

◆ NEWSWATCH ◆

Tower Worker Dies in Fall

PHILADELPHIA The Occupational Safety and Health Administration is investigating a tower accident in which a worker fell to his death in November.

According to several sources, an employee of Philadelphia-based Skyline Tower Service was killed Nov. 10 while installing a digital TV antenna on a tower owned by NBC television station WCAU. Officials for WCAU and CBS-owned WOGL-FM,

which leases antenna space on the tower, said several people were working on the tower when the accident occurred.

Philadelphia police identified the worker as Steven Bailey, age 42.

WOGL Engineering Director Janet Kowalczyk said the worker was pulling a copper DTV transmission line up from the ground in order to secure it at the 800-foot level. The tower is approximately 1,139 feet tall. Service for WCAU and WOGL-FM was not interrupted by the accident.

Kowalczyk said the worker slipped at about the 600-foot level and fell some 100 feet onto a metal platform

below. Several sources said it appeared the man died instantly. Skyline had no comment.

A spokeswoman for OSHA said cases involving a fatality typically take at least two months to investigate.

Pittsburgh Pirate Shut Down

PITTSBURGH Officials from the FCC, U.S. Marshal's Service and the U.S. Attorney's Office seized equipment that they said was used for operating an

unlicensed radio station here on 91.7 MHz in late October.

The FCC said it had warned the unlicensed operator, identified as Mark Lange, several times to shut down the operation.

Hundt Joins Buyout Firm

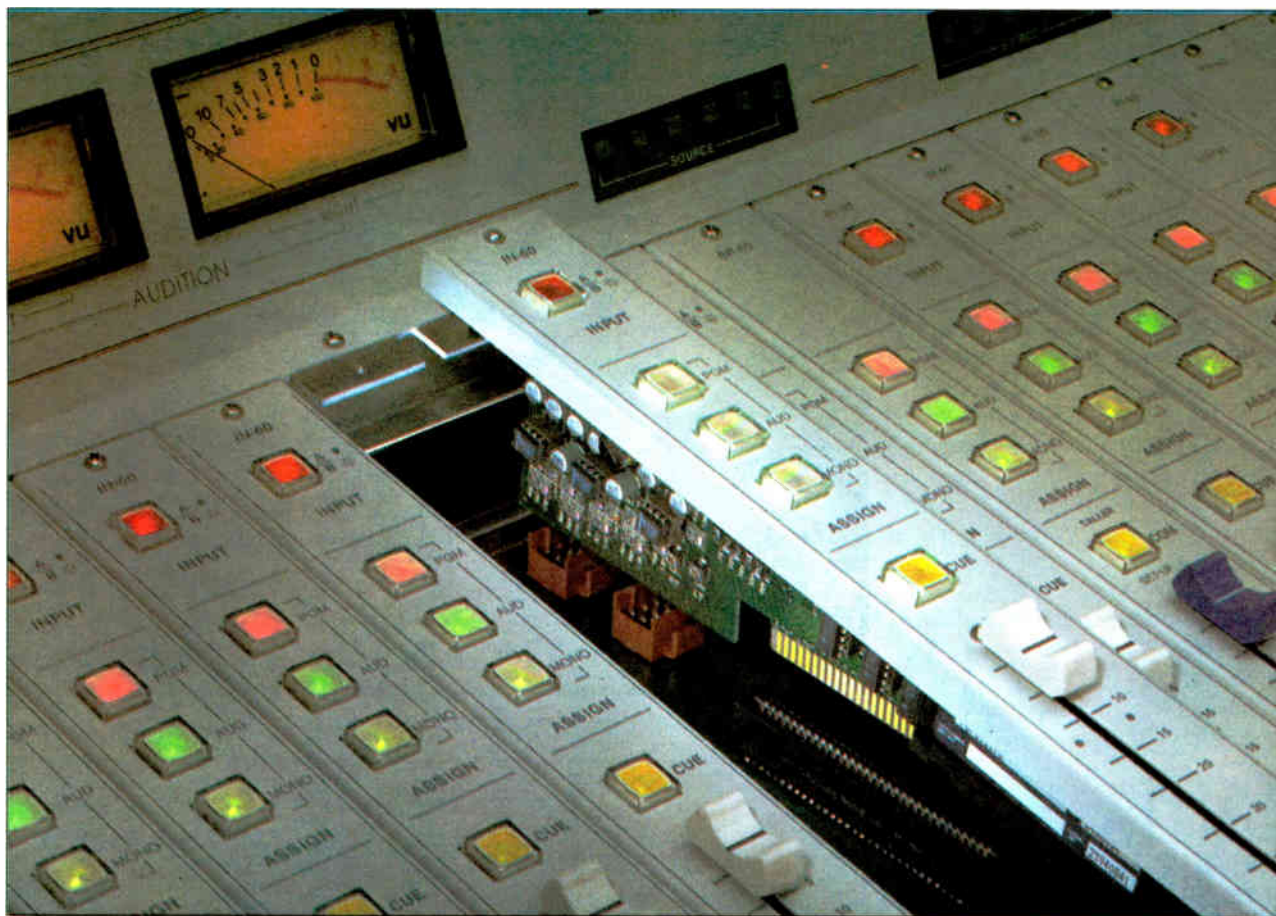
Former FCC Chairman Reed Hundt has become an adviser to the Chicago-based venture capital and buyout firm Madison Dearborn Partners Inc.

Hundt, who left the FCC in 1997, will advise the company on regulatory and industry trends in telecommunications.

MDP President John Canning said, "Our communications team has enjoyed working closely with Reed over the past year, and we are delighted to formalize our relationship with him. We think Reed's special insights into the changing telecommunications environment will add enormously to our efforts in the sector."

See NEWSWATCH, page 3 ▶

Take a LOOK at THIS:



Then look at our competition.

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

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

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

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

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

 **AUDIOARTS® ENGINEERING**

Index

FEATURES

Weather: True Local Content
by Val Davis 20

ATI Turns to Digital DAs
by John Penovich and Abner Mir 22

On the Road With Frank McCoy
by Frank McCoy 23

Workbench
by John Bisset 30

Behind the Scenes at Premiere Radio
by Barry Victor 36

GM JOURNAL

Radio Disney Matures With Kids
by Dee McVicker 39

Arbitron's Study: A Closer Look
by Laurie Cebula 39

AAHS to ABC: Might Doesn't Make It Right
by Dee McVicker 40

YZK: A Broadcaster's Strategy
by Dorann Bunkin, Esq. 41

Okay Folks, Time to Give Me a Big Hug
by Alan Haber 46

STUDIO SESSIONS

Zoom 1201: Simple Can Be Fun
by Ed LaComb 51

OnStage Soundcard Rides the PCI Bus
by Carl Lindemann 51

Everybody Must Get 'Stoned'
by Alan R. Peterson 52

Pair of Books Explain Net Audio
by Tom Vernon 52

Clock Wars: Going Down the Sync
by Mel Lambert 53

Software May Save Damaged Data
by Read G. Burgan 55

NEWS ANALYSIS

Radio Buyers Eye Master Deals

Master Purchase Agreements Raise Fundamental Questions About the Equipment-Buying Process

by Randy Stine

The radio industry is starting to take notice of some differences in the way radio groups and vendors conduct business. Consider the master purchase agreement, or MPA.

While customer-friendly purchasing agreements have been around for a long time, some managers say that in this consolidation era of fewer, larger radio groups, the stakes are higher and rewards bigger for vendors that can secure such contracts. They demonstrate the desire of some ownership groups to centralize their corporate engineering purchases and take advantage of their increased buying power.

With reports of a post-consolidation infrastructure boom in the industry, these questions are sensitive and central to how engineers do their jobs.

How widespread such contracts are is difficult to gauge. Buyers and sellers often prefer that the specifics of such contracts be kept private. Such agreements also may prove controversial in the engineering fraternity. Some local engineers worry that they will find their decision-making power shifted to the corporate office.

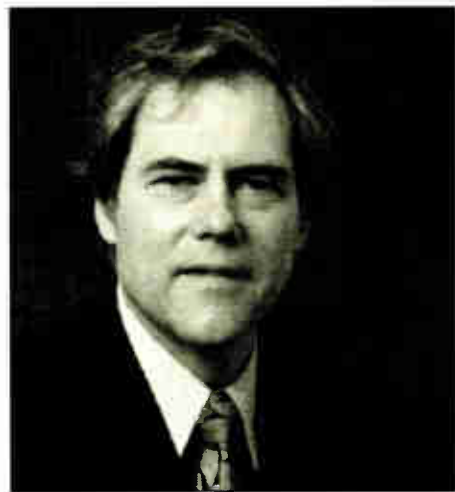
Market power

Suppliers are well aware of the potential buying power of large radio groups, and some companies are pursuing master agreements more actively than others.

For example, the Broadcast Division of Harris Corp. recently announced the signing of three major radio ownership groups to master purchase agreements. Harris said it won MPAs with Cumulus

Media Inc., Capstar Broadcasting and Chancellor Media. Not all of these deals are exclusive.

Harris presents an interesting case study, because it is both a manufacturer and a distributor of a range of radio products.



Terry Baun of Cumulus

Jim Woods, vice president of radio broadcasting for Harris, said the marketplace certainly has changed since consolidation.

"These new agreements are much more formal than what we were used to seeing," Woods said. "And I think they reflect a change in philosophy of the operator groups to standardize ordering and to get better service."

Distributors tell *RW* that broadcast clients today seek value-added features and benefits, like free training seminars for engineers, direct exclusive 800 numbers for service and discount group rates.

Of the deals announced by Harris, the only exclusive one is with Cumulus. In the three-year deal, the Milwaukee-based broadcaster agreed to buy all its radio transmitters and related studio equipment from Harris in exchange for what is called "preferred pricing." The only item not covered in the agreement is hard-disk mass storage items.

Terry Baun, vice-president of engineering for Cumulus, said the MPA makes life simpler for his chief engineers in the field while it saves the company money.

"I believe it to be a win-win deal," he said. "This really helps with our centralized purchasing plan. Our engineers can still get everything they like; they'll just be dealing with a different supplier in some cases," he said.

As part of the agreement, Harris will provide training for Cumulus engineers and has installed 800 numbers that only Cumulus stations can call for technical assistance.

"Pricing wasn't the only thing we were looking for," Baun said. "We did this deal because it was in the best interest of Cumulus. With the Harris MPA, we know who our stations are dealing with."

The Capstar and Chancellor MPAs are non-exclusive. The companies will merge soon. The new Chancellor will own almost 500 radio stations by the second quarter of 1999. With its MPA, Chancellor agrees to use Harris to supply Harris RF equipment and other vendor-supplied equipment on a non-exclusive basis.

"We are not locked into using Harris," said Chancellor Media Director of Engineering Jeff Littlejohn. "We can and will price-check just about everything. We do expect to satisfy the majority of our equipment needs through Harris. The price levels we are guaranteed at a certain number of units purchased will be tough to beat."

Chancellor has similar purchasing agreements with Pacific Research & Engineering and Broadcast Electronics.

Littlejohn said Chancellor first approached Harris with the idea of a group deal more than a year ago.

"It makes sense to do something like this. We know we have a ton of purchasing power. We are looking at some major overhauls to our stations and we'll need big-ticket items for those upgrades," he said. "Those group discounts will save us money."

The non-exclusive MPA with Capstar covers Harris analog and digital transmission equipment, including the Z CD solid-state and HT CD single-tube FM transmitters. "That is what we use almost exclusively anymore for our FMs anyway," said Mark Stennett, Capstar vice president of engineering. Stennett said Harris had pursued Capstar with this agreement for more than a year.

Harris, Stennett said, will provide Capstar with "radio broadcast equipment and related services at fair prices in

exchange for certain levels of participation by the company."

"We don't want to lock ourselves in with only one vendor. We'll always price-shop. We believe that competition is a good thing and we won't be afraid to buy from other suppliers," Stennett said.

Local voices

With purchase decisions out of their hands in some cases, will engineers react negatively when told they can only shop one supplier?

Chancellor's Littlejohn doesn't want to take all buying responsibility out of the hands of the engineers in the field. "They can use this as a tool. But, we certainly have people at our stations qualified to make buying decisions on their own," he said.

Not all radio groups and vendors are pursuing purchase agreements. Five major radio groups contacted for this story — Cox Radio Inc., Susquehanna Radio Corp., Entercom, CBS/Infinity and Greater Media — all said they do not have any purchase agreements and had no plans to pursue such.

"With the way technology changes so fast, I would fear being locked into a deal with one supplier," said Milford Smith, vice president of radio engineering for Greater Media. "And just because we don't have a written agreement with someone doesn't mean we don't try to cluster stuff together to increase our buying power when the time is right."

Many engineers do not see the value in non-exclusive purchase agreements.

See BLANKET, page 12 ▶

WHAT COMES AFTER DIGITAL?

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

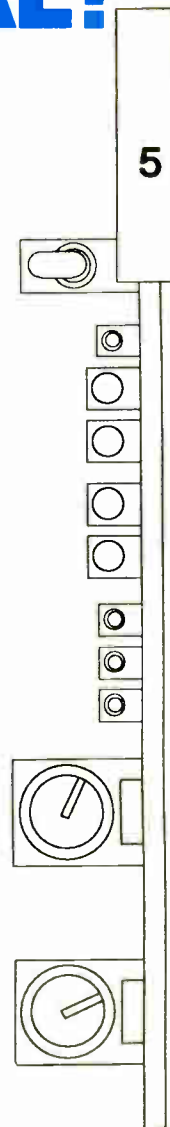
Certainly the stone wheel must have looked to the caveman to be the greatest discovery that ever could be. And to the simple farmer of the 1800's, the steam engine was the most modern contrivance that his mind could imagine. But neither was a terminal technology. Both have been replaced as time marches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

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

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

CLARK
COMMUNICATIONS

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



Readers Have What It Takes

Some issues back, I wrote that many broadcast owners are in need of good technical talent, even as many engineers bemoan a perceived lack of employment opportunities.

Readers replied to my invitation to write for the names of prospective employers. Their comments give insight into the breadth of experience out there. If you are in the job market, too, you will find it interesting to know what kind of experience your colleagues are putting on their résumés.

The DOE of a small group of stations (these days, "small group" can mean a half-dozen) writes that he is an SBE Certified Professional Broadcast Engineer with extensive high-power RF experience in AM, FM and shortwave transmitters and antenna systems. He mentions computer experience and willingness to relocate as assets. I agree; those factors make this engineer a promising candidate.

A person with more than a decade in the military and several years in AM radio wrote, "I wonder if the large companies would be willing to pay for the move, if I were willing to relocate. Since I have essentially zero experience dealing with civilian companies except for my recent broadcast work, I haven't looked into what companies will and won't pay for. I guess the military spoiled me in that regard!"

My guess is he is correct, but don't jump to the conclusion; every group is different, and larger employers are discovering the need to offer aggressive inducements to good talent. If you have a lot in your favor, ask about creative ways to overcome your doubts.

A former group engineer tells of his experience installing and aligning satellite uplink and downlink systems, working with a four-tower AM DA, tuning, repairing and proofing. This engineer has installed various brands of remote control, and has documented studio, transmitter and production facilities. He has configured Internet connectivity, and handled networking including Windows for WorkGroups, Win95/98, NetWare, WinNT, LANtastic and UNIX. He has

done cabling installation and repair of Thick and Thin Ethernet, UTP, fiber optic, and standard RF coaxial connectors on nearly all cable types. And to boot, he's "fluent in various forms of OS/2, Windows, DOS and MacOS, and familiar with SCO, AIX, UIX, BSD, MPE, RTE and Linux."

Whew! Give that man a contract!

Good money

One engineer has 33 years in the business, including five as a field service engineer for a major supplier. "One of my requirements is I need good money."

Replies reveal a breadth of job experience and interests — including young people who want to go into radio engineering.

this reader wrote.

(At this point the reader might be tempted to reply, "Me, too, but this is radio!")

Not every response was from a person with decades of experience.

A college student in the south writes, "I want to become an engineer. While I am not experienced with commercial broadcast stations, I am willing to learn. I have experience with sound recording and production and some technical workings of a station, such as transmitter and antenna/tower maintenance. I'm well versed in various audio standards and have used most of them in a broadcast situation. I'm a student in Communications, Music Industry and Recording."

Those are the kind of comments that encourage me most — from enthusiastic young people.

One reader was pleased to read that Frank McCoy, head engineer of GulfStar, is willing to hire less-experienced people with good attitudes, and train them.

"While I have been in radio about three years, and have worked with several full-time CEs in everything from studio construction to transmitter repair, I consider myself 'inexperienced' as I have

not held an engineering job," he wrote. "I've done on-air, promotions, production, traffic and been paid for that, but never to dig into the good stuff! I would really appreciate if you could pass along contact info for Frank or anyone else who might be looking for an eager young lad to take under their wing."

And my favorite part: "Thanks so much!! I love the publication — I read it cover to cover every time!"

I sent these readers the names of several group engineers who are seeking technical help. I also pointed them to the SBE's job postings at www.sbe.org and to

our own classified *Help Wanted* ads in the back of *RW* and at www.rwonline.com

Good luck to all who replied.

★ ★ ★

Here's another success story about a broadcaster-turned-supplier. CBSI is celebrating its 20th anniversary.

Vice President Steve Kenagy said the founders started out running a radio station in Reedsport, a small town on the central Oregon coast.

"Our chief engineer, Wes Lockard, wrote a program to computerize our program log and we couldn't believe how much time and tedium it saved. We started getting inquiries from nearby stations. So we took the system to the Oregon Association of Broadcasters meeting in October of 1978 and sold our first six systems."

How far we've come in 1998: The original CBSI traffic system was written to run on Wang computers, evolved to DOS and then to Windows. CBSI is on its third-generation Windows system. The company has

From the Editor



Paul J. McLane

earned a lot of attention this fall with its new Digital Universe audio management system, which was written for a client/server Windows NT platform and supports uncompressed audio.

The company was founded by brothers Jerome Kenagy, the president, Steve Kenagy, vice president of sales and marketing, and John Kenagy, vice president of administration, with associate Wes Lockard, now the vice president of development.



A supplier celebrates 20 years serving broadcasters.

The company remains in Reedsport, where it is one of the top three employers. CBSI has a staff of more than 100 and serves 3,000 clients. Kenagy had words of thanks for its supporters.

"We'd like them to know we appreciate all the 20th anniversary wishes they've been sending in our direction this year, and value their friendship as well as their business."

Burk puts you in control.



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

BURK
TECHNOLOGY

Toll Free 1-800-255-8090 • email: sales@burk.com

With
NEW
AutoPilot
FOR WINDOWS

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

◆ READERS FORUM ◆

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

Play by the rules

Dear **RW**,

I have no sympathy for radio pirates. A rule is a rule — if you don't like the rule, get it changed. It is that simple.

It does not matter if it is broadcast or shortwave, the same rule applies. If you want to broadcast, get a license.

Again, it is that simple. I'm sorry, but those of us who play by the rules often pay the price for those who don't.

*Bill Lambing
Field Service Engineer
Greenwood, Ind.*

Not-so-Perfect Paul

Dear **RW**,

The synthetic "voice" of the National Weather Service's Perfect Paul (**RW**, Oct 28) resembles the

accent of a Germanic dialect.

It has trouble sounding consonants.

Perhaps a speech pathologist could identify its objectionable qualities and recommend how to clean it up. There are good contacts at Emerson College, Boston, and Northwestern University at Evanston, Ill. It's worth a try.

Could be a great publicity gimmick: "Weather Service Computer 'Voice' Rebuffed by Radio Broadcasters."

"Radio Broadcasters Turn Off Weather Service Computer Voice."

"Weather Service Computer 'Voice' Is a Turnoff. Say Broadcasters."
*Richard W. Fatherley
Voice-Over Guy
Kansas City, Kan.*

No reason to return

Dear **RW**,

Re: "Know Any Good Engineers?" (**RW**, Oct. 14).

Yeah, and they now work for Microsoft!

Surprisingly, many of my workmates have been in radio. The consensus is this: We haven't been given a reason to return to our first love. And with online broadcasting becoming more popular and available, I expect more defections.

Radio could fall farther behind on-air and cable TV. Content online will continue to be more creative, accessible, selective, downloadable and portable than the "bankers" will allow on-air (I miss the "broadcasters").

After 16 years in radio, I find the skills I have put much effort into developing are in demand by other industries. The compensation has been better, paycheck size aside. For example, I am assisted in the acquisition of more skills and education (at no cost, reimbursement or discount). My high-school-aged coworkers are paid more than their friends who are obtaining, and have, degrees — and they don't pay for their education, it's provided for.

Pray Bill Gates doesn't get a signal.

*"Slick" Mike Edmonds
Engineer
Tucson, Ariz.*

AP and John Glenn

Dear **RW**,

I was disappointed to see a significant omission in the article "Radio Follows John Glenn Aloft" (**RW**, Oct. 28). There was no mention of the Associated Press's broadcast coverage of the historic events. AP Broadcast News Center's two radio networks covered the event thoroughly, providing feeds to more than 3,500 affiliates.

AP All News Radio and AP Network News dispatched a team of veteran space reporters and anchors to cover this historic launch and mission. The launch reunited the team of Bob Moon and Dick Uliano, two of the voices behind AP Broadcast's historic and compelling live coverage of the Challenger launch in 1986. Veteran shuttle launch reporter Tony Winton joined them at the Kennedy Space Center.

Live reports aired on AP Network News and AP All News Radio beginning with morning-drive newscasts the day of the launch. Special live "Update"

Tell Your Story

You own a big bullhorn. Are you using it to tell your story?

Earlier this year, the NAB began a campaign to educate the public and legislators about the tremendous community service activities of broadcasters. It said stations contributed \$6.85 billion worth last year, through donated airtime for PSAs, debates and convention coverage, and in money raised for charitable causes.

This campaign makes sense. Broadcasters have come under fire from interests claiming that radio and TV owners enjoy unfair, free use of valuable spectrum. Our community service contributions are an important part of the answer to that challenge.

But groups and owners can do much more than they do, to trumpet their contributions.

Did your station provide an important service to your listeners during the recent fires in Florida or the hurricanes of autumn? Did you give hours of air time to candidate debates and special election coverage? Did your traffic reporter help inform the police about an emergency? How much money did your morning team raise in their week-long food drive?

Individual stations should use the same techniques that large companies do, to promote their good works. Assign a person the responsibility of promoting your public service. Develop a short list of important print and TV journalists, and send them your press releases and newsletters. Take your local legislator to lunch and explain how your station helps the community. Write a guest commentary for your local newspaper. Speak to clubs and organizations in your area, many of which are eager for new topics and speakers for their meetings. Talk to your broadcast association about developing a statewide PSA that highlights the contributions of its members.

And while you're doing all that, don't forget to create your own promo spot for use on your own station, explaining the good work your staff does. In other words, use the bullhorn you already have.

Radio public service is far more than Sunday morning programs and overnight PSAs. We can do a better job of explaining how *much* more.

— **RW**

Cheap is not good

Dear **RW**,

I read with great interest your issue on transmitters (**RW**, Oct. 28). My partner Mike Baldauf and I are contract engineers for seven stations in southern Colorado. Over the past four years, we have installed or moved five transmitters and purchased four others for clients. We also work for the local community college: Mike heads the electronics department and I teach broadcasting and manage the campus radio station. Our experience has been: cheap is not good.

My college station chose a Gates transmitter. We recently brought over a 5 kW Harris SX-5 and dplexed them at my site. Both transmitters work happily

segments aired at 30 minutes past each hour, beginning two hours before the launch. Additional live coverage aired in every regularly scheduled news block.

Continuous live coverage also aired on AP Broadcast's value-added long-form programming channel, AP HOTLINE. Live programming began five minutes before liftoff and ran through the critical MECO (Main Engine Cutoff) about nine minutes after launch.

AP HOTLINE also marked Glenn's historic return to space with a 25-minute documentary called "Godspeed Discovery." The special program included historic archive audio from Glenn's first mission orbiting the earth, as well as exclusive new interviews with Glenn, NASA officials and critics of the current mission. The special was pre-fed to affiliates the day before mission and kicked-off launch-day coverage. It segued directly into our live launch coverage.

*John K. Jones
Manager of Marketing Communications
Associated Press Broadcast News Center
Washington, D.C.*

together and the SX-5 has been virtually trouble-free since we installed it in an older directional system in 1986.

The latest is a Nautel 1 kW at a three-tower DA-2. Add to the list a Harris FM-35K and two BE transmitters.

I will not mention the last FM transmitter by name, but it was the cheapest of the bunch. Admittedly the installation was equally cheap, but the unit has a very bad track record.

We have redesigned the low-voltage power supply, which has self-destructed twice, and we now keep our fingers crossed it stays on the air.

The bottom line: you spend only a little more for top-of-the-line equipment and your reliability takes a quantum leap. Even on tight budgets, well-designed sites and good equipment pay off every month you stay on the air and sound like you care.

*Dan Thomas
Contract Engineer, General Manager
KKPC(AM)
Pueblo Community College
Pueblo, Colo.*

Correction

The third-quarter financial story and chart in the Oct. 28 issue failed to mention two significant stock splits that occurred during that quarter.

Stock in the Walt Disney Company (NYSE:DIS), owner of ABC Radio, traded for \$106-1/4 a share at the beginning of the third quarter. The company did a three-for-one stock split during the quarter and its stock finished the quarter at \$25-3/8.

Clear Channel stock (NYSE:CCU), which traded for \$111 at the beginning of the quarter, split in late July and closed the quarter at \$47-1/2 per share.

Radio World

Vol. 22, No. 25 December 9, 1998

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

Paul J. McLane ext. 117	Editor
Sharon Rae ext. 126	Managing Editor
Alan Peterson ext. 135	Technical Editor
Leslie Stimson ext. 129	News Editor/ Washington Bureau Chief
Laurie Ann Cebula ext. 198	Business/ GM Journal Editor
Brian Galante ext. 146	Assistant Editor
Thomas R. McGinley	Technical Advisor
Stevan B. Dana	Publisher/CEO
Carmel King ext. 157	Chief Operating Officer
Robert "Skip" Tash ext. 160	Associate Publisher
Marlene Lane ext. 128	Editorial Director
Alan Carter ext. 111	Editor in Chief (International)
T. Carter Ross ext. 137	Editor (International)
Christine Joaquim ext. 138	Managing Editor (International)
Rogelio Ocampo ext. 121	Latin America Managing Editor
Marguerite Clark	European Editor
Brooke Abernethy ext. 130	Editorial Assistant
Linda Sultan ext. 141	Editorial Assistant

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

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

POSTMASTER: Send address changes to Radio World, P.O. Box 1214, Falls Church VA 22041. REPRINTS: Reprints of all articles in this issue are available. Call or write Michael Crosssett, P.O. Box 1214, Falls Church, VA 22041; (703) 998-7600; Fax: (703) 998-2966. Copyright 1998 by IMAS Publishing (USA), Inc. All rights reserved.

—PRINTED IN THE USA—

**Next Issue of Radio World
December 23, 1998**

Northwest Show Draws a Crowd

by Paul J. McLane

BELLEVUE, Wash. More than 2,000 people attended the Electronic Media Expo, sponsored by SBE Chapter 16 in Seattle. The exhibit floor this year was oriented heavily toward television, perhaps due in part to the timing of The NAB Radio Show in Seattle just two weeks before, and in part to the lucrative market suppliers see in digital TV.

The Chapter 16 conference is a popular one. Many exhibitors called it the best regional broadcast engineering event. Indeed, during the expo, its sponsors accepted an award from the Society of Broadcast Engineers for best conference in 1997.

Show chairman Earl Fleehart said about 20 percent of attendees and 22 percent of exhibitors were radio-oriented. He expressed pleasure with the overall turnout.

"Our attendance was 2,386," Fleehart said. "We do not count students, but there were at least 200 of them. We consider this to be an important number, as they represent the future of broadcast engineering."

Many exhibitors regard themselves as suppliers to other markets, not strictly to radio or TV. And many reported a robust business environment.

Floor themes

"There's just a lot of building that's going on up here," said Whitt Adams, regional sales manager for rack maker Stantron. "My product falls into that, either new headends, rebuilds of schools, I do a lot with Microsoft as well. This is a good show because there's a lot of dealers that come to the show; and you get a lot of end users from radio and TV stations. It's the strongest chapter of SBE that I know of in the country."

Formerly Zero Stantron, the product line was acquired recently by Wisconsin company Applied Power Inc.

A walk of the exhibit floor revealed trends that have become familiar themes at other shows: digital technology, the possible impact of DAB, competition for space on towers and the effects of radio consolidation.

Antenna supplier Scala Electronic Corp. exhibited at the expo for the first time. Sales Engineer Everett Helm said, "The big activity in radio that we deal with is (in) low power, the translators and the Class As and the fill-ins and the drop-ins. There's a lot of that kind of activity. I'm not sure what's driving that."

"It used to be (a broadcaster) covered the major markets, the metro areas of your location, and if there were 5 or 10 percent of the viewers or listeners that were outside the area that you covered real well, it was no big deal. You got 95



Visitors stop by the booth of Belden Wire & Cable.

percent of them," Helm said. "Nowadays, everybody's going after every pair of ears. If they have to spend a little money to bounce a signal over this hill, to pick up this other little community that's supposedly part of their coverage area, they're doing it."

Fewer clients to visit

Suppliers acknowledge that consolidation has changed the way they sell.

"When I took this job, I noticed that immediately," said Walt Lowery, who recently joined Harris Corp. as a district radio sales manager. "It used to be that when you went to a city as a (salesperson), to Boise or Spokane, you'd plan on staying there a week, to make the

rounds of all the stations, the AM/FM combos. Recently I went to Spokane. I was done in a day, because there were only two or three guys in the market who were engineering decision-makers worth seeing."

And fewer engineers

"The consolidation is bringing the standardization of equipment," Lowery said. "A group will standardize on a part. A transmitter for their FM (stations), for their AMs. More decisions (are) made away from the actual sta-

tions, on a corporate level. The competence level of the engineers that are in charge is higher, but there's fewer of them."

Scott Slocum, western division sales manager for Computer Concepts, said customers are asking for better, simpler graphic user interfaces in the computer products they buy.

"They need screens that are easily understandable because they have so many different people coming in; there's also a lot of interest in sharing audio between sites, because of all the consolidation. ... We've had a lot of interest from people who want to do WANs with us, or want to easily ship audio from one site to another."

Slocum said the Internet is becoming a more important tool for moving audio around.

"We do have people who use the Net to ship voice-tracks from one site to another," he said. "Typically, when we record voice-tracks, we like to be able to hear the songs we're recording, and it's hard to do that in real time from a site that may be elsewhere on the Web. But some people will have the music at the recording site, as well as the target site, so they can record the voice-tracks, send the dry voice-track by Internet or whatever means they choose to the downlink site."

Digital has made its way down to the level of wire and cable. Gepco International introduced four new digital audio cables and promoted them here.

"Digital is the trend, what everyone is going after — the manufacturers, the FCC," Western Regional Account Manager Mike Yaffe said. "We're just filling in the blanks, the nuts and bolts that make all this equipment link up to one another."

What sets digital audio cable apart?

"The makeup is different," Yaffe said. "The twists per inch are a little bit tighter. They have to remain more constant to keep the 110-ohm impedance, as well as the outer conductors on each conductor — the actual material around each copper conductor — has to be a little bit thicker. Which, again, gives you that 110-ohm impedance in the consistency you need throughout a cable, as it's being pulled and stretched."

Tubes remain

With all the interest in digital products, was it a surprise to see a power tube rebuilder exhibiting?

"I guess you'd call it a dying technology," said Joseph Freeland, president of Freeland Products. "But unless there's a new major breakthrough in solid-state devices, tubes are going to be around for a good while. And though the low end is being taken over by solid-state devices, the higher frequency and higher power are still very viable for tubes. We'll be around for awhile."

"AM is being gobbled up by solid-state," he said. "All the new transmitters that are being sold nowadays are solid-state. Even in FM it's slowly being taken over. (But) most of the major manufacturers still make a single-tube transmitter; TV is still using the IOTs and klystrons and other higher-end types of devices. And shortwave is also using big tubes."

Radio equipment suppliers are well aware of the research into digital audio broadcasting. But are the questions surrounding the possible implementation of DAB affecting the buying of equipment? On that, suppliers disagree.

"Yes," said Lowery of Harris. "Within the last few months, I've had some people that are postponing decisions. I've had one guy who bought a used transmitter rather than a new one, because of the uncertainty of DAB."

But other suppliers told RW that a DAB system for the United States is too hypothetical, that clients are not delaying their buying decisions.

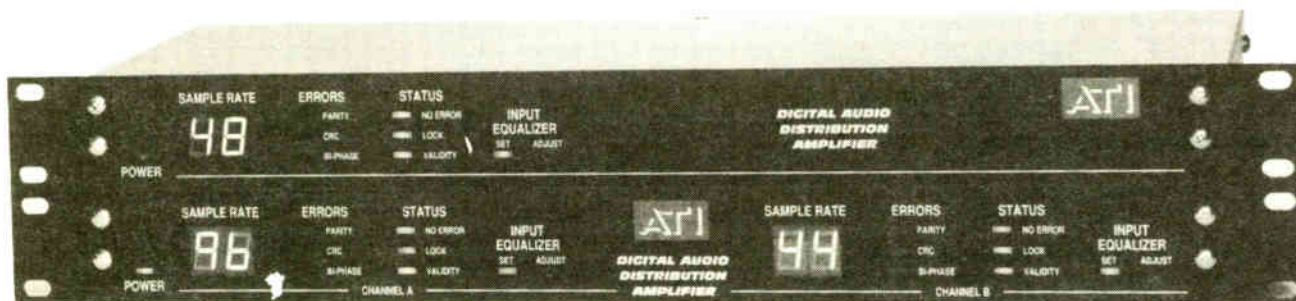
The man responsible for the Electronic Media Expo is skeptical about DAB.

"I don't see where radio benefits from digital transmission," show chairman Fleehart said. "In radio, multipath isn't as much of a factor (as television), and you have many millions more receivers."

AES/EBU DIGITAL AUDIO DISTRIBUTION AMPLIFIERS

DDA106-XLR (1X6)
DDA112-XLR (1X12)
DDA206-XLR (Dual 1X6)

DDA112-BNC (1X12)
DDA124-BNC (1X24)
DDA212-BNC (Dual 1X12)



- Accepts sample rates from 27 to 96kHz
- Data reclocking and regeneration
- Loop-thru inputs with switchable terminations
- Transformer balanced inputs
- Adjustable Input cable equalization
- Sample rate, Status and Error indicators
- Up to 12 XLR or 24 BNC outputs



AUDIO
TECHNOLOGIES
INCORPORATED

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

SBE Enjoys Interest

► SBE, continued from page 1

RW: Why Madison in particular?

Miller: Our concept is pretty simple: "East Coast, West Coast, Central." We didn't want it always to be lopsided, west or east coast.

Madison has been up-and-running for 40 years. Pittsburgh has been around 27-plus years. There's a combination of the economics involved (in the decision), ease of which board members can get there, geographic fairness ...

RW: Now that World Media Expo is behind us and you've had a couple of years of rotating the site of your national meetings, how is this approach working?

Miller: I think it's working very well. It brings to the local level some higher-end exposure to the national board, who probably would not (otherwise) have an opportunity to meet these people.

It can have a good effect on the local chapter, in that it may generate a little more interest in attendance.



Edward Miller

RW: Do you feel you gave anything up by going away from the WME concept? It seemed to bring in more people.

Miller: We did well with World Media Expo. Over three years, our attendance got better each time. So we were disappointed when it went away.

A lot of people asked, right after it happened, how we would replace it. That's when the idea of getting out in the country was formed, and it has worked out well for us.

RW: You announced a youth program earlier this year. Where does that stand?

Poray: It's started pretty well. We kicked it off Aug. 1.

Back in May, we sent letters to introduce this concept to more than 300 high-school-based radio and TV stations, to their instructors or advisors, (stating): "When you thinking of starting off in the fall, keep us in mind. We're going to send you more information in August, specifics about how to get students who might have an interest in the technical side of broadcasting involved in a program that will help them see a career path."

We sent them membership materials; we prepared a career brochure.

We have about 30 youth members right now ...

We're finding that we get individuals, but we're also getting groups. Last week we got registration materials from 16 students, all from one high school in Indianapolis. There, an instructor has signed up a good portion of a class.

We're getting ready to move into the

next phase of this program, where as many chapters as possible will put on a special student night chapter meeting. We'll provide them a special organization packet, sample agenda, sample invitation letter, and mailing labels for high-school-based stations in their area and any youth members that we have on the rolls, so they can send invitations.

The idea is that they go to a station environment and invite these students, who can bring friends and parents, and they can hear presentations by active engineers.

We hope that this can lead into some internship possibilities, maybe summer jobs or full-time future employment. But

they have to start somewhere by getting (students and engineers) together.

EAS and NWS

RW: What is the status of your proposals to the FCC to improve the EAS system?

Miller: That's still a work in progress.

A year ago, it looked like the entire EAS issue would get to a workable resolve. There had been a lot of input by SBE, by the manufacturers, by the FCC.

The National Weather Service was added toward the end of the collecting of ideas, and it has a system already in the works that is based on a different protocol of doing things than was worked up for EAS. That was a fly in the ointment; it has allowed systems to not progress as flawlessly and comfortably as we'd like. There have been some code issues that were tried and experimented with, and it

caused problems; there was some corruption in the code datastream that caused other problems.

With all these issues, it was like a giant step back before we could move forward again. They are being addressed. Manufacturers of the boxes are listening to what they need to do; the FCC is saying "Let's do this"; the Weather Service is getting a line on it. We're working in a forward direction.

RW: How would you characterize the relationship between broadcasters and the National Weather Service?

Miller: I don't think there's any antagonism there. What bad press they could have received, perhaps, was because of the impact that it had on a nearly working system, and now suddenly we have to

See SBE, page 8 ►

ISDN Simplicity.



Broadcasting on ISDN doesn't have to be complicated or expensive.

The Nexus has everything you need for full-fidelity, low delay, mono audio on ISDN. And it is extremely easy to use. With a list price of only \$2,300, there's no need to wait any longer to sound great.

(800) 237-1776

Comrex Corporation, 65 Nonset Path, Acton, MA 01720

Fax: (978) 635-0401 Fax-on-demand: (978) 264-9973

Email: info@comrex.com

COMREX
www.comrex.com

SBE Sees Growth

► SBE, continued from page 7
make some changes. But the broadcasters have always been involved with the Weather Service, at one time or another.

Poray: There were some cases cited (at the SBE board meeting) where broadcasters and the Weather Service are working together to solve problems. Wisconsin was cited as a good example. They've had a meeting of the minds, as far as certain kinds of recordings and what can be played.

Miller: It (the NWS) has mechanically reproduced messages that they have put online. Well, quality is not as good as it should be; it's not as good as a broadcaster would like it to be. But those are issues that are being worked through. And it will work out in time.

Certification

RW: You've paid attention recently to certification, and created two categories.

Miller: We have set a record with the highest rate of certified people. This past year, there's been 700 new certified people. We've got about 3,500 in the organization who are certified.

I think it almost speaks for itself: People recognize certified engineers as having achieved a plateau of expertise that cannot be compared to anything else. There's no other yardstick out there, that we're aware of, that really demonstrates to GMs, chief engineers and so on, the quality of the person they're working with or looking to hire.

Poray: In the new audio engineering certification, we have around 25. That (category) is only about a year old. In video, there's about 40 or 50.

(Former SBE President) Terry Baun is now certification chairman, replacing David Carr. ... Terry has announced a doubling of exam periods. Now it will be a 10-day period in February, as well as

June, August and November.

We want to be able to make it more accessible for people to take a test.

RW: Give us an update on the state of the organization.

Poray: As of the end of September, we had reached 5,140 members, and that's 222 more than the same period last year. We're still seeing this year-over-year growth rate that has gone on now for about six years.

Financially we're in excellent shape. Our board is pleased that we've not had to raise regular member dues since 1992. We've been able to do that because of other, non-dues income sources, such as the books we've published. Membership growth itself brings in more revenue.

RW: What's the total budget?

Poray: The budget for 1999 is \$472,000, in that range, with a roughly 2 percent increase in income over last year, and a 1 percent increase in expenses. We look to finish 1998 very healthy, well above our projections.

RW: Of new blood, what is the breakout of radio- vs. TV-oriented members?

Poray: It's a split. We have seen in the radio side, with the consolidation, a lot of meshing as far as where people are in their membership status. We've got contract engineers who are extremely busy, some of them are not able to attend chapter meetings and functions as they have in the past, yet stay in contact via e-mail.

Miller: Radio folks are still a very viable part of the organization. We have just finished a new radio Chief Operator's Handbook. That indicates that we are responding to the radio side of things.

A lot of people who are in television started out in radio. When do you draw the line that you're no longer radio, that now you're TV? I don't think you do. It's a growth process.

Radio careers

RW: In radio it seems as if there is more work for talented people, but fewer of them, because they have been attracted by other industries. Would you recommend that a young person go into radio?

Miller: I think radio is here for the long term. It's not going to go away.

The growing pains that the television industry is going through in digital conversion is not going to stop with the TV



John Poray

side. There's going to be need for talented people to get into radio because digital is coming on the radio side.

RW: There's a common feeling that radio engineering, in particular, doesn't pay as well as other jobs available to a person who has computer and technical know-how. Do you think broadcast management is getting that message, and has any intention of improving that situation?

Miller: I think they've known that message for a long time. Management is very sensitive to bottom line. They have to be, that's their function.

Revenue stream coming in has not been that exciting. There isn't a lot of new cash flow, even in the television side of things. This new rollout of digital, there's no guarantees; you can almost bet you're not going to recoup your losses of expenditures. So wherever you can, you're going to save.

The whole gist of consolidation is to bring together all these different stations under one management level, under one or two tiers of engineering rather than individual engineers for each station. I think that's a fact of life, and I don't think we're going to be able to compete with the aerospace industry, the AT&Ts and the IBMs, but certainly you don't have to starve in this business. You can make a very comfortable living.

RW: What other issues is the SBE board handling?

Miller: We turned a record number of dollars' rebate (back to) the chapters. We gave back \$31,000 from the coffers as chapter rebates.

