Radio World®

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Work… See Page 59

NWS Hot to Improve EAS Event Codes

by Lynn Meadows

KANSAS CITY, Mo. The National Weather Service has submitted eight proposals to the FCC for improving the Emergency Alert System.

The recommendations were expected to appear this spring, along with 11 recommendations from the Society of Broadcast Engineers, in a Notice of Proposed Rule Making, according to Frank Lucia, director, Emergency Communications, FCC Compliance and Information Bureau. Both sets of recommendations were put on public notice for comments.

Lucia said the weather service is playing a large role in the success of EAS. "We welcome that role, because they provide over 80 percent of the EAS warnings," he said.

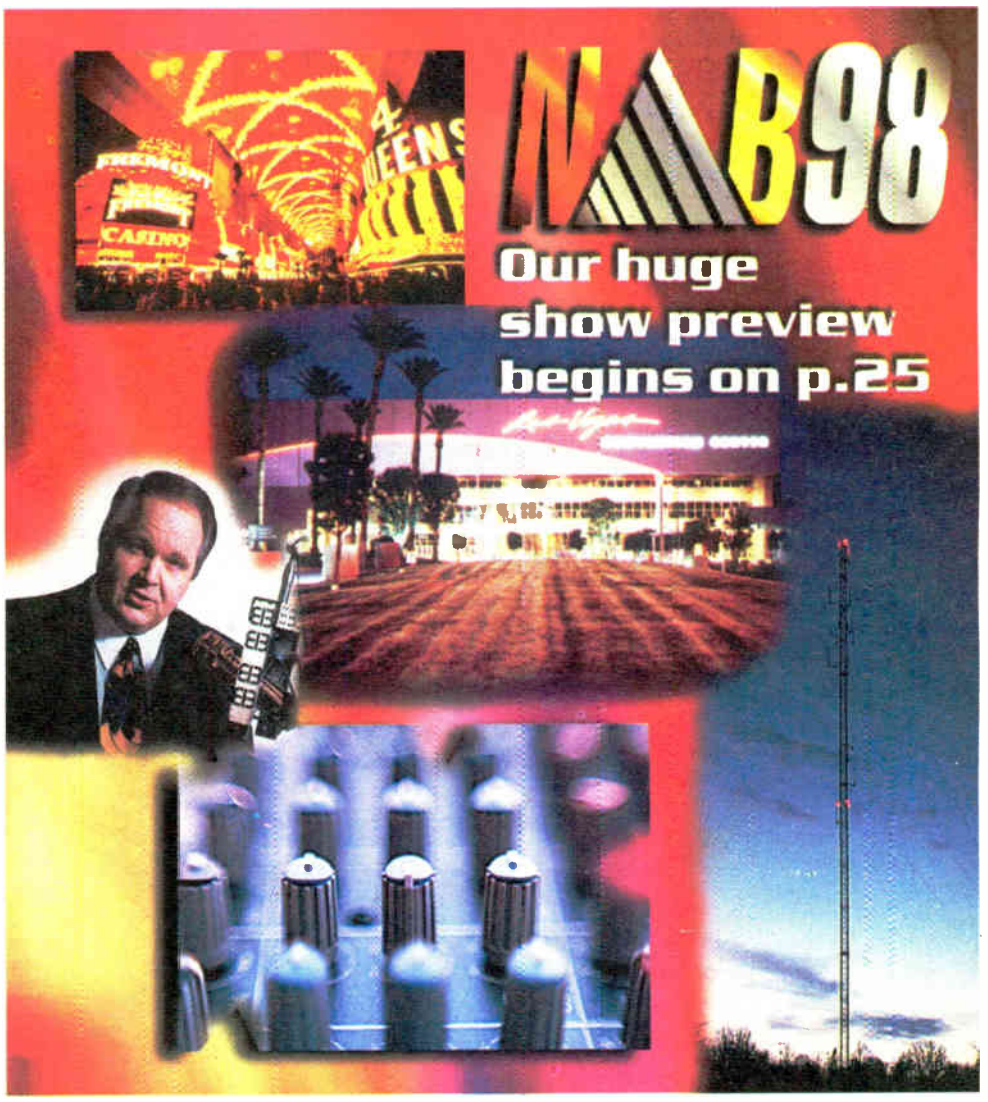
The first NWS recommendation would allow EAS equipment at broadcast facilities to log the receipt of only those codes the unit is programmed to process. The NWS has encountered difficulties because EAS equipment picks up codes that are outside the realm of the emergency system, such as ADR (Administrative Message) and DMO (System Demonstration/Practice) that the NWS uses to test its own equipment.

NWS recommended that EAS decoders look for codes that are material to them, and ignore others. Larry Krudwig, manager, field systems for the central region of NWS and developer of NOAA Weather Radio - Specific Area Message Encoding, said the weather service stopped using the DMO code shortly after the EAS was activated because it caused confusion.

Definitions for weather-related events have been standardized by the NWS. Now NWS employees want to standardize definitions for all types of events. The NWS suggested four categories:

•*Warning* — An event that poses a threat and is likely to occur in a specific location in a relatively short period of time.

See EAS, page 10 ▶



NEWS MAKER

Walden: 'This Is the Future of Radio'

E. Glynn Walden, director of engineering for CBS Radio, believes in the future of digital radio.

Walden, 53, is a co-founder of USA Digital Radio, which is developing technology to allow the industry to broadcast digitally, in the AM/FM bands, on existing radio channels. This in-band, on-channel effort is funded by CBS Corp. and Gannett Co.

He talked with ***RW*** *Editor Paul J. McLane and News Editor/ Washington Bureau Chief Leslie Stimson.*


Glynn Walden

RW: *Are you spending all of your time on DAB?*

Walden: I'm doing two jobs. I am the director of engineering for CBS, and I do digital radio.

The company likes the fact that I am straddled between two worlds. They want a broadcaster here; so do these folks (at USADR). They want someone who understands not only the technical business, but the whole broadcasting business, and also receiver manufacturers.

RW: *This is your schedule for the foreseeable future?*

Walden: This is not a project, it is an ongoing business. You need to look at

See WALDEN, page 17 ▶

NEWSWATCH

OmniAmerica Combines With Specialty Teleconstructors

ALBUQUERQUE, N.M. Tower owner/operator OmniAmerica and Specialty Teleconstructors, which provides tower design, construction and component implementation services, agreed to merge in a stock for-stock transaction valued at about $320 million. The deal is expected to close by the end of this quarter.

The combined company will be renamed OmniAmerica Inc. and will continue to be publicly traded and listed on the NASDAQ stock exchange. The management team will be headed by current OmniAmerica President/CEO Carl Hirsch, who will hold the same positions at the combined company.

The headquarters of the combined company is undetermined.

Also, OmniAmerica has purchased TowerCom and Miller Transmission Tower for an aggregate price of about $50 million for the two acquisitions.

TowerCom is based in Jacksonville, Fla. The purchase includes two existing towers: one serving Miami/Ft. Lauderdale, the other serving Orlando.OmniAmerica was formed last year by Carl Hirsch and Anthony Ocepek, in partnership with Hicks, Muse, Tate & Furst.

Clear Channel's Ferrara On NAB Radio Board

WASHINGTON Clear Channel Communications Senior Vice President Peter Ferrara will be the newest member of the NAB Radio Board. He was appointed by Radio Board Chairman Howard Anderson to replace Dean Goodman, who resigned from the board in January.

Ferrara will represent District 7 — Florida, Puerto Rico and the Virgin Islands. He oversees 58 radio stations for Clear Channel in the Florida region. Ferrara joins the board at the next meeting, planned for June 27-30.

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Low-Power Radio in the Spotlight

by Leslie Stimson

WASHINGTON A Petition for Rule Making on low-power broadcasting now at the FCC has created a buzz among industry insiders. The FCC has solicited comments on the petition, which calls for amending the AM and FM service rules to designate one AM and one FM channel for microradio broadcasting.

The petition, filed by Nickolaus and Judith Leggett of Reston, Va., and Don Schellhardt of Waterbury, Conn., proposed a low-power service of 1 watt or less, and low antenna height of no more than 50 feet

Nick Leggett, a technical writer and ham operator, said existing stations, even volunteer-run community stations, are not sufficient for general citizens to have their voices heard.

"In effect, we're proposing to legalize pirates with restrictions," he said. "Sooner or later the FCC will have to deal with this issue."

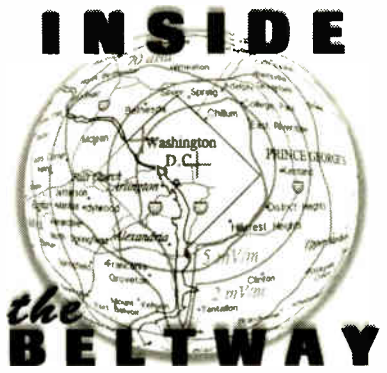
The three have filed petitions with the commission before, on other topics, but none has reached the next step of being considered for comments. "Apparently, the time is right" to discuss this topic, said Schellhardt, an attorney who used to work on Capitol Hill and at the Environmental Protection Agency, and who now works in New Haven, Conn.

"We proposed this to get the ball rolling. We believe large commercial entities should be kept out of microbroadcasting networks. They should be a place for people to experiment," he said.

But spectrum is a finite resource. Asked whether the addition of stations would create interference problems, he replied, "There's enough control of mass media now by large commercial entities."

Archery on radio?

The proponents say a low-power service would expand the ranks of those who can participate in radio. In their petition, they said it would "expand the variety of subjects and types of entertainment presented." For example, sporting events covered on micropower could include "golf, archery and flying."



Micropower stations, they say, could be set up with a minimum of capital investment. "People with low incomes can have a shot at 'The American Dream,' " the proponents stated in their 11-page document.

It suggests that each station be licensed to a specific geographic location or "cell," and that only one station be assigned to each cell.

The cell system would not guarantee that stations would not interfere with each other. "However, if the output of power is sufficiently low, most of each cell area would be served by a single (low-power) station."

To maximize diversity of ownership and programming, the proponents suggested, ownership should be capped, with each entity owning up to five stations. "We do not want to favor the big boys of industry here," the petition stated. It suggested the commission not auction licenses, but rather, award them in the order it receives applications that meet the criteria. The petioners expected a large number of license applications to be filed, but did not give a specific figure.

This is not likely to go over well with opponents of such a low-power service. They argue that micropower broadcasters are unlikely to apply strict quality control to the manufacture of transmission equipment. This, they say, could lead to significant interference to existing stations from off-frequency emissions.

The petition is one of several on file at the FCC on the low-power issue. Low-power FMs were legal until 20 years ago when the FCC was asked the review the number of stations on the FM band because of clutter (**RW**, Feb. 18).

Comments on RM-9208 are due April 27; the FCC has extended that from its original March 9 deadline. Reply comments are due May 26. Commission employees will review the comments, then decide whether the issue warrants a full-blown rule making.

In effect, we're proposing to legalize pirates with restrictions. Sooner or later, the FCC will have to deal with this issue.

— Nick Leggett

Broadcaster reaction

The proposal brought swift comment among broadcasters. The topic was a hot one for online chat groups, where it was debated by proponents, opponents and those who believe it's OK to license limited types of low-power stations.

A sampling:

- "Allocating low-power stations will just make things worse. Why else has so much been made of providing a 'first service to a community' even though it will actually be the 25th signal servicing the community?"
- "I have to wonder where the idea that the radio spectrum is an infinite resource came from?"
- "Perhaps it's time to rethink the entire licensing and allocation scheme ... Seems to me that if we cut back the service area of some stations, we could squeeze in more and the ultimate benefit would be the listener."
- "Don't put so many unrealistic restrictions on a (low-power) station that the owner could not make a profit or operate effectively."

Other broadcasters call for limited low-power licenses for schools or other non-profit organizations.

See LOW, page 9 ▶

Radio and RW, Poised for More

A New Editor Finds Much to Like and Much to Cover in the Dynamic World of Radio

My name is Paul McLane, and I am the editor of **Radio World**.

That sentence means a lot to me. For more than two decades, **RW** has covered the world of radio equipment and news. I started my radio career at about the same time Steve Dana founded this publication. I have watched it prosper. The prospect of leading our editorial coverage is exciting and challenging.

This is my first column as editor. I'll tell you about myself, briefly, but first let me tell you about you.

You, the readers of **RW**, are informed, stubborn, intelligent, cantankerous, opinionated, savvy people. You know radio, you like radio, you worry about the future of radio.

Half of you could clean the insides of a transmitter with your eyes shut (but please don't). You are staff engineers, contract engineers, corporate technical managers. The other half — c'mon, admit it — may or may not care exactly how amplitude modulation differs from frequency modulation, or what ISDN stands for, but you want to know about trends in our business. You own a station, teach a class or design products. You like to read stories about new equipment, about how other people do their jobs. You read the ads to keep up with important trends.

Some people think **RW** is just for engineers. I would put it this way: **RW** is for people who want to know about the radio business, including the important products and technologies that make it up. Other publications get the first part right, but forget the second; or they write only about the latter, and ignore the rest.

Readers of RW are informed, stubborn, intelligent, cantankerous, opinionated, savvy people.

Loyal and passionate

As we note on our masthead, no radio publication has more readers. All this translates into a lot of people paying close attention to what we do. **RW** readers are loyal, passionate consumers.

So what's ahead?

You will not see sweeping changes in what we do. **RW** works well because it understands its readership and because it gives those readers a forum. It has grown thanks to the hard work of many good people, notably including my predecessor, Lucia Cobo. Although this is my first column, I have overseen our editorial content for the past 18 months, working closely with Luci. So you already know the kind of stories I find important.

Keep in touch

But we can do better yet, and there is much to cover. Digital products pour onto the market. DAB looms. Group owners struggle to manage their new assets. Ad sales are up. The Internet tantalizes us. Advocates of legal low-power radio make noise. States struggle with EAS plans. Satellite radio prepares to come online. We will bring you these stories.

My e-mail address is *pmclane@imaspub.com*. Tell me how you think we can improve.

The obligatory background information: I joined **RW** as managing editor in 1996, and became editor last fall. I started in radio as a jock and news reporter at University of Delaware station WXDR(FM), now WVUD. For six years I worked as a news anchor and reporter, most of that at WDEL(AM)-WSTW(FM) in Wilmington, Del., where I learned that radio engineers love doughnuts, and can do or fix anything. From there it was seven years in sales at Radio Systems Inc., where I worked on many studio design projects for major-market stations and was baptized into the world of equipment. A stint as marketing manager for Bradley Broadcast Sales brought me to the Washington area and on to **Radio World**, where, I might add, I'm having a blast.

My goal is to provide you every two weeks with interesting articles about the technology and rules that make up the U.S. radio marketplace. But behind every product and regulation are people. They have much to tell us. **RW** will bring you their stories, too.

★ ★ ★

With that in mind, Glynn Walden is a suitable subject for a front-page interview. He is in a unique position, as director of engineering for the top-billing radio group as well as a driving force behind USA Digital Radio and its research into DAB.

One anecdote tells you something about the man. At one point during our interview, Walden became reflective. The USADR team, he said with obvious feeling, is working on the future of broadcasting for the next century.

"We had a tape in here one day on the history of radio," he told us. "With all the engineers sitting around, I said, 'Can you stop the tape for just a second?' They were showing some shots of KDKA.

From the Editor

Paul J. McLane

"I said, 'You know, I was lucky enough to meet Leo Rosenberg, who announced the first broadcast on KDKA. I got to shake his hand and say hello to him, just before he died.'"

Walden continued, 'And I said, 'Seventy-five years ago in Pittsburgh' — I get a little emotional about this — 'seventy-five years ago, in Pittsburgh, Westinghouse invented radio. Here in this room, you're inventing the next century of radio.'

"We are broadcasters. We have a real commitment here, on the part of Mel (Karmazin), on the part of Mike Jordan, the part of broadcasting, to do this. Real things are happening here."

At this point in our discussion, Glynn Walden had tears in his eyes.

I don't know for sure whether USADR or anyone else will make DAB succeed. But I find it comforting that people like Glynn Walden are hard at work on the future of our medium.

READERS FORUM

If you have comments for Radio World, call us at (800)336-3045 or send a letter to Readers Forum (Radio World, P.O. Box 1214, Falls Church, VA 22041 or e-mail radioworld@imaspub.com). All letters received become the property of Radio World, to be used at our discretion and as space permits.

Pirates and Low-Power Touch a Radio Nerve

*Should we allow more low-power radio stations? Should the FCC crack down on illegal "pirates"? These questions have generated many letters to **RW** in recent months. Here is a sampling. Note, these letters were received prior to the recent related petition to the FCC (see page 3).*

Licensing LPFMs

Dear **RW**,

Though in principle I support the idea of licensed low-power FMs, I have one fear. If LPFMs were legal, I worry that most of the available channels in any given market would be gobbled up by religious broadcasters.

