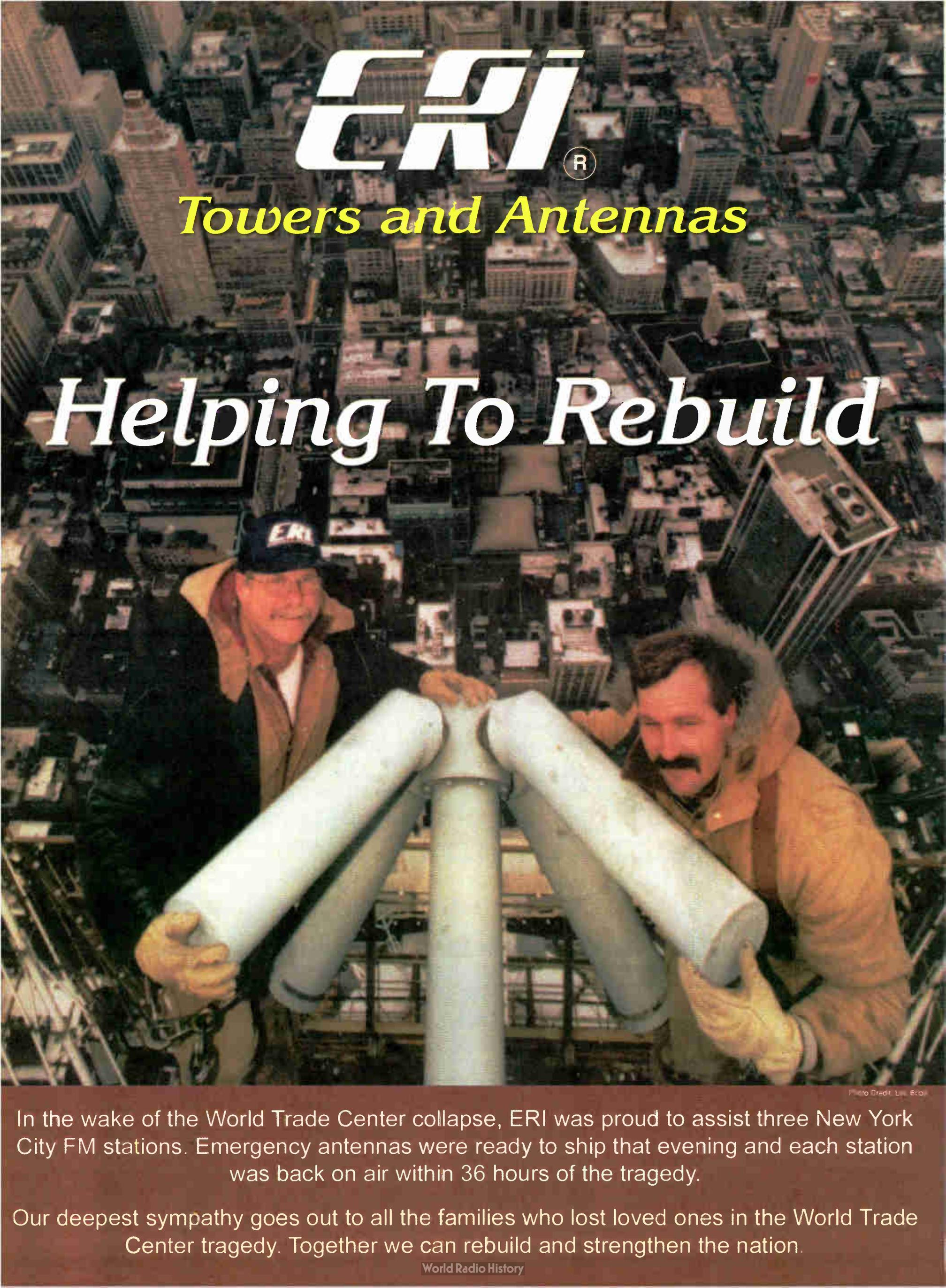
Denon Canada, Inc., 17 Denison St., Markham, Ontario, Canada L3R 1B5 (905) 475-4035

World Radio History

DENON

The first name in digital audio

Number
One
DENON

An aerial photograph of New York City serves as the background. In the foreground, two men are working on a rooftop antenna tower. The man on the left wears a dark jacket and a blue cap with the ERI logo. The man on the right wears a tan jacket and has a mustache. They are both holding large, white, cylindrical antenna components. The tower structure is visible around them.

ERI[®]

Towers and Antennas

Helping To Rebuild

Photo Credit: L. L. Scott

In the wake of the World Trade Center collapse, ERI was proud to assist three New York City FM stations. Emergency antennas were ready to ship that evening and each station was back on air within 36 hours of the tragedy.

Our deepest sympathy goes out to all the families who lost loved ones in the World Trade Center tragedy. Together we can rebuild and strengthen the nation.

World Radio History

Is Your Public File in Order?

Jack Layton, CPBE

There is little ambiguity in the FCC rules that spell out the requirements for commercial broadcast station public inspection files, as well as those that cover the non-commercial stations.

For commercial broadcasters, the FCC Rules Section 73.3526 applies; for non-commercial broadcasters, Section 73.3527 applies.

Yet in the course of performing alternative broadcast inspection program compliance inspections, I rarely come across a file that is complete, orderly and in compliance with the rules.

Keeping in mind that an article is no substitute for legal advice, let's examine the actual requirements set forth by the rules for the public file of a broadcast facility.

Who is required to maintain a file — Every facility licensee and construction permit applicant for a new broadcast facility is required to maintain a public file.

File location — The file is to be maintained at the station's main studio. The main studio is the only acceptable location for the public file for an operating broadcast facility.

Public access — Commission policy mandates that the licensee maintain a human presence at the main studio location during normal business hours so any member of the public can access the public inspection file.

Normal business hours typically are an eight-hour period between 8 a.m. and 6 p.m. local time, Monday through Friday.

Computer access — All or part of the



Jack Layton inspects a public file.

file may be maintained in a computer database as long as a computer terminal is made available at the location of the file. Material in the file also must be made available, upon an in-person request, for printing or reproduction.

A reasonable charge may be made for such services.

Individual station files — A separate file is to be maintained for each station for which an authorization is outstanding. This means that in communities where the licensee operates more

than one station (including an AM/FM combination) a separate file for each station must be maintained.

Station authorization — A copy of the current FCC authorization to construct or operate the station along with any material reflecting a modification to it or placing conditions on an authorization must be available in the file.

In practical terms, this means a complete paper trail of current operating authority must be in the public

See PUBLIC FILES, page 34 ▶

COLE'S LAW

Radio Shows Its Mettle in Time of Crisis

Harry Cole

The status indicator lights glowed "situation-normal" green throughout Team Cole's Law's new offices in scenic Arlington, Va. The nightshift team had been de-briefed by the incoming daytime shift members of the FCC Activity Monitor Team.

Shock to come

Most of the Task Force on the next Radio World article had assembled in the small auditorium in the Cole's Law Central Building for a breakfast meeting to begin the final edit on an article predicting (with detailed explanation) why the upcoming FM auctions would likely be postponed (a prediction that turns out to have been correct, of course).

By 8:30 a.m. business was moving as usual. Within 30 minutes, however, that was not the case. It was Sept. 11, 2001.

First came the reports about a plane hitting the World Trade Center. We initially flocked to the telephones and Internet to get more information.

Then came the report of a second plane. By now a cadre of workers had assembled in the windowless television room to view the New York carnage over the air. As we watched in stunned silence, a new image appeared on the screen — not the Trade Center, but a familiar building with a large plume of smoke rising in the distance behind it.

After several minutes, the on-air

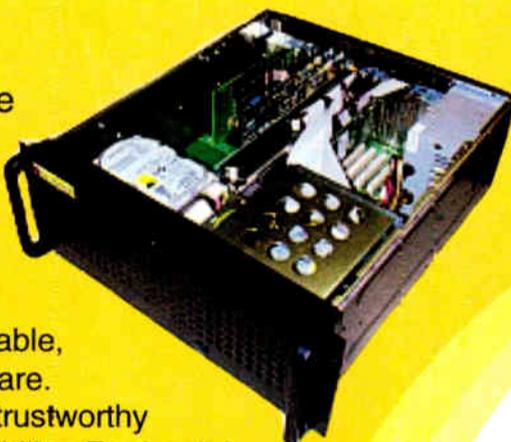
See COLE'S LAW, page 37 ▶

Reliability.

SMARTS Systems are built around the idea that air time is extremely precious. No radio broadcaster wants to hear dead air. As broadcasters, we understand the importance of a consistent audio signal.

We design every SMARTS System with dependable, professional, audio-focused hardware and software. Smartcasters use stable operating systems and trustworthy components that prove time and again their reliability. Rock solid dependability you can rely on year after year.

When your digital audio system has you down, call SMARTS!



Broadcast Intelligence.
Digital radio that makes sense.

www.smartsbroadcast.com

800-74 SMART
(600-747-6278)

info@smartsbroadcast.com
2508 West Main Street, PO Box 284
Emmetsburg, Iowa USA 50536

 **SMARTS**
Broadcast Systems

Tom Peters: The Weirdoes Will Win

Radio Should Change Its Thinking on Women and The 55-Plus Demo or Else Miss a Huge Opportunity

Ken R.

Writer and consultant Tom Peters will never be accused of being shy.

"Organizations and radio stations which are ordinary are doomed," Peters said. "The world is being turned upside down and there are no experts."

Peters, author of such books as "In Search of Excellence" and "Thriving on Chaos," alternated loud outbursts of anger with pregnant pauses of reflection as he described the current business climate as he sees it during

remarks at The NAB Radio Show earlier this fall.

He lambasted his audience about blowing up their traditional corporations and ignoring women and aging baby boomers.

Quoting Peter Job, CEO of Reuters, Peters said the corporation as we know it will not survive the next 25 years.

"Our challenge is to create markets," Peters said.

Speaking prior to the terrorist acts of Sept. 11 in New York and Washington, Peters said the United States is in a

period of discontinuity and that all bets are off. The noted motivational speaker believes that the entire nature of "work" is changing and that 90 percent of white-collar jobs will be destroyed.

"We are a great country because we had the guts and nerve to destroy 44 million jobs at corporations such as GM, Ford and AT&T," Peters said. "We replaced those jobs with 73 million high-tech jobs."

He stated that the advantages of the current work climate are matchless opportunities brought by the Internet and the redefinition of work.

"The worst part: workplace turmoil for the foreseeable future. Take control of the runaway train or be flattened by it."

Turning his attention to the broadcast world and mega-stars such as Howard Stern, Paul Harvey, Don Imus and Rush Limbaugh, Peters said,

"These people are all weirdoes who have had failure after failure after failure before they got it right. Talent is the brand in radio."

People are strange

He advised station owners to invest in strange people, stay with them through their mistakes and reward them.

"The magic in Silicon Valley, for example, is Technicolor people," Peters said. "Many of them go broke but the other 1 percent change the world."

Broadening his remarks on the importance of "unique" personalities in any corporation, Peters said, "Nobody ever did a damn thing vaguely interesting based on a focus group. Look at the data but then go with your gut."

The author said successful enterprise

See TOM PETERS, page 31 ▶



Tom Peters makes a point at The NAB Radio Show.

STATION/STUDIO SERVICES

BALSYS

TECHNOLOGY GROUP, INC.
PROFESSIONAL BROADCAST
ENGINEERING SERVICES

Analysis - Installation - Support

7141 Tallotree Lane
Orlando, FL 32835
Tel: 407-822-7055
Fax: 407-296-2587
www.balsys.com
sales@balsys.com

4300 Hits

on Hard Drive!

AC, CHR, Gold, Country, AOR

Only \$895

if you send your
IDE or SCSI hard drive.
Complete information at:
www.h-b-s.com
Or call 800-759-4561
For Radio Broadcast only!

ATTENTION PROVIDERS!

Promote your services to
Radio World's readers.
Reach Radio Station and Recording
Studio owners/managers and
engineers with your message.
For information on
affordable advertising
call **Simone** at **1-703-998-7600**,
ext. 154.



Professionally done Commercials \$25.00
Liners, Voice Tracking, and more
The Lowest Prices On Earth!
Choose from 20 Voices
www.internetjock.com
Toll Free (877) 646-4163

Conrad's House Knocked Down

The house where Frank Conrad lived while he tinkered in his garage on experiments that led to the start of the commercial radio industry was torn down in September.

Many early radio broadcasts originated from Conrad's music room in the house.

Last spring, the National Museum of Broadcasting succeeded in disassembling Conrad's garage in suburban Pittsburgh, but the group was unable to save the house as well.



The bricks, boards and fixtures of the garage now sit in a nearby warehouse, in anticipation of a time when the NMB can raise funds to reassemble it.

Radio World first reported on this project in a cover story in our April 11 issue.

The group hopes to make the garage the cen-

terpiece of a National Museum of Broadcasting in Pittsburgh.

Rick Harris, chairman of the proposed NMB, said the future is anything but certain for the garage restoration, much less a museum.

"So far we've failed to convince the groups that should be helping with this project that the birthplace of the broadcasting industry is something worth preserving and worth the relatively small sum it would take to make it happen," said Harris.

He has tapped preservation organizations, foundations and government agencies in search of funds for the Conrad garage restoration and the NMB, to no avail.

There is a group that Harris said has the biggest stake in the project but has yet to participate.

"Most disheartening of all is the broadcasting industry, which has only turned down our requests for financial help. The one single contribution that made the Conrad garage dismantling possible was from Interep's Ralph Guild.

"Without his help, the garage would now be in a landfill along with Conrad house. Other than that, we have not received one dime from the broadcasting industry for this effort," said Harris.

Those interested in the Conrad Project can visit <http://trfn.clpgh.org/nmb> or call Rick Harris in Pittsburgh at (412) 241-4508.

The National Museum of Broadcasting is a nonprofit organization.

— Laura Dely

 can run my radio station for \$995.

MP3 on any card!

Multiple Streams
No Skipping! No Kidding!

- ✓ Satellite
- ✓ Voice Track
- ✓ Live Assist
- ✓ Automation
- ✓ Internet



 **MediaTouch**

Record and Play MP3, MP2, PCM, ADPCM, and Windows Media Audio on ordinary sound cards. iMediaTouch does more for less!

(888) 665-0501 www.imediatouch.com

World Radio History

PROMO POWER

Radio Broadcasters Do Right

Mark Lapidus

As I write this article, the nation is still reeling from the attacks in New York, Washington and Pennsylvania.

It's impossible for me to know what will transpire between today and tomorrow, let alone what may have happened by the time you'll be reading my comments.

This much I can say today: I am very proud of what radio has done as a medium in covering this tragedy. Tough decisions were made within minutes at both local and corporate levels at thousands of stations from coast to coast.

Music stations that never consider doing anything but staying in format broke ranks and delivered news and information throughout the United States.

From this point forward, radio's challenge is how to deal with these two emotions: anger and grief.

Many radio and television networks and local affiliates set aside their contractual concerns and openly shared their audio with any radio outlet that needed it. Corporations not only encouraged this format switch, they boldly told stations not to be concerned with the amount of advertising revenue they would lose by going commercial-free for as long as necessary.

While it's easy to take that decision for granted, we shouldn't; we need to recognize the owners for this valiant and immediate commitment.

After the initial news and information broke, radio broadcasters encouraged the public to emote on-air. Two emotions surfaced quickly. The first was mourning the dead and a desire to help the victims' families. The second emotion pumping out over the American airwaves was anger.

From many, this anger manifested in a call for revenge. From this point forward, radio's challenge is how to deal with these two emotions.

First let's consider how we will continue to funnel help to surviving families. It's vital for our work to continue to be selfless. If we are not careful, we'll slip back to our natural state of self-promotion and a rush to be the first to claim credit for anything we do.

This is almost instinctual for radio broadcasters, so we must be on guard for this attribute. There's a simple test you can use as you filter through the many ideas flying into your e-mail and voicemail.

Ask this question: Are we as a station doing a particular promotion to benefit our country? Or to get media attention?

Are we rushing to do something first because we believe in the law of marketing firsts (he who does something first will be remembered for it far longer than those who are next in line) or are we deciding to pursue this activity because it will actually help?

Finally, are there are other stations that may wish to join us to make this activity even more beneficial to recipients?

Are you now shaking your head in disappointment that a diehard *radio guy* — (me!) who for years has encouraged you to fly your self-promotion flag as much as possible — is wimping out at a critical juncture? I hope not.

I will forever believe in the necessity

of promotional hype in our business, but right now it's time for us to be cognizant that radio can and should be beneficial to public welfare, especially while the national conscience runs the gamut from renewed, robust patriotism to feeling desperate vulnerability.

Now is the time for us to think first of how we can help our communities and country and not care whether or not that

activity will help us get attention. When you think about it, this is how we reacted the first few days after the attack. It's only as time goes by that the urge to bang our collective chests returns.

I am not saying that radio stations should never take credit for helping during this crisis. Let's just be careful about the language we use and be mindful that a wound this large will not heal quickly. Let us be strong and continue to do the right thing.

Mark Lapidus is president of Lapidus Media. Contact him via e-mail to mark.lapidus@yahoo.com.

STATION SERVICES

Love Is What the World Needs Now

"Hook Me Up" is an interactive matchmaking game that begins at a big venue — a bar, a concert location — with five questions posed to players who answer on a pen-based electronic tablet. The responses are recorded on a wearable label coded with the participant's answers.

Your station personality roams through the mingling crowd and scans the labels with a hand-held device that indicates if there are any matches between the people standing together.

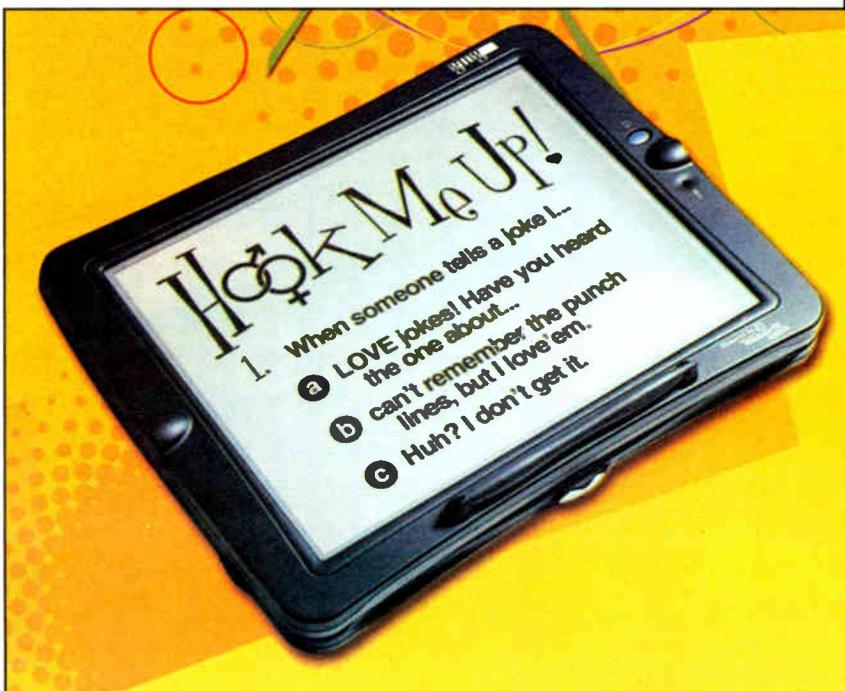
Screens on the Mobile Scanning System inform players that they are "a match made in heaven," "a love connection," "go Dutch treat," or "Friends 4-ever." The players take it from there.

The basic "Hook Me Up" package includes a 30-day rental of the MSS, one pen-based electronic tablet, barcode labels and game piece labels printed with your sponsor's and/or your station's logo.

For more information contact Lisa Capps at Gold Media in Kansas at (316) 683-5454 or visit www.goldmediagroup.com.



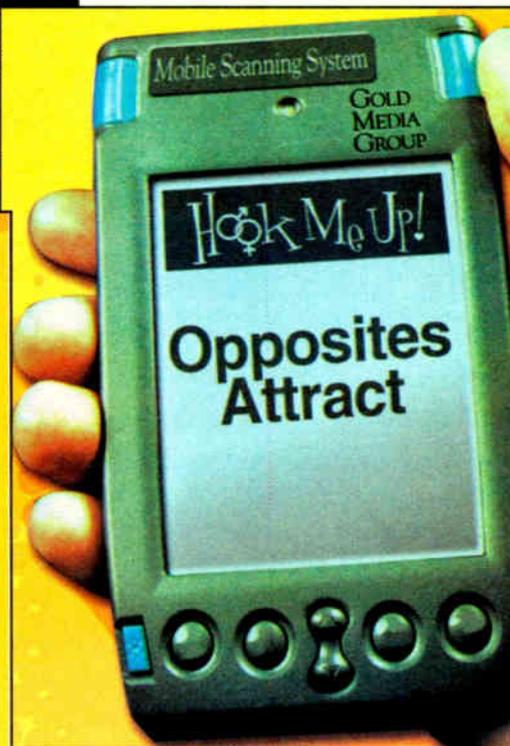
Shown are participants at a recent 'Hook Me Up' event.



Players answer questions on the electronic tablet.



Wearable, Scannable Game Piece Labels



The scanning device reads a game piece label.

Every great connection starts with a

NEUTRIK® connector

and every

NEUTRIK®

connector starts with an innovative design

new

Easycon®

- Gold IDC or SOLDER contacts standard. No more tarnished connections
- 3 parts only...for the fastest field or production cable assembly on the market
- A cable strain relief that grips like a vise—without damaging the attached wire.

new

2-pole Speakon®

- 2 poles only—reduced cost and assembly time
- Mates with 2 or 4 pole Speakon receptacles
- Integrated strain relief for all cable sizes 6–10mm
- Combination pozidrive and slot screw terminals

new

75ohm BNC

- Built to be a "true" 75ohm connection for DTS/HD. A totally new design that includes a rear twist boot for easy turning onto the mating jack.
- Bulkhead jacks are available in a "D" series housing or as a single feed-through in isolated or grounded versions.
- Parts are precisely machined, not diecast for rugged reliability.
- VSWR/Return loss: $\leq 1.10 / >26$ dB up to 3GHz.

In the Spotlight!

The Broadcast Richardson name may be new to you, but its ideology is not...servicing the customer.

Broadcast Richardson has combined the technical, integration and consulting expertise of the recently acquired Broadcast Richmond with the wide product offering and unsurpassed service of Richardson Electronics.

Complementing its specialized, value-added services, Broadcast Richardson draws from its 200+ product lines to offer you true inter-product integration.

Broadcast Richardson is prepared to lead the way in the broadcast industry. Turn to us for your next component, equipment or system need!

- **Transmitter Components**
- **AM, FM, TV, HF Transmitters**
- **Studio Equipment**
- **Broadcast Systems**
- **Antennas**
- **Cable TV**
- **Microwave**
- **Satellite**
- **Webcasting**

Call Today!
800-348-5580

*More than 60 locations
worldwide to serve you.*

E-mail: broadcast@rell.com

Internet:
www.broadcast-richardson.com

630-208-2200
Fax: 630-208-2550

© 2001 Richardson Electronics, Ltd. MK2189

A Featured Presentation...
From one of our 200 product lines!

RFCAST

AM Transmitters

Features Include:

- Identical and on-line hot plug-in amplifiers, fully protected
- Built in modulation monitor and audio processor (optional)
- Digital and AM stereo compatible
- Covers AM and extended AM band
- High accuracy synthesized oscillator
- Built-in remote control interface
- 24 month warranty



AT1K5 – 1 kW AM Solid State



AT7K5 – 5 kW AM Solid State

Competitively Priced For You!
In Stock. Call Today!

BROADCAST 
 **RICHARDSON**

Integrated Solutions

Mrs. Jones — And Mr. Jones Too

At the Core of the Baby Boom, Generation Jones Is a Distinct Demographic Radio Broadcasters Can Tap

Ken R.

If you're too old for Britney Spears and not old enough for Metamucil, you're part of Generation Jones.



Jonathan Pontell

These are the folks who missed out on Woodstock but were just in time for "The Brady Bunch." This population, caught

between the Xers and the baby boomers, is a desirable and reachable target for radio advertisers, according to Jonathan Pontell, author of "Generation Jones," the "Joneser" magazine and the creator of the online "Joneser Café."

Pontell, who is himself a part of this 35-47-year-old demographic, said the Jonesers are about 26 percent of all adults.

"The pie is being divided into smaller slices by the agencies because it's easier to target a group like this than it is the giant 25-49s," said Pontell at the NAB Radio Show in New Orleans.

The term "Jones" comes from '70s slang meaning, "to have a desire for," as in "Basketball Jones" and "Love Jones," two popular radio hits of that decade.

As agencies move from demographic to psychographic research, the qualitative description of these age groups becomes as important as the quantitative aspect. Pontell maintains that the characteristics found in Generation Jonesers distinguish them from other groups.

"They want to spend more time with their kids," Pontell said. "We were born into an affluent society but our version of the American dream is more spiritual than that of our parents. Our parents went for the cash but we have a bit more idealism."