Also, we're now up to 103 chapters.

Poray: The Columbia, S.C., chapter has come back; they had been dormant for a few years. New chapters in the last year include Erie, Pa.; Imperial Valley, Calif.; and Fort Meade, Md.

Bandwidth

Miller: One success story is the 2 GHz issue ... channels being taken away and auctioned off by the FCC. It would have a rather disastrous effect on news coverage on the television side of things.

So John and I and (SBE General Counsel) Chris Imlay paid a visit to Capitol Hill at the beginning of (October), and had an opportunity to visit with 13 congressmen, members of the House telecommunications subcommittee and/or their next in command.

We simply shared with them our concern about what impact this reduction of frequencies is going to have on the 2 gig band, and what impact it's going to have on the news coverage capabilities of broadcast stations. ...

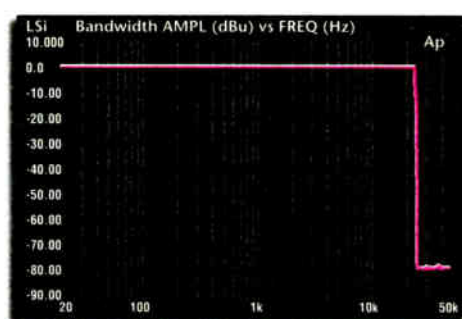
One encouraging item that made the trip worthwhile was that the office of (U.S. Rep.) Billy Tauzin (R-La.), who is chairman of this subcommittee, asked if SBE would be a resource in their future recommendations and investigations. ... So we will have input as an engineering force on some of these issues that will lead to legislation or changes in policy.

RW: What about concerns that the "Little LEO" satellites would interfere with RPU frequencies?

Miller: I think the threat is still real. We have filings with the FCC to deal with that issue. There has been no definitive answer, to my knowledge, as to how we're going to resolve that. It will impact radio and TV alike.

The whole shtick about using frequencies is suddenly coming into the forefront. Years ago, people didn't even know what frequency was. Now that there is a dollar value attached to bandwidth, you're getting the interest of folks who feel they need to get into the fracas, who really don't even understand the issues and the impact of their legislation.

We hope to start in the direction of, "If you're going to do this, don't be afraid to ask us if this makes sense from a technical standpoint."



How much would you pay for this response?

>100dB S/N • 2.5 mile line driver • Ground/Lightning isolation
90-day satisfaction guarantee. 3 year parts and labor warranty.
2 channels for less than \$1,650.

www.kci-dfw.com

Knight's Communications Inc., 2219 West Broadway,
Fort Worth, Texas 76102 800-880-5061



SBE Inducts New Board Members

BELLEVUE, Wash. Members of the Society of Broadcast Engineers returned their four board officers to office in recent national elections.

Edward J. Miller was elected to serve a second one-year term as president, also re-elected were Vice President Troy D. Pennington, Secretary Thomas P. Weber and Treasurer James (Andy) Butler.

In addition the SBE inducted four new board members during its national meeting here. They are Samuel E. Garfield of Technical Broadcast Consultants in Raleigh, N.C.; Al Grossniklaus of WTHR(TV) in Indianapolis; Jeffrey A. Keith of WMJI(FM) in Cleveland; and Jerry C. Whitaker of Morgan Hill, Calif., who had served on the board earlier.

Re-elected to the board were current members Raymond C. Benedict of CBS Corp. and Robert P. Hess of WBZ-TV, WODS(FM) and WBZ(AM) in Boston.

Those members were elected from among 11 candidates running for the six open seats. Six other seats were not up for election.

— Paul J. McLane



ZEPHYR IS EVERYWHERE



The irreplaceable Telos Zephyr has earned a hard and fast place in the hearts of broadcasters, engineers, and recording professionals around the world. Why? With its integrated ISDN terminal adapter, MPEG Layer 5 and Layer 2 compression technology, optional AES/EBU digital I/O, and an intuitive user interface, the Zephyr was designed by Telos specifically for broadcast audio applications over ISDN. It's the ideal solution for remote mixing and broadcasts, ad hoc networks, recording sessions, voiceovers, distribution of commercials, backup to satellite and microwave links, and nearly any other application you can imagine. How could anyone function in today's world without one?

The Best Way to Hear from There™



Telos Systems • 2101 Superior Avenue • Cleveland, OH 44114 • Tel: +1.216.241.7225 • Fax: +1.216.241.4103
 Telos Systems Europe • Johannisstraße 6 • Freising, D-85354 • Germany • Tel: +49 81 61 42 467 • Fax: +49 81 61 42 402
 E-mail: europe@telos-systems.com • www.telos-systems.com

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

ZEPHYR EXPRESS IS

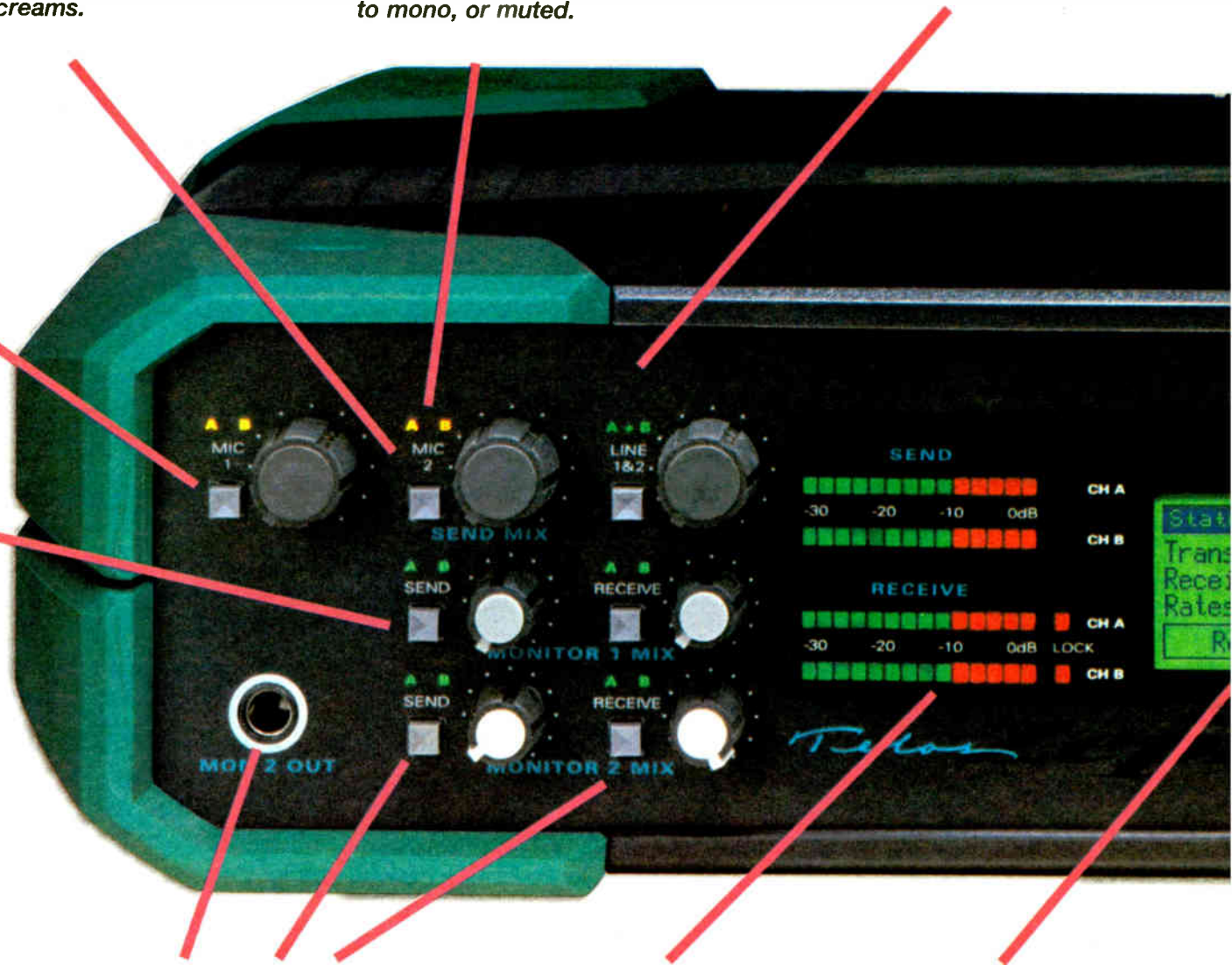
Careful analog design helps to ensure superior sound. Thanks to the mic input audio limiter, your audio won't distort when your talent screams.

Each mono input can be assigned to channel A, B, AB, or muted (with no assignment). The stereo line inputs are either routed as a stereo pair, summed to mono, or muted.

Test tone generator is included for ease-of-setup. Now you can instantly verify levels and signal integrity.

Onboard 48V phantom power and highpass filters come standard on both microphone inputs.

Flexible channel source selection and panning are all available at the touch of a button. Monitor mixer configurations can be customized, saved and recalled using the LCD and EDIT knob.



Headphone jack can receive independent levels of both send and receive audio.

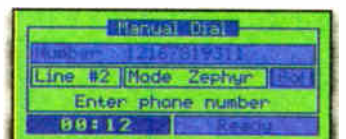
Full metering of send and receive audio levels for both channels provided.

Call out timer.

The only fully portable, stereo transceiver around, the ZephyrExpress lets you hit the road without leaving quality audio behind.



Regardless of where you are, if you can grab an ISDN line, you can get your full-frequency audio to the world. Embodying the spirit and technology of the famous Telos Zephyr, the new ZephyrExpress is a compact, full-featured portable ISDN transceiver/mixer. Rather than merely offering a handful of traditional transceiver functions in a portable chassis, ZephyrExpress provides no-compromise performance and functionality. It incorporates three digitally-controlled stereo mixers, a built-in ISDN terminal adapter, MPEG Audio Layer 3, Layer 2, and G.722 coding, an innovative interface with graphical displays that are easy to read and navigate, and much, much more—all in a road-worthy unit based on the most widely-used ISDN transceiver in the world. So now, when you hit the road, you no longer have to leave your Zephyr behind.



EVERYWHERE

ELSE!

Full-featured ISDN transceiver including three coding schemes (MPEG Layer 3, Layer 2, G.722) capable of simultaneous transmit and receive. Coding modes can be individually selected for transmit and receive paths.

Front panel has a clean, uncluttered design for simple operation.

Dialing functions include manual dialing and one-button auto-dialing of 40 presets. These 40 user-programmed auto-dial sets include codec section settings, local ISDN line information, and the numbers of the remote location you wish to dial.



shown at actual size

Easy-to-read LCD display is adjustable for various viewing angles when ambient light in the field makes reading difficult. Menus are organized in logical order and are easily navigated via EDIT knob.

Online HELP includes comprehensive documentation and step-by-step, how-to instructions.

The ISDN terminal adapter is built-in and is compatible with US and Euro-ISDN systems. Everything required for the ISDN connection is included.

Molded chassis absorbs the bumps of the road.

The Best Way to Hear from There™



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

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

Groups Ponder Buying Power

► BLANKET, continued from page 3

"I know I can go and get just as good a deal without one," said Marty Hadfield, director of engineering for Entercom. "By playing your cards right and making the bidding process competitive, you should be able to squeeze out as much as anyone could."

Hadfield said he has not found a single vendor that could supply Entercom with everything it needs. "There isn't a one-size-fits-all supplier out there. And what happens if you need a piece of equipment that might be at the end of its run when you need it from this one particular supplier? You're in trouble," he said.

Charles Morgan, senior vice president of engineering for Susquehanna, said his company has been approached by several suppliers looking to make a deal.

"At this time we don't think that would be in our best interest. We like the idea of shopping around for the best price and equipment when the time arises," he said.

Competition

Broadcast Electronics Inc. manufactures RF and transmission products and is a direct competitor of Harris. "Right now we have no (master) agreements and have no formal talks on going," Steve Ely, vice president of North American sales and marketing, said.

Ely sees the current industry moves as a natural progression of radio consolidation. Big groups realize they can flex their buying power and start looking for deals.

"But you don't necessarily need a purchase agreement to do that," he said.

The opinions of companies that make equipment are driven in large part by the nature of the distribution systems they have set up.

At least one manufacturer interviewed for this story said he would never consider any exclusive purchasing option, despite the consolidating radio marketplace.

There isn't a one-size-fits-all supplier out there.

— Marty Hadfield

"I would alienate my distribution system so much, I'd lose more than I would gain," said Dan Rau, director of broadcast and international sales for Intraplex.

"Plus, you figure you sign up a 300-outlet chain. How many of those stations will require your specific product over a year's time? Maybe 10 percent or 15 percent. And how does it affect your relationship with other radio groups if you become known as an exclusive dealer or manufacturer?" Rau said.

At Audio Broadcast Group, the distributor has discussed a purchasing agreement option with several medium-sized groups.

"Typically, these groups (said) that our prices were better on some things, while other vendors had better deals on something else," said Dave Howland, vice president for sales and marketing.

"On its face, it probably looks like a good deal for the radio groups to be able to streamline purchasing and have all of the bills come to one office," Howland said. "But to take away the competitive nature of this business and

to standardize things so your freedom to choose is taken away might not be the best way to go."

Radio Computing Services has long had special purchase agreements in place with several big groups.

"I think it's a natural for us to handle such things as software needs and networking for the major groups with these types of deals," said Leo Facto, chief financial officer for RCS.

Facto was quick to point out that just because the number of engineers in buying positions may have dwindled through

consolidation, a vendor cannot ignore individual radio stations. "The need to visit stations and gain feedback will always be there. We still feel it's the engineer at the local level that you need to impress and make sure is happy with your product," Facto said.

Next?

Most observers agree that a number of groups entering into some kind of purchasing agreements with manufacturers and suppliers will continue to increase.

Chancellor's Littlejohn sees more of it coming. "A company would be foolish not to at least investigate the possibilities. It eliminates negotiation and makes life easier for our engineers since we won't need three price quotes for a \$10 item," he said.

Baun of Cumulus said an increase in the number of formal purchase agreements was inevitable.

"By that I mean as an industry consolidates, like radio has, typically its supplier base will too. Big companies seem to have leverage with other large companies. I don't know if that's good or bad, it's just business," he said.

Such deals may hurt distributors that are smaller or regional in scope most, some say. These companies may not have the resources to compete with the nationals — mirroring trends in radio ownership itself.

One industry observer, who wished not to be identified, said consolidation in the distributor business would not necessarily be good for radio.

"Nothing keeps prices in check better than competition. In the long run, it's to the customer's advantage to have that," he said.

Broadcast Electronics Cuts Staff, Seeks CEO

by Randy Stine

QUINCY, III. Change is afoot at Broadcast Electronics.

Citing global economic developments as the major contributing factor, BE said it laid off 10 percent of its workforce in early November. BE officials said sales and service for its product lines, which include AudioVAULT, Marti and Auditronics products, would not be affected. At the same time, the company is searching for a new CEO, and hoped to have one in place by the end of the year.

BE officials declined to state the exact number of employees affected by the job cut. Company insiders put it at approximately 18. BE said the cuts came from across the board, ranging from manufacturing to the management level. BE has approximately 210 employees at its four facilities.

Among the former employees most familiar to radio equipment buyers are Don Rust, director of operations and a 22-year BE employee; Mike Troje, director of domestic sales; and Tracy Rodman, public relations specialist. The company retains 140 workers at its Quincy headquarters.

At Auditronics in Memphis, Tenn., nearly 10 percent of the job force was trimmed. BE acquired the console manufacturer earlier this year. Operations at its other subsidiaries, Broadcast Programming in Seattle and



Douglas Davis

Marti Electronics in Cleburne, Texas, were unaffected.

Year of change

The company is watched closely in the industry because of its size and breadth of offerings, and its focus on the radio marketplace. BE makes both studio and transmission equipment, and offers programming as well — an unusual combination for an equipment supplier. In recent years, it has been an aggressive acquirer of companies and product lines.

This has been a year of change for the 39-year-old company. The most recent layoff followed a round of job

See BE, page 18 ►

The Replicator.

Digital Audio Delay Systems

Traffic Master II, System 6

Traffic and Billing Systems.



The PHANTOM

Digital Audio Automation

Dependable, Affordable and Available through S.C.M.S.--

With over 23 years experience serving the broadcast industry.

For more information or a demonstration, Call the S.C.M.S. *Phantom* specialists today!

Bernie O'Brien or Bob Cauthen

1-800-438-6040

1691 Forsyth St., Macon Georgia
Phone 912-745-5500
Fax 912-745-0500

RCS REGISTER
DATA
SYSTEMS

COMPARE

When you compare digital audio processors, it's not apples to apples. Why? Because only the Omnia.[®]fm gives you adjustable composite clipping, a powerful technique used by thousands of broadcasters for PD-pleasing loudness-loudness that can't be achieved in any other way, no matter which processor you're using.

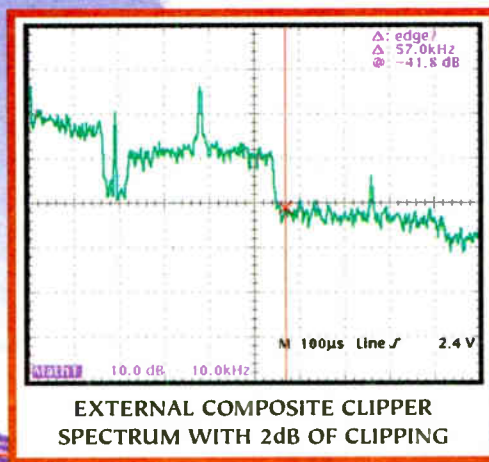
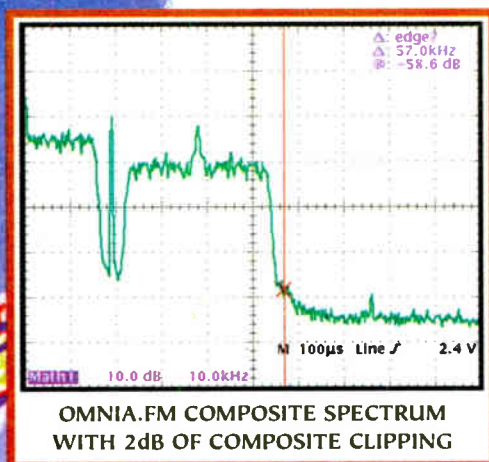
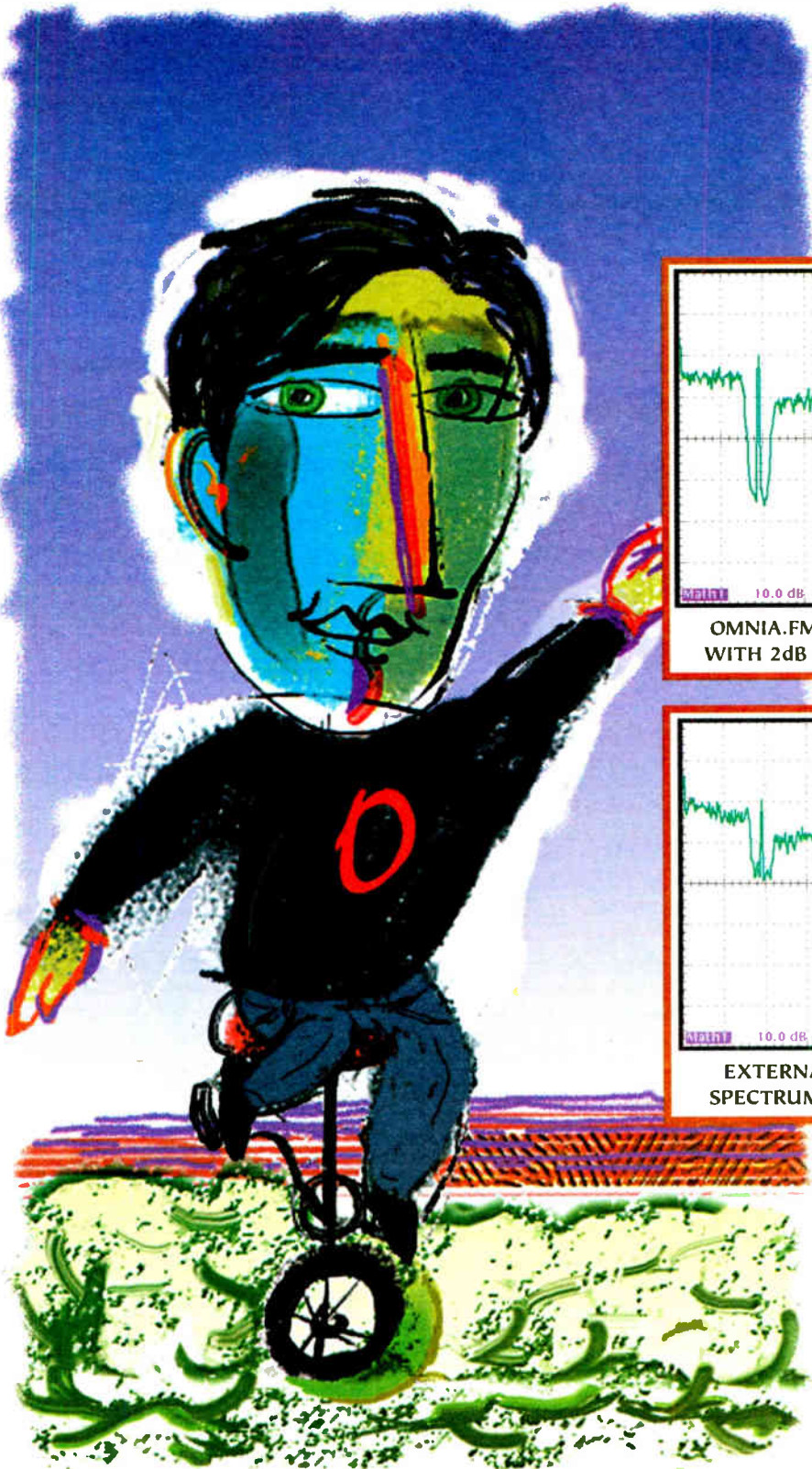
You can have this power without worry: The Omnia.fm includes a precision digital composite low-pass filter which eliminates interference to subcarriers (including RDS) from clipping by-products. And since the pilot is added after the clipper, it remains unharmed.

Sure, you can tack on an external composite clipper to other digital processors. But with the Omnia.fm's integral composite clipper, operation can be controlled remotely and included in stored presets. And because of the Omnia.fm's unique, non-aliasing final limiter, you have rock-solid peak control, even without composite clipping. Put it all together and you have the Omnia.fm's clean spectrum, loud, punchy sound and *absolutely no digital grunge*.

Make your own comparison and you'll find that the Omnia.fm provides unmatched performance, with or without composite clipping. Only the Omnia.fm gives you a choice. And only the Omnia.fm gives you a free 60-day demo with a money-back guarantee*.

Here's how: The test signals were generated by a Delta Electronics SNG-1 (Stereo Noise Generator); spectrum analysis was performed with a Tektronix TDS-744A Digital Scope in the FFT mode. The top graph shows the spectrum out to 100kHz of the Omnia.fm with its built-in, all-digital composite clipper and composite low-pass filter. The bottom graph shows a different processor combined with an external composite clipper. Both composite clippers were set for 2dB of clipping. Notice in the bottom graph the significant harmonic energy in the SCA region as a result of composite clipping.

For a complete technical report, call us for a copy of our paper entitled "Omnia.fm: An Engineering Study." Or visit our web site at: www.nogrunge.com.



CUTTINGEDGE

2101 SUPERIOR AVENUE CLEVELAND, OH 44114 TEL: +1 (216) 241-3343 FAX: +1 (216) 241-4103 E-MAIL: INFO@NOGRUNGE.COM WWW.NOGRUNGE.COM

*Contact your dealer for details on this demo program. Demo requests must be accompanied by a purchase order so our dealers know you're really serious about some serious sound.

- Audio Broadcast Group 3685 Roger B. Chaffee Blvd. Grand Rapids, MI 49548 Tel: +1 (800) 999-9281 Fax: +1 (616) 452-1652 e-mail: support@abg.com
- Bradley Broadcast Sales 7313G Grove Road Frederick, MD 21704 Tel: +1 (800) 732-7665 Fax: +1 (301) 682-8377 e-mail: info@bradleybroadcast.com
- Broadcasters General Store 2480 SE 52nd Street Ocala, FL 34480 Tel: +1 (352) 622-7700 Fax: +1 (352) 629-7000 e-mail: bgs@mercury.net
- Broadcast Supply Worldwide 7012 27th Street West Tacoma, WA 98466 Tel: +1 (800) 426-8434 Fax: +1 (800) 231-7055 e-mail: info@bswusa.com
- Crouse-Kimzey Company P.O. Box 155999 Fort Worth, TX 76155 Tel: +1 (800) 433-2105 Fax: +1 (972) 623-2800 e-mail: sales@proaudio.com
- Radio Communications Unlimited 5509 Barrington Ooltewah, TN 37363 Tel/Fax: +1 (423) 396-3743
- Caveco 1121 Bellamy Road, North Unit #10 Scarborough, ONT M1H 3B9 Tel: +1 (416) 438-6230 Fax: +1 (416) 438-1065 e-mail: bob@caveco.com
- Marketing Marc Vallée 1067 Chemin St. Lambert St. Sauveur de Monts, QE J0R 1R1 Tel: +1 (450) 227-1828 Fax: +1 (450) 227-8394 e-mail: marc@vallee.com
- All Electric 487 Cariboo Crescent Coquitlam, BC V3C 4X7 Tel: +1 (604) 945-5651 Fax: +1 (604) 945-5652 e-mail: allelec@dowco.com

Circle (62) On Reader Service Card

World Radio History

NEWS MAKER

Kennard on Ownership, EEO

FCC Chairman Bill Kennard is a veteran of many NAB radio conventions. In his first speech as FCC Chairman to attendees of The NAB Radio Show, Bill Kennard touched on proposed changes to the FM technical rules and FCC efforts to increase ownership diversity. Kennard also explained why the commission is studying proposals to create a new low-power service and the FCC's role as radio prepares to transition to digital broadcasting. The following are excerpts from his Oct. 16 speech.

How he knows radio:

My first job out of law school was

with the NAB. ... I learned a lot about your industry and what it takes to run a radio station. ... I have been a fan of radio for as long as I can remember. In college, I worked at the college radio station. Every college with a radio station has a group of students who spend more time at the radio station than in class or in the library. I was one of those students. ... When I had a radio show, I didn't play jazz or oldies. I did news and public affairs. Back then I was dreaming about a stint on "60 Minutes."

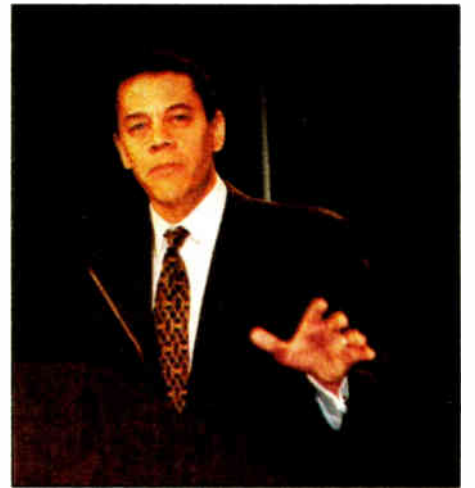
On public service:

When Hurricane Georges raged over

the Florida Keys, WWUS(FM), a station that normally broadcasts oldies off a satellite for most of the broadcast day, became a local life line. The station's satellite dish blew away that morning. After receiving calls from the frightened residents, the station switched to a live local call-in format.

Bill Becker, the station's news director, soon realized that his broadcast was the only source of local information for the community. Even the county sheriff said that he turned to the station as his main source of information.

The New York Times wrote about this story. It wrote that "In an industry domi-



Bill Kennard

nated by group ownership and satellitized formats with dismembered voices, the sound of neighbors holding hands on the air seems almost old-fashioned."

Of course there is nothing old-fashioned about that at all. To me, and to many of you, it still defines what the public interest is all about.

Competition from other media:

Many cable television systems are offering packages of digital audio programming. Satellite-delivered radio is just around the corner. And, like all the electronic media, you face the challenge of converting from analog to digital.

We will not undermine the technical integrity of the FM band. Our job is to be the guardian of the spectrum, not to degrade it.

The FCC's role as competition to radio increases:

It comes down to two things. First, we must let the marketplace work. We must trust in the marketplace, and let the competitive forces unleashed by the market spur innovation and creativity that benefits the public.

Second, as guardians of the spectrum, we must do everything we can to ensure that it is used efficiently, and that we maximize its potential to provide outlets for many voices and viewpoints.

How to advance these goals:

We're working hard at streamlining our rules to make it easier for you to interact with the FCC — and to help you respond more quickly to a quickly changing marketplace. We need to make sure that our processes work. And that they work for you and not against you.

Before I came to the FCC, I spent a dozen years as a lawyer representing broadcasters before the agency. And I know firsthand the frustration that many of you feel when FCC filing requirements seem more burdensome than necessary.

Rule changes afoot:

We amended our main studio and public inspection file rules. The new rules give you much more flexibility to locate your main studio and your public files. They also lessen your burden in maintaining the

See KENNARD, page 16 ▶

New Compact **TOOLS** Perfect for **BROADCAST**



Symetrix

Symetrix introduces a new series of flexible half-rack audio tools. The Symetrix 300 Series offers broadcasters and other audio professionals precise solutions for a wide range of audio applications. These affordable building-blocks deliver exactly what you need for jobs (and budgets) of any size:

301 Low Distortion Comp/Limiter:

A mono comp/limiter with unique circuitry that eliminates secondary causes of distortion during compression.

302 Dual Microphone Preamplifier:

An update of the classic Symetrix SX202 design. Like its predecessor, it delivers solid stereo imaging, excellent transient response, very low noise and almost undetectable distortion.

303 Interface Amplifier (Bi-directional):

A stereo level matching amplifier that converts consumer level audio of -10dBV to a +4dBu level, or vice-versa, allowing pro audio equipment to work with consumer gear.

304 Headphone Amplifier:

A stereo in/four output amp that drives headphones of any impedance. Its compact design is ideal for translation service installations and control rooms.

305 Distribution Amplifier (1x4):

A one input/four output design that includes a four-segment LED input meter, individual trim pots for input and output levels, and Euroblock terminal connectors for quick installation. Precision circuitry yields THD+Noise of less than .009%.

307 Dual Isolation Transformer:

A one input/two output isolation box that breaks up ground loops and improves overall system performance.

Equipment Solutions To Keep You Number One

BSW

BROADCAST SUPPLY WORLDWIDE

Call BSW For Great Pricing And Information On All 300 Series Products

1-800-426-8434

Fax: 800-565-8114 Web: www.bswusa.com

7012 27th Street West • Tacoma, Washington 98466 USA

Meet the "Morning Show Team"



Instant music, instant sound effects, instant fun.

- Holds up to 1,000 "carts" of any length, from milliseconds to hours.
- 10 banks of 50 programmable Hot Keys. It's like having 50 cart machines pre-loaded and ready to fire.
- Up to 24 hours of total on-line audio storage.
- "Find" button locates any cut instantly.

There is nothing faster, easier, or cooler! You can finally let go of your analog cart machines and associated maintenance headaches. Or, if you're running automation, now you have the perfect compliment for those times when you need to play something, and you need it now.

Instant Replay® 2.0 HARD DISK DIGITAL AUDIO

Fast and easy editing for news and listener call-ins.

- Instant record feature captures incoming audio manually, or from popular phone systems and network downlinks.
- Real cut/copy/paste editing with a large waveform display.
- Portable enclosure includes speakers and mic preamp; great for remotes.
- No razor blades, no tape, no learning curve, and no maintenance!

Now you can quickly capture and edit incoming audio. Realistic "scrub" editing, plus standard tape machine controls let you kiss your reel-to-reel machines goodbye.

Ask for a test drive and put them through their paces at your station. It's on us.



Short/cut™ PERSONAL AUDIO EDITOR



Attention call letter stations.* You're only a phone call away from a free 10-day Test Drive. So try it out. We'll understand if you don't give it back.

(818) 991-0360

360 Systems®

PROFESSIONAL DIGITAL AUDIO

For more information call (818) 991-0360 / Fax (818) 991-1360 / e-mail: info@360systems.com / Website: www.360systems.com

*Offer good in U.S. and Canada only.

Circle (11) On Reader Service Card
World Radio History

Kennard on the Issues

► KENNARD, continued from page 14
public file. ... I also want to streamline our technical rules. In June we started a proceeding to rework these rules to give FM broadcasters greater flexibility. We proposed rules to allow you to negotiate interference agreements, to give you greater flexibility when you want to modify or expand your facilities ...

NAB has concerns about these proposals on negotiated interference. I will consider these concerns carefully. But I encourage each of you to look hard at these proposals because they are designed to give you more flexibility to adjust to market conditions so that you

can compete more effectively in the marketplace (RW, Nov. 25).

Enforcement against pirates:

We have been more aggressive in shutting down pirate stations than any FCC in history. In the last 10 months we have shut down over 250 illegal stations — thanks to the terrific leadership of Rich Lee, chief of the FCC's Compliance and Information Bureau. In July alone, Rich and his team shut down 15 pirate stations in the Miami area. We will continue to send the message to pirate broadcasters that this FCC will enforce the law.

Get Better Jocks for Less Money

Increase profits by running your station more efficiently. Outside the highest billing hours, it doesn't make sense to pay announcers to sit around *waiting* to talk. A Scott uncompressed music on hard drive System can put all the songs, spots and prerecorded Voice Trax together smoothly with *nobody* in the air studio!

For years, Scott Studios' client stations have been successfully pre-recording *great* 4-hour shows in 15-20 minutes.

Now, thanks to Scott Studios' new *free* Voice Trax Via Internet (VTVI) software, free-lance announcers can record timely localized shows *from anywhere*. All they need is a good microphone, an Internet connection, any Windows computer, and Scott Studios' free VTVI software!

After the station's music has been scheduled, one touch of a button automatically e-mails the log and the latest live copy to the distant announcer. Scott's VTVI works seamlessly with all music schedulers and traffic/billing programs.

Scott's Voice Trax Via Internet software is *very* easy for your announcers to use. Scheduled live tags, trivia and copy display automatically on the right side of the screen. There's no fumbling with a copy book or even a mouse. When you're recording a song ending, simply press the space bar on the VTVI keyboard to start the next song or spot. Release the space bar after you stop talking. VTVI then moves ahead to the next place to talk.

All Voice Trax are recorded with the computer's ordinary sound card with impressive digital fidelity. Depending on your format, a microphone processor may be helpful to punch up the announcer's voice, but no console is needed.

If all the station's spots have been produced when the log is sent, Scott's Voice Trax software automatically computes and displays accurate time checks the announcer can include if desired in any Voice Trax.

After recording, any or all of the show can be reviewed and changed. Scott's VTVI Segue Editor even lets your jock fine-tune timing without any need to re-record anything.

When done, a click on the VTVI Auto-Send button dials the Internet and moves the entire show to the distant Scott digital audio system automatically. Transfer speeds vary based on your Internet Service Provider, but with a dial-up phone line a shift can upload to the Internet in 40-50

minutes. With ISDN, transfer time can be 20-25 minutes.

Your announcer can be answering e-mail, writing copy, editing promos or doing a number of other things on the VTVI computer while your show is being transferred.

Scott Studios VTVI also includes our exclusive Voice/Music Synchronizer. When any Voice Trax mentions song titles or artists, your jock turns on the link so the Trax plays only with the correct song. No operator attention is needed at the station for Voice Trax to play seamlessly. If the announcer forgets to record something, or songs or spots get changed at the last minute the Scott Voice/Music Synchronizer automatically substitutes generic Voice Trax for each day and hour for each announcer.

Nothing could be easier or less expensive, yet still sound so good as good talent with Scott's VTVI! Of course, the free Voice Trax Via Internet does require Internet connections on both ends, a \$29 per month FTP transfer site, and the Scott NT System plus a \$2,500 Scott Remote Recording Router back at the station.

We also offer a \$500 VTVI Deluxe that lets the announcer download telescoped song intros and endings from the Internet, then fine-tune timing of talk-ups and backsells in the context of the music and spots with little or no need for re-recording. With the VTVI Deluxe, a telescoped aircheck can be previewed with the beginnings and

How consolidation has changed radio:

Since Congress relaxed the ownership rules, we have seen dramatic and unprecedented consolidation. I believe that it's happening faster than anyone predicted. ... At the local level, since the passage of the 1996 Act, we have lost an average of about three owners in each of the top-ten radio markets and about one owner in each smaller market ...

I am concerned when I talk to small, independent broadcasters who tell me that they are being squeezed out of their markets. I am concerned when I talk to advertisers who tell me that large multiple owners have locked up certain demographics in many markets. And I am concerned when I talk to small entrepreneurs, including minorities and women, who tell me of their fears that

they will have to abandon their dreams of ever owning a broadcast station.

On concentration:

I worry about the consequences if more and more radio stations are concentrated in fewer and fewer hands. The FCC is in the process of re-examining all of its broadcast ownership rules this year. And I intend to consider the impact of consolidation on diversity of ownership and diversity of voices in the marketplace. I need your input on these questions.

On Equal Employment Opportunity:

A federal appeals court in Washington, D.C., recently struck down the FCC's EEO rules. For 30 years these policies opened the door of opportunity for a generation of minorities and women in the broadcast business.

I have talked to many broadcasters about the EEO rules and I have never talked to a broadcaster who did not believe that these rules served a worthy end. We sometimes disagree on the means. But everyone agrees that reaching out and finding talent in your communities — of all races and genders — makes your stations stronger and improves your service in the public interest.

I intend to consider the impact of consolidation on diversity of ownership.

And I am encouraged that many broadcasters have pledged to me that they will continue to abide by EEO principles. But we also know that there will be some among your ranks who won't do the right thing. So I encourage you to work with me and my colleagues at the FCC to design new rules that address the court's concerns but that ensure that broadcasting is an industry of opportunity for all.

On microradio:

There is a tremendous need for us to find ways to use the broadcast spectrum more efficiently so that we can bring more voices to the airwaves. We are seriously evaluating proposals for a new microradio service. I believe that we have an obligation to explore ways to open the doors of opportunity to use the airwaves, particularly as consolidation closes those doors for new entrants.

But let me be very clear. Here is what we will not do: We will not undermine the technical integrity of the FM band. Our job is to be the guardian of the spectrum, not to degrade it.

The digital conversion:

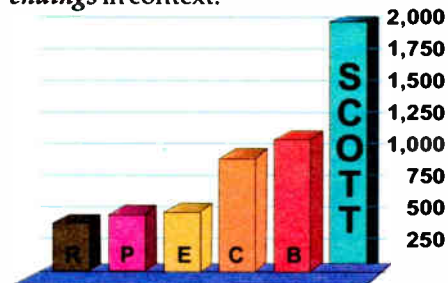
While we're considering this (USADR's IBOC DAB) petition, we'll also continue to follow the testing and development of in-band digital systems by the National Radio Systems Committee set up by the NAB and CEMA. This is a great start, and I will do my part to make sure that local radio is not left on the sidelines of the digital revolution.



Here's Scott's Voice Trax Via Internet (VTVI) software, shown with the optional Segue Editor. VTVI allows a distant announcer to pre-record a 4 hour show in about 15-20 minutes with nothing more than a Windows computer, an Internet connection and a good microphone.

ends of the songs and spots.

Or, the \$1,000 Super Deluxe VTVI lets your distant announcers record *while listening to song and spot intros and endings* in context!

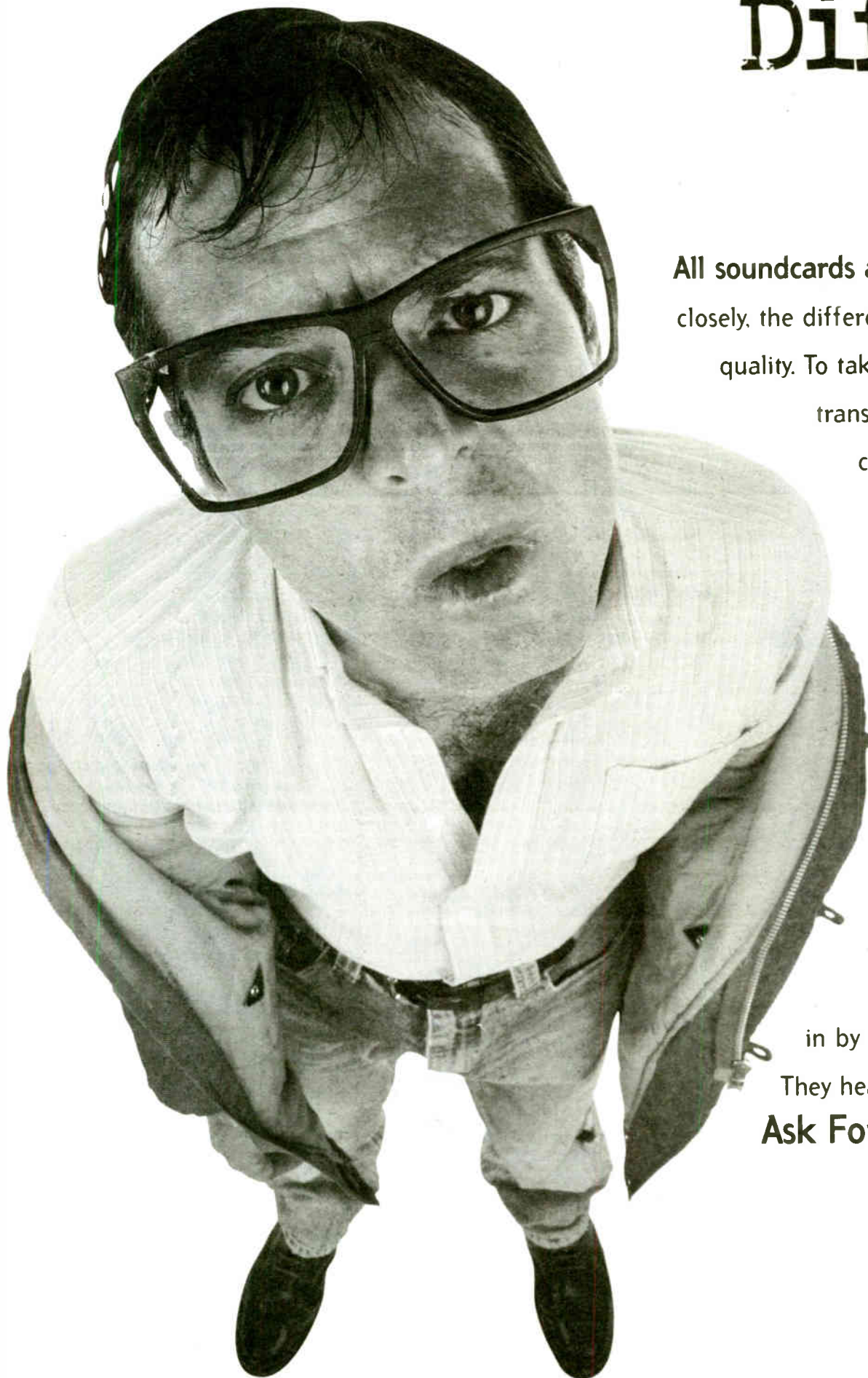


It's a fact: More U.S. stations use Scott Studios than *any* other major digital audio system. 1,950 radio stations have 4,300 Scott digital work-stations, including *major* groups like CBS, Chancellor, Disney/ABC, Clear Channel, Emmis, Citadel and many more. In the US' top 10 markets, 45 stations and 5 networks use 155 of our digital workstations

Call Scott Studios to see how the Voice Trax Via Internet digital system can greatly improve *your* bottom line.