To prevent one group or several from monopolizing an LPFM service, I propose the following requirements of any LPFM licensee:

- No group owners; one station limit
- High integration of ownership and management (no absentee owners)
- Limit amount of network programming
- Studios/offices be manned a minimum number of hours and located within the primary service area of the station.
- Must be on-air at least 50 percent of the week (84 hours).

LPFM operators will be limited in resources, but minimum standards should be established to weed out the half-hearted.

A good first step to LPFM (Class D) might be to allow it first to non-comms. Also, allow Class D FMs (10 to 100 W) only in markets where all other high-power channels are gone; and allow operation in the commercial band (92-108 MHz) only if no channel is available in the non-comm band.

Harold Kozlowski
WJYY(FM), WNHQ(FM), WNHI(FM), WRCI(FM)
Concord, N.H.

Community service

Dear **RW**,

More and more communities are taking to the airwaves despite bureaucratic regulations denying small stations access to the airwaves. Low-power community stations must be a counter-balance to the current media mergers.

I am one of more than 80 volunteers donating my time in a small community access micro-station, which has also received notice from the FCC. Our station has been the result of a tremendous community effort. The product is a rich diversity of music and talk programs that can be found on no other form of radio.

We are perplexed that there isn't a licensing procedure for this type of station short of a waiver, which we have applied for.

It's time to give serious consideration to the reinstatement of the Class D license.

Steve Stemmerman
Lawrence, Kan.

On Kennard

Dear **RW**,

He may have astonished some readers, but FCC Chairman William Kennard's comments (**RW**, Feb. 4) about unlicensed broadcasters are timely and refreshing.

He made it clear that "pirate" operators are violators who face FCC enforcement. But he said that the FCC is considering how some type of low-power radio broadcast service could be authorized. He recognized the possible benefits of such a service.

The commission should be applauded for taking a fresh look at low-power radio. The service could make use of digital technology, frequency reuse and spread spectrum. These innovations could deliver a broadcast service with lower entry costs, smaller spectrum requirements, and far greater capacity for stations than the current AM and FM system or even the promising terrestrial design systems.

A new lower power service in the existing AM or FM bands would encounter technical problems and meet ferocious opposition from incumbents. The new service should be located elsewhere, in the unused and underutilized bands that remain across the spectrum.

Bennett Z. Kobb
Arlington, Va.

The micro-power movement

Dear **RW**,

It disturbs me to see the NAB take such an antagonistic stance toward low-power FM stations.

For the most part, these stations are providing a needed service to their communities, a service that the commercial stations forsake in the interests of making more money.

I doubt that any of these operators actually intend to cause interference to licensed FM stations, much less aviation radio. The lack of low-cost, high-quality equipment, coupled with poor understanding of transmitter separation and frequency selection, are the most likely reasons for any interference.

I feel that a more appropriate response would be for the NAB to work with the FCC to provide a means for licensing such low-power stations. FCC Chairman Kennard has indicated his willingness to create a low-power FM license.

The NAB would stand to benefit if it could bring 1,000 more dues-paying radio stations into its fold, rather than attempting to silence these voices.

David Forbes
Tucson, Ariz.

Frequency frustration

Dear **RW**,

As radio club advisor for a major, top-ranked high school, which has tried on-and-off for 30 years to get a frequency, I can appreciate the frustration and travails that others have encountered.

The FCC should make a new class of assignments — a municipal channel for each municipality that can financially support a broadcast outlet.

Time on these stations would be shared to provide city council and school board meetings, presentations by community and business leaders, local public affairs discussion shows, student training and productions, school musicals and plays, etc.

These stations would have to open to all legally recognized non-profit organizations chartered to that specific municipality. This assignment would be similar to the local access channel on a local cable TV system.

It would provide the very thing that the FCC and radio originally sought to foster :

Information, education, entertainment for the public interest, convenience and necessity.

The licensing process would be easy.

The local municipal government would supply the application, organize the local governing commission, and share supervision.

Roger Badesch
Evanston, Ill.

Don't Go There

Is momentum building for some new form of low-power radio? The FCC recently sought comments on a proposal for an "affordable" microstation service, in which each new station would serve a single municipality or neighborhood. The system would consist of 1-watt transmitters with antennas 50 feet above the ground, spread around the country on a single AM and single FM channel, with only one station per "cell," each available to the first person who asks.

We predict chaos in the unlikely event the FCC accepts this idea. The proposal is unworkable, and its rules impossible to enforce. It is but a step above Citizen's Band, not exactly a model of successful use of the spectrum. It calls for licensees to build their own transmitters, free of any type approval, yet with sufficient quality to protect other broadcasters. It would require them to stay on the air for a certain length of time each year. What bureaucracy would enforce that? Who will protect other stations from interference? What happens to the current occupants of those channels?

The radio band is crowded. We still feel the effects of Docket 80-90, which the FCC passed in the 1980s to squeeze in more FMs. Part of the reason for relaxing ownership limits was to correct those excesses.

Further, radio already offers an outlet to the type of person who would be inclined to slap up a $50 radio station just to get on the air for a little while. Community stations offer many people a chance to air their music and views for an hour or two, without any licensing or extra regulation.

Our government still has a legitimate interest in providing careful, fair allocation of a limited resource. The proposed service would make that job impossible.

However, only a fool would ignore the trends behind this petition. In an age of desktop publishing and online communication, Americans do not like being told they do not deserve their own voice. The trend toward homogenization of radio programming also gives fuel to low-power advocates.

A better proposal may come along. The industry should pay attention, and consider the forces behind these ideas.

— RW

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Next Issue of Radio World
April 1, 1998

Colorado Firm Buys TFT Inc.

Media Technologies Inc. Acquires Manufacturer; TFT Founder Wu Will Stay as President

by Sharon Rae

SANTA CLARA, Calif. After nearly three decades under the same ownership, TFT Inc. is changing hands. The privately held company, which designs and manufactures products for the wireless telecommunications industry and is a familiar name in radio, has been sold to Media Technologies Inc. of Englewood, Colo., for an undisclosed amount.

"Media Technologies was created in 1997 and is a holding company," said Darryl Parker, TFT director of marketing. "They purchased TFT because they want to have high-tech companies involved in telecommunications that will provide their stockholders and shareholders a profit on their investment."

According to Parker, TFT President Joe Wu will continue in his position. Mike Reddy, president of Media Technologies, assumes CEO responsibilities as well as chairmanship of the TFT board.

"We were looking for companies which have strong proprietary technology, product leadership and outstanding customer franchises," stated Reddy. "I am looking forward to continuing and building upon the technology leadership and product strengths of TFT, and to further strengthening our relationships with our media customers and marketing partners."

Parker said, "I think this will give TFT employees a better visibility in the market that they serve, and present new challenges and opportunities." As for TFT customers and dealers, he said, "They will see improved relationships and a better response to technological issues in the industry and market."

TFT managers sought to assure customers that its operations will continue as in the past, including support of TFT products in the field.

TFT was founded in 1970 by Wu. Parker said Wu built the first remote television monitor for frequency and modulation monitoring shortly after the FCC permitted television stations to be operated by remote control.

"That first television monitor led to a line of AM and FM monitors and then to a line of STL products and remote control equipment," said Parker. "In 1976, TFT was one of a handful of companies that supplied equipment to the broadcast industry for EBS ... then in 1994 became the first proponent of what is now the EAS protocol."

TFT products are distributed in more than 40 countries. The company, based in Santa Clara has 35 employees.

BUSINESS DIGEST

Bradley Finds New Facility

FREDERICK, Md. Equipment dealer Bradley Broadcast Sales is moving to new headquarters in suburban Washington, D.C.

The company has leased a 10,000-square-foot facility with office and warehouse space for its 15 employees and its equipment inventory, according to General Manager Art Reed. Bradley, in its 15th year in business, is owned by the Veneman Music Co. For the past three years it has occupied space within the Veneman retail building in Rockville, Md.

We needed a larger, more efficient facility.

— Joellen Reed

Marketing Manager Joellen Reed said, "With the increase that we have seen in business, we needed a larger, more efficient facility. We will also now have the ability to maintain a product demo area."

Art Reed said the new office was set to open March 2.

The new business address for Bradley Broadcast Sales is 7313-G Grove Road, Frederick, MD 21701. The business phone number is (301) 682-8700. Bradley will retain its current toll-free sales line, (800) 732-7665.

— Paul J. McLane

GUEST COMMENTARY

What's Wrong With the System?

by Fred Baumgartner

Fred Baumgartner

I have just read the Jan. 21 **RW** editorial lament "Lots of Talk, But Few Comments." I had promised myself when the FCC announced the EAS rules, that I would "let it go." I think what follows needs to be said.

I was working the overnight shift at WIBA(AM), Madison, Wis., some 18 years ago, when a tornado leveled the nearby small town of Barneveld, leaving behind deaths and devastation. All of the faults of the EBS aligned before my eyes, and I have no doubt that those people need not have perished. For me, and other engineers, it became an engineering challenge.

For the longest time, there was little support for the idea of an alerting system fast enough to save lives, built on a Web network, with intelligent signaling, that wouldn't irritate listeners. It was difficult to even get articles published. When enough work had been done to test the early EAS, the FCC discouraged the project by requiring that EAS only be used in conjunction with and under EBS rules — or to phrase it another way, drowned it in red tape.

It wasn't until 1992 that the FCC became interested in replacing EBS. That year also saw a change in administrations. I learned how short the attention span of a federal agency can be.

The politics of safety?

The case for EAS had been presented to both the SBE and NAB before 1992. Both organizations declined to take EAS under its wing and foster its development. NAB politics ruled out supporting things that would cost its members money. The SBE, in the midst of growing pains, chose not to become a standards-setting organization, which would have required resources it did not have and presented a legal risk the members might not accept.

If either of these organizations had had the wherewithal to lock five engineers in a room for a weekend, the results would have been a simple, inexpensive system that would save lives and move information efficiently.

In the end, the FCC created a process of competing politics and manufacturers. In the bottom-line, show-me-the-money 1990s, a financial (rather than public-service) motive may have been the only formula that could exist. Missing in this was the broadcast industry, whose members chose to whine rather than be proactive.

For me, the low point came when Helena Mitchell, the FCC head of the EAS project, formed "focus groups" of kids and housewives to set the course of EAS during the Denver tests. I believe the FCC had little technical competence and was too driven by career motives.

The result was an overly complicated EAS encumbered by brain-dead regulation and containing too many marginally useful features. If you go back to the NAB 1993 Broadcast Engineering Conference Proceedings, you will find that the EAS system is laid out without the added garbage, complete with most of the features, codes and simple procedures for which the SBE is petitioning today.

The miracle is that manufacturers and broadcasters managed to transform the defective FCC EAS rules into hardware and alerting networks that worked at all. For those of us involved in the process, the choice was between standing up and pointing out the FCC had no clothes, thus likely derailing the entire effort, or waiting until after the parade and working with the FCC to fix things.

Once the FCC process produced a "standard," no matter how flawed, the industry and specifically the SBE proceeded to educate, implement, patch and proactively straighten out the mess.

Accept SBE comments

There is only one legitimate course of action now. The FCC should verify the validity of the SBE comments and act upon them. I sincerely doubt that any sufficiently educated, non-self-centered person or group can argue with the SBE proposals.

Trying to make this a "controversy" is simply journalistic simulated sizzle. Comments like those of Tom Taggart in the pages of **RW** during the past year have every right to be presented, but one should not lament when truth quietly overtakes them.

See EAS, page 9 ▶

The Case For EAS Revisions

▶ EAS, continued from page 7

If history continues, we can expect EAS to need replacement someday. EBS lasted 20 years. Conelrad, the predecessor to EBS, lived an even shorter life. The seeds for the retirement of EAS are found in satellites and the "500-channel" digital universe before us.

The role of communication in saving lives is as old as life, and it will not be supplanted. History will be little concerned with our ratings and cash flow, but it will judge how we served society. I am grateful for the experience I had with EAS. I believe we learn both from failure and success, and this is what I learned:

First, the industry (the NAB and especially the SBE) had every opportunity to drive the EAS process. Waiting for the government and the manufacturers to propel this was a blunder. Never be afraid to lead.

Second, the SBE can and will fix what can be fixed, if supported and allowed to do such.

Third, the FCC for some time has been technically impaired. It makes a technically flawed decision, people make polite excuses (but no one publicly defends these decisions), thousands of hours and dollars are spent to correct or patch the faux pas, and the FCC repeats the process. The FCC is not technically handicapped because it wants to be, but simply because it is composed almost entirely of non-technical people. The industry makes a mistake in treating this condition as a dark little secret. It can and should proactively mend this.

Fourth, while the EAS equipment and regulation are not optimal, they are interminably better than EBS. If your state or station is not taking advantage of this to perform the one public duty that is clearly ours, I simply can not fathom this. It seems almost a certainty that one or more lives have been saved in 1997 specifically by EAS.

It's unfortunate that the media don't report on the role of communications in alerting survivors.

■■■

Fred Baumgartner is director of broadcast satellite operations for TCI, where 100 transmitters uplink more than 500 video and 200 audio services and networks. For 10 years, fixing EBS was his passion; he designed and built prototype equipment, and authored more than a dozen articles and papers on the subject, including "EAS an EBS alternative" in RW in the fall of 1990.

RW welcomes other points of view.

'Net Regulation?

▶ LOW, continued from page 3

NAB had no comment on the petition.

The FCC has discovered the Internet and is trying to decide how to regulate it. But commissioners are in no rush. Indeed, as Commissioner Susan Ness told attendees at an Internet policy forum here, the FCC has purposely refrained from putting restrictions on Internet service providers.

Regulating the Internet

"We haven't required Internet service providers to pay the per-minute 'access charges' that are imposed on long-distance carriers. We haven't subjected ISPs to any of the other regulatory requirements that the Communications Act places on carriers — such as price regulation or tariff filing or universal service requirements," Ness said.

What Commissioner Ness did not say is that FCC employees haven't had the time to figure out how to regulate another industry. They've been consumed with meeting the numerous deadlines for implementing the Telecommunications Act — and they've had to do it with current staff levels.

When members of Congress debated passage of the Telecommunications Act in 1995, they touched on when and how the FCC and the Federal Trade Commission should regulate the Internet. Under current thinking by regulators, both federal agencies would be involved. For example, with the regulation of broadcast alcohol advertising, the FTC would look at whether there are fraudulent or deceptive ads on the Internet while the FCC is likely to handle licensing its use, much like the agency governs the wired and wireless telephone industries.

The FCC is grappling with several issues regarding the Internet. The commission's goal is to review its existing regulatory classifications and determine if those are suitable to regulate the Internet.

The FCC is concerned that homes and businesses have access to bandwidth needed to use the Internet in the future. At the current rate of growth, Ness said, voice will exceed data traffic by the year 2000.

NWS Proposes Trimming EAS Codes

▶ EAS, continued from page 1

•*Watch* — An event in which the onset time, probability of occurrence and/or location were uncertain.

•*Emergency* — An event that would not kill or injure anyone by itself, but could indirectly cause other hazards.

•*Statements* — Follow-up information messages.

As examples of an emergency, Krudwig used the failure of a 911 system or a large-scale power failure. The failures themselves do not constitute a hazard, but could create an emergency situation.

Using that titling methodology, the NWS proposed that the third letter of the event code indicate what type of alert was being used: W for Warning; A for Watch; E for Emergency and S for Statement. Two existing codes, TOR (Tornado Warning) and SVR (Severe Thunderstorm Warning), would have to be changed.

Hazard codes

The NWS proposed adding 21 codes to its event code list and deleting two (Evacuation Immediate and Civil Emergency Message).

Some of the proposed codes are for "Radiological Hazards" and "Hazardous Materials" watches and warnings. Three new codes from "Civil Danger Watch," "Civil Danger Warning" and "Local Area Emergency" would be locally defined.

The NWS also proposed eliminating eight codes from EAS use, including "Winter Storm Watch" and "Severe Weather Statement." If this change is adopted, stations could still use the messages for non-EAS purposes.

The NWS had suggestions for the use of the county (CCC) code in the EAS encoded message. It suggests reserving the numbers 900 to 999 for special overland alerting areas and allowing a combination of ASCII alphabet, numbers and characters to be used in the "CCC" geographic code for critical alerting areas near special facilities.

Lawrence Krudwig of the National Weather Service

At present, any one message is limited to 31 location codes. If letters and selected symbols are allowed, the NWS says 217 million location codes and message combinations could be available in the six-digit location block.

That way, special facilities like nuclear power plants and chemical, biological and nuclear weapons storage facilities would be able to continue to use National Weather Radio to send messages effectively to special receivers. Radio, television and cable systems could use the codes if they wanted as a public service, but that would not be required.