Pontell said that Generation Jones had to learn the value of compromise.

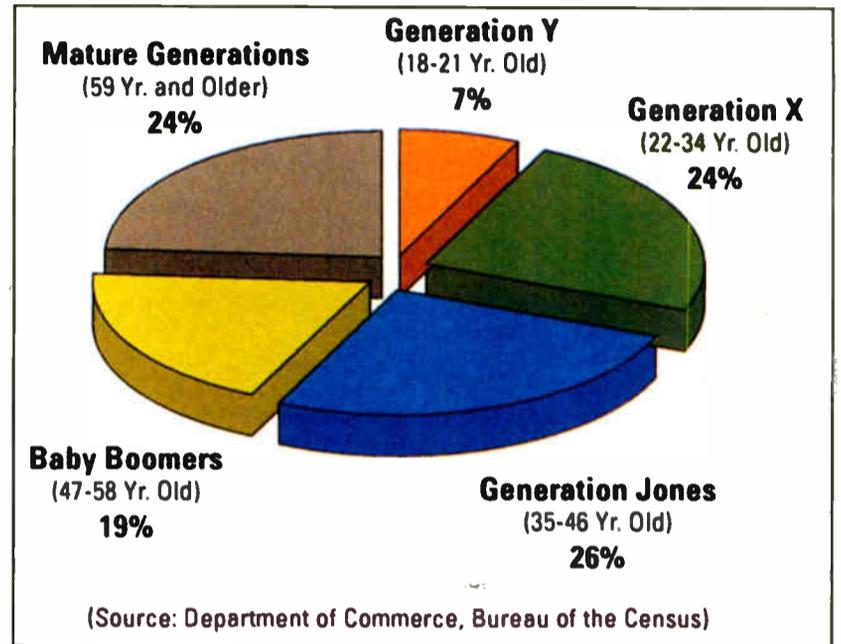
"We use the system, but we are not alienated from it like Generation X is," Pontell said.

years ago," said Pontell. "When you talk to older people on the radio you might say, 'Buy this or that because you earned it.' But you should say, 'Buy this because you deserve it' when you talk to Generation Jones."

With artists such as Michael Jackson, Madonna and Prince, Generation Jones is locked into the late '70s and '80s music.

"Use this in your contests," Pontell said. "Relate to them through the music and through what you say."

Pontell compares defining trends that distinguish the generations: boomers used to swallow goldfish, Jonesers streaked while Xers bungee jump.



Generation Jones Americans Born 1954-1965

Tom Peters

► Continued from page 26

is about energy, spirit, sparks, spunk and brilliant failures.

He cited a recent article in Fortune magazine concerning the most admired corporations in America. The qualities most desired were minimized risk, respect for the chain of command, support of the boss and making budget.

"That's pathetic," Peters said. "You certainly won't make it into the history books that way."

Women rock

"The attributes of the new organization are the attributes most women have," said Peters. "Women are relationship-conscious, less rank-conscious and more willing to listen."

Peters playfully suggested that the managers in the audience return to their stations and fire all their male salespeople.

"It may be against the law, but you'll be rich," Peters said with a wink.

Continuing with his praise of the female style, Peters said he was stunned to discover that men still design most products for women.

"Men and women use products differently and buy for completely different reasons," Peters said. "I'm surprised the divorce rate after two years isn't even higher because we have nothing in common."

We are a great country because we had the guts and nerve to destroy 44 million jobs at corporations such as GM, Ford and AT&T.

— Tom Peters

He also said men buy particular brands while women "join" their brands.

"They like to communicate with each other and become a part of the companies they buy from," he said.

"The good news is that if we have a Y2K crisis and men have to go back out and hunt hyenas to survive, we will again be useful," Peters said. "This (women) thing is bigger than the Internet."

Peters chided the radio industry for not recognizing that the hot 18-34 demographic will be much less important in the future.

"Eighteen-to-34 is stupid, stupid," as Peters said.

He presented U.S. Census Bureau data that the 18-49 age group is declining while the 50-64 bracket will increase 47 percent over the next decade.

"And we have all the money," Peters said. "So why are only 5 percent of the advertising budgets targeted to us?"

Ken R. is a former broadcaster who is proud to be in the middle of the 45-54 demographic.

Pontell said many broadcasters who reach baby boomers are trying to get some younger demographics to make their audiences more desirable to advertisers.

"You need to know this when calling on agencies," Pontell said. "Because your competition knows it."

Studies show that Generation Jones is willing to switch brands, according to Pontell. He said they are at a point in their lives where they are hungry for new experiences, new careers and travel to new places.

"We are reachable, more so than five

Boomers wore hot pants; Jonesers had painter pants and Xers have cargo pants.

Then consider that boomers watched "American Bandstand," while Jonesers watched "Soul Train" and Xers watch "The Grind" on MTV.

To find out more about this demographic group, visit www.generationjones.com.

Ken R. is a former broadcaster who listens to hip-hop versions of Patti Page tunes.

He's not sure which generation he fits into.

NEED SATELLITE TIME?

ARE YOU CURRENTLY PAYING TOO MUCH?

We have a number of slots available on GE Americom GE-5 satellite (79° West).

Access to other GE satellites also available.

If you use Radyne-Comstream uplink equipment for your network, here is what we can do for you!

64 kbps QPSK 1/2 FEC (10 kHz mono)	* \$850.00
128 kbps QPSK 1/2 FEC (20 kHz stereo channel or 10 kHz dual mono)	* \$1,250.00
192 kbps QPSK 1/2 FEC (20 kHz stereo channel or 10 kHz dual mono)	* \$1,850.00
* per month/5 year lease/Ku band only	

50 state coverage. Typical receive EbNo 10-12 using 1.8M Dish. We can also provide dual illumination while you make the transition!



River Communications, Inc.

211 River Road
Walden, NY 12586
800-OK RADIO
800-657-2346
sales@riverc.com

Incredible Sale Prices on Symetrix



Symetrix 506E

ONLY \$299.00
Save 43%

The 506E headphone amplifier has everything you need to make headphone monitoring a snap. Features: 6 direct inputs and 6 direct outputs; proprietary high voltage drive technology; internal power supply; crystal clear, low distortion for reduced listening fatigue; front and rear panel outputs. Best of all, Symetrix reliability for an incredible low price of only \$299.00 (while supplies last).

506E List \$529.00 **ONLY \$299.00**



Symetrix 528E

ONLY \$479.00
Save 36%

Broadcasting's most popular voice processor. The 528E is a complete unit that performs 6 separate functions: microphone preamplification, de-essing, compressor/limiting with downward expander and 3-band parametric equalization. Buy one for every microphone in your facility!

528E List \$749.00 **ONLY \$479.00**



AKG C4500B-BC Mic/Headphone Package

The AKG C4500B-BC is a front-address, large-diaphragm condenser microphone designed for use in professional broadcast environments. It's immune to electrostatic and magnetic fields and provides an extremely wide dynamic range and low self-noise.

Features: 20 dB pad and a bass roll-off (6 dB/octave below 120Hz); internal shock mount; operates on all phantom power voltages; self-noise 8 dB; max SPL: 155dB; dynamic range 137 dB. The microphone includes an H100 spider suspension and W4000 windscreen.

Free AKG K240M headphones with purchase! Order today.

C4500BK240PKG **ONLY \$499.00**

FREE
AKG K240M Headphone
with Purchase of
AKG C4500B-BC



Includes
ShockMount!

Hafler Reliability
Only \$349.00



Hafler P1000

The P1000 is the perfect marriage of amplifier technology and efficiency, with a MOSFET output stage producing over 100 watts of pure Hafler power from a single rack space (50 watts/channel into 8 ohms). You'll find Hafler's patented trans-ana circuitry in the P1000. Whether you require broadcast monitoring, critical studio monitoring or surround sound amplification, the Hafler P1000 delivers the results you demand.

P1000 List \$569.00 **ONLY \$349.00**



Hafler TA1100

Hafler's new super-affordable TA1100 is a two-channel, two rack height, convection-cooled (no fans), MOSFET (metal oxide semiconductor field effect transistor) power amp. The circuitry used in the TA1100 has been very successful in bringing new levels of clarity and intelligibility to broadcast facilities and headphone monitoring installations. Features: soft start circuit protects speakers; thermal sensing network amplifier monitors the heatsink and transformer temperature; LED indicators of operating status and fault types; 40 watts per channel into 8 ohms.

TA1100 List \$299.00 **ONLY \$199.00**

The World's Best



BROADCAST SUPPLY

FREE distribution amplifier with purchase of an R-5 (a \$449.00 value)



Get a Great Deal on this Rock-Solid Audioarts Console

The R-5 is a quality Audioarts console in a cost-effective package. Features: 12 channels (2 mic, 10 stereo line, 1 telephone); 4 high-quality switches throughout; Simple Phone® telephone channel; Program and Audition; channel on/off switches with full monitor muting; remote control of channel on/off; six-segment talkback; 5-source control room monitor selector (PGM, start/stop, reset and hold controls. Now, through December, receive a free distribution amp with your R-5 purchase. Exclusively at BSW.

R-5 List \$5,095.00 **ONLY \$4,395.00**

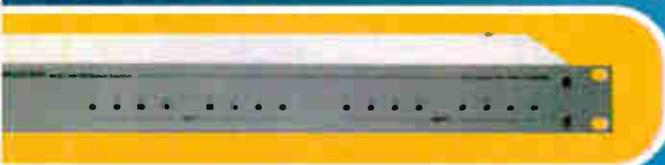


The Audioarts SDA-8400 is a 1x8 channel stereo, rack-mountable distribution amplifier. Features: LED status lights for all input and output channels, extremely flat frequency response, separate 3-conductor connectors for each input and output. **BSW Price \$449.00 or FREE with R-5 purchase.**

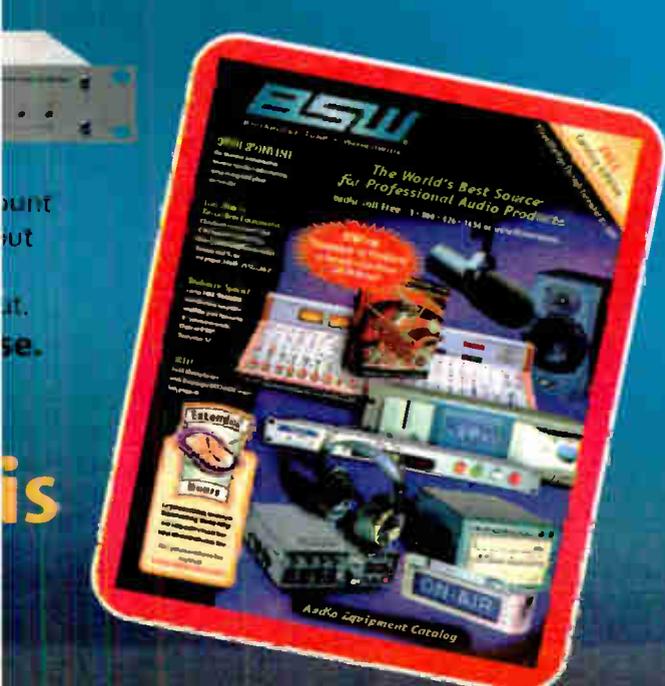
Our Fall Catalog Available Now

Order Today 1.800.426.8

Source for Professional Audio Products.



fixed-position configuration. Features: 13
 ymic preamps; 2 inputs per channel; illuminated
 and mix-minus out; 51am stereo VU meters for
 machine control logic and programmable
 rce stereo line selector; studio control with
 D, TEL EXT1, EXT2); built-in digital timer with
 er 31st, 2001 receive a FREE Audioarts SDA8400
 W.



BSW's Huge Gentner Sale Continues Through November 15th!



FREE
 2nd Control Surface or Screenwin
 Software with TS612-6 Purchase
 (a \$489.00 Value)

SALE
\$2,895⁰⁰



ScreenWin Windows®-based software puts line selection at the fingertips of the screener with a keyboard and allows the screener to gather pertinent caller information such as name, age, gender, topic for discussion, etc. Includes TS612 version 2.5 software upgrade kit.
 Free with purchase (if you choose ScreenWin to \$489.00 Value)

TS612-6 – Your Next On-Air Telephone System

The TS612-6 phone system interfaces up to 6 (expandable to 12) telephone lines to its two internal digital hybrids, providing conferencing for up to four callers. All telephone lines may be answered or placed on hold or "on air" from any of the three control points with TS612 control surfaces. TS612 control surfaces are multi-line telephones that incorporate special broadcast related features like hold, air, conference, VIP, next, record, mute, and aux. With separate hold and screened hold queues, a screener may prescreen calls before placing them "on air". Screening calls is done with a standard TS612 control surface or the optional TS612 ScreenWin software. The TS612 supports split studio, which provides access to telephone lines from 2 studios, and network interface mode, which allows a network of 9 studios and 120 telephone lines. A TS612-6 system includes one control surface.

Mfr. List \$3,149.00 **ONLY \$2,895.00**



FREE
 Koss TD60 Headphone
 with Purchase of
 Gentner Microtel

SALE
\$249⁰⁰

Microtel1

This portable telephone interface is perfect for anyone who needs to record calls or send audio via the telephone. The Microtel functions as a "mini mixer" with a variety of inputs and outputs for mic, headphones, tape recorder, and other audio equipment.

Mfr. List \$272.00 **ONLY \$249.00**



FREE
 LPB Silent Boom
 with Purchase of
 Gentner DH20

SALE
\$899⁰⁰

Affordable Single Digital Hybrid

The DH20 is an inexpensive digital hybrid designed to connect a telephone line to audio equipment. It includes several features that are usually only available in more expensive units, such as selectable caller control, AGC, and auto answer/disconnect. The DH20 is easy to install and simple to operate. Order today.

Mfr. List \$995.00 **ONLY \$899.00**



FREE
 Koss TD60 Headphone
 with Purchase of
 Gentner Auto Coupler

SALE
\$319⁰⁰

Auto Coupler

The Auto Coupler from Gentner provides a balanced line level input and output for connection to a telephone line. Functions include auto answer/disconnect as well as manual operation. This product is ideal for sending or receiving audio to or from a phone line.

Mfr. List \$349.00 **ONLY \$319.00**



SALE
\$439⁰⁰

FREE
 LPB Silent Boom
 with Purchase of
 Gentner SPH10

Value-Priced Hybrid

The SPH10 is the best, low-cost solution if you want to send or receive audio over a standard dial-up telephone line. Gentner's exclusive audio filtering and equalization eliminate unwanted noise while maximizing the intelligibility of the caller. The SPH10 analog hybrid has balanced input and output, and a built-in monitor amp.

SPH10 Mfr. List \$499.00 **ONLY \$439.00**

Public Files

► Continued from page 25

file: copies of the station's license, the latest renewal card, documentation changing the station's call letters and documentation changing the name of the licensee if different than what appears on the license.

Applications — A copy of any application filed with the FCC, along with any related material (exhibits, etc.), are required to be available for as long as they are pending. Any application that is granted conditioned upon a waiver or any renewal application granted for a short term must remain in the file as long as the waiver is in effect or until the next full-term renewal is granted.

Citizen agreements — A copy of written citizen agreements must be available. A citizen agreement is an agreement between a licensee and one or more citizens that deal with goals or proposed practices that affect station operations in the public interest in areas such as — but not limited to — programming and employment.

Agreements must be available for as long as they are in force.

Contour maps — A copy of any service contour maps submitted with any application filed with the FCC must be

available and must be retained for as long as it accurately reflects current information. A sales brochure with a coverage map (unless it was the map submitted with the application) *does not* fulfill this requirement.

Ownership report — Ownership reports are required to be filed with the FCC every other year. A copy of the most recent complete report that

accurately reflects ownership of the facility (FCC Form 323 or FCC Form 323E for non-commercial educational stations) must be available in the file.

Political file — The station must keep in the file a complete and orderly record of all requests for broadcast time made by or on behalf of a candidate for public office, together with an appropriate notation showing the disposition of the request and the charges made, if the request is granted.

The term "disposition" includes the schedule of time purchased, when the spots actually aired, the rates charged and the class of time purchased.

If free time is provided for use by or on behalf of a candidate, a record of the time provided must be available in the file. Political information must be placed in the file immediately and retained for a two-year period.

EEOC reports — In January 2001, the U.S. Court of Appeals held that the FCC's current EEO rules were unconstitutional.

of an FCC investigation or complaint is required to be in the file. Such material must be retained until the FCC advises the licensee that it may be discarded.

Radio issues/program lists — Every three months a list of programs that dealt with the station's most significant community issues must be prepared and placed in the file. This must be done no later than the 10th day following the close of a calendar quarter.

The list must contain a brief narrative that describes which issues were addressed and which programs provided this treatment. It must at least include the time, date, duration and the title of each program in which the issue was treated. This material must remain in the file until final action is taken on the station's next renewal application.

Time brokerage, joint sales and local marketing agreements — A copy of every station LMA or time brokerage agreement or contract must be available in the file. In addition, time brokerage or LMAs by any other station's licensee at your station must be in the file.

A copy of every agreement or contract joint sale of station advertising time, whether between stations in the same market or other markets, must be available in the file.

This information must be retained for as long as the agreement is in force. Confidential or proprietary information regarding LMAs, time brokerage and joint sale of advertising time agreements may be edited for public release.

Conclusion

The rules applicable to the Local Public Inspection File are easy to understand. The information required to be in the file, for the most part, is generated internally at the radio station. It's a matter of pulling together the required information and documentation and organizing it.

The author is the owner of Layton Technical Services in McMurray, Pa. He provides technical consulting services, including ABIP compliance inspections and due diligence inspections for the broadcast industry.

Contact him via e-mail to layton@sgi.net.

While performing alternative broadcast inspection program compliance inspections, I rarely come across a file that is complete, orderly and in compliance with the rules.

Shortly thereafter, the FCC issued an order suspending its EEO record-keeping requirements. Thus this article omits reference to these requirements.

'The Public and Broadcasting' — A copy of the latest edition of the FCC manual "The Public and Broadcasting" must be available. This is the June 1999 edition. It is available on the Internet at www.fcc.gov/mmb/asd/welcome.html.

A copy of this manual must be mailed to anyone requesting it. The station pays the postage.

Letters and e-mail from the public — All letters and written comments received from the public regarding the operation of the station must be placed in the file.

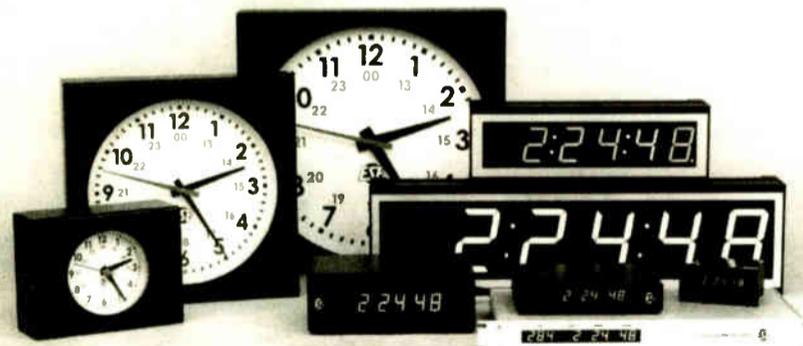
Written comments and suggestions include electronic mail sent to an e-mail address that the station publicized or communications addressed to station management.

Exceptions include when the writer requests that it not be placed in the file or when the licensee feels that nature of the comments are obscene or defamatory.

Mail and e-mail addressed to station employees need not be retained in the file. Letters and e-mail must be retained for a three-year period from the date it is received.

FCC investigations or complaints — Any material having a substantial bearing on a matter that is the subject

When you require the ultimate in accurate timing



WHEN you require the best, most accurate in precision timing look only to ESE. Designed for "Precision Timing", ESE Master Clocks & Accessories have been the industry standard for over three decades.

Whether using GPS, WWV, Modem, Crystal or line frequency accuracy — all ESE Master Clocks can drive digital or analog slave clocks, as well as interface with video and/or computer based systems. Call or visit our web site for more details.



142 Sierra Street • El Segundo, CA 90245 USA
Phone: (310) 322-2136 • Fax: 310.322.8127

www.e-se-web.com

STATION SERVICES

'Magic of the '80s' Goes National

Taylor Broadcasting is marketing the two-hour weekend music program, "The Magic of the '80s," hosted by Tom Furci, for national syndication. It has been airing since July 2000 on a station in the New York City area as a test project.

"In its first book, 'The Magic Of the '80s' ranked second, with double digits ... in New York, Sundays 7 to 9 p.m.," said Robert Taylor, president of Taylor Broadcasting. Performance quoted was 25-54, Monday to Sunday, 6 a.m. to midnight in Arbitron's Fall 2000 book.

"Tom Furci is a well-known programmer in AC circles and has won numerous radio industry awards and nominations."

Taylor Broadcasting was founded "with the goal of producing national programs that sound like local radio shows and unlike other syndicated shows that have been following the same old cookie-cutter formatics for the last 20-plus years."

For information contact the company in New Jersey at (732) 398-3655 or (866) 810-7330 or send e-mail to rob@taylorbroadcasting.com.



DIGITAL AUDIO NETWORK ROUTER

- *BI-DIRECTIONAL FIBEROPTIC OR CAT-5 INTERLOCATION CONNECTIVITY*
- *ALL DIGITAL DOMAIN AES SWITCHING*
- *ANALOG OR DIGITAL (AES SAMPLE RATE) INPUTS*
- *BOTH ANALOG AND AES DIGITAL OUTPUTS*
- *SERIAL CONTROL AND DISPLAY WITH WHEATSTONE CONSOLES*

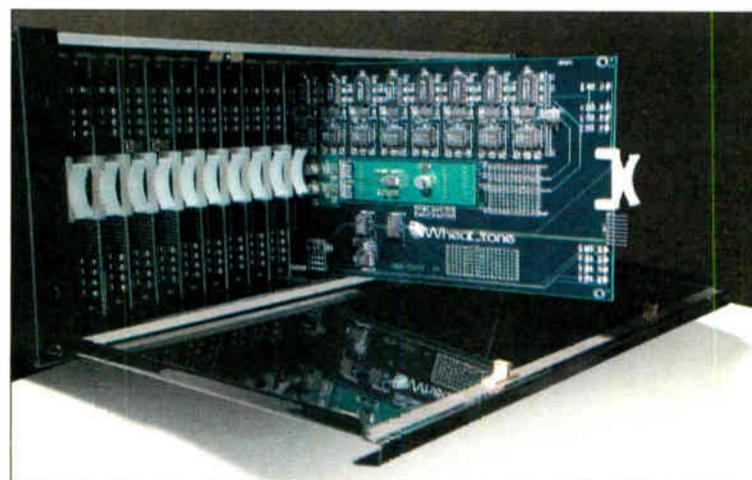
THE 2001 MAKES AUDIO NETWORKING PRACTICAL. It's simple to install, easy to learn, and certain to reduce system costs. Compact enough for small applications, yet stackable for tremendous growth potential, its design consists of 7" rackmount digital routing cages, each capable of handling 512 simultaneous audio channels on its backplane.

Units can be stacked to suit particular card complements (analog or digital input and output cards or optical network cards) but more significantly cages can be separated by great distances and network their audio through either bidirectional fiberoptic links or a single CAT-5 wire. **ONE INTERCONNECT DOES IT ALL:** 64 channels of simultaneous bidirectional digital audio, intercage communication, X-Y controller commands plus auxiliary RS-232 data streams. This single interconnect between your studio and central rackroom can save you tens if not hundreds of thousands of feet of wire in a typical installation.

The 2001's graphic based setup software is intuitive and easy to use, with all the authorization and security levels you could want. And of course we have a full

complement of control panels and PC applications to choose from—all designed for straightforward operation and a rapid learning curve.

With 25 years of experience, Wheatstone has the infrastructure in place to help you build your OWN infrastructure. Contact us for answers.



MIXED SIGNAL SWITCHING is easily accomplished with a choice of AES digital or ANALOG 24-bit A>D input cards, and of course 24-bit digital or 24-bit D>A ANALOG output cards, all of which can be serviced from the front of the cage. All signals are routed entirely in the digital domain.

Bayliss Roast Postponed To Spring

The John Bayliss Broadcast Foundation postponed the 16th Annual Bayliss Radio Roast to March 14, 2002.

Organizers took the action after terrorist attacks in New York disrupted events in that city.



Katz Media Group Chief Executive Officer Stu Olds will still be "dis" honored by a line-up of roasters that includes Don Bouloukos, Infinity Broadcasting; Carl Butrum, Katz Media Group; David Crowl, Clear Channel Communications and Ron Ruth, Radio Advertising Bureau. The proceeds benefit the Bayliss Radio Scholarship fund.

Look for updates regarding the roast on the Web site at www.baylissfoundation.org.

— Laura Dely

Pederson Is New NRB President

The National Religious Broadcasters has chosen NRB Chairman Wayne Pederson to be its new president and chief operating officer.