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

What's the Difference?



All soundcards are not created equal. When you listen closely, the difference is day and night. First there's sound quality. To take advantage of the newest all-digital transmission paths you need the best. Do a sound check – you'll find nothing sounds better than Antex. Then there's compatibility. A great soundcard gives you more choices – in system compatibility, application performance, and compression formats. Again, Antex is unequalled. Finally look at the record. The leader in digital audio for more than a decade, Antex exceeds expectations and delivers the finest sound anywhere. With over 100,000 soundcards sold worldwide, it's no wonder that Antex Audio is plugged in by more professionals than any other soundcard. They hear the difference – you will, too.



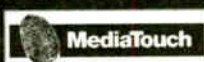
Ask For Antex.

**ANTEX
ELECTRONICS**
NEVER LOSE SIGHT OF SOUND.

1125 West 190th Street, Gardena, California 90248
310-532-3092 · 800-338-4231 · www.antex.com

Circle (63) On Reader Service Card

The best digital broadcast systems use Antex Audio. Do you?



World Radio History

Prophet Systems, Inc.

Scott Studios

rds



Broadcast Electronics Cuts Staff

► BE, continued from page 12

cuts on the factory floor earlier this year in Quincy.

The company also continued its search for a new CEO. In early October, BE's parent company announced the resignation of Jack Nevin as BE president and chief executive officer, a position he had held since 1990. Douglas Davis is the acting president.

At the time of Nevin's resignation, the chief executive officer of BEI Holding Corp., Bob Carroll, said Nevin would stay on in a consulting role.

BE acquired console maker Auditorics in May. The move was seen by company executives as an integral step in keeping BE competitive by giving it a full line of analog and digital consoles.

These changes come on the heels of BE's acquisition by Hoak Communications Partners in August of 1997. The capital investment firm is led by former Heritage Media owner Jim Hoak.

Business analysis

Davis, the acting president, said the company conducted an analysis of business operations in early October. The conclusions of that analysis led to the job cuts. The troubled economies in

Southeast Asia and Latin America, he said, had an adverse affect on BE sales through the first three quarters of this year.

Typically, international sales make up nearly 35 percent of BE's total sales. The company does not disclose finan-

speculated that Hoak had paid too much for Broadcast Electronics, and that the company was now feeling the effect. Some BE insiders said the purchase by Hoak in August of last year was highly leveraged and that Hoak is carrying a heavy debt load on BE.

Without question, this downturn overseas has hurt us and anyone else trying to sell to Pacific Rim countries.

— Douglas Davis

cial figures. Company insiders said first-half sales for 1998 were soft, but that orders in September and October had rebounded nicely.

"We decided that we had to bring our cost structure back to equilibrium with our current revenue projections," Davis said. BE remains optimistic about its long-term prospects. "We are not planning any further reductions."

One executive of a BE competitor

How much Hoak paid for BE has not been disclosed.

Davis said Hoak's purchase of BE may have accelerated the pace of the of job reductions. "I think the underlying feeling was there even before the sale, that something had to be done to get the finances back in line. But when you have new management coming in, sometimes those types of things can happen faster," he said.

Davis said he suspects BE is not the only supplier in the radio supply business feeling a pinch from international economic turmoil.

"Without question, this downturn overseas has hurt us and anyone else trying to sell to Pacific Rim countries," Davis said.

"The economies those international markets are very volatile, with down cycles expected every four to five years. However, we are not giving up the ship

on those markets, and neither is the sales team," Davis said.

Customers should not see any interruptions in service or product delivery, he said. "We are retooling our sales force and sales strategies," Davis said. "The impact of our moves upon radio stations should be limited to what sales rep they deal with."

Unexpected change

With the cutback, can BE expected to remain in the acquisition mode? Yes, said Davis. "Hoak Communications still would like to add a few complementary pieces to the BE unit. I think you'll see us grow through acquisitions and organic growth."

Davis does not think BE's core business will change much in the coming year. "Transmitter and studio equipment sales make up an equal share of our business. I do not see any great change in the percentages there. And the third leg of our business, Broadcast Programming, certainly is a smaller part of the company, but important nonetheless," he said.

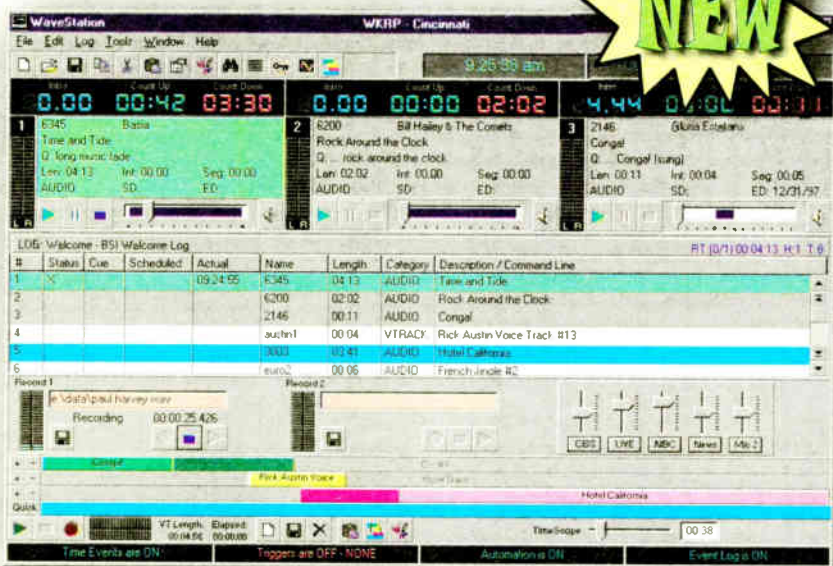
The cutbacks should not affect BE's product development department. Davis said it plans to fund its engineering department fully, to work on transmitter and studio projects. "We can't afford to fall behind. We'll focus on research and development and domestic sales for right now," Davis said.

He said customers can expect BE's main push in product development to remain focused on digital products, in both the studio and transmission categories. "We have just shipped the first line of the Predator, our new FM digital exciter," Davis said. "That followed the launch of Auditorics' first series of digital consoles this fall."

Davis, who joined BE from Amtech Corp., said he is not interested in the top spot at BE. "No, I was brought in to provide leadership in the interim."

Affordable Digital Automation **24 HOUR FREE TECH SUPPORT**

NEW



Our new WaveStation 3.0 has all the features of the \$50,000 automation systems, but is priced reasonably like software, not gold-plated broadcast hardware. We often hear, "It can't be true!" More than 1000 satisfied users worldwide prove the contrary. WaveStation includes a powerful digital audio editor and uses standard or compressed audio files, including MP3. On-screen Voice-Track editing, time-shift recording, serial port control. WebCast ready. Full automation, satellite, voice track and live assist. No recurring fees, Free upgrades. Microsoft Windows 95, 98 or NT.

888-BSIUSA1

Try Before You Buy

Download the Actual Software!

www.bsiusa.com

Only

\$999

BSI

DIGITAL NEWS

XM Satellite Radio Signs Receiver Deals

WASHINGTON XM Satellite Radio has signed agreements with three receiver manufacturers to produce and distribute



radios capable of receiving XM Satellite's signals for its satellite-delivered digital audio broadcasting service.

Alpine Electronics and Pioneer Electronic Corp. will design, build and distribute car radios capable of receiving AM, FM and XM Satellite DAB, while Sharp Corp. will focus on home receivers.

XM Satellite has also signed an agreement with STMicroelectronics to make computer chips to process the digital signal for the receivers. STMicroelectronics also supplies chips for the WorldSpace satellite-delivered DAB service. WorldSpace is testing its AfriStar satellite for service aimed at that region.

WorldSpace is part owner of XM Satellite Radio along with American Mobile Satellite Corp.

Lucent Technologies is providing the chips for CD Radio, the other FCC license-holder to provide Satellite DAB.

CD Radio Begins Facility Construction

NEW YORK CD Radio has begun building its broadcast studio in Rockefeller Center in New York City.

The 100,000-square-foot facility is expected to be completed in March. CD Radio plans to offer 50 music and 50 talk channels to subscribers by the year 2000. XM Satellite Radio plans to offer the same number of channels later that year.

Bass Group Investment Closes

CD Radio also announced that Prime 66 Partners L.P. has completed its purchase of 5 million shares — about 20 percent — of CD Radio's common stock (NASDAQ: CDRD) for \$100 million.

Prime 66 is a limited partnership composed of persons associated with Sid Bass of Fort Worth, Texas (RW, Nov. 11).

— Leslie Stimson

Harris Acquires Digital Supplier

► HARRIS, continued from page 1
 president of Harris Broadcast's Radio Systems Business Unit.

"Our assessment of Intraplex was a very strong management team, extremely strong engineering organization, and consequently a very strong product mix. Frankly, there's no reason to mess around with that," Woods said. "It's our plan to ... add some of the things that we can bring: broader access to the market, international distribution and service capabilities."

"Since we entered the STL market with the CD Link, we've looked at a number of ways to expand our offerings in the digital STL and program transport markets," Woods said. "Intraplex clearly fit the bill ... for what's taking place in our radio broadcast market, the networking of radio facilities and stations, in trying to move program audio from the studio to the transmitter."

President Bill Rollins founded Intraplex with partner Ken Beaupre in 1987. His new title is director and general manager of Intraplex Transmission Solutions.

"We've grown the company on our own nickel," Rollins said. "To be able to continue the growth that we've experi-



Bill Rollins of Intraplex

enced — over the last three or four years, about 50 percent a year — we felt that we needed to find a good strategic partner."

Rollins said Intraplex had initiated the merger discussions.

"From the beginning it was our intention to reach this point, either going public or merging with the right company," Rollins said. "Harris is probably the best fit we could have had." He said Harris has been the largest domestic distributor of Intraplex products for the past four years. "We think it's a terrific marriage."

Intraplex Vice President of Marketing Chuck Alexander said the matchup of markets was unusual.

"Harris is involved in two diverse markets that have been so strong for us, two-way wireless communications and broadcast. To find a corporate partner and an acquisition candidate that had interest and strength in both of those areas is real important to us," he said.

Harris is in the process of consolidating several offices into new headquarters in Cincinnati. Asked whether it might do the same with Intraplex and the former Northeast Broadcast Labs operation in New York State, which it also owns, Woods said there were no plans to do so, but did not rule it out.



Intraplex

Based in: Littleton, Mass.

Sales: \$11 million last year

Business: Developer of digital network products for broadcast and wireless communications.

Web site: www.intraplex.com

HARRIS

Based in: Cincinnati (Broadcast Systems Division)

Sales: Corporate sales \$3.9 billion. Division sales not made public.

Business: The division is a supplier of radio and TV products, systems and services. Harris Corp. is an international communications and electronics company.

Web site: www.harris.com

Former RFE Chief Will Head Up NPR

Network Names IBB Director Kevin Klose as President and CEO to Replace Delano Lewis

by Leslie Stimson

WASHINGTON The man who will lead National Public Radio into the next millennium is due to begin his new job this month. How he will help position the network to remain viable in the face of still-shrinking federal support and ever-growing commercial radio groups remains to be seen.

Out of about 200 candidates considered in some way for the job of NPR president and chief executive officer, a selection committee of the NPR Board of Directors chose the director of the United States International Broadcasting Bureau, Kevin Klose.

NPR Board Chairman F. Kim Hodgson, also station manager of WAMU(FM), Washington, said there were two finalists for the position, but it was important for the candidate to have a deep commitment to public radio, and Klose articulated that well.

600+ member stations

"I think Kevin has a good sense of what local stations bring to public radio," said Hodgson. NPR has more than 600 member stations.

Klose is an avid NPR listener. "It is an honor to join NPR's team of broadcasters, whose record of excellence in news, current affairs and cultural programming is unrivaled in America," he said. "I cherish this opportunity to work with this extraordinary group of broadcasters, member stations and the

NPR Board to shape the future of public radio."

Klose replaces Delano Lewis, who left NPR in August (RW, May 27).

Before the IBB post, Klose was president of Radio Free Europe/Radio Liberty here. During his tenure (1994-1997), Klose helped devise a global strategy to consolidate all United States-funded international



Kevin Klose

broadcasting to save money and, at the same time, modernize operations in the post-Cold War era. Those operations include Voice of America, RFE/RFL and Worldnet Television.

Klose also spent 25 years at the Washington Post as a reporter and editor.

The full NPR board of directors was expected to ratify the selection committee's choice of Klose at its Nov. 19 meeting.

BUSINESS DIGEST

Thomson-CSF Pacific Acquires Wormald Technology

DEE WHY, Australia With the acquisition of Wormald Technology by Thomson-CSF Pacific Pty Ltd., Australian developments in digital broadcast technology will be getting more exposure on the international stage.

Prior to the November acquisition, Wormald Technology finalized manufacturing and marketing responsibilities with the Australian Broadcasting Corp. for the D-CART multiuser digital audio storage and editing system and the D-Radio integrated on-air digital console system.

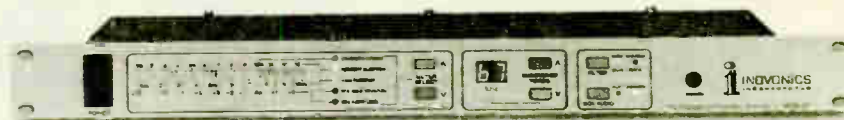
Thomson-CSF Pacific will now assume manufacturing and marketing responsibilities for these digital systems.

In addition to being used throughout Australia by the Australian Broadcasting Corp., D-CART systems have been sold to the BBC, Europe 1 in France, the Canadian Broadcasting Corp., Westdeutscher Rundfunk in Germany, Radio Television Hong Kong, Televisa in Mexico, Minnesota Public Radio and other operators in Europe, Asia and the Americas.

Gilbert Dangleterre will continue in his role as managing director of Thomson-CSF Pacific. The company will operate out of Dee Why, New South Wales.

— T. Carter Ross

FM Subcarrier Monitor/Demod



Accurate measurement of SCA, RDS and the new high-speed data subcarriers. This precision monitor/demod is the ideal companion to any FM Mod-Monitor. Check these features:

- Dual-conversion design with precise digital tuning. Covers 54kHz to 99kHz in 1kHz steps.
- Displays subcarrier injection level in percent and in kHz-of-deviation.
- Demodulates audio SCAs, shows subcarrier deviation and audio level. Balanced SCA program output.
- Optional RDS decoder plug-in comes with software for complete radio-data analysis.

MODEL 540 — \$1150

Inovonics, Inc.

1305 Fair Ave., Santa Cruz, CA 95060 USA
 TEL: (408) 458-0552 • FAX: (408) 458-0554

www.inovon.com



Weather: True Local Content

Weather Information Is Critical to Radio Programming. We Look at Some of the Choices

Val Davis

Need weather information for your station? Who ya gonna call?

At one time, the only difference between most radio station forecasts was how well the staff read the forecasts. Many stations took their weather information from the National Weather Service or from wire services that relied on it. The playing field was pretty level.

Stations began to look for ways to differentiate themselves. Weather was part of that discussion. Today's weather forecast is a vital part of a station's overall sound. In some formats, the weather can play an important part in building and

maintaining loyal listenership. In areas of the country where severe weather is common, radio stations become an even more important part of the community, thanks to their role in disseminating forecast and emergency information quickly.

Managers who want local content on their stations know that few program elements are as localized as the weather.

What's out there

We've compiled information about some of the many options and service providers from which stations can choose. If you provide a service or know of an option that is not mentioned here, contact us at the address listed below, and

we'll pass along the information.

Stations looking for weather coverage have at least four clear avenues to consider:

- Enlist the services of a weather provider to record customized weather forecasts. These can be delivered over the phone, by ISDN or by other means.
- Add an automated weather service to work in conjunction with an automation system. These use prerecorded weather announcements that are then strung together to reflect current conditions and the forecast. The order of the prerecorded cuts is determined by a text file sent via phone lines.
- Purchase the necessary weather station equipment and hire a meteorologist to develop forecasts.
- Create a relationship with a independ-

ent meteorologist or television station meteorologist and have them record custom forecasts for your station.

Many stations do not have a large budget to throw at the weather problem. For many stations, the best way to solve this problem is a call to a local TV station.

WPKR(FM) in Omro, Wis., serves the Appleton-Oshkosh and Green Bay markets. It has formed an alliance with a Green Bay TV station for weather services.

"Their chief meteorologist, John Chandik, feeds us AM drive weather in a live format," said Joel Dearing, the program director for the radio station. "After AM drive, we credit WLUK with our on-air reads. If the weather turns nasty, we have the option of using John live on the air in other dayparts.

"As part of the trade, we also get a 10-second TV spot that reinforces that Chandik is on our station and that they can get his forecast and also hear great country

See WEATHER, page 21 ▶

Products & Services Showcase

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

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

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

THIS MONTH'S SPECIAL
10% OFF THE AMAZING
MICROBOARD
C.D. DUPLICATORS
SAVE MONEY WITH
IN HOUSE CD DUPLICATION
WITH MODELS STARTING
AT ONLY \$1695

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

READER SERVICE NO. 79

STATI-CAT

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

AFFORDABLE - RUGGED LIGHTNING PROTECTION

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

Cortana Corporation Inc.

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


READER SERVICE NO. 80

NEW! DM-1
AES/EBU Digital Monitor



- ♦ Portable Digital Audio Monitor
- ♦ AES/EBU Digital Input
- ♦ 1/4" Amplified Headphone Output
- ♦ Sampling Rate Indicators
- ♦ Input Termination Switch
- ♦ 9V Battery or AC Adapter
- ♦ Low Cost

\$249.00



Call for a Videoquip products catalog or visit our web site.

VIDEOQUIP RESEARCH LIMITED Phone: 1 (416) 293-1042
Toll Free: 1-888-293-1071
Fax: 1 (416) 297-4757
Internet: www.videoquip.com

READER SERVICE NO. 81

Excaltur Electronics
HC-1 Handi-Coupler



Here is the simplest, quickest, most convenient way to connect audio to a telephone. The HC-1 connects in series with the handset of any phone using modular connectors. No connection to the phone line is needed. Press the front panel button and external audio is available on separate send and receive 1/4" TRS jacks on the rear panel. Release the button and the handset is once more connected for normal use of the phone. Nothing could be simpler!

You can find many uses for the HC-1 around your station: on-air studio, production room, newsroom, sales office, field news kits, sports remotes, etc.

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

READER SERVICE NO. 99

THE COST EFFECTIVE ALTERNATIVE TO MANUFACTURER SERVICE

SERVICE, REPAIR & CALIBRATION

- STL's • RPU's • TSL's
- Exciters • Optimods
- AM/FM Monitors
- Remote Control Systems

SPECIALIZING IN EQUIPMENT BY

- Belar • Marti
- Moseley
- McMartin
- TFT
- And others...

WE ALSO PROVIDE

Free, over-the-phone technical assistance
STL loaner/rentals
PCL 505 Certification



2198 Hubbard Lane, Grants Pass, OR 97527

(541) 471-2262

READER SERVICE NO. 122

Attention Advertisers:

Radio World

Combine Direct Mail With Advertising in a Total Marketing Package!

RADIO WORLD reaches 18,000+ equipment buying prospects. The list can be customized for your specific needs. Select by geographic region, firm type, occupational breakdown or other sub-divisions.

Call Sheryl Unangst at **800-336-3045 x164** for more information!

► **WEATHER**, continued from page 20 music." Dearing said. "The TV spot floats through the various newscasts, so we get exposure across many dayparts."

In Emmetsburg, Iowa, KEMB(FM) owner John Eisert programs a mix of music, news and information. His station, too, works with a local TV station.

"We lean more toward a music format in later dayparts. After looking at the options available to us, we decided to work in cooperation with a local television station. KCAU meteorologists record three to four weather forecasts for us each day. These increase viewer awareness for KCAU and provide us at KEMB with very accurate meteorological forecasts. These forecasts also add to the overall sound of the station."

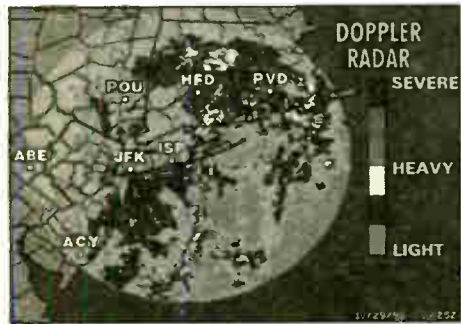
He said the partnership works well for both entities.

But there are many options. What companies provide weather service information or measurement equipment for broadcasters? Here's a brief contact list, by no means exhaustive. It is a place to start in researching your choices.

All Internet URLs should be preceded by <http://>

AccuWeather

AccuWeather, one of the most established sources of weather info for stations, offers local forecasts, commentary



AccuWeather Services

and live Q&As by top broadcast meteorologists, for cash or barter. Many stations charge premium rates for sponsorship. AccuWeather is also a leading supplier of weather content for station Internet sites.

For information, visit the Web site at www.accuweather.com or call (800) 566-6606.

Baron Services

Baron Services offers real-time, site-specific weather technologies with the capability to zoom down to city streets, rivers and lakes. Baron is based in Huntsville, Ala., with offices in Texas, Oklahoma and North Carolina. It is the parent company of Baron Tech, with headquarters located in Tulsa. Both companies focus on products and services in news and weather forecasting technology.

Learn more at www.baronservices.com or by calling (256) 881-8811

DTN

Until recently DTN has not had much to offer radio broadcasters in the way of weather resources, but it recently announced the acquisition of Weather Services Corp., founded in Massachusetts in 1946 to provide specialized weather information.

WSC believes its strength is its ability to support clients in a variety of industries with a thorough understanding of how their industries operate. Learn more at Web site www.dtn.com or call (800) 610-0777.

Metro Networks

Metro's new marketing alliance with The Weather Channel allows Metro to offer its news affiliates The Weather Channel's branded weather information for radio. Affiliates receive a TWC radio anchor, day-parted, full-time service around the clock and customized weather information.

Visit www.metronetworks.com or call (800) 800-News.

NOAA

The National Oceanographic and Atmospheric Association provides detailed weather information via its Web site at iwin.nws.noaa.gov/iwin/graphicsversion/main.html. This information is available free to anyone wishing to use it. The information includes short-term and long-term forecasts, warnings and radar images.

The NOAA main site is at www.noaa.org

Premiere Products

Formerly Rodco, this company was started for the purpose of manufacturing the Computemp system. It expanded into a full-line mail-order supplier. Based in Nebraska, it aims to provide affordable, quality weather instruments.

Visit www.megavision.net/premier/index.html or call (800) 323-2799.



Tom Churchill's Weatheradio

Spectrum Technologies

The Weather Monitor II provides real-time weather information, which the company says is preferable to readings from a distant TV station or airport.

An LCD console displays wind speed and direction. Temperature, wind chill and humidity levels can be checked with the touch of a button. Options for this weather station include a rain collector, external temperature/humidity sensor, mounting hardware.

Visit www.specmeters.com/ or call (800) 248-8873

The Weather Channel

As noted, The Weather Channel is working with Metro Networks to provide weather content to stations, but it is continuing to offer weather services through its "Radio

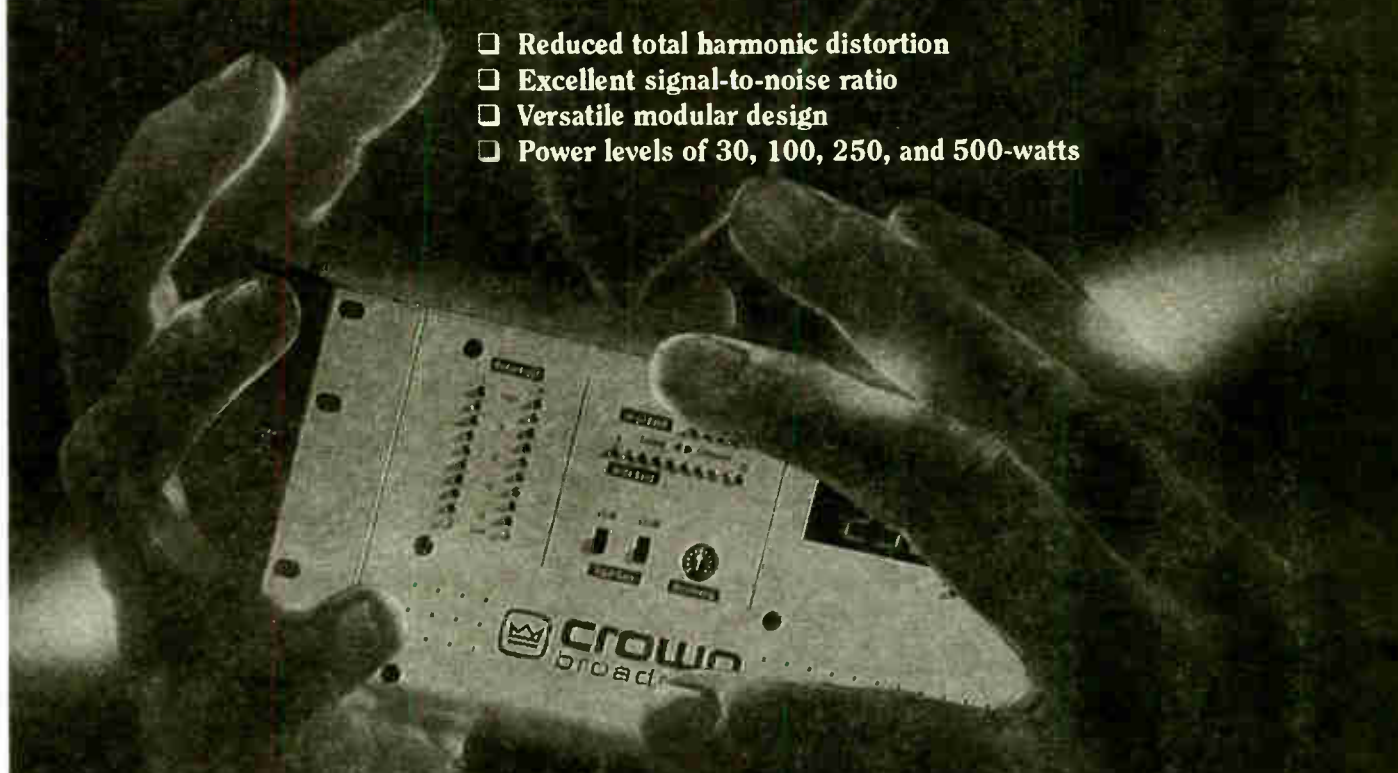
See WEATHER, page 28 ►

Crown's New Exciter

...we've created a Monster broadcast solution!

Our Design Engineers have created a second generation, high-performance FM exciter with significantly improved specifications. Fear no one—this monster solution fends off the competition by ensuring clean, accurate audio quality and includes:

- Reduced total harmonic distortion
- Excellent signal-to-noise ratio
- Versatile modular design
- Power levels of 30, 100, 250, and 500-watts



Need a Monster of a solution for...

- Replacement of the IPA in your high-power tube transmitter
- New installation
- Backup

Give us a call!

**In-the-box Innovations.
Out-of-the-box Solutions.**



800-294-8050 or 219-294-8050

Fax: 219-294-8222

Email: broadcast@crowntel.com

Web: www.crownbroadcast.com



PRODUCT EVALUATION

ATI Turns to Digital DAs

John Penovich and Abner Mir

Today's radio stations benefit from the power that digital audio can bring to the recording, editing and broadcasting of music, news and information.

Tape-based systems continue to disappear from the radio landscape, and although the familiar cart machine is still in use, it is unlikely to survive much past the millennium. The many different pieces of digital equipment in use at any one time require multiple digital outputs from a single input. Small, single-studio operations and much larger facilities with multiple studios and editing suites, such as our employer Radio Free Asia, need stable, jitter-free digital sync and audio distribution.

New products pop up daily to fill this need. Distribution amps are not sexy. They don't have lots of lights to look at and knobs to fiddle with. They do not exist to impress the latest golden-eared

status LED displays, and an input equalizer trimpot that you access through a small hole.

On the back panel, the XLR inputs are transformer-balanced and isolated, with



ATI Digital Distribution Amps

loopthrough capability and switchable input termination resistors. The dozen 110-ohm XLR outputs are isolated and transformer-balanced.

Interior construction is neat, with most components laid out on a double-sided glass epoxy circuit board bolted to the chassis. A second board mounted perpen-

the PC board and passed through holes in the panel. We would like to see them screwed to the back panel as well.

The jacks do fit snugly in the panel, though, and guide pins on them go through the board, so they should be relatively secure. ATI Vice President Ed Mullins pointed this out when asked about the chassis and jacks, and added that ATI has made approximately 10,000

products with this type of construction with no problems. That's a pretty good record — just don't do your Tarzan impersonation by swinging from cable to cable.

Out in the real world

Our first test was to use the DDA112-XLR in a simple, real-world situation. We mounted the unit here at RFA in the rack with our master clock and distributed sync signals to nine studios for two weeks straight. No errors of any kind were reported, unlock or otherwise.

The outputs measured fairly consistently at 3.15 V peak-to-peak, ±20mv. There was a slight voltage drop from the 3.42 V peak-to-peak that we measured directly off the outputs, but the studios are at the end of 150 to 200 feet of cable, so this is to be expected and it did not seem to cause any problems. Clock jitter was insignificant at a maximum of 1.01 nanoseconds, well under the published specification of less than 3 nanoseconds. Measurements were taken using a Neutrik A2 tester.

We also applied our golden ears (Abner's are golden, John's are more like teak) to program material sent from a DAT machine and it sounded just like it should: no extraneous noise was induced by the unit. Try as we might, we could

Product Capsule:

ATI DDA112-XLR

Digital Distribution Amplifier

Thumbs Up

- ✓ It worked
- ✓ Wide range of sample rates
- ✓ Accepts 96 kHz for future compatibility
- ✓ Comprehensive error and status display
- ✓ Crystal Semiconductor receiver/transmitter ICs

Thumbs Down

- ✓ Chassis is not as sturdy as we'd like

For more information contact ATI in Pennsylvania at (215) 443-0330; fax (215) 443-0394 or visit the Web site at www.atiguys.com or circle **Reader Service 1**

not find a cable run long enough to require input EQ. The unit was as happy at the end of 2.5 feet of cable as it was at the end of 250 feet, and performed equally well at either length.

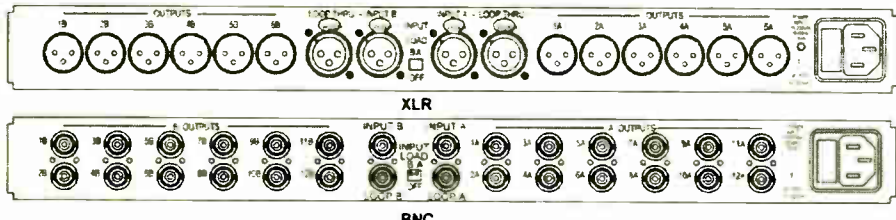
Overall, the DDA112-XLR is a well-designed piece of equipment which performed perfectly. Our only niggle, concerning the chassis, is not critical if you plan to put the unit in a stationary rack and leave it. ATI makes five other DAs in this series, with single- and dual- input XLR and BNC models available, all available through broadcast dealers. The unit we tested retails for \$939. The detailed, well-written manual comes with complete technical descriptions and schematics.

ATI has made equipment since 1979. When we called up (twice), we reached the owners of the company. How's that for tech support?

We loved the warranty, which basically states that the unit will work according to published specs, as long as you and the power company treat it right and don't take it swimming. Not covered: acts of God, Murphy's law and the wrath of your boss. Oh well.

The authors are production engineers for Radio Free Asia.

REAR PANELS



These DAs are available with XLR and BNC connectors.

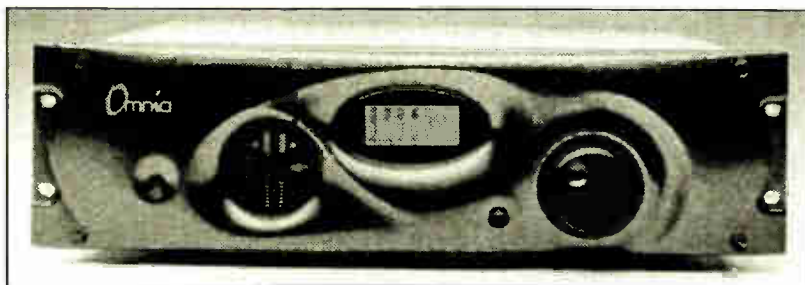
producer. They are utilitarian boxes you want to plug in and forget, relaxed in the knowledge that clean signals are sent to your gear.

The ATI DDA112-XLR is such a product, with a few extra features. It is an AES/EBU digital audio distribution amp in a single RU enclosure that accepts sample rates from 27 kHz to 96 kHz. It sports front-panel sample rate, error and

dicular to the first holds the front-panel display components.

ICs on the main board are mounted in sockets, a plus for serviceability. The chassis is perhaps not as robust as it could be, especially the front panel, which was only mounted to the enclosure at each end. Input jacks are soldered to the PC board and screwed to the rear panel. Output jacks are only soldered to

Omnia. The promise of digital... delivered.



The all-digital Omnia.fm processor from Cutting Edge delivers all the clarity and precision of digital, with the fullness and depth of analog. Positively no grunge. And loudness that blows the suits right out of their... well, suits. Demo the Omnia in your station for 30 days*. We think everyone will agree that the Omnia makes your station sound better than ever. If not, you have a money-back guarantee from Cutting Edge. Call Jack Conners at 1-800-999-9281 to arrange.



CUTTINGEDGE

Trust **ABG**

* Demo requests must be submitted as a purchase order.



www.abg.com

On the Road With Frank McCoy

GulfStar's DOE Shares What He Learned On the Summer Tech Trek of Its Stations

Frank McCoy

Greetings from the griddle. It's a bit disheartening when the USA Today weather page shows everywhere you're going, and everywhere you've been, in solid red. Every bank thermometer you pass reads three digits. Every disc jockey gives a weather forecast with a lame joke about the heat. It doesn't help that I know the jock is in a 60-degree studio. Meanwhile, I'm in the bus.

The Tech Trek bus, which I told you about in *RW* earlier this year, continues on tour, visiting, monitoring, measuring and evaluating the stations and markets of GulfStar. *RW* agreed to print my findings so its readers can compare our experiences with their own.

When you read this, the tour will have ended. But as I write, we're about halfway through our Trek, having driven about 1,800 miles. Our tour underwriter, Harris Broadcast, met us at the Texas Association of Broadcasters Convention in Dallas. The TAB puts on a fine show and we saw lots of good friends from across Texas and the country.

I now know that the two 12,000 BTU air conditioners along with the engine A/C are still not enough for bright sun and 108-degree temperatures. Neither am I, but like most engineers I'm a trooper, and so we trek on and truck on.

This tour is about problems and solutions and applying them in a manageable way across a large universe of stations. The consolidation process undertaken by GulfStar and others is batting cleanup for 20 years or more of neglect and marginal operation of the stations in middle markets. The challenges are many and varied. Here are three that we found in our Trek.

You got gas?

In the two years I have been with GulfStar, there have been eight episodes of antenna and/or feedline failures. In most cases the equipment was old, having been bought when the station was constructed, typically in the mid-1970s or early 1980s.

In two cases the stations had antennas and feedlines that were totaled when we acquired them — they literally came in on a gurney. GulfStar chief engineers Richard Petty of Baton Rouge and Roger Taylor of Lubbock got us off life support and back to full power.

A collection of stations like GulfStar's allows you to see problems in "fast forward." If an antenna and feedline have an estimated life of, say, 20 years, and if you own 80 stations, then it seems statistically reasonable that in any given year you'll be replacing four antennas or so.

Looking at our experience, I attributed the higher number of failures to the fact that GulfStar's antennas and feedlines are disproportionately older. If the ages of the antennas were evenly distributed from new to 20 years old, my earlier theory would hold. They're not, and so there were more than the predicted number of burnouts.

A disturbing discovery is the degree to which maintaining dielectric gas pressure within feedlines is misunder-

stood or ignored. Most of the antennas we have inherited, in all probability, at some time in the past went without pressurization. Somewhere there originated an erroneous notion that once the feedline is pressurized, the gas supply can be turned off. I have seen elaborate systems of gauges and shutoffs, the result of which is that when a leak develops, no matter how slight, the pressure will be lost and the feedline and antenna are compromised.

Perhaps this arises from the practice of shipping feedline pressurized on the

spool but without a supply of gas attached. Whatever the origin, this is wrong and will void the warranty of most antennas and feedlines.

Because the stakes are so high and because even a Cadillac solution is relatively inexpensive, I conferred with engineers at Andrew and sales representative Steve Schott of Harris Broadcast for guidance. Steve confirmed that he, too, had seen the "turn-off-the-gas" wives' See MCCOY, page 25 ▶



GulfStar engineers Hans Atwood, left, and Richard Petty, right, pose with Frank McCoy in Biloxi, Miss.

The Best Digital Audio Delivery System Just Got Better

More Powerful, Less Cost!

Make the **EZ** Selection

<p>Library & Playlist Modification Module EZ-LIB Great For PD's, MD's, Traffic... Multiple Cart Walls Module EZ-ARRAY Unlimited Instant Access—Customize Each User Automated or Live Assist Player Module EZ-PLAY Up to 4 Available Per Workstation MasterLog Live Assist Player Module EZ-MLOG Second Generation Interface for Advanced Users Quad Player Module EZ-QPLAY Multi-Deck Cart Player Enhanced Quad Player Module EZ-4PLAY Multi-Deck Player With Scheduling</p>	<p>Tracker 2000 Module EZ-TRKR The Easiest & Most Powerful Voice Tracker Available Recording & AutoRecording Machine Module EZ-REC Up to 4 Available Per Workstation Graphic Waveform Cut & Paste Assembly Editor Module EZ-EDIT Fast Non-Destructive Editor Script Display Module EZ-SCRIPT Prompting Display With Embedded Audio Wire Capture & Editing NewsDAD32 Complete News System STRATA Comprehensive Multichannel Editor Embedded DAD Application</p>
--	--

The **DAD_{PRO32}** Digital Audio Delivery System already has a widely established and enviable reputation as the most versatile and reliable system on the market. Now configuring a DAD System



is as easy as picking your favorite tunes. New **EZ Modules** permit selection of only the features and functionality required for optimization of any Workstation, typically at a significant cost savings.

LAN or WAN - LIVE ASSIST or AUTOMATED MAJOR or SMALL MARKET

DAD_{PRO32} DELIVERS WHAT OTHERS ONLY PROMISE

Applicable Play and Record DSP boards will need to be added depending on module selected. The full DAD_{PRO32} system is recommended for operationally intensive facilities. For more information on EZ Modules and other DAD products, contact your nearest ENCO dealer, or call



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



***When two innovative companies join,
the game has just begun.***



Scrabble is a registered trademark of Milton Bradley Company

***Harris And
Intraplex Synergy
Continues***

Harris, the leader in advanced broadcast systems, is pleased to welcome Intraplex, the leader in digital transmission solutions, to the Harris Communications family.

Whether you are outfitting a new station, networking a group of stations, or upgrading your equipment, Intraplex Transmission Solutions from Harris Broadcast Systems will take you there. Call us today.

Harris and Intraplex Transmission Solutions.
Welcome to the next level.



next level solutions

WIRELESS
BROADCAST
COMMUNICATIONS
PRODUCTS

HARRIS
Communications

1-877-468-7275 • www.harris.com/communications

What McCoy Learned

► MCCOY, continued from page 23
tale at work and expressed concern.

Between us we arrived at what we believe is a foolproof, redundant solution. It is based in large part on a well-thought-out system in Alexandria, La., put together by Richard Petty, our chief engineer in Baton Rouge, with help from Lyn Hare, the local engineer in Alexandria.

Each plant installation using gas dielectric feedlines will have two sources of dielectric gas. The primary source is the old reliable bottle of nitrogen, with a new twist. An idea provided by Jason Black, chief engineer of the GulfStar stations in Jackson, Miss., is to use not one but two regulators on the nitrogen bottle. The first provides regulation from the bottle gauge pressure, typically 3,000 PSI, down to about 100 PSI. Then a second regulator is attached to the output of the first through a nipple and regulates down to a final pressure of 2 or 3 PSI.

The resulting system is very stable and does not exhibit the pressure drift of single-regulator installations.

The second source of dielectric gas is there because trouble can happen. An inexpensive fish-pump dehydrator of the kind supplied by one of the feedline manufacturers is "teed" into the gas line leading to the inlet on the feedline. If a leak develops and empties the bottle, the dehydrator will kick in and maintain positive gauge pressure until the leak can be found, repaired and the nitrogen bottle restored.

A disturbing discovery is the degree to which maintaining dielectric gas pressure within feedlines is ignored.