The NWS proposals would result in some equipment modifications. Krudwig said that, depending on the maker of their EAS box, broadcasters would have to replace an EPROM chip in their units or download a new instruction set.

For most broadcasters, the code changes would require pushing a few buttons on their EAS box panel or hitting a couple of computer keystrokes. For others, it will require telling the manufacturer ahead of time what new codes and areas they want; their software upgrade would be customized.

Thunderstorm warnings

The weather service also is ironing out some in-house issues that affect EAS indirectly. For instance, the NWS is considering raising the criteria for a severe thunderstorm warning and adding a "Thunderstorm Advisory." A new code would make EAS more efficient by reducing the number of warnings, which can overwhelm the system, Krudwig said.

At press time, the NWS was close to completing hardware and software upgrades to its 218 playback units in the field. The changes make the equipment more automatic, eliminating the chance of operator error. Krudwig said they wanted those upgrades in place for the next severe weather season

In late summer, the NWS will begin to replace the upgraded units with new consoles that will further automate the system. The rollout will take about a year.

Krudwig said the NWS is testing four of the new units in the field, but wanted to have the upgrades in place for the next severe weather season.

Broadcasters and NWS

Some broadcasters who say they were frustrated at first by long-windedness from their local weather service offices have noticed some pleasant changes —

See EAS, page 14 ▶

NEWS ANALYSIS

Radio, FCC Face Year 2000 Issue

by James Careless

WASHINGTON The "Year 2000 Problem" is dominating business headlines. As the millennium approaches, business people whose livelihoods rely on computers are afraid their systems will choke when the date rolls over from 1999 to 2000. The federal government, too, is scrambling to prepare.

There is good reason for this fear among those who run older computers. If you are just beginning to think about this, here's the background: Many computers and applications were built at a time when memory was so expensive that storing the year as four digits — 1999 — simply was too expensive. Computers were designed instead only to store the last two digits, for example 99. The "19" part of 1999 was assumed in the system. In such older systems, the computer will read 00 to mean that the year is now 1900, rather than 2000.

Broadcasters, too, have reason to be concerned. These days, computers often form the backbone of a radio station, running billing, traffic, payroll and control of audio and transmission functions. Imagine the chaos in accounts receivable if your computer suddenly decides that all accounts dated for January 2000 suddenly aren't due for a century!

This is the big fear, and it is hard to quantify the problem, to figure out what programs are at risk, and which aren't.

In this and future articles, **RW** looks at the impact of the problem.

On the federal front

Expect to hear a lot in the coming year about how Uncle Sam is facing this issue. In February, President Clinton created the President's Council on the Year 2000 Conversion, to lead the government's efforts. The Office of Management and Budget estimated in December that the government had completed repairs to only 10 percent of its most critical systems, and it has estimated the cost of fixing government computers at $3.9 billion.

Along with other federal government agencies, the FCC is taking part in task forces investigating the matter. Chairman William Kennard told **RW** earlier that the commission is focused on the issue (Feb. 4).

The commission move towards "electronic filing" — broadcasters sending in required data via the Internet — probably will not be affected by the Year 2000 bug because the system will be based on software with four-digit dating, FCC sources said.

The NAB is collecting information about the 2000 problem.

Eventually, broadcasters will be able to file routine paperwork with the FCC electronically. In selected dockets, the FCC has accepted comments filed electronically, as an experiment. There is no electronic filing now for filings with the Mass Media Bureau, but some of the other industries the FCC regulates can file some items that way. FCC electronic filing procedures for broadcasters still are being developed.

For stations

"In broadcasting in general, we think the private sector has to take the lead in addressing this problem," said an FCC source working on the 2000 issue. "Luckily, the broadcasting industry faces fewer problems than some other sectors of the communications industry, particularly the telephone industry."

So what will those problems be? "The broadcasting sector will face the same problems that all companies in the U.S. face that rely on computers," he said. "They're going to have to make sure their payroll systems, their word processing programs, all the computer systems that they use on a day-to-day basis will work on January 1st, 2000.

"That said, they are going have to spend millions of dollars fixing this problem. And if they don't, they could suffer some serious consequences."

FCC employees mainly use new Windows-driven PCs that don't suffer from the Year 2000 problem. "We do have a few large mainframes, a few large databases, and those are being checked as needed," said one FCC source, "but the challenge at the FCC is no more serious than that at a medium-sized travel agency."

Another FCC source said the commission is using mostly off-the-shelf software, rather than customized programs, and manufacturers are working with it on anticipated problems.

Staffers in NAB's Research and Information Group are collecting information about what problems the year 2000 may cause broadcasters. NAB also has a year 2000 survey on its Web site at *www.nab.org*

Because most radio stations run as small, autonomous units, said NAB Director of Media Relations John Earnhardt, group owners are bringing in their own people to take care of it. Stations are handling it on an ad hoc basis, as needed.

Canada

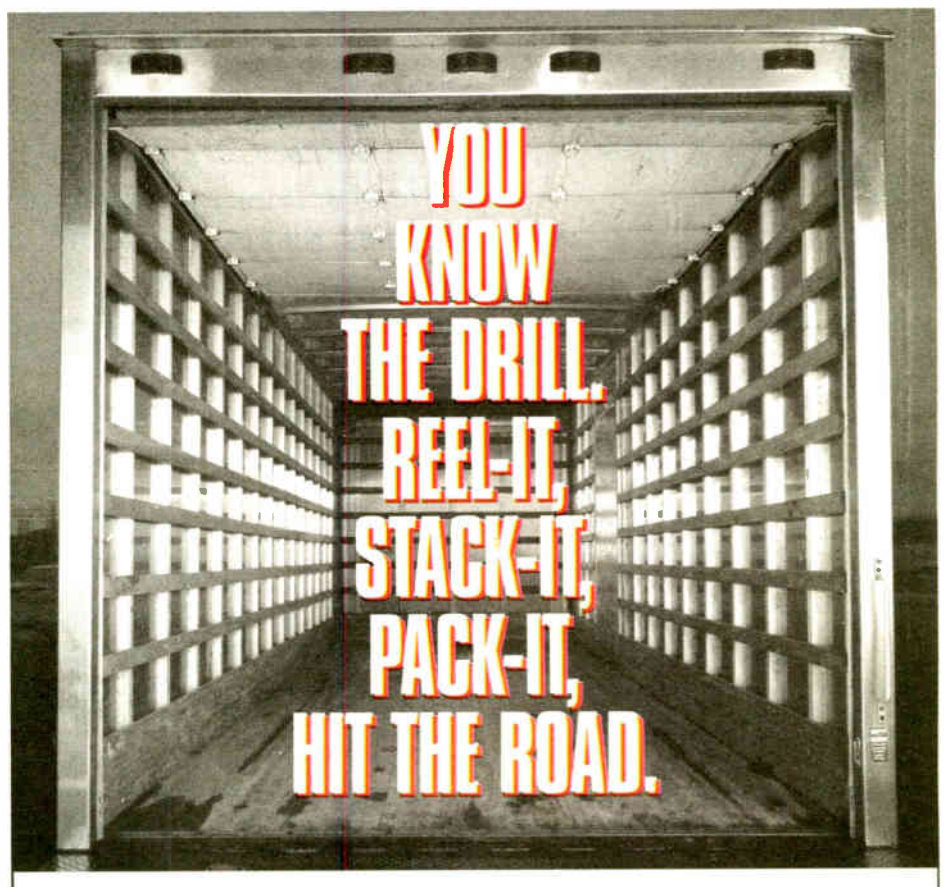
North of the border, broadcasters face similar questions. In Canada, "There isn't a whole lot of information out there yet," said Wayne Stacey, technical advisor to the Canadian Association of Broadcasters. "I think as far as most of the internal operations of radio stations go, they probably will be dealing with their computer services advisors on questions of how it might impact on their traffic systems and billing systems and so on. It's just more a standard operational question for them. So I guess it's fair to say there hasn't been a lot of attention to it by the (Canadian) national association yet, except they're aware there's this general situation that just about everybody who uses computers has to address."

In upcoming stories, **RW** will explore how equipment suppliers and radio stations are coping.

■ ■ ■

RW News Editor/Washington Bureau Chief Leslie Stimson contributed to this story.

How is your station or company handling the Year 2000 problem? We invite stations and suppliers to tell us, via e-mail to radioworld@imaspub.com *or by fax to (703) 820-3245.*



Digital DJ Has Big Hopes for DARC

by D.A. Barber

MILPITAS, Calif. Digital DJ is knocking on the doors of radio stations in the top 10 U.S. markets, hoping to expand its high-speed data services to a large part of the country this year.

The company is one of several trying to translate the technical promise of "smart radios," and of high-speed data services using FM subcarriers, into practical new revenue sources for radio and new data services for the consumer.

DDJ launched service at WCBS-FM in New York in November. It hopes to launch at KROQ-FM and KLSX-FM in Los Angeles and WKLS(FM) and WPCH(FM) in Atlanta by the second quarter of this year. Among its offerings are three new subscription-based services: Wireless Wall Street, providing listeners with real-time stock quotes; Uptown Update, distributing stock quotes on a 20-minute delay; and Sports Folio, offering real-time sports scores. DDJ also has worked with Sharp to make a high-speed data receiver and AM/FM Radio available to consumers in the United States.

Originally working with San Francisco station KPIX-FM and Atlanta station WKLS, DDJ tested high-speed technology called Data Radio Channel, or DARC. Proponents say DARC will be more successful at penetrating the radio market than the Radio Broadcast Data System has. Because DARC is much faster than RBDS, the company argues, real-time information services have the potential to open new revenue streams for radio stations — income that has not yet materialized with the first generation of "smart radios."

"(DARC) is 10 times more powerful in terms of data rates and sheer volume of information," Joel Schwartz, vice president of sales and marketing at DDJ, said.

While the data rate for RBDS is 1,200 bits per second, the DDJ system transmits at 16 kbps. Schwartz said the DARC system has been tested in Japan since 1994 and was approved as the international voluntary standard for high-speed data transmission using the FM subcarrier, by the International Telecommunications Union (ITU) in October 1995.

The DARC technology was developed by NHK Broadcast Technology Center in Tokyo. In July of 1993, NHK and DDJ formed a technical alliance to introduce the technology into the U.S. market.

DDJ DRW-V2
AM-FM receiver

Manufacturers including Clarion, Sanyo, Alpine, Pioneer, Panasonic, Hitachi, Kenwood, Mitsubishi and Casio are making automobile receivers, hand-held receivers and PCMCIA cards to receive high-speed data in the Japanese markets. According to Schwartz, the technology went online in April of 1995 in Japan, and in eight months more than 400,000 receivers were sold.

"In Europe, they're looking at our technology as the next generation of RBDS," Schwartz said.

Lots of information

In San Francisco and Atlanta, the DDJ systems were tested to provide listeners with a variety of alphanumeric formation text and graphics. The company tested hand-held radios with an LCD screen that allows the information to be transmitted without interrupting the audio from the radio stations.

The menu of information includes traffic reports; local, regional, national and international news from AP and UPI; business news; financial reports; weather; and radio station promotions. Each receiver has a unique identification number so listeners can receive customized personal information, including e-mail, stock reports, sports scores, and direction and navigation information, all in a mobile environment.

Computer PCMCIA cards, offered with an FM radio receivers by Panasonic and Oki, allow radio stations to send significant amounts of information without incurring the high transmission or user costs connected with modems, pagers, satellite systems or cell phones.

At San Francisco news/talk powerhouse KPIX-FM, the system was tested between April 1996 and February 1997, providing customized information on demand to hand-held receiver units provided by DDJ. The workstation at KPIX-FM allowed the station to add its own station information to the material provided by DDJ.

"By allowing broadcasters to customize the information that their listeners receive automatically, they will get their listeners to listen longer," Schwartz said. "That's been proven in Atlanta with WKLS."

WKLS began operating the DDJ system just before the Summer Olympics in Atlanta, providing real-time traffic, news from UPI and AP, a 96 Rock Home Page and Olympic updates. The home page came directly from the station's Internet site, offering advertiser client promotions, concert information, events schedules and song listings. The

See DDJ, page 14 ▶

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NWS, EAS Codes

▶ EAS, continued from page 10

brevity, for one.

In areas where there are "high-frequency, short-fuse, severe weather events," Krudwig said, NWS employees were accustomed to taking just 30 seconds to get out the "who, what, why, when and where" to broadcasters under the EBS system.

In areas with fewer severe weather events, some NWS employees used EAS to transmit entire statements. The result was broadcaster frustration. The textural part of those messages generally contained canned safety rules, said Krudwig, which radio stations would rather customize to advise listeners. Brevity becomes even more important considering the potential for alerts to override commercial programming at automated stations.

A lot of that was procedural, said Krudwig. "We needed to be better broadcasters."

EAS in California

Richard Rudman, director of engineering, KFWB(AM) in Los Angeles and California South State Emergency Communications Committee Chair, said employees at the Oxnard, Calif., NWS office listened carefully to broadcaster concerns about EAS and made a number of improvements. These included new hardware and software and shortening the length of the NWS audio alert messages.

"Their early EAS Alert audio messages ran well over a minute. After hearing comments from the Los Angeles County LECC and its broadcaster members, their policy now states that EAS audio messages will just contain basic EAS alert information and direct the public to broadcasters who will supply more detailed information on the emergency," Rudman said. Including digital header and attention signal, the NWS messages now take about 30 seconds.

NWS upgrade

The NWS has upgraded its 218 playback units with new hardware and software to make the coordination between NOAA Weather Radio and EAS more efficient. Before the update, officials say, problems were more likely to occur. For example, the encoder panel might lock up the program console or allow parts of previously recorded messages to be broadcast before the end of the message code could be sent.

Now, once the operator presses the "send" button, the encoder takes over and automatically ensures the proper timing and handshake between the encoder and message broadcast and playback consoles. The upgrades cost about $150 per unit.

The NWS field units have two parts. The operator records the alert on a playback device and then uses a control panel to select the event code and create a digital message that will be received by local broadcast stations.

HSDS in Your Car

▶ DDJ, continued from page 12

DDJ system in this instance acted as an extension of the Internet for a station to a wireless mobile audience.

"From our standpoint, I put it in the category of the Internet," Pat Ervin, director of marketing at WKLS, said.

Today, KPIX-FM in San Francisco is no longer using the system. DDJ has added Bay Area stations KITS(FM), KFRC-FM, KMEL(FM), KFFG(FM) and KKSF(FM).

Big hopes

Because receivers allow fast, real-time transmission without interrupting the audio signal, and can save data for later retrieval, DDJ says its system can create new revenue streams for stations. One possibility is supporting a radio spot with a display showing an address, phone number and directions, all of which can be saved by the listener for recall at a later time on their hand-held, car or computer receivers. Ervin of WKLS calls these "audio coupons." He thinks the revenue stream opportunities will expand when receivers reach the automobile level.

As more value-added subscription services become available, proponents say, such systems may help increase revenues at radio stations even in flat markets. As more car receivers come on the market, stations likely will look at this new generation of "smart radios" more critically.

"That's where I think some gains can be made and that's where the big use is in Japan," Ervin said. "That's when you can start making money off it."

At Digital DJ, Schwartz is optimistic for the future of this technology in cars. "Ford has one of our systems installed in one of their plants in Michigan to do internal testing," he said. "We have every expectation that those units are going to be available within two years as part of factory equipment, or as an after-market item."

But implementation takes time. Last fall, DDJ was hoping to be in the top 10 U.S. markets by mid-1998. By January, the company had pushed back that target to the end of this year.

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Walden of USADR

▶ WALDEN, continued from page 1

that, when you talk to other people who might be interested in digital audio. We're in the digital radio business.

The world is going digital. We are going to make (DAB) optimized for broadcasting and for our listeners. If we don't do that, we have nothing.

We're going to be in business for a long time. We have to train people to convert radio stations to digital. We have 10 years of implementation issues.

We've got to be there, supporting transmitter and receiver manufacturers, for years to come. We have to be supporting the overall scheme of making this transition from a world of analog to digital.

Integrated receivers

RW: What's new in your DAB work here?
Walden: We are building AM and FM receivers that receive analog, digital, all-digital; you can change stations on them, decide whether you want to listen to analog or digital. It's a complete system, one common receiver. We have completed the design and we are now implementing it in hardware. We are not building just one system, but multiple systems.

It is not going to be like before, when you had an AM demonstration and an FM demonstration. This is a radio that picks up all the modes. You can listen to that radio, and decide whether you want to listen to AM or FM, analog or digital.

You can't make up your mind to listen to all-digital (at this point in the receiver testing), because we're going to have a limited amount of time we can do all-digital (testing). Not too many broadcast stations are going to let us turn off their analog so that we can test all-digital. But we hope that we can get some off-the-air time on a weekend, overnights, to do some testing.