Following the death of Dr. E. Brandt Gustavson of cancer in May, the NRB Executive Committee unanimously approved Pederson's selection and recommended him to the board of directors, which ratified his selection without opposition in September.

Pederson said the NRB will use emerging technologies and new formats to reach the postmodern world and have an impact on "the church and the culture with the good news of Jesus."

Pederson, executive vice president at Northwestern Radio in St. Paul, Minn., was to begin his work with NRB on a part-time schedule on Oct. 1. It is expected that he will relocate to the NRB's headquarters in Manassas, Va., to begin full-time work by the end of the year.

In the transition, Pederson will step down from his position as NRB chairman. First Vice Chairman Glenn Plummer will fill that position until an election is held during NRB's annual convention in February.

Plummer, who has served on the NRB Executive Committee, is president of Christian Television Network in Michigan.

Plummer, who has worked with Pederson for many years, said he looks forward to working with him in their new roles.

"He has great ideas and great vision for NRB. Wayne is coming into this position with the unanimous and enthusiastic support of the NRB board."

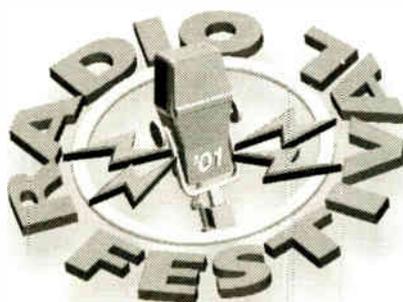
— Laura Dely



Wayne Pederson

THE MUSEUM OF TELEVISION & RADIO

RADIO FESTIVAL 2001



Los Angeles: October 18 to 27
New York: October 18 to 28
For a complete schedule, please visit www.mtr.org

FUNDING FOR THIS FESTIVAL IS GENEROUSLY PROVIDED BY



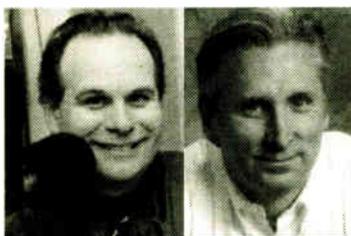
The Los Angeles Festival's opening reception is sponsored by Norman J. Pattiz, Chairman, Westwood One.

Special thanks to the Festival's media partners for their in-kind support:



25 WEST 52 STREET, NEW YORK, NY 10019
465 NORTH BEVERLY DRIVE, BEVERLY HILLS, CA 90210

Festival Hotlines: 212/621-6709 • 310/786-1010



LARRY MANTLE MICHAEL LEVINE



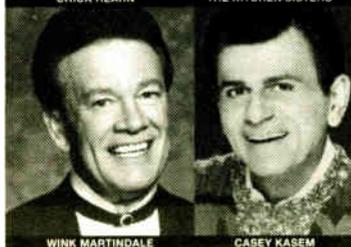
TRIP REEB THE LIQUID RADIO PLAYERS



SPEEDFREAKS LEE ABRAMS



CHICK HEARN THE KITCHEN SISTERS



WINK MARTINDALE CASEY KASEM



JOHN GAMBLING SOUND PORTRAITS



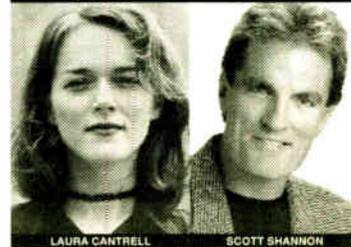
ON AIR ELVIS MITCHELL



STAGE SHADOWS LEONARD LOPATE



DAN INGRAM PETE FORNATALE



LAURA CANTRELL SCOTT SHANNON

ALICIA V. NISTERN, LAURIE FOLGER

STAGE SHADOWS: TOM PAULINO; LEONARD LOPATE: JILL NEHEMENTZ

Cole's Law

► Continued from page 25

newspeople confirmed that the building was the old Executive Office building in Washington, but by then we had figured that out and we had also figured out where the smoke behind it was coming from.

A look out our windows was all it took.

In September, Team Cole's Law proudly joined forces with the venerable communications law firm of Fletcher, Heald & Hildreth, with offices on the 11th floor of a skyscraper (by Washington standards) in scenic Arlington, just across the Potomac from Georgetown. The building is next to Arlington Cemetery, which in turn is next to the Pentagon.

So from our new offices we had an unobstructed, close-up view of the aftermath of the terrorist attack on the Pentagon.

Unimaginable

The sight was unimaginably unnerving. The seemingly impregnable fortress was engulfed in roiling, billowing, unending smoke — black, black smoke, smoke from which nothing but occasional flames escaped.

All this was happening just down the street from where we were standing, watching, helpless.

We did not need television at that point. — we needed radio.

Radio, good old-fashioned local radio, could tell us what we needed to know. It could and did tell us what was really happening in Washington, in Arlington, in the places where we were standing or the places where our loved ones were standing or the places in between.

It could debunk rumors flying in over the telephone from those outside our area. It could comfort, alert and direct us.

For our money, radio is the medium of choice in local emergency situations. Why? After all, television can provide visual images of things we might not otherwise be able to see and that can be useful.

But perhaps that visual capacity, while affording additional perspective, is itself limiting.

When the emergency is local, so local that you can see it yourself out your window or down your street or in the next neighborhood over, you don't need the visual images or the announcers' efforts to explain those images to viewers who aren't in the vicinity.

Radio is not shackled to visual images that must be explained, interpreted, justified or otherwise processed for the viewer.

Radio requires full-time, informational content that is immediately accessible to the listener. Radio permits the listener to be on the move, in the car, on the bus, walking down the street, in the office where there are no televisions.

Radio is already attuned to provide quickly updated news, traffic, weather — information that demands updating throughout an emergency.

Above all, radio is local. The limits on any station's signal, which may seem to be a competitive albatross against television stations' megawatt reach, provide radio operators a well-defined, geographically proximate audience that shares a need for local emergency information.

Those same limits make it relatively

simple to cover the whole service area. What's needed when the forces of nature — or evil — barge in uninvited on our daily lives is exactly what station signal limits allow radio to deliver: a focused presentation of localized information.

Historically, localism has been a hallmark of each licensee's obligation to serve the public interest. In recent years, however, the commission has seemed to drift away from its hard focus on localism.

An increasing emphasis on deregulation and the 1996 elimination of the comparative renewal process have created the impression that the FCC may not really care about whether radio licensees really do serve the local audience and even if it does care, it may not have any regulatory mechanism through which to monitor and regulate the local nature of

broadcast service.

And the nationwide consolidation of radio ownership, made possible by Congressional action in 1996 and made real under the commission's watchful eye since then, seems to have diluted the close relationship between licensees and their audiences.

The fundamentals

But at least from the local Washington radio response to the terrorist attack on the Pentagon, concern about the demise of locally oriented information programming may be premature. And we at Team Cole's Law salute the area's radio broadcasters for a great job under very difficult circumstances.

Along these lines, we note that, the day after the terrorist attacks, Chairman Powell issued a written statement com-

plimenting "the tireless and heroic efforts of those in the telecommunications industry who are working hard to keep our most fundamental communications systems — such as telephone service, wireless phone service and television service — operating efficiently" during the crisis.

To his credit, the chairman corrected this statement within 24 hours, emphasizing that he salutes *all* broadcasters, radio and television alike.

And of course, as far as Team Cole's Law is concerned, radio broadcasting is about a "fundamental" a communications service as you can get.

Harry Cole is a member of the law firm of Fletcher, Heald & Hildreth P.L.C. Reach him in Virginia at (703) 812-0483 or via e-mail to cole@fhhlaw.com.

25th Anniversary Silver Sweepstakes

Enter to win one of 25 great prizes in Radio World's reader appreciation contest giveaway!

IMAS Publishing is celebrating 25 years of serving you and the radio broadcast industry. To mark this significant milestone, 25 of radio's leading equipment suppliers have teamed up with Radio World to express their appreciation. Throughout 2001, Radio World will conduct 25 random drawings. Prizes and winners will be announced in every issue of Radio World all year long.

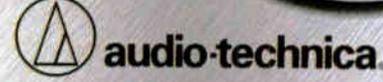
To become eligible to win, you need to complete these three easy steps:

- 1) Register online at our Web site www.rwonline.com
- 2) Click the Silver Sweepstakes icon on our homepage
- 3) Fill out the electronic entry form — that's it, you're done!

It's your chance to celebrate our Silver Anniversary with these fine Radio World supporters ...

















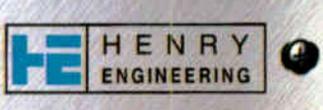




































Contest Rules: To enter the drawing, simply register online at www.rwonline.com/sweeps. 25 drawings will be held throughout the year. Contest ends December 19, 2001. One prize per winner. All contestants MUST reside in the United States and have a valid mailing address. Winners should receive prizes within 30 days of notification, however, actual delivery time may vary and is not guaranteed by IMAS Publishing. Federal, state and local tax laws may apply to prizes and are the sole responsibility of the winner.

CUTS THROUGH ANY TRAFFIC

C 4500 B-BC

the new standard in
broadcast studio microphones.



H A Harman International Company

**914 Airpark Center Drive • Nashville, TN 37217 • Phone: 615-620-3800
Fax: 615-620-3875 • e-mail: akgusa@harman.com • akgusa.com**

World Radio History

Studio Sessions

You're surrounded, pardner ... Surround Mic Techniques Page 40



Radio World

Resource for Radio On-Air, Production and Recording

October 24, 2001

A Studio Built in Only 13 Hours?

Alan R. Peterson

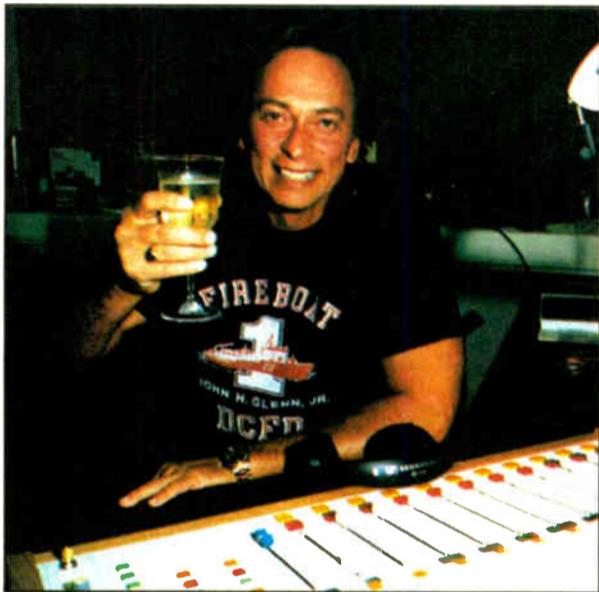
Some weeks back, I told you about my escapades with Doug "GreaseMan" Tracht, and how plans for a home broadcast studio were in the works.

At the six-month mark in his contract with a local station owner, changes had come down the line that would affect the way the show would be done — not the least of which was the opportunity for Tracht to finally have his own broadcast studio where the show could originate.

This of course is not exactly news; I told you about this in our last get-together. But now the ball was rolling.

After some 30 years of wrestling with studios both good and bad, he wanted a personal studio that would give him flexibility, afford

growth for emerging technologies and let him transparently deliver his theater-of-the-mind sketches to affiliate stations without the technology getting in his way.



Doug 'GreaseMan' Tracht toasts the launch of his new home broadcast studio — schweet!

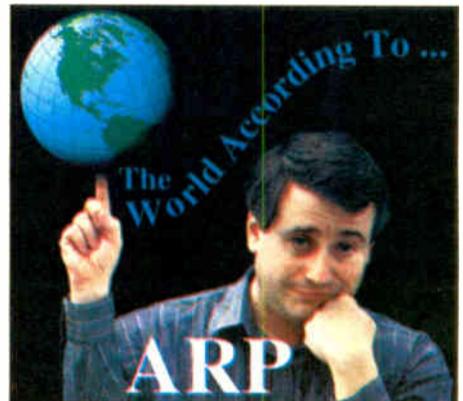
Photo by Alan R. Peterson

But it was clear he had had it with the commute. Waking up at 2:45 a.m. each day, fishtailing through snowdrifts, risking flat tires and enduring summer boiloverters had taken its toll. He wanted to roll out of bed, put on the coffee and commute as far as a basement-level studio ... even deliver the show in his bathrobe if he wanted to!

With friends like these

Grease contacted a few old friends to help with a buildout, including local computer whiz Greg Dinardi and Fox TV engineer Skip McCloskey, who years earlier had been his board engineer at WRC(AM), back in the days when on-air talent was not allowed to touch the gear. I was going to be in good company.

The old rented GreaseMan radio studio was closed out at the end of his Friday, Sept. 21 show, and the new one had to be built in a spare basement



tool room and launched in time for the Monday, Sept. 24 network feed.

That also meant we had to slam it together with readily available cabinetry and outboard gear. Practically nobody could have handled or shipped an order phoned in at such a late date.

Conventional computer-style office furniture was picked up at an Office Depot store: inexpensive, strong, immediately available and easy to move and crawl behind.

My 18-year-old Sennheiser 421 mic See ARP, page 42 ▶

PRODUCT EVALUATION

AW4416 Right for Indy Producers

Alan R. Peterson

The Yamaha AW4416 is a compact, self-contained audio workstation that allows the recording, editing, processing and mixing of audio, then outputs it or burns it to a CD.

It combines features found in some of Yamaha's best products, including mixer technology inherited from the 02R and 03D mixers and signal processing adopted from an extensive heritage of effect boxes.

The AW4416 is cool to use, with a cluster of sample playback keys that let you drop in music loops and sound effects. It is also fun to watch, with motorized faders

See YAMAHA, page 44 ▶



Is running your production studio like controlling a nuclear reactor?



Simplify. Cool Edit Pro | The complete multitrack recording studio for Windows™



Up to 64 tracks • More than 40 DSP effects
DirectX™ Support • Crash recovery • Tons of file formats • Optional MP3 encoder/decoder

Download a demonstration version from www.cooledit.com or call and we'll send a free demo/tutorial CD.

Syntrillium Software

P.O. Box 62255
Phoenix, AZ 85082 USA
www.syntrillium.com
cepro@syntrillium.com

1-888-941-7100
(toll-free sales, USA and Canada)
tel: +1-480-941-4327
fax: +1-480-941-8170

TIPS AND TRICKS

Surround-Sound Mic Techniques

Bruce Bartlett

This is the first of a two-part article.

Surround sound is one of the next big waves in audio production. A major part of this development is microphone techniques for recording in surround.

this method offer discrete surround. They also are claimed to sound good in stereo and with "steered" analog decoding, such as Dolby Pro Logic.

In making these recordings, Eargle typically uses the microphone placement shown in Figure 1.

This method employs a coincident-stereo microphone in the center, flanked by two spaced omni mics, typically four feet apart, to pick up hall reverb, are placed 30 to 40 feet behind the main pair. Spacing beyond 40 feet creates an undesirable echo.

These house mics are omnis or cardioids aiming at the rear of the hall, spaced about 12 feet apart. There also might be *spot* microphones (accent mics) placed within the orchestra.

The microphones are assigned to various tracks of a digital eight-track recorder: Tracks 1 and 2 can be a mix of the coincident-pair mics, flanking mics and house mics and spot mics; tracks 3 and 4 the coincident-pair stereo mic; tracks 5 and 6 are assigned to

the flanking mics and tracks 7 and 8 would be house mics (surround mics).

NHK Method — The Japanese NHK Broadcast Center has worked out another surround miking method. It has found, for surround recording, that cardioid mics record a more natural amount of reverb than omni microphones. The mics are placed as described below, and illustrated in Figure 2:

- A center-aiming mic feeds the center channel.
- A near-coincident pair feeds front-left and front-right.
- Widely spaced flanking mics add expansiveness.

- Up to three pairs of ambience mics aim toward the rear

The front mics are placed at the critical distance from the orchestra, where the direct-sound level matches the reverberant-sound level. Typically, this point is 12 to 15 feet from the front of the musical ensemble and 15 feet above the floor.

NHK engineers suggest that when monitoring the surround program, the

In the left channel, the omni and figure-8 mic signals are summed to give a front-facing cardioid pattern. They are also differenced to give a rear-facing cardioid pattern. The same thing happens symmetrically in the right channel.

The sphere, acting as a boundary and a baffle, steers the cardioid patterns off to either side of center, and makes their polar patterns irregular.

By adjusting the relative levels of the front and back signals, the user can control the front/back separation. As a result, the microphone sounds like it is moving closer to or farther from the musical ensemble.

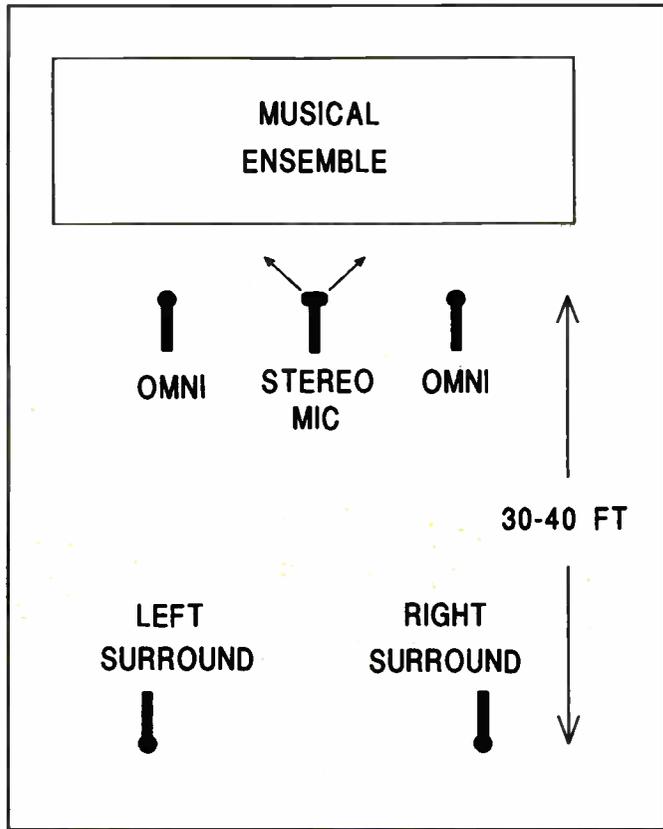


Fig. 1: Delos Surround Miking Method

You might record a symphony orchestra with hall reverb in surround, a live concert with audience reaction or a documentary with surround ambience.

In addition to the usual front-left and front-right microphones, two surround mics are needed to pick up sound from the rear, as well as a center microphone to feed to the center channel.

Note that listening in surround reduces the stereo separation (stage width) because of the center speaker. Microphone techniques for surround are optimized to counteract this effect. A number of miking techniques have been developed for recording in surround.

Soundfield 5.1 Microphone System —

This system is a single, multiple-capsule microphone (Soundfield ST250 or MKV) and Soundfield Surround Decoder for recording in surround. The decoder translates the microphone's B-format signals (X, Y, Z and W) into L, C, R, LR, RR and mono subwoofer outputs.

Delos VR2 Surround Miking Method —

John Eargle, director of recording for Delos, developed the company's VR2 (Virtual Reality Recording) format. Recordings made with

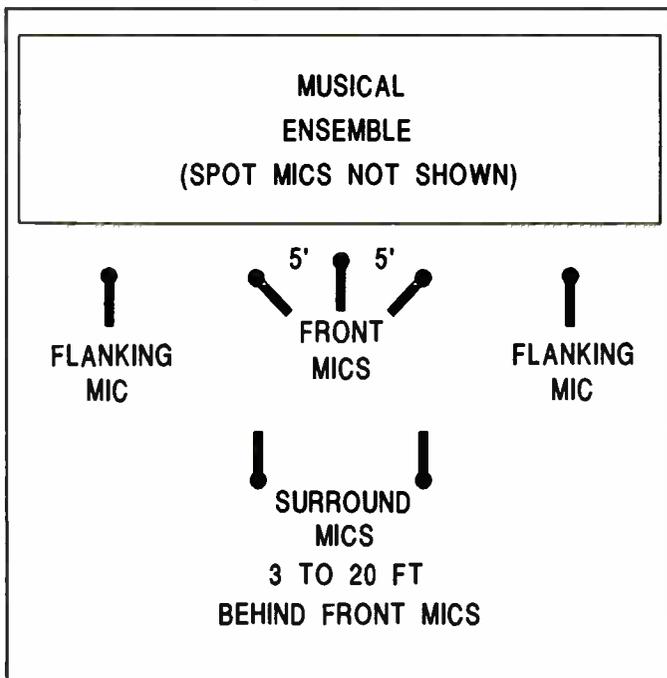


Fig. 2: NHK Surround-Sound Miking Method

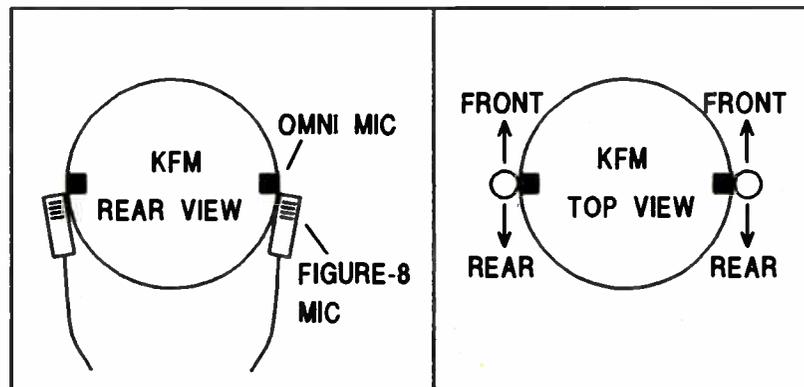


Fig. 3: KFM 360 Surround-Sound Miking Method

reverb volume in stereo listening should match the reverb volume in multichannel listening. That is, when you fold down or collapse the monitoring from 5.1 to stereo, the direct/reverb ratio should stay the same.

The KFM 360 Surround System — Jerry Bruck of Posthorn Recordings developed this elegant surround-miking method. It is a form of the mid-side (MS) stereo technique.

Bruck starts with a modified Schoeps KFM 6U stereo microphone, which is a pair of omni mics mounted in opposite sides of a 7-inch hard sphere. Next to those microphones, nearly touching, are two figure-8 mics, one on each side of the sphere, each aiming front and back. See Figure 3.

This array creates two MS mic arrays aimed sideways in opposite directions. The mics do not seriously degrade each other's frequency response.

According to Bruck, "The system is revelatory in its ability to recreate a live event. Perhaps most remarkable is the freedom a listener has to move around and select a favored position, as one might move around in a concert hall to select a preferred seat.

"The image remains stable, without a discernible 'sweet spot.' The reproduction is unobtrusively natural and convincing in its sense of 'being there.'"

The four mic signals can be recorded on a four-track recorder for later matrixing. The figure-8 microphones need some equalization to compensate for their low-frequency rolloff and loss in the extreme highs. To maintain a good signal-to-noise ratio, this EQ can be applied after the signal is digitized.

We'll finish our discussion of this topic in the next issue of Radio World.

Bruce Bartlett is the author of "On-Location Recording Techniques," published by Focal Press.

PRODUCT GUIDE

CyberResearch PCMCIA Cards Replace Laptop COM Ports

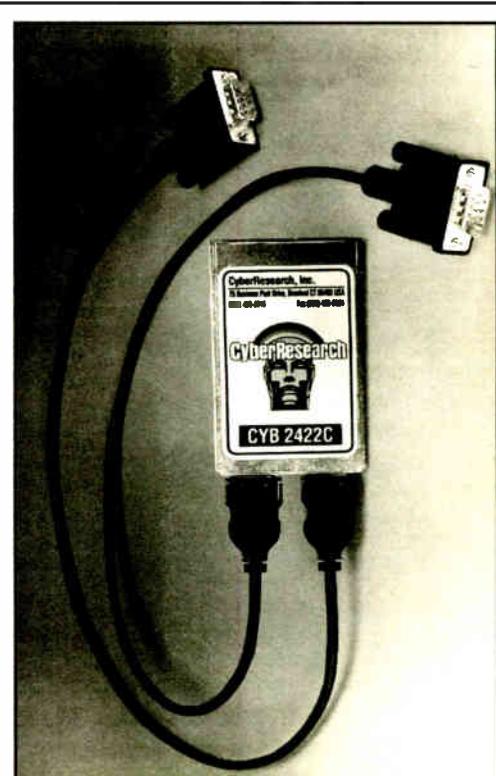
Laptop PCs lacking COM ports could be limited in their usefulness around station PCs.

CyberResearch CYB-Series PCMCIA cards are aimed at easing communication with processors, RF monitoring devices and other digital products.

These cards provide RS-232 and RS-422/485 COM ports.