All that remained was to design a set of alarms that would alert the engineer in the event a failure occurred. The traditional pressure sensor, while valuable, only indicates that pressure is lost completely. What was needed was a way to know that the primary source was exhausted and that the secondary dehydrator was operating.

The solution is a simple combination alarm, paralleling the normally closed (open when pressure is indicated) contacts of the pressure sensor and the normally open contacts of a 120 V relay connected across the motor leads of the dehydrator. Now whenever the dehydrator runs — under ideal conditions, never — an alarm is communicated to the remote control.

While this will never prevent leaks, at least dielectric pressure will be assured under all circumstances.

Steve Schott agreed to be the contact person to manage the ordering and distribution of needed components. This accomplished two valuable goals: It allows us to take advantage of quantity discounting, and permits GulfStar engineers to describe what they have now, and Steve simply sends them

what they need. An efficient, effective and permanent solution. Steve and Harris deserve much credit for willingness to respond in this way, expanding the definition of the sales engineer and representing the best kind of value-added vendor support.

A second finding of our tour concerns modulation.

The deregulation of the 1980s put ownership of an FM modulation monitor in the optional column. I suspect that manufacturers like Belar and others have seen fewer units sold than would have been forecast by sheer station numbers and normal attrition. The absence of annual proof of performance



GulfStar staff in Baton Rouge, La., pose with the Tech Trek bus.

and the relative stability of the current generation of stereo generators and exciters have allowed operators to do without, particularly in medium and small markets.

Add staff reductions at the FCC, self-inspection and state association inspection programs without measurement requirements, and you have a recipe for

occupied bandwidth trouble.

It shows. Most of the stations in medium and small markets are within the 60 dBu contour of a large-market station or at least the 54 dBu contour of a major-market station. As a result, program directors have a standard for apparent loudness comparison. In the absence of a

See MCCOY, page 27 ►

Broadcast Solutions for broadcast professionals.



"My job is to make sure our listeners hear a seamless, interactive broadcast—and fortunately, that's Gentner's job too."



COMING SOON—

Watch for the exciting new addition to the Gentner telephone hybrid product line!

Gentner offers telephone interface products for any broadcast setting, from live remote to broadcasts to listener call-ins. We have the right solution for you.

 **Gentner**

Perfect Communication through Technology, Service, and Education.™

1.800.765.9320 • 1.801.975.7200 • www.gentner.com

It's one
thing to have
a built-in
character flaw.
Broadcasting
it is quite
another.

Unlike Omnia, the OPTIMOD-FM 2200 does not use composite clipping to achieve peak control. Rather, it delivers loud, clear, digital sound across the entire spectrum—without introducing possible corruption, signal trashing or overshoots into your broadcast chain.

Composite clipping is a bit like truth in Washington. The more you listen to it, the more you question it. It can trash the stereo signal or corrupt the RDS. In an all-digital air chain, a processor that doesn't control peaks on the digital outputs is asking for trouble. To prevent over-modulation, you must reduce the overall loudness level, thus undermining the whole point of a signal processor.

By comparison, the 2200 gives you tight peak control, no matter which output you use. It maintains pure digital clarity and cleanliness throughout the broadcast chain. And at nearly half the price of an Omnia, it allows any station to get the best possible sound—without compromising your budget. Or character.



T H E O P T I M O D - F M 2 2 0 0



orban[®]

A Harman International Company

Lessons of a Tech Trek

► MCCOY, continued from page 25
mod monitor, and often using older or poorly set-up processing, the result is loudness comparable to the majors, through overmodulation.

Typically, if any station in a market is overmodulating, they all are. I expect this is in part because often there is only one engineer in the market and he just sets all the local stations to the same loudness, again without benefit of an absolute standard.

It appears that FM in these markets has been this way for a while. Current rules still require that a directional antenna AM have an antenna monitor and a field intensity meter (why is AM always harder?). In my opinion, it is not unreasonable that we be required to have a modulation monitor on the minimum equipment list for an FM station.

On the Tech Trek, we are able to check the peak deviation of stations that put a 60 dBu or better at our location. As I identify stations that are guilty, we make polite, diplomatic calls to the owners or managers encouraging them to come into compliance. After all, we're not the spectrum police. But if, after a decent interval, there is no improvement, I'll rat 'em out. Industry self-regulation at its best.

Equally common were stations that were undermodulating. Most likely they are relying on older, pulse-count type mod monitors. Any analog moni-

Many stations were undermodulating. Most likely they are relying on older, pulse-count type mod monitors.

tor that has a moving coil meter or threshold detector peak lights has to develop DC to run them from detected baseband. This detection involves a diode, smoothing capacitor and bleeder resistor.

The resulting network is not a peak detecting circuit. The voltage developed is proportional to the area under the composite waveform — the RMS, not the peak. These monitors are truly valid only under conditions of sine wave modulation. Very few FM stations broadcast sine waves these days, as we all know. As the baseband increasingly contains clipped waveform components, the relationship between the area under a sine wave with similar peak amplitude becomes less accurate. The result is an erroneous higher-modulation indication.

What tower?

A third lesson of our station visits is that these days, you should assume nothing.

A routine request to the local planning and zoning department revealed that our studio tower, home to our STL dishes and other needed assets, was apparently built without permission. A little more digging revealed that the previous owner had

applied, and been denied, then built the tower anyway.

Our company retained a local lawyer to help sort out the mess. In our initial meeting, the attorney made it look like a slam-dunk, that we'd have no problem.

"Getting a special use permit will be easy," he boasted.

A few days later, the lawyer called again, this time a little less confident. It seems we would need to get all the area residents to agree to let us have the tower. Every few days, the story got worse, and by the time we presented our case before the city council, it seemed unlikely that we would get any relief at all.

We lost the tower issue on a vote of 5

to 2, but we did get rezoned for a sufficiently large building.

Sometimes you win 'em and sometimes you don't. This time it was both. The same lawyer now is back asking if we want to try again for a shorter tower. Win or lose, he gets to bill some hours.

Every problem we encounter is practice for the next time the same problem arises. This is no exception.

In another market, I've got a stone church bell tower in the way of an STL shot. When the bell rings on Sunday, we have trouble.

I can't move the church, so the only answer is to raise the antennas. We need a taller tower. We inherited a tower that looks badly overloaded anyway.

I expect all the usual objections. The big three are lightning, risk of collapse and "It's ugly."

You can address concerns about lightning with a comparison to the gantry used to fuel boosters at the Kennedy Space Center. With its launch facilities in central Florida, the epicenter of lightning frequency, the U.S. space program would have been a flaming liquid hydrogen scorched-earth program if lightning were uncontrollable. Obviously it must be possible to prevent lightning strikes. This argument leads me into an explanation that the presence of a tower actually can reduce the likelihood of lightning, providing an umbrella of protection.

Falling towers are a scary thought, and this objection can be challenging to answer. Enlist the help of the city engineer by asking him or her to attend the council session. Ask at the meeting if the

See MCCOY, page 28 ►

GLOBAL BROADCASTING SOLUTIONS

Exciters

Television Broadcasting

Radio Broadcasting

For over 50 years Continental Electronics has been building the most powerful transmitters for broadcast and communications installed throughout the world. Let us assist you with Engineering, Designing and Commissioning your Studios and Transmitter Facilities.

Celebrating 50 years of continuous service

ISO9001 Certified

CE Continental Electronics Corporation
800.733.5011 • Dallas, Texas 75227
www.contelec.com

Continental Censa
Santiago, Chile

TELEFUNKEN
Sendertechnik
Berlin, Germany



MPR Theater Adds Soundcraft Console

The historic Fitzgerald Theater in St. Paul, Minn., the primary home to Garrison Keillor's show "A Prairie Home Companion," installed a Soundcraft Series FIVE console for front-of-house and monitor mixing tasks. It replaces an old Soundcraft 800B desk, installed during the theater's complete restoration in 1986.

"There were a number of reasons we liked the Series FIVE — its number of channels, flexibility and matrix output,"

said Brian Sanderson, the Fitzgerald's general manager. "Plus, most of the engineers here tend to be Soundcraft fans, I think primarily for its EQ, which is very musical sounding."



The Fitzgerald Theater

Built in 1910 as a Schubert Vaudeville theater, the venue, owned by Minnesota Public Radio, seats more than 1,000 patrons on its main floor, two balconies and four boxes. Events held at the theater

include live concerts, theatrical performances and corporate events.

For more information, contact Soundcraft in Tennessee at (615) 360-0471; fax (615) 360-0273; or circle Reader Service 27.

NHK in Japan Buys Short/cut System

NHK, Japan's National Television and Radio Network, is using a 360 Systems Short/cut Editor for recording, playback and editing tasks.

The unit is housed at the Osaka production facility. It will be used in network programming and sporting events.

Sound effects and background music themes are recorded, edited and stored on Short/cut, allowing NHK Osaka to adjust the length of each musical segment during the final mix. The final production is stored on Short/cut for editing.

In addition to the network's radio dramas, Short/cut is used as a field recorder and editor. The system was used in the recent Winter Olympics.

For information, contact 360 Systems in California at (818) 991-0360, or circle Reader Service 2.

"Who's Buying What" is printed as a service to our readers who are interested in how their peers choose equipment. Information is provided by suppliers.

Companies with news of unusual or prominent sales should send information and photos to: RW Managing Editor, P.O. Box 1214, Falls Church, VA 22041.

GulfStar Tech Trek

► MCCOY, continued from page 28
local building code safety requirements are conservative. The expected affirmative answer will allow you to read into the record the wind speed and ice load parameters used, getting confirmation from the neutral city engineer.

The toughest sell is the aesthetic issue. Nobody likes how towers look, for some reason. This next round, we will be better prepared. The process is essentially the same, with a hearing and a vote in the city council chamber. In this case, rather than ask for permission to build an unsightly tower, we are planning to erect a local landmark.

What if the tower looks nice? Can a tower be attractive to anyone except broadcasters? Suppose we were to construct a self-supporting tower with curvilinear lines. The tower could even be illuminated at night. Picture three curving rows of bulbs converging 150 feet in the sky. Picture an illuminated star, visible from everywhere in the city, mounted for the Christmas season.

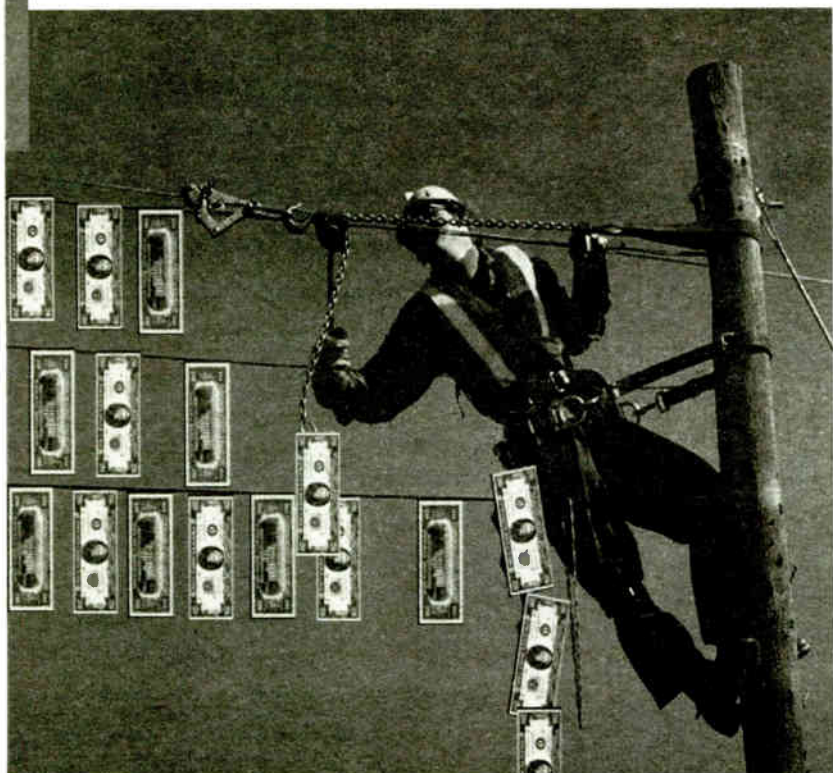
Can I get the city fathers to allow me to build a little Eiffel tower in their town?

Stay tuned as the trek continues.

■ ■ ■

Frank McCoy is vice president, director of engineering and self-described rug trader for GulfStar Communications, a subsidiary of Capstar. RW will print more of his Tech Trek engineering observations in an upcoming issue.

Money doesn't grow on trees; it grows on phone lines.



Your phone could be bringing in a lot of revenue if you have an Audio OnLine from Henry Engineering. Audio OnLine is the easy way to turn an extra phone line into a money maker! Audio OnLine lets you have multiple "information lines", with multiple sponsors while using ONE system! Callers menu-select the information they want to plus hear your sponsor's message! Hundreds of messages can be stored on line, each with its own call counter.

Audio OnLine is ideal for weather reports, ski conditions, concert information, traffic updates, sports scores, lottery, and school closings. The list of possibilities is endless! Sell information sponsorships to local ski shops, record stores, gas stations, concert promoters, theaters, and convenience stores. Practically any advertiser will benefit from sponsorship.

Audio OnLine installs in any DOS computer. It can answer up to 16 phone lines simultaneously, without supervision. Just start it up and start collecting the revenue!

next level solutions

HARRIS
Communications

1-800-622-0022

www.harris.com/communications

Weather Info Vital to Stations

► WEATHER, continued from page 21

Partners" and via the Internet.

TWC says radio affiliates have found its forecasts to be one of the most salable elements of their programming. The company can provide information about how its weather products help a station to extend ratings and revenue.

Access specific information at www.weather.com/aboutus/radio/index.html

Tom Churchill's Weatheradio

Weatheradio systems automatically combine prerecorded speech fragments into broadcast-quality weather reports, which the company says are virtually indistinguishable from live weathercasts.

The units provide real-time, on-air mention of current conditions through attached weather sensors, as well as forecasts, bulletin and NWS site conditions via local news wire or Internet data links to Weatheradio computers.

Learn more at www.weatheradio.com or by calling (800) 728-4647.

Weather Research Center

Weather Research Center provides broadcast meteorologists to help enhance local programming. Options include direct dialogue with air personalities, taped discussions and hard-copy forecasts. The company promotes discussion between air personalities and meteorologists as a way of enhancing credibility and listenership.

The Web site is www.wxresearch.com/ Some radio broadcasters have opted to purchase their own weather radar systems, for their own use and as a profit center. For example, they can send a live radar image to local cable companies and sell advertising on the radar feed to their broadcast clients. For some stations, this source of nontraditional revenue could be a viable option. The following companies sell radar systems, but be prepared to take a deep breath when you ask for pricing information.

Ellason Weather Radar
www.ewradar.com
(800) RADAR-34

Radtec Engineering
www.radar-sales.com
(303) 438-8745

Advanced Designs Corp.
www.doprada.com
(812) 333-1922

Enterprise Electronics Corp.
www.eecradar.com
(334) 347-3478

These are just a few weather service providers, equipment providers and other solutions stations can implement.

What's your experience? Send e-mail to radioworld@imaspub.com or write to the address on page 5.

See Our FREE Catalog

& be sure to drop by our web site

WE BRING THE STORE TO YOUR DOOR



HEARD THE BUZZ?

Audio • Video • A/V • Lights

FULL COMPASS

800-356-5844

Circle (40) On Reader Service Card



Same great gear, streamlined service!

We're your after-hours sound source.

7am to 11pm CST M-F • 10am to 6pm CST Sa-Su

Pro Audio, Video, Lights!

COMPASS X PRESS

800-476-9886

The newest division of Full Compass

Workbench

Radio World, December 9, 1998

Expert Advice Is on the Web

John Bisset

Last issue, I spoke about the great resources available through the NAB Technical Workshop tapes. If you are looking to stay current or brush up your technical skills, the AM Directional Antenna Workshop, the Digital Facilities Workshop and the AM/FM Transmitter Workshop are good places to start.

There also is some good transmitter maintenance information on the Web. Nautel and Broadcast Electronics, for example, provided PowerPoint maintenance presentations on their lines of transmitters; these programs are available on their Web pages. The presentations included lots of photos for assistance as you maintain their transmitters.

On the Harris Web site, you can request a copy of Dave Kobe's "Staying

on the Air: Case Studies in Emergency Planning," among other helpful maintenance information.

These presentations, written by the experts who manufacture the equipment, are free for the asking, so take advantage of them.

This year's transmitter workshop added an interactive troubleshooting session. I think we all had fun narrowing down the problems, starting with all-too-familiar calls, like the jock "thinking" they are off the air, but hitting a monitor button on the console so nothing is feeding the speakers! One of the biggest laughs was the response to the problem, "You're driving home, listening to your station, and you hear the station go off the air. What do you do?"

The reply: Keep driving home! (We wish!)

One suggestion repeated throughout the transmitter manufacturers' panel discussion was to utilize technical services. Dave Chenoweth of Continental reminded the attendees that this service is figured into the price of the transmitter you buy — be sure to use it. Equally important, though, is to have your thoughts organized before you call the field ser-

vice engineer. Remember, he becomes your eyes as you solve the problem. You must feed him as much information, in as organized a manner, as possible.

at Continental Electronics for a copy. Ed Slimak from CCA prepared a useful narrative which describes the control circuit "ladder" on CCA transmitters, underscoring the importance of knowing how the circuit works before you troubleshoot it. A copy of Ed's paper is available through CCA.

Efficiency ideas

Our engineer's panel and question-and-answer period at the end of the day brought forth its usual great suggestions, ideas and tips.

Here is one to consider: If you are going to file an insurance claim because of lightning, ice or storm damage, take several rolls of pictures of the damage. Many times, in the rush to get back on the air, defective parts are replaced, and may be thrown away. The soot-filled transmitter or coupling unit is cleaned. When the adjuster shows up, it looks like you're trying to pull one over on him.

Another suggestion was to find out whether or not your station has "business loss insurance." Claims filed against this type of insurance will motivate the insurance company to move quickly. If the damage was caused by lack of surge suppression, talk to the insurance company about your desire to install this type of protection. I've seen instances where the insurance company will pay for all or part of a surge suppressor, because of the savings against future claims the improvement will bring.

There were other suggestions and discussions to help you run your facility

See WORKBENCH, page 34 ▶

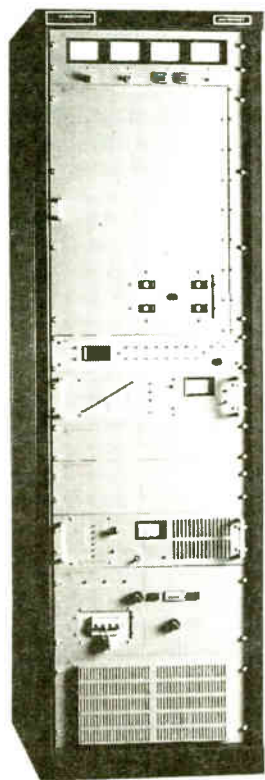


Figure 1: A chase nipple fitting prevents wire abrasion.

vice engineer. Remember, he becomes your eyes as you solve the problem. You must feed him as much information, in as organized a manner, as possible.

Dave has prepared a one-sheet on Radio Station Maintenance. Contact him

ARMSTRONG FM TRANSMITTERS



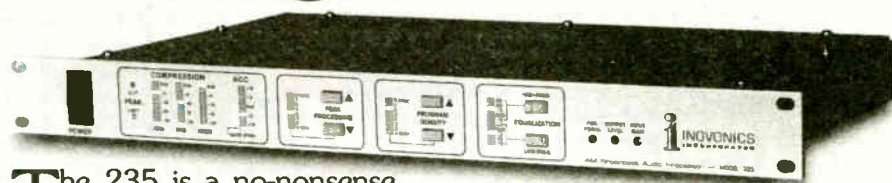
Engineered for Reliability

- ◆ 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 Road • Marcellus, NY 13108 • (315) 673-1269 • Fax (315) 673-9972
www.armstrongtx.com

Honest AM Improvement



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

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

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

Model 235 — \$1800

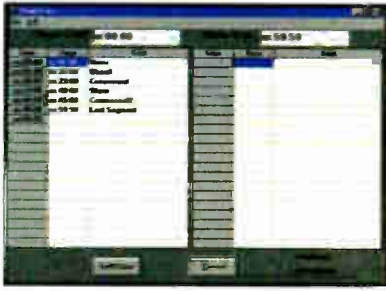
Inovonics
1305 Fair Ave. • Santa Cruz, CA 95060
TEL: (408) 458-0552 • FAX: (408) 458-0554

www.inovon.com





Main and Conference buttons indicate easy-view call status at all times, and provide remote control of a Telos interface. Point-and-click on Conference buttons to pick up calls. The live call will be highlighted as indicated.



The Show Data window is used for scheduling events that occur within a pre-determined time interval—for example, 3:00PM–5:00PM. When an "x" is entered in the hour field, Show Data runs as a generic hourly clock, as shown in the above display.



The caller menu bar displays lines in use and caller information for each line. To enter caller information, simply double-click on the desired line for the caller pop-up box. Enter Caller Name, City, and Comments, then press "exit" to post information on the screen.



Commercial2



TIME



MESSAGE

From: Bob The Screener



The Message Window is a helpful tool for communications throughout the Assistant Producer network. To send a message, double-click inside the message box for the Message Entry pop-up box. Type in a message and press "send" to post it. "Send urgent" makes the message background area bright red. A message "hotbox" allows you to store and send frequently-used messages.



The dialer feature allows you to choose a dialout line, and automatically dial outside calls from the Assistant Producer pop-up dial menu.

FOR SALE: BIG TIME NETWORK PRODUCER

Assistant Producer

TALKSHOW MANAGEMENT SOFTWARE FOR WINDOWS

Assistant Producer for Windows™ now allows producers and talent to manage callers while maintaining constant communication with each other, all in an easy-to-use, attractively-displayed Windows environment. It is perfect for virtually any studio environment, enabling producers to provide talent with information on each caller, send instant messages, and control the status of multiple telephone lines. Since the entire system is Windows-based, it can even be networked through an ethernet or intranet network. In addition, Assistant Producer is designed to work effortlessly with all Telos interface products to create a complete, integrated system that is perfect for any studio setting.

- Supports Windows 95/NT or higher
- Serves as either a talent or producer workstation on a PC
- Features line selection and control over the network by keyboard, mouse, and Telos Switch Console
- Contains robust color-coded line status indicators for easy recognition
- Manages your time with clock and call timers and a unique countdown timer for indication of time-to-break, etc.
- Houses a flexible database which allows configuration of desired listener demographic fields and talk show statistics
- Writes database files using Microsoft Access files for easy analysis and conversion to other formats
- Designed for use with a Telos Direct Interface Module (DIM) or 1A2 Interface Module, combined with any Telos hybrid



Assistant Producer controls any Telos telephone interface and hybrid combination, such as those pictured here.



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

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

Circle (92) On Reader Service Card

STOP . . . LOOK . . . & LISTEN TO THE FUTURE OF RADIO . . . ARRAKIS SYSTEMS INC.

Technology and Price Breakthrough

NEW- Your Complete Digital Solution!!!

Perfect Cart machine replacement: play, stop, pause, loop, link . . .
Perfect for Live Assist: Jingle Box, Phoner Editor, & much more . . .
Perfect for Automation: Voice Over Recorder, Segue Editor, & more . . .
From the #1 manufacturer of Digital Workstations in Radio !!!

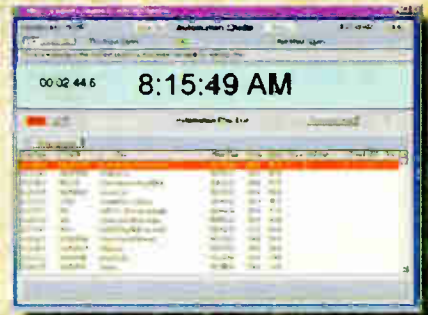
Live On Air
\$495



Live Assist \$1,995



Hard Disk Automation
\$2,995



(includes Live Assist software)

Cart Machine Control
\$750



Triple Play & Record

Jingle Box Control
\$1,195



Optional Front \$495



DL4 Digital Audio Engine

\$2,995 (24 hrs ~2,000 spots) \$5,295 (105 hrs ~ 2,000 songs)

The DL4 is a technology & price breakthrough !!! More reliable and 1/4 the price of comparable products, the DL4 is NOT a PC computer with sound card in it. The DL4 is in fact a digital audio appliance that is controlled by Arrakis LCD control panels, jingle boxes, and Windows 95 PC computers. If the PC fails, your audio library is still available !!! Expandable from 3 Plays & 1 Record to up to 96 Plays & 32 Records, the DL4 fits any size station's needs. You can even use your favorite PC based digital editor for production with the DL4 On Air !!! Call TODAY to find out how little it will cost for you to SAVE money and move into the 21st century !!!

Arrakis Systems inc. (970) 224-2248 www.arrakis-systems.com



Plenty of Good Advice

► **WORKBENCH**, continued from page 30 more efficiently. Do you have the makings of an "emergency" antenna? Do you know why you shouldn't use those cheap \$15.99 uninterruptible power supplies on your rack equipment? Is your transmitter site properly grounded? Do you know why the fins of blowers should be cleaned?

All these and more are included in the session tapes. I encourage you to have your station make the investment for you. To obtain an order form, contact Mobiltape Company at (805) 295-0504, or visit them on the Web at www.mobiltape.com

★ ★ ★

One of the slides I used in the maintenance and troubleshooting section of the workshop showed a tube that had overheated because of clogged air filters. The folks at Econco mentioned that copies of their booklet, "Tube Topics," are available free. Send your written request to Econco on your station letterhead, or circle Reader Service 107.

In the back of the booklet is a set of helpful component identification drawings. The portion shown in Figure 1 helps identify the grids, filament leads, etc. Knowing which part of the tube does what helps in troubleshooting a problem, since you can trace the signal to the tube socket and know where that particular contact goes. Tube Topics is a

great resource for any engineer who works with transmitters, and desires a deeper understanding of how to maintain tubes.

★ ★ ★

Here's a request from Laverne Siemens, the director of engineering for Golden West Broadcasting. The station has a news director who does a lot of editing news clips using a cassette. Laverne has been trying to standardize on Tascam 112 and 122 machines, but he's getting some resistance from the news department due to the delay in audio that occurs when Play is pressed.

Laverne asks *Workbench* readers if anyone has found a way to modify the unit so it responds more promptly to the Play command. If you've got an idea, send it via e-mail to jbisset@harris.com, or fax (703) 323-8044.



Figure 2: Use caution when trenching in new cable, repairing each cut radial or strap with silver solder.

★ ★ ★

Ralph Winquist has been a frequent contributor to *Workbench*. Figure 1 shows a bushing that can be used on a motor to reduce wiring failure due to vibration rubbing the insulation. The "Chase-Nipple Fitting" has curved edges, and reduces wear on the wires, especially where there is vibration.

Ralph also responds to Paul Litwinovich, who commented here about CVS use in the Oct. 14 issue.

"While I will not argue Paul Litwinovich's calculations on the savings by shutting off the CVS, I would respectfully refer him to the Manufacturer's (SOLA) recommendation on page 10 of their instruction manual (P/N 299-35206-01), wherein it is stated:

"It is desirable to have a switch in the input circuitry for turning off power to the unit when it is not in use. While all CVS transformers are designed for continuous duty, they draw appreciable current, regardless of the output loading."

"While there is a savings in shutting off the CVS, you would also be following the manufacturer's recommendations."

Thanks, Paul, for your clarification.

★ ★ ★

Laying in new transmission line? You'll find a number of new trenchers at the equipment rental companies that are really great, but in an AM field, be aware not only of radials, but also of transverse copper ground strap (Figure 2). Take your time, and if you outsource the job, supervise the crew. Cut or broken radials will greatly reduce your coverage.

One technique I've used with success is to tell the contractors that there are electric wires in the ground that could pose a shock hazard. This keeps them alert, and helps avoid extensive damage to the ground system.

■ ■ ■

John Bisset has worked as a chief engineer and contract engineer for more than 20 years. He is a district sales manager for Harris Corp.

Submissions for this column are encouraged, and qualify for SBE recertification credit. Fax your submission to (703) 323-8044, or via e-mail at jbisset@harris.com

Which would you rather carry on your next Remote?

ALL THIS

ROADRUNNER

or



Your one box remote broadcast solution!

When you're rushing off to your next remote you don't want to lug around a lot of equipment. RoadRunner from MUSICAM USA gives you:

- A 3-channel mixer
- Built-in ISDN Terminal Adapter with integrated NT-1
- MUSICAM® MPEG Layer II, Layer III and G.722 for total compatibility
- Internal power supply or external battery

All in one box.

Performance, price and portability — RoadRunner outdistances the competition every time



MUSICAM USA
670 North Beers Street, Building 4, Holmdel, New Jersey 07733 USA
Tel: 732/739-5600
Fax: 732/739-1818 • Fax On Demand: 732/935-2777
Email: sales@musicamusa.com
Internet: <http://www.musicamusa.com>

Prices shown are published manufacturer's list prices as of 3/1/98

DOS AMIGOS

The AMIGO series from CRL is your answer when you want great sounding processing at an affordable price.



AMIGO FM

- A Complete Processing System Including AGC, Multi-Band Limiting, and Stereo Generator
- Dual Band AGC with more than 25 dB of Range
- Tri-Band Pre-Emphasis Limiting with High Protection Low-Pass Filters
- Digitally Synthesized Stereo Generator with more than 50 dB of Separation
- Includes Both L/R Audio and Low Z Stereo Outputs

The AMIGO FM is a compact but powerful FM Stereo processing system. The AMIGO FM has a wide range dual band AGC, followed by a full tri-band Limiter. Precise high protection audio low-pass filters ensure excellent cross-talk immunity. The digitally synthesized stereo generator provides over 50 dB of drift free separation. Selectable bass boost and stereo sound-field enhancement circuitry are included.

The value packed AMIGO FM is a popular replacement/upgrade for the 8000, and 8100 processors. The AMIGO FM is easy to set up, and works great on any format.



AMIGO AM

- A Complete Processing System for AM Stereo and Mono Applications
- Dual Band AGC with more than 25 dB of Range
- Full Tri-Band Matrix Limiter with Mono Gain Support, and NRSC-1 Audio Filtering
- Stereo Sound-Field Enhancement Circuitry
- Dual Outputs: One Stereo, One Mono

The AMIGO AM is a complete processing system for mono and stereo stations. The AMIGO AM contains a dual-band AGC followed by a tri-band Matrix Limiter. Our exclusive mono gain support circuitry provides up to 6 dB better envelope modulation for stereo broadcasts. Full NRSC-1 Audio Low Pass filtering is included. The AMIGO AM also includes bass, midrange, and high equalizers, plus our exclusive stereo sound-field enhancement circuitry.

The AMIGO series offers your station a great sound at a great price. Our demo program lets you try one out today! Ask us for the details!

CIRCUIT RESEARCH LABS, INC. 2522 West Geneva Drive • Tempe, Arizona 85282-3192 • U.S.A.

Tel: 602.438.0888 • Fax: 602.438.8227 • Web site: www.crlsystems.com

Toll Free: 800.535.7648 • E-Mail: sales@crlsystems.com



GUEST COMMENTARY

Behind the Scenes at Premiere Radio

The DOE of a Major Syndicator Explains the Policies, Problems of Program Feeds

Barry Victor

The author is director of engineering for Premiere Radio.

Our industry hears much discussion about syndicated programs. Among radio engineers and affiliates, that talk often turns to tone closures, quality control questions and response to technical problems.

Premiere Radio has 6,500 affiliates, all of whom rely on us for consistent audio delivery. Many of those clients ask us similar questions about our technical policies and practices.

As director of engineering for Premiere Radio, I felt it would be useful to review how a show is produced here, and to list the myriad obstacles a show must get past to reach your satellite receiver. My hope is to explain these parameters, and how we handle your technical troubles and complaints. The editors of RW felt that readers would appreciate a peek inside our operation.

Premiere Radio is a wholly owned division of Jacor Communications. We syndicate Rush Limbaugh, Dr. Laura, Dr. Dean Edell, Jim Rome, Mike Reagan, "After Midnight," Art Bell and "The Group Room." Premiere Radio, the network entity for Jacor, is the commercial rep partner for several networks in the United States. Premiere

also produces 12 comedy networks, and offers morning prep services, Hot Mix Radio Network, BRG Music Works, and a research division, Mediabase.

Premiere's headquarters are in Los Angeles. Our studio complex in Los Angeles consists of 16 studios. Five of



Director of Engineering Barry Victor, right, poses with host Michael Reagan.

these are primarily for on-air use, and three are configured for talk radio. The company also has studios in Medford, Ore., Scottsdale, Ariz. and Philadelphia.

In the studios

Each of our talk studios is slightly different. Dr. Laura Schlessinger is in a

large studio, with her show's technical equipment, along with her board operator. Her telephone screener and producer are in an adjacent studio.

Jim Rome and Mike Reagan share the same studios. This complex has a separate announce studio, set up with provisions for three air talents. At times, it has housed up to 10 people for our cancer help program, "The Group Room."

The control studio contains technical

equipment, the board operator, producer and telephone screener. Mike Reagan is broadcast live on America's Voice cable TV network, so there are video lights and three remote controlled-cameras in the studios.

A third talk studio is under construction and will be the new home for Jim Rome when it is finished.

house 0 dB reference, and the main satellite feeds each utilize two 15 kHz stereo telephone circuits to ABC Watermark, the ABC radio network Los Angeles news and network hub, in studio.

Watermark then digitizes the audio and transmits it to the New York ABC Technical Operation Center on a dedicated T1 fiber connection. This gives Premiere four audio paths to ABC New York.

For backup, as well as overflow, Premiere has four Telos Zephyr codecs available. These are also utilized for remote origination of programming. ABC Technical Operations Center in New York turns Premiere's +4 dBu level to +8 dBu, and then encodes the audio into SEDAT and transmits this digital signal via a T1 fiber connection to GE Americom in New Jersey, where it is uplinked to Satcom C5, transponder 23. With the audio having to travel through several signal paths, by the time the affiliate receives the 25/35 Hz tones they are at -2 to -3 dB from program 0 dB, or +6 to +5 dBu.

Premiere has built a Ku uplink for connection to the Jacor backbone. At the time this article was being written, the uplink was undergoing program tests. Soon enough, Premiere will be able to deliver digital audio directly to ABC Technical Operations Center in New York. When this happens, Premiere can use ABC net cue commands for the L.A. talk programs, which we could not accomplish previously. This will also eliminate the weakest link in the audio path.

We strive to deliver the highest quality audio possible to our affiliates. However, the people who produce our programming are human and sometimes make mistakes.

Premiere's policy is to admit mistakes

Premiere uses the least amount of audio processing possible to deliver consistent audio levels without artifacts.

All our talk studios have the same basic equipment: An on-air style mixing console; Sonic Solutions networked digital editor; cart machines; CD players; DAT recorders; cassette decks; a reel-to-reel recorder; Aphex Compellor level controller; audio delay and a 25/35 Hz high pass filter/tone encoder.

Clean audio

Premiere's audio philosophy is to deliver the cleanest audio possible. With this in mind, Premiere uses the least amount of audio processing possible to deliver consistent audio levels without artifacts. All on-air telephone calls are handled directly from Pacific Bell on dedicated 1 MB lines to an ITT 1A2 switch.

Each air studio telephone bank is an independent system. If one were to die, it would not affect the others. All telephone numbers in each bank are in a circular hunt group. Any failure of one line will not affect the rest of the hunt group. Our telephone hybrids are Telos 100s with 1A2 controllers.

Premiere uses 25/35 Hz tone encoding for most talk shows. Because of the problems with tone decoders false-tripping with low 25/35 Hz tones, Premiere's standard tone level leaves the studios at 0 dB. Premiere uses +4 dBu as standard

we are aware of. One of my jobs is to talk with affiliates that have technical questions. I spend an average of one or two hours a day talking to affiliates regarding technical questions and problems. When Premiere has a problem, the affiliates do not hesitate to tell us.

In April, when we moved Dr. Laura into her new studio, there was a strange problem that was not caught during the studio checkout with the 25/35 Hz tone encoders. When the operator fired a 35 Hz tone, it occasionally fired a 25 Hz tone at the same time by error. Approximately 50 affiliates called to let us know. I called each of them to apologize.

Technical tweaks

Most affiliate technical problems fall within one of several areas: false tone triggering or no tone triggering; bad reception, digital breakup or interference, wrong cueing, and cabling; and not receiving technical updates.

Regarding bad tones and closures: Most tone problems are level problems with the affiliate's tone decoder. Premiere sends tones at a high level in order to avoid false tripping or missed tones. All Premiere studios send the same 25/35 Hz tone levels. They all have the same type of encoder and filter.

See PREMIERE, page 37 ►



We Design Reliability


SWR products and services continue to surpass industry standards. We offer new systems as well as provide service and upgrades on existing ones. Stations all over the world depend on SWR technology to meet broadcasters' needs.

SWR designs Reliability into:

- UHF, VHF, and FM antennas
- Coaxial and waveguide transmission lines
- Combiners and Filters

All SWR products are supported with turn-key installations and 24 hour emergency service, focusing on service before, during, and after the sale.

For additional Domestic sales information call 1-800-279-3326



SWR INC
Our Priority is Your Satisfaction

Antennas and Transmission Line Systems
Systems With Reliability, Inc.
P.O. Box 856, Ebensburg, PA 15931
1-814-472-5436 FAX 1-814-472-5552
email: swr@third-wave.com
Website: http://homepage.third-wave.com/swrweb

► **PREMIERE**, continued from page 36
A decoder with sensitivity too high will false-trigger under program audio. Conversely, a decoder with its sensitivity set too low will miss tones.

Another common problem is the automation system with no debounce in its command input. To debounce is to eliminate multiple contact closures from a switch or a relay to a command input. This can be accomplished either electronically or within computer software.

The symptom is a double command, one second apart. Premiere has a UDS computer system for control of a DCS computer for commercials and Sony CD jukeboxes for music for the "After Midnight" program. After nine months, this system suddenly began logging occasional multiple commands when the Go button was enabled. This was rather embarrassing on the air. A small-value electrolytic capacitor fixed this problem.

Bad reception can happen at any time. Because of the long audio path and many audio devices our programming goes through to reach the affiliates' receivers, many possibilities for audio problems exist. The most common problem is the digital T1 from Watermark to New York. This link can exhibit nasty digital noise at times. When ABC encounters this, they move our programming to a backup Ku link.

Wide area havoc

On the affiliate side, bad signal reception, bad receiver and terrestrial interference can cause the same problems. Occasional local terrestrial interference can cause havoc over a wide area, especially in very flat areas of the country.

ABC is always available to check out satellite reception 24 hours a day. The New York Technical Operations Center can be reached at (212) 456-5000. During working hours on the West Coast, you can reach Premiere to check on transmission problems by calling (818) 377-5300. Both Premiere and ABC have downlink receivers in place, just as an affiliate would. Our people can monitor the received signal for any problems.

ABC Technical Operations Center will also provide a dial-up telephone coupler feed for affiliates having receiver outages. They have a limited number of couplers and they are on a first-come, first-served basis. However, these are not available for sun outage problems.

Wrong cueing and cabling are problems that generally occur when a new affiliate starts a program or an existing affiliate changes their mode of running the program. The affiliate has the wrong command hooked to the wrong decoder, or the decoder is monitoring the wrong channel.

When Premiere has some holes in the day, we can test on one of our satellite channels for an affiliate having serious receiver or decoder problems. This is rare and does involve advance planning. As for missed update information, Premiere occasionally moves programming from one channel to another. Additional cue tones are added, and so forth. Affiliates are informed by fax, telephone calls and, when possible, during breaks in the program.

Premiere generally tries to inform everyone with at least 60 days notice for changes. Unfortunately, some affiliates are missed, the proper person was not informed, and so on. The angry affiliate calls up and demands to know why they

weren't informed. Another breakdown in the communications industry.

Premiere is a large company, with 290 employees in 10 offices across the United

States. These people are experts in what programming Premiere has to offer and what it will take to get a contract signed and approved. They are not

experts about tones and closures. The engineering department has created a fact sheet and the programming department has created a show clock for them to use when answering basic questions from affiliates as to how the shows operate. All affiliates are sent these and many other documents when they sign up for a program. When changes are made, all affected affiliates are sent updates. If an affiliate requests a replacement copy, they are faxed one the same day. These requests are generally handled by their marketing rep.

I enter the picture when an affiliate experiences technical problems. Generally, a marketing rep will call me with a basic question, such as, "If an affiliate has a StarGuide receiver, can they pick up Premiere programming with it?" In the case of StarGuide, the answer is, "Not at this time. You must

See PREMIERE, page 38 ►

Because of the problems with tone decoders false-tripping with low 25/35 Hz tones, Premiere's standard tone level leaves the studios at 0 dB.

Most of these hard-working people are not technically inclined. Most affiliates call their marketing reps for

experts about tones and closures. The engineering department has created a fact sheet and the programming

Tascam & Bradley Turn The DAT World Upside-Down



With The World's First 24-Bit DAT Recorder

Leave it to Tascam to expand the possibilities of what a DAT recorder can do. Rather than merely offering conventional standards and features, Tascam gives you a family of DATs that provides unparalleled performance and compatibility, versatile interface options, and classic Tascam value. They range from the full-blown, multiple-resolution DA-45HR Master DAT Recorder, the only DAT recorder to offer the ultimate in high-fidelity—24-bit DAT recording, to entry-level recorders—like the DA-20 MKII which combines professional features with a surprisingly low price. The amazing DA-302 dual-deck recorder performs simultaneous recording using both decks, and dubs even your 24-bit recordings with ease. Take your pick: they're all bound to change your mind about what you can expect from a DAT recorder. We offer the entire Tascam DAT line at Bradley—call us for more information.



DA-302



DA-60 MKII



DA-30 MKII



DA-20 MKII



Our Service Makes The Difference
7313-G Grove Road, Frederick MD 21704 • Toll Free: 800-732-7665
Tel: 301-682-8700 • Fax: 301-682-8377
http://www.bradleybroadcast.com • E-Mail: info@bradleybroadcast.com

Behind the Scenes at Premiere Radio

► PREMIERE, continued from page 37
have a SEDAT-capable receiver and StarGuide is not."