RW: If the National Radio Systems Committee said, "Now that Digital Radio Express has an IBOC proposal, we want to have one-track testing between DRE and USADR," would you participate?
Walden: No. I've been burned by the EIA before, I've been burned by the test process before. It was a circus. We have real scientific work going on here, and we are not going to get involved with committees and stuff. We have a job to do to develop broadcasting for the next century. It is being funded by broadcasters, and we intend on testing the system in a manner that will be above reproach in submitting those details to the FCC.

If there is another company that wants to test their system in May of this year, then go ahead and do it. We have a plan, which has been laid out to **RW** and published before. We have plans for doing our testing throughout 1998 and 1999.

Tests in 1998

RW: Are you still expecting over-the-air field tests in the fall of this year?
Walden: Yes, that is our goal, for both AM and FM.

First the tests are going to be here, because it is more convenient. (USADR has an experimental FCC license for over-the-air tests on TV channel 6 in the Washington area.) This is a difficult market to do testing in because of the interference scenarios. That gives us a good deal of information that we could never get testing in a place like Las Vegas.

RW: How actively are the transmitter and receiver makers involved?
Walden: We are working with a transmitter manufacturer, and we have the first draft of a transmitter spec done. We have a meeting here... with a manufacturer of antennas and diplexers about what kind of specifications we need in bandwidth.

We have two meetings scheduled with transmitter manufacturers, and have ... more to schedule. We have met with a couple of receiver manufacturers and we have had ongoing interest with several over the years. ... We learned some interesting things from them. First of all, our system is cheaper to implement than Eureka. We learned that some manufacturers like to produce their own chips, and others like to have chips made available to them.

Receiver manufacturers are starting to pay attention because IBOC is starting to look a lot more feasible, and they don't want to be caught out in the cold.

RW: You don't intend to manufacture?
Walden: No, we are in the broadcasting business, and we will be licensing technology. We are not in the manufacturing business.

IBOC in 2000

RW: When are we going to be able to hear IBOC digital radio in our cars?
Walden: The current plan calls for receivers to be available for Christmas in the year 2000, the first commercially produced receivers. ...

All the radios until some point are going to receive both (analog and digital). Probably the first DAB radios will be in the after-markets. These will be the Pioneers, Aiwas, Sonys ... That is where the business will probably come first, also home radios, then will follow the OEMs, original equipment radios that go in the car, and after that boom boxes and Walkmans.

What will it cost?

RW: Owners or engineers of small or medium market stations might not want to spend a lot of money to upgrade to DAB. How much is that going to be?
Walden: We don't know. In the prospectus Satellite CD Radio did, they said somewhere between $70,000 and $150,000. They're not far off.

There are stations we can convert very cheaply. It happens to be those that can afford it the most, because they are the stations that have kept their equipment up to date. I can walk into KYW (in Philadelphia), and for the cost of an exciter, convert KYW to DAB.

RW: So how much will that be?
Walden: I don't know; the exciter could run anywhere from $15,000 to $35,000, maybe $50,000. I don't think it will be that much. But if I go to a radio station in Alabama that has a 20-year-old AM transmitter, he has a $150,000 price tag to get started, because he has got to have a transmitter. The guys who can afford it the least are the guys for whom it will cost the most.

That was an AM station I talked about. Right now, if I were looking at converting an FM station — I'm talking about a new transmitter for *every* station. I don't know what the cost is; $30,000, $25,000 just for the transmitter. Then I have got to buy a combiner, I have got to buy a new STL and I have got to buy an exciter, because the STLs are going to be too hissy, too much noise, and I have got to have this DAB transmitter to run along right now with my analog transmitter.

The manufacturers are going to produce a transmitter that transmits both digital and analog simultaneously in the same transmitter. Hopefully, it is one transmitter that, in the future, transitions to *all* digital. That is what we want.

RW: What do you say to the broadcaster who isn't convinced to go digital?
Walden: We'll see you in bankruptcy court.

RW: Why?
Walden: They are going to go out of business. There is going to be nothing analog after the year 2000.

Radio will be the longest holdout in analog because our system is compatible. That is going to be a choice that broadcasters get to make in the future. It is not forced, not mandated. It is not driven by the receiver manufacturers or the FCC. It is driven by broadcaster choice.

Karmazin and DAB

RW: What is Mel Karmazin's commitment to DAB?
Walden: Mel's expressed commitment is very strong, stronger than I would have ever imagined. He is continuing to fund

See WALDEN, page 19 ▶

Walden on Karmazin, Group Buys, Autonomy

Glynn Walden is a busy man. He spends the work week at the USADR facility south of Baltimore, returning home to southern New Jersey each Friday.

Walden retains his regular job of director of engineering for CBS Radio, where he serves as a resource to the company managers and its engineers in the field. During his interview with ***RW*** *he also discussed radio trends and his responsibilities at CBS.*

On how CBS Radio engineering is structured, and who signs off on equipment orders:

CBS tries to operate the stations as autonomously as possible. The general manager most likely gets recommendations from the engineer, and only with strong support from the manager of the station are purchases approved ... (But) anything that has any real value attached to it has to go to headquarters to be approved.

On whether local engineers have the power to make deals with manufacturers directly:

Sure. You make a deal, you get your best price. The television side has aggressively been pursuing discounted purchasing agreements and exclusives. The radio division has not tried to produce deep discounts at one source. ... There is no evidence that this is going to change. ... (Vendors) are all competing now, so it is not a huge amount of money. I can't point at any one item that we buy so much of that we can take a big discount on.

On whether CBS Radio will follow the example of Capstar and other large groups in designing advanced systems to share audio and data among stations:

We have actually gone the opposite and tried to decentralize everything, back to autonomy. The only real linkup I know of anymore is e-mail. Some stations share things, on an ad hoc basis, over ISDN and so forth.

Mel seems to believe in autonomy.

On Mel Karmazin:

We don't talk a lot, but I do send him e-mail, and when he wants something, he calls and he expects to get it. I will guarantee you that when he calls he gets a response, quickly.

So far I like him. You have to make a good case for what you want.

On managing a large force of engineers in the post-consolidation era:

At CBS, there was a period about four or five years ago where we were consolidating multiple stations under one engineer. That hasn't been happening much recently. In fact, in several cases it went back to individual rather than consolidated engineers. ... In a couple of our markets we had consolidated one engineer for the market, and we have backed away from that.

General managers felt that they didn't get enough individualized attention. In our company it is done on a case-by-case basis. Some radio stations only need a half an engineer. It depends on the format.

On whether Internet listening and satellite-delivered radio are threats:

Internet radio is tethered to a cable. Internet listening is active radio. Radio's strength is based on its portability and its user-friendliness. Will (Webcasting) take away from time spent listening to radio? Yes, it probably will. But it probably robs people more from their TV time than it does their radio time. ...

If (satellite radio) works well, then it is going to be a competitor in the car. That is why we have to have DAB, because their quality definitely is going to be better than the quality we currently have. ... The questions and the interest level in DAB (among radio managers) have risen dramatically since the license was issued to Satellite CD Radio.

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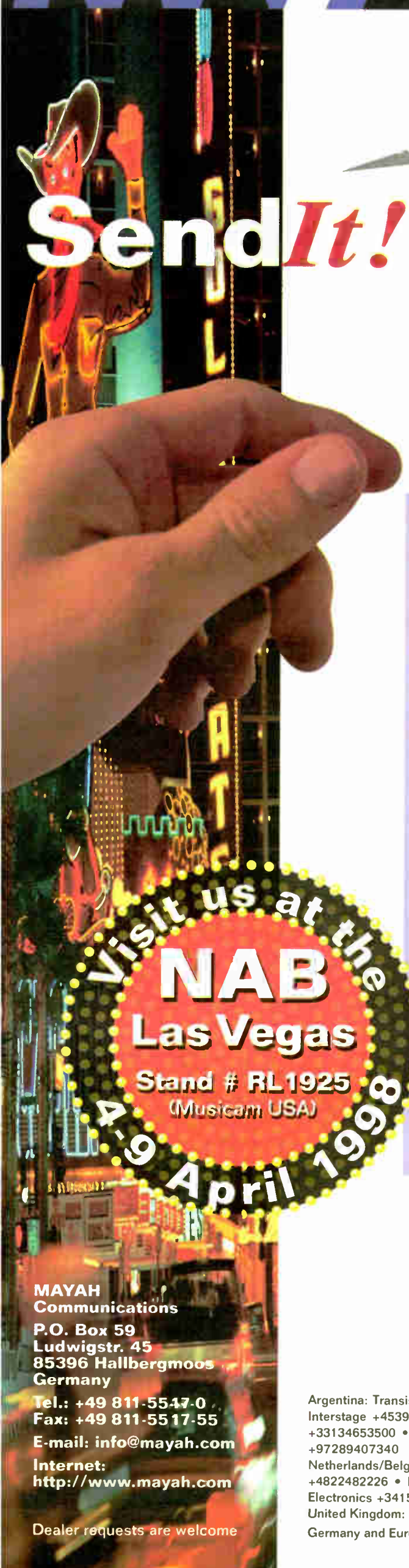

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High Hopes at USA Digital Radio

▶ WALDEN, continued from page 17

this program, he has continued to defend this program, and he's telling us, "Get it done. Get it done, and when are you going to get it done?"

There have been some tough negotiations recently, and he has stood very firm behind this program.

RW: Negotiations with whom?
Walden: Negotiations with outside parties. You have to realize that slight nuances in how you develop the system can have positive and negative effects on various constituencies. A company coming in from the outside to develop DAB might have an interest in making the data part the strongest element, and having the audio as nice, or secondary. We're not producing a system without data, but

'I can walk into KYW, and for the cost of an exciter, convert KYW to DAB.'

our emphasis is on broadcasting.

RW: Has it really been proven that the listener with the car radio really is going to hear a difference?
Walden: Oh, absolutely. We did focus groups and I will tell you that the results are outstanding.

RW: How did you do the focus groups?
Walden: We played FM and then played what DAB would be in the car. The percentage of people that would buy the radio for the improvements on AM were astronomical. We were surprised, because the receiver manufacturers have consistently said that the buyers would pay nothing for AM improvement.

The future of radio

RW: The focus groups were listening to computer-simulated IBOC ...
Walden: Yes, and they were hearing real FM, with multipath. ... We did broadcaster focus groups too, to see what broadcasters needed.

We have a specification for the engineers working on the project that reads, "This is a difficult task, but be aware of what you are doing. You are affecting the future of broadcasting for the next *century*."

RW: What is your reaction to the CEMA DAB report that said of the nine systems tested, only Eureka-147 was viable?
Walden: Eureka was a miserable failure in San Francisco (in 1996 tests). Twenty percent of the time the receiver was muted. ... It can work, but to claim that the only winner was Eureka is absurd. All they've got to do is admit that it takes a lot of transmitters to make Eureka work. But to say that S band is not a good system ...

(Eureka) is a cellular system. Eureka works if the transmitters are not separated by more than, I think, 12 kilometers.

RW: Part of the USADR approach is time diversity backup, meaning the system will allow new digital radios to fade to analog rather than just cut out when you're on the edge of the digital signal. That is desirable, except now the system requires that the analog signal be delayed.
Walden: It doesn't *require* that it be delayed, but it enhances the performance of both the analog and the digital by delaying it five seconds.

When you're driving along listening to digital, you've got to look out the rear window to see what caused a problem, because all digital systems have some delay. You can optimize your system for the shortest delay possible, which means that with interruptions the system will restore more quickly, but there will be time outages.

All digital systems, whether they come from Eureka, USA Digital or anybody else, including cell phones, all experience drop outs. We are not used to it and we don't like that. We have intentionally delayed the digital, so when an outage occurs, the digital and analog outages do not occur at the same time.

RW: It's going to be harder to listen to a game on a radio, while in a stadium.
Walden: All digital systems have delay and they are going to be on the order of one second, three-quarters of a second. We can't make it zero, so we are going to take advantage of this delay problem, exaggerate it and make the system more robust.

You can't expect people to live with muted radios.

PAC and 96 kbps

RW: Why did USADR switch algorithms from MPEG-2 MUSICAM to Lucent's PAC?
Walden: For the same reason that DRE has had to change algorithms and not use MUSICAM.

MUSICAM is a terrific algorithm, without a doubt. It is transparent. It sounds like a CD and it makes very efficient use of the data that you have available to you.

I learned long ago from the MUSI-

'Receiver manufacturers are starting to pay attention (to IBOC).'

CAM people that the "plum" was CD quality at 64 kilobits per second, because it fits in a standard telephone channel. That's the goal of anybody who is in the digital audio compression business: the highest quality with the least number of bits. But our channel wasn't big enough to support MUSICAM. We would have been perfectly happy to stay with MUSICAM, but the channel just couldn't support 256 kilobits.

The PAC people told us that they were going to deliver CD quality at 96 kilobits when we were ready to release the system. We froze the system design based on PAC being available at CD quality by the time we release the system.

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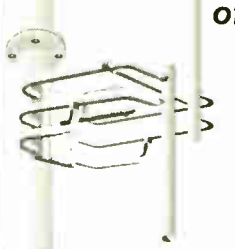

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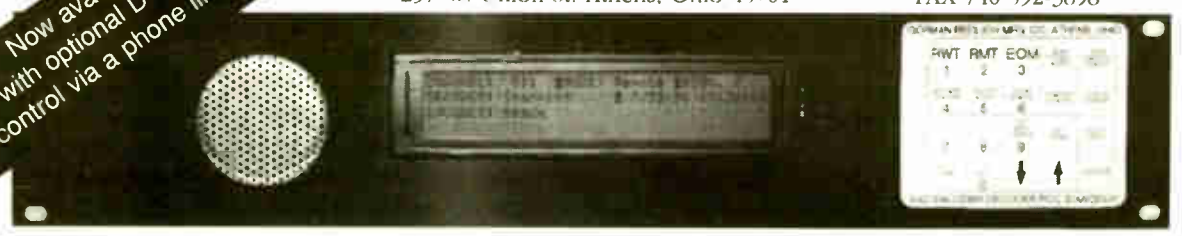

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NEWS ANALYSIS

AAC Finds New Fans at DRE

by Thomas R. McGinley

WASHINGTON Motion Picture Expert Group has come up with an audio compression scheme that a spokesman calls "the highest performance compression algorithm of all the MPEG standards."

MPEG-2 Advanced Audio Coding, or AAC, is in the news because it is the chosen compression scheme for a proposed digital audio broadcast system from Digital Radio Express.

Schuyler Quackenbush, spokesman for AT&T Research Labs, said AT&T is one of several major companies involved with the development of AAC, along with Fraunhofer (FhG), Dolby Labs and Sony. After two years of collaborative development, MPEG-2 AAC was issued in April of 1997.

DRE President Norman Miller said, "We believe this is the algorithm we'll go with at this point."

By contrast, USA Digital Radio, another IBOC system proponent, uses the Perceptual Audio Coding algorithm, or PAC, from Lucent Technologies. USADR, which has a joint development agreement with Lucent, is funded by CBS Corp. and Gannett Co.

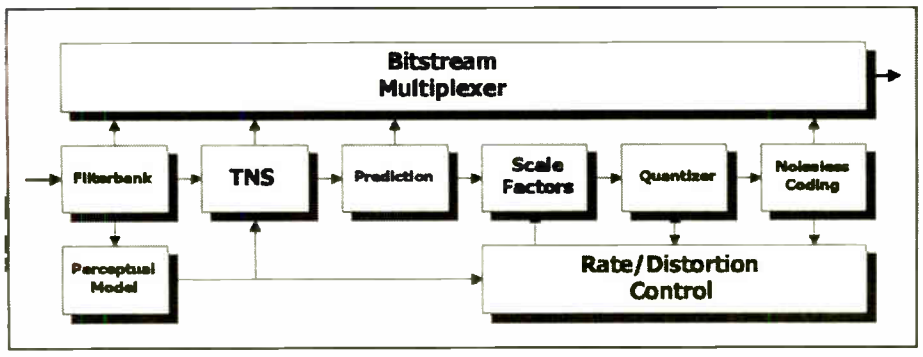
Close cousins

Compression algorithms have been around for a long time, and are necessary to make digital audio transmission fit within limited bandwidth media. The trick to all of them is to eliminate unnecessary data as elegantly as possible to allow lower transmission bitrates, leaving the listener unaware that the audio signal has been compressed in any way. In-band, on-channel DAB demands lower bitrates, especially for the AM band.