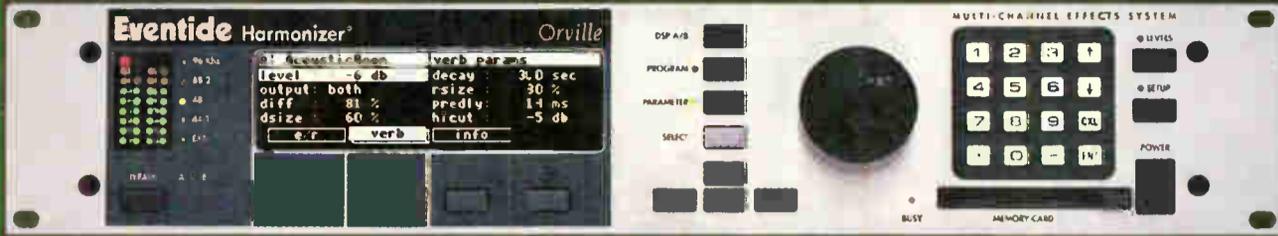
Price: \$195-\$375.

For more information contact CyberResearch in Connecticut at (800) 341-2525 or (203)-483-8815, fax (203) 483-9024 or visit www.cyberresearch.com.



“Clean, rich and soaring reverbs with superclean tails...one of the most classy reverbs I have encountered and I would seriously consider giving it rack space for the reverb programs alone.”

—Rob James, *Studio Sound*



Orville™ Voted Top Outboard Reverb by readers of *Studio Sound Magazine*

SEE A TREND DEVELOPING HERE?

**Orville™
World's
Best Pitch
Shifter**



“The UltraShifter™ algorithm is everything you’d expect from the folks who developed the Harmonizer® units: smooth, accurate...more natural and open sounding than any of my other effects boxes.”

—Dave Martin, *Recording Magazine*.



Most Versatile Multi-channel Effects Processor Family

Mix and match any number of channels in standalone, Eve/Net™ remote controlled, or economical blank front panel Orville/R configurations. The Orville + Eve/Net system changes and grows with your requirements.

Eventide
the next step®

www.eventide.com • 201-641-1200

The Best of
Everything
Orville
Harmonizer® Brand Effects Processor

ARP

► Continued from page 39

and a spare boom, which was loaned to the operation, as well as a dbx 286 mic processor and a Behringer Autocom compressor/limiter were used to reel in Grease's wild mic technique. Equipment racks came from the pro audio department of a musical instrument superstore.

Caffeine-powered

Grease already owned his own Eventide delay line, Telos Zephyr ISDN codec and CD decks, and had ordered an Audioarts R5 broadcast console several days prior, which was slated to arrive on Saturday, Sept. 22.

Given my other commitments, that meant maybe 13 hours in all for us to build, tune up, troubleshoot and tweak the new "Ronald Reagan Radio Theater," as Grease had named it.

Armed with Diet Coke and extra strong DJ-style coffee, we were ready to hit the room at 10 a.m. Saturday. But first, a very serious test.

The first box out of the old space and into the new one was the Zephyr codec. If we didn't have an active line, we were sunk, especially since we couldn't go back to the old studio.

In went the new SPIDs, a line was connected and we hit that Auto-dial button twice. The box quacked, but our hearts sunk when the Lock light didn't come on. But during another trial an



Al fine-tunes a distribution amp scant hours before showtime.

hour later, it did. Evidently, our ISDN line was idle for more than a week and the provider needed an hour to sense there was an instrument connected to the line. Our first hurdle was clear.

We got even luckier when the console actually arrived late Friday, but we still couldn't do anything with it until Saturday morning.

A quartet of used cart machines had

also arrived via UPS — as I mentioned, the Grease Show still depends heavily on carted effect playback. While I began pulling cable for the console, McCloskey plugged in the decks to check them out. None worked properly, and not one arrived with a manual or a pinout diagram. Skip was on his own trying to chase a signal from tape to terminal strip.

Single-slot player saves day

A trio of '80s vintage PR&E "Tomcat" cart decks, on loan from an associate producer of the show, sat in a corner, equally unusable. All three needed considerable work, and as these decks were microprocessor-driven, the level of complexity to repair them in time for the launch put the task outside the window of completion.

Is there any wonder why the industry moved over to digital storage and playback? Out of seven used decks, not one was ready to rock Monday morning.

In the end, a plain vanilla ITC single-slot player already owned by Tracht was pressed into service.

McCloskey came to the party with a half-mile of Belden twist-pair, a bag full of XLRs and a well-worn Weller iron. Dinardi provided a monitor amp,

Just Jawin' And Solderin'

Jocks cannot hang out together for long without swapping tall tales of the old days. Tracht is full of stories and knows the punch lines to a thousand jokes.

A protracted silence hung in the room by late evening. Boredom settled in as I crimped pins for the console when I asked, "Doug, got any good battle stories? I'm in the mood for a real ripper."

He thought it through for a moment, then related the time he was jocking the night of the very first moonwalk in July 1969. During that historic, solemn moment, he quietly rolled spooky '60s science fiction music underneath the network newfeed. As most folks were gathered around their TVs, it was a good bet most of his audience missed it.

That one drew a laugh, but he then topped it with a tale of his days on WWDC(FM) in Washington.

"Across the hall at WWDC(AM)," he said, "they put in some new automation system to play that Big Band stuff. Something was wrong with the console and the mic was leaking."

Tracht's counterpart on the AM side, a popular and easygoing drive-time market legend, began swearing a blue streak as he wrestled with the '80s-vintage automation system. The leaking mic was sending his voice over the air without his knowledge.

"Management called me on the FM side and told me to go over there and get him to stop; he was being heard on the air," said Tracht. "So I did. He thanked me, and then continued to curse."

The kicker? "Years later, the FM PD told me, 'You know, Doug, I hired you and I hired Howard Stern. I never thought it would be (the AM morning man) that would be the one cussing!'"

most labor-intensive aspect of the whole project. Patching the R5 console was a breeze, with crimped-pin terminal plugs. We opted against using a punchblock under the console, as it would have doubled the project time; all studio components were instead connected directly into the mixer.

THE SOURCE FOR SOLUTIONS

For the last 30 years QEI has supplied innovative FM Transmission solutions.

HIGHLY RELIABLE SINGLE TUBE GROUNDED GRID FM TRANSMITTERS

For 15 years QEI has manufactured a line of technologically advanced grounded grid FM transmitters that provide outstanding performance and reliability.

SINGLE PHASE HIGH POWER FM TRANSMITTERS

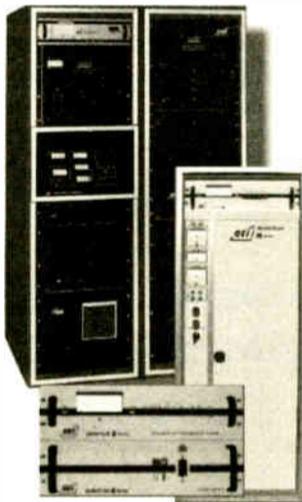
QEI was the first broadcast equipment supplier to offer high-power FM transmitters able to operate from single phase AC power sources. These products allow the development of many transmitter locations where providing 3 phase power would be cost prohibitive.

COST EFFECTIVE SOLID-STATE FM TRANSMITTERS

QEI has been manufacturing solid-state FM transmitters since 1975, longer than any other US manufacturer. The QUANTUM Series FM transmitters are power efficient and very competitively priced. They are designed in 600-watt increments so you can buy precisely the amount of power output need.

QEI also manufactures the finest FM Modulation Monitor and Test System available and the CAT-LINK Digital STL/TSL System.

Contact QEI today and let us put our innovations to work for your station. Contact our sales department at 800-334-9154 (International 856-728-2020) or by e-mail at qeisales@qei-broadcast.com.



QUALITY

ENGINEERING

INNOVATION

Web site <http://www.qei-broadcast.com>

QEI CORPORATION
PO Box 805 Williamstown NJ 08094 USA
800-334-9154/856-728-2020/856-629-1751 Fax

We had maybe 13 hours in all to build, tune up, troubleshoot and tweak the new 'Ronald Reagan Radio Theater.'

speakers, and the expertise needed to set up the PC feeding the Live365.com signal. The three of us clipped, soldered, cursed, grunted, drilled, crimped, harnessed and racked up everything not nailed down.

Soldering the connectors was the

All the while, Grease — the star of the show — was doing pizza runs and pouring stiff drinks for those of us who didn't have to drive anywhere.

By late Saturday, the board was humming, along music was going in

See ARP, page 43 ►

ARP

► Continued from page 42

and out of the rig, a mic was connected and the satellite provider confirmed they were getting a clean ISDN signal.

Sunday was spent wiring DA sends across the room to several recording devices, including Grease's complement of Instant Replays and Short/cut decks. To our amazement, no groundloops or hums were present anywhere. With the monitor amp wide open, the only hiss came softly from the mic preamps.

By Sunday night, only two genuine problems revealed themselves. One was too hot a line level going into the broadcast delay box. We set the room up so the delay line fed program audio to the Autocom compressor, then to a DA, where it split off to the streaming PC, a realtime CD burner and the Zephyr. With the delay line distorting, it would affect the signal hitting every other component in the room.

Champagne launch

The second was levels on our phone hybrid. The little hole accessing the trimmer pot was too small for all the screwdrivers we brought. The phone had to wait until morning when I could return with a set of jeweler's tools.

In the end, a Shure switchable pad took care of levels going into the delay. And I would find my tools in time for Monday's inaugural broadcast.

Finally, we swept up the clippings and closed the top of the console. As we wiped away our sweat, our host showed up with a chilled bottle of Moet to commemorate the event.

We made it: finished a new broadcast studio in under 13 hours.

I haven't risen at 4 a.m. for a radio show since 1987. But I knew I had to be at Grease's house early Monday morning in case something sneaked past us and ruined that first broadcast.

To my relief, the studio was warmed up and running when I got there, the ISDN feed was clean, the mic processor punched up that old Senny 421 and the show was ready to roll at 6 a.m. ET.

I found myself trimming and tweaking nearly everything in the racks as Doug slipped into the Grease man persona and did his show. It isn't hard to slap a studio together, but it is hard to get it sounding right on the first shot, especially with such a small window in which to construct it.

As I'm writing this, I am listening to the looped 24-hour playback of the first day's show on *Live365.com*, quite pleased with the work the four of us poured into that little basement room over that weekend in September.

And I grin to myself remembering how Grease met me at the door that Monday morning, an hour before the first show from his home studio — In his bathrobe, just as he always wanted to do. 🌐

PRODUCT GUIDE

Equipto Provides Rush Service

Equipto Electronics' Express Line Service can provide a range of vertical racks, 15-degree sloped-front consoles, workstations and instrument cabinets within five days of receipt of order.

It is also possible to specify numerous accessories, including shelves, drawers, plug molds, panels, panel mounting angles and hardware to customize any rush order. Many of the Express Line available products can be ordered in any of 12 standard colors.

For more information, contact Equipto in Illinois at (800) 204-7225, fax (630) 897-5314 or visit www.equiptoelec.com.



Racks Available From Equipto Electronics' Express Line Service

Have all your remotes covered with SCOOP E-Z

- POTS
7 kHz speech
- GSM - Wireless
- Inmarsat Capabilities
- Microphone Supplies
Ph48, Ph12
or T12
- ISDN
7 kHz, (G722)
20 kHz, (MPEG
Layer II)
- Two Channel Audio Mixer
- Small Weight and Size
<4 pounds
9 x 6 x 3 inches



ISDN
WIRELESS
POTS
INMARSAT



Linking Innovation
with Clarity

Aeta Audio Corporation
75 Fleetwood Dr. Suite 200 • Rockaway, New Jersey 07866
Phone: 973-659-0555 • Fax: 973-659-9555

www.aetausa.com
sales@aetausa.com

Yamaha

► Continued from page 39

that dance during automated mixdowns. It makes the job easy for the producer while providing eye candy for clients visiting the studio to update their spots.

However, the Yamaha AW4416 would probably not be your first choice as a main production room tool. The company itself is targeting the AW4416 for the personal music studio community, as evident in the Tutorial manual, which walks the user through a music mix.

The depth of features it offers would be overkill in a hardwired radio production room. Also, it seems unable to export a polished product as a WAV file to insert directly into a station's digital storage system.

This is not to say radio producers should look elsewhere. The AW4416 is an outstanding performer *outside* the station; for the independent producer involved in the advertising jingle marketplace, or the creation of longform audio with a cast of multiple voices, such as talking books or recorded drama. Here, its extensive roster of features would not be neglected.

Much like an expensive Christmas present, there is "some assembly is required" with the AW4416. Out of the box, it is necessary to open the case and install the CD-R unit and the disk drive, then format the disk. Enclosed instructions make it as easy as plugging in a mic.

The AW4416 offers 16 tracks, each consisting of eight "virtual" tracks that may contain alternate takes. All 16 tracks may be recorded simultaneously for live recordings of multiple voice talents or musicians.

Navigation

Navigation through items in the Display is done through four Cursor keys and an Enter button located near the Jog/Shuttle wheel. Many screens, notably the Track display and Utility, also include tabbed sub-menus that are accessible through the Function (F) keys mounted under the display.

The Mixer portion of the AW4416 takes up fully half of the real estate on the worksurface. Sixteen motorized faders handle input and output levels, with several performing double-duty as Input Nos. 17 through 24. One red fader is for Master Stereo Output channel.

Levels for recording and playback are tracked in a bright fluorescent display in the upper right corner, above the Record Track Select safety keys.

Four keys in the upper left corner of the AW4416 select the view in the display, allowing, among other things, examination of pan position, dynamics control and equalization.

A word about these features: excellent. Instead of cluttering the panel with dozens of knobs, Yamaha engineers reprised the topography of the 02R and 03D and tucked these features into menu-accessible layers. EQ, panning and compression all are available on each input.

The four-band EQ spans a frequency range of 21 Hz to 20.1 kHz, a Q of .10 to 10, and gain/cut of 18 dB up or down. Audio can sound as shiny, bassy or boxy as you want. That popular bandpass "filtered" vocal effect heard in promos everywhere can be dialed in here.

The dynamics processor doesn't limit you (HA!) to simple compression. The

library also contains gates and expanders that can be used for different purposes. Say you want to gate out a mic when nobody is speaking, cutting off room noise. Pull up a gate and go.

Need bigger and better? Patch in one of two internal digital effect processors and take advantage of some tasty reverbs, ring modulators, flangers, dynamic filters or effect combinations. These effects can be assigned to individual channels or globally via an AUX bus.

With the combination of EQ, dynamics and effects available all at once, you can write and store your own special "liner guy" voice processing preset that can be recalled and recorded at any moment.

More toys: The eight sample pads under the Function keys. Divided into A and B Banks, these offer instant audio playback



of prerecorded passages or effects. Eight pads can be played at once, with about 1.5 minutes of total sample time available.

There are lots more features available, but only so much page space to describe them.

Preparing for a recording involves plugging sources into one or more of eight balanced TRS quarter-inch jacks on the rear panel (optional I/O modules can be installed in two slots on the AW4416). Level trimming is done with pots at the top of the front panel.

In default mode, the device assigns Inputs 1 through 8 to recorder inputs 1 through 8. By opening the Patch In window in the display, these may be re-assigned in any manner you wish, much in the way you would use Bus Assign buttons on an analog console. Likewise, the Patch Out window allows the routing of the mixer outputs to the main stereo output, back to the busses or wherever the feed will do you the most good.

You are free to name your patching arrangement and store it in the Library. A Title Edit window pops open a little on-screen QWERTY keyboard, which lets you pick a name with the cursor keys.

Oddly enough, the AW4416 allows the use of a serial mouse to modify parameters and pick menu items, but has no provisions for an actual keyboard to enter patch names. You must only use the on-screen keyboard.

Recording

Pick your record tracks with the bright red buttons under the level meters. The blinking red lights under the meters shows Record Ready status, just the way we like them.

Before you record, bring up the monitor level so you can hear what you are doing. This involves reopening the Pan/Route screen from earlier and selecting the channels you wish to hear through headphones or monitor speakers.

This one tripped me up, thinking that I could just hear signals pass through as I do on my computer-based rig.

When ready, hit and hold the Play and Record buttons in the transport section of

the front panel (under the right hand). The counter begins and you are rockin'.

In a typical radio spot recording, a mic and perhaps a CD deck can be wired to the AW4416. Preset the mic for as much compression, EQ et al as you want. Rewind and add the CD selection on a paired stereo track. Add additional voices and effects as desired on remaining tracks. Remember, you have up to 16 tracks to work with.

99 flags

In the course of your recorded performance, you may need to drop several markers at key locations. The AW4416 lets you place up 99 of these flags in your recording to instantly speed ahead or return to various points for additional mixing or massaging.

Product Capsule:

Yamaha AW4416 Professional Audio Workstation

Thumbs Up

- ✓ Impeccable audio specs
- ✓ Self-contained and compact
- ✓ Automated mixdown
- ✓ Expandable disk capacity and I/O options
- ✓ Yamaha effects
- ✓ Version 2 adds to the MIDI functionality and provides enhanced user interfaces

Thumbs Down

- ✓ Jog wheel feels flimsy
- ✓ Cannot export WAV file except to media
- ✓ Ironically, too many features for plain radio production

For more information contact Yamaha in California at (714) 522-9011 or visit the Web site at www.yamahapro.com.

As on any digital device, the disk drive is susceptible to fragmentation. I have found out that files scattered over the disk cause track dropouts that occur as brief periods of silence or loud bursts of noise. Run the internal defrag program as often as practical.

The Jog/Shuttle wheel has an inexpensive feel, which I notice on many workstations. My point of comparison remains the hefty wheel on the old Fostex Foundation DAW, as well as those on the 360 Systems Short/cut and Orban Audicity. For a control bound to be in heavy use, I sense it should have a more confident feel.

A capable performer

The depth and breadth of the features found in the Yamaha AW4416 may be bewildering at the outset, requiring a serious investment in time and a lot of flipping through the manual. But once the user has a feel for the navigation of the menus and how to assign tracks and busses, the AW4416 becomes a capable performer. A working knowledge of the Yamaha 02R console comes in very handy here.

Treat the unit as gently and carefully as any high-end audio device. Any self-contained workstation (not necessarily this model) that combines console, multitrack recorder and output device is subject to the failure of the entire studio if even one portion of the rig develops a problem.

Also be sure to look for addenda to the original manual. As new software versions are issued (my unit was on V1.3), additional printed materials are enclosed with the unit. Check these when you encounter a menu item that sounds unfamiliar.

For the typical broadcaster that pulls a production shift, the AW4416 is a bit much, especially if all they are used to is a simpler PC-based solution. If your station already has an established production system that you are happy with for basic commercial and promo work, so be it. The decision has been made for you.

But if you want to branch out into commercial jingle production or take a crack at sophisticated work that transcends the limitations of the station studio, it is hard to do much better than the Yamaha 4416.

Alan Peterson is a technical adviser to RW and is committed to more projects than can be listed here. 🌐

Rave Reviews!

"Excellent Product" — Doug Walker, Clear Channel, Cincinnati

"Telos has taken two great products [the Zephyr and the Zephyr Express] and made them better. They listened to the customer." — Raul Velez KNBR, KFOG, Susquehanna Broadcasting of San Francisco

"Telos asked us what we wanted and they put it in there... you can't ask for anything more than that."
— Paul Burt, Clear Channel, New Orleans

"It's even easier to use than the original Zephyr."
— Michael Black, WEOS, Geneva, New York (NPR affiliate station)

"The most popular ISDN digital transceiver in the country has a fresh new look... Zephyr Xstream, a slick, updated version of [the] familiar Zephyr."
— Steve Kirsch, Silver Lake Audio, New York

Telos
www.zephyr.com



Did you see these breaking stories?

Management Data Files Chapter 7

VOA Kicks Off New China Broadcasts

Harris Ups Berenics, Two Others

Radio Festival Set to Go

Guy Wire: EAS Is Not Even a Glass Half-Empty

Get your daily diet of

NEWS BYTES

by visiting us on the web every business day.

www.rwonline.com

PRODUCT GUIDE

Products for Radio Air & Production Studios

Mail info and photos to: RW Product Guide, P.O. Box 1214, Falls Church, VA 22041

BSI Touts Simian, TimeShift, Skimmer

Broadcast Software International is offering three new digital audio programs Oct. 1. The programs include Simian digital automation, an aircheck program called Skimmer, and TimeShift, which provides continuous record with time-delay or random-access playback.

Simian has advanced capabilities for interstation communications and streaming spot substitution. It is touchscreen-enabled and supports tagging and simultaneous playback of professional audio file types.

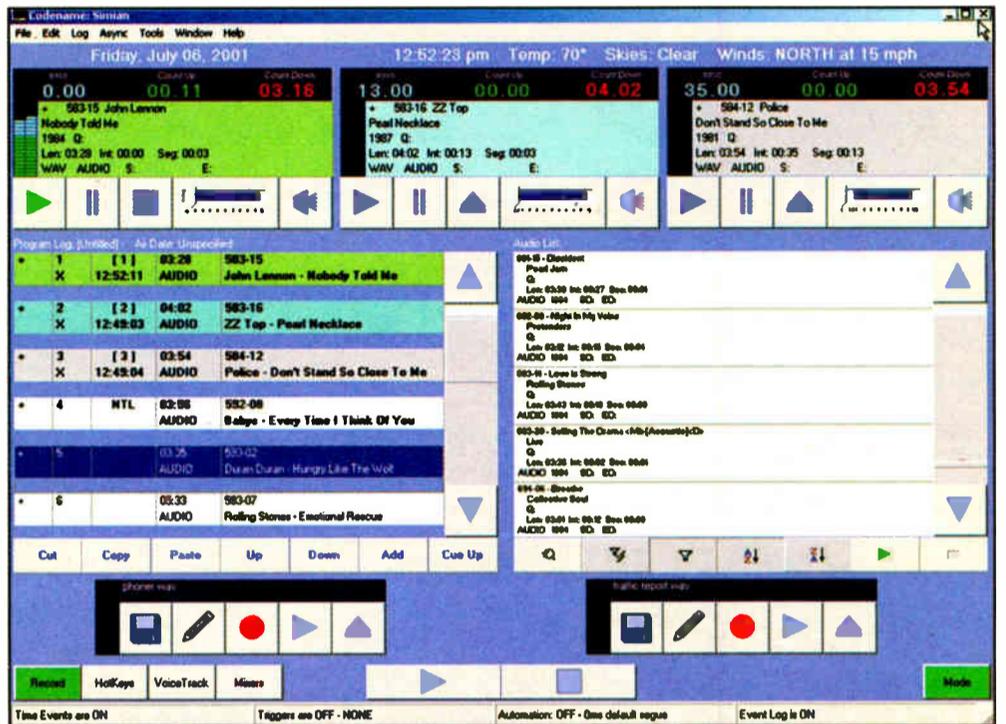
The program is self-healing and can contact BSI for diagnostics and repairs of errors automatically. The price is \$499 plus \$99 per month subscription that includes preventive care and maintenance, telephone support and software updates.

The TimeShift program continuously records an incoming signal, which can then be randomly accessed or played back with a time-offset. Broadcasters in any time zone can continuously delay satellite feeds.

The program can also be used to instantly create "best of" shows. The program interfaces well with Simian to combine satellite programming with live broadcast or hard-drive automation. Price: \$999.

The third audio program up for release is Skimmer, an audio capture program that can sample jocks or any other kind of aircheck. Skimmer can record up to a year of audio, with any minute of any day instantly accessible. Price: \$299.

For more information contact BSI in Oregon at (541) 338-8588, fax (541) 338-8656 or visit www.bsiusa.com.



Broadcast Software International's Simian program

Harris Offers \$1,999 Console

The Harris ProCast is a mixing console suitable for broadcast and audio production facilities. The introduction marks a new presence for Harris in the economy console class. The board has a retail price tag of \$1,999.

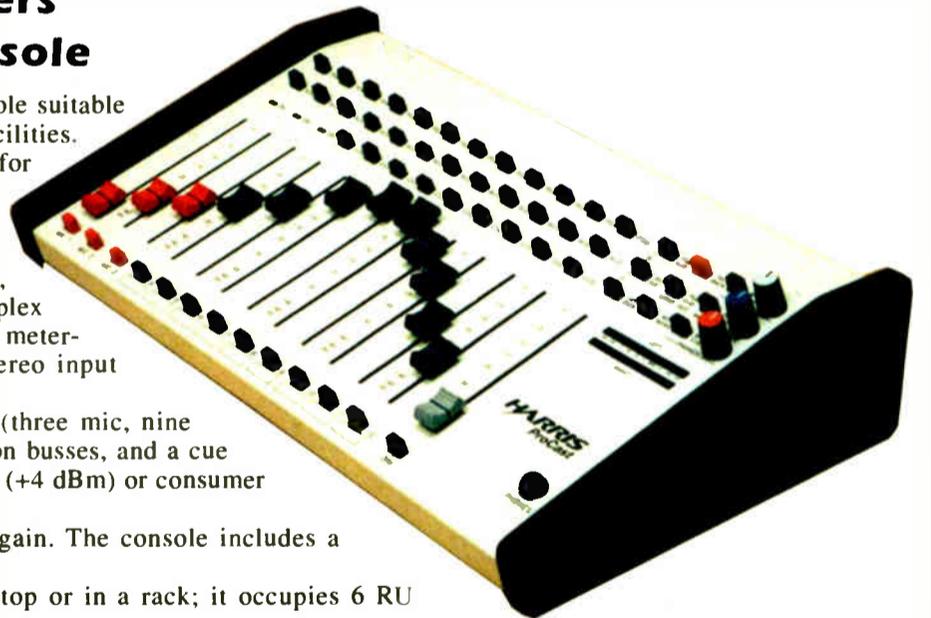
The ProCast has a mix-minus output, an announce booth output with full-duplex talkback, a monaural output, selectable metering and remote starts on line-level stereo input channels.