If the problem is complex, I will call the affiliate directly to avoid the miscommunication of a third party. Lots of affiliates do not have full-time engineers, so I have become accomplished at deciphering technical talk for PDs and GMs.

Premiere takes complaints from affiliates very seriously. When there is a problem at Premiere, large numbers of affiliates call. Premiere has approximately 6,500 affiliates; the talk shows range from having 80 to 600 affiliates for each show.

I know it is very frustrating to call a company with a problem and be told, "Gee, no one else has called to com-

plain." But 80 to 90 percent of the time, when an affiliate calls about a problem, that affiliate is the only call, and around 99 percent of the time, that problem is on the affiliate side.

That doesn't mean that Premiere is writing off the affiliates' concerns — the company has a procedure for dealing with technical complaints.

We take down the affiliate's name, market and telephone callback number. If a marketing rep gets the call, they generally call me and I'll investigate before getting back to the rep. If the call comes straight to me, I will call the affiliate back directly.

As a recent example, the Dr. Laura show was running a week of "best of," as

Dr. Laura was on vacation. We received the same complaint from five affiliates during the first three days of the week: false tripping of the 25 Hz command during the 35 Hz tone. Although these five stations represented less than 0.5 percent of Dr. Laura's affiliates, we double- and triple-checked our systems for any problems. We could not find any problem with our studio equipment.

Further investigation revealed that all five affiliates had the same brand of tone decoder. It turned out that on that Monday, ABC had accidentally raised the audio level of the satellite feed by 3 dB. This was enough to false-trip the 25 Hz tone detectors at these five affiliates. On Wednesday afternoon, ABC reset the

Premiere Gear

The studio equipment at Premiere includes:

Aphex Audio DAs
Aphex Compellers
CircuitWerkes Tone Decoders

Denon CD Players
Fidelipac CTR-14 Cart Machines
Pacific Research & Eng.
Custom RadioMixers

Panasonic SV-3800 DAT Machines
SAS 32000 Audio Routing
Sennheiser 421 Mics

Shure SM-7 Mics
Symetrix Audio Delays
Tascam 122 MkIII Cassette Decks

Tascam BR-20 Reel-To-Reel Machines
Telos 100 Telephone Hybrids
Zephyrus Filter/Tone Encoders

audio level to the proper level and the five affiliates' problems were solved.

Reception woes

If the problem is reception, I will listen to our downlink. Premiere has cabled all of the L.A. offices to be able to hear all Premiere programming in any office. This enables anyone who receives a technical complaint to listen immediately to the satellite-received audio and compare it with the affiliate's problem. For

Premiere has installed an automatic logging system that receives programming exactly as our affiliates.

received tone problems, each studio has metering and audio monitoring of the received satellite signal.

All operators look for the cue tone when it is generated, and also around eight seconds later when it is received off the satellite. Premiere has installed a computerized automatic logging system. This system receives Premiere programming exactly as our affiliates do. Every show is monitored 24 hours a day and all received commands are logged, accurate to within one second by means of our GPS master clock system.

Every affiliate telephone call is returned. If I am in the office, they are returned within an hour if there are no fires burning. Premiere tries to help its affiliates resolve their technical problems, even if it is on the affiliate side.

I think it is safe to say that 99.9 percent of our affiliates are satisfied with the service Premiere provides to them. Yes, there is an occasional glitch, but we admit to our mistakes and work to eliminate any future problems.

Part of this article appeared in different form on broadcast.net

How has your experience with Premiere been? Tell us at radioworld@imaspub.com

If you have questions for Barry Victor, call him at (818) 377-5309.

Affordable Digital Consoles

Logitek digital with a better difference!

3320 Bering Drive, Houston, TX, 77057 e-mail info@logitekaudio.com

Voice: North America 800.231.5870 Fax: 713.782.7597 Others 713.782.4592

Visit our home page at www.logitekaudio.com for more information

Radio Disney Matures With Kids

Dee McVicker

Sure, kids should be seen and not heard. But will they listen?

Radio Disney believes they will, despite analyst concerns that a radio network for listeners under 12 cannot generate enough interest in a generation that cut its teeth on television.

ABC Radio Networks' Radio Disney, based in Dallas, is wasting no time mulling over whether kids will be all ears.

Its kids' network now is airing in 31 markets, and it expects to have 63 stations in the top 20 demographic market areas by the end of 1999. By the year 2000, Radio Disney expects to reach 75 percent of all markets.

Others have pursued the burger-munching, soda-swilling crowd, in hopes of capturing a demographic that influenced spending of more than \$500 billion in 1997 alone, according to Texas A&M University Market Research.

And others have failed.

"There have been at least four, and perhaps one more than that, that just

didn't make it," said John Tyler of Rhino Communications, a Dallas consulting firm. "These were very serious broadcasters who knew what they were doing, too."

The under-12 demo is not tracked by Arbitron. But Vice President of Communications Thomas Mocarsky, says the ratings service has tested

methodologies to measure listenership in young children in the past. Moreover, a new fill-in box in this fall's diary will "shed some light on this" demo, he said. "So while we're not measuring the behavior of children under 12, we can look at diaries and households that have children under 12 (to find out if) ... children listen to Radio Disney."



Radio Disney's World Tour

Arbitron's Study: A Closer Look

Laurie Cebula

A new study suggests that to succeed in the future, radio should focus on its ability to act as a vital link to local communities.

The recently released Arbitron/Edison Internet Listening Study found that, after 75 years of operating in a localized market, radio is facing the challenge of worldwide competition.

"For years, programmers have sought to infuse their sound with creative packaging, unique personalities and local attributes," the report stated. "This strategy will be more important than ever in a world of greater listener choice."

A total of 2,900 people were interviewed for the study. One thousand, six hundred radio diarykeepers from the Spring 1998 survey and 1,300 audio users were involved in a separate online study conducted by Northstar Interactive, Arbitron's Internet perceptual research company.

The study indicates AOR and news/talk radio are the leading preferred formats for the online listener. An interesting note in the online user audience is that alternative formats, which garner only 2 percent of all listeners in broadcasting, register at 10 percent of online listeners. The majority of Internet listening is by adults in the 25-44 age group.

Loyal means local

Arbitron and Edison suggest that local service will become the most important aspect of radio in the future and that it is crucial for stations to measure their images and

See ARBITRON, page 46 ▶

Production at Radio Disney

Radio Disney production is anything but kids' play.

The network "is very production-intensive," said Margaret Bryant, director of engineering and technical operations for ABC Radio Networks in Dallas, where the mostly musical network originates.

The programmer uplinks on the GE-3 satellite to 33 stations. Putting the CD players and MiniDisc recorders to work are some of the most unusual voices and talent in the business.

"These guys, because of all the sound effects they use, love their Instant Replays," Bryant said, referring to an audio storage and playback product from 360 Systems.

Even Radio Disney remotes go beyond the norm, with stage events, characters in costume, and "a very elaborate technical setup" to support the kids' play going on and going out over the air.

So production-intensive is the format that Radio Disney is adding onto the production studio with more space and, eventually, more Digidesign ProTools applications.

"Right now we have production people and studios tied up 24 hours a day, just for Radio Disney," Bryant said.

— Dee McVicker

Tyler isn't sold on the idea. He said, "Never mind that most large advertisers have never so much as thought of placing a radio spot for this market."

In his estimation, kids just are not interested in radio. "Children under 12, by and large, do not listen to radio; they're glued to television. They're into graphics. They like moving colors and moving pictures," Tyler said.

Radio Disney says otherwise.

"We did, initially, test it in four markets and we found that the tests were very successful," said Jean-Paul Colaco, senior director and assistant general manager of Radio Disney, which is owned by ABC Radio Networks, a part of The Walt Disney Co.

"Our ratings are quite strong. We have a rating of 1.2 for children and a 0.9 for moms. That's based on our March 1998

See DISNEY, page 40 ▶

Give them what
they want
to hear



Shaping Knowledge™

UPI Broadcast

Flexible for broadcasters. Tailored for listeners.

- Funny, Ready-to-air Morning Show Prep
- State News
- Local Weather
- Sports
- Breaking National and International News
- Business and Consumer News

Everything you need for all the formats you feed.

800.503.9993

bavery@upi.com www.upi.com

UNITED PRESS INTERNATIONAL

Worldwide News Inc. a UPI

Mouse Empire Seeks to Dominate

► DISNEY, continued from page 39 network report from Statistical Research Inc., and it's children aged 6 to 11, Monday to Sunday, 6 a.m. to 7 p.m.," Colaco said.

That its market is all but invisible to Arbitron ratings no doubt causes some concern for the Mickey Mouse empire, which hired SRI in 1996 to rate the marketability of a kids' radio network.

SRI, a research firm well-known to television media buyers, found encouraging data. Initial surveys of four test markets showed Radio Disney achieved an average rating of 1.3 for kids 5 to 9 years of age, with ratings highest during weekday drive-time hours and on weekends. In-car listening accounted for 41 percent of the listening.

The real test of Radio Disney, however, takes place daily on the air at the 33 Disney-owned stations and Radio Disney affiliates. Are these stations running in the black?

"The format is definitely bringing in revenue," said one affiliate sales manager, Katherine Worthington of KCNR(AM) in Salt Lake City. "People are buying into it, more so because it produces results rather than (because of) what the numbers say," she said.

Previously a sports station, KCNR has

been running the Radio Disney network full-time for more than a year.

Reports like this indicate that if any organization can make something out of the kids' radio market, perhaps Disney will — if not because of its experience with kids, then certainly because it is its own best advertiser.

What with Disney movies,

Disney stores and Disney theme parks, Tyler said, "They have a world of products to sell, and I assume they would never have to go to a time buyer and try to get an order with no ratings."

But Colaco is quick to point out that Radio Disney is not "a 24-hour commercial" for The Walt Disney Co., citing Campbell's, General Mills, Mattel, Mrs. Smith's Pies, Nintendo, Sears and Wrigley's as among the network's national advertisers.

Worthington of KCNR supported that claim. "Most of our billings come locally; 90 percent are local. We have Blockbuster Video, local grocery stores Smith's, Albertsons, Associated Foods — everything that you would find on any other station," she said.

Yet what is giving Radio Disney a fighting chance in the kids' market is what Colaco calls its "synergy" with its Disney and ABC partners.



Although more than 90 percent of the network's programming is music from pop hits, oldies, TV and movie soundtracks — many of which are not owned by Disney — Radio Disney "Disney-izes" the format with Disney characters and broadcasts from the company's theme parks.

Every weekday, for example, Radio Disney's "Mark and Zippy" show is fed live to Dallas over T1 line from its Walt Disney World/MGM studios in Orlando.

Yankovic, as well as "Prince Ali" from the "Aladdin" soundtrack and "Whoomp! (There it Went)" from "Mickey Unrapped."

Apparently, the Mickey Mouse empire is doing something right, as evidenced by listener response.

Listener interaction is up to 30,000 call-ins per day; Web site visits are at 150,000 a month. Colaco said.

"We're the only 24-hour kids' network out there right now," he said. He pointed to block programming, mostly on weekends, by Fox and others as the only serious contenders in the kids' radio market.

Radio Disney is not a 24-hour commercial for The Walt Disney Company.

— Jean-Paul Colaco

Mickey Mouse, Minnie Mouse and other Disney characters recently went on a world tour to 20 major markets, as well. Then too, features such as an ESPN for kids, with Jim Nasium as a host, show the imagination for which the children's empire is known.

But Radio Disney is not entirely Disney-ized. A sample-hour music log listed song titles "Spice Up Your Life" by the Spice Girls and "Yoda" by Weird Al

All of this may or may not be moot, depending on just how well children listen, which is in itself an always unpredictable variable. Stay tuned.

■ ■ ■

Dee McVicker is a free-lance writer and a regular contributor to *Radio World*.

Does your station target children listeners? Tell us your experiences at radioworld@imaspub.com

We Have What You Need!



COMPACT DISC PRODUCTION MUSIC AND SOUND EFFECTS LIBRARIES

Call, write or send us a fax and it will be a pleasure for us to send you a complete catalog of our compact disc libraries free of charge. Our catalogs have a large variety of what you need for your productions. For your convenience, we will be pleased to send you a demonstration compact disc containing all the information you need to place your order. But we can't send you our catalog until you get in touch with us.

Take the first step and contact us today!

Valentino

... a complete library of production music and sound effects in an exclusive binder system.

Valentino

... Our products are used for productions around the world.

Valentino, inc

CATALOGS & DEMOS AVAILABLE AT: TVMUSIC@ibm.net
TEL: +1-914-347-7878 FAX: +1-914-347-4764

AAHS to ABC: Might Doesn't Make It Right

Dee McVicker

Children's Broadcasting Corp. (CBC) of Minneapolis took on the Mickey Mouse empire in a federal court and won.

After a protracted and high-visibility legal fight, a jury of nine in a St. Paul courtroom ruled in favor of the children's radio network after deciding that industry giant ABC Radio Networks, whose parent is Walt Disney Co., breached a marketing contract signed in 1995 between the two companies.

The Sept. 30 verdict resulted in a \$20 million award, a fraction of the \$170 million sought by CBC.

"They got a heck of a business for \$20 million," said Christopher Dahl, the CEO and president of CBC, which broke new ground with its nationally distributed children's programming format in the early 1990s but ceased airing the format in January.

"I think the jury concurred with our belief that not only did they breach the confidentiality clause by using and developing information they gleaned from us, they developed their own children's network," he said.

The verdict came almost two years to the day after CBC brought suit against ABC Radio Networks.

In 1992, CBC went on the air with AAHS World Radio children's format and went public with an initial stock offering of about \$1 million.

By 1995, it owned 10 radio stations with a combined value of \$23 million. Later that year, it entered into a two-year marketing agreement with ABC

intended to bolster national advertising, affiliate development, research, marketing and promotion.

In July 1996, however, CBC reported a change in the relationship. ABC, now owned by Walt Disney Co., severed its operations agreement with CBC, according to Dahl, "and almost the next day, announced they were going to do Radio Disney." As a result, he said, CBC was forced to sell its 13 stations and close down its programming operation.

ABC Radio issued a statement on Sept. 30 that it is seeking a mistrial based upon the jury's "inconsistent" verdict. The jury's finding that ABC had not committed any "material breach" of its contract is inconsistent with its \$20 million award, ABC officials claimed.

"Although we are disappointed in the jury's finding that ABC Radio committed a nonmaterial breach of its contract with CBC and misappropriated one trade secret, we are pleased with the rejection of the bulk of CBC's claims," ABC stated.

Dahl said the verdict is a victory for everyone. "We hope their verdict sends a message, not just to ABC and Disney but to all big companies, that might doesn't make right."

With the proceeds from station sales and the jury award, which could amount to more than \$20 million with legal and other fees, CBC plans to reinvent itself as a company involved in television commercial production. It is now part owner of Harmony Holdings, a Los Angeles commercial production company.

Y2K: A Broadcaster's Strategy

Dorann Bunkin, Esq.

This article first appeared in a slightly different form on the NAB Web site. RW found it to be an insightful discussion of the questions facing radio and TV managers about the "Y2K Problem." It is printed here with permission.

In less than 13 months, the year 2000 begins, and with it countless potential problems caused by the Millennium Bug, also known as the Year 2000 or Y2K Problem. Computer programmers nearly a generation ago inadvertently planted this virtual time bomb when, in an effort to save computer memory space, they recorded dates in computer programs using only the last two digits of the year (e.g., 1970 as "70").

At midnight on December 31, 1999, computer systems programmed with a two-digit year code will see the date "00" and not know whether it means 1900 or 2000. Because computers calculate time spans by subtracting two dates, a computer that reads "00" as 1900 will no longer calculate time properly. For example, today a computer using a two-digit date code would calculate that a person born on Jan. 1, 1968, is 30 years old ("98" minus "68"). On Jan. 1, 2000, the same computer may calculate the same person's age as negative 68 ("00" minus "68"). This may cause some computers to go haywire, or to cease functioning altogether.

Modifying code

According to Robert G. Gerber, roughly 40 to 80 percent of all existing computer code will need to be modified. The Y2K Problem plagues not only computers and electronic systems that rely on computers, but also some equipment with embedded microprocessors. These microprocessors or "microchips" contain programmed instructions for equipment operation. They are frequently contained in control or monitoring equipment such as climate-control systems and remote-control timers. Of the billions of embedded microprocessors in existence, probably only a small percentage are both date-sensitive and not Y2K-compliant. But even one microprocessor chip acting in an unpredictable way can trigger failures in other systems further down the line.

Given the multitude of computer systems and embedded microchips in the equipment used by a typical American business, at least one commentator, speaking before a congressional committee, predicted that the average Year 2000 conversion project may take up to two years or more. Moreover, experts believe that problems may manifest themselves even before Jan. 1, 2000.

For example, some computer systems use the number "99" as a code for a specific operation and will not recognize it as a date entry. When "99" is included in a date field (e.g., 1/1/99, 9/9/99), the affected system may produce erroneous results or stop functioning entirely. In addition, any computer that must deal with dates or time periods beyond Dec. 31, 1999 in its operations may malfunction now (e.g., computerized records as well as programs for tracking the expiration dates for news wire or syndication contracts and construction permits, program

forecasting or scheduling and commercial spot bookings).

It is crucial, therefore, that broadcasters implement a Y2K readiness program immediately, or they risk beginning the new millennium with inoperable facilities. The steps outlined herein provide a guide for actions that broadcasters can take now to address this looming Y2K disaster.

It should be emphasized, however, that the following discussion provides only a broad overview of the Y2K issues that may affect broadcasters, rather than an exhaustive listing of such issues. For this reason, broadcasters concerned about the implications of the Y2K problem for their operations

should consult technical and legal counsel familiar with Y2K issues.

Getting started

Let us consider the elements of a "Broadcasters' Y2K Readiness Program." They can be summarized as follows:

- Equipment Audit
- Remediation Efforts
- Legal Audit
- System Testing
- Interoperability Testing
- Emergency Plan

The equipment audit

A Y2K readiness program should begin with an inventory and compliance

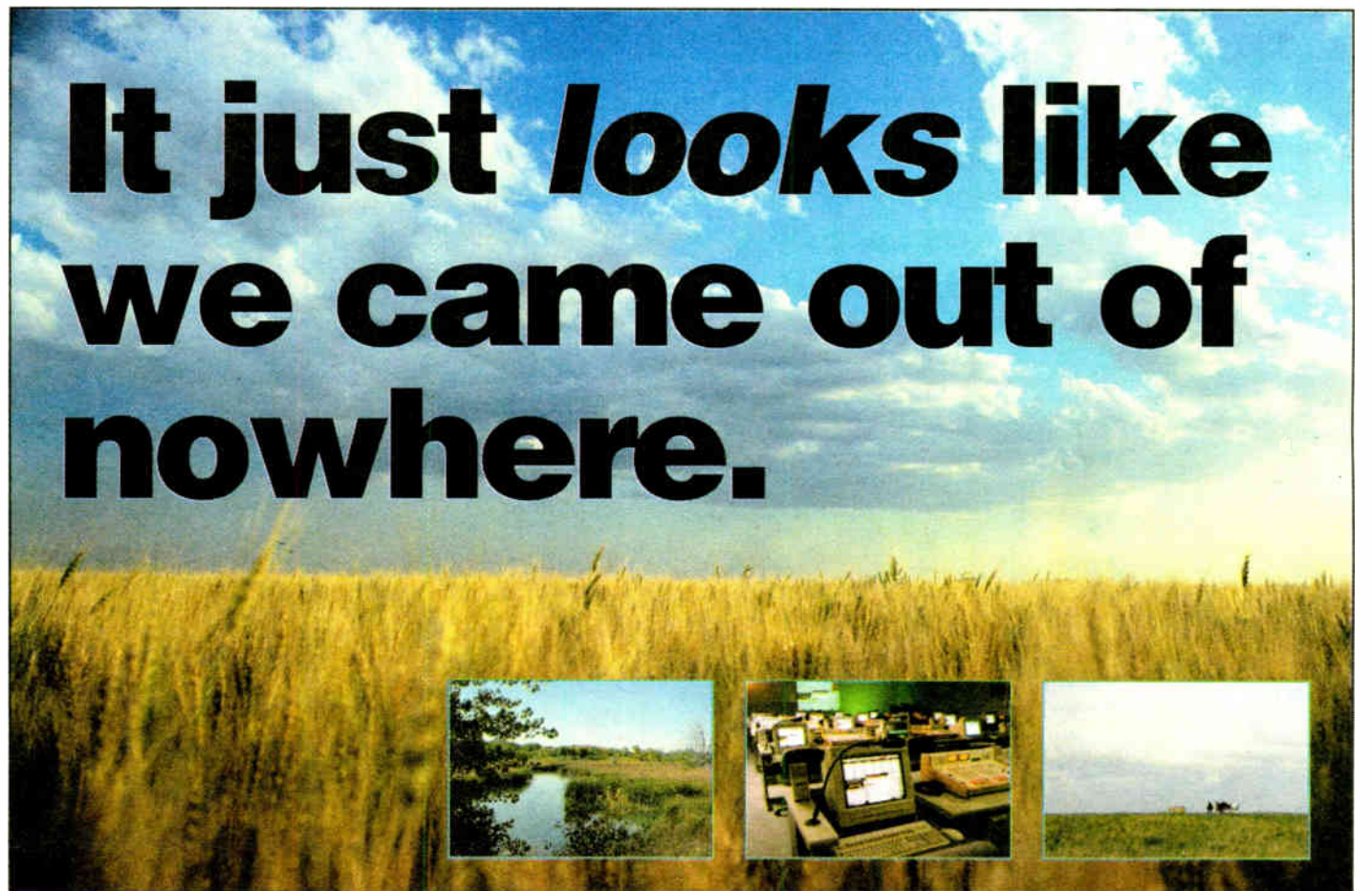
assessment of all equipment that might use computer technology or contain embedded chips.

A. Non-Broadcast Specific Equipment (Affecting Any Significant Business)

Computer systems such as office computer systems, telephone systems, automated inventory systems, employee-related databases (e.g., payroll and personnel, time and attendance), and accounting and billing systems should be examined.

The same is true for building equipment that may contain microprocessors, such as elevators, security systems, and heating and cooling systems. For such non-broadcast equipment, a computer or other technical/engineering consultant may be able to assist in recognizing where Y2K problems may exist.

See Y2K, page 43 ▶



Out of the heartland comes the AudioWizard CFS™ for Windows™ the most complete digital production and delivery system available

Within the last few years, the AudioWizard from Prophet Systems Innovations has been chosen by the broadcast industry's big boys, small groups and individual stations to become a leader in digital audio delivery.

But, we're not new. We have decades of experience in digital audio radio. In fact, a number of us joined the PSI team after successfully relying on the AudioWizard in day-to-day broadcast situations. Our programming department continues to anticipate not just your needs for today, but for the months and years to come—both in updates to AudioWizard CFS and in the development of AudioWizard CFS³². Our Academy is ready to teach you all the AudioWizard's extensive capabilities. And our tech support is standing by with expanded service hours and a more comprehensive offering of support options.

The innovations continue as we improve and refine our products to give cost-effect digital audio to single stations, huge groups and everyone in-between. Count on us. *Together, let's make great radio.*



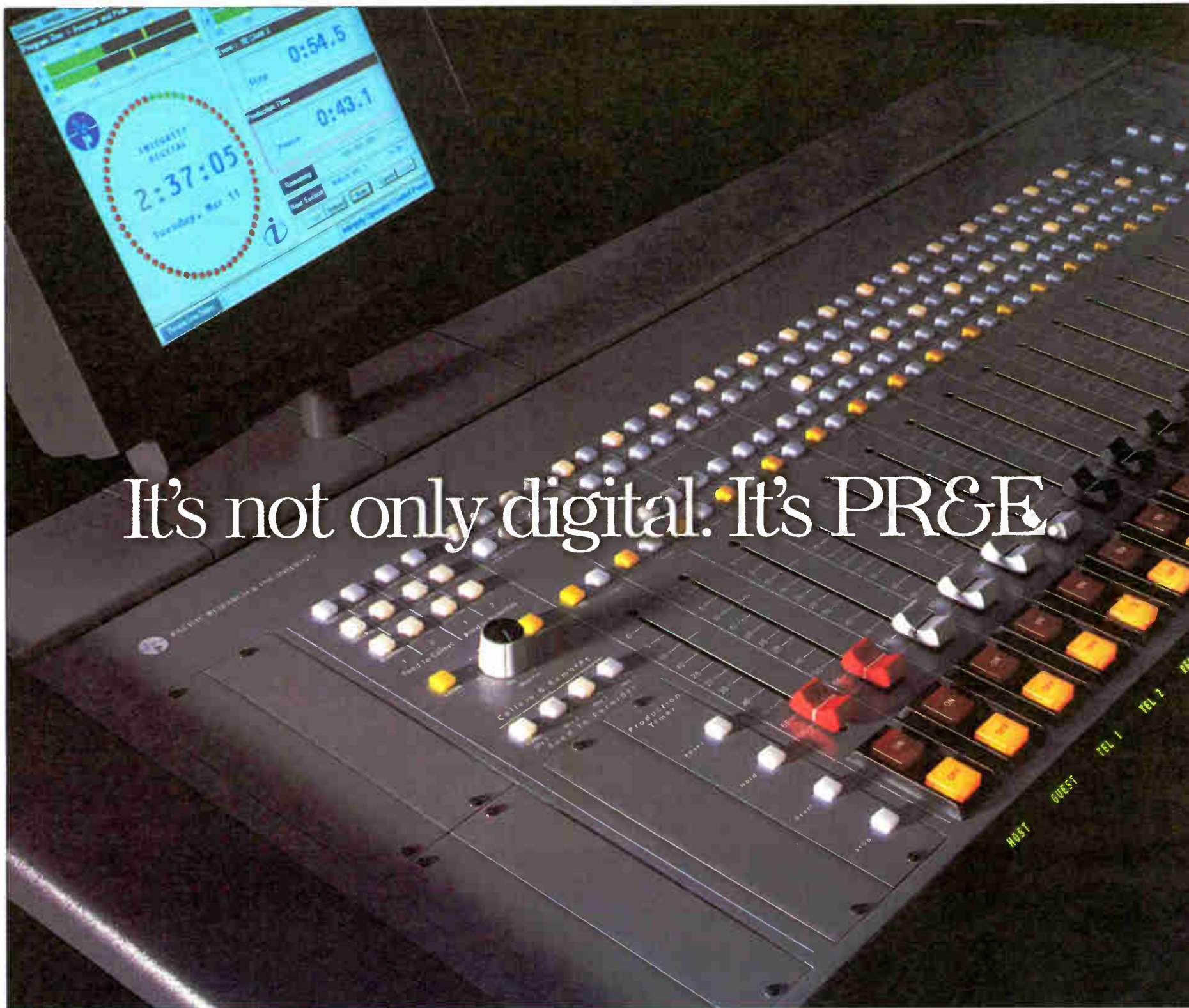
AudioWizard™



'nuff said!!



Sales: (800) 658-4403 Support: (308) 284-8450 E-mail: sales@prophetsys.com Web: www.prophetsys.com



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

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

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

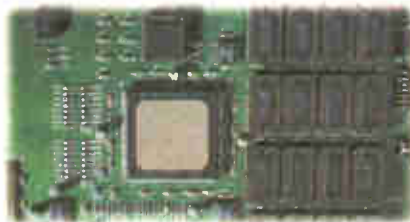
For a brochure, call us at 760-438-3911, visit www.pre.com or e-mail sales@pre.com



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



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



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



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



PACIFIC RESEARCH & ENGINEERING

Circle (43) On Reader Service Card

World Radio History

Y2K: A Broadcaster's Checklist

► Y2K, continued from page 41

B. Broadcast-Specific Equipment

Someone with specific knowledge of broadcast technology should carefully examine station facilities and equipment in order to identify potential Y2K problems. Equipment that may have Y2K problems includes:

Programming/Studio Equipment
Software that handles traffic
Spot players
Cross-point audio switchers
Video switchers
News wire feed storage equipment
Digital logging products
Digital audio editor software
EAS units
Graphics equipment
Digital video effect units
News computers
Video tape recorders
PCs that run TelePrompTers
Multiplexors
Telephone call screening equipment
Studio lighting boards
Automation systems
Satellite downlinks

Transmission Equipment

Exciters
Tower lighting
Stereo generators
Cooling systems
Remote control systems
Studio-to-Transmitter links

Auxiliaries/Secondaries

Digital links
Remote control systems (e.g., for microwave links or tower cameras)

Remediation efforts

After old systems subject to potential Y2K problems have been identified, triage and remediation plans should be developed to prioritize and implement necessary corrective measures. Mission-critical systems should be addressed first. Fixes should be completed in time to permit effective testing for Y2K readiness as described below.

Legal audit

Concurrently with remediation efforts, a legal audit plan should be developed to deal with Y2K-related legal issues as they arise.

A. Determining Pre-Existing Rights

Existing contracts and legal relationships with suppliers/vendors, customers/subscribers and other entities should be analyzed to determine the rights and obligations of the respective parties (such as with respect to indemnification) in the event of a Y2K problem.

B. Contacting Equipment Suppliers:

Certificates of Compliance

All vendors, suppliers and independent contractors should be contacted to determine the extent to which their systems and products are Y2K compliant; to obtain assurances that compliance will be adequately tested; to receive specific information concerning the time by which the vendor, supplier or indepen-

All vendors, suppliers and independent contractors should be contacted to determine the extent to which their systems and products are Y2K compliant.

dent contractor will have completed its Y2K readiness efforts with respect to the particular equipment; to evaluate the status of their efforts to ensure Y2K compliance by third parties in the supply chain; and to seek certificates of Y2K compliance in appropriate situations.

Certificates of compliance should indicate the manner in which compliance was achieved (e.g., expansion of year codes to four fields or development of methodology to fool the system so that "00" does not cause problems). The manner in which Y2K compliance was achieved is important because devices that have been made Y2K-ready using one methodology may not work in conjunction with other equipment or systems employing a different methodology.

Furthermore, it is important to ascertain the manner in which the equipment manufacturer conducted its testing. Because broadcasters use equipment in highly customized configurations, equipment tested in one specific configuration may not function properly in a different configuration.

C. Obtaining Authorizations for Replacing or Fixing Non-Compliant Equipment

For equipment that is not Y2K ready, it may be necessary to renegotiate the terms of an agreement or contract with a vendor or supplier in order to deal with fixing Y2K problems. Note that modification of software may raise copyright issues in situations where the computer programmers or manufacturers hold the software copyright. In such situations, programmers or manufacturers must be contacted to acquire a "fix" or to obtain permission to modify the software.

It is also important to assure that self-help measures do not have the effect of releasing the software developer from liability should fixes prove ineffective. Similarly, software licenses and sales contracts should be reviewed to deter-

mine the extent to which warranties will still apply if a company alters the software code.

D. Negotiating New Contracts

All new contracts, such as those for equipment purchases, should contain warranties and indemnification provisions, as well as obligations to repair/replace Y2K-problem-affected

technology. This is particularly important for television broadcasters purchasing digital equipment. Moreover, due diligence in new station acquisitions should include an examination of potential Y2K problems.

E. Evaluating Third-Party Obligations

Agreements with third parties that may involve computer system interfaces (e.g., JSAs and LMAs) should be studied for their Y2K problem implications. Broadcasters could face claims for damages to third parties resulting from any system failures caused by uncorrected

Y2K problems in their systems.

F. Addressing Non-Broadcast Specific Legal Issues

When conducting a legal audit, broadcasters must also remember to review non-broadcast-related legal issues. These issues would include potential tort claims arising from Y2K problems at their facilities; claims brought by employees stemming from failures in payroll and other employee-related computer systems; corporate officer and director liability related to legal issues raised by the Y2K problem; shareholder derivative suits; and compliance with Federal and State Y2K laws and regulations, e.g. SEC disclosure obligations related to publicly-held corporations; and IRS Y2K accounting regulations.

(Although the FCC recently began examining the issue of broadcaster Y2K readiness, the agency has not yet proposed any specific regulations or requirements related to the Y2K problem.)

Insurance policies should likewise be reviewed to ascertain the extent of any coverage for, or exclusions of, repair and/or liability costs. Options for new Y2K coverage should also be explored.

G. Developing a Legal Contingency Plan

Upon completion of the legal audit, broadcasters should develop a contingency plan for all potential legal claims after the Year 2000. Such a plan should identify potential avenues for responding to areas of liability and possible failures

See Y2K, page 44 ►

Now available for Radio Stations...

Q: Where are the Bright New Voices in Radio Coming From?

A: ...Your Radio Station!

This is Bob Harris



DBA is proud to introduce **BOB HARRIS**, an award winning humorist and commentator for **KNX Radio - Los Angeles**, whose loopy humor and keen journalistic eye earned him a **1998 Associated Press award for Best Radio Feature** and the **L.A. Press Club award for Best Specialty Feature Reporting**.

Bob's credentials for capturing the attention of young adults is impressive:

- Nominated five times as Lecturer of the Year by Campus Activity Today... Bob has appeared on stage at over 250 college campuses.
- Widely published newspaper and magazine columnist including Mother Jones On Line, The Funny Times, Z and National Lampoon.

Want more? - Bob is a five-time *Jeopardy* champion, author of "Cramming 101" and has received accolades like these: "wickedly observant" - (Chicago Tribune), "One of the most talented political comics performing today" - (Cleveland Plain Dealer)

For More Information Contact

David West at:

Dick Brescia Associates

164 Garfield Street

Haworth, NJ 07641

Phone: 201-385-6566

Fax: 201-385-6449

E-Mail: dbasyndicators@prodigy.net

**Two minutes daily
(including commercial)
Monday — Friday
CD Format • Barter**

Another Fine Radio Program from Dick Brescia Associates

Yes, we are

OPEN

The reports of our death are greatly exaggerated

 **Sine Systems** INC.
innovative solutions

615 • 228 • 3500 (voice)

615 • 227 • 2367 (fax)

www.sinesys.com (web)

Y2K Readiness Requires Planning

► Y2K continued from page 43

including "first day" responses to lawyer and press inquiries; assure that management and the board of directors take proper, fully-documented steps to respond to the Y2K challenge; and protect the business from risks wherever possible, including conducting any Y2K litigation as it arises.

H. Communications

Broadcasters, in conjunction with legal counsel, should develop a single point of contact and a consistent message for responding to Y2K compliance questions or forms from the outside. Employees should *not* attempt to answer any of these questions on their own but should refer all queries to that designated spokesperson. Even well-meaning remarks that later turn out to have been misleading or inaccurate can have expensive consequences.

Y2K readiness cannot be achieved by merely updating computer systems, fixing software programs, and obtaining

certificates of compliance. Particularly with the highly specialized equipment used to operate broadcast stations, testing must be performed not only on each piece of equipment, but on the broadcast system as a whole and the broadcasters' interaction with third parties (as explained more fully below).

With the multitude of models and versions of embedded systems found in various pieces of broadcast equipment, it is impossible to extrapolate the Y2K readiness of one system from the testing of another. In fact, identical chips may act differently in different systems. A recent survey of Y2K problems conducted by the Information Technology Association of America provides a dramatic example of the need for testing. Of the 450 organizations responding to the survey, 67 percent had system failures during Y2K compliance testing.

Y2K readiness also may be worthless if the systems (your own or third parties') with which your computers must

interact are not Y2K ready.

If the interacting systems are not Y2K compliant, or if they have achieved Y2K compliance through a method incompatible with those used by the broadcaster, the systems may crash when they try to interact. For this reason, it is necessary to identify such systems, determine Y2K readiness and conduct interoperability testing. Examples of other computer systems or microprocessors with which a broadcaster might interface include satellite providers where satellite receivers are used for program delivery, especially where those received are digital in nature and/or involve automation systems; and telephony, such as point-to-point audio circuits used, for example, to delivery audio from a reporter to the studio.

Emergency plan

Regardless of the quality of the Y2K readiness plan developed, the potential for an unforeseen problem caused by something as small as a wayward embedded chip or as major as a city-wide power outage makes it essential that broadcasters develop contingency plans for operating on Jan. 1, 2000. Broadcasters should attempt to assure that mission-critical systems can operate for some specific period of time, perhaps a few hours — maybe a few weeks, even with possible failures to associated equipment.

Thus, for example, an emergency power supply should be readied in case the local power grid fails, and a system of manual overrides should be tested in case remote operations controlling such critical functions as tower lighting fail.

In conclusion, as the year 2000 rapidly approaches, so too does the possibility that the Millennium Bug will leave many broadcast stations off the air at the dawn of the new century. Although time to take preventive action is running out, broadcasters can prepare for

the new millennium by immediately developing and implementing a Y2K readiness program as outlined above.

■ ■ ■

Dorann Bunkin, Esq., works for Wiley, Rein & Fielding in Washington, D.C.

The original version of this article appears online at www.nab.org/year2000/Y2Kmemo.htm

That site also includes charts of application-specific dates that may affect your business, including dates for applications that do calculations, and applications that perform fiscal year, quarterly, monthly and specific-date processing, such as tax payments.

BUSINESS DIGEST

Chancellor Media Enjoys Rise in Q3 Revenue

Chancellor Media Corp. reported an increase in revenue from \$145 million in last year's third quarter to \$344 million for the three months ending Sept. 30, 1998.

Year-to-date net radio broadcasting revenues, on a pro-forma basis, increased 18 percent to \$778 million. In the third quarter alone, net radio broadcast revenue increased 21 percent, while broadcast cash flow increased 27 percent compared to the corresponding period for 1997.

Arbitron reports indicate seven Chancellor-owned radio stations are No. 1 in the top 10 radio markets in the nation.

Jeffrey Marcus, Chancellor president and CEO, said the continuing strategy to build on the new Chancellor Outdoor Group has contributed to the increased cash flow.

Chancellor completed the acquisition of Martin Media in the third quarter and plans to secure Whiteco Outdoor Advertising by year's end.

Important Y2K Dates for Testing

The following is a general starting point, not a comprehensive list of all dates that may be subject to Y2K and related problems. Technical experts should be consulted to determine the testing methodology best suited to individual broadcaster's operations. This list reproduced by permission of the New York State Office for Technology.

Jan. 1, 1999	First "99" date
Sept. 9, 1999	9/9/99 date
Sept. 10, 1999	The day after 9/9/99
Dec. 31, 1999	The last day before century change
Jan. 1, 2000	First date with a "00" abbreviated year; first month beginning on a weekend date
Feb. 28, 2000	Day before leap-year day
Feb. 29, 2000	First leap-year day. Also check to make sure system does not process Feb. 30 or 31 dates
March 1, 2000	Day after leap-year day
Dec. 31, 2000	First year end; last day of the year (system must count 366 days)
Jan. 1, 2001	First day of the 21st century (system must roll from 00 to 01)
Feb. 29, 2001	First invalid leap-year day
Dec. 31, 2001	System must not count 366 days

Now available for Radio Stations

Leonard Maltin's Video Views

Popular contributor to

"Entertainment Tonight"

and

"Starz"

reviews current and classic home videos

Two minutes daily (including commercial)

Monday - Friday • CD Format • Barter

Add a familiar voice with timely tips for your listeners

Another Fine Radio Program from Dick Brescia Associates



Call David West
201-385-6566

e-mail: DBASYNDICATORS@PRODIGY.NET

SMART BOY

-he bought a BEXT

Look to the low power leader

for high performance in transmitters, exciters (such as the popular LEX 25) and a whole catalog of intelligently priced RF equipment.

E-mail your questions. We'll answer promptly.



LEX 25 25 Watt FM Exciter
S/N: >80dB THD: <0.03% \$1,495

Two-year limited warranty



1045 10th Ave.
San Diego, CA 92101
619-239-8462

FAX: 619-239-8474

e-mail: support@bext.com

web: www.bext.com

BEXT

Products & Services Showcase

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

1,000 Hits on HARD DRIVE for \$695!

Compatible with Arrakis, BE, BSI, Enco, Prophet, Smarts, Register Data, others...

All formats! Oldies, '70s, AC, Country 1-day service at no extra charge!



1289 East Alost Avenue
Glendora, CA 91740 USA
PH 626-963-6300
FX 626-963-2070
www.h-b-s.com

Just call our name

800-HALLAND
800-425-5263

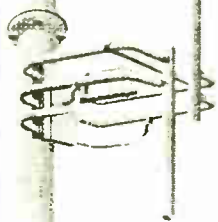
Music on CD in Stock!

READER SERVICE NO. 26

Shively Labs

Reach for Ratings!

Shively Antennas Deliver Coverage!



- Superior Engineering
- Multistation Solutions
- Filters & Combiners
- Translators
- Reliable Pattern Studies

FM & TV Antennas and Related RF Equipment

because ... it pays to be heard!

P.O.Box 389, Bridgton, ME 04009 USA
Tel.: (207) 647-3327 FAX: (207) 647-8273
1-888-SHIVELY e-mail: sales@shively.com
Web: www.shively.com
- An Employee-Owned Company -

READER SERVICE NO. 52

The HSA-100 Series High Performance Headphone Amplifiers for Demanding Applications



The HSA-100 Series Headphone Amplifiers

Drives 8 ohm loads, even small speakers
Mounts easily above or below counter top
Accepts balanced or unbalanced inputs
Accepts -10, 0, +4 and +8dBm input levels
Short Circuit Protected Outputs



Broadcast Devices, Inc.
5 Crestview Avenue
Peekskill, NY 10566

Tel. (914) 737-5032 Fax. (914) 736-6916
Email: Broadcastdevices@Worldnet.att.net

READER SERVICE NO. 78

WEATHER RADIO

Model CRW



Price \$540.00

Sensitivity .28 microvolts for 12 dB quieting. All 3 frequencies. Alert tone demutes receiver, closes relay and gates audio to 600 ohm rear terminals. Another set of rear terminals has continuous 600 ohm audio output. Double conversion crystal controlled, crystal filter in first I.F., ceramic filter in second I.F. Dual gate MOS FET front end. 50 ohm coaxial input. Adjacent channel (j25 kHz) down to 70 dB. 19" rack mount, 31/2" H, all metal enclosure. In stock—available for immediate delivery.