MPEG-2 AAC and Lucent PAC are close cousins in terms of their design architecture. Some of the same engineers who worked on PAC at AT&T, before that part of the company became Lucent, have also been involved in the development of MPEG-2 AAC. Some of the characteristics of Dolby's new algorithm, AC-3, are found in MPEG-2 AAC, which is not surprising because Dolby also participated in its development. According to NAB Senior Engineer for DAB David Layer, "Both are smart enough to continue to evolve and improve without having to change hardware configurations at the decoder or receiver end. The encoder sets the rules of compression and the decoder is designed to follow them."

Layer said, "MPEG-2 AAC is not MPEG-4. MPEG-4 is a distinctly different new algorithm that includes speech

See AAC, page 22 ▶



Source: NAB's Radio TechCheck

The General Structure of an AAC Encoder

AAC: New IBOC Algorithm

▶ AAC, continued from page 21

synthesis capabilities."

The AAC code delivers the same audio quality at 96 kilobits per second that its older brother, MPEG-2 Layer II, produces at 192 kbps. MPEG-2 Layer II is the codec used in the Eureka 147 DAB system. At 128 kbps, AAC gives the same audio quality at 256 kbps for MPEG-2 Layer II. This represents a two-to-one improvement.

The AAC standard employs linear subband predictive decoding and actually offers three modes or operational profiles: main, low complexity (LC) and scalable sampling rate (SSR). The different modes trade off achievable audio quality and encoding complexity for a given bit rate.

Digital Radio Express plans to use this design to offer a flexible scheme of scalable data rates up to 192 kbps for FM. In a statement, Derek Kumar, DRE vice president, engineering, stated that the data rate employed will be determined by the broadcaster's programming and terrain conditions in its coverage area. In markets where multipath and interference are more problematic, the data rate can be reduced, allowing for increased forward error correction in the signal to sustain interference-free digital decoding.

The block diagram accompanying this story, provided by the National Association of Broadcasters, depicts the various blocks or "tools" incorporated in the AAC design. Most of these blocks also are present in other compression codecs or systems. However, the temporal noise shaper and the prediction tool are significantly different or unique to AAC. These tools use a backward adaptive prediction process that removes redundant components produced in the frequency sub-bands created in the filterbank block.

In-band, on-channel DAB

demands lower bitrates, especially for AM.

Optimized PAC

USA Digital Radio and Lucent actually are using a modified version of PAC for the AM and FM IBOC systems under development at USADR. According to Glynn Walden, director of engineering for CBS Radio and USADR spokesman, "Our system fully integrates the PAC algorithm with channel coding. PAC has been optimized to respond to channel impairment caused by multipath and interference. We spent a lot of time and effort characterizing multipath so that PAC could effectively deal with it to produce significant interference reduction."

Walden said the bitrate reduction of PAC can operate all the way down to 16 kbps. The AM system uses 48 kbps, which is comprised of three 16 kbps subsets, each of which can be programmed differently to achieve optimized interference suppression.

"This capability gives the broadcaster the opportunity to set up his station's encoding to fit his particular needs," Walden said. Standardized receiver decoders merely follow the instructions set up by the encoder.

PAC and AAC are similar, but take slightly different paths in achieving very aggressive bitrate reduction while preserving virtually unaltered audio quality. Layer said, "Both appear to be good enough for the IBOC DAB application. The real difference in the performance of USADR and DRE will be determined by the behavior of their respective RF and modulation characteristics, not by the audio codec."

AAC performs better than PAC, followed by Dolby and then MPEG-2 Layer II, said Gerald Chouinard, director, radio broadcast technologies research for the Communication Research Centre in Ottawa. He was referring to the results of a study conducted by CRC that compared the algorithms. The results of the study are published in the March AES journal.

Both USADR and DRE plan to make presentations at NAB '98. A paper on MPEG-2 AAC will be presented on Sunday, April 5, in the session titled "Digital Sound Broadcasting: Worldwide Expectations and Progress."

■■■

*Tom McGinley is technical advisor to **RW**. He is employed by a CBS-owned station. He prepared this analysis at the request of **RW**.*

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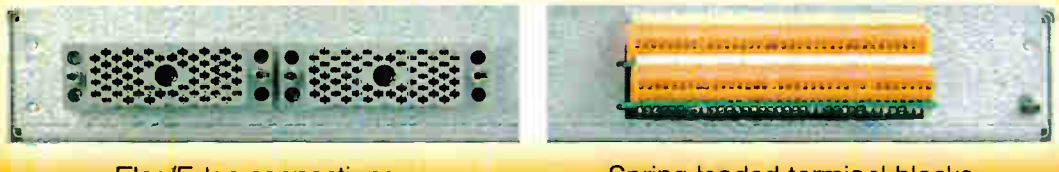

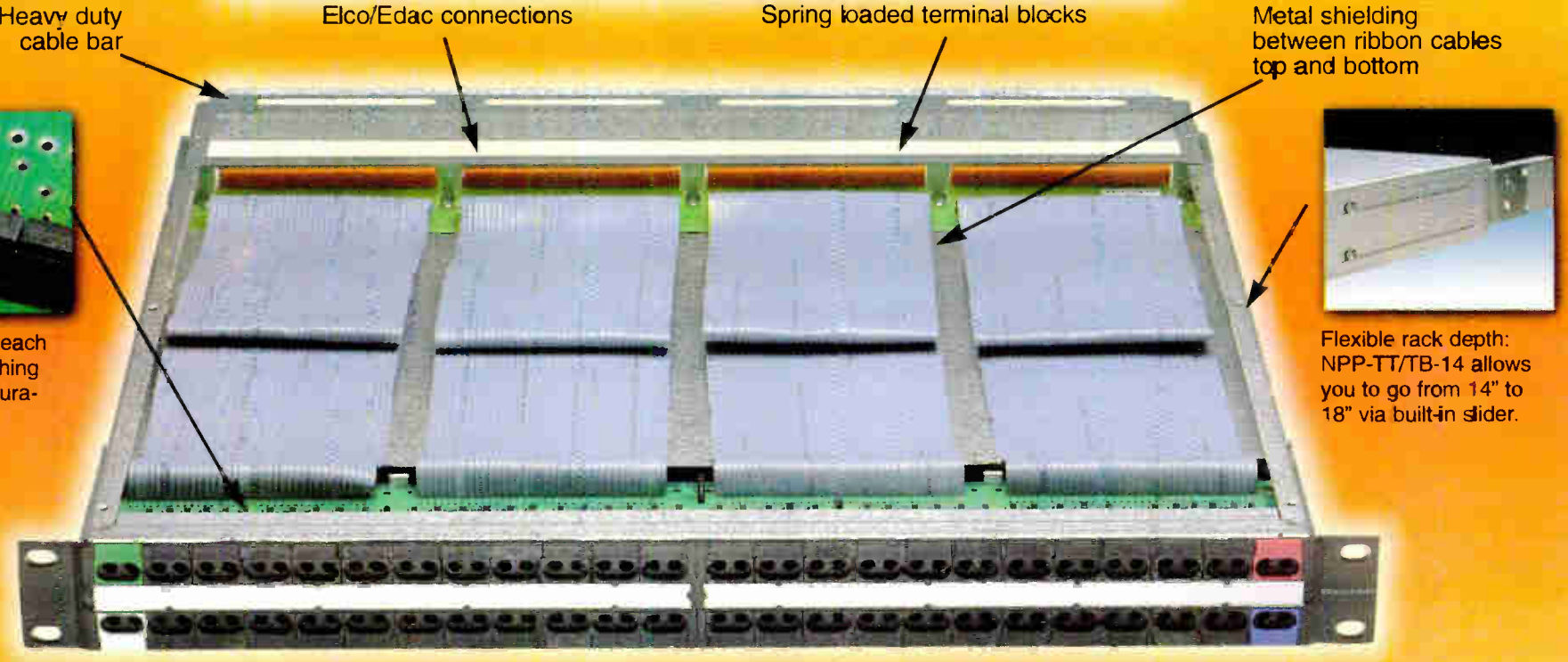

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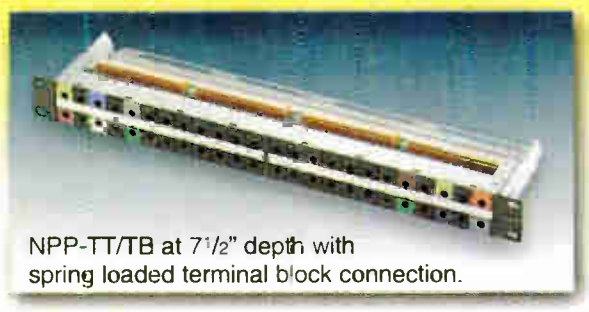

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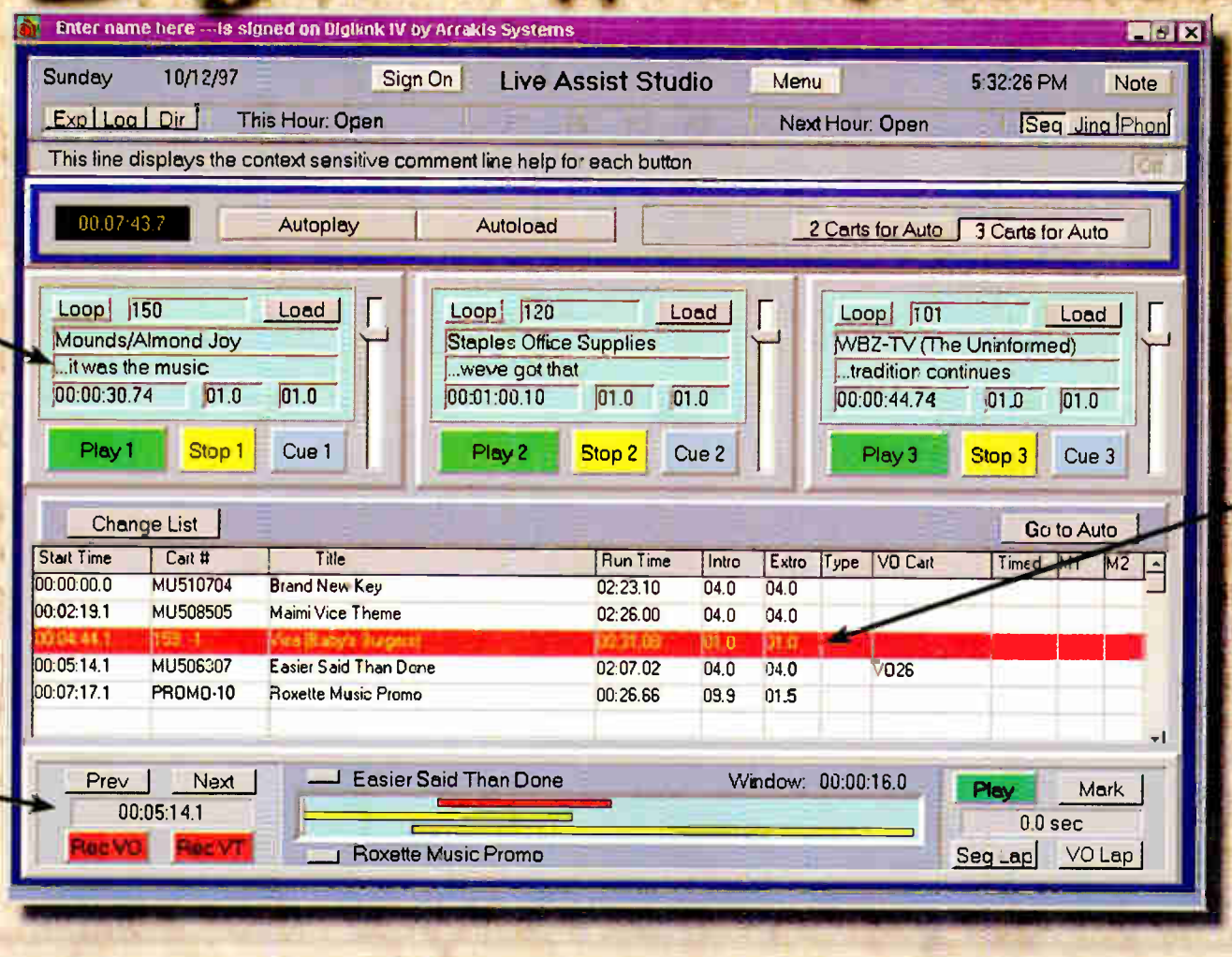

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Leslie Stimson

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More than 1,300 companies are exhibiting their wares at the LVCC and at the Sands. Reported attendance last year topped 100,000 for the first time.

Visitors to NAB '98 will see and hear the most powerful people in broadcasting and technology.

Steve Jobs, co-founder of Apple Computer, will deliver the keynote address at the All-Industry opening ceremony on April 5. Apple Computer sparked the personal computer revolution in the 1970s with Apple II, and reinvented the PC in the 1980s with the introduction of the Macintosh.

Jobs co-designed the Apple II, led the development and marketing of the Macintosh, and oversaw the growth of Apple into one of the most well-known, and most scrutinized, computer companies in the world.

NAB President/CEO Eddie Fritts will deliver his annual "state of the industry" address just before Job's speech.

New FCC Chairman William Kennard will speak at the FCC Chairman's Breakfast, part of the Broadcasters' Law and Regulation Conference. Kennard is expected to share his regulatory priorities for 1998, for broadcasting and other electronic media.

All five FCC commissioners, including its four new members, will be in Las Vegas as part of the Broadcasters' Law and Regulation Conference. In a special Regulatory Dialogue, subjects at the forefront of broadcaster business plans and the government's regulatory agenda will be discussed, including station ownership consolidation, minority ownership, EEO and the transition to digital broadcasting for radio and TV.

Las Vegas Skyline

DTV and DAB

Several notable speakers will appear. Mitchell Kertzman, chairman and CEO of software company Sybase, will deliver the MultiMediaWorld keynote address. ABC President Robert Iger will give the keynote speech at the TV/TVB Joint Luncheon, part of the Television Management Conference. Iger is a 23-year veteran of ABC with experience in virtually every aspect of network TV. He is responsible for all broadcasting and cable-related operations of The Walt Disney Company.

By virtue of its size, the television industry gets a lot of attention at the annual spring convention, and this year the onset of digital TV will turn up the volume even more. But radio people will find their days full.

The 10 winners of the 1998 NAB Crystal Radio Awards will be honored at the Radio Luncheon, to be held on the second day of the RAB Management/RAB Sales and Marketing Conference.

"Radio leads the way in public service. It is with great pride that the NAB recognizes stations for making a difference in the communities they serve," Fritts said.

Likely topics to be on the minds of radio managers and engineers will be the industry's recent sales successes, its attention from Wall Street, and decisions about going digital, both in the studios and in the transmission chain. Digital audio broadcast proponents USA Digital Radio and Digital Radio Express are expected to update attendees about their progress toward an in-band system for DAB.

Hardware

The biggest concentration of radio equipment is in the North Hall of the Las Vegas Convention Center. But a number of important suppliers can now be found in the large main hall; and more than 35 radio/audio companies will show their gear in a special exhibit area at the Sands Expo Center.

More radio managers are using the Internet to gather information, about

See NAB, page 26 ▶

NAB Offers 'Dittos' To Rush Limbaugh

Chris Hamaker

Some say he resuscitated AM radio. Without question, he helped change the political discourse of America by providing a forum for conservatives frustrated with other media outlets.

The NAB will honor Rush Limbaugh as the radio inductee into its Broadcasting Hall of Fame. The induction ceremony takes place during the Radio Luncheon at NAB '98, Tuesday, April 7.

Affiliate multiplication

So enormous has Limbaugh's impact on the medium been that it is hard to remember what talk radio was like before his program debuted on Aug. 1, 1988. Conservative talk is now a staple of radio, as one by one, hosts such as G. Gordon Liddy, Oliver North, Mary Matalin and Michael Reagan have found their niche.

Limbaugh was heard that August day on 56 stations; today, "The Rush Limbaugh Show" has more than 10 times that number of affiliates. He claims listenership of some 20 million people.