Features include 12 input channels (three mic, nine stereo line), stereo program and audition busses, and a cue bus. The line inputs accept professional (+4 dBm) or consumer (-10 dBv) levels.

Microphone inputs have adjustable gain. The console includes a spare parts kit.

The console can be used on a tabletop or in a rack; it occupies 6 RU when mounted with an optional kit.

For information contact the company in Ohio at (513) 459-3400 or visit www.harris.com.



SystemsStore.com Adds Middle Atlantic Line

Middle Atlantic rackmount solutions are now available at SystemStore.com.

In addition to equipment racks, Middle Atlantic products include wire management systems, AC power strips, rack accessories, editing desks and a modular custom panel system.



The company's catalog, as well as its CD-ROM, can be ordered at SystemsStore.com. For more information about Middle Atlantic products, as well as other product lines SystemStore.com carries at its online store, call the company in Missouri at (314) 872-8222 or visit the company Web site at www.systemsstore.com.



Industry Changes

Suppliers

Harris Corp. has a new director of radio sales for the broadcast communications division. **Virginia Lee Williams.**

Jackie Broo also joins the Harris broadcast communications team as public relations coordinator.

Blake Augsburger was appointed president of **Crown Audio.** In other company news, **Jonathan Parker** was named eastern regional sales manager and **Loren Robinson** became the western regional sales manager. The company also recognized Senior VP of Research and Development **Gerald Stanley** for three new patents.

Gentner Communications Corp. appointed **Timothy Morrison** as VP of sales and **Randall Wichinski** as VP and CFO. **Charles W. Sigars** has been appointed director of information systems.

Erik Thoreson recently celebrated 25 years of service in the engineering department of **Comrex.**

Cam Eicher is the new director of sales at **Logitek.**

S.C.M.S. Inc. has appointed **Doug Tharp** as west coast representative for broadcast products. Tharp formerly worked for Harris Corp. **Chris Singleton** joined S.C.M.S. as a sales engineer.

Broadcast Electronics promoted **Paul Jackson** to manager of studio systems customer service.

Keith Jahr joins **Aphex** as the new operations manager. The company named **Bormann Marketing** as a sales representative for the Midwest.

Full Compass Systems was named in the top 500 of women-owned businesses for the third consecutive year by *Working Woman* magazine.

Soundcraft USA promoted **Scott Wunschel** as western regional sales manager.

The staff of **RDA Systems** is certified to install SAS audio routing systems, which they will do for **Hispanic Broadcasting Corp.** in Los Angeles.

The new development manager for the U.S. sound reinforcement market at **AKG Acoustics** is **Kevin Madden.**

IDT has brought on three staffers: General Sales Manager **Olivier Guillet**, Area Manager (International) **Nicolas Loutgleter** and Sales Manager (France) **Eric Fournier.**

Bob Boster is the new managing director at **Enco Systems Ltd.**

Broadcast industry vets **Dan Rau** and **Al Jason** now represent **Electronics Research Inc.** in the northeastern and western regions, respectively.

Encoda Systems appointed **Michael Dunn** as global chief technology officer.

Leitch underwent staff changes as **Douglas Korte** was promoted to VP of server system sales. **Ariel Sardiñas** was appointed director of

marketing for Latin America and **Michael Western** became the new northwest regional sales manager.

The new executive VP of **American Tower Corp.** is **William Hess.** **James Taiclet** joins the company as

president and COO.

APT has appointed a pair of staff members to help build sales. **Alan Doherty** is European sales manager while **Simon Factor** is the new North American sales manager.

Continental Electronics has named **Dave Hultsman** as broadcast channel manager.

Research

Arbitron Inc. underwent changes, starting with the promotion of **Ronald Kolessar** to VP of technology, worldwide portable people meter development. The media and marketing research company appointed **Harry Clark** to the post of Southwest regional manager, where **Joanna Cammack** is a new account manager. **David Chipman** is a new account manager in the Mid-Atlantic region. **Vin Ciavatta** is an account manager in the New England region. **Carrie Wornall** was appointed customer service representative in the southeast. **Ian Samuel** is a customer service representative in the Midwest region while **Jennifer Bratten** holds a similar post for the southwest. **Joe Walker** has been promoted to senior training specialist for the Midwest region.

Scarborough Research announced the promotion of **Howard Goldberg** to senior vice president of radio and sports marketing.

Bob Turner rejoined the **Interep** team as president of D&R Sales. He replaces **Jacqui Rossinsky**, who is retiring after 20 years at the company.

FCC & Engineering

Andy Reed is now the first marketing manager at **TSC Consulting Engineers.**

The **Audio Engineering Society** has appointed **Mark Yonge** to the post of AES standards manager. Yonge, who replaces retiring 20-year manager **Dan Queen**, formerly worked for **Solid State Logic.**

Lauren Maxim Van Wazer was named special counsel to the chief of the **Office of Engineering and Technology.** She previously served in the office of FCC Commissioner **Michael J. Copps** as an interim

legal advisor for wireless and international issues.

Meantime, Copps reorganized his staff to include **Jordan Goldstein** as senior legal adviser/competition and universal service legal adviser, **Susanna Zwerling** as media and consumer protection legal adviser, **Paul Margie** as spectrum and international legal adviser and **Carolyn Conyers** as confidential assistant.

Networks/Services

Sirius Satellite Radio named **Michael S. Ledford** senior VP of engineering.

ABC Radio Networks appointed **Scott McCarthy** to the post of executive VP.

BIA Digital Partners' new director is **Scott Chappell.** Digital radio service **ClickRadio Inc.** announced that **John Madison** is now its CEO and that **Steve Hicks** and **Bobby Lawrence** were named to its board.

Sharon Williams joins the staff of **Radio.Beonair.com** as account executive.

Audio production/post-production company **Room-Service Audio** expanded by hiring engineers **Tim Grove** and **Rich Cutler.**



Al Jason



Blake Augsburger



Jonathan Parker



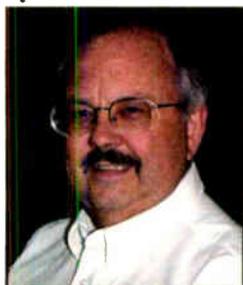
Loren Robinson



Mark Yonge



Scott Wunschel



Dan Rau



Rich Cutler

Vocalist **Dee Dee Bridgewater** was named as the new host of NPR's "JazzSet."

The new VP of business development at **ChainCast Networks** is **Robert Ross.**

Digital Music Network (DMN) is the new name for the former **DotClick Digital Music Network.**

Jones Media-America Inc. has been named sales rep for **Kim Komando's** computer radio show.

Warren Banholzer announced that he would be leaving his job as director of engineering for the Seattle division of **Jones Radio Network.** He is replaced by **Jerry Parker.** **Rick "Bwana Johnny" Johnson** is the new oldies programmer for **JRN** in Seattle.

Wayne Pederson was named as the new president and COO of the **National Religious Broadcasters.** The group lost former President **E. Brandt Gustavson** to cancer this spring. Pederson serves as executive VP of **Northwestern Radio** in St. Paul, Minn.



Wayne Pederson

NRB also announced that **Bob Powers** is the new manager of member services.

Two appointees at **FMiTV Networks** are **Paul Bowlin**, VP of national sales, and **Steven Felt**, VP of Midwest regional sales.

Listen Technologies Corp., a company that sells wireless listening solutions, hired **Lance D. Madigan** as the new marketing/public relations coordinator.

Groups

Beasley Broadcast Group Inc. announced that **WGAC(AM)** in Augusta, Ga., received the Georgia Association of Broadcaster's **Gabby** award for Best Newscast/News Story. Meantime, in an annual gathering for its business managers and members of its President's Club, **Beasley** awarded **Kristine Monroe** with its 2001 Business Manager of the Year prize and named **Terry Kellems** the overall winner of the 2000 President's Club award.

Jefferson-Pilot Communications Co. appointed **Darrel Goodin** to the post of VP/general manager of the chain's radio properties in San Diego.

Eugenio "Gene" Bryan was named VP of sales for **Entravision Communications Corp.'s** radio division.

Xytech Systems launched its **Professional Services Group** for providing IT consulting to media and Fortune 500 companies. The company also opened a new office in New York.

iBEAM Broadcasting Corp. appointed **Randall Gausman** to chief financial officer.

John Hogan was promoted to president and COO of **Clear Channel Radio.** **Jerome Kersting** was named to the post of chief financial officer. **Linda Byrd** is the new regional VP for the company while **Thomas Glade** has been named VP/radio market manager of San Antonio radio operations and **Lee Larsen** tapped as the new VP and market manager of the network's Denver radio cluster.

In other **Clear Channel** news, **Don Howe** has been named senior VP of west coast operations and **Bob Cohen** was picked to oversee international radio operation.

Clear Channel Radio named **Peter Ferrara** southeast senior VP. **Mark Kopelman** will be responsible for the Raleigh and Greensboro, N.C., markets while **Skip Schmidt** assumes Charlotte, Statesville, Waynesville and Asheville, N.C., plus Greenville, S.C. Schmidt also takes over as the Charlotte VP and market manager.

Nassau Media Partners promoted **Frank Brunke** to creative director. **Michael F. Panebianco Jr.** has been bumped up to the post of director of sales for Nassau.

The new president of **Emmis Publishing's** Los Angeles Magazine is **Alan Klein.**

The new director of programming for the **Salem Communications** Los Angeles-area cluster is **Chuck Tyler.**

Artie Altman was named executive VP of **Millenium Sales & Marketing's** new Sinclair Division.

John Davidson was promoted to president and general manager of **ABC Radio's** four stations in Los Angeles.

Other organizations

The **Museum of Broadcast Communications** has a new board member. **Jim de Castro** now holds the post.

Lucille Luongo was named president and chief operating officer of the **Broadcast Pioneers Library of American Broadcasting.**

Salvatore J. Meola has been promoted to the post of chief development officer for **Live 365.com.** Meola previously served as senior VP of engineering.

We seek your personnel news, particularly information about radio engineers. Send your announcements and high-resolution photos via e-mail to srae@imaspub.com.

Power Can Be Beautiful

BMX*digital*



Sure, it's the best looking broadcast console you've ever seen. But, beneath the sleek, elegant exterior beats the heart of a true warrior!

Pacific BMX*digital* has everything you need to win the digital revolution. Whether it's the number of output buses, mix-minuses, off-line mixes, stereo sends, direct IFB's, monitor inputs and outputs, inter-communication paths or logic interface, BMX*digital* offers more.



Incredible Flexibility including all input modules accommodate analog and digital signals without reconfiguring, swapping, or even removal from the mainframe.

Amazing Adaptability with easy storage, recall and reconfiguration of set-ups for various day parts, and built in connectivity to routing switchers, digital storage systems and other networked sources.

Low Cost of Ownership by design, Pacific BMX*digital's* true cost of installation, operation and maintenance is markedly lower than other consoles.



Legendary BMX Reliability

is what you expect in a Pacific BMX from Harris. The table pounding of your resident shock jock won't faze this beauty.

Pacific BMX*digital*. Beauty that's a lot more than skin deep.

next level solutions

SERVICE

SYSTEMS

AUTOMATION

TRANSMISSION

www.broadcast.harris.com

HARRIS

Buyer's Guide

Tech Updates
Inside



Radio World

Consoles & Mixers

October 24, 2001

USER REPORT

Console Line Gains Following

by Mark W. Persons
President
M.W. Persons & Associates

BRainerd, Minn. A few years ago, two of my radio station customers became "hooked" on the Radio Systems line of analog audio consoles. I found I enjoyed the same excitement when I installed the consoles for them.

It all started when I was asked to recommend a console to a broadcaster who still believes in programming live 18 hours a day.

The console had to be rugged and reasonably priced, and the audio had to be clean. That ruled out all consoles with audio transformers.

In my 30 years of radio broadcast engineering, I have installed and reinstalled more than 100 audio consoles, but at this time I noticed that Radio Systems was gaining a good name in the industry with the RS-12 series 12-channel audio consoles.

After installing the first one at WJJY(FM) in Brainerd, Minn., there was no turning back. The client was so impressed that he would accept nothing else for his main studios.

To date, he has purchased one for each of his seven stations and ordered two more for stations scheduled to be built soon. Three of them are in his new \$800,000 studio facility in Brainerd.



Mark Persons is shown with a Radio Systems Millenium console.

cards in the bottom of the console and is adjusted by audio voltage-controlled amplifiers, which are clean as a whistle and have left-to-right stereo gain matched to fractions of a dB.

Front-panel buttons turn the VCAs on and off. Front-panel slide pots are DC controls for the VCAs.

The Radio Systems RS-12A 12-channel Millenium console was intro-

duced two years ago. It was a good upgrade to the RS-12. It kept the wonderfully clean audio circuit boards in the bottom of the console frame and replaced the black colored top with a beige/blue panel of the same size.

The most interesting changes were soft rubber pushbuttons with LED lamps instead of the original hardware switches with incandescent lamps. The new buttons have a really nice feel as well as being completely silent in operation.

The factory people say the meters have been improved to be more accurate. Either way, they work just fine.

For stations with the original RS-12 console there is an upgrade kit, which will replace the black top with the new beige/blue Millenium top. They throw in new wood sides to make it look like a new console. The kit costs \$2,000.

For \$2,500 you can send a console to the factory for a reworking, including bringing it up to factory-new specifications. A new RS-12A 12-channel audio console is \$5,495. Six-, 18- and 24-channel models are available. High-quality P&G faders are available as an option.

Digital may be a current buzzword, but for the client's money and mine, these analog consoles are as good as it gets. Until we have a real digital standard, I'm staying with analog consoles.

For more information contact Radio Systems in New Jersey at (856) 467-8000 or visit www.radiosystems.com.

USER REPORT

Harris Moves Cox to Digital

by Dom Bordonaro
Chief Engineer
Cox Radio/Connecticut

MILFORD, Conn. Engineers are a skeptical bunch, especially toward sales hyperbole. When console manufacturers started praising their new digital models, I thought, "How much better can they be than a high-end analog console?"

It took the consolidation of our radio facilities, WEZN(FM) in Bridgeport, Conn., and WPLR(FM) in New Haven, along with our JSA station, WYBC(FM), New Haven, to show me just how much better a digital console can be.

Moving on

WEZN and WPLR are leaders in their respective markets. WEZN Star 99.9 is an adult contemporary station that started broadcast life as a beautiful music station in 1973. It made a changeover in the early 1980s to an adult contemporary format.

WPLR, called 99.1 PLR, began broadcasting as a progressive album-



Harris' AirWave Console at Work for Cox Radio/Connecticut

oriented station in 1974 and is the market leader in New Haven with a classic rock format.

We decided to combine our differ-

ent and independently successful radio stations when the old WPLR building was scheduled for demolition. The

See HARRIS, page 51 ▶

Until we have a real digital standard, I am staying with analog consoles.

What brought on this attitude? The Radio Systems RS-12 consoles, and later the RS-12A Millenium, are designed to be rugged and easy to use while keeping audio quality high. The operators love them.

Personally, I like the red peak lights on each analog VU meter. Console output commands to start and stop CD players and digital audio storage equipment are easily programmable with computer-type plug-in jumpers.

The commands can be continuous or momentary. Audio stays on the audio

USER REPORT

Logitek Makes 'Virtual' a Reality

by David Lawrence
Host/Executive Producer
Online Today Inc./CNET Radio

WASHINGTON When I set out to put together my studio for my new CNET(XM) Radio morning show, I was faced with an interesting challenge: I'm in Washington and CNET's studios are in San Francisco.

In addition to feeding them the audio from my program, I also needed to have control of the on-air board during my show, which airs between 3 and 6 a.m. PST. I also do a nightly syndicated show, "Online Tonight," which is heard on 80 stations, and a syndicated countdown show, "Net Music Countdown." I needed high-quality equipment for producing those shows as well.

That's where Logitek came in.

CNET's studios use Numix consoles. My original plan called for creating a duplicate of the San Francisco installation, but we discovered that we didn't have enough surface space on the Middle Atlantic furniture that would house the Numix in my studio.

I called Paul Anderson at Logitek, who confirmed my solution would work: a touchscreen computer running vMix.

He's got the touch

My setup in Washington uses a Logitek Audio Engine with the vMix virtual console on an ELO touchscreen. I'm emulating the Logitek ROC-10 board, but I can switch to a Numix layout if I want.

Every function on a physical Logitek console is available on the touchscreen, including faders, on/off, intercoms, pans, trims and busses. I don't know if everyone will be as comfortable with this setup as I am, but my show is about technology and pop culture, so this is a natural for me. I'm walking the walk.

The process in running the CNET East-Coast morning show is intense. I send a mix output from my console and control closures to San Francisco via Zephyr over ISDN lines. For control of the remote studio we use a VPN (virtual private network) over T1 lines and Logitek's vFader program.

With a closure from iMediaTouch, I can take control of the Logitek Audio Engine in San Francisco. I see a virtual image of the Numix console and I use vFader to bring up my audio feed on the Numix and go from there.

Kudos also to engineers Josie Padilla at CNET in San Francisco and J.R. Richardson, my engineer here in D.C., for getting the system just right.

So I'm sitting there in D.C. with a powerful control surface in about 15 inches of touchscreen space. I control the air signal of a station in the fourth market in America, KNEW(AM), with the touch of a button. Plus, my signal is being fed at the same time to cnetradio.com and XM Radio.

At 6 a.m. PST, when Brian Cooley comes in for his shift, he brings his fader up, takes my fader down, and I'm done for the day.

Because of my isolation from CNET, my console must be reliable. When you

look at the other options for virtual consoles, they don't look all that exciting. (Logitek can really capitalize on this market if they do it right.)

Plus, between the Logitek digital consoles and my iMediaTouch system, everything is done in the digital domain. The only analog components are my microphone and some consumer gear.

Quick response

I have never encountered a company that has responded as quickly as Logitek in terms of upgrade suggestions or simple changes to the interface. That's testament No. 1 to the way their software is programmed.

vFader was not originally made to do exactly what we wanted, but it does so now. At my request Logitek added bus selectors to vFader, which allowed me to set up a mix-minus between San Francisco and D.C. Logitek's response time is great.

Tag Borland, Logitek's president, and Jerry Paquette, a programmer, set up their code so that it isn't difficult to

make changes. This means foresight and planning on their part. I would mention to Tag that I needed something done, and he would say, "Oh, that's just a piece of code we can cut and paste." The new version would be sent to me in a matter of hours.

There are minor glitches in the Logitek system, as with any piece of software, but as I report them, they get fixed ... and that's all you can ask.

I have the sexiest studio in the world. My show is like a top-40 morning show with a lot of elements, a lot of channels running at the same time, phone calls,

actualities, etc. I'm demanding a lot from the software and it's performing.

For more information contact

Logitek in Texas at (713) 664-4470 or visit the company Web site at

www.logitekaudio.com.



Logitek's vMix Virtual Console on a Touchscreen

TECH UPDATES

ATI Offers Line of Consoles

The Vanguard Series consoles from Audio Technologies Inc. are available as a six-mixer, 10-input board (BC6DSL), an eight-mixer, 12-input board (BC8DSL) and a 12-mixer, 24-input board (BC12DSL).

They include dual stereo and dual mono-sum program outputs with four line selectors for both the headphone and muted monitoring outputs.

A digitally scanned panel switch matrix controls distortion-free current mode IC audio switches. DC-operated VCAs remove the faders and their potential noise generation from the audio signal path. The exclusion of program audio from the panel area improves RF immunity.

Two or four VU meters are standard. Other features are LED bargraph output displays with simultaneous VU and PPM peak readout, a two-channel mix-minus telephone adapter, start-stop switches, additional microphone preamplifiers and a dual, five-line, stereo input expander.

For more information contact ATI in Pennsylvania at (215) 443-0330 or visit www.atiguys.com.



Nicom Makes Modular Consoles

Nicom has high hopes for its Neptune mixing consoles, which are designed for on-air applications.

The console can have two frame sizes that fit 26 (model 39) or 18 (model 27) modules. This allows a 24-input and two-output set or a 16-input and two-output set. The modular structure can fit mono, stereo, multi and telco input modules and master or sub output modules.

Each module has double selectable inputs (A/B) so that two sources can be connected permanently to each of them. They are also interconnected through a multipolar flat cable (bus).

Neptune has spliced and separately controlled outputs for studio and control room loudspeakers and headphones.

Every stereo mod can use different kinds of start/stop controls for remote equipment.

Other features are a built-in microphone for talkback, internal circuitry designed to assure low noise and distortion, a choice of three types of sliders and balanced audio connectors for high-connection quality.

The external connections are grouped onto the mixer control surface, which makes for easy changing of connections, module assignment and maintenance.

For more information contact Nicom in California at (619) 477-6298 or visit www.nicomusa.com.



Harris

► Continued from page 49

new building was constructed so that each station could keep its identity. We kept each radio station together, with its own separate area in the building and studio.

After evaluating console suppliers for the new studios, we decided to go with Harris digital consoles for two reasons.

Cox Radio's 20-year experience with Pacific BMX analog consoles had been positive from the standpoint of quality and service.

We couldn't think of any other piece of equipment in the facility that had been more reliable than those consoles. Second, Harris' pricing was competitive.

Changing over

We installed Harris AirWave Digital consoles in our two main control rooms and three main production rooms. Our two news booths were outfitted with Harris Impulse digital consoles. The AirWave digital consoles work equally well for both formats and the redundancy of equipment and parts between the stations eases maintenance requirements.

On the day of the move WPLR was the first station we cut over. As far as the air sound, I figured the move would be routine as the only change to the air chain was the Harris console.

The difference in the air sound was noticeable. The improvement in sound clarity and definition was obvious to many of the WPLR staff. But I still didn't attribute the sound improvement to the digital console.

Then it was Star 99.9's turn to change over. Our old Star console was a BMX II that had been overhauled recently with all new capacitors and had tested to better-than-new for specifications. The BMX II was putting out a great sound.

Once again, the difference was amazing. The apparent stereo separation was wider, and the signal had a new clarity. This was especially noticeable on live voices and on the high end of the music spectrum.

Both station staffs really like the Harris consoles. They are easy to operate and look great. They don't have useless buttons and controls to intimidate our on-air talent.

The Airwave Digital consoles have the flexibility to be installed in an analog or digital environment. Each input can be configured for analog or digital audio by using the appropriate plug-in module.

The digital plug-in module has automatic sample rate conversion so any peripheral device can feed into the Airwave. The analog plug-in module accepts regular stereo analog audio and converts it into a digital signal. All the audio after the input plug-in modules is 24-bit, 48-kHz digital audio.

The Airwave has simultaneous analog and digital outputs for three program busses. The digital output is fixed at a 48-kHz sample rate, so if you have a different house standard, an external sample rate converter will be needed.

The channel modules are identical, with no difference between a mic or a line-level channel. There are five mic

preamplifiers in the console that can be patched into a channel to function as a mic or a line input.

be attached to the consoles to make them function with the telephone system. When these channels are off, the

go down the proper telephone line.

This feature was the most appreciated of the console during the installation. Usually the telephone interfaces and the other custom work make console installations difficult, but no extra boxes were needed for these studios.

The only snag we hit during installation was the grounding. Digital consoles don't like static electricity, so we had some strange behavior until we fixed the grounding problem. Afterward, the consoles became stable.

Needless to say, Harris has shown me the light, and I am definitely a digital convert.

For more information contact Harris in Ohio at (800) 622-0022 or visit the company Web site at www.harris.com.

The improvement in sound clarity and definition was obvious to many of the WPLR staff.