GORMAN REDLICH MFG. CO

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

READER SERVICE NO. 25

Classic Loudness

New Low Price

The FM FlexiMod Composite Processor restores lost loudness due to digital processing

Control your composite, don't clip it!

- ▶ Clean regenerated pilot
- ▶ Ultra low distortion control
- ▶ Tame processor / stl overshoots
- ▶ Up to 4db of clean loudness possible
- ▶ Buy direct & save
- ▶ \$900. pro net
- ▶ Over 1,000 on the air
- ▶ Satisfaction guaranteed

www.microconsys.com

Free processing newsletter

Coming in December: KAMIKAZE!

MicroCon Systems Inc.

(440) 546-0967

READER SERVICE NO. 51

#1 WEBSITE!

You can link to 125 suppliers in 400 product categories. View BR's Prewired Racks. Select the best Processing, CD, MD, STL, Consoles... Even check out used gear.

WWW.

broadcast-richmond.com

(The Practical Website)

"Portable Matchbox"

NEW!



It's PORTAMATCH, the Matchbox that runs on batteries!

Great for remotes, field recording, ENG, or anywhere you don't have AC power.

Just add two 9-volt batteries and go!



"So cool it doesn't need a slogan."

HENRY ENGINEERING

TEL (626) 355 3656 FAX (626) 355-0077
FAX-on-Demand Doc #125 (626) 355 4210
http://www.henryeng.com

READER SERVICE NO. 104

REMOTE MONITORING AND CONTROL FOR ANY SIZE SITE

Davicom systems provide all the automated monitoring, reporting and control functions you need to keep your site(s) operational and legal. Our systems are practical: they are sized for every type of operation from small AM sites to large TV facilities, with set-up and operational software that even casual computer users can understand.



Call us today for more information!
Toll Free: 1.877.327.4832
(609) 653.1065

READER SERVICE NO. 77

Advertisers Say Radio Works Online

▶ ARBITRON, continued from page 39 perceptions in their market continuously.

Arbitron has announced an agreement with RadioWave.com, an interactive radio subsidiary of Motorola. Arbitron plans to use RadioWave.com's software to track Internet listening reports for radio stations and other groups that stream audio on the Internet. The reports, based on 300 Internet radio stations, will be posted online and in print before the end of the year.

The study's authors believe that stations can minimize audience erosion by applying strategic marketing plans that reflect the desires of their PI audience — their core listeners.

Radio sells Web sites

People want to listen online to their favorite radio station, above all. These listeners also want to see visual images of the products advertised on a radio station. At least half have indicated they will buy from these advertiser sites online.

Advertisers have indicated to Arbitron that radio is more successful at getting people to visit Web sites compared to Web-based advertising. Arbitron estimates that radio now reaches 50 to 70 percent of all people in a market, thus making radio the best possible medium to drive people to visit Web sites.

Stations can advertise their own sites for no cost, on their own stations. The problem is what's going on once the listener has arrived at the Web site.

The study indicates radio stations are doing very little to make their Web sites

as marketable as possible.

"The time has come," according to Arbitron, "for radio stations to look at their Web site as more than just a pro-

Respondents rank online shopping and the desire to see, buy and get more information about products advertised on the radio as tops on their list of radio online desires.

A lack of visual elements is the No. 1 complaint of advertisers against radio. This could quickly become a gripe of the past with a good Web designer and the neighborhood grocery store on board.

Measuring the Web

In other words, listeners could have it all — the ability to print the grocery and merchandise coupons they now get from newspapers and, at the same time, actually see the succulent turkeys on sale at the supermarket or adorable children looking smart in the latest clothing, just like they do on television.

"Clearly, it is worth-

while for an advertiser to pay additional money to have a prominent position on a radio station's Web site with product information, hot links to the advertiser site, and lots of visuals," the study stated.

"Radio stations have tremendous capabilities to market their Web sites ... free of charge. A radio station can use its airwaves to drive usage of its Web site and then turn that large traffic into advertising commitments and dollars."

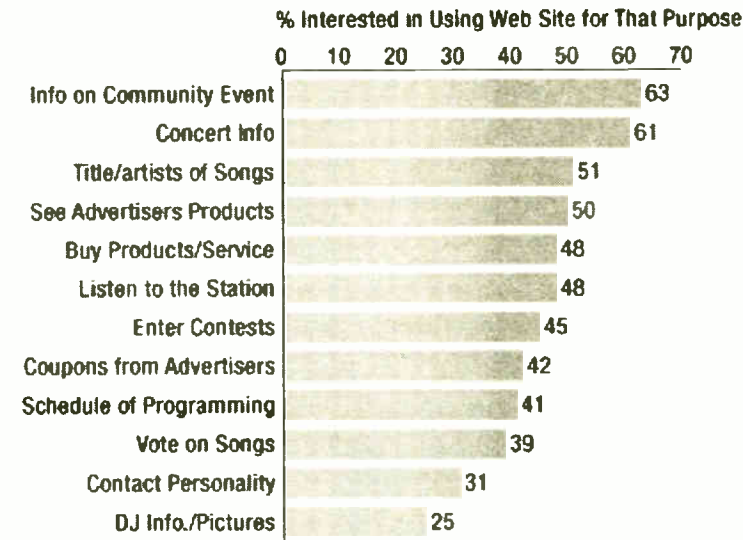
Many businesses are adding new customers through demographic information collected from Web site visitors.

Arbitron is collecting and processing Internet listening data through the measurements compiled in association with RadioWave.com. Developing a method to incorporate integrated webcast/broadcast advertising packages into the marketing arena for radio stations is part of the company's goal.

Arbitron believes that advertisers want to know who is listening online so that media buyers can customize and accommodate both broadcasting and webcasting audiences. The organization aims to generate the "gold standard" of Webcast measurement.

For additional information on the Arbitron Internet Listening Study, visit the Web site at www.arbitron.com

Interest in Visiting a Radio Station Web Site for...



Graph based on diary keepers who indicated online access.

Results From the Arbitron Internet Listening Study

motional tool."

The study indicates that seven of 10 Internet listeners who tune in during the workday are doing so from their office. Internet usage increases in the evening hours, decreasing the time spent with radio and television, according to the report. Arbitron/Edison argue that Internet Webcasting can bring a station's content to places it has never been able to reach.

It's no mystery, then, that consumers want to be able to shop on the Internet. After fighting traffic each morning and evening, booting up the computer to browse the virtual shopping network is a lot less stressful than getting back in the car and on the road.

Okay Folks, Time to Give Me a Big Hug

Alan Haber

So I tell you that we're going to discuss the idea that the world is your station's oyster and that embracing it will enhance your cyber-activities and maybe increase your audience. And not too long after I say that Arbitron releases its Internet Listening Study, which includes the following: "If given the choice, one-third of Americans would listen more to out-of-town stations, as opposed to local stations."

The survey, which can be viewed online at www.arbitron.com/studies/20nmw.htm, also states, "Seventeen percent of Americans say their local radio stations do not do an adequate job of playing the music they like. While the vast majority do say that radio does a good job, about one out of five indicates

radio doesn't satisfy his or her particular music niche — one which could be satisfied with the huge variety of choices being offered by digital satellite radio and Internet audio."



CYBER HOUSE

That's a pretty big potential audience to start, don't you think? Let's have a big, huge, gargantuan group hug and feel all warm and fuzzy, shall we?

That's one hell of an opportunity, folks. And here's why. I was working in public relations back in the late 1980s (well, that's not why, but stick with me here), and I remember that

there was a downturn in ad spending among advertisers. Nevertheless, there were those folks who bucked the trend and spent anyway, and they reaped the rewards, smaller-than-usual though they may have been at the time.

See CYBER, page 47 ▶

The Wizard™ has gone STEREO!

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



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

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

BELAR ELECTRONICS LABORATORY, INC.
119 LANCASTER AVENUE • P.O. BOX 76 • DEVON, PA 19333-0076 USA
(610) 687-5550 • FAX (610) 687-2696
Call, write or FAX for more information on Belar AM, FM, Stereo, SCA, and TV monitors.

AS-101 Audio Switcher

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

10 Stereo In - 1 Stereo Out

P.O. Box 1342 Bellingham, WA 98227
1-800-645-1061 FAX (206) 676-4822

Conex Electro-Systems, Inc.

► CYBER, continued from page 46

Those pioneers who said "Buy time!" when their peers said "Bide time!" were the small fishies in the big pond of sleeping advertisers and, as long as they didn't wake the snorers, they were visible to consumers and they got their message across and perhaps were remembered when the snorers awoke and started spending again.

Now, it's not going to be like this forever. Like what? Around 1,700 radio stations Webcasting, that's what. Before too long, I'll wager, that number will be substantially larger. So right now is the time to jump in the pond, while the number of radio stations Webcasting is relatively small compared to the number of stations doing the over-the-air waltz.

In the survey introduction posted on Arbitron's site, the following question is posed: "As Internet usage grows, will Americans be listening to 'over the air' stations on the Web, or Internet-only stations?"

That's a great question. I'm still not sure whether Internet-only stations that eschew

jingles and liners and other traditional radio elements such as DJs are actually radio stations, but I seem to be sliding into the "call me converted" camp, because I find myself listening to these "stations" more and more and not liking them less one single bit because they don't sound like (fill in local call letters here).

I'll bet the answer to Arbitron's question is "both." I think this is important and you should too, because your station, if it's going to be Webcasting, is going to be competing with them all, and instead of a handful of local competitors, you're going to have many handfuls vying for worldwide market share with you. Stations like:

El Nuevo Siglo — The New Century — which bills itself as "Internet Radio for Today's Latino" and reaches the world with Tejano music.

Internet Radio Hawaii, which hits the cyber-bricks with — what else? — Hawaiian music.

Summer of Love Psychedelic Web Radio, which brings listeners back to the

glory days of cool music, man.

Rock-it Radio. Got your head in the '50s? Have a taste for regional hits? Rock-it beams those glorious sounds to the world from Ventura, Calif.

And if Christmas music is your cup of tea — any time of year, mind you — Broadcast.com's XMAS 101FM is the ultimate tree ornament and cup of eggnog.

Could an over-the-air station playing all-Christmas, all the time, make a viable stab at commercial acceptance? Would Hawaiian music play over-the-air in Peoria? What about Tejano music? Perhaps not, but certainly all would and do play over the Internet.

It may be because the Internet plays by its own set of rules. There's some conditioning of listeners to be done here, for sure, but the conditioning's been done for over-the-air radio listeners for some time.

I mean, you can take the steak off the grill already — it's well-done by now!

Stations on the Internet don't have to play by the over-the-air edition of the radio rulebook. Just as satellite radio can supply underserved or niche audiences with tightly tailored programming choices, Internet-only radio stations can bring the hungry targeted meals aplenty.

It all comes down to what your station's water level is, as far as profits are concerned. How much are you willing to settle for on your bottom line? And, what's more, how long are you willing to stick with it before you throw in the cyber-towel?

How's your foresight? Stations like HardRadio see the possibilities, and those possibilities include hugging the world. And there's nothing quite like a hug to bring the world together.

Link-O-Rama

El Nuevo Siglo: www.elnuevosiglo.com

Internet Radio Hawaii: www.hotspots.hawaii.com/irhmusic2.html

Summer of Love Psychedelic Web Radio: www2.orangesunshine.com/orange_sunshine/

XMAS 101FM: www.broadcast.com/radio/special_broadcasts/XMAS/

HardRadio: www.hardradio.com

Washington, D.C., Jocks Bag Losing Home Team



DC101 jocks wear 'The Bag of Shame' in protest of Redskins' losing start. From left: Morning man Buddy Rizer, Promotions Assistant Roya Vakili, Program Director Bob Neuman and staffer Jared Stern. We think.

One radio station thought it knew what to do about the Washington Redskins' football season: put a bag over it.

The morning duo of Buddy Rizer and Victoria Ray started a "Bag of Shame" campaign, including paper bags for fans to wear to protest the football team's 0-8 start.

DC 101, a Chancellor station, distributed more than 50,000 paper bags with its logo through a local pizza company and at Jack Kent Cooke stadium during a Redskins-Giants game in October.

It didn't stop there. WWDC-FM hired a plane to fly around the stadium trailing a sign that read: "Just Bag It."

The stunt annoyed the team, media

pundits and many fans in this town that loves its Skins. The station took pains to pledge its love of the local franchise.

"The truth is, DC 101 loves the Redskins," Rizer and Ray said in a reply to reproachful letters that appeared in the editorial section of the Washington Post. But the stunt got the station plenty of ink. And maybe it worked: the team won that day.

"For the record, when DC 101 gave out the 'Bags of Shame,' the Redskins were 1-0," the jocks said in a press release. "When we didn't, they were 0-8. Coincidence? We don't think so."

— Laurie Cebula



And You Thought You Knew Us.....



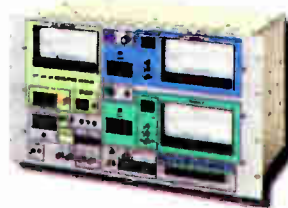
Solid-State and Single Tube Transmitters



Low Power Transmitters



Digital STL / TSL Systems



Modulation Monitors



Pre-Built Modular Transmitter Sites

For More Information Call Us Toll-Free At (800) 334-9154

QEI Corporation
One Airport Drive, P.O. Box 805
Williamstown, NJ 08094
e-mail: qeisales@qei-broadcast.com

Toll-free Sales (800) 334-9154
Fax (609) 629-1751
Emergency Service (609) 728-2020
Web Site: <http://www.qei-broadcast.com>

◆ STATION SERVICES ◆

Programs and Services for Radio Stations

Mail info and photos to: RW Station Services, P.O. Box 1214, Falls Church, VA 22041

Sizzling Riffs With Bacon

AM/FM Radio Networks distributes "The Guitar Show with Kevin Bacon," a two-hour weekly program available for programming.

Kevin Bacon, the movie actor and guitar player, talks with great guitarists in all forms of rock and roll. The variety of scheduled guests include Eddie Van Halen, Carlos Santana and Joe Satriani.



Together, Bacon and the guitar guest of the week develop in-depth interviews that reveal backstage stories, equipment preferences, and instruments the guitar greats prefer, including the latest in computer technology for recording and playing guitar. Listeners will hear samples of some of the greatest guitar songs on record while Bacon and guitar experts discuss their favorite riffs.

For more information on obtaining this program for your station, contact AM/FM Radio Networks in Texas at (972) 239-0220, send e-mail to mraab@amfmradio.net or circle Reader Service 234.

The History of Rock and Roll

Backstage with the Beatles ... the career of Marvin Gaye ... first inter-

view of Buddy Holly ... inside with Neil Diamond. Those are just some of the highlights from "The History of Rock and Roll" with Gary Theroux — a three-minute feature available for radio markets.

"The History of Rock and Roll" is offered Monday through Friday on a barter or cash basis. Shows are based upon interviews with the hitmakers of the '50s, '60s and '70s. Theroux explores the roots of rock and roll with this CD-based program. The three-minute spots are available for programming on weekdays.

Theroux, who currently serves as senior music editor for Readers Digest Magazine, boasts a music archive of over 280,000 CDs, LPs, 45s, 78s and cylinders.

For more information, contact Murray-Walsh Radio Programming, Inc. in Connecticut at (800) 729-6499 or circle Reader Service 3.

Ready for RuPaul Radio?

If you're looking for dance music and fashion advice, AM/FM Networks has the answer with its new program featuring the one and only RuPaul.



Dressing up your weekends is the theme for RuPaul Radio. The host's two-hour weekend program mixes dance music with girl talk.

RuPaul works hit songs that score high on the dance beat circuit. Listeners enjoy

lip sync classics, receive wardrobe advice from RuPaul's fashion rescue and discuss the personality's favorite videos.

For more information, contact AM/FM Radio Networks in Texas at (972) 239-6220; e-mail mraab@amfmradio.net or circle Reader Service 207.

Daily Career Guru Debut

A daily dose of career advice will be available to listeners in two-minute features called "The Career Clinic."

The vignettes will air on more than 27 stations across the country beginning this month. The program is distributed on CD and affiliates are paid a share of the national spot revenue.



Maureen Anderson

Host Maureen Anderson will feature personal accounts of major career moves, testimony from those who are happily employed and professional career counseling.

Anderson believes this program is essential for those searching for happiness in the work world. According to her, there currently isn't much out there to fill this niche. "There seems to be very little on radio about career development," said Anderson. "People are putting in at least 40 hours a week on a job they're unhappy with, so there's certainly a need for this information."

For additional information, contact Darrell Anderson at North Shore Productions in Minnesota at (800) 746-1936 or circle Reader Service 29.

STATION/STUDIO SERVICES

Sound Effects Production Effects Buy-Out Production Music!

Over 50 products to choose from. Call 612-522-6256 or get full details and hear on-line demos at our web site:

<http://radio-mall.com>

Dave Dworkin's Ghostwriters
2412 Unity Ave N., Dept RW,
Minneapolis, MN 55422

READER SERVICE 130

Radio

Satellite Delivered Radio Programming

Tel: 954-735-4070
Fax: 954-735-0370

READER SERVICE 130

BUSINESS BOOSTERS FROM GRACE BROADCAST SALES

WINTER SAFETY CAMPAIGN

Sell to all community-minded businesses. A natural fit for insurance agents, health care, auto service & towing, plumbing, heating, and electrical contractors, non-traditional advertisers, too! **YOU GET: Thirty (30) attention-grabbing features!** Each :60-sec. feature provides at least :20 seconds to insert sponsor copy.

BUY IT ONCE — USE IT FOREVER!
Order Now - Own it in Your Market!

**SUPER JANUARY-FEBRUARY
BUSINESS BOOSTER!**
—just \$299 complete—

24-Hr. Demo Line (509) 229-1427
ORDER TOLL FREE 888-GRACE-88

1012 hit songs from 1980-1995
1229 hit songs from 1954-1969

545 hit songs from the 70's
819 Kickin' Country Hits
on CD for Only \$499 each
(per set plus shipping)

For complete track listings

NOW go to web site:

<http://radio-mall.com> or

Email: mediamall@aol.com or

Phone or FAX Ghostwriters at

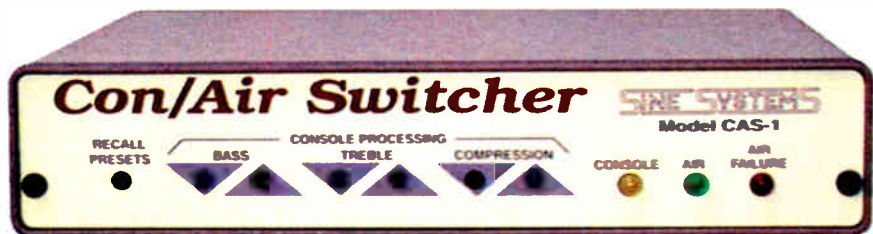
1-888-852-4747

For radio broadcast only!

READER SERVICE 125

Headphone Delay Problem

SOLVED



Switches headphone monitor between AIR and CONSOLE automatically
Internal processing on CONSOLE audio simulates AIR audio quality
Correlation circuit gives operator warning if AIR audio fails
Desktop chassis--rack mounting kit available
Easy to install--uses MIC relay to activate
Balanced audio input/output

SINE SYSTEMS

voice: (615) 228-3500
fax-on-demand: (615) 227-2393
web: www.sinesys.com

Are you reading someone else's
copy of Radio World?

If so why not apply for your personal subscription?

Simply complete the subscription card & return it to us! You'll never have to risk missing an issue of

Radio World

ATTENTION PROVIDERS!

Promote your services to **Radio World's** 18,000+ readers. Reach Radio Station and Recording Studio owners/managers and engineers with your message. For information on affordable advertising call **Simone** at **1-800-336-3045, extension 154.**

Products & Services Showcase

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

VACUUM CAPACITORS



- Variable or Fixed Types
- Capacitance Ranges from 3pF to 6600pF
- Peak Test Voltages to 100kV
- Current Ratings to 1000 Amperes

Ideal for Semiconductor Fabrication, Broadcasting, RF Heating/Drying, Medical (MRI), Avionics, Scientific, and other RF power applications.

COMET North America, Inc.

89 Taylor Avenue, Norwalk, CT 06854 USA
Phone (203) 852-1231 Fax (203) 838-3827



READER SERVICE NO. 24

ERI[®] ELECTRONICS RESEARCH, INC.



- Structural Analysis
- Tower Reinforcing

(812) 925-6000

7777 Gardner Road
Chandler, Indiana 47610
Home Page: www.ERInc.com

READER SERVICE NO. 50



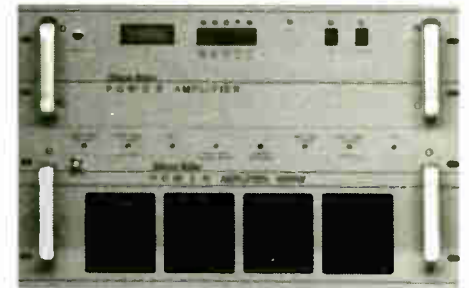
Silicon Valley POWER

AMPLIFIERS

The RF People

FM Broadcast Power Amplifiers

Designed for reliability, durability, & efficiency.



Models from 165 watts to 2.4 KW

- Solid state. Frequency agile.
- VSWR foldback. Digital display.
- Remote operation. Easy installation.
- Full documentation. Modular construction.

1-800-986-9700

www.svpa.com e-mail: sales@svpa.com Fax 1-408-986-1438

READER SERVICE NO. 76

Fits In Even "STINGY" Budgets!



The **HOT NEW "DELUX"** quality built **SPACEWISE** system!

BASIC SYSTEM \$1555!
FULL SYSTEM \$3195!

HOME OF VOLUME VALUE PRICING

GENERAL FEATURES: Basic system consists of main counter top and two PC system pedestals ... then you add on what you need from there, such as racks and shelf wings or talk table wings for a full system.

USER FEATURES: Two PC system base pedestals ... heavy rack rail systems with easy access standard ... passive ventilation systems throughout ... adjustable shelves ... wiring block backplane ... customizing ... quick installation.

DURABILITY BUILT IN: Top counters are two ply 1 1/2" thick with quality name brand laminate with protective 1 1/2" solid wood trim raised on the outside perimeters. Plus ... generous vertical and horizontal solid wood trim and recessed kickboards.

SPACEWISE[®] Broadcast/Furniture

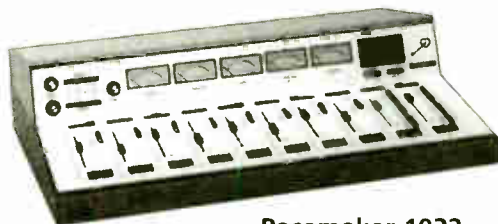
CALL 800-775-3660

Visit our web catalog: www.spacewise.com

"The Broadcasters Furniture Store"

READER SERVICE NO. 23

A Perfect AUTOGRAM Combination



Pacemaker 1032

Pacemaker
RTV
Mini Mix
?



Solution 20

Console Accesories All In ONE Package:

Distribution Amp Card • 10 Watt Stereo Amp Card
Relay Card • Microphone Processor Card

AUTOGRAM CORPORATION

Plano Texas

1-800-327-6901 FAX (972) 423-6334

E Mail: info@autogramcorp.com

www.autogramcorp.com

READER SERVICE NO. 103

Switcher tools

Designed by broadcast engineers for broadcasters, our audio and digital audio switchers offer excellent sonic quality, removable I/O connections, contact closures and serial remote control capabilities and flexible mounting accessories.



SS 12-4

Active crosspoint switching/routing with 12 stereo inputs and 4 stereo outputs.



8X2D

Active crosspoint switcher with 8 stereo inputs, 2 stereo and 2 mono outputs



SS 3.1

Passive switching/routing with 3 stereo inputs and one stereo output or vice-versa.



10X1

Passive switching/routing with 10 stereo inputs and one stereo output or vice-versa.



6X1G

Passive switching/routing with 6 stereo inputs and one stereo output, or vice-versa.



SS 2.1/BNC

Passive switching/routing with 2 composite audio, video, or AES/EBU inputs to 2 composite audio, video, or AES/EBU outputs, or vice-versa.



SS 8.2

Active crosspoint switching with 8 stereo inputs, 2 stereo plus 2 mono outputs.



3X2B

Active crosspoint switcher with 3 stereo inputs and 2 stereo outputs.



8x1 DAS

Routes any one of eight AES/EBU digital inputs to split outputs.



SS 2.1/TERM

Passive switching/routing with two stereo inputs to one stereo output or vice-versa.

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

BROADCAST tools inc.

Internet: www.broadcasttools.com E-mail: bti@broadcasttools.com

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

READER SERVICE NO. 102

The CircuitWerkes AC-3 Autocoupler



AC-3 shown with optional rack mount

More Features. Better Price.

- Auto-connect and disconnect.
- Two-Year limited warranty.
- LED Indicators for incoming rings/on-line status & power.
- Answers on user selectable number of rings.
- Momentary or latching dry contacts at pickup.
- Open collector output for ring/online
- Metal case can be wall/desk or, optionally, rack mounted.
- Audio, control and power connections on screw terms.
- Optional ComboLok provides password security.
- Suggested list only \$229.
- Simple, active hybrid with unbalanced, In/Out for simultaneous send & receive communications.
- Remote connections include: aux. relay closure, pickup-enable, remote pickup trigger, call end sink, & Ring / Online sink.

CircuitWerkes



3716 SW 3rd Place
Gainesville, Florida 32607
(352) 332-6555 / fax 352-380-0230
email sales@circuitwerkes.com
<http://www.circuitwerkes.com>

READER SERVICE NO. 49

Products & Services Showcase

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

UNIVERSAL XE-1000 SCPC AUDIO RECEIVER



AN AFFORDABLE QUALITY SCPC RECEIVER

New, affordable, frequency-agile receiver, direct channel entry by keyboard, selectable companding 1:1, 2:1, 3:1, wide/narrow bandwidth, de-emphasis selectable, 950-1450 MHz, line output 600 ohms, muting, transponder agile, LNB power supply, 50-channel memory, full baseband output, high-quality audio. Every needed feature at a sensible price (lowest in the industry).

REMOTE ACCESS AUTOMATION (OPTION)

CALL OR FAX FOR PRICING INFORMATION

Phone: (614) 866-4605 Fax: (614) 866-1201

UNIVERSAL ELECTRONICS, INC.
Communications Specialists

4555 Groves Road, Suite 12 Columbus, OH 43232-4135

READER SERVICE NO. 75

PTEK

LOW COST FM TRANSMITTERS & POWER AMPLIFIERS



Exciters/Transmitters

10W
25W

Power Amplifiers

150W
300W
500W
1000W

**CALL 888-411-5174
FOR DETAILS**

1814 SCHOOLDALE DRIVE, SAN JOSE, CA 95124. 408-448-3342 FAX 408-448-5951

READER SERVICE NO. 101

EQUIPMENT LEASING

START UPS TURNAROUNDS

**\$100,000
TO
\$1,500,000**

CALL ... (617) 267-2900

BOSTON FINANCIAL & EQUITY CORP.
20 OVERLAND STREET BOSTON, MA 02215
WWW.BFEC.COM

READER SERVICE NO. 22

**REMEMBER THE CORTANA
FOLDED UNIPOLE ANTENNA?
WE STILL MAKE IT WITH THE
SAME HIGH QUALITY MATERIALS
AND WORKMANSHIP.
IT FEATURES...**

- **BROAD BANDWIDTH** for better sound,
- **GROUNDING ANTENNA** for lightning & static electricity,
- **ELIMINATES ISOCOUPPLERS** in VHF & UHF antenna lines,
- **BEST ANTENNA FOR DIRECTIONAL ARRAYS.**

ALSO

**DETUNING SYSTEMS FOR ANYTHING THAT DISTORTS YOUR
AM COVERAGE PATTERN: TOWERS, POWER LINES, TANKS
OR ANY METAL STRUCTURE.**

FOR INFORMATION CALL, FAX OR WRITE:

nott ltd.

4001 La Plata Hwy
Farmington, NM 87401
phone 505-327-5646 fax 505-325-1142

READER SERVICE NO. 48



Econco REBUILT POWER TUBES



*Approximately One Half
the Cost of New*

3,000 Hour Unconditional Guarantee

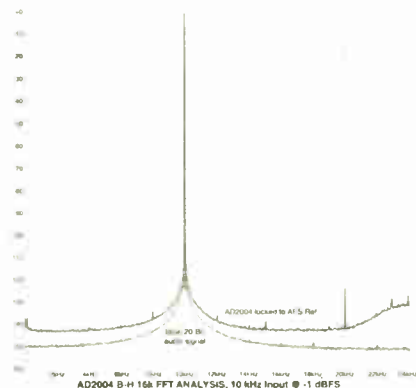
Call for Our Price List

Econco 1318 Commerce Ave. Woodland, CA 95695
Phone: 916-662-7553 Fax: 916-666-7760 Telex: 176756
Toll Free: 800-532-6626 From Canada: 800-848-8841

READER SERVICE 74

The Perfect Digital Console Interface

The AD2004 A-to-D converter is the cleanest, quietest, most neutral sounding converter available! It was designed for the 20-bit multichannel user who insists on the very finest performance. This device introduces ground breaking improvements in A to D conversion. Analog preprocessing significantly reduces distortion products, while a custom phase lock loop IC all but eliminates jitter induced sidebands, under all operating conditions. The graph shows an FFT analysis with virtually no jitter induced sidebands. Best of all, the AD2004 comes in at the most affordable price of \$2200 for four channels. And now the eight channel AD2008, housed in a full width 1 RU chassis, is available for \$3950. Protect your investment: get next generation performance today with the BENCHMARK converter series. Call Rory Rall today!



Now recording at: The San Francisco Symphony, Telarc Records, Encore Recording, and other notable facilities.

BENCHMARK MEDIA SYSTEMS, INC.
800-262-4675, 315-437-6300, <http://www.benchmarkmedia.com>

READER SERVICE NO. 100

Attention Advertisers!

Reach **18,000+**
broadcasting professionals!

**RADIO WORLD's Product
Showcase** provides a perfect
medium for test marketing
your products and services.

*It's an efficient, effective &
affordable advertising option!*

For more information, including
rates and deadlines, fax

Simone Mullins at
703-671-7409

or call
703-998-7600 ext. 154

Studio Sessions

ForeFront
Recovers Your
Data

See Page 55

Radio World

Resource for Radio Production and Recording

December 9, 1998

Zoom 1201: Simple Can Be Fun

Ed LaComb

Remember that first car you bought? No, I don't mean the first *new* car you bought. I mean the car you probably bought while still in high school. You know, that beat-up clunker.

possible, only for some production rat to try to find out how to make it sound as bad as a first-generation piece of audio gear.

If you like the feel of hands-on hardware to process your audio, I submit that you can now accomplish many of the same things as your fancy lo-fi plug-ins

that are what really make this box worth the investment.

In Effects Bank C, I found a very neat Vocoder effect. This is the "singing instrument" effect you have heard many times in Peter Frampton songs and Electric Light Orchestra recordings. The effect is not as clean as Frampton's, but it sure does crank out an interesting sound.

The 1201 accomplishes this by taking a vocal fed through the Left channel input and combining it with a keyboard or any other sound you wish fed into the Right channel. The vocals modulate the carrier in the Right channel and the result is a mono Vocoder effect.

In radio, parody songs are a staple of any production department. The easiest way to produce them is still to strip vocals out of an original recording by reversing the phase of one channel and recombining the signal in mono (L minus

R). This works, but in some cases you also lose bass response.

With the Zoom 1201, you can dial up the Karaoke effect and strip up to 90 percent of that vocal away. The 1201 strips the bass off first, then recombines it after the vocal cancellation so you don't lose all the fidelity of the song. One side effect of the Karaoke setting is that you do seem to lose quite a bit of the high end. But for canceling vocals, this is a pretty clean way to do it.

Buckets of grunge

Another effect that I like for radio production is the vocal distortion effect. This is great if you are looking for a distinct techno-sound.

You could accomplish the same thing by cranking the mic pot way up and screaming, but why live like animals? Instead, simply use the ZoomStudio 1201.

Finally, when looking for a scratchy, hard-to-receive, distant AM station-at-night sound, the "Lo-Fi EFX" setting

See ZOOM, page 56 ▶



The Zoom Studio 1201 Digital Reverb and Multieffects Processor

Yeah, that one. Chances are you have some pretty fond memories of that old behemoth, in spite of it being about as low-tech as you can get.

Now that I've set this scenario of nostalgia up in your mind, let me transfer that thinking to audio and the wonderful world of lo-fi, introducing the Zoom Studio 1201 Digital Reverb and Multi-effects Processor from the folks at Samson Technologies.

The 1201 comes with a complement of decent-sounding reverbs and other processes, but I can tell you that this piece of gear has some dial-up presets that are extremely lo-fi by today's standards. And that is where the unit's charm comes in.

Big and fancy

Today, you can go out and buy plug-ins for your big, fancy digital workstation to make it sound lo-fi.

Why? Because somewhere far away, in some distant production room, it was deemed necessary to have a retro-sound for certain projects (I think I was one of those people).

I smile when I think about all of the effort that went into making the new digital gear as noiseless and as pristine as

with the Zoom 1201. Its beauty lies in its simplicity.

The ZoomStudio 1201 is a very shallow, single-rackspace unit with a wall-wart power supply. It features unbalanced quarter-inch Right and Left inputs and outputs. On the front panel, there are six knobs and one three-position switch. From left to right the knobs are Input Level with peak indicator; Mix (dry to wet); Output; an 11-step "Character Variation" control knob; Reverb Time; and an 11-position "Reverb Effects" knob.

That last knob has a sub-switch which allows you to choose one of three banks of effects, labeled as Bank A, B and C. Each bank has a set 11 effects, thus giving the unit a total of 33 effects to choose from.

You can then take those 33 effects and dial up 11 additional variations of each one.

Tech details

The sampling frequency is 44.1 kHz and it has a pretty decent A/D converter at 18-bit/64 times oversampling.

There is the standard complement of Room, Plate, Hall and Vocal reverbs, but the 1201 gives you some way cool extras

OnStage Soundcard Rides the PCI Bus

Carl Lindemann

The triumph of the compact disc over the LP was more from convenience and durability than any inherent sonic virtues, or so the claim goes.

The pronunciation of "CD quality" for digital audio is really just to say that it is adequate.

For me, it is not just about resolution. Audio sampled at the 44.1 kHz/16-bit

CD standard is hard on my ears. There is a harshness that translates into discomfort and even pain after awhile.

The "warmth" of analog audio nev-



OnStage Soundcard

er grates like digital does. Because of this, the LP persists as audiophiles

See ONSTAGE, page 54 ▶



MACKIE

Professional Audio Systems

www.mackie.com

Everybody Must Get 'Stoned'

Alan R. Peterson

Show me any radio talent who, to some extent, did not get in it for the glory, the recognition, the sheer thrill of being a radio star.

Many are honored for their contributions to the medium. Local and regional awards are freely given. Winning kudos from Bobby Poe or Billboard magazine are the aspirations of many.

At the NAB Radio Show in October, WNNK(FM), Harrisburg, Pa. — my former station — got handed two more Marconi Awards for the station and its personalities alike. Then there is the big ticket: being immortalized in the NAB Hall of Fame.

Some jocks are saluted in their adopted hometowns with official proclamations of "Bob James Day" or having Main Street temporarily renamed "Johnny Daniels Boulevard" in their honor.

In all fairness, my time on the air has been a fun ride. But while enjoyable, it has been anything but stellar. I had generally played the medium markets, got to jam backstage with Roy Orbison and Junior Walker years ago, did two minutes of bad standup before introducing George Carlin in Sunderland, Mass., and done all of the wacky things deejays are expected to do.

I had my monthly column in *RW* — a decade strong this coming year — but there have been no industry honors or awards to show for my years of devotion to the mic and it was unlikely I would ever see any.

That was until last March, when I discovered two unique statues in Washington, D.C.

Old Stoneface

Near the dome of the Jefferson Memorial and the new Franklin D. Roosevelt Memorial, there is a very narrow bridge. This thin structure accommodates two single lanes of traffic and has a sidewalk that can oblige only a thread of pedestrians. Cut into the stone wall of the bridge are a pair of small fountains, each a carving of a human face dribbling water from a toothy open mouth into a basin below.

The miserable things look just like me when I was in my 30s.

Okay, so they aren't really me and they are more gargoyles than statues in

the literal sense. I don't even know whose face it is supposed to be. But just look at the photo. The haircut, the cheekbones, the dark eye sockets; except for that hideous lower lip, *that's me!*

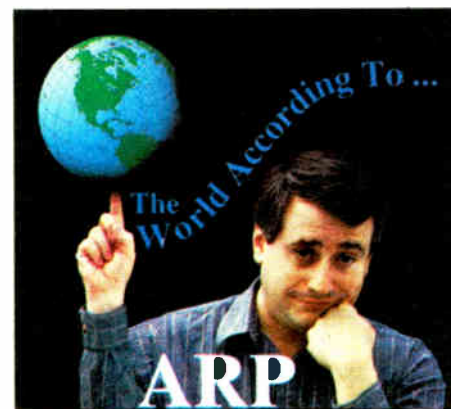
At first, I was a little repulsed by the grotesque countenance of my chiseled clone. But the more I looked at it, the more amused I became by it and how much fun I could have with it.



The graven image of the author welcomes you to Washington ... and reminds you to brush regularly.

We all know somebody that skunked us early in our radio careers. Whether by an unfair firing or just being a jerk to work with, there is somebody out there that made life miserable at one point. How great it would be to encounter that very person today and experience the joy of full closure.

"Ah, Al," he or she would say. "So nice to see you again. I've read your work for years. You've probably heard I'm living in (name of really great city) and programming (call sign of really



great station). I've won my state's Giuseppe Garbanzo radio award three years in a row and am about to launch my own consultancy. I'm dating the (actor/actress) that starred in our Clio-winning TV commercials and I drive a company Lexus. So, how has your career been going?"

That is when I would say, "Fine. You ought to come visit me in Washington. Let me show you the statue of me erected by the Jefferson Memorial."

That would frost them long enough for me to walk away smiling.

My carved counterparts would come in equally handy at class reunions. Over the years, my high school turned out TV star Carol Leifer, supermodel Carol Alt, television writer Winnie Holzman, tennis star Linda Seigelman and even *RW* publisher Steve Dana. I shared gym class with the nephew of science fiction master Isaac Asimov and endured study hall with the heir to New York's Fortunoff department store dynasty.

What hope was there for a slug like myself? They would find out at the next big reunion when the football hero would bellow, "Hey, Peterson! Is that you? Ha! Remember Bonnie, the captain of the

See ARP, page 55 ►

Think of Them as Reference Monitors You Can Wear

When you need to hear exactly what you've recorded... nothing more, nothing less... then only Sennheiser's HD 25 SP will do. Excellent isolation, with clear, accurate reproduction are the trademarks of these reference-quality headphones. Plus, they're MUCH more comfortable than wearing speakers.

Your project studio is incomplete without the HD 25 SP. Check them out today at your local Sennheiser dealer.

HD 25 SP



SENNHEISER

4 VISTA DRIVE, P.O. BOX 987, OLD LYME, CT 06371
TEL: 860.434.9190 • FAX: 860.434.1759
IN CALIFORNIA: 4116 WEST MAGNOLIA BLVD., SUITE 100,
BURBANK, CA 91505 • TEL: 818.845.7366 • FAX: 818.845.7140
IN CANADA: 221 LABROSSE AVE., PTE. CLAIRE, PQ H9R 1A3
TEL: 514.426.3011 FAX: 514.426.1951

BOOK REVIEW

Pair of Books Explain Net Audio

Tom Vernon

With new technological advances squirting by you faster than greased pigs at a county fair, it is hard to find time to stay current.

Much of my reading along those lines is done during a three-hour commuter rail trip from the hinterlands to Philadelphia and back. Small books that won't weigh me down are the most likely to be packed in the morning.

Recently I checked out two short books related to Web audio that may be of interest to broadcasters and production people — "Audio on the Web: The Official IUMA Guide" and "Passport to Web Radio."

Jeff Patterson and Ryan Melcher are co-authors of "Audio on the Web," published by Peachpit Press and retailing for \$34.95.

Groundbreakers

So what can a couple of garage-band types tell us about Internet audio? Lots, actually. These guys launched the IUMA (Internet Underground Music Archive) back in the fall of 1993, which was the equivalent of the Stone Age for Web audio.

Through trial and error and lots of technical savvy, Patterson and Melcher

pioneered a Web site where up-and-coming bands could post samples from their songs and music fans could listen and download. This book is the outcome of their struggle.

The first two sections of Audio on the Web discuss the basics of working with digital audio files. You will learn about sampling rates, extensions and MIME types, as well as the types of compromises you have to make between sound quality and file size.

Next comes a discussion of compression, including ADPCM and MPEG. PCM is discussed too, as some really small files are not worth compressing.

Next chapter

The next chapter is all about setting up a studio, recording and tweaking digital sound. Sound cards, ripping CDs and digital sound processing are all discussed. For most of us, this is old hat. Part II is where the fun begins.

The second part of Audio on the Web concerns itself with downloadable audio files. Most of the digital audio formats we work with predate the Web, and not all adapt well to the Internet. AIFF, WAV, AU and MPEG are all Net-friendly in terms of ease of use, portability, and quality vs. file size.

Once you have a few digital sound

samples in hand, you can experiment with integrating them into your Web site.

For this, you will need to know the fundamentals of HTML (HyperText Markup Language, the standard for defining Internet documents) and a bit about how URLs are put together.

Two ways of incorporating audio into Web pages are described: linking, where users must click to download and hear a sound; and embedding, where the sounds are downloaded and played automatically. There are advantages and disadvantages to each method, described in the text.

The next section of Audio on the Web concerns itself with streaming audio, the technology that makes Webcasting possible. Three contenders in streaming technology are discussed: RealAudio from RealNetworks; StreamWorks by Xing Technologies; and Liquid Audio by Liquid Audio. The authors walk you through all three systems, illustrating with screenshots how to set up the server software, encode audio clips and serve the files from your Web site.

Finally, Patterson and Melcher look into the crystal ball and predict what will be hot in the near future. The

See REVIEW, page 56 ►

DIGITAL DOMAIN

Clock Wars: Going Down the Sync

Mel Lambert

One of the more obvious things about digital, just in case you have not noticed, is that it is not an On/Off affair.