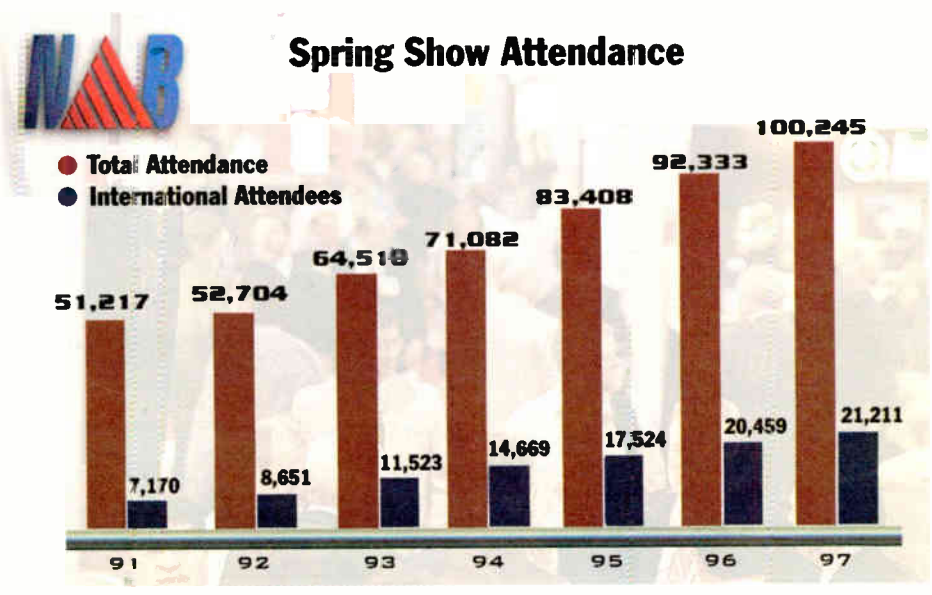
"This guy made AM radio what it is today," said Clint Sly, president and general manager of KEWS(AM) and KEX(AM) in Portland. Ore. "There is a lot more competition in that arena. There are a ton of Rush wannabes out there who are trying to be who he is."

John Butler, operations manager at WMAL(AM) Washington, said, "He has redefined the function and the *modus operandi* for the talk show host, and he continues to redefine himself as the issues and the landscape changes. In some cases, he's been able to redefine the argument. The more politicians say, 'It's the Rush Limbaughs of the world who are making trouble,' all they're doing is empowering him even more."

Rush Limbaugh

Limbaugh's dominance in the realm of talk radio spawned "The Rush Limbaugh Morning Update" — a complementary radio feature — as well as a monthly newsletter with more than 400,000 subscribers, and

See LIMBAUGH, page 30 ▶



Convergence in the Desert

▶ NAB, continued from page 25

their competitors, possible vendors, jobs and industry news. Much of what a station manager would need to know about the Internet will be discussed at NAB '98. Internet sessions and demonstrations will occur within conferences and as part of MultiMedia World, where attendees can see multimedia product and services: CD-ROM, animation and graphics, digital video, Internet and online services, video compression and encoding/decoding tools.

The 1998 MultiMedia World is at the Sands Expo Center. Sessions will cover the challenges of doing business on the Web as well as demonstrations of the latest Web technology.

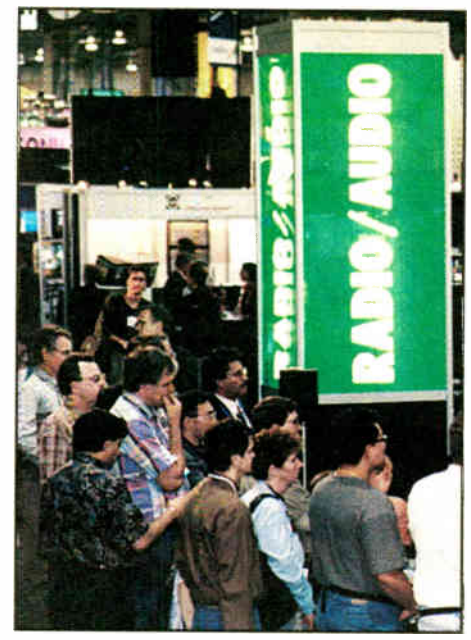
MultiMedia World will comprise two conference programs, "New Media Professionals Conference" and the new "Internet Technologies and Applications Conference." The former offers an overview of technologies and ideas from experts on ways to develop professional content for the new media. Business sessions will focus on trends and investments, while creative sessions will offer success stories.

New this year is a telecommunications and satellite conference, called "NAB Communications and Connectivity." Two programs are included; the first offers examples of how businesses can benefit from advanced fiber optic, satellite, wired and wireless technologies. The other covers mobile satellite applications, investing in space-based technologies and opportunities for newsgathering.

The technical side

The Broadcast Engineering Conference offers numerous opportunities to learn about digital trends.

"Digital Sound Broadcasting: Worldwide Expectations and Progress" will cover the Eureka-147 system, satellite DAB and IBOC DAB. "Building the Digital Station" will focus on how to design digital studios and the tradeoffs involved in the age of consolidation.



Radio/Audio Hall at NAB '97

On the facilities side, "Broadcast Towers: Managing Your Vertical Real Estate" will address the tower siting issue, the need for towers to accommodate new services, and tradeoffs between structural loading and structural strengthening.

For an update on spectrum issues, EAS, RFR and unattended operations, go to "Hot Topics: Regulatory Issues in the Real World."

Those interested in any facets of radio management, programming, promotions and production should attend the Radio Management/RAB Sales and Marketing Conference.

Distinguished service

Popular conservative talk host Rush Limbaugh will enter the Broadcasting Hall of Fame at the NAB Radio Luncheon. According to "Talkers Magazine," Limbaugh is now the highest-rated national talk show, carried by more than 600 stations. Limbaugh is a two-time recipient of the NAB Marconi Radio Award for syndicated radio personality of the year.

Tribune Broadcasting EVP James Dowdle will receive the 1998 Distinguished Service Award at the All-Industry Opening. Dowdle began his career in 1956 by selling ads for the Chicago Tribune.

The technical side of the industry will be honored with the Radio Engineering Achievement Awards, to be handed out at the Technology Luncheon of the Broadcast Engineering Conference.

May we help you?

Various on-site services can help attendees plan their day. Throughout the LVCC and the Sands, monitors will display the key events.

In this issue of **RW**, you'll find listings of companies that serve radio and audio attendees, and articles to help you choose useful seminars.

At the show, look for the official NAB Daily News, prepared by the staffs of **RW** and its sister publications. NAB Daily News is published in two editions, both morning and evening.

The NAB publishes two important show guides for attendees: One is a program guide with show overview and session information, the other is a listing of exhibitors with booth information.

28

HE DARED TO GO THERE.

Radio: The State of the Industry

Lynn Meadows

As radio operatives arrive in Las Vegas for another spring convention, the talk undoubtedly will center on selling. But this year, radio is not about selling stations — it is about how best to sell time.

The past 12 months have witnessed new heights of consolidation activity. Industry giants like American Radio System, Viacom, Paxson Communications and SFX Broadcasting have fallen to consolidation. Others have shed familiar names: Westinghouse is now called CBS, and Evergreen Media and Chancellor Broadcasting morphed into Chancellor Media.

"The big issue is operating the stations that have been accumulated," said Richard Blackburn, president of Blackburn & Company. "The industry continues to work toward beating that mystical 7 percent piece of the total advertising pie."

The news is good on that front. The Radio Advertising Bureau reported that 1997 earnings reached an estimated $13.646 billion, a 10 percent increase over 1996. The industry finished the year with its 64th month of radio revenue gains. With cable, television and other advertising industry figures still out, it was not known at press time whether the record earnings broke the 7 percent barrier.

"All indications are that radio sales are outpacing general advertising revenue," said RAB President and CEO Gary Fries. The total number of advertising dollars is an elusive number and apt to fluctuate depending on whether items like bus advertising or Internet advertising is counted. The number is estimated to be about $187 billion.

Radio rates

Advertiser demand for radio is strong, said Lyn Strickler, executive vice president of Philadelphia-based Harmelin and Associates, which buys time for advertisers. Strickler said consolidation had not affected rates as far as firming them up. She said companies are a little hesitant to up their rates, although they are now able to "own" certain demographics.

Their reluctance, said Strickler, stems in part from not wanting to upset advertisers, and in part from not wanting to attract the attention of the Department of Justice. Strickler said she thinks groups could almost double their rates and the demand would still be strong.

For now, advertisers are taking advantage of the long-promised economies of scale. Although Strickler did not consider it a trend, she said she has noticed groups of stations willing to make deals to gain total share of advertiser budgets.

Richard Ferguson, CEO of Cox Radio, former NAB Radio Board chairman and now Joint Board chairman, said radio is doing "outstanding" from a financial health standpoint. As proof, he cited high station sale prices and healthy radio group stock prices.

Heftel is a good example of stock success. Its stock started the third quarter of 1997 at $75 3/4 per share. The stock split in December; six weeks into the new year, it was selling for $46. That same day, Clear Channel Communications Stock closed at $89 1/16.

"I think people are bullish about 1998," said Ferguson. He said he has heard the excitement about finding new business for radio. In most markets, Ferguson said, there are more formats today than there were several years ago. Ferguson pointed to disruption of the workplace, as stations jump through the balance sheets of several different owners, as a difficulty.

John Casciani is owner of country station WNUC(FM) serving Buffalo, N.Y., the last stand-alone FM in that market. He said his station is worth much more than it was before the Telecommunications Act of 1996. After the act passed, Casciani expressed his expectations that spot rates would increase as major groups carried radio to new heights. In Buffalo, he said, rates have gone down in some cases.

The job at hand

"This has been a good year for radio in general, but the job that has to be done is yet to be done," said Casciani. He said management in the large groups must convince advertisers to pay what the medium is worth, like they do in television and newspapers. In Buffalo, he said, they are still working the old way: going after each other and taking whatever the traffic will bear, instead of fighting other media.

E.B. Hawkins, owner of WILM(AM), a 1 kW news station in Wilmington, Del., said he has had a banner year because the station is holding rates.

"I am more sure than ever that sticking to content-driven radio and holding rate absolutely is going to guarantee our long-term success and stability," Hawkins said.

He said the early benefits touted by proponents of consolidation, such as the ability to cut costs, make radio more creative and excite the public about radio.

"It's been my observation that most of those did not occur, and that the majority of controllers fell back on the old American standard of 'if in doubt, cut costs, cut prices, show profit,'" said Hawkins.

Hawkins said an advertiser told him he could not even get a rate card from one of his competitors. That makes it impossible for the advertiser to plan, said Hawkins, who added that if an advertiser cannot plan, he or she is going to consider radio a problem.

Some groups have tried to organize their sales department by account, using one representative to show three stations to an advertiser, said Ferguson. The result is that gross revenue tends to go down, he said.

Some stations found they could get more money by having more people call on the same account. When he operated NewCity Communications, Ferguson experimented with the combined sales department. Cox Radio recently split its sales departments in Birmingham, where it owns an oldies station and a country station. The oldies station already is starting to do better, said Ferguson.

"I do think it's still pretty early," Blackburn said. "Not everybody has figured out how they are going to sell."

Business is good

"We've done about 10 years of business over two," said broker Gary Stevens. "We now see what this business is going to look like going forward." The question now, he said, is whether big groups can run all their stations.

The Department of Justice remains a presence. The fact that DOJ now takes a major oversight role "speaks volumes," said Stevens. "That means we're big time."

In November, Justice sued to block the Chancellor Media acquisition of SFX properties on Long Island. A Justice spokeswoman said no litigation date has been set, but Sept. 17 is the expert witness cutoff date for both sides.

As its largest convention opens, the NAB itself is watching other issues closely. Free air time promises to be a hot topic this year. In his State of the Union address, President Clinton called for the FCC to adopt free airtime for candidates. The NAB believes this should be the jurisdiction of Congress.

NAB spokesman Dennis Wharton said the NAB believes that broadcasters already offer thousands of hours of free airtime to candidates by airing debates, providing news coverage and doing candidate profiles.

Wharton also suggested that in-band, on-channel digital radio developers appear poised to deliver later this year, making digital radio a hot topic once again. Hard-liquor advertising, a big issue this time last year, appears to be a non-issue now in part because many broadcasters refuse to air hard liquor ads. Other topics include regulatory fees, which the NAB abhors but which are unlikely to go away, and ad tax deductibility, which remains a sleeping giant so far in this session of Congress.

Some Useful Numbers

The following numbers and Web address may come in handy during your stay in Las Vegas. The area code is 702.

www.lasvegas24hours.com

WHEELS
Citizen Area Transit: 228-7433
Whittlesea Bell: 384-6111
Yellow Cab: 873-8012
Presidential Limo: 731-5577

McCarran Airport

SAY HI
Las Vegas Welcome Center: (800) 821-6624
Las Vegas Convention and Visitor's Authority: 892-7585

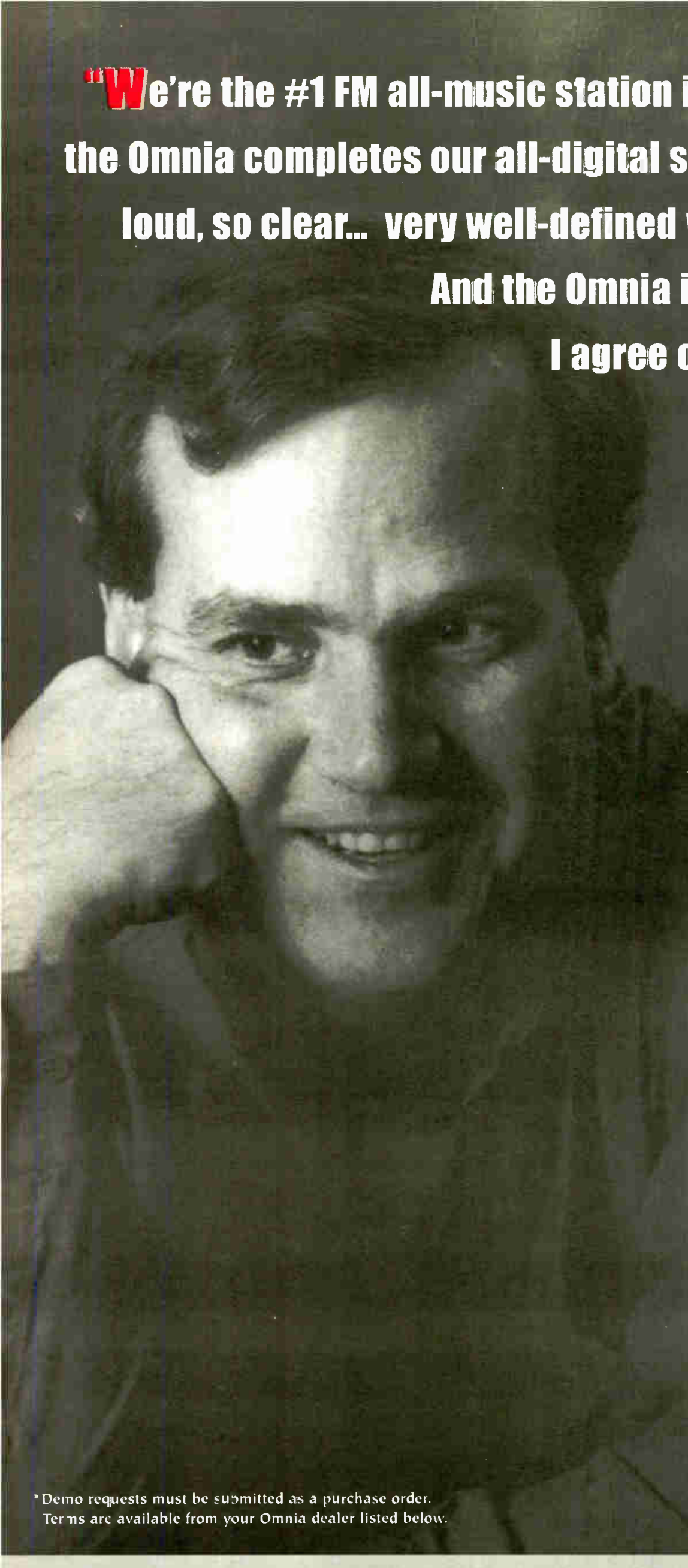
CLEAN CLOTHES
South Phillips Cleaners, 24-hour: 733-1043

CARS AND GUNS
Las Vegas Mini Gran Prix: 259-7000
The Gun Store indoor range: 454-1110

'CHEESY' RESTAURANT
Boston Pizza: 385-2595

HEALTH CARE
University Medical Center: 383-2000

MARRIAGE IN A JIFFY
Clark Co. Marriage License Bureau: 455-4415 (Hours: 8 a.m. to midnight daily. License $35. No blood test, no waiting period.)



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

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BSW Broadcast Supply 7012 27th Street West Tacoma, WA 98466 Tel: 800.426.8434 Fax: 800.231.7055 www: info@bswusa.com
Crouse-Kimzey Company P.O. Box 155999 Fort Worth, TX 76155 Tel: 800.433.2105 Fax: 972.623.2800 www: sales@proaudio.com
Radio Communications Unlimited 5503 Barrington Ooltewah, TN 37363 Tel/Fax: 423.396.3743

See Us at NAB Booth # RL3630

Circle (171) On Reader Service Card

Limbaugh Lauded at NAB '98

▶ LIMBAUGH, continued from page 25

two books that sold a combined 8.9 million copies: "The Way Things Ought to Be" and "See, I Told You So."

It also gave birth to a half-hour TV program, no longer on the air.