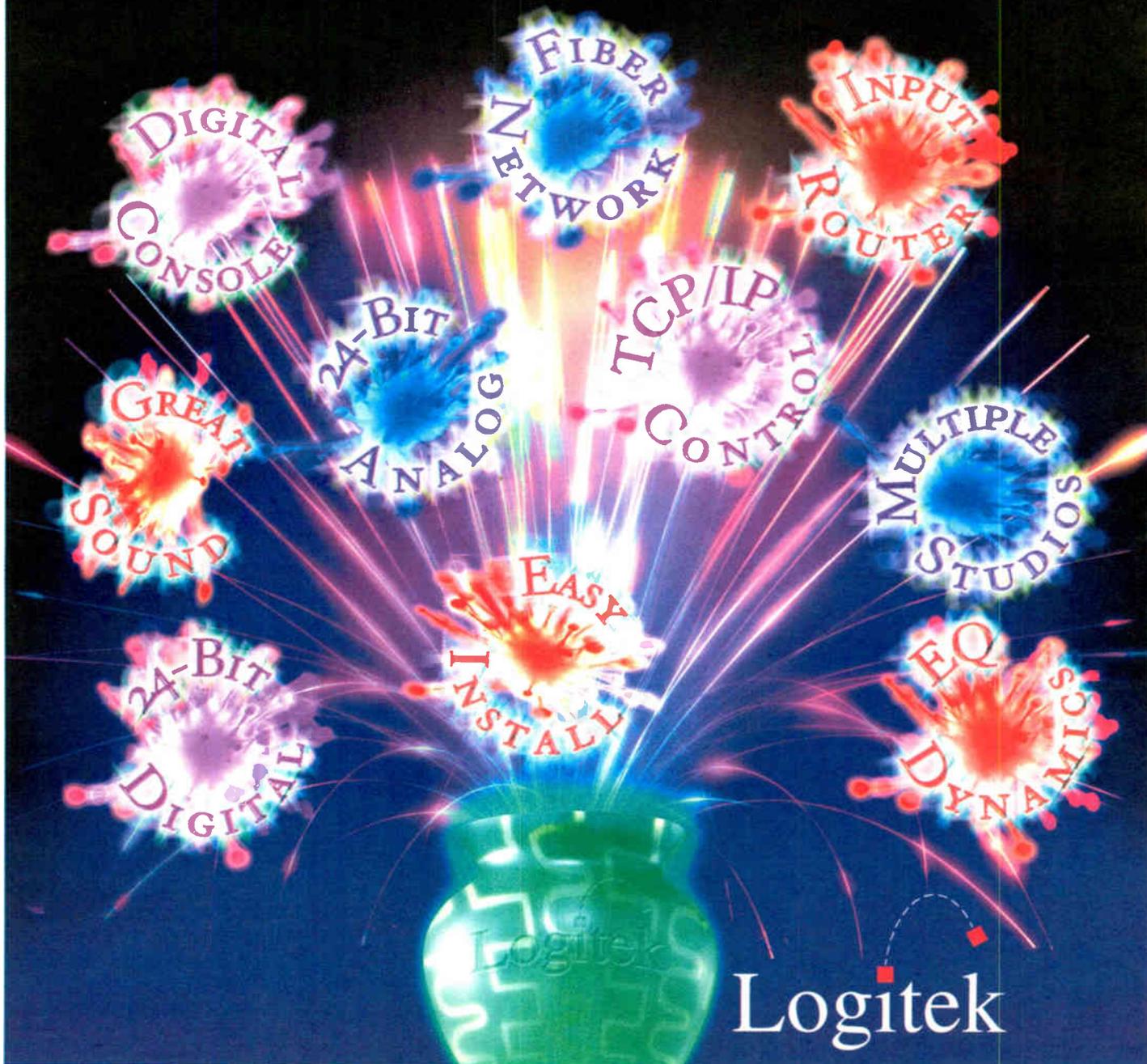
Each board can accept two telco modules. These are built logically so that no external gadgets will need to

console acts like a hands-free speakerphone, and when on, the proper mix-minus feed is automatically selected to

The Perfect Arrangement for Your Audio

Digital doesn't have to mean difficult. With Logitek, your studio wiring and configurations are beautifully simple - and completely flexible. Combine analog and digital sources easily and control them from anywhere. Centrally locate all of your audio sources, share them throughout your facility, network your audio with high speed optical connections and easily manage your audio distribution, routing and mixing.

Find out how at 800.231.5870 or www.logitekaudio.com



TECH UPDATES

Logitek Redesigns Control Surface

Logitek Electronic Systems has redesigned its Numix console, the control surface for Logitek's Audio Engine, a digital mixer and router. The Numix Selector Wedge has improved monitoring displays and button commands.

The new wedge allows greater interaction with hard-disk systems. The small LCD displays were replaced with a single, larger full-color panel that provides more room for messages. Users can better see the function settings and fader selections.



The new Wedge also has programmable buttons that can be customized with the unit's Supervisor or Command Builder software. This software allows the user to monitor the Audio Engine's activity and build custom scripts in a range from starting a piece of equipment to a full shift change.

For more information contact Logitek in Texas at (800) 231-5870 or visit www.logitekaudio.com.

Auditronics Mixes Console, Router

Auditronics' ALM-12d console combines the functions of a console and a router. It can route any input to any fader or monitor.

The console uses 24-bit analog-to-digital and digital-to-analog inputs and outputs. Its AES digital inputs use sample rate converters, so the console can work with most digital source gear. Up to eight source machines can be run as well, all of them opto-isolated.

Users can monitor the console's functions with DSP digital metering that simultaneously displays VU columns and peak-hold full-scale digital. It also uses LED dot-matrix source displays above faders and monitor pots.



The ALM-12d uses 12 faders plus two caller faders, four mic preamps, control room and studio monitoring, cue and headphone amplifiers and a concealed headphone jack.

Other features include caller tools that generate mix-minuses automatically and four MXMs that can be programmed as pre- or post-fader.

For more information contact Auditronics in North Carolina at (252) 638-7000 or visit www.wheatstone.com.

Klotz Integrates Mixer Into Platform

Klotz Digital's VADIS D.C. II is a digital audio production console built for radio stations that need a semicustom, multiformat mixer.

The console is integrated as part of the VADIS 880 digital audio platform, and the 880's frames are positioned around the plant and connected via fiber optics.

A source connected to the 880 can appear on any of the D.C. II's faders. Because of this, the console's setup of sources, mix-minus, dynamics and other factors can be recalled with one button push. The platform's technology can also integrate the functions of the mixer with external processors, routers and other equipment. Multiple control rooms with Klotz consoles can share functions while connected with fiber-optic lines.

The system uses mic, analog line and several digital audio format I/Os, including Y2, ADAT Optical, MADI, AES/EBU and S/PDIF. The console also has a MIDI interface to Pro Tools digital workstations. Its modular construction is available in four- to 24-fader mainframe sizes and has 20+ module types. The audio connectors are gold contact. It has several bus assign, fader, EQ and dynamics control panels. The amount of DSP power is user-determined. Monitoring is performed with a variety of meter styles.

For more information contact Klotz in Georgia at (678) 966-9900 or visit www.klotzdigital.com.

Shure's Mixer Made for Field Use

The FP33 from Shure is a three-input, two-output, battery-powered portable stereo mixer designed for remote audio recording and electronic field production.

The unit can support dynamic and condenser microphones. Condenser microphones are operated by 48V phantom, 12V phantom or 12V T (A-B) power sources. It has a dynamic range of 100+ dB and an extended frequency response of 20 Hz-20 kHz.

The inputs and outputs are transformer-balanced to help reject RFI and electromagnetic hum.



The unit uses sealed input potentiometers and low-cut filters. LED indicators monitor input levels, output peaks and limiter action; professional, backlit VU meters monitor output levels from the unit.

Other features include pop-up pan pots and a link switch to couple Inputs 2 and 3 into a stereo pair; a Mix Bus connection to expand to six inputs with an additional FP33 or FP32A; comprehensive headphone monitoring control including headphone MS stereo matrix; and internal DIP switches for customized setups.

For more information contact Shure in Illinois at (800) 25-SHURE or visit www.shure.com.



THE AFFORDABLE POWER

ONLY \$2,795*
* Manufacturer's Price



Features

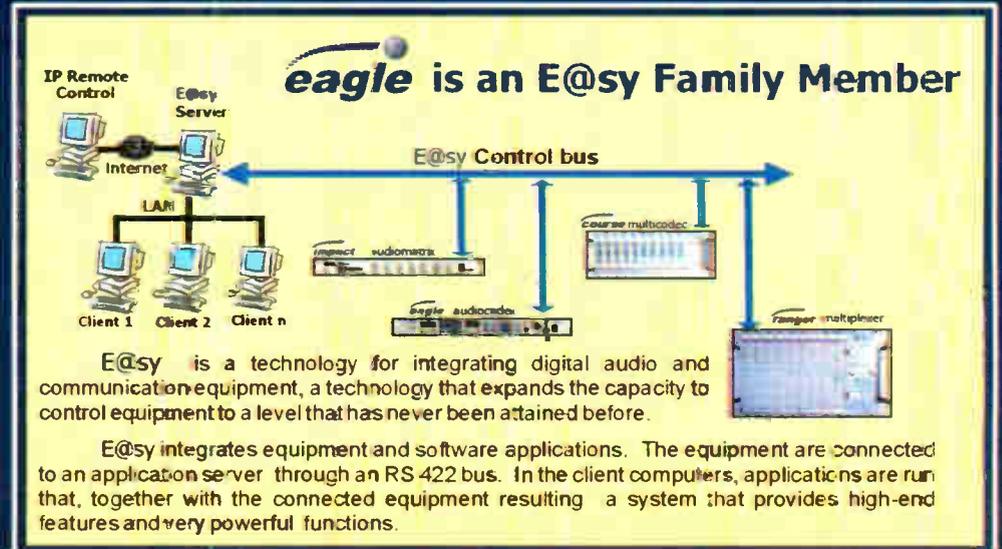
- Monitoring at your fingertips: Mic input and headphone jack plus a regular phone jack in the front panel.
- A Dual Display For E@sy Operation.
 - The LCD Screen for Set Up: Choose all parameters and compression algorithms.
 - The Second Screen to handle all calls for Line 1 and Line 2.
- Analogue and Digital Inputs and Outputs.

• Unique multiplexing capabilities in an audiocodec:

Allows for a bidirectional communication between channel 1 and 2 through a simple key stroke.

• The E@sy Control Bus features IP Remote Control capability by internet and standard network.

• In the Global Village, you can take The EAGLE outside the US, its dual ISDN interface will handle the international ISDN requirements.



Visit us at www.aeq.es

AEQ Broadcast International Inc: 2660 S.W. 87 Avenue. Davie - Fort Lauderdale - FLORIDA 33328
Phone: (954) 424 02 03 Fax: (954) 424 0902 e-mail: aeqamerica@aol.com - <http://www.aeqbroadcast.com>

AEQ : c/ Rey Pastor 40. Pol. Ind Leganés - 28914 Leganés / MADRID (SPAIN) Phone: 34 91 686 13 00 - Fax: 34 91 686 44 92 - <http://www.aeq.es>

SHOWCASE

Automating Programs? No Problem!



The NEW SUB-03 Subaudible Tone Decoder

You can use the Sub-03 to automate your network feeds or take the guess work out of when to cut away from networks. The decoder listens to your audio source and gives you dry contact closures from any service that sends subaudible tones, including satellite receivers, RPU's and POTS frequency extenders. The decoder's relay contacts interface easily with your automation system. The Sub-03 is a reliable and inexpensive problem solver. The Sub-03 can be ordered set for 50/75Hz operation. Rack mount option (as shown) available. List Price only \$329.00. Check our website for more info or to download the latest manuals.

The Sub-03's features include:

- Interlocked, dry relay closure outputs for 25, 35 & combo.
- Balanced or unbal. audio input.
- Provides filtered, balanced out.
- Indicators for all three tones, audio level setting & power.
- Enable input lets you (or your automation) prevent closures.
- Uses standard 1/4" TRS (head phone style) jacks for all audio.
- Db-9 and screw terminal outs.

CircuitWerkes

3716 SW 3rd Place
Gainesville, Florida 32607
(352) 335-6555 / fax 380-0230
<http://www.circuitwerkes.com>

Retrieve and Review EAS Logs...from your Office

Dawning's Secure Network Interface provides a simple and cost-effective method for any broadcast location to quickly and easily retrieve and transmit FCC Emergency Alert System test and activation logs, even those from your remote locations. Imagine having this information automatically delivered to you for regular review as required by the FCC!



Technical Specs:

- Dimensions: 5.6"W x 4.6"D x 1.5"H
- Serial Connection: RJ-45 8-pin Serial Port
- Ethernet Network Connection: RJ-45
- FTP or email data delivery options
- Programmable serial ports connections
- Definable IP address and network connection parameters
- List Price: \$595



www.dawning.com/?RW

1-800-332-0499

STOP THOSE POPS!

The *X-Plosive* is the solution for vocal plosives and obstructed sight lines to scripts/copyboard. It attaches directly to the shockmount ring of side-firing mics such as the Neumann U87™ and AKG C414™, which means there's no need to readjust once it's attached. The *X-Plosive* is made of durable ABS plastic and uses 2-ply nylon/spandex mesh. Buy now at:

www.x-plosivefilter.com



Manufactured by MMR Services
14505 Berry Rd., Accokeek, MD 20607
301-203-1617

Remote tools

Designed by broadcast engineers for broadcasters, our flexible line of remote access and control equipment gives you elegantly functional solutions to your control requirements without the need for "custom boxes".



DC-8A Dial-Up Remote Control

Controls and monitors 8 external devices from any touch-tone telephone with extremely flexible programmable features.



PSC Programmable Schedule Controller

Stores and controls up to 160 events with Hour/Minutes/Seconds, Day/Month/Year, or Day of Week with Daylight Savings Time correction. 20 SPST relays and/or 32 serial custom commands provided.



MSO-8 Control Panel

Provides a convenient way to add front panel control to our smaller profile products with eight LED-indicator-equipped switches.



SRC-1616L Serial Remote Control

Equipped with 16 opto-isolated and CMOS/TTL compatible inputs and 16-Relay (Form C) outputs that may be controlled from a host computer, or a pair of units can be used in a stand-alone configuration (relay extension cord).



MC-16 Telephone Hybrid/Coupler

Full featured telephone line coupler/hybrid provides 32 programs; 32 ASCII strings (DTMF to ASCII); 64 macros; 16 relays; auto answer; 4-digit access codes and much more.



BOS, ROS & PBB-24 Switch Panels

The BOS offers 12 N.O. dry contact switches with status LEDs in a desktop panel. The ROS is similar, but in a single-space rack unit. The PBB-24 provides 24 momentary buttons that can be programmed to output ASCII character strings.



SRC-8 Serial Remote Control

The SRC-8 provides a means of adding 8 channels of remote control to RF, wireline and fiber type STL systems and may also be used with dedicated modems (full & half duplex models).



SSM Smart Silence Monitor

Monitors any stereo or two independent monaural sources and generates alarms indicating loss of carrier when white noise and/or silence is detected.



UI-411 Universal Interface

Perfect for adding logic functions to mechanical switches/relays, adding remote functions to transmitter control/logic, detecting phone line "ring", etc.

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

Internet: www.broadcasttools.com E-mail: bti@broadcasttools.com

Voice: 360 . 854 . 9559
Fax: 360 . 854 . 9479



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

THE RAMSEY PX1 35W FM STEREO EXCITER/TRANSMITTER



- Frequency Agile - 87.5 to 108.0 MHz
- Digitally Synthesized PLL
- Temperature and VSWR Protected
- 120/240/12 VDC Power with Auto Battery Back-up

ONLY \$1795⁹⁵

The PX1 was designed to fill the needs of the low power or community broadcaster. Set-up and use is fast and simple with just 5 buttons to access all parameters - power, frequency, modulation, and more. The 2-line vacuum fluorescent display gives you "at-a-glance" verification of all important functions. The micro-controller continuously monitors frequency, temperature, deviation, etc. and makes subtle adjustments on the fly-like a "virtual" station engineer.

Two balanced inputs (XLR) are provided, as are inputs for SCA and RDS (BNC) RF Output connection is type "N", output power is adjustable from 1 to 35 Watts.

If you're setting up a new station, we also supply consoles, microphones, antennas, feedline, and more.

AVCOM-RAMSEY TECHNOLOGIES

793 Canning Parkway • Victor, NY 14564
Order Toll-Free: 800-446-2295
www.highpowerfm.com • sales@ramseyelectronics.com

AES/EBU DIGITAL AUDIO DISTRIBUTION AMPLIFIERS

- DDA106-XLR (1x6)
- DDA112-XLR (1x12)
- DDA206-XLR (Dual 1x6)
- DXA112-XLR (1x12)

- DDA112-BNC (1x12)
- DDA124-BNC (1x24)
- DDA212-BNC (Dual 1x12)
- DXA124-BNC (1x24)



- Accepts sample rates from 27 to 96kHz
- Data reclocking and regeneration
- Loop-thru inputs with switchable terminations
- Up to 12 XLR or 24 BNC outputs

- Transformer balanced inputs
- Adjustable input cable equalization
- Sample rate, Status and Error Indicators



Dedicated to sound engineering
ATI • 328 W. Maple Avenue, Horsham, PA 19044
(800) 959-0307 • (215) 443-0330 • Fax: (215) 443-0394 • <http://www.atiguys.com>
Free Brochure Available Upon Request

TECH UPDATES

AEQ Upgrades With BC-2500



AEQ has replaced its BC-2000 console for broadcast mixing with the new BC-2500, which has improved technical specifications and new capabilities.

The unit has four independent stereo outputs, four mono outputs and two telephone outputs. The mic and line inputs are transformer-balanced and operate on a sampling range of 20 Hz to 20 kHz.

The two external inputs have electronic symmetry. Independent sends can go from all channels to Master Output 1 and 2, Auxiliary 1 and 2, Telephone and Audition.

The design has I/O connectors in the modules themselves, which allows quick module placement in the chassis. AEQ makes 10 modules for the product. There are also three sets of headphone controls, two for studio and control with level control and a third for the control operator.

Monitoring functions are completed by simultaneous bargraph metering for Master 1 and 2, Audition and Selection. The programmable speakers have muting and metering, fader start and pre- and post-fader sends. The console also interfaces with AEQ digital phone hybrids, which can multiplex from two to four lines.

For more information contact AEQ in Florida at (954) 424-0203 or visit www.aeqbroadcast.com.

AEV Offers Digital Console

The Energya digital on-air console from AEV is designed to be an innovative and flexible system for radio station use.

The unit has 24 inputs: four mic transformer balanced inputs, four digital AES/EBU stereo inputs and 16 balanced analog stereo inputs. There are four voice processors on the mic input. The outputs are analog/digital and telco.

A 24-bit digital audio converter has a sampling rate of up to 96 kHz. Audio quality is improved by the all-digital signal path. It also has eight 100 mm faders, a color LCD monitor for display and a digital router. It can connect to computers with an RS 232 and a 10 Base-T Ethernet controller.

The console offers mixing and monitoring facilities and other channel functions.

For more information contact AEV in Italy at +39-051-6634-711 or visit www.aev.net.

Calrec Upgrades Minimixer

Calrec demonstrated an upgraded version of its Minimixer 3 at NAB2001 and reports strong sales to radio stations in Europe.

The M3 was designed for remote music recording, small mobile units and other applications. The new version takes up less space than the C2, Calrec's smallest full-studio console, but has more channels than the old M3. The new model fits 42 modules in its new chassis design and allows for 36 channels, four groups and two main outputs. The groups can be mono or stereo, with the option of L/R split on mono groups.

The unit has dual-mono, stereo-mic and stereo-line channels; individual channels use bargraph level monitoring. A three-band equalizer and two-band filters are available on all channel types. The M3 uses two main stereo outputs with dynamics and has three mono and one stereo auxiliaries.

The M3 retains the features of the previous model, including mix-minus on every channel and comprehensive monitoring facilities.

For more information contact Studio Consultants in New York at (212) 586 7376 or Redwood in California at (615) 871 0094.

Autogram Upgrades Consoles

Autogram recently upgraded two consoles into the new Pacemaker Iik 218 and the Iik 228 using new circuit boards and cards. They are, according to the company, digital ready.

Both feature Autogram Dual Mode Processing, six AES/EBU or S/PDIF stereo digital audio and two outputs of the same type. The inputs have automatic sample rate converters. Nine outputs are used overall.

The consoles also have two Audio-PMC embedded processor boards. The consoles are modular-expandable and use DC controls so modules can be replaced on the air. Both use up to eight patchable microphone preamplifiers and self-resetting "Poly Fuses" to protect individual circuit boards. Monitoring is done with four lighted meters.

The PM-218 fits 40 stereo inputs and 18 modules. The PM-228 can use up to 60 inputs and 28 modules. The frequency response range is 20 to 20,000 Hz.

For more information contact Autogram in Texas at (972) 424-8585 or visit www.autogramcorp.com.

BTI Interfaces with Other Consoles

Broadcast Tools Inc. makes the Console Controller IIA for interfacing non-broadcast consoles and digital workstations to the broadcast studio.

The CC-IIA is equipped with three channels of insert switching. The channels allow the control of each monaural microphone channel while connected to the console's insert points, or between a source's output and a device's input. The console also provides front-panel switching for internal and external monitor inputs. Multiple consoles can be cascaded to increase the total number of inputs.

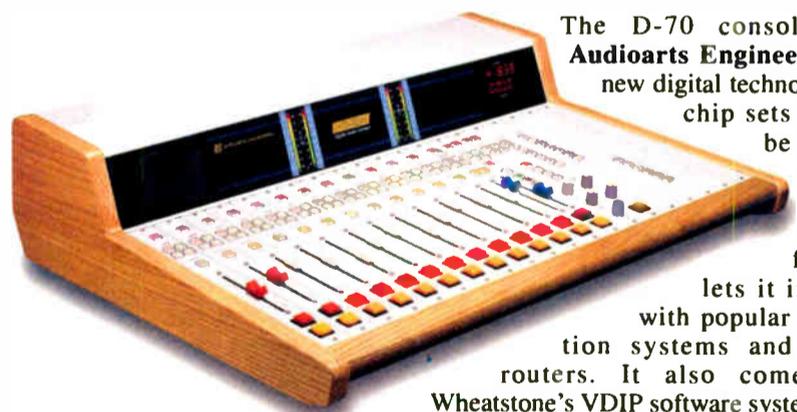


For monitoring functions the console uses monitor muting (which can be disabled on Channel 3), bright red LED indicators on the switches, a monitor level control and channel indicators that can be set to flash when active.

Other features include audio switching with gold contact relays, remote control and status, audio connections via TRS 1/4-inch jacks and an ergonomic desktop unit with a sloped front case.

For more information contact BTI in Washington at (360) 854-9559 or visit www.broadcasttools.com.

Audioarts Uses New Technology



The D-70 console from Audioarts Engineering has new digital technology and chip sets and can be ordered with a serial interface that lets it integrate with popular automation systems and station routers. It also comes with Wheatstone's VDIP software system.

The modular rear connector system uses plug-in submodules for easy analog-to-digital field switches. The modules let users have any combination of mic, analog or digital line inputs. Sample rate conversion is available on digital inputs. The four stereo busses each have digital and analog outputs for improved flexibility.

Monitoring is performed by full-scale digital peak plus VU or PPM metering with LED illumination. Other features include selectable console clock rates of 32, 44.1 or 48 kHz (plus an optional external house sync), a machine interface and separate source selection for control room and studio plus talkback.

The D-70 can be ordered with a Superphone module to support two callers with automatic digitally generated mix-minus. Digital and analog line selector panels are also available.

For more information contact Wheatstone in North Carolina at (252) 638-7000 or visit www.wheatstone.com.

Products & Services SHOWCASE



The RF People

Silicon Valley POWER AMPLIFIERS

Our growing product line
SATISFACTION GUARANTEED !!



B-150A
up to 185w
B-300A
up to 330w



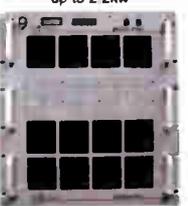
B-450
up to 500w
B-600
up to 630w



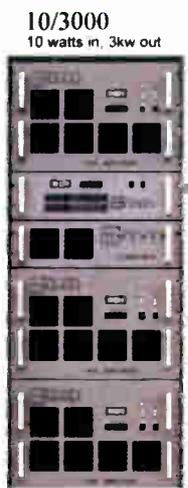
10/1000
10 watts in, 1000w out



B-850
up to 930w
B-1000
up to 1200w



B-1500
up to 1750w
B-2000
up to 2.2kw



10/3000
10 watts in, 3kw out

Phone:- (408) 986 9700

Fax:- (408) 986 1438

e-mail:- sales@svpa.com

Website:- www.svpa.com

Incredibly Flexible DTMF Control



The DS-8 Programmable DTMF decoder

Bridge the DS-8 across your audio source and get eight individually programmable relay outputs. Each closure is activated by its own code of one to four digits long. Each relay can be set up as momentary, latching or interlocked with other relays! Use the DS-8 for remote audio switching, automated program recording, secured remote EAS control, you name it! Optional rack mount (pictured) is available. A two unit R.M. is also available.

The DS-8 features include:

- Each of the eight relays may be independently programmed for codes and mode.
- Program it with any DTMF phone.
- High quality metal enclosure can be wall or table mounted. Low cost (optional) rack mount available.
- All connections on screw terminals.
- Retains settings after a power failure.
- List price is just \$299.

Call your favorite dealer or visit our website for the latest info and downloadable tech manuals!



CircuitWerkes

3716 SW 3rd Place
Gainesville, Florida 32607
(352) 335-6555 / fax 380-0230
<http://www.circuitwerkes.com>

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

THE #1 CHOICE!