Sure, the binary data stream comprises a sequence of ones and zeros. But operationally, there are a number of aspects of digital that are capable of being supported by a continuum of values.

Take interconnecting various studio systems, for example. Aside from the obvious case of "it either works or it doesn't work," you might select the wrong sampling rate for the system. Either the sender or receiver is incapable of freewheeling down to the correct rate or, more simply, the data streams are totally incompatible.

In other words, there are many circumstances where the system will function just long enough for you to become complacent, and then produces a nasty *boink*.

Welcome to the Clock Wars.

The Clock Wars begin when the host master clock is running off speed, the receiving clock is not running at the appropriate clock rate or the cable is fouling things up. Believe me, there is a wide spectrum of reasons why bits will not make it successfully from Point A to Point B. The main problem with digital is that, unlike analog, coming up with a reliable fix is not easy.

That "fix" could involve waiting

around several hours just to make sure that, over a long time period, a FIFO (first in, first out) buffer does not run out of space and dump one or more bits than it just cannot handle from an off-speed interconnect link. It does get messy.

What to do? The only obvious solution I have encountered is to make sure that every component in your production studio and on-air system is nailed to the same clock reference.

There is simply no other way of ensuring



All digital studio components get in step when clocked from a single, stable time reference.

that no matter what is connected to what, you can be assured of 100 percent plug-and-play compatibility, assuming of course that you are using compatible I/O formats.

There are a number of companies that do respectable business supplying broadcasting and other industries with reliable, highly stable master synchronization references. Probably the most famous is

Nvision, whose wares set high standards for ruggedness and simple, no-brainer solutions. One possible drawback is that its system can be a shade expensive.

All you need do is follow one, easily remembered Golden Rule and your world should be dramatically simplified: Make sure that all systems that are capable of receiving a master clock input are connected to whatever Master Sync Reference source you have specified.

Use high-quality, low-capacitance

cables. If you haven't, you should see what poor cable does to the high-frequency response of a signal. Two-channel AES/EBU format digital data running at one of the popular sampling rates generates about 3 Mbits of square-wave data per second — up in the range of RF transmission rates — plus a rich content of harmonic overtones.

The end result is a signal that will not survive more than a couple of feet through conventional cable. End of story.

What do you do about sources or destinations that do not offer a Word Clock input? Certain brands of CD-R and DAT recorders are good examples.

In my experience, because such units were designed without reference ports, their digital inputs are based around phase-lock loop circuits that can flywheel up and down several percent without running out of buffer memory.

Just so long as you do not ask for the impossible, and can ignore the sonic artifacts that several golden-eared members of our profession swear make a major difference to a system's overall performance, life in the Digital Fast Lane should be relatively simple.

If at first you don't succeed ...

If you are faced with a situation in which an entire studio system is being referenced to a non-synchronous source, my single piece of advice is *try something else*. Such a scenario might be when a DAT machine is playing back into a digital audio workstation, and the DAW needs to be disconnected from a master time reference to follow the off-speed clock from the DAT.

While you may be able to secure a reliable transfer one day, there is no guarantee that this will occur every time you attempt to repeat the procedure. A DAT recorder is pretty stable and capable of running on-speed for respectable periods of time. But one day, right in the middle of a long transfer of a master recording to a DAW for archiving, the clock's gears are going to grind and there will be an audible glitch.

The only solution here is to go back and start again or maybe edit the sequence in the workstation. Either way, it is a royal pain.

Why have I spent so much time pleading for such an obvious solution? Simply because good engineering practice can save you a great deal of grief in the long run. With digital systems, your primary objective is to adopt a System Approach. Get it right once. Have every system component follow a common, highly stable clock reference, and you can enjoy a quiet life, literally and figuratively.

That is, of course, until the automation computer goes down, but that is a tale for another day.



Currently the international marketing director for Otari, Mel Lambert has been intimately involved with the production and broadcast industries on both sides of the Atlantic for several decades. He can be reached at mediapr@earthlink.net

On-air control is just part of our picture.

- Four on-air digital players — with volume, fade and segue control.

Pristine RapidFire:
the all-in-one digital broadcast system.

Pristine RAPIDFIRE
www.pristinesys.com (310) 670-7500

Circle (20) On Reader Service Card

WE SPEAK YOUR LANGUAGE!

SIDEKICK AUDIO SUBCARRIER GENERATOR

The SCA-186 Sidekick® is the industry standard for subcarrier services. When stations lease their SCAs to foreign language and reading services and need a reliable generator, the Sidekick is the only place to turn.

Here's why:

- **Crystal-Controlled Subcarrier Generator**— Frequency stability: +0.006% from 0-50° C
- **Modulation Monitor**— Simple, accurate and eliminates the need for an additional monitor
- **Integrated Audio Processor**— Better peak control significantly reduces crosstalk
- **Transmitter Tuning Aid**— RF fine tuning minimizes incidental AM to further reduce crosstalk
- **Composite Loop Through Feature**— Automatic mix of subcarrier signal into composite simplifies installation.

modulation sciences inc.
12A World's Fair Drive • Somerset, NJ 08873
Voice (732) 302-3090 Toll-Free (800) 826-2603 Fax (732) 302-0206

Korean • Chinese • Russian • Italian • French • Reading Services

Circle (46) On Reader Service Card

OnStage Obsolescence Insurance

► ONSTAGE, continued from page 51
continue to hassle with the meticulous care and cleaning of LPs.

The next wave of digital audio equipment promises to transcend the limits of CD quality and finally match or even surpass the best that vinyl is capable of.

The OnStage soundcard from Applied Magic is, as the company's promotional literature claims, a "form of obsolescence insurance." This is so forward-thinking that the card is designed for the Windows NT operating system only, with Windows 95/98 drivers forthcoming.

Wishes

The fully balanced OnStage soundcard incorporates more features than any pro audio or video producer could wish for. For the radio environment, the wealth of features may be overkill, but the sound quality is hard to pass up.

The OnStage operates on a computer's PCI bus, anticipating an industrywide switch from the now-common and much slower ISA (Industry Standard Architecture) bus.

Last year, Intel and Microsoft announced intentions to eliminate the ISA bus altogether in their "PC 98" specifications. But realizing that shifting over the enormous installed base of ISA cards will not happen overnight, both companies retreated from this position.

Still, the limited ISA bandwidth cannot handle more than a few channels of CD-quality audio and is even more hard-pressed with the coming 24/96 standard.

The OnStage has four XLR audio inputs matched with four XLR outputs, plus an AES/EBU digital connector. According to David Newman, vice president of engineering for Applied Magic,

enabling these multichannel capabilities requires a faster bus.

"If we are going to run the number of channels we can run on this board, ISA saturates," he said. "You can't do anything else on the bus. PCI is necessary for this product."

Another advantage of PCI is that the increased data transfer capabilities allow the DSPs on the card to assume some of the workload of the CPU. Processing sound on the card can be an improvement over the CPU-intensive software emulation built into audio editing programs.

The OnStage uses a 40 MHz Texas Instruments C30 DSP floating-point processor. For Newman, this chip is "a classic for high-precision floating-point mathematics," and a quantum jump in quality over the 20- or 24-bit fixed-point DSPs typically used. It generates a 32-bit linear value for the output. This gets paired down to 24 bits for digital output, and 20 bits for analog.

The standout specification for the OnStage is its 110 dB signal-to-noise ratio. Achieving this in the PC environment is a trick. "The inside of the computer is a difficult environment," said Newman.

The key is using fully balanced circuits throughout. "Balanced audio compares the negative to the positive signal, and as a result cancels out noise," he said. But not all balanced audio is the same. For Newman, the claim can be confusing.

"Other soundcards come in balanced because it is considered professional," he said. "Then the sampler or the A/D is single-ended. That gives a major opportunity to add noise in the environment. Even though the card may be 'professional +4 dB balanced,' some of the circuits may not be."

Other engineering approaches to the problem have opted for out-of-the-box solutions. External A/D-D/A converters promise to sidestep the problems inside computers. Newman considered going this route, but deemed it unnecessary and found it could introduce new difficulties.

"We looked at it," he said, "but we achieved our specs. We removed all the noise down to the specs of the chips. Going outboard provided no advantage and offered opportunities for additional noise."

Going with an external converter means great care has to be taken with cabling and data transfer protocols — otherwise, more noise. Though it seems reasonable, these practical realities make it problematic. "For us," said Newman, "the outboard A/D-D/A is a marketing approach rather than an engineering necessity."

Listening to recordings produced with the OnStage was a revelation. Recordings had a warmth I have not heard with other digital soundcards.

According to Newman, digital audio gets this harshness from what is called *jitter*, or phase error between samples. The extensive use of anti-jitter stabilization on the card minimizes this inherent problem.

This exceptional sonic quality does not come cheap. The OnStage lists for \$1,595. Part of this is due to features targeted toward video and multimedia producers including SMPTE LTC time code I/O and video genlock.

If your production seldom goes beyond simple rip-and-read sessions, the extra channels and other bells and whistles — albeit heard with incredible warmth, clarity and low noise — may not justify the high price.

But as "obsolescence insurance," the Applied Magic OnStage may keep you from having to shop for anything else for the foreseeable future.

Applied Magic is at 6078 Corte Del Cedro, Carlsbad, CA 92009.

Check out the company Web site at www.appliedmagic.com

■ ■ ■

For information, contact Applied Magic in California at (888) MAGIC-55 or circle Reader Service 28.

Carl Lindemann is a contributing writer to *RW* and the producer of the syndicated "Cyberscene" radio feature.

He can be reached via e-mail at carl@cyberscene.com

Word of the demise of ISA is premature. A dB International bets that the ISA bus will remain viable for some time.

The company makes the Multi!Wav PRO24 series of soundcards and aims to unseat the venerable CardD+ from Digital Audio Labs. The recently released PRO Analog 24 records and plays back through four balanced quarter-inch jacks.

This is a welcome improvement over the unbalanced RCA connectors or the flimsy eighth-inch jacks found on hobby cards. The fact the PRO Analog 24 is not PCI may be advantageous to some, according to Hugh Harrer, vice president for operations at A dB.

"Ninety-nine percent of all computers still have a number of ISA slots available, and these computers will be around for years," he said. "With the proliferation of PCI products on the market — video display, SCSI, network, video capture and broadband modems — many users may have more ISA than PCI slots open."

PCI is necessary for recording many discrete channels simultaneously — a key factor for pro audio, but not necessarily for radio station production. "The ISA slot has more than enough bandwidth for full duplex 24-bit audio," said Harrer.

Differences between ISA and PCI do not impact sound quality directly. Being fully balanced throughout the process is the defining factor. Harrer said, "Designing a high-end analog product to work in the noisy environment of a computer is a challenge, but by using balanced circuit design together with careful shielding and power supply regulation, we achieve better than 100 dB signal-to-noise ratio in actual operation."

The A dB Multi!Wav PRO Analog 24 includes a Word Clock I/O for tight synchronization with video. It can be paired with the Digital PRO24 to add an AES/EBU digital I/O capability.

Bob Dylan once said, "Money doesn't talk, it swears." This is especially true in radio. With its \$499 list price, the PRO Analog 24 delivers a price/performance ratio production directors just might swear by.

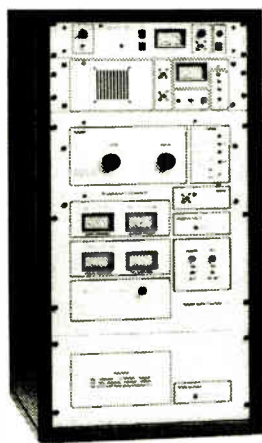
A dB International can be reached in Georgia at (770) 623-1410, or circle Reader Service 54.

— Carl Lindemann

Superior Broadcast Products

Quality Products at Reasonable Prices

FM Transmitters



High Performance Solid State Exciter
Solid State IPA Amplifier
One Year Limited Warranty
Factory Service
On site check out by factory
personal available

1,000 watt	\$5,990.00
2,500 watt	\$11,990.00
5,00 watt	\$18,990.00
10,000 watt	\$22,990.00
15,000 watt	\$29,990.00
20,000 watt	\$32,990.00

20 Watt Solid State Exciter - \$995.00

Solid State FM Transmitters with Digital Exciter

120 watt	\$2,800.00	2,000 watt	\$12,900.00
300 watt	\$3,500.00	3,000 watt	\$19,990.00
1,000 watt	\$7,990.00	5,000 watt	\$29,990.00

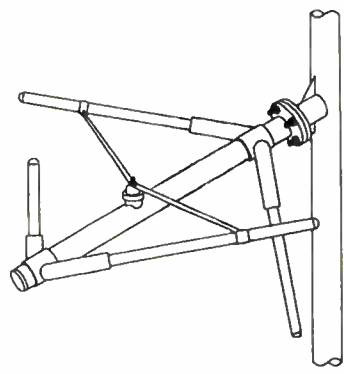
FM AMPLIFIERS

100 watt.....	\$995.00
300 watt.....	\$1,790.00
500 watt.....	\$2,990.00

FM STL
Both Transmitter
and Receiver
\$3,500.00

FM Antennas

All Power Levels 500 watts
to 20,000 watts per bay



* RF Coaxial Patch Panels
*FM Combiners

FREQUENCY AGILE
FM TRANSLATOR
\$2,500.00

Contact Jimmie Joynt 17194 Preston Road, Suite 123-297 • Dallas, Texas 75248
Ph: 972/473-2577 • 800/279-3326 • Fax 972/473-2578 • 800/644-5958

Software May Save Damaged Data

Read G. Burgan

Unless you are very lucky, sooner or later a computer around your station will begin to show error messages, and before you can say "Bill Gates," it will refuse to boot. Welcome to the club of computer users that have experienced a disk-drive failure.

If you are fanatical about backing up your files, it may be just a momentary inconvenience. But if you have data you need — not only audio files but a music/effects database and perhaps even your DAW software itself — you will want to recover the data on the failed drive. What can you do?

First, you need to know if the difficulty is

a mechanical failure or data problem. When I lost a SCSI drive last year, I heard an awful grinding sound every time I turned the computer on. It was the sound of the head grinding against the disk's surface. In a case such as that, recovering data is highly unlikely.

If your computer BIOS has a hard drive autodetect function, see if it can detect the faulty drive. If the autodetect does not see the drive, it is probably damaged either mechanically or electronically.

While you probably cannot recover the data under these circumstances, check the date of manufacture on the label against the warranty. If it is still covered, you may at least get a new hard drive for all your troubles.

If however the drive is mechanically "repairing" the disk or recovering the data.

Several good utilities exist that can run diagnostics on a hard drive and repair it so it is again operational, including Norton Utilities. I use Version 3.0 for Windows 95. Other versions are available for various operating systems.

But what do you do when your BIOS says the drive is there, but DOS can't detect it, Windows 95 cannot boot from it and even Norton Utilities is unable to detect it?

A Florida company called ForeFront Direct has a remarkable utility called Rescue Professional. It comes on a single

3.5-inch floppy disk and is designed for one purpose only: to recover data that other software just cannot touch.

Note that Rescue Professional will not restore or repair a disk, but is designed to recover lost data and is relatively easy to use.

To recover files from a hard drive crash, first boot the computer to a DOS prompt by using your operating system's emergency disk (you did make one, right?). At the DOS prompt — normally a C:\ prompt — insert the Rescue Professional disk and type in the word "rescue."

You will be presented with a list of drives. After selecting a drive, you will see a menu with eight options. For hard-drive recovery, you will most likely select either "Hard Drive Recovery" or "Partition Bypass."

If your data is recoverable, you will see
See RESCUE, page 57 ▶

Rocks and Radio Jocks

▶ ARP, continued from page 52

cheerleaders? We got married a month after graduation and she told me what a lousy date you were. Yeah, I went 'pro' after high school and my jersey is in the lobby of the Football Hall of Fame. So what have you done with your life since high school?"

And with a barely suppressed grin, say, "Went into radio. There's a statue of me in the nation's capital."

How about *those* apples, Bonnie?

Okay, time to turn the self-indulgence meter down a few dB.

Look, I know those carvings were there long before I came to town and I have no claim to them. But I also know you can see anything you want in any image or picture.

Supposedly, Bob Hope's face is in a centuries-old painting in Europe. Mother Teresa's visage was witnessed in a bun here in the states. The profile of Richard Nixon regularly turns up in potatoes. And what about the Great Stone Face on the surface of Mars? You would begrudge a fellow broadcaster a few pounds of igneous rock?

Part of the game today is to make a jock's face as familiar as the voice. The syndicated Bob and Tom Show has one of the most recognizable caricature logos in radio today. Don Imus gave away bobble-head dolls in his image during the early '90s. It was possible to obtain rubber Howard Stern masks this past Halloween.

Other promotions-conscious jocks use billboards, bubblegum cards and Web sites to promote their images as well as their shows. Some take it in stride, others are fiercely sensitive about it, and far too many are arrogant about it. But in the end, *promotion* is the name of the game, and anything that will give a station the edge it needs to win is considered in-bounds.

Lots of folks got into radio because it was low-risk stardom. As their talents improved, the stakes escalated and so did their visibility. Let the industry rewards go to those that deserve them. The rest of us will always have our statues, make-believe or otherwise.

I just wish they had gotten the lower lip right.

Get the full picture.



- Live assist, walkaway and satellite
- Four on-air digital players with volume, fade and seque control
- Easy playlist editing capability
- Access your entire audio library
- RF edit on-air waveform editor
- Instant jock "audio drop box"
 - Bulletproof reliability
 - Satisfaction guaranteed

Pristine RapidFire:
the all-in-one digital broadcast
system.

Access **PRISTINE RAPIDFIRE** on the web at www.pristinesys.com or call (310) 670-7500

Pristine RapidFire is a product of Pristine Systems, 3881 Hollister Way Suite A, Silver City, CA 95231



Books Offer Intro to Web Audio

► **REVIEW**, continued from page 52

prospect of increased Net bandwidth with technologies such as ADSL (Asymmetric Digital Subscriber Line) opens up a lot of possibilities. ADSL promises download rates of up to 9 Mbps will be possible.

While all digital media will benefit from this enhancement, three in particular stand out. Macromedia Director sends audio based on the MPEG Layer 3 codec, but requires a lot of extra work to set up a player application. Apple QuickTime 3.0 and Microsoft NetShow 3.0 are exciting because they will be able to stream most audio and video formats without additional server or client software.

Included with this book is a CD containing the latest version of Netscape Navigator and Internet Explorer, as well as sample Web pages so that you can see how different coding techniques affect your finished product. The software is provided on both Windows and Macintosh formats.

Here, in a little less than 200 pages, is a concise introduction to Web audio and all the latest steaming technologies. Reading this book should take you from novice to practitioner with little difficulty.

Second time around

Not long ago, I reviewed the premiere edition of "Passport to Web Radio." Now the second edition has hit the streets, courtesy of publisher International Broadcasting Services (IBS).

At the time the first edition was released, there were not many regular Web broadcasters, but we looked forward to an explosive growth in both their numbers and locations in the near future. Now there are over 1,500 stations that are Webcasting from over 100 countries.

That means that you can hear more stations via the Web in any given location than you can over the airwaves. Some stations deliver live programming, others provide audio on demand.

While Web listeners do not rival the drivetime audience in numbers and importance just yet, consider the following. A growing number of Americans are

telecommuting, working at home via their computer, and are out of the drivetime experience. Many corporate employees work at their computers in steel-framed buildings.

For both types, working with a computer turned on makes the prospects of decent radio reception pretty dismal, even in some urban environments. Their only hope for musical entertainment while pounding the keyboard is Web radio. And the great thing is that you can use your computer for word processing or other activities once you are tuned in.

Computer capability

Consider also that a quarter of the American population has the necessary computer capability to listen right now.

In 144 pages and nine chapters, Passport to Web Radio tells you how to get started and gives complete listings of what is out there. There is a chapter on determining local time anywhere in the world. The concept of Coordinated Universal Time (UTC) is introduced, and there is a chart showing how many hours to add or subtract from UTC for different localities worldwide.

The chapter on Prime Cuts lists the best of the rest, chronicled both by geographic location and format.

There is the Bluegrass Radio Network in Nashville, providing pickin'-and-grinnin' music on demand; NetRadio Kidz, with enough music, games, and animations to keep kids and their parents amused; Mohawk Nation Radio, one of only a few Native American stations on the Web; Radio Casablanca, featuring on-demand indigenous Moroccan music; and the infamous KPIG, a California station with a format reminiscent of free-form or "underground" FM programming of the late '60s and early '70s.

"Voices From Home," the next chapter, is a country-by-country, city-by-city listing of who is Webcasting. For each station there is a location, description of format, Web address, and other useful notes. Not surprisingly, this section makes up the bulk of the book.

What will the future of Internet radio be

like? Author John Campbell ventures out on the proverbial limb to make some predictions about the technology, economics, and programming he sees in Webcasting.

RW columnist Kim Komando zeros in what may be the most important question of all: Can anyone make money by Webcasting? The quick answer is not yet, but do look at it as an investment in the future. No one made any money off FM during the first 30 years either.

Once the traffic on a station's Web site reaches critical mass, it may be time to consider nurturing Web-only ads to be aired over the Internet while local spots are playing over the airwaves.

Komando's prediction is for a merging of the broadcast industry and the Internet, until they are perceived as one entity. Stations that take the plunge now may be in the best position to reap the benefits in the future.

If you need any more convincing that Web radio is the market of the future, you need only consider the story of *broadcast.com* — the largest Web radio network. It went public on a Friday, and by the following Monday its stock had soared higher in one day than any other initial stock offering in the last decade.

When it comes both to understanding how to get started with Web listening and knowing who is doing what with this new medium, Passport to Web Radio is the only act in town. For \$19.95, a good deal to boot.

So there you have it — my commuter-time reading for the past two days. Patterson and Melcher's book gives an excellent introduction to digital audio and streaming technology, and Passport tells you what other folks are already doing with it.

■ ■ ■

For information on Peachpit Press, call (510) 524-2178; Internet at www.peachpit.com or circle Reader Service 106.

For information on International Broadcasting Services (IBS), call (215) 598-3298; Internet at www.passport.com or circle Reader Service 4.

Tom Vernon is a multimedia consultant working in Philadelphia and commuting to Elizabethtown, Pa.

Zoom 1201: A 'Neat Piece of Equipment'

► **ZOOM**, continued from page 51

gives you what you need. And with the Wet/Dry knob, you can dial in however much lo-fi you need.

I would be doing the Zoom 1201 a big disservice if I left it at that. This little box has a pretty decent-sounding array of standard effects such as reverbs, flanges, pitch, phasing, chorus, delays, and a ring modulator. Because the control over each setting is limited to two knobs, you will not get bogged down in complicated algorithms every time you want to add a little reverb.

You may not get the flexibility of those fancy boxes, but that is not the purpose of the Zoom 1201. From where I sit, the Zoom 1201 is a neat piece of equipment if you are in a hurry for a quick sound modification and are not concerned with finessing the finer points.

As multi-effects boxes go, I really like the ZoomStudio 1201. Truthfully, it is unlikely a 1201 will gain a prominent position in the racks of a world-class production center. But if you are a radio production pro looking for an inexpensive way to nail that lo-fi sound, while at the same time having a nice selection of decent-quality reverbs and other standard effects, check out the ZoomStudio 1201.

I find it ideal for modern rock and contemporary formats that are looking for that "home-grown" sound. The box is simple and intuitive and only costs you a single rack space. Not a bad investment for a little nostalgia.

■ ■ ■

For information, contact Samson Technologies in New York at (516) 364-2244 or circle Reader Service 30.

Ed LaComb runs his own voice-over and imaging business in Syracuse, N.Y. He can be reached at edlacomb@aol.com

ATTENTION SPANISH & PORTUGUESE SPEAKING READERS!

Radio World

EDICION INTERNACIONAL

Written and edited in Spanish and Portuguese



Your link to the radio industry news of South America, Central America, Mexico and the Spanish Speaking U.S.

All over the world, station owners, engineers and studio managers, depend on Radio World as their source for industry news.

Cover the World of Radio With All 3 Editions

Please send me:

Radio World Edicion Internacioanal \$44.95
 Radio World (USA) \$59.00
 Radio World International (Europe) \$44.95
 TOTAL ORDER

Air Mail Option - add \$15.00 per subscription for priority delivery

Name

Title Company

Address

City State

Country Zip

Fax () Phone ()

Email

Credit Card #:

Expire Date:

(circle one) MC Visa or send check/money order to:

RADIO WORLD Subscriptions • P.O. Box 1214 • Falls Church, VA • 22041 USA

On line registration www.rwonline.com

◆ PRODUCT GUIDE ◆

Products for Radio Production

Mail info and photos to: RW Product Guide, P.O. Box 1214, Falls Church, VA 22041

Shure WH20 Headworn Mic

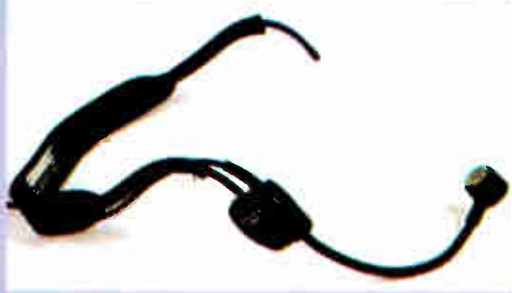
Recommended for voice applications where mobility is required, the WH20 headworn microphone from Shure Brothers is a dynamic, close-talking unit with response of 50 Hz to 15 kHz.

A swiveling gooseneck assembly allows the WH20 to fold into a compact unit for storage and transport, without weakening the point where the gooseneck meets the body. A lightweight wire frame and a Croakie headband provide a secure fit for anyone.

The mic element has high immunity to RF interference. Built-in voice frequency presence peak and low-frequency roll-off compensate for the proximity

effect caused by close-miking.

The professional version of the mic is the WH20XLR, with a balanced XLR connector and belt clip for strain relief.



Suggested price of the WH20 is \$120.

For information, contact Shure Brothers in Illinois at (847) 866-2200 or circle Reader Service 5.

DOD Line Mixer/DA

The DOD division of Harman Music Group has the SR606 Line Mixer/Distribution Amplifier, combining the handiest features of both.



The 1 RU-sized SR606 has six TRS balanced inputs and six TRS balanced outputs to provide numerous routing possibilities. Six line-level inputs can be mixed to a single L/R stereo output, or the unit can func-

tion as a 6-by-6 buffer amplifier.

As a distribution amp, the SR606 can split a single input into six outputs or two inputs into three outputs. Each channel has independent rotary gain and pan controls. A shielded internal

transformer eliminates wall-wart power supplies.

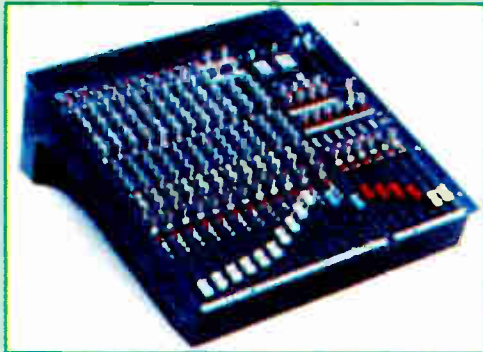
For information, contact DOD in Utah at (801) 566-8800 or circle Reader Service 55.

New Allen & Heath MixWizard

Allen & Heath unveiled a new generation of MixWizard consoles, including the WZ14:4:2+ mixer.

The WZ14:4:2+ is an upgraded version of the earlier model mixer. The newer version features metal jacks in place of the composite type in the original version. The new model also features LED "On" lights to show when a channel is activated, individual phantom power and a 1 kHz oscillator/pink noise generator for level set-up.

The WZ14:4:2+ offers four Groups, 10 Mic/Line inputs, two Stereo Line inputs and four Stereo



Returns. Faders are 100 mm sliders and all controls are color-coded for easy identification.

For information, contact Allen & Heath in Utah at (801) 568-7660 or circle Reader Service 132.

A Data Rescue and Recovery Solution

► RESCUE, continued from page 55
the root directory displayed on the screen. Selecting a subdirectory and pressing Enter will take you to the files there. Each file you want to recover must be tagged. Then you can save them in a single operation to a directory location of your choice on another working drive. It works. Read on.

I crashed my C drive and it would not boot. It was also not recognized by DOS and could not be detected by Norton Utilities. Rescue Professional immediately identified the drive and was able to locate and save each of the files I needed.

Joe Collins, product manager for ForeFront, said Rescue Professional is able to do what it does because, "It doesn't use the same DOS interrupts to access the hard drive as other utilities do."

This is a powerful utility, and it can even recover data sector-by-sector on badly damaged drives. This is best left to professionals who have experience in this kind of work. Rescue Professional will work with floppy disks, hard drives, compressed hard drives, and Bernoulli drives. The favorite demonstration at ForeFront is

where somebody uses a pencil to punch a hole through a floppy disk and Rescue Professional recovers the data.

Rescue Professional is also capable of copying the damaged disk data sector-by-sector to another drive, in case you want to try to repair the drive using another utility. Many times such an attempt will render the existing data useless. This process allows you to attempt a repair knowing the data is safe on another hard drive.

If your computer is an integral part of your day-to-day studio operations, this is a utility that belongs in your toolkit. It comes with a money-back guarantee or an offer to apply your purchase price toward the services of a professional disk recovery service.

Rescue Professional has a retail price of \$399 and is available only through ForeFront Direct, 25400 U.S. Highway 19 N #235, Clearwater, FL 33763

For information, contact ForeFront Direct in Florida at (800) 653-4933; by e-mail at ptools@ffg.com or circle Reader Service 105.

Complete used broadcast equipment solutions.



Arrakis Digilink III with the multipurpose ability to be used in Live On-Air, satellite automation, CD automation, hard disk automation, two track stereo editing, news, and remotes. They are the most powerful digital audio workstations in radio today.

Harris used equipment department has the Digilink III complete system available for \$4995 with a 90-day warranty/support.

Whether you're buying, trading, or selling, call Harris for quality, selection, service and price.

next level solutions

HARRIS
Communications

1-800-300-0733

www.harris.com/communications

Radio World[®] Broadcast Equipment Exchange

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

ACOUSTICS

Want to Sell

ACOUSTIC FOAM

Broadband Absorbers • Modular Systems
Sound Barrier • Diffusers • Bass Traps & More!

- ★ Consistent Pattern...No Innies & Outies!
- ★ Long-Lasting...Won't Crumble Like Other Brands!
- ★ 1", 2", 3", 4" & 12" Thicknesses In Stock!
- ★ 12 Vivid Colors In Many Cool & Effective Styles!
- ★ Highly Flame Retardant: Passes California Fire Code!
- ★ Absorbs 60% Better Than More Expensive Brands!
- ★ Best Value By Far! We Double Dare You To Compare!
- ★ Available Through All Major Broadcast Suppliers!

Auralex acoustics
317-842-2800 • Fax 317-842-2780 • 1-800-95-WEDGE
Web: www.auralex.com • E-Mail: auralex@auralex.com

Circle (224) On Reader Service Card

AcousticsFirst™
Toll Free 888-765-2900
Full product line for sound control & noise elimination.
www.acousticsfirst.com

AMPLIFIERS

Want to Sell

Bdct Technology BT-500
500 W pwr amp, 20 W drive produces 500 W, we'll ship, \$2500/BO; McMartin B-950 60 W RF amp, 10 W in 60 out, \$300/BO. LB Oliphant, 406-446-1199.

Carver PM900, PM 1.2 high pwr PA amps, mint cond, PM 900, \$450/BO, PM 1.2, \$800/BO. S Horner, 805-654-0577.

Want to Buy

WE 129 preamp, 25B console, will pay \$2500 if nice, other models also wanted. S McDaniel, 1-800-251-5454.

ANTENNAS/TOWERS/CABLES

Want to Sell

225' of 1-5/8" unjacketed transmission line, in gd cond, BO. J Natoli, 740-922-2700.

ERI 3 bay on 98.7, retunable, current mdl, medium pwr, rototiller type, excel cond, BO. C Phillips, 423-457-2697.

S.W.R. FM Antennas

Great Antenna
Great Price!
HE HALL Electronics
(804) 984-4255

Cablewave, 375' of 1-5/8" hardline, 2 yrs old, gd cond, \$1000; ERI 2 bay 1/2 wave spaced on 98.5, 2 yrs old, gd cond, \$1000. P Wolf, 941-458-3777.

Potomac AM-19 digital, 6 towers D/N, vgc, in calibration when removed from service last year, \$2500. M McCarthy, 847-640-8965.

3" HELIAX STANDARD COAXIAL CABLE

50-Ohm, unused, cut to length. Priced below market. Shipped instantly.
Call Basic Wire & Cable
(NANCY) 800-227-4292
FAX: 773-539-3500

RCA/Dielectric 6 bay, 99.3 Mhz, 20 kW, fair, \$1000. J Coursolle, 920-236-4242.

TOWER SITE REQUIREMENTS
We make custom FCC Antenna Structure Registration Signs
Guy Wire ID Warning Balls
Fence CAUTION signs with your message
Road entrance sign with Co. & phone No.
Antenna ID Tags for Tenants
CALL FOR FREE INFORMATION
610-458-8418

FUN, 9' MW Antennas 500 Khz-2 Mhz Tunable. Pt15, TIS, 160M \$139 +shipping. Helixing Inc, POB 804, Lockport IL 60441.

AUDIO PRODUCTION

Want to Sell

Excalibur dual stereo line amp, gd cond, \$75. P Wolf, 941-458-3777.

Audiometrics voice-over booth on wheels w/XLR/phone inputs, \$975 +shpg. J Baltar, 207-673-1941.

CRL SEP800, SMP-800, SG-800 FM processors, excel cond, \$350 ea or \$850/complete; Orban Opti-mod 8100A/ST studio chassis, gd cond, \$300. P Wolf, 941-458-3777.

CASSETTES • CARTS • REELS

J & I AUDIO/VIDEO

A wholesaler in the Radio and Television market.
Now running SPECIALS on audio and video:
BASF CASSETTES-AMPEX R-Rs
AUDIOPAK, FIDELIPAC & ITC CARTS
DAT & THE NEW R-CD
For more information call Kris Elliot at 1-800-942-1711 or write to: J&I Audio/Video 20899 Kelvin Pl. Woodland Hills, CA 91367

Circle (223) On Reader Service Card

Valley People 2x2 interface box, XLR to RCA levels, \$100. D Kocher, 610-776-1455.

Gates Solid Statesman FM limiter, gd cond, will trade for a Spectra Sonics 610 Complimiter. J Roper, 812-877-2663.

Koss/Realistic LV-20 stereo headphones w/volume control on cord, new in box, trade for working pair of AKG K-240 or K-141 headphones. J Roper, 812-877-2663.

Orban 245 stereo synthesizer, excel cond, will trade for an old Urei Cooper Time Cube. J Roper, 812-877-2663.

Want to Buy

Roland VS880 digital workstation. Rene Bell, 502-766-1035.

Sony MUR-201 reverb, digital. B Meuse, 650-969-2433.

WE 753 or 757 speakers, single or pair, will pay \$1500-\$2000 ea. S McDaniel, 1-800-251-5454.

AUTOMATION EQUIPMENT

Want to Sell

Air Century automation controller vgc, \$700. J Coursolle, 920-236-4242.

Smartcaster 2000, loaded, call for details, \$25,000. J Coursolle, 920-236-4242.

BUSINESS OPPORTUNITIES

PRODUCE Host your own 212-760-1050 radio show
Generate hundreds of qualified leads
50,000 W NYC radio station

CART MACHINES

Want to Sell

ITC 3D, vgc, \$650. Gwen, 915-550-0558.

Audicord mono play decks (3), gd cond, \$100 ea. P Wolf, 941-458-3777.

BE Spotmaster, 10 spot mono, never used, \$1000; used carts, \$.50 ea. J Lalino, 315-891-3110.

ITC stereo R/P unit, rebuilt w/new heads, etc, \$450. G Dunn, 925-516-0299.

Beaugart stereo play (3), \$150 ea; Harris/Gates R/P, \$350; BE 10 spot mono play, like new, \$1000. J Lalino, 315-891-3110.

Fidelipac CTR 124 stereo R/P, slightly used, like new, \$990. Jeff, 801-771-4271.

ITC Delta R/P, excel cond, \$875; (3) SMC 712, vgc, \$200 ea; Dynamix splice locator ESD-10, excel cond, \$500. J Coursolle, 920-236-4242.

CD PLAYERS

Want to Sell

NEC CD530 player w/hand-held remote, \$50. G Dunn, 925-516-0299.

COMPUTERS

Want to Sell

Grid 386 laptop w/monochrome screen, hard drive, built-in modem, needs work on pwr switch/supply, BO; 386 desktop w/100 meg hard drive, 1.2 & 1.44 drives, BO. J Emmel, 717-842-6065.

CONSOLES

Want to Sell

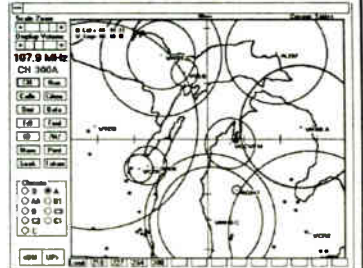
Harris Stereo 80, 8 chnl, \$850; LPB stereo 8 chnl, \$850. J Lalino, 315-891-3110.

RCA 760B & BC-3 tube type consoles, 76-B 1940's, BC-3 1950, gd cond, BO. S Horner, 805-654-0577.

Auditronics 212, blue version, full refurbished, gold A/B & buss switches, new ON/OFF switches & wood trim, rebuilt faders, factory new blue faceplates. Telco module, 3 mics, control & studio monitor, up clock, \$6K, 2nd Auditronics 212, same vintage, complete but no rebuilt, have switches, parts, new wood, spares, \$2500. M McCarthy, 847-640-8965.

BROADCAST ENGINEERING CONSULTING SOFTWARE

Professional software packages for preparing FCC applications and plotting coverage. For Windows and DOS.



- ✓ Prepare concise FCC coverage maps and allocation studies from USGS digital line graph databases
- ✓ Search for AM, FM, and TV channels with professional graphics oriented programs and FCC databases
- ✓ Determine population with US Census databases
- ✓ Plot S.T.L. paths using NGDC terrain databases
- ✓ Tower and airport databases & more!

Soft Communications

DOUG VERNIER
1-800-743-DOUG (3684)

Internet Access - Worldwide Web
http://www.v-soft.com
email: dvernier@v-soft.com

Circle (232) On Reader Service Card

Harris stereo 80 8 chnl, LPB stereo 8 chnl, \$850 ea. J Lalino, 315-891-3110 or 3239.

Wheatstone A-500, 26 input mainframe, 5 mics, 14 lines, studio & control monitors, A-500 submixer, dual telco input, full metering, redundant pwr supplies, vgc, no butched faceplates or mods, recent vintage, in storage last 2+ yrs, \$14K. M McCarthy, 847-640-8965.

Lightning Got You DOWN??
Get a NEW Under Con
switch
6-18 Channel
DYNAMAX
On Air Console
Next Day Delivery
(215) 464-2000

Yamaha NC 1604II, excel cond, \$2200. J Coursolle, 920-236-4242.

LPB Signature Citation stereo console, excel cond, u-ship or pick up, \$3500. R Osborne, 304-273-2544.

DO YOU NEED PARTS FOR AMPRD CONSOLES & CART RECORDER
SEQUIA ELECTRONICS
1-(408) 363-1646
FAX 1-(408) 363-0957

McCurdy SS4388A 8 single chnl (2), 2 inputs by chnl, 2 RIAA preamps, 2 mic preamps, 5 start/stop switcher, \$10 ea; Daveco LEM-5 disco mixer, \$150; Collins 212Z-1, \$75; EV ELX-1 (3), 4 mic/line mxr, \$200 ea; Shure M67, 4 mic/line mixer, \$200. D Boucher, 418-387-1360.

MCI/Sony 618, 24x24, \$6.5K; Quantum 24x24, \$4.5K; Soundcraft 600, 32x16, \$5.5K, like new; Model 30, \$295; 512, \$950; 520, \$1450. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

HE HALL Electronics
706 Rose Hill Dr. Charlottesville Va. 22901
804-984-4255 (Voice) 804-984-3299 (Fax)

This Month's Special !!
BSI Broadcast Software International
Broadcast Automation Software
JUST \$999 List
Turnkey Systems Starting at \$2995
Call or visit our web site for your discount price
sales@halls.com www.halls.com tech@halls.com

Circle (231) On Reader Service Card

DISCO-PRO SOUND EQUIP

Want to Sell

Intersonics TPL-3 subwoofer, dual 15" drivers, subwoofer; (2) large JBL speakers, 18" bass, 10" mid, HF horn, BO. S Horner, 805-654-0577.

Technics SL-1200 MK II road case w/2 SL-1200 MK II TT's & biamp mixer, excel cond, \$700/BO. S Horner, 805-654-0577.

Beyer DT-100 (2), \$100 ea. D Boucher, 418-387-1360; McCurdy LSA 609 w/10W amp (2), \$75 ea; Marantz (2), \$75/pr; Realistic w/volume, \$30; McCurdy mono TT SS-3157 (4), \$150 ea. D Boucher, 418-387-1360.

Numerous Radio Shack speakers in walnut, \$50. J Emmel, 717-842-6065.

LIMITERS

Want to Sell

Composite Processor Micron Flexmod, excel cond, \$750; Audio Digital Delay TC-4, excel cond, \$800. J Cour-solle, 920-236-4242.

Orban Optimod 9000, \$2000; CBS Volumax 4000A peak controller, \$500; CBS Audiomax 4440A peak controller, \$500. D Boucher, 418-387-1360.

EXPERIENCED EQUIPMENT

Save \$\$\$ on Excellent Quality Used Consoles, STL, Test Gear...

BROADCAST RICHMOND

Tel 765-966-6468 Fax 765-966-5505
e-mail broadcast@infocom.com
www.broadcast-richmond.com

Want to Buy

Teletronix LA-2A's, UREI LA-3A's & LA-4's, Fairchild 660's & 670's, any Pultec EQ's & any other old tube compressor/limiters, call after 3PM CST, 972-271-7625.