Limbaugh landed his first radio job in his hometown of Cape Girardeau, Miss., at age 16, and subsequently worked radio gigs in Pittsburgh and Kansas City.

It was Edward F. McLaughlin who "discovered" him. Limbaugh had returned to radio as a political commentator after a stint with the Kansas City Royals sales organization, but it was not until McLaughlin heard Limbaugh, by then a talk show host in Sacramento, Calif., that Limbaugh found a national following.

"He was talking about national issues, world issues — and it was working in Sacramento. People were calling in and the phone lines were jammed. He was just hitting their hot buttons," McLaughlin said in a 1996 interview with **RW** correspondent Alan Haber.

Best yet to come?

Limbaugh's huge listenership is matched perhaps by the intensity of his detractors. Ever since Limbaugh began to dominate the talk radio scene, critics have pronounced the imminent demise of their vocal opponent.

Don't tell that to Mike Rose, assistant program director at Limbaugh affiliate WGST(AM) in Atlanta.

"When you have his kind of ratings, if he's peaked, I'll take his peak over somebody else's growth. He's peaked at a very high point. No one reaches our target demographic, men 25 to 54, better than Rush."

WGST tinkered with its talk format last year, trying out a short-lived experiment called "Planet Radio," designed to better compete with WGST competitor WSB. Limbaugh has been the linchpin of the WGST line-up throughout the changes, and Rose said there's a simple reason: "If everyone here had the numbers of Rush, we wouldn't have any problems."

Sly said AM broadcasters "would give their left arm to have him on their radio station, especially if he was on their competitor."

Numbers game

Limbaugh's numbers at KEWS have been strong since the station began airing the program last August, Sly said. He expressed optimism about Limbaugh's future numbers, which he predicted would see a bump up due to the White House intern scandal.

"Sometimes his topic matter is more interesting when there's something to feed it, like Monica Lewinsky," Sly said. "Rush is always interesting, but there's a more heightened awareness of what he's doing ... when there's (news) that's really fun. The Lewinsky case is just perfect."

Rose was equally optimistic about the future of the Limbaugh show. "I'm gonna be the last person in the world who would ever say that Rush Limbaugh has any kind of half-life," Rose said. "I don't know if we've even reached the half-life for Rush Limbaugh yet."

FAIR: No Kind Words For Rush

A senior analyst for the media watch group Fairness and Accuracy in Reporting, a stalwart opponent of Rush Limbaugh, expressed extreme disappointment upon finding out that the NAB plans to induct Limbaugh into its Broadcasting Hall of Fame.

Steve Rendall, who also co-authored "The Way Things Aren't: Rush Limbaugh's Reign of Error," said, "It is absolutely an embarrassment that any professional organization would induct Rush Limbaugh into its Hall of Fame. Was the racist and anti-semitic Father Coughlin inducted? He's another disgraceful guy who had huge numbers, huge. They made Limbaugh's numbers look like nothing. We're talking about 40 million listeners on a single Sunday night program. ... Huey Long ... had 40 million listeners on Sunday night.

"If the only criteria for making it into the NAB's Broadcasting Hall of Fame is huge numbers, these guys should be there way before Limbaugh.

"Limbaugh is a regular disseminator of misinformation and disinformation, and I would go so far as to say he is a regular liar.

"I think the NAB has done tremendous damage to our public space and to Americans' rights to their own airwaves. I think the NAB's lobbying for the Telecommunications Act of 1996 was disgusting, and I think the fact that we didn't have a Congress that actually gave a damn about the people and the people's possession, that is the airwaves, is an even bigger disgrace."

— Chris Hamaker

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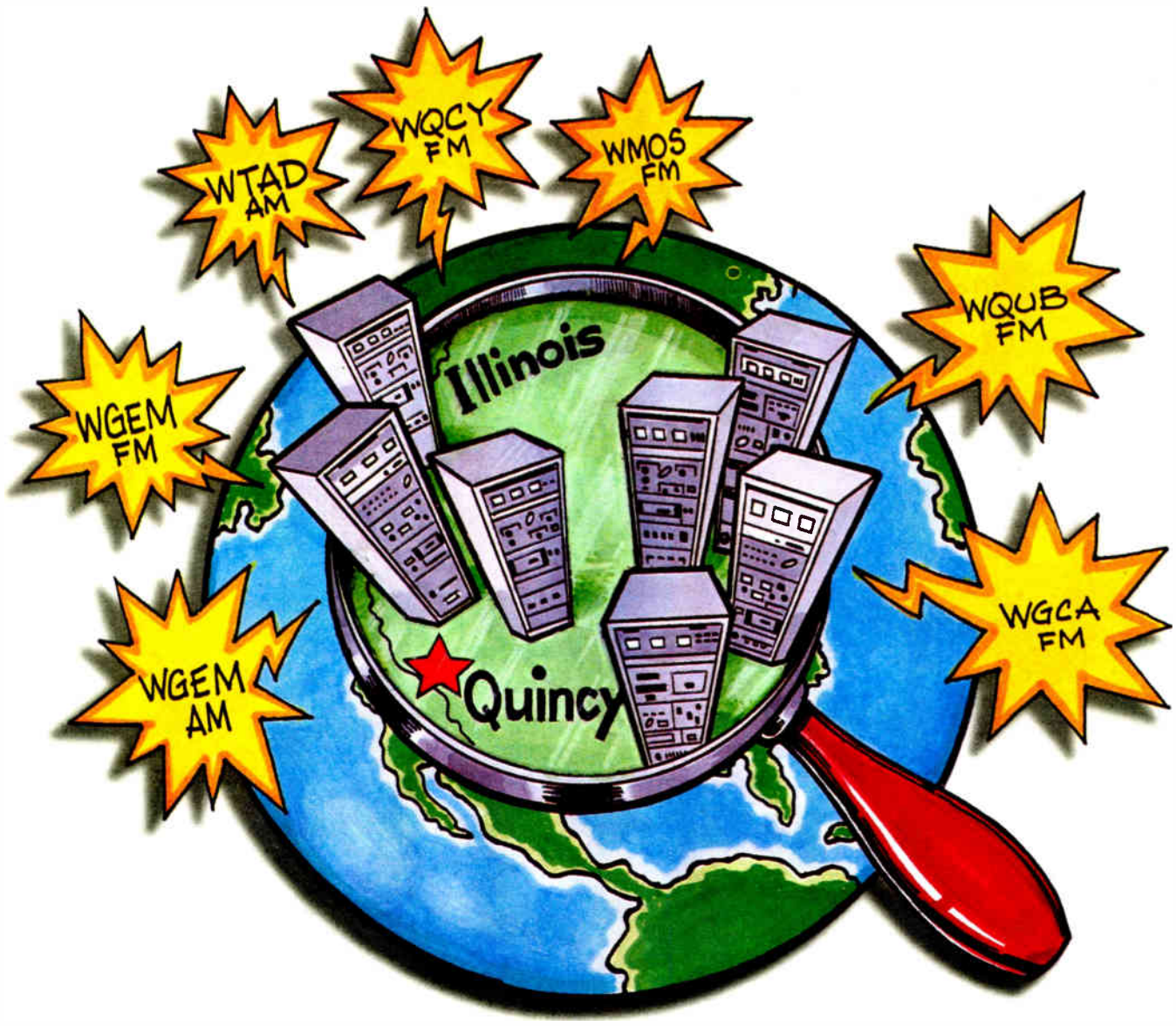

Radio Transmitter Manufacturing Capital Chooses Harris.

Broadcasters understand the significance of 100% market share. It's often pursued and rarely achieved. It means that you know your customer's needs... Your quality standards are extremely high...And, you are ahead of the competition by leaps and bounds.

Quincy, Illinois is the world capital for radio broadcast transmitter manufacturing. It's also a place where you can go across town to check out a company's quality standards and demo new products before making a buying decision.

With this convenience easily at hand, all radio broadcasters in Quincy have chosen Harris transmitters— hands down. In addition, nineteen other Harris transmitters are the choice in the local Hannibal, MO and Keokuk, IA areas.

All of Harris' transmitters are manufactured under strict ISO 9001 quality control standards which means we take great pride in the products we deliver to our customers. In addition to this, we support all of our product lines with a 24-hour service number so you can call anytime day or night. We are a total solutions supplier who can update or completely renovate your radio studio facility from beginning to end— or supply anything in between.

This is what you get when you deal with a company that has been in the radio broadcast industry for over 75 years— longer than any other U.S. radio transmitter manufacturer.

When it comes to choosing the best quality, value, and service, it all boils down to one simple fact that Quincy engineers have come to realize: There's a big difference between ordinary and ***extraordinary*** which can also be the difference between 0 and **100%** market share.

Most recent world firsts in radio broadcast

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- **1991: Harris demonstrates prototype digital FM exciter**
- **1993: Harris introduces DIGIT, world's first digital FM exciter**
- **1994: Harris introduces AES3 input module which allows DIGIT to directly accept digital studio standard audio**
- **1996: Harris introduces Platinum Z FM transmitter and DIGIT CD digital FM exciter**
- **1997: Harris introduces world's first *uncompressed* digital 950 MHz STL**

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SBE NEWS

Ennes, NAB Present Boot Camp

Richard Farquhar

Six times a year, RW provides space for the Society of Broadcast Engineers to inform our readers of activities at the society.

I recall the story of a young man's first teaching assignment. He was extremely nervous. As the sun was just peeking over the horizon, he awakened his wife and stood at the foot of the bed.

"Well," he said, "I'm ready to teach. Check me out before I leave for school."

"It's too early," his wife muttered.

"Come on, this is important. Look, my shoes are shined; my suit is fresh from the cleaner; my tie is spotless; I have two black pens and one red pen; there's a ruler and glue and extra paper in my briefcase; and I have my schedule taped on the inside cover of my book. I am ready to teach!"

"Not quite," yawned his wife.

"What do you mean?"

"You may be all set to teach," said his wife, "but teaching isn't ready for you."

"Why not?" asked the young teacher.

Replied his wife, "Today's Saturday."

Like school on Saturday

April 4 is a date you will want to remember and, yes, it is Saturday. On that date, some of the best teachers in our industry will present a variety of interesting topics during the SBE Ennes Workshops, part of NAB '98 in Las Vegas. "The NAB '98 Radio Boot Camp" starts at 8:30 a.m. with a session titled "Critical Power Engineering."

What is that? With the proliferation of switch mode power supplies in broadcasting and production facilities, the potential impact on system integrity and operational reliability has become a significant concern. Major components of the facility could be affected. Overloaded conductors, damaged distribution transformers, overvoltages caused by harmonic resonance, generator malfunctions and induced electronic noise are only a few of the potential problems. Peter Gross of Einhorn Yaffee Prescott, one of the largest engineering firms in the United States, will lead this workshop.

Next up is "Power Conditioning." This session will provide you with what you need to know about harmonic filters, isolation transformers, line voltage regulators, motor-generator sets and uninterruptible power supplies. To have a power clean facility, you will not want to miss this session.

Richard Farquhar

Have you protected your station from lightning damage? If not, the 10:15 a.m. session on lightning fundamentals and protection will teach you to keep your plant operational during the worst of the upcoming summer storms.

What is really involved in grounding? A session on grounding techniques will cover topics such as the purpose of a ground system, factors affecting ground resistance, ground and neutral relationships in AC circuits, techniques of grounding, ground measurement methods and instrumentation. This workshop will review case studies of actual grounding situations.

The sessions on power conditioning, lightning protection and grounding will be presented by Patrick Reed, electrical engineer with Northern Technologies. Pat brings to the sessions his many years of field experience. Pat also has industry experience in RF communications designs and applications and has participated in writing standards for various industries in the areas of power and grounding.

P.M.

In the afternoon sessions, we move into transmission and antennas. Fred Riley and Dave Chenoweth will lead this workshop. Fred is the manager of the High Power Broadcast and Dave is manager of the Field Service Department at Continental Electronics Corp. As engineers we need to stay on the air. These sessions will help you minimize your down time.

The first part of this workshop will cover transmitters. Whether you are an RF beginner or an ol' salt, the maintenance procedures provided in this session on AM and FM transmitters will be something you can put to use immediately.

The next session will cover antennas. Transmitters are not efficient without a good antenna system. In the antenna maintenance session you will learn about methods to block damaging voltages, how to provide good DC ground paths, directional and non directional antennas, bandwidth considerations and tower inspections.

What do you do when your station must move? The leader of the "Station Move" session is Barry Thomas, CSRE, director of engineering of KYLD(FM) in San Francisco. This station just finished a major move and is planning another.

Phase one of the "Station Move" session will cover these topics: Are you constructing a new b
an older plant? Who
real estate agents, constr
company management? D
attorney? This session also
needs assessment. What questi
you be asking? How do you p the
move? What types and how many studios?

As engineers we need to stay on the air. These sessions will help you minimize your down time.

Phase two of the session will detail the actual design phase, incorporating offices, studios and any outside consultants you might consider. Designing your wiring plan, planning your connections, type of termination systems, building a wiring order, protocol decisions and documentation are just a few of the topics covered in this session.

Phase three of "Station Move" will cover the physical construction techniques and the move-in. This session also will use a case study of KYLD in San Francisco.

It is my pleasure to be moderator of this high-profile, highly informative Ennes Workshop. Why not join us at 8:30 a.m. for the start of the program? Each program will build upon the other, so you will not want to miss anything. You must be a registered NAB '98 attendee to take part in these sessions. If you are a member of SBE, you can register at NAB member rates. For registration information, contact NAB at (800) 342-2460. You can also receive registration information on the NAB home page at *www.nab.org/conventions*

See you in Las Vegas.

■■■

Richard Farquhar is CPBE and Ennes Educational Director.

Webcasters and the 'Net Hot Topics at NAB '98

Peter M. Zollman

If you are interested in broadcast Internet services or Webcasting, and you are headed to NAB '98, get there early.

You'll find plenty of information and lots of exhibitors showing computer and Internet tools. But some of the most promising sessions about Webcasting and building your business on the Internet are scheduled at the beginning of the convention.

On Saturday, April 4, NAB will offer its popular "MultiMedia Boot Camp." It kicks off the New Media Professionals Conference of NAB MultiMedia World. The goal: "to offer an overview of the technologies leading toward ideas from experts on ways to develop and produce professional content for the new media."

On Sunday, you can follow up the boot camp with the three-part, back-to-back Internet and broadcasting sessions: "Extending Your Franchise," "Winning on a Global Playing Field" and "Revenues, Expenses and Profits."

ASSOCIATION for INTERACTIVE MEDIA AIM

"These sessions will be very practical," said Andy Sernovitz of the Association for Interactive Media.

"Since last year, things have changed. The Internet isn't just a theory, and interactive media isn't something that tangentially affects broadcasters. It now affects broadcasters and

See INTERNET, page 34 ▶

Show Offerings Reflect Boom in Internet

▶ INTERNET, continued from page 33

their customers directly.

"Consider this: More people now have Internet access in the United States than the number who owned TVs when we landed on the moon."

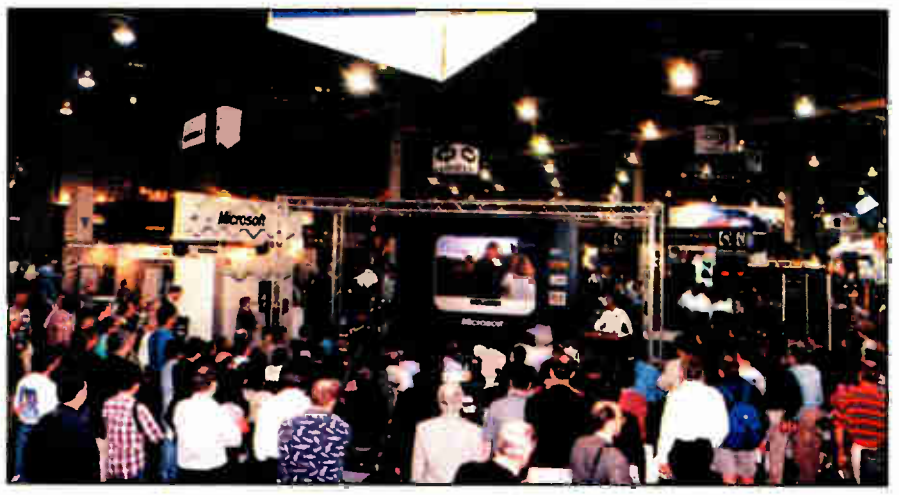
Sernovitz is scheduled to moderate several panels, including a session on "Thinking Interactively" and another on "What Will Win With Consumers."

Internet Theater

The keynote speaker at NAB MultiMedia World is Mitchell Kertzman, chairman and CEO of Sybase Inc., who will speak on the role of technology in traditional broadcast and on computer issues relating to convergence between telecommunications, broadcasting and the Internet.