AIRcorp 500PH Microphone Processor



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

- Front panel input level select +4 to -50 dB
- Three section variable boost and cut equalization
- Compander/Expander cross coupled for maximum punch
- Built-in earphone jack

- DE-ESSER designed to protect pre-emphasis curves
- Simultaneous mic level and line level outputs
- Internal 48 Vdc Phantom Supply

AIR corp

Call your dealer

or call **972-304-0455** or fax: **972-304-0550**

American Radio Manufacturers Association

Attendance is FREE!



A.R.M.A.

ARMA Expo – Boston is here!

November 15th & 16th at the
Boston Marriott – Burlington
Burlington, MA

Technical Sessions may be applicable for SBE Recertification Credits.

Call 610-640-1229 today for details.

Please register online at:

www.armagroup.org

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



- ✓ Competitive Prices
- ✓ Extensive Rental Fleet (RF Coders Test Equipment, Audio)
- ✓ Experienced Staff
- ✓ Used Trade-Ins Welcomed
- ✓ New and Rebuilt RF and Audio
- ✓ Custom Studio Design and Furniture
- ✓ Representing Over 600 Quality Manufacturers
- ✓ Turnkey Installations Available

You Know We Know Radio

800-438-6040 • www.scmsinc.com • Fax 704-889-4540

TECH UPDATES

Mackie Expands VLZ Pro Line

Mackie's 1402-VLZ Pro adds features and 60-mm log-tape faders to its little brother, the 1202-VLZ Pro.

Six "audiophile" Extended Dynamic Range mic inputs offer RF rejection capability, freedom from ground loops and impedance-independence. The mixer has six balanced/unbalanced mono line inputs and four pairs of balanced/unbalanced stereo line inputs. The balanced XLR main L/R outputs have mic/line level switches.



A 75-Hz low-cut filter on each mic channel reduces noise. The mute button on each channel mutes it in the Main Mix, placing the signal on the Alt 3-4 stereo bus. The Mute/Alt 3-4 effectively can create a second stereo bus.

The EFX-to-Monitor feature allows routing of reverb or other signals back into a monitor mix via Aux Send 1. The Aux 1 Master's Pre/Post switch can be set for pre-fader/post-EQ use or post-fader/post-EQ use. It also has a level control.

The Control Room/Phones section also has a level control, stereo 1/4-inch balanced L/R output pair and input matrix for selecting options to create custom headphone mixes and other functions. A separate switch routes the multi-source signal back into the Main Mix.

For more information contact Mackie in Washington (425) 487-4333 or visit www.mackie.com.

Wheatstone's Easy-Install Console

Wheatstone designed its A-2000 console for easy functionality and installation, suiting it to multistudio buildouts. Insulation connectors and tooling are built to make integration easy.

The meter bridge hinges for fast access to the I/O connectors, logic programming dipswitches and calibration trims.



For functionality the console sports two stereo program busses and two mono busses, one pre- and one post-fader, for backfeeds and on-the-fly mix-minus.

Dual phone caller support uses Wheatstone's Bus-Minus circuitry, which generates mix-minus caller feeds with the push of a module's MXM bus assignment switch. It also has one master module and two monitor module positions.

Control room and studio talkback are provided, including pre- and post-studio and headphone-level pot monitor feeds. Users can choose a second monitor module for studio two/headphone two output feeds. The frame can fit 23 input or accessory modules.

The console has LED-illuminated electronic switching, control room monitoring, dual studio and headphone support and concealed headphone jacks.

For more information contact Wheatstone in North Carolina at (252) 638-7000 or visit www.wheatstone.com.

RDL Makes Small Mixer

Radio Design Lab's RU-MX5 is a small audio mic/line mixer that is part of the company's Rack-Up line. It takes up only one-third of an RU, so multiple units can be mounted together.



The mixer has four inputs that can accept mic or line-level inputs. The fifth input is allocated to line level. The mic inputs are made for low-impedance balanced microphones, though unbalanced mics can be used as well.

Through use of a jumper, a terminal can connect an internal 24-VDC phantom voltage to any of the mic inputs. The line-level inputs can be balanced or unbalanced. The connections are made with full-size barrier block terminals.

An unbalanced MIX input allows an external audio source to be summed directly into the mix amplifier. This can be used to cascade multiple mixers to expand the unit's capabilities.

The equipment has one balanced mic output and one balanced line-level output, and both can operate unbalanced if necessary. Monitoring is done with three LED indicators.

For more information contact RDL in California at (805) 684-5415 or visit the company Web site at www.rdl.net.

TASCAM Intros Digital Console

TASCAM's new DM-24 is a small-format professional digital mixing console for multitrack recording and radio production use.

The DM-24 features 16 analog input channels with XLR mic, balanced TRS line inputs and analog inserts on each channel. Each channel features a custom-designed delay with a circuit design that compensates for fixed latencies within a digital studio.

The DM-24 features MMC and RS-422 transport control, allowing production staff to operate additional production equipment from the mixer's control surface. The mixer also has smooth 100-mm touch-sensitive motorized faders, and the console comes standard with 24 channels of TDIF I/O, eight channels of ADAT optical I/O, two stereo AES/EBU and two stereo S/PDIF interfaces, allowing the unit to interface with a variety of production equipment.

Two option slots can be used for additional analog and digital I/O and/or a cascade interface module.

The DM-24 offers 24-bit digital converters and a sampling rate of up to 96 kHz, enabling high-quality mixing for applications from standard CD mixing to DVD audio.

The flexible routing architecture uses four assignable sends and returns. The returns can be routed to any channel and can be used as assignable inserts. Any of the six aux sends can be assigned to any of the four assignable sends. Aux sends can also be assigned to the AES/EBU and S/PDIF digital outputs.

The DM-24 automation capabilities are built into the mixer with no external computer or software required. Eight mixes can be stored in the unit, and the DM-24 automatically goes into automation mode when a new mix is opened so that static changes can be saved instantly and dynamic moves can be made with one key press. Users can also offload automation data via MIDI.

For more information contact TASCAM in California at (323) 726-0303 or visit www.tascam.com.

Soundcraft Sports M Series Consoles

Soundcraft's Spirit M Series is a line of multiple-input mid-sized consoles for live broadcast.

The Spirit M4, M8 and M12 are equipped with four stereo inputs, stereo returns and auxiliary sends, as well as 100mm faders and an S/PDIF stereo digital output. They have four, eight and 12 mono inputs respectively. The mono input mic preamp design comes from Soundcraft's Ghost mixer console. The M8 and M12 feature removable side cheeks for rack mounting.

For more information, contact Soundcraft in Tennessee at (615) 360-0471 or visit www.soundcraft.com.

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

AcousticsFirst™
Tel Fax 888-765-2900

Full product line for sound control & noise elimination.
www.acousticsfirst.com

AMPLIFIERS

Want to Buy

RCA, Altec tube amplifiers & mixers in any condition, working or not. Larry Drago, WELI, POB 85, New Haven CT 06501. 203-230-5255.

ANTENNAS/ TOWERS/CABLES

Want to Sell

AM GROUND SYSTEMS:
Reliable, On-time Installation, Quality Workmanship, Ground System Evaluation & Repair.
www.amgroundsystems.com 1-877-766-2999.

Dielectric 3-5/8" motorized four port coaxial switch. Continental Communications, 314-664-4497. Email: contcomm@fiastil.net

Andrew 1-5/8" air dielectric transmission cable, 200', \$400. K Diebel, KHMB, 1707 Louisa St, Rayville LA 71269. 318-728-2370.

Cablewave 3 bay FM medium power, 92.1 mHz, \$1500. K Diebel, KHMB, 1707 Louisa St, Rayville LA 71269. 318-728-2370.

TOWER SITE 2000 COMPLIANCE

Antenna site signs
Registration signs
FCC-OSHA tower signs
Tower site products
610-458-8418
www.antennalD.com
Antenna ID Products

CCA 10 bay antenna. Worked when removed from service in 3/01. Currently on ground, tuned to 99.1 mHz, \$10,000/BO. Tommy Jenkins, Encore Broadcasting, 3303 N Midkiff, #115, Midland TX 79706. 915-520-9912.

ERI 6 bay FM antenna, 92.1 mHz, medium power, \$1000. K Diebel, KHMB, 1707 Louisa St, Rayville LA 71269. 318-728-2370.

Rohn CC 24" face tower. (17) twenty foot sections (340'), includes beacon, sidelights, guy pull-offs, other hardware. Carlton Veirs, WTBG, POB 198, Brownsville TN 38012. 731-772-3700, 8AM to 5PM Central.

Broadcast Equipment Exchange

For more information, call Simone at 703-998-7600, ext. 154.
[Radio World](http://www.RadioWorld.com)

AUDIO PRODUCTION

Want to Sell

Digigram cards: (2) PCX80 1 rec/4 play; (2) PCX9 PB only; (5) PCX5 R/P; (4) PCX5 PB only; (1) PCX5 R/P (need repair); (3) PCX5 PB only (need repair). Price includes all audio cards, cable with XLR connectors, lightning arrestors, instructions & pin out sheets for both digital & analog set-up, \$5000/all. David Leeds, New Media Bdctrs, PO Box 7000, Havre MT 59501. 406-265-7841 or email: leeds@imine.net.

Gentner 10, 10 chnl stereo switcher for analog audio, \$300 +shpg. Joe Barker, Trans World Radio, 14411 Commerce Way #250, Miami Lakes FL 33016. 305-828-4237.

AUDIO RESTORATION

We bake squeaky tapes, remove hiss, hum and background noise and remaster old airchecks, jingles or production onto CD. Visit www.kenr.com for a demo. Bring old tapes back to life!



AUTOMATION EQUIPMENT

Want to Sell

Prophet XP5, Antex cards, Wizard editor, D.R.R., excellent unit for satellite interface. Mitchell Johnson, Johnson Comm, 501-756-9933.

Enco DAD 32 system w/server, production workstation & on-air workstation which is touchscreen. Tommy Jenkins, Encore Broadcasting, 3303 N Midkiff, #115, Midland TX 79706. 915-520-9912.

CART MACHINES

Want to Sell

AudioCord DL players (3) in excellent condition, \$250 each. Richard Plessinger, Oyster Radio, 35 Island Dr, #16, Eastpoint FL 32328-3264. 850-670-8450.

COMPLETE FACILITIES

NEW OR USED COMPLETE PACKAGES

STUDIO/STL/TRANSMITTER/ANTENNA OR ANY COMBINATION OF ABOVE.

-LEASE OPTIONS-
-EMERGENCY RENTALS-
-REMOTE BROADCAST RENTALS-

SCMS, Inc. (800) 438-6040
"You Know We Know Radio"

CONSOLES

Want to Sell

Harris Stereo 80 8 mixer stereo console, \$850 +shpg. Joseph Bahr, Islands FM, Box 6556, San Juan PR 00914. 787-728-0364.

Want to Buy

Looking for good, used stereo console. 10-18 channels, 20+ inputs. Prefer sliders. Call Randy Norris, WXTQ-FM, 300 Columbus Rd, Athens OH 45701. 740-593-6651 or email: randy@wxtq.com.

Western Electric 25A. Paying up to \$7500 for this console & always buying WE mics, tubes, catalogs & turntables. Larry Drago, WELI, POB 85, New Haven CT 06501. 203-230-5255.

Radio World

Space is available!

To advertise, call 703-998-7600, Ext. 154.

LIMITERS/ AUDIO PROCESSING

Want to Sell

Orban 8000-A audio processor, \$1500 +shpg. Joseph Bahr, Islands FM, Box 6556, San Juan PR 00914. 787-728-0364.

Orban XT-2. Joseph Bahr, Islands FM, Box 6556, San Juan PR 00914. 787-728-0364.

Want to Buy

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 Buy

RCA 77-DX, 44-BX, KU-3A's, WE-639's, On-Air & recording lights wanted, top dollar paid! 615-352-3456, FAX: 615-352-1922. E-mail: billbryantmgmt@yahoo.com.

Altec 639B, cage beat up, but sounds great. Would like to swap for RCA Junior Velocity in good condition. Rudy Paolangeli, RP Media, 324 South Geneva St, Ithaca NY 14850. 607-273-5773.

RCA 77-DX's & 44-BX's, any other RCA ribbon mics, on-air lights, call after 3PM CST, 972-271-7625.

RCA 77DX/44BX. Will pay \$1000 for these mics. Call anytime. Larry Drago, WELI, POB 85, New Haven CT 06501. 203-230-5255.

MISCELLANEOUS

Want to Sell

ROTRON BLOWERS AND PLATE BLOWERS, new & rebuilt for Elcom, Harris, CCA, CSI, McMartin, Goodrich Ent. 11435 Manderson St. Omaha, NE 68164 402 493 1886 FAX 402 493 6821

SCA RADIOS for sale. Any Quantity. Call: 212-244-1140.

Want to Buy

Gates catalogs, any old radio catalogs, older than number 96. Leave phone number. Jeff Glass, 815-784-5219.

RCA on-air lights in any condition, working or not, will pay best prices for them. Larry Drago, WELI, POB 85, New Haven CT 06501. 203-230-5255.

MONITORS

Want to Sell

Used Mod Monitors, McMartin & Belar. Many to choose from, tuned & calibrated on your frequency, full guaranteed. Goodrich Ent. 402-493-1886.

RECEIVERS/ TRANSCIVERS

Want to Sell

EAS receiver, brand new condition, \$1000. K Diebel, KHMB, 1707 Louisa St, Rayville LA 71269. 318-728-2370.

Fairchild Dart 384 with DATS & SE DATS with cards & down converter (2), like new, \$800 each. Richard Plessinger, Oyster Radio, 35 Island Dr, #16, Eastpoint FL 32328-3264. 850-670-8450.

RECORDERS

Want to Sell

Revov PR99 2 track (1/2 track) low hours, \$695; Tascam 34B 4 track (1/4 track) w/remote, low hours, \$995. Rack mount ears on both, neither used in broadcast service. Bill Borrelli, Costa-Eagle Radio, 462 Merrimack St, Methuen MA 01844. 978-686-9966 x41.

REMOTE & MICROWAVE

Want to Sell

Burk TC-8, 8 channel remote control, no relay panel, \$1000 +shpg. Joseph Bahr, Islands FM, Box 6556, San Juan PR 00914. 787-728-0364.

WE RENT FOR LESS

Hotlines	FM Exciters
Zephyrs	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"

Moseley PCL/505/C STL XTR on 950.00 mHz, BO. Joseph Bahr, Islands FM, Box 6556, San Juan PR 00914. 787-728-0364.

REMOTE EQUIPMENT RENTAL

Silver Lake Audio
(516) 763-1776
silverlakeaudio.com

REPAIR SERVICES

DAT Machine Service

Digital Audio Tape

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

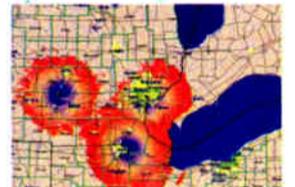
SATELLITE EQUIPMENT

Want to Sell

Comstream CM701 satellite modems (2), \$3500 +shpg each. Joe Barker, Trans World Radio, 14411 Commerce Way #250, Miami Lakes FL 33016. 305-828-4237.

BROADCAST ENGINEERING CONSULTING SOFTWARE

Professional software packages for preparing FCC applications and plotting coverage. For Windows and NT.



- ✓ Create "real-world" coverage maps with Longley-Rice, TIREM, PTP & other models using polygon map features.
- ✓ Prepare concise FCC model coverage maps and allocation studies using USGS geographic map databases. Census calculations, tower and airport databases.
- ✓ Search for AM, FM, TV, DTV & LPTV channels with graphics oriented programs and FCC databases.
- ✓ Plot STL paths in 3-D using NGDC terrain databases... and more!

V-Soft
Communications
800-743-3684
www.v-soft.com

Comstream CX801 modem protection switch includes support for automatic failure of modems & codec's, \$3000 +shpg. Joe Barker, Trans World Radio, 14411 Commerce Way #250, Miami Lakes FL 33016. 305-828-4237.

Comstream Uplink rack, sturdy equip rack with power dist & wiring for codec's, ABR's, modems, etc., \$2000 +shpg. Joe Barker, Trans World Radio, 14411 Commerce Way #250, Miami Lakes FL 33016. 305-828-4237.

PCSI CS8000 satellite voice/data multiplexer, \$3000 + shpg. Joe Barker, Trans World Radio, 14411 Commerce Way #250, Miami Lakes FL 33016. 305-828-4237.

SSE transceiver, 10 watt, C-Band transceivers (2), \$2500 each +shpg. Joe Barker, Trans World Radio, 14411 Commerce Way #250, Miami Lakes FL 33016. 305-828-4237.

Wegener DR-96 satellite receivers (2), very little use, \$1000/both. K Diebel, KHMB, 1707 Louisa St, Rayville LA 71269. 318-728-2370.

STATIONS

Want to Sell

PROFITABLE! CASH-FLOWING! 3 AM/FM STATIONS! BEST SMALL MARKET ANYWHERE! LIMITED COMPETITION, NEW EQUIPMENT, INCREDIBLE LOCATION! FAMILY EMERGENCY FORCES SALE. Email: radioonair@aol.com.

DUE TO DEATH OF OUR FATHER, TWO GREAT RADIO STATIONS FOR SALE: North East California, great hunting and fishing, 5000 watt AM 570, Class C FM 100,000 watt, \$250,000 or Best Offer, highly motivated! Phone 530-233-3570.

AM/FM COMBO in Southwest Missouri. 25,000 watt FM, 1,000 watt Daytime AM. Owner will carry note. 417-326-6445.

ATTENTION MANUFACTURERS & DISTRIBUTORS

HURRY! Don't get left out!
Of our "2002 Directory Sourcebook" of course!

IT'S FREE!

If you haven't already submitted your FREE LISTING FORM yet then you better hurry!

You can do it easily online! Just go to:
www.imaspub.com/rwsourbook.html

Various advertising opportunities are also available in the Sourcebook. For more information on advertising call Simone at 703-998-7600 ext 154 or email your requests to: smullins@imaspub.com

But hurry! Time is running out!
The deadline is quickly approaching!

TAPES/CARTS/ REELS/CD's

Want to Buy

10.5" music reels, Drake Chenault, Con Tempo 300, Library reels, 1979-1990, also seasonal reels & cue sheets. Chuck Raub, 570-434-2782.

Marantz PMD-221 that are non-working, physically complete preferred, but basket cases will be considered. Leave message. Jeff Glass, 815-784-5219.

TEST EQUIPMENT

Want to Buy

Field intensity meters, any make, any model, any condition. Gary Keener, KBNU/KBLT, 5150 Broadway, #601, San Antonio TX 78209. 210-828-4555.

Buying or selling Used Equipment?
You're in the right place!
To advertise call 703-998-7600, ext. 154.

TRANSMITTERS

Want to Sell

BE FM-30, 30KW FM. Continental Communications. 314-664-4497. Email: contcomm@fiastl.net.

Harris-Gates BC-10H 10KW AM transmitter. Continental Communications. 314-664-4497. Email: contcomm@fiastl.net.

RCA BTF-20-E1. Continental Communications. 314-664-4497. Email: contcomm@fiastl.net.

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"

RCA BTF-5-E1 5KW FM transmitter, single phase. Continental Communications. 314-664-4497. Email: contcomm@fiastl.net

Continental 317B parts. (2) plate transformers 480V input, various tubes, inductors & caps. Contact WEVD Engineering Department, 201-939-4266.



Ramsey FM-100 hobby transmitter, stereo FM, 25 MW to 1 watt, like new, \$375. Gene Whittenberger, Whittenberger Studio, POB 396, Mexico IN 46958. 765-985-2224.

CCA 1000-D 1.0 KW FM, w/out exciter, \$3500 +shpg. Joseph Bahr, Islands FM, Box 6556, San Juan PR 00914. 787-728-0364.

Harris 10-H, 10KW w/out exciter, \$8000 +shpg. Joseph Bahr, Islands FM, Box 6556, San Juan PR 00914. 787-728-0364.

Harris MX-15 FM exciter, good condition, \$1500 +shpg/BO. Joseph Bahr, Islands FM, Box 6556, San Juan PR 00914. 787-728-0364.

Want to Buy

BE, Harris, any exciter, physically complete but in poor electrical condition. Leave message. Jeff Glass, 815-784-5219.

TRANSCOM CORP.

Serving the Broadcast Industry Since 1978

Fine Used AM & FM Transmitters and Also New Equipment

300W	FM	1988	Harris FM300K Solid State Single Phase
1 KW	FM	1981	Harris FM 1K Single Phase
1 KW	FM	1968	Harris FM 1H Single Phase
2.4KW	FM	1995	QEI Quantum Single Phase
2.5KW	FM	1984	Harris FM 2.5K Single Phase
2.5KW	FM	1980	Harris FM 2.5K Single Phase
2.5KW	FM	1979	Harris FM 2.5K Single Phase
2.5KW	FM	1976	Collins 831D Single Phase
3.8KW	FM	1994	Continental 814J Solid State Single Phase
5 KW	FM	1985	BE FM 5A
5 KW	FM	1991	BE FM 5B
6 KW	FM	1994	Henry 6000D
10KW	FM	1974	Harris FM10HWK
25KW	FM	1980	CSI T-25-F
25KW	FM	1982	Harris FM 25K
50KW	FM	1982	Harris Combiner w/auto exciter-transmitter switcher

5KW	AM	1996/8	Harris "Gates" 5
5KW	AM	1980	Harris MWSA
10KW	AM	1989	Nautel AMPFET 10, Solid State
10KW	AM	1986	Harris MW10B
50KW	AM	1978	Continental 317C-1
50KW	AM	1982	Harris MW-50B

Miscellaneous Equipment:

- Belar FM Mod. Monitor
- Belar FM Stereo Monitor
- CRL SMP-900 AM Stereo Matrix Processor
- CRL MDF 800 Stereo De-Emphasis Filter
- CRL SEC 800 Compressor

2655 Philmont Ave #200, Huntingdon Valley, PA 19006
800-441-8454 • 215-938-7304 • FAX No. 215-938-7361
VISIT OUR NEW INTERNET SITE: www.fmamtv.com
SEND YOUR E-MAIL REQUESTS TO: transcom@fmamtv.com

CONSULTANTS

EVANS ASSOCIATES Consulting Communications Engineers
FCC Applications • Design • Field Engineering • Tower Detuning Upgrade & Relocation Studies • AM Directional Array Tuning & Proof
EXPERTS IN:
TV • DTV Transition • FM • Directional Antennas • RF Exposure
210 S. Main St., Thensville, WI 53092, (262) 242-6000, FAX (262) 242-6045
<http://www.evansassoc.com> Member AFCE

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: info@owleng.com 1-800-797-1338 Fax (763) 785-4631
8899 Hastings St NE, Minneapolis, MN 55449 (763) 785-4115 Member AFCE

T. Z. Sawyer Technical Consultants www.sawyer.com
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

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

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

System One Communications
Broadcast Constructors & Consultants
Houston, Texas
888-625-5649
➤ AM-FM Site Construction Specialists
➤ Complete Tower Service
➤ Antenna & Transmission Line Diagnostics
➤ Custom Studio Designs & Furniture

Herb Kravitz Broadcast Engineering
Contractors/Consultants
AM-FM
Professional Technical Support
Comprehensive Field Service
phone 609-347-4821
fax 609-347-6397
hkradio@msn.com

M Celenza Communications Consultants
TV-\$550; LPTV-\$550; FM-\$250;
AM Freq Searches-Call for quote
Applications, Amendments & Upgrades
Antenna Structure Registration,
Field Work Avail
631-928-0077
Fax: 631-928-1905

MULLANEY ENGINEERING, INC.
Consulting Engineers
• Design & Optimization of AM Directional Arrays
• Analysis for New Allocation, Site Relocation, And Upgrades
AM-FM TV LPTV
Wireless Cable (MDS/MMDS/ITFS/OFS)
• Environmental Radiation Analysis
• Field Work
• Expert Testimony
9049 Shady Grove Court
Gaithersburg, MD 20877
Phone: (301) 921-0115
Fax: (301) 590-9757
email: mullengr@aol.com

FM FREQUENCY SEARCH
FM APPLICATIONS - \$1,199
Amendments & Upgrades
Field Work • Site Construction
MX Resolutions • Petitions
Coverage Maps - \$39
MBC Consulting
(800) 219-7461
www.mbcradio.org

dataworld
Market Analysis
Engineering Software
Ethnic/Demographic Data
Custom Full-color Mapping
Sales Marketing Packages
www.dataworld.com 800-368-5754
info@dataworld.com fax: 301-656-5341

Communications Technologies, Inc.
Broadcast Engineering Consultants
AM FM TV LPTV
Cellular/PCS Site Analysis
P.O. Box 1130, Marlton, NJ 08053
Phone: (856) 985-0077
Fax: (856) 985-8124
Internet: commtechrf.com
Clarence M. Beverage
Laura M. Mizrahi

FASTER... MORE ACCURATE RADIO COVERAGE
• Real Time 3-D Displays
• Interference calculations
• Cost effective mapping
• Fully integrated databases
• Used by the FCC
• Latest standards built-in
RADIO SOFT
Visit us on the web at www.radiosoft.com
109 West Knapp Ave. • Edgewater • FL • (386) 426-2521

Radiotechniques
402 Tenth Avenue • PO Box 367
Haddon Heights, NJ 08035
Consulting Engineers
Voice 856-648-8008 • Fax 856-648-1841
E-Mail ted@radiotechniques.com
AM - FM - TV
FCC Applications
Directional Antennas
Field Work
Transmitter Plant Design
Acoustics and Sound
Edward A. Schober, PE
Principal Engineer
Member AFCE

Structural Analysis
ERI
Electronics Research, Inc.
7777 Gardner Road
Chandler, IN 47610
(812) 925-6000
www.ERInc.com
REGISTERED PROFESSIONAL ENGINEERS
STRUCTURAL ANALYSIS
ERI Incorporated 1943
TOWER REINFORCING

AM Annual NRSC Spectrum Measurements
Low Cost Flat Fee
We make trips all across the U.S.
Call to get on our schedule.
T and T Measurements
800-687-9161
email: Itaft@2fords.net
tandtmeasurements.com

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

e-mail: link@surcom.com web: www.surcom.com

...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

STUDIO FURNITURE?
STURDY CUSTOMIZED SYSTEMS FOR EVERY NEED AND BUDGET!
WHY PAY ANY MORE?
SPACEWISE
800-775-3660
info@spacewise.cc

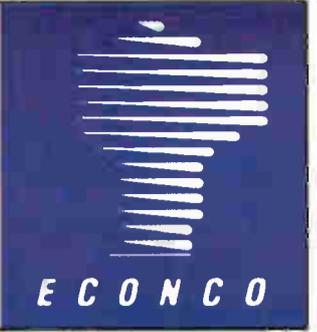


POWER TUBES
REBUILT

1/2 THE COST
OF NEW!