MICROPHONES

Want to Sell

Telefunken M-221B, M934B capsules, orig PSU & cables, excel working cond, \$2200/pr; Neumann CMY563 M-7 capsule, orig PSU & cables, \$2200/ea; Neumann UM-57 M-7 capsule, 3 patterns, orig PSU & cables, \$2000/ea. F Danner, 781-294-1218.

RCA 77DX, \$1000; Altec 687, \$400; Shure SM51, \$75; OC White mic arm w/riser, \$50. G Dunn, 925-516-0299.

RCA MK-5 mics (2) in gd cond, BO. S Horner, 805-654-0577.

Atlas desk mike stand, 6", excel, \$10; Telex V220 sports-caster headset mic, excel, \$145. J Coursolle, 920-236-4242.

Audio-Technica AT4033, large diaphragm condenser mic, w/shock mount & case, mint cond, \$380 +shpg. M Schackow, 605-374-3424.

WINDSCREENS
The Auralex WINDJAMMER 2421
AVAILABLE THROUGH MAJOR BROADCAST SUPPLIERS
• Fits RE20, MD421, AKGs, ATs, big Neumanns, etc!
• Cost up to 63% less than competing brands
• Won't crumble like other brands
• Sounds great & available in 6 vivid colors
1-800-95-WEDGE

Gates RF dist injector, several Marantz tape deck parts PDM's, Gate model 200 mic, UTC coils & etc, PA box speaker. R Weaver, 910-897-8044.

Sennheiser MD421 (5), \$300 ea; EV 666, \$100; Realistic 33-922, \$30; Audio Technica AT-818II, \$50; AKG 2000E, \$75; Shure Unidyne, \$75; Shure SM82, \$150; EV RE-34 (2), \$100/ea; Sennheiser HMD-224 headset (3), \$100 ea. D Boucher, 418-387-1360.

Neumann U47, \$3900; U67, \$3300; U87, \$1800; KM83 or 84 pairs, \$1400; KM88s, \$950 ea; RCA 77DX, \$1200; BK5, \$700; BK1A, \$300. W Gunn, POB 2902, Palm

Springs CA 92263. 760-320-0728.

Radio Shack hand-held dynamic mics, vgc, \$25. J Emmel, 717-842-6065.

Want to Buy

RCA 77-DX's & 44-BX's, any other RCA ribbon mics, on-air lights, call after 3PM CST, 972-271-7625.

RCA 77-DX's, 44-BX's, WE KU-3A's On-Air lights, recording lights. Top price paid. Fast response. Bill Bryant Mgmt, 2601 Hillsboro Rd, G12, Nashville TN 37212. 615-269-6131, FAX: 615-292-3434.

MISCELLANEOUS

Want to Sell

Assorted large tubing coils, mica & vacuum capacitors, list avail. G Brennan, 334-272-0692.

ENGINEERS-HAMS
CHECK OUT MY WEB SITE
USED EQUIPMENT OF ALL KINDS
www.spacestar.net/users/radiorey/
715-268-2233

Broadcasting magazines from 1945-1946, \$5 ea/BO for quantity. S Horner, 805-654-0577.

Intl cartridge eraser, \$125. D Boucher, 418-387-1360.

BUY FROM THE LEADER.
CUSTOM steel, anodized aluminum, or laminated - plates, panels, rack mounts, and floor boxes built to your specifications.
Fast and Accurate!
Any way you need them:
blank, punched, engraved, loaded, even pre-wired!
Call 800-733-9473.
whirlwind™

CONSULTANTS

EVANS ASSOCIATES Consulting Communications Engineers
FCC Applications, Design, Field Engineering & Tower Detuning
Video/Data/Voice • Statewide Networks • Wide-Area Networks
EXPERTS IN:
TV • AM • FM • ITFS • MICROWAVE • PCS • FIBER
210 S. Main St., Thiensville, WI 53092 (414) 242-6000 FAX (414) 242-6045
Internet: http://www.evansassoc.com Member AFCC

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 (612) 785-4631
8899 Hastings St NE, Minneapolis, MN 55449 (612)785-4115 Member AFCC

DON'T GAMBLE WITH YOUR ADVERTISING DOLLARS!
Advertise in Radio World and reach 18,000+ broadcast professionals.
Call Simone TODAY!
703-998-7600

T. Z. Sawyer Technical Consultants AM-FM-TV-LPTV
• FCC Applications & Exhibits • Frequency Studies
• Experimental Authorizations • Class Upgrades
• AM Directional Antennas • STL Applications
• High Power Antenna Arrays • Station Inspections
1-301-913-9287
FAX: (301) 913-5799 • 5272 River Rd. #460 • Bethesda, MD 20816

MLJ Moffet, Larson & Johnson, Inc. Consulting Telecommunications Engineers
1110 North Glebe Rd, #800 Arlington, VA 22201
(703) 741-3500 FAX: (703) 741-0312
Member AFCC

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

RF Warning Signs
9" x 12" \$13.95
10" x 19" \$19.95
HE HALL Electronics (804) 984-4255

Microwave Filter 3 cavity notch filter on 98.5. 2 yrs old, gd cond, \$1000. P Wolf, 941-458-3777.

Gorman Redlich encoder/decoder EBS, excel, \$10; llbruck studio acoustical insulation, white, \$1/sq ft; rack, home with casters, \$400; Panduit 2"x2"x6", \$2/lin ft; Pelican case, \$50; display cases, \$175; Henry super relay, \$75. J Coursolle, 920-236-4242.

Gentner G2500 Super Hybrid, \$950. Gentner Tele-Switch \$350, both items like new. S Kirsch, 516-763-1776.

Want to Buy

Yamaha BP-2 bass pedals, not drum pedals. B Meuse, 650-969-2433.

McIntosh cabinets (2) for MA-230 and C28. P Robillard, 504-827-6000.

E-Mu Emax digital sampling keyboard. Prefer with manuals and disks. Alan, 703-698-4347.

MULLANEY ENGINEERING, INC. Consulting Engineers
• Design & Optimization of AM Directional Arrays
• Analysis for New Allocation, Site Relocation, and Upgrades
AM-FM TV LPTV
Wireless Cable (MDS/MMDS/ITFS/OFS)
• Environmental Radiation Analysis
• Field Work
• Expert Testimony
9049 Shady Grove Court Gaithersburg, MD 20877
Phone: (301) 921-0115 Fax: (301) 590-9757 email: mullengr@aol.com

E. HAROLD MUNN, JR. & ASSOCIATES, INC. Broadcast Engineering Consultants
AM - FM - TV
THE BROADCAST ENGINEERING CONSULTANTS
Box 220, 100 Airport Rd. Coldwater, MI 49036
517-278-7339

GRAHAM BROCK, INC. BROADCAST TECHNICAL CONSULTANTS
Full Service From Allocation to Operation AM-FM-TV-ALX Services, Field Work, Antenna and Facilities Design
Over 35 years engineering and consulting experience
912-638-8028
202-393-5133
www.grahambrock.com

C.P. CROSSNO & ASSOCIATES CONSULTING ENGINEERS
P.O. BOX 180312 DALLAS, TX 75218
AM, FM & TV Broadcasting
ANTENNA DESIGN, ALLOCATIONS, FCC/FAA
CHARLES PAUL CROSSNO, P.E.
(214) 321-9140 MEMBER AFCC

Don't Gamble with your Advertising Dollars!
Advertise in Radio World and reach 18,000+ subscribers.
Call Simone at 703-998-7600 today!

System One Communications Broadcast Constructors & Consultants
Houston, Texas
888-625-6649
Complete Turnkey Construction
Antenna Line Testing
AM Directional Field Work
AM and FM Applications
Tower Services
Studio Designs
Custom Studio Furniture

OnLine Web Access RF Engineering Tools
CDS OnLine is the first Web-based RF Engineering System providing remote access to a host of FCC, FAA, USGS, and US Census databases. CDS OnLine offers a familiar look and feel to web users, instant graphical output, comprehensive help, and accessible technical assistance.
Up-to-date Databases. No hidden or automatic charges.
Communications Data Services
800-441-0034
www.comdata.com

- DTV Study
- Master Frequency File Search
- FM Study
- Population Count
- Terrain Averages
- Within Study
- Terrain Profile
- Contours

MISC. continued...

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

MONITORS**Want to Sell**

Belar stereo monitor, \$300; FM monitor, \$300. J Lalino, 315-891-3110.

CCA AMM-IT AM monitor, \$500; CCA AM-19 3 antennas check, \$500. D Boucher, 418-387-1360.

Used Mod Monitors, McMartin & Belar. Many to choose from, tuned & calibrated on your frequency, full guaranteed. Goodrich Ent. 402-493-1886.

RECEIVERS & TRANSCEIVERS**Want to Sell**

Hammarlund HQ140X w/matching speaker, clean cond, needs alignment & peaking due to age, otherwise clean cond, BO. T Spencer, 540-629-1161.

Yaesu FTH-7008 15 chnl 5 W UHF hand held, will program, w/charger, \$100. P Russell, 207-725-3066.

C. CRANE COMPANY**FREE CATALOG
Radio Land**

We offer exceptional radios and receiving antennas, as well as, an extensive variety of radio accessories

WEBSITE: CCRANE.COM

1-800-522-8863

**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

...country, top 40, news,
urban, talk, jazz, the classics,
mixed bag...

RADIO! The beat goes on!

**CROUSE-KIMZEY
OF ANNAPOLIS**

tops in broadcast equipment

1-800-955-6800

ask for Kathleen

kkannapolis@worldnet.att.net

SCA RECEIVERS—ALL TYPES

Will work to meet your receiver needs

Professional / Table / Portable
Field Strength Meters
Reading Service / Ethnic / Data**DAYTON INDUSTRIAL CORP.**

2237 Industrial Boulevard

Sarasota, FL 34234-3119

Tel: 941-351-4454 FAX: 351-6081

E-Mail: SCARadio@aol.com

Comrex 2-line freq extender, xmtr & rcvr, \$1995 for both ends. Steve Kirsch, 90 S Long Beach Rd, Rockville Centre NY 11570. 516-763-1776.

Want to Buy

TenTec Century 22 mod 519 HF amateur radio CW transceiver. T Spencer, 540-629-1161.

Bogen R765 a-m/f-m mono radio, RCA ACR 175 receiver. M Vincent, 804-276-3983 (days).

WE 1kW xmtr, complete, all tube type, accessories such as spare parts, console, etc. M Vincent, 804-276-3983 (days).

RECORDERS**Want to Sell**

Otari 5050-BIII 2 trk, like new; Panasonic 3900 DAT, very low hrs w/remote control. J James, 415-331-9346.

Pioneer PDR-05 CD rcdr, new w/box, manual, \$450/BO. D Kocher, 610-776-1455.

Roland DM-800 w/case, \$3500. S Cox, 770-969-5371.

Scully 1/2" r-r in cabinet, \$400; refurbished ITC rack mtd 10" rcdr, \$400. G Brennan, 334-272-0692.

Teac 1230, 3 head, 3 motor r-r w/dbx NR, \$75. G Dunn, 925-516-0299.

Teac 200R (2) 10.5" reel stereo, \$350 ea. J Lalino, 315-891-3110.

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

Pioneer RT 1011L 10.5" r-r tape deck in walnut case, 4 trk stereo, vgc \$200; Pioneer RT-701 7.5" r-r tape deck in metal case which may be free-standing or rack mounted, 4 trk stereo, \$200. J Emmel, 717-842-6065.

**STUDER REVOX
PARTS/SERVICE**

Cassette-CD-Open reel

Capstan resurfacing, ALL BRANDS.

JM TECHNICAL ARTS

1515 Elm Hill Pike #203

Nashville, TN 37210 (615) 365-9030

Revox A77 (3) stereo, 2 trk, \$200/BO. J Lalino, 315-891-3110.

Sony TC-W365, 7.5" mono, \$150; Sony TC-339, 7.5" stereo, \$300; Foster Multi-tracker 160 4 trk, \$300; Ampex 10.5" mono, \$500; Intl cartridge tape r-r mono, \$450; Harris cartridge tape r-r mono, \$450; Intl triple cartridge rep mono (3), \$300 ea. D Boucher, 418-387-1360.

**CLEAN PATCH BAYS
NO DOWNTIME**

VERTIGO BURNISHERS AND INJECTORS
RESTORE ORIGINAL PERFORMANCE
TO YOUR PATCH BAYS

\$34.95 Ea. Please write for additional information and order form today.

VERTIGO RECORDING SERVICES

12115 Magnolia Blvd. #116 818-907-5161

North Hollywood, CA 91607 Fax: 818-784-3763

Tascam 38 1/2" 8 trk r-r, excel, \$1950; JVC TDW 201 cassette deck, excel, \$50; (2) Ampex 1/2" 499 tape on 10" reel, \$30 ea; Telex cassette duplicator, orig + 3 cpy, ACC 4000, excel, \$1800; Telex cassette duplicator, 4 copy slave, ACC 4000, excel, \$1800. J Coursolle, 920-236-4242.

Ampex 4 trk tube deck, \$2500; stereo 351 (recond), \$1800; Akai Adam, new, digital 12 trk, \$3500; MM1000-16 w/new heads, \$4500; Otari MTR10-4, \$3500; Ampex ATR102s, search to cue, \$495; Ampex locator for ATR or 1200, \$895; MCI 110C-8, \$3.5K; Tascam 85-16 recond w/dbx, rc & loc, \$3K. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

Fostex E2 1/4" prod recorder, balanced, excel cond, original box & packing, \$600; Otari 5050 MKIII-8 1/2" 8 trk rcdr, original box & packing, excel cond, \$1400. M Schackow, 605-374-3424.

Want to Buy

Need schematic for Dokorder 1140 4 trk r-r deck. J Roper, 812-877-2663.

Ampex ATR100 taperecorders for parts. Circuit cards, heads, motors, machine parts, or electronic parts. Call 818-907-5161.

Ampex PR10 tape recorders. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

REMOTE & MICROWAVE**Want to Sell**

AutoPilot downlink manager PC program for satellite controllers, new, \$50. P Russell, 207-725-3066.

Cellcast cellphone, audio mixer & freq conversion in one unit, battery & AC operated, great cond, \$1500; Gentner EFT-1000 automatic freq conversion transmit & receive unit, \$800. G Arroyo, 407-830-0800.

Symetrix T101 telephone interface, \$150. G Dunn, 925-516-0299.

MORE EQUIPMENT

RENTAL EQUIPMENT
COMREX Vector, Hotline, ISDN codecs
TELOS Zephyr, Zephyr Express, digital hybrids
MUSICAM Prima 120 and 230

Silver Lake Audio • Remote Audio Packages
516 763-1776 • Mixers
fax 516 763-1750 • Microphones
internet: silverlakeaudio.com

MORE EXPERIENCE

Best STL xmtr & Moseley STL xmtr, almost new, also Moseley 505-C STL rcvr, all in excel cond, BO. C Phillips, 423-457-2697.

WE RENT**TELOS ZEPHYR****CCS "Prima" Codecs**

Frank Grundstein

Audio/Video Consultants

COMREX

3-line extender

610-642-0978

Gentner TS-612 network interface, \$275; Gentner AT 125-SM telephone breakout, \$50; Comrex TCB-1A telephone coupler, \$90; Circuit Werkes coupler bay w/3 cards, \$700; Comrex DXR.1 codec, \$900; Adtran NTI ACE ISDN network termination, \$100; Adtran ISDN interface ISU 2x64-5, \$485; Adtran DSU IIIAR SW 56 interface, \$450; Radio Shack telephone headset 43-192, \$25; Ascend ISDN router, T-1 split SIDN pri applications, \$10,000. J Courselle, 920-236-4242.

Marti SSL10-R10, complete stereo system, excel cond, \$5000/BO. P Wahl, 715-723-1037.

WE RENT FOR LESS

Hotlines

Zephyrs

Nexus

Audio

FM Exciters

STL's

FM Pwr Amps

Test Equipment

If we don't have it, we will get it!

SCMS, INC. (800) 438-6040

"You Know We Know Radio"

Marti subcarrier gen STL data SCG10, excel, \$400; Marti subcarrier demod STL data SCG10, excel, \$400; Marti subcarrier demod 67 kHz, excel \$400; Moseley subcarrier demod, 110 kHz, excel, \$200; Marti 67 kHz amp in mini box, excel, \$20; Marti RMC remote control, gd, \$500; Marti rcvr RR30/45D/3000 450.02 Mhz, vgc, \$750; Racom 1300AP morse idebtifier, excel, \$50. J Coursolle, 920-236-4242.

Moseley MRC 1600 system, wireline modems, works & in vgc, recently tested, \$1500; Potomac remote control system, wireline modem, companion to the AM 19, computer program version, including wire harness for a 6 tower AM-19, working when removed from service last yr, \$1500. M McCarthy, 847-640-8965.

REPAIR SERVICES**PIKE'S PEAK
SATCOM**

→ Dart 384

→ SA7300 (Dat32)

→ SPCP Receivers

Repair Specialist

Low Rates

Fast Reliable Service

Buy, Sell, Trade

Pike's Peak Satcom

Tel 719-573-0094

Fax 719-573-0095

Circle (230) On Reader Service Card

Comstream ABR 200 digital rcvr, like new, \$1500/BO. J Lalino, 315-891-3110.

Fairchild Dart 384 w/down converter & dual channel card DATs, works fine, \$1300. B Lado, 419-483-2511.

Westwood One data demod, vgc, \$100; ABC Network decoder, excel, \$20; Mainstream data rcvr MS1130, DR11, excel, \$400. J Coursolle, 920-236-4242.

**SOFTWARE/
DATABASES****Want to Sell****RadioSoft**

RF Mapping Software

109 W Knapp Ave.

Edgewater, FL 32141

888-723-4695

www.radiosoft.com

STATIONS

Start your own commercial
radio station with only
\$5000 or less!

Yes it's possible & legal. Part 15 of FCC rules allows low power AM radio stations to operate without a license!! Cover an entire town & bill \$1500 a month!! It has been done!! Order the newsletter booklet that tells you all you need to know to get started for just \$29.99. Send check or money order payable to: WCTD Radio, 4 Canal St, Westerly RI 02891 or call 401-348-9222 for more info. FCC Inspected.

Want to Sell

5 kW AM in South-Eastern North Carolina, non-commercial Christian educational station, however holds a commercial station license. Towers, studio/xmtr bldg, all equip, 10 acres of land in Lillington NC, \$250,000 negotiable. M Wilson, 910-892-9322.

Advertise in **Radio World!**
Call 703-998-7600 TODAY!

**SATELLITE
EQUIPMENT****Want to Sell****SATELLITE SYSTEMS****Satellite Equipment for Radio****Off the air?
Looking for reliable
repair service?****Rely on us!**

Satellite Systems is respected industry-wide for prompt, accurate service to radio stations and networks.

Whether you have a Dart 384 or Scientific Atlanta 7300/7325 we can repair your equipment.

Pre- and post-service technical support, along with a 6-month warranty.

Turn to the leader in repair, new equipment, used equipment and accessories. We can answer all your questions.

Celebrating 7 years
of providing reliable repair service

SATELLITE SYSTEMS

615 East Brookside Street, Colorado Springs, CO 80906

Phone: (719) 634-6319 Fax: (719) 635-8151

Circle (229) On Reader Service Card

6 kW FM on beautiful gulf coast of Florida, upgradable to 50 kW, minutes from beach, \$425,000. F Willis, 850-653-3648.

5KW AM in South-Eastern North Carolina, operating as non-comm Christian Educ station, however holds a commercial station license. Towers, studio/xmtr bldg, all equip, 10 acres of land in Lillington NC, \$225,000/neg. M Wilson, 910-892-9322.

Want to Buy

AM or FM located in the New England area, non commercial or commercial, no station to small, will consider partnership. M Cardillo, 401-942-8341.

Network looking for stations! dark, brokered, AM & FM, fax details to programming: 954-735-0370.

TAPES/CARTS/ REELS/CD'S

Want to Sell

300 used carts, \$.50 ea; (5) 10.5" empty reels, \$1 ea. J Lalino, 315-891-3110.

TM Century Hit Discs, 6 yrs worth of weekly hit discs, blue & red series, Country, rock, urban, EZ, 1989-1996. BO. S Horner, 805-654-0577.

Beaugart triple deck stereo play, \$400; Harris Gates R/P stereo, \$350; 10" empty reels, \$1 ea. J Lalino, 315-891-3110.

CD Library, 275 Country CD's, many from Dolly, Merle Haggard, Reba, Alan Jackson, etc., \$750. D Mance, 315-782-1240.

ITC Scotchcart II's (250) almost new, 3.5 min, blk shell, \$1 ea +shpg. B Lord, 206-932-4839.

Large Adult Contemporary music library on 10.5" reels. 2 trk stereo, pro recorded w/music sheets, also has 25 kHz tones for automation. all in individual boxes. BO. J Emmel, 717-842-6065.

Numerous 10.5" reels, all need to be bulked, all 1/4" tape. BO. J Emmel, 717-842-6065.

TAX DEDUCTIBLE

New AM/FM Christian station, non-profit, non-comm. seeks donations of r-r, cassette, CD player, juke box, consoles, mics, automation & satellite equip, antenna/tower. C-Quam exciter, monitor, test equip, xmtrs, stereo gen, computers & software, etc. P Sandhu, 250-627-7305, Fax 250-624-3476. email: cfirm@citytel.net.

TELEPHONE EQUIPMENT

WE BUY AND SELL BUSINESS TELEPHONE EQUIPMENT. DOMINION TELECOM. 800-998-3281.

TEST EQUIPMENT

Want to Sell

Prime Image HR600 TBC, \$950 +shpg. J Baltar, 207-673-1941.

Want to Buy

Equipment Wanted
FIM-21, FIM-41, OIB-3
Cash for AM Field Meters & Bridges
Contact Win Donat
800-522-4464

TUBES

Want to Sell

Quality Power Tubes

3CX10.000H3	4CPX800A	5CX1500B	SV572-3
3CX15.000A3	4CX1500A	572B	SV572-10
3CX15.000A7	4CX1600B	6550C (See SV6550C)	SV572-30
3CX15.000H3	4CX3500A	6AS7G	SV572-160
3CX20.000A7	4CX5000A	6BM8	SV6550C
3CW20.000A1	4CX5000R	6D22S	SV6L6GC
3CW20.000A7	4CX7500A	6L6GC (See SV6L6GC)	SV811-3
3CW20.000H3	4CX10.000D	6N1P	SV811-3A
3CW20.000H7	4CX12.000A	811A	SV811-10
3CW30.000H3	4CX15.000A	812A	SV811-10A
4CX250B	4CX15.000J	833A	TH5-4
4CX250BC	4CX20.000A	8161R	TH5-6
4CX250BT	4CX20.000B	8560AS	TH6-3
4CX250R	4CX20.000C	EF86	TH6-3A
4CX350A	4CW10.000A	EL34	YC130/9019
4CX350AC	4CPW10.000R	EL509	SK300A
4CX400A	4X150A	SV83	SK1300
4CX800A	5CX1500A	SV300B	SK1320

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

Watch this list GROW!
• Manufactured in Russia's largest power tube factory •
Generous warranty based on high quality • Honest prices based on quality at low cost • Check our Stocking Distributors for best price and delivery
www.svetlana.com
Headquarters: 256-882-1344 Fax: 256-880-8077 • Engineering: 650-233-0429 Fax: 650-233-0439

Circle (227) On Reader Service Card

TRANSMITTERS

Want to Sell

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"

Harris FM-5CD/less exciter, like new, \$16,500. P Wolf, 941-458-3777.

Harris FM 3.5K, gd working cond, in service till 8/98, \$12,500; BE FX-50, great exciter, in service till 8/98, \$3500. J Kellstrom, 501-525-9700.

BROADCAST EQUIPMENT
USED: FM/AM Transmitters, RPU's, STL's, FM Antennas, Consoles, Processing, etc. CONTINENTAL COMMUNICATIONS, 3300 Chippewa, St. Louis MO 63118. 1-800-664-4497 FAX: 314-664-9427.

CCA AM 10,000D 10kW, very clean, \$10,000. D Boucher, 418-387-1360.

Want to Buy

Bauer 707 1 kW xmtr T5 transformer. M Cohen, 978-454-0404.

FM xmtr, 7.5 to 10 kW power output, any make or model. D Hollingsworth, 318-255-5000.

McMartin AM/FM xmtr, any model, exciter or stereo modules. Goodrich Ent., 11435 Manderson, Omaha NE 68164. 402-493-1886.

For details on space availability contact Simone at 703-998-7600

Harris FM20H3 20 kW FM in vgc, never off air, large spare parts inventory, easy access. \$15000/BO. P Wahl, 715-723-1037.

INCREDIBLE TRANSMITTERS



TV TRANSMITTERS		FM RADIO TRANSMITTERS Including Stereo Encoder	
1Watt	\$1,114	1Watt	\$1,138
2Watt	\$1,664	30Watt	\$1,499
4 Watt	\$2,138	300Watt	\$3,174
20 Watt	\$3,880	600Watt	\$5,960
40 Watt	\$5,046	1KWatt	\$8,716
100 Watt	\$6,206	2KWatt	\$11,905
200 Watt	\$9,874	4KWatt	\$20,741
400 Watt	\$13,171		
800Watt	\$18,295		
1KWatt	\$22,900		
2KWatt	\$38,900		

TAYLOR
The Transmitter People
Taylor Bros. (Oldham) Limited, Lee St. Oldham England. Tel: 0161 652 3221. Fax: 0161 626 1736

TRANSCOM CORP.
Serving the Broadcast Industry Since 1978

Fine Used AM & FM Transmitters and Also New Equipment
For the best deals on Celwave products, Andrew cable and Shively antennas.

100 W FM 1985 Harris FM100K	1 KW AM 1979 Harris MW1A
100 W FM 1985 Harris FM100K	1 KW AM 1978 Collins 820D1
2.5 KW FM 1974 Harris FM 2.5H3	5 KW AM 1980 CSI T-5-A
2.5 KW FM 1984 Continental 814R1	5 KW AM 1978 Collins 828E1
5 KW FM 1988 Harris FM 5K1	50 KW AM 1978 Continental 317C-1
5 KW FM 1983 Harris FM 5K	50 KW AM 1982 Harris MW-50B
6 KW FM 1994 Henry 6000D	50 KW AM 1981 Harris MW-50B
10 KW FM 1962 RCA BTF 10D	
20 KW FM 1970 Harris FM 20H3	
25 KW FM 1981 Harris FM 25K	
25 KW FM 1981 Harris FM 25K	

2655 Philmont Ave #200, Huntingdon Valley, PA 19006
800-441-8454 • 215-938-7304 • FAX No. 215-938-7361

VISIT OUR INTERNET SITE: WWW.TRCORP.COM
SEND YOUR E-MAIL REQUESTS TO TRANSCOM@TRCORP.COM

Circle (225) On Reader Service Card

EMPLOYMENT

HELP WANTED

Radio is changing. Will you join in or watch from the sidelines?

Do you know your stuff?

Prophet Systems, the leader in digital audio broadcast systems, might be the place for you. Opportunities for tech support, programmers, engineers and sales. Great salary and benefits.

Check out listings on the web: www.prophetsys.com or call (308)284-3007.



ENGINEERING OPPORTUNITIES!

Triathlon Broadcasting is looking for experienced chief engineers with excellent digital skills and the desire to manage complex automated technical operations in aggressive duopoly environments. Successful applicants will have at least 5 yrs. radio engineering experience with at least 2 yrs. as a chief and good references. FAX resume to Dennis Ciapura 520-204-2221.

Director of Engineering

Jefferson-Pilot Communications Company's Radio Group is looking for a Director of Engineering. Successful candidate should have 5 plus years of radio broadcast engineering experience and be capable of taking responsibility for the technical operation of a major market multi-station facility; be well versed in the operation, maintenance and installation of high power AM/FM transmitting equipment and modern studio equipment, including digital delivery systems and must know microwave and satellite systems. Computer literacy is required with LAN network knowledge a plus. Must have FCC general class license, SBE certification, or documentable comparable educational credentials. Requires a hands-on self-starter with good communication skills who will answer to the VP and GM. Must be able to set priorities and supervise the work of subordinates. This position has great growth potential with a stable and prestigious family friendly broadcasting company. Excellent salary and benefits. Jefferson-Pilot Communications is an equal opportunity employer. Minorities and Women are encouraged. Send resume in confidence to:

Cathy Lockhart Cloud, Jefferson-Pilot Communications, One Julian Price Place, Charlotte NC 28208. Or Call: 704-374-3606. Or Fax to: 704-374-3626. Or E-mail to: ccloud@jpc.com.

Chief Engineer

for small group of AM & FM stations headquartered in Midwestern City. Successful candidate will have experience in building new stations from the ground up as well as maintaining several studios & transmitter sites. Must have at least 5 yrs experience as a radio engineer & at least 2 yrs as a chief. Interested candidates send cover letter & resume to:

Garrett G Lysiak, PE, Owl Engineering, 8899 Hastings St. NE, Minneapolis MN 55449.

POSITIONS WANTED

Semi-Fab Radio! Morning AT with mouth & brains. Phones, fun, ratings. Mike 509-397-6505.

Big sports fan, trained & ready to make the play; bdct grad w/intern exper willing to work hard to get fee wet. Scott, 405-843-1072.

CE position wanted, exper w/computers, xmtrs, automation, DCS, UDS, digital studios. R King, 815-399-1829 after 6PM.

CE position wanted, exper w/computers, xmtrs, automation, DCS, UDS, digital studios. R King, 815-399-1829 after 6PM.

Hard working, friendly, outgoing CE seeks employment, FT, PT, contract work, Northeast, TV/FM/AM, cable station, exper CET & FCC licensed, avail immed. M Rakoff, 718-969-5224.

New but experienced bdct school grad ready to hit your airwaves, on-air, prod, copywriting & board-op exper, will relocate. Chrystal, 405-736-6971.

Seasoned AT, upbeat, creative, quick witted, relate well to listeners, dedicated team player, exper in multi-formats, willing to relocate. Robin, 602-461-8209.

Young, hot talent works cheap, sounds cheap too. Better choice: veteran news anchor, production & air talent, affordable pipes. Alex, 513-777-8423.

Morning Air Ace, lock n load attitude, A/C, Oldies, Country, have brain will travel. Mike 509-397-6506.

Listener & sponsor-preferred, live, local programming making comeback, exper veteran talent avail for salary exceeding poverty level. Alex, 513-777-8423.

Exper bdct engineer seeking CE or assistant CE or project design eng. Budget conscious, friendly, helpful, gd communicator. Jason 870-257-4747.

Fresh voice for production or promotion, reasonable rates, high quality, delivery avail via internet, r-r, DAT or cassette. For demo call P Johnson, 208-324-2593.

On-air/music director person looking for a new palace, CHR style will keep your phones busy. Bryan, 405-642-3276 or at briantano@hotmail.com.

ADVERTISE! in Radio World, Call 703-998-7600 TODAY!

ADVERTISER INDEX

This listing is provided for the convenience of our readers. Radio World assumes no liability for inaccuracy.

Page No.	Advertiser	Reader Service No.	Page No.	Advertiser	Reader Service No.
15	360 Systems	11	57	Harris	21
17	Antex Electronics	63	45	Henry Engineering	104
30	Armstrong Transmitters	6	48	IBN Radio	130
32,33	Arrakis	15	19	Inovonics	12
6	ATI	9	30	Inovonics	66
22	Audio Broadcast Group	64	58	J & I Audio/Video	223
2	Audioarts Engineering	34	20	J Squared Technical Service	122
58	Auralex	224	8	Knights Communications Inc	61
49	Autogram Corporation	103	38	Logitek	42
46	Belar	70	51	Mackie Design	71
50	Benchmark Media Systems	100	45	MicroCon Systems	51
44	Bext	44	53	Modulation Sciences	46
50	Boston Financial & Equity	22	34	Musicam USA	41
37	Bradley Broadcast	16	50	Nott Ltd.	74
45	Broadcast Devices, Inc.	78	26	Orban	13
45	Broadcast Richmond	-	60	Pike's Satcom	230
18	Broadcast Software Int'l (BSI)	89	42	PR&E	43
49	Broadcast Tools	102	53	Pristine Systems	20
14	BSW	88	55	Pristine Systems	98
4	Burk Technology	86	41	Prophet Systems	17
35	Circuit Research Labs (CRL)	67	50	PTEK	101
49	Circuit Werkes	49	47	QEI	19
3	Clark Communications	60	12	Register Data Systems	36
49	Comet North America	24	61	RF Parts	226
7	Comrex	35	60	Satellite Systems	229
46	Conex Electro-Systems	96	20	S.C.M.S., Inc.	79
27	Continental Electronics	91	16	Scott Studios	37
20	Cortana	80	52	Sennheiser/Neumann USA	93
21	Crown Broadcast	38	45	Shively Labs	52
13	Cutting Edge	62	49	Silicon Valley Power	76
45	Davicom Technologies	77	43	Sine Systems	-
43	Dick Brescia Associates	95	48	Sine Systems	45
44	Dick Brescia Associates	18	49	Spacewise Broadcast Furniture	23
50	Econco	74	54	Superior Broadcast Products	72
61	Econco	228	61	Svetlana	227
49	Electronic Research Inc.	50	36	SWR Inc.	97
23	Enco Systems	90	9	Telos Systems	87
20	Excalibur Electronics	99	10,11	Telos Systems	10
29	Full Compass Sound	40	31	Telos Systems	92
25	Gentner	39	61	Transcom	225
48	Ghostwriters	130,125	50	Universal Electronics	75
45	Gorman-Redlich Mfg. Co.	25	39	UPI	68
48	Grace Broadcasting Service	-	40	Valentino Music & Sound Effects	94
45	Halland Broadcast Services	26	20	Videoquip Research	81
58	Hall Electronics	231	58	V-Soft	232
1	Harris	8	63	Wheatstone	56
24	Harris	65	64	Wheatstone	33
28	Harris	14			

Production Director	Lisa McIntosh	Production Assistant	Anastacia Stormetta
Production Manager	Jeff Fisher	Ad/Classified Manager	Simone Mullins
Publication Manager	Jennifer West	Circulation Director	Sheryl Unangst
Showcase Coordinator	Vicky Baron	Circulation Manager	Robert Green
Ad Traffic Manager	Kathy Jackson	Accounts Receivable	Steve Berto
Marketing Manager	Heather Harris		

Advertising Sales Representatives

U.S. East: Skip Tash	703-998-7600 ext 160 Fax: 703-998-2966
U.S. West: Dale Tucker	916-721-3410 Fax: 916-729-0810
U.S. Midwest: Sandra Harvey-Coleman	765-966-0669 Fax: 765-966-3289
Other Regions: Stevan B. Dana	703-998-7600 Fax: +1-703-998-2966
Latin America: Alan Carter	+1-703-998-7600 ext 111 Fax: +1-703-998-2966
UK, Ireland: Phil Guy	+44(0)1869-337508 Fax: +44(0)1869-337509
Europe, Africa, Middle East: Raffaella Calabrese	+39-2-7030-0310 Fax: +39-2-7030-0211
Asia/Pacific: Eiji Yoshikawa	+81-3-3327-2688 Fax: +81-3-3327-3010

Free Subscriptions are available upon request to professional broadcasting and audiovisual equipment users. For address changes, send current and new address to RW a month in advance at P.O. Box 1214, Falls Church, VA 22041. Unsolicited manuscripts are welcomed for review: send to the attention of the appropriate editor.

RADIO NEVER SOUNDED SO GOOD!

ABC Radio Networks, a unit of the Walt Disney Company, is building a new distribution platform and we want you to be on our team.

Project Leader

The selected candidate will develop requirements, identify/evaluate vendors and solicit quotations; as well as oversee the design, delivery, installation, and acceptance testing phases of the project. This will include preparing timelines and monitoring project budgets.

To qualify, you must have at least 5 years' experience performing technical operations at commercial radio stations and networks, with demonstrated knowledge of audio technology, telecom platforms, switching and automation hardware/software. Exceptional project management skills and experience preparing technical specifications, RFQ/RFI bid quotes, and timeline and budget drafts are essential. A Bachelor's degree, FCC General Class License, and/or SBE certification (or equivalent) are required. Proficiency in project management software and MS Office Suite is necessary.

National Network Manager

Responsible for operating the new distribution platform, you will ensure system reliability by providing maintenance, repair and support services of satellite and store and forward systems. You will also manage channel capacity for network programming and news operation.

To qualify, you must have at least 5 years of supervisory and management experience in a broadcast TOC/NOC operation; demonstrated commercial broadcast technical operating skills; and knowledge of satellite earth station operations, procedures and methods. Proficiency operating/maintaining broadcast audio technical facilities, telecom systems, and switching and automation hardware/software is essential. A Bachelor's degree, FCC General Class License, and/or SBE certification are required. CNE certification is a plus.

We offer highly competitive compensation and benefits packages. For immediate, confidential consideration, please forward resume (which must indicate position of interest and compensation history) to: **Employee Relations Department, ABC, Inc., Dept. SS, 77 West 66th Street, New York, NY 10023. Fax: 212-456-5622**



Equal Opportunity Employer M/F/D/V

Sometimes
we have to
settle for
what we
need...

Wouldn't
you rather
Get what
you
WANT?

We've taken the very **best** technology, components and field engineering input to make this the **FINEST** console available.

The **A-6000** is engineered specifically for major market stations that demand a lot of function and need to lead with technical excellence. It's based on an open architecture mainframe that lets you change module locations with **no** restrictions, giving layout top priority and allowing easy reconfiguration as format needs change.

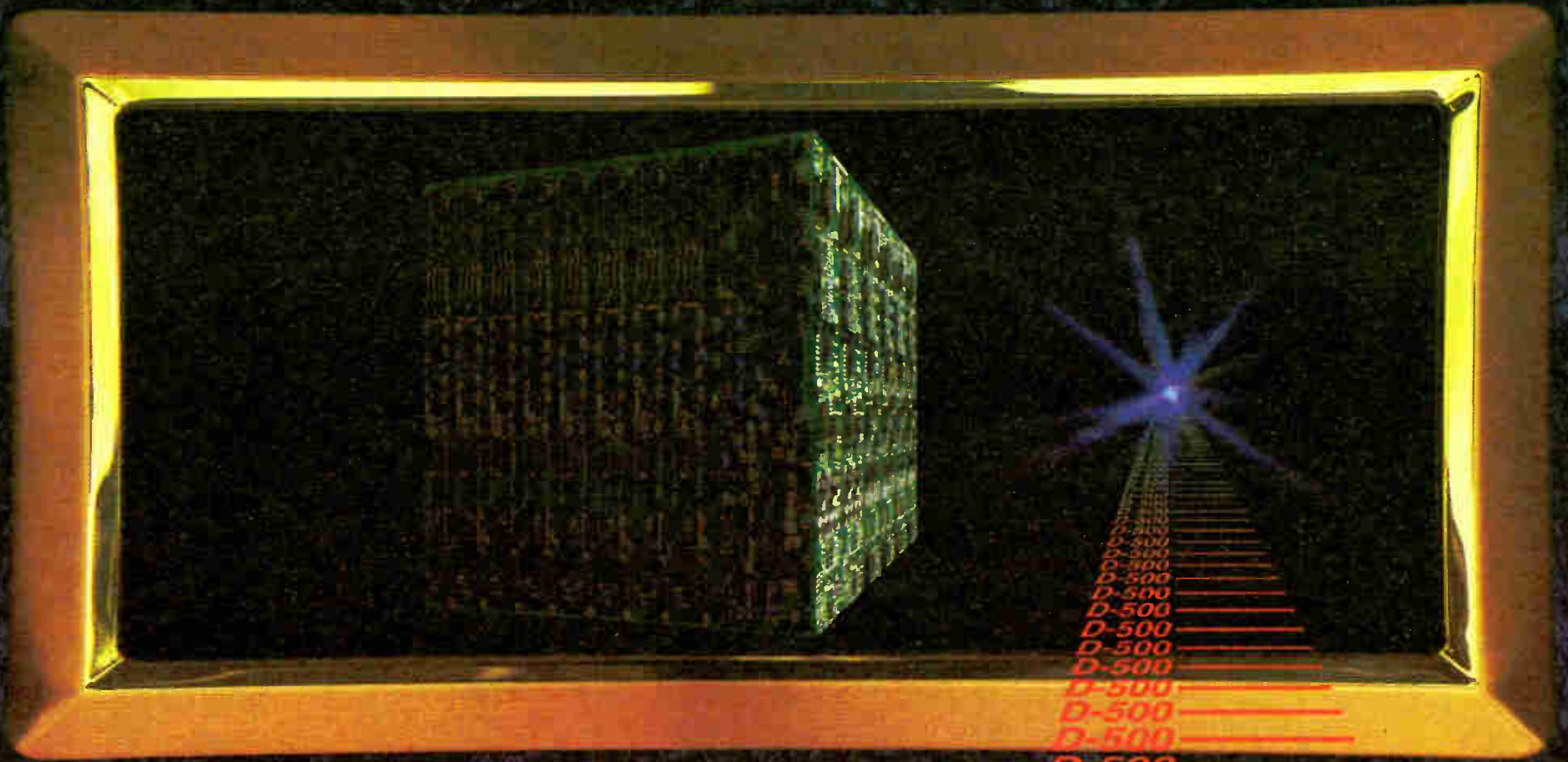
The **Wheatstone A-6000** has the appearance, features and power to excite the most demanding program and production staff; its engineering, performance and thoughtful design will help your personnel achieve broadcasting excellence.

 **Wheatstone**

252-638-7000

Circle (56) On Reader Service Card

DIGITAL is HERE



Resistance is FUTILE

It's just a matter of time—you're going digital anyway. Digital is cost effective, low maintenance and high performance. So why not go with a console that has it all worked out for you? The Wheatstone D-500 is the first digital console to bring you top-notch features and performance in a form totally familiar to your station. It's all set to plug in and go on-air handling both your digital *and* analog needs. **Make the DIGITAL move!**

D-500
D-500
D-500
D-500
D-500
D-500
D-500
D-500
D-500
D-500
D-500
D-500
D-500
D-500
D-500
D-500
D-500
D-500
D-500
D-500
D-500



The D-500 Digital Radio Console

tel 252-638-7000 / fax 252-637-1285 / sales@wheatstone.com

 Wheatstone Corporation