ECONCO

TEL: 800-532-6626
INTL: +1-530-662-7553
FAX: +1-530-666-7760
www.econco.com
SE HABLA ESPAÑOL



TUBES

Want to Sell

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.

EIMAC, AMPEREX, ED-COM, 3CX2500F3, 3CX3000A7, 4CX250B, 4CX300A, 4CX1000A, 4CX1500B, 4CX5000A, 4-400C, 811, 833C, ETC. WESTGATE 800-213-4563.

D & C Electronics Co.

NEW TUBES

We have the alternatives for all your needs, at the lowest prices, direct from OUR STOCK!!!



EIMAC, SVETLANA, PRO-TEK®, EEV and many others. (352) 688-2374 PH: (800) 881-2374 FAX: (352) 683-9595

SE HABLA ESPAÑOL
WE EXPORT
VISA / MASTERCARD ACCEPTED

TUBES, Eimac, Svetlana
Phone: 905-844-5772
Fax: 905-844-6263
www.hard-to-find.net
ams@hard-to-find.net

**ADVERTISE YOUR
EMPLOYMENT AD ON
OUR WEB SITE FOR ONLY
\$2 PER WORD!**

**ADS GET POSTED THE NEXT BUSINESS DAY
AND WILL RUN FOR A FULL TWO WEEKS!**

**COMBINE THIS WITH AN AD IN OUR
RADIO WORLD NEWSPAPER
EMPLOYMENT SECTION AND REALLY
COVER THE BROADCAST INDUSTRY
AND THEN SOME!**

www.RWonline.com

Call Simone Fewell for all the details at

**703-998-7600
Ext. 154**

between 9-5 EST

EMPLOYMENT

HELP WANTED

**CHIEF ENGINEER
West Virginia**

We are currently seeking a full-time Chief Engineer. Qualified applicant must possess a minimum of 2 years experience in the maintenance & operations of AM & FM radio station studio & transmission equipment. Remote broadcast experience required. Must be computer proficient. Complete knowledge of FCC rules & regulations also required. EOE. Send resume to: S. Fewell, Radio World, POB 1214, Falls Church VA 22041, Attn: Box #10-24-01-1.

Radio World

ENTERCOM ROCHESTER, NY has an immediate opening for a staff engineer. Ideal candidates will have knowledge in transmitter and studio repair and installation. Computer and AudioVault experience helpful. We offer excellent benefits and growth potential. Resume to Joseph Fleming, 500 B. Forman Bldg/Midtown Plaza, Rochester, NY 14604 or fax: (716) 423-9552.

POSITIONS WANTED

Broadcasting school graduate looking for work as an announcer or in sales. Willing to relocate. Call Robbie, 918-652-7853.

Fresh out of school. Rookie DJ looking for a job. Excellent music DJ & announcer for commercials & PSA's. Kevyn, 918-496-0419 or capanelah14@aol.com.

Friendly, industrious, FCC commercial-1st Class w/radar/amateur-extra radio licensed, CE, asst CE, seeking FT, PT, contract work, AM/FM, cable, TV, within 75 miles radius of metro NYC area. 718-969-5224 or write: Mitchell Rakoff, 81-12 Roosevelt Ave #702, Jackson Heights NY 11372-6746 or email: mitchellrakoff@yahoo.com.



Looking for radio opportunity. Joe, a shooting star, the name for fame in this game called life. Joe, 918-622-8103.

Brilliant personality, great voice & tight board! Will relocate. Rhianna, 405-440-0595.

Rookie seeks on-air, production, and/or producer position. Willing to relocate. Experience with OKC's #1 news/talk radio station. Jen, 405-773-6169.

SPACE IS AVAILABLE!

To advertise, call
703-998-7600, ext. 154.



Radio World

5827 Columbia Pike, 1st Floor • Falls Church, VA 22041

PHONE: 703-998-7600 • FAX: 703-671-7409

**Classified Advertising Rates
Effective January 1, 2001**

	1x	6x	13x	26x
1-9 col inch (per inch)	\$95	90	85	80
10-19 col inch (per inch)	\$80	70	60	50
Distributor Directory	\$120	115	110	105
Professional Card	\$90	85	80	75
Station/Studio Services	\$175	150	125	100
Classified Line Ad	\$2/word			
Blind Box Ad	\$15 additional			

Call Simone, Ext. 154, Classified Ad Manager, to reserve space in the next issue.

Use your credit card to pay, we now accept VISA, MASTERCARD and American Express.

Radio World

THE NEWSPAPER FOR RADIO MANAGERS & ENGINEERS



Radio World celebrates 25 Years by giving you **\$25.00 off** the regular subscription price. Take advantage of this Silver Anniversary offer and enjoy the newspaper for Radio Managers & Engineers at this lowest rate ever.

Don't miss our Silver Sweepstakes in which 25 lucky winners will win valuable prizes! Look for contest details in this issue.

Special Introductory Rates • For New Subscribers Only

- 1 Year for \$34.00 (usually \$59.00)
- 2 Years for \$59.00
- 3 Years for \$85.00

N95

Payment Options:

- Check or money order payable to IMAS Publishing
- Visa
- M/C
- Am Ex

Card # _____ Exp _____

Signature _____ Date _____

Please Print: Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

E-Mail _____

Phone () _____ Fax () _____

Your subscription begins upon receipt of payment. IMAS Publishing appears on all financial transactions.

ACTION-GRAM

EQUIPMENT LISTINGS

Radio World's Broadcast Equipment Exchange provides a FREE listing service for radio stations only. All other end users will be charged. This FREE service does not apply to Employment Help Wanted ads or Stations For Sale ads. These are published on a paid basis only. Send your listings to us by filling out the form below. Please be aware that it takes one month for listings to appear. The listings run for two consecutive issues and must be resubmitted in order to run again. Thank you.

Please print and include all information:

Are you currently a subscriber to Radio World?
 Yes No

Signature _____ Date _____

Contact Name _____
 Title _____
 Company/Station _____
 Address _____
 City/State _____
 Zip Code _____
 Telephone _____

Brokers, dealers, manufacturers and other organizations who are not legitimate end users can participate in the Broadcast Equipment Exchange on a paid basis. Line ad listings & display advertising are available on a per word or per inch basis.

WTS WTB Category: _____
 Make: _____ Model: _____
 Brief Description: _____
 Price: _____

WTS WTB Category: _____
 Make: _____ Model: _____
 Brief Description: _____
 Price: _____

WTS WTB Category: _____
 Make: _____ Model: _____
 Brief Description: _____
 Price: _____

WTS WTB Category: _____
 Make: _____ Model: _____
 Brief Description: _____
 Price: _____

WTS WTB Category: _____
 Make: _____ Model: _____
 Brief Description: _____
 Price: _____

WTS WTB Category: _____
 Make: _____ Model: _____
 Brief Description: _____
 Price: _____

WTS WTB Category: _____
 Make: _____ Model: _____
 Brief Description: _____
 Price: _____

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 lister.

Broadcast Equipment Exchange

PO BOX 1214, Falls Church, VA 22041 • Tel: 703-998-7600 • Fax: 703-998-2966

ADVERTISER INDEX

This listing is provided for the convenience of our readers. Radio World assumes no liability for inaccuracy.

PAGE	ADVERTISER	WEBSITE URL
56	A.R.M.A.	www.armagroup.org
53	AEQ	www.henryeng.com
43	AETA Audio Corp	www.aetausa.com
56	Air Corp	See ad for contact information
38	AKG Acoustics	www.akgusa.com
18	Armstrong Transmitters	www.armstrongtx.com
54	ATI	www.atiguys.com
64	Audioarts/Wheatstone	www.wheatstone.com
63	Auditronics/Wheatstone	www.auditronics.com
54	Autogram Corporation	www.autogramcorp.com
54	Avcom-Ramsey Technologies	www.highpowerfm.com
26	BALSYS	www.balsys.com
12	Belar	www.belar.com
59	Bext	www.bext.com
30	Broadcast Richardson	www.broadcast-richardson.com
15	Broadcast Software Int'l (BSI)	www.bsiusa.com
54	Broadcast Tools	www.broadcasttools.com
32,33	BSW	www.bswusa.com
4	Burk Technology	www.burk.com
54	Circuit Werkes	www.circuitwerkes.com
56	Circuit Werkes	www.circuitwerkes.com
7	Comrex	www.comrex.com
14	Conex Electro-Systems	www.conex-electro.com
1	Continental Electronics	www.contelec.com
54	Dawning	www.dawning.com
23	Denon America	www.denon.com
22	Energy-Onix	www.energy-onix.com
24	ERI	www.eriinc.com
34	ESE	www.es-web.com
41	Eventide	www.eventide.com
11	Fostex Corporation	www.fostex.com
16	Harris	www.harris.com
48	Harris	www.broadcast.harris.com
6	Inovonics	www.inovon.com
17	Inovonics	www.inovon.com
56	J Squared Technical Service	jsquared@cdsnet.net
19	Klotz Digital AG	www.klotzdigital.com
51	Logitek	www.logitekaudio.com
27	MediaTouch	www.imediatouch.com
54	MMR Services	www.x-plosivefilter.com
29	Neutrik USA	www.neutrikusa.com
9	Omnia, a Telos Company	www.omniaaudio.com
42	QEI	www.qei-broadcast.com
5	Radio Systems	www.radiosystems.com
31	River Communications	sales@riverc.com
56	S.C.M.S., Inc.	www.scmsinc.com
10	Scott Studios	www.ccc.fm
20	Sierra Automated Systems	www.sasaudio.com
56	Silicon Valley Power	www.svpa.com
3	Sine Systems	www.sinesystems.com
25	SMARTS Broadcast Systems	www.smartsbroadcast.com
39	Syntrillium Software	www.syntrillium.com
13	Telos Systems	www.telos-systems.com/smartsurface
45	Telos Systems	www.zephyr.com
2	Wheatstone	www.wheatstone.com
35	Wheatstone	www.wheatstone.com

◆ READER'S FORUM ◆

Sept. 11, 2001

Shortly after the terrible destruction of the World Trade Center and the Pentagon attack, the radio engineers' e-mail listserv devolved into a discussion of rants, flames and finger pointing with harsh words being traded.

I was absolutely disgusted. This was no time for blame — that can come later — this was a time for reaching out and supporting each other, something a few members on the list apparently can't do. So I posted the following as I returned to the Z100 studios the day after the tragedy:

"STOP IT - STOP IT - STOP IT. I'm back, looking out the studio window — across the river from where the towers used to be.

"After watching both towers collapse yesterday and hearing the incredible roar as the towers fell, I'm wondering just which one of my fellow engineers and SBE Chapter 15 members were

thing: He decided to broadcast AP's radio feed instead of regular programming.

In fact, many other stations in the Philadelphia area did the same (I understand most of the Clear Channel stations simulcast NBC TV's audio feed.) As I am sure is the case with many Americans, my information for most of the day came from the radio, not TV, and certainly not the Internet (which was completely useless and, when available, horribly outdated during the day).

I congratulate all the program directors who opted to cover this disaster rather than to play CDs.

This crisis also underscores the necessity of national radio networks like AP and CNN. Even those stations without network affiliation showed wise judgment by using network TV audio.

Gerrett H.A. Conover
Vice President
Radio Systems
Bridgeport, N.J.



Photo by Eric Nelson

working yesterday and thinking of the thousands who have lost their lives in this cowardly attack.

"Let's think and pray for them and the rescue workers currently working their hearts out and leave the rest of this crap for another time and place."

George Marshall
Staff Engineer
WHTZ(FM)
New York

Kudos to WSTW(FM) in Wilmington, Del. I first heard about the World Trade Center attack from WSTW at a few minutes after 9 a.m. Johnny B and Jill calmly and quickly kept the updates coming through the hour.

Then John Wilson (now PD) did a smart

Bose Wave/PC

Nice article by Frank Beacham on the Bose Wave/PC (Aug. 15, "New Bose Wave/PC Radio Is Fine").

I bought one about three months ago and love it! Your article makes it very clear how stunning it is, particularly for radio folks like us.

There's even another obvious feature: an amplifier! Of course there is, but I'd just been searching for a compact amp for my new 300-CD jukebox when the Wave/PC came out. I just connect my jukebox into the ext source input in the back and poof! All done.

Tom Zarecki
Marketing/Public Relations
RCS New York
New York, N.Y.

Carpe Diem! News Is Hot

Radio should learn well from the audience numbers it attracted in the morning hours of Sept. 11 and the days that followed. News is worth the cost.

With an uncertain future that could include military action and permanent changes to American lifestyles, listeners will look to any source that delivers late-breaking, live content. Radio did that better than any other medium that day, especially for the millions who remained at work.

At 9:15 a.m. on Tuesday Sept. 11, you could learn little to nothing from online news services. The Net was slowed to a futile pace, whether you wanted streamed audio or just headlines. In those early terrible hours, the Internet was not the public's first or even second choice for content.

If you couldn't find a TV, you wanted a radio.

Don't bet that online providers are going to repeat their sorry performance the next time big news breaks. But the public is more likely to go to the medium that gave them what they wanted that day and those that followed.

Listeners still hunger for news throughout the day. Radio broadcasters should hold their markers in the public's mind by providing the content listeners want most now — news.

This is a time for programmers and GMs to reconsider the role that information plays in their formats.

When Sept. 11 came, some FM stations responded by having music jocks interviewing news sources — because they certainly couldn't play music, and they didn't have their own news people to turn to.

Some of those interviews were informative, but many others showed the importance of having a trained journalist behind the mic asking the questions and separating rumors from established facts.

Stations should think big in assessing possible program changes. Remember, music stations can indeed air newscasts, read by live local anchors, not mere giggleheads. Our industry also has available many fine audio and text news resources. Talk shows give your listeners an opportunity to voice their thoughts in uncertain times.

It's difficult to know what to do these days, which tone is appropriate to air. Radio provides news as well as entertainment, although all too often it underfunds the former on behalf of the latter.

Both are needed now. Radio should seize this opportunity to serve the public's interest and build its brands to ever-stronger levels in the process.

— RW

Still a fan of APT

I read with interest the *Reader's Forum* letter in the July 18 RW from Art Constantine, VP Business Development, CCS/Musicam USA, in response to my earlier column about digital coding. Every company that manufacturers codecs knows that sequential and/or tandem coding is a no-no and that high data rates sound better — a fact that was not discovered by Musicam.

In any side-by-side comparison with Musicam, at any data rate, APT will win hands-down, no contest; try it for yourself. The difference is like night and day. I am indeed "fond" of codecs that sound good. Sure, you need more data bits, but ISDN and related broadband connections are available to broadcasters who put quality first.

(I wince when I hear sports and other programming that relies on low-bit MPEG systems — the thin, metallic sound quality is so easy to spot that I wonder how stations have the nerve to think that their audiences do not notice the degradation.)

Quality vs. bandwidth remains a very subjective compromise, but once you have heard the enhanced sonic transparency of APT, there is no going back. Unless, or course, you don't worry about sound quality. (And this does not even get

into processing-delay problems associated with MPEG codecs.)

These opinions are mine and not necessarily those of Radio World, where my columns appear. And, lest there be any surprises, from July 1990 through July 1992, I handled marketing communications for Audio Processing Technology. During and since that time, I have spend many hours auditioning apt-X Series codecs and their competitors, and stand by my assessments.

Mel Lambert
Principal
Media&Marketing
Studio City, Calif.

Write to Us

RADIO WORLD
READER'S FORUM

P.O. Box 1214
Falls Church, VA 22041

radioworld@imaspub.com

—EDITORIAL STAFF—

Paul J. McLane	ext. 117	Editor
Sharon Rae Pettigrew	ext. 126	Managing Editor
Leslie Stimson	ext. 129	News Editor/Wash. Bureau Chief
Laura Dely	ext. 198	Business Editor/GM Journal
Michele Kramer Peterson	ext. 149	Studio Sessions Editor
Thomas R. McGinley	—	Technical Adviser
Alan Peterson	—	Technical Adviser
T. Carter Ross	ext. 120	Editor-In-Chief (International)
Marguerite Clark	—	Editor (International), Milan
Rogelio Ocampo	ext. 121	Latin America Editor in Chief
Karina Gerardi	ext. 137	Latin America Editor
Renata Beck	ext. 196	Latin America Assistant Editor
Michael Hedrick	ext. 146	Buyer's Guide Editor
Terry Hanley	ext. 130	Administrative Assistant
Peter Finch	—	Editorial Assistant, Milan

—EDITORIAL CONTRIBUTORS—

W.C. Alexander, Bruce Bartlett, Frank Beacham, John Bisset, Read Burgan, Naina N. Chernoff, Harry Cole, Troy Corner, Vince Ditingo, Mark Durenberger, Ty Ford, Scott Fybush, Harold Hallikainen, Paul Kaminski, Peter King, Mel Lambert, Mark Lapidus, Carl Lindemann, Ted Nahil, Tom Osenkowsky, Ken R., Rich Rarey, Bruce Rogow, Randy Stine, Steve Sullivan, Travis the V/O Guy, Barry Umansky, Tom Vernon.

Radio World

Vol. 25, No. 22 October 24, 2001

Telephone: (703) 998-7600 • Business Fax: (703) 998-2966 • Editorial Fax: (703) 820-3245
E-mail: radioworld@imaspub.com • Web site: www.rwonline.com

—ADVERTISING SALES REPRESENTATIVES—

US Southeast & Mid-Atlantic: John Casey	330-342-8361	Fax: 330-342-8362	e-mail: jdcasey@imaspub.com
US Northeast & Central: Sandra Marcum	765-966-0669	Fax: 765-966-3289	e-mail: ads4sales@aol.com
US West: Dale Tucker	916-721-3410	Fax: 815-352-1698	e-mail: dtucker@imaspub.com
Classified Ads: Simone Mullins	703-998-7600 x154	Fax: 703-671-7409	e-mail: smullins@imaspub.com
Germany, Austria: Dagmar Hähle	+39-02-7030-0310	Fax: +39-02-7030-0211	e-mail: dhanle.imaspub@tin.it
France: Silvia Di Stefano	+39-02-7030-0310	Fax: +39-02-7030-0211	e-mail: sdistefano.imaspub@tin.it
European Sales Mgr., Africa, Middle East: Raffaella Calabrese	+39-02-7030-0310	Fax: +39-02-7030-0211	e-mail: rcalabrese.imaspub@tin.it
Japan: Eiji Yoshikawa	+81-3-3327-2688	Fax: +81-3-3327-3010	e-mail: callers@msn.com
Asia/Pacific: Wengong Wang	+86-755-5785161	Fax: +86-755-5785160	e-mail: wwg@imaschina.com
Latin America: J.O. Lima e Castro	+55-11-3873-1211	Fax: +55-11-3673-1499	e-mail: limcas@uol.com.br

NEXT ISSUE OF RADIO WORLD NOVEMBER 7, 2001

For address changes, send current and new address to RW a month in advance at P.O. Box 1214, Falls Church, VA 22041. Unsolicited manuscripts are welcomed for review: send to the attention of the appropriate editor.

World Radio History

—ADMINISTRATION & PRODUCTION—

Stevan B. Dana	President/CEO
Carmel King	VPI Group Publisher
Marlene Lane	Editorial Director/COO
Chuck Inderrieden	Production Director
Eric Trabb	Sales & Marketing Director
John Casey	Associate Publisher
Lisa McIntosh	Circulation Director
Annette Linn	Production Department Manager
Kathy Jackson	Ad Traffic Manager
Sheryl Unangst	Circulation Director
Robert Green	Circulation Manager
Amy Gutowski	Marketing Manager
Alexander Sisson	Accounts Receivable

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 Joanne Munroe, P.O. Box 1214, Falls Church, VA 22041; (703) 998-7600; Fax: (703) 998-2966. Copyright 2001 by IMAS Publishing (USA), Inc. All rights reserved.

—Printed in the USA—

AUDITRONICS

tel 252-638-7000/fax 252-635-4857/sales@auditrnics.com

www.auditrnics.com

Copyright © 2001 by Whitestone Corporation

- FULLY modular
- All electronic switching
- Separate mic & line inputs
- Eight or twelve input channels
- Two stereo Program busses
- Two Mono/Mix-minus busses
- Full-featured monitoring
- Twin VU meter pairs (PGM & switched)
- Opto-isolated control logic
- Built-in cue and headphone amps



IT'S NEW — IT'S A BARGAIN — AND IT'S MODULAR, giving you any combination of mic, line or accessory modules. It's also INSTALLER FRIENDLY, with a hinged meterbridge that opens wide for direct access to connectors, trimmers and logic switches. Onboard cue and headphone amps keep you in budget. BEST OF ALL, you can have this **AUDITRONICS** tough-as-steel quality for **\$3995!**

AUDITRONICS SERIES 2600

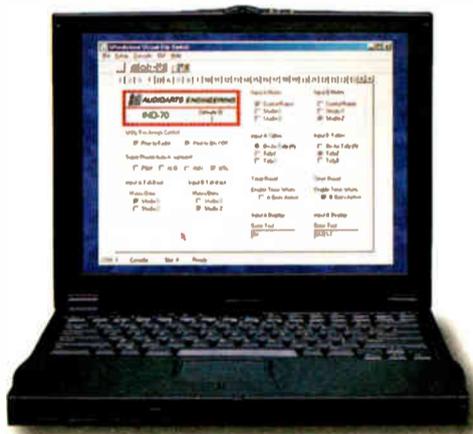
World Radio History

AUDIOARTS DIGITAL D-70



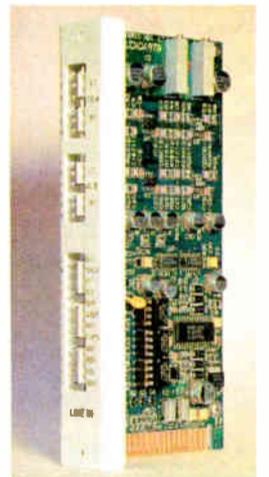
The D-70 digital console from AUDIOARTS not only utilizes the latest in digital technology and chip sets, it can be ordered with a serial interface that lets it integrate with most popular automation systems and station routers; it even has WHEATSTONE's exclusive VDIPTM software system.

Plug-in modules let you have any combination of mic, analog or digital line inputs, and the 4 stereo buses give you plenty of flexibility (each has both digital and analog outputs). With sample rate conversion on all digital inputs plus selectable console clock rates of 32, 44.1 or 48KHz (and an optional external house sync) the D-70 can fit right in with all your facility's present equipment.



WHEATSTONE'S VDIPTM Virtual Dipswitch Software lets you configure D-70 input channels with a laptop computer. Once configured console runs stand-alone.

With a compact, tabletop-mount footprint and a modular rear connector system that utilizes plug-in submodules for easy analog-to-digital field switches, the D-70 can be configured onsite quickly and easily. On the functional side, fullscale digital peak plus simultaneous VU metering, LED illumination everywhere, built-in machine interface, automatic timer and clock (stand-alone or ESE slave) all come standard, along with separate source selection for control room and studio plus built in talkback. You can even order the D-70 console with a SUPERPHONE module to support two callers with automatic digitally generated mix-minus. Both digital and analog line selector panels are also available.



THE D-70 DIGITAL AUDIO CONSOLE—benefit from WHEATSTONE's experience—at an AUDIOARTS price!