Dominated by Microsoft but offering other meaty programs as well, the Internet Theater at the show will offer the following topics each day, Monday through Thursday:

- An introduction to Web TV, at 10:15 a.m.



Internet Theater at NAB '97

- NetShow solutions enabling commerce, advertising and content management, at 12:30 and 2:45 p.m.
- Adding streaming media to your Web site with NetShow 3.0, at 2 p.m.
- Ongoing support for Web professionals: the Site Builder Network, at 4:15 p.m.

Also at the Internet Theater, attorney Neal Friedman will offer advice on "avoiding potholes on the information superhighway" Monday at 11 a.m.; Adam Sharp of Assets New Media Corp. will preview 1998 elections Tuesday at 3:30 p.m.; and Dan Naden and Rick Wessels of Internet Broadcast System will discuss successful TV stations on the 'Net Thursday at 11 a.m.

Tune in TV

Just because a session has TV in its name, by the way, doesn't mean you should pass it up. On the Internet, successful radio strategies and successful TV strategies are pretty similar. After all, *neither* is true television or radio.

Andy Sernovitz

If you want to see the latest powerful products, you certainly can. NAB has signed up some 1,300 exhibitors, split between the gargantuan Las Vegas Convention Center and the smaller but still massive Sands Expo Center.

Many of those exhibitors will target new-media areas: At least 25 listed themselves in the category of "online services/interactivity" in the NAB exhibitor roster, and more than 200 exhibitors told NAB that they offer computer-related products and services.

■ ■ ■

Peter M. Zollman (pzollman@aol.com) is a consultant in interactive services based in Altamonte Springs, Fla.

NAB '98 Focus: Radio Management

James Careless

Among the benefits of a trade show is the chance to hear and swap ideas from your peers. Those opportunities are significant at the Radio Management Conference at NAB '98.

Sunday, April 5, NAB offers the "Chart a Course Through NAB '98 Exhibits" session. Moderated by Dick Maynard, who owns KEKB(FM) in Grand Junction, Colo., this session will spotlight some of this year's most compelling displays. It is designed as a "crib sheet" for deciding which exhibits radio broadcasters should not miss.

John Lund

Swapping stories

At the same time, small- and medium-market broadcasters may want to send their staff to "Small/Medium Market Idea Swap98." Moderator Gary Grossman, the general manager of KRKT(AM)/KRKT-FM in Albany, Ore., will lead delegates in swapping their best ideas for making and saving money, and finding and keeping talent and management.

On Monday, April 6, the Radio Management Conference resumes with "Creative Ways to Recruit and Train Your Staff."

Network radio host, TV host and Los Angeles Times syndicated columnist Kim Komando speaks on "Webcasting: Ready for Prime Time."

"Webcasting has become the latest buzz word in radio stations across America and around the world," Komando said. "It sounds simple, and on the surface, it is. However, there are plenty of technical, programming, legal and marketing considerations to be thought through before you jump into Webcasting. I'll cover them all."

One warning: "Don't expect to generate any big bucks jumping into Webcasting now," said Komando. Webcasting is, at best, "an investment in the future."

O'Day discussion

After lunch, noted radio producer Dan O'Day will discuss "Ten Key Ingredients to Creating Effective Commercials," while the challenges of consolidating multiple radio stations are tackled in "The Multiopoly Manager."

"Ten Great Radio Promotions" is moderated by Maureen Bulley, president of Toronto's "The Radio Store" radio-only agency.

This session will "provide participants with promotional ideas they can take home and implement immediately," she said. Bulley also wants to sensitize station managers to the need to maximize their promotional budgets, in order to achieve their audience and revenue goals.

Kim Komando

Consultant John Lund will discuss "Time Management for Radio Managers." Lund will spend two hours detailing how to get a grip on your time management challenges, and "stay organized after getting there," he said.

This is no mean feat, but one that cannot be avoided. "Today's biggest challenge in an age of duopoly and multiopoly is managing one's time and other people," said Lund. "With multiple responsibilities and stations to program, today's GMs and PDs must practice time management skills and empower staff people as specialists to meet goals."

The final radio management session is "The Seven E-Mail Habits of Highly Productive Broadcasters," hosted by Mike McDaniel, owner of WBTO(AM)/WQTY(FM) in Linton, Ind. This presentation will explain how to send commercials via e-mail, use discussion groups to promote your station, and how to develop an e-mail newsletter.

Tuesday, April 7, is devoted to the NAB Radio Luncheon and the traditional Radio Opening Reception. The NAB Radio Luncheon includes the announcement of the annual NAB Crystal Radio Award winners. As well, colorful broadcaster Rush Limbaugh will be on hand to be inducted into the NAB Hall of Fame.

The Radio Opening Reception is a chance for radio broadcasters to relax, renew contacts, and digest what they've learned over the past three days.

■ ■ ■

*James Careless is a frequent contributor to **RW**.*

Financial Workshop Sessions on Tap

On Sunday, April 5, the BCFM Financial Management Workshops offer two sessions to interest money-minded broadcasters. The first is "Wall Street and the Broadcaster." It will feature experts from both sides to examine the market's view of the future of radio, and the chances broadcasters have for generating public funds.

"The Internet and Broadcasting III: Revenues, Expenses and Profits" will look at ways to draw people to your Web page, how to generate revenues, manage costs, and perhaps make a profit.

Construction At the Show

Attendees will notice construction this year. The Las Vegas Convention Center is expanding its North Hall toward the neighboring Hilton and Paradise Road. When that work is done, in time for NAB '99, the North Hall will reach Paradise Road, adding approximately 275,000 gross square feet of exhibit space and extra meeting rooms. The work will allow show planners to reunite all radio/audio exhibits next year.

To reach the Hilton from the LVCC this year, attendees must follow a canopied walkway accessible from the LVCC lower concourse. Also, the construction on what was Convention Center Drive means taxis, buses and cars must follow new routes, which will be marked. To catch a taxi as you leave the LVCC, turn left as you exit, walk past the shuttle buses and find taxis at the south end of the facility. Another option is to leave the LVCC via the back of the building, where taxis also await.

Show parking should be easier this year. A new Gold Lot with 2,700 spaces is located across the street, on the site of the old Landmark Hotel, for the use of attendees who drive to the show.

Construction also will be visible at the Sands, which is adding the 3,000-room Venetian Hotel next door. NAB planners say that work will limit parking there. The NAB has made arrangements with the Sands for overflow parking.

Tech Expectations at the Big Show

Broadcast Industry Experts Tell RW What They Think Will Be Interesting at NAB '98

Val Davis

The changes in broadcast technology in the last two decades are nothing short of mind-boggling. Consider the studio facility. In the last 18 years, we've gone from vinyl and tapes, to CDs, MiniDisc and hard drives.

In 1975, a radio station might have been automated with three carousel-type cart machines and four reel-to-reel decks, controlled by a "chipper" system that read cards with holes punched in them. A light would shine through the cards; depending on where the holes were, it would activate photo cells to trigger a specified audio device.

Now a large percentage of the radio stations in America are using hard-disk music delivery systems. Nothing visible spinning, no album or CD covers —just a clean stream of audio out of a PC and onto the airwaves.

Where is the broadcast industry going? Where will we be this time next year? How about 10 years from now? For the answers to these and other questions, I asked more than 300 broadcast professionals this question: "What new trends or new technologies will we see at NAB '98?"

Answers were varied. However, the top three can be grouped this way:

Consolidation As broadcast corporations begin to slow in their buying sprees, they will be under pressure to show profits from these large acquisitions. In many cases, these corporations own large numbers of stations in one market. Respondents said a trend will develop in moving these stations into one facility, where they can be tightly managed with minimal staff. Any technologies that support these consolidations will boom.

Digital The trend toward digital audio will continue to pick up speed as stations continue to move to music on hard-disk systems, install digital audio consoles and make more use of digital audio workstations in the production room.

'Internet access and transport will be the next major shift in our industry.'

— Ron Erak

The Internet Many new companies will spring up to show radio stations how to use the World Wide Web to their advantage. The Internet will be used for a range of functions, from corporate correspondence to listener contest registration to program content delivery.

Indeed, many of these trends are well under way in radio.

Here are the experts, in their own words, anticipating what we will see at NAB:

"I expect the focus to be on technology; primarily on how stations can utilize the Web to not only serve the needs of listeners, but gain new ones and also to gain a stronger core base. The networking of station functions will grow between group-owned stations, not only within the same building but in other cities as well. Now that computers are small ... they will get big again, as groups opt for massive centralization of storage and operations."

JR Russ
Independent Consultant

'I pray there will be a plug-and-play all-digital studio operation.'

— Walter Sabo

"Continued interest in digital audio in the studio, from production workstations to automation. The quality is getting better and the programming is getting more sophisticated and reliable. (There is also) interest in how digital transmission is progressing, especially IBOC."

Jay Mitchell
Jay Mitchell Associates

"Probably radio consolidation will continue to be a trend to watch. As more and more stations are gobbled up by big and small companies ... more and more radio people are finding themselves either facing more management responsibilities or being let go. For those that stay and take on the responsibilities of operating/managing three, four or even six stations in a market, continued training is a must. And what about the production director who went from a two-station operation to a five-station-or-more group? Those folks will burn out in a short time."

Mike Carta
Mike Carta Productions/
Super Sweepers

Digital difficulties

"The dirty secret in technology today is that many or most of the digital delivery systems for studio on-air operations don't work. The chief engineer must spend months actually bringing them to spec. I don't know what we'll see at the convention, but I pray there will be a 'plug-n-play' all-digital studio operation. For now, I lust for carts."

Walter Sabo
President
Sabo Media

"Biggest trend: movement of all size market stations to hard-drive delivery systems. Improves quality, cuts overhead, increases consistency. Those who have tried a satellite-type delivery system are unhappy with the lack of customization and control."

Bob Lowry
President
Lowry & Co.

"Trends ... more consolidation (especially in medium and smaller markets). More unattended dayparts, hence ... more digital systems will be sold."

Keith Hill
Hill & O'Malley Consultants

"For this year's NAB, digital *everything*! The ability for more computer integration into daily programming, production and intra-netcasting will be the hot technology up for review."

Harvey Blain
President
Blain Consulting

Voices on the 'net

"The hottest new technology this year will be Internet Phones tied to radio stations. Many stations will start replacing jocks with Internet jocks at a huge savings. The Internet Phone technology is not new, but is being applied in a new way.

"The jocks can work from home and only need basic audio equipment and ISDN phone lines for the clearest transmission of voice-to-Internet-to-radio. Plus, a talent in Chicago could do mornings in L.A. at a fraction of the studio, satellite and digital costs normally involved. This will compete with the new 'Virtual Radio' stuff currently being marketed from a couple of companies."

"Howard"
Publisher
iRADIO

"The common denominator for all these broadcasters these days is to be able to do more, spend less, make more money with fewer people on the payroll. It doesn't matter if they are large mega groups or small mom-and-pop operations. Most believe that digital is the answer so I think most people at the NAB this year will be looking for digital solutions for their needs that really work.

"Most of my clients are looking at things like ISDN/POTS codecs, better and cheaper digital storage devices for program audio, integrated program automation and transmitter control to allow more 'walkaway' time for operator-less stations, better more practical digital wireless equipment to replace Marti-type equipment for RPU/STL, and anything that makes it easier to operate megapolies. I also noticed some interest in new solid-state transmitting equipment because of its reduced cost of operation and reliability."

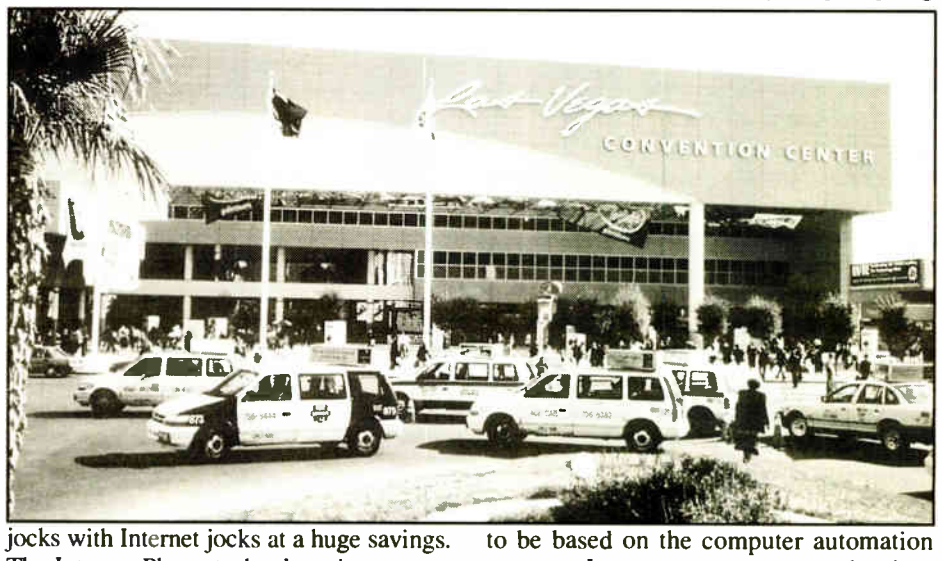
Allen Boaz
A.B.E.S.
Contract/Consultant Engineer

"I think the advent of Internet access and transport of product will be the next major shift in our industry. Once we as an industry figure out how to make it cost- effective to digitize everything from commercials to programming, to STLs, there's no reason all those things can't be compressed onto the Internet to bring the costs down even more. This paradigm shift is for all industries, not just radio. Everything virtually is linked to the 'bandwidth' issue and who gets ahold of the best proprietary compression algorithms first!"

Ron Erak
President
GMI Media Group/Seattle

Lots of computers

"The industry is going to computer-based broadcast systems. Even for the mom-and-pop operations, these systems are now affordable. Everything is going to be based on the computer automation systems. I can put a system together in a box that is virtually no more complicated than a cassette."



Robert Alexander
Sales Engineer
Hall Electronics

"I am seeing a continuing flood of computer-based systems ... more and more station automation systems out there and ... a continuing shift from analog to digital. MiniDisc is continuing to grow. I have recently seen the first digital microphone with an A/D converter built into the microphone. Consolidation seems to be a continuing trend."

Tom Roalkvam
Sales Representative
Broadcast Supply Worldwide

"I think that you will continue to see a move toward digitalization in both analog and RF transmissions. Digital television will be a major feature at the show. The major groups are in their infancy as to discovering the art of efficiency and decreasing operational costs."

John Delay
Radio Product Line Manager
Harris Broadcast

These are just a few of the many responses I received. I thank everyone for their input. Will the experts be correct? Perhaps we will find out next month. I can't wait to see where we are going.

■ ■ ■

Val Davis is a broadcast technology consultant. He can be reached at vdavis@nerds.com

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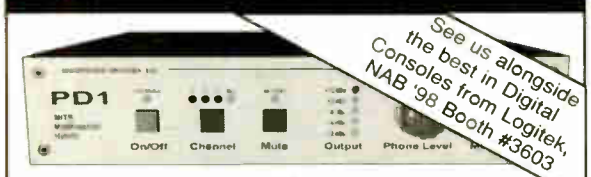

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READER SERVICE NO. 46

A Full Plate Offered at NAB '98

Here are some NAB '98 highlights. See your show program for times and locations.

Conference Key:

- **LVCC** — Las Vegas Convention Center
- **LVH** — Las Vegas Hilton
- **SANDS** — Sands Expo Center
- **RAD** — NAB Radio Management Conference at LVCC
- **BEC** — Broadcast Engineering Conference at LVCC
- **BLR** — Broadcasters' Law and Regulation Conference at LVCC, LVH
- **TELE** — Telecommunications Strategies at LVCC, Sands
- **TV** — NAB Television Management Conference at LVH

SATURDAY, APRIL 4

NAB '98 Radio Boot Camp
A focus on radio engineering issues, radio station resources. Presented in cooperation with the Ennes Educational Trust of the SBE.(BEC)

SUNDAY, APRIL 5

Radio Opening Reception
Make new friends and schmooze with the old at this welcome celebration. (RAD)

Chart a Course Through the Exhibits
Here's your chance for a sneak peek at all the goods in the exhibit hall. (RAD)

NAB/BEA Career Fair
Whether you are an employer or a potential employee, this showcase is for professionals, students and others interested in the latest trends in radio and television hiring. (LVCC)

Small/Medium Market Idea Swap 98
Moderated discussion on moneymaking ideas, tips on finding and retaining talent and more for the small and medium market station manager. (RAD)

MONDAY, APRIL 6

Consolidation Engineering Management Perspectives
Consolidation concerns, approaches to management in the "new age" of multiple facilities. (BEC)

A Conversation with Industry Newsmakers
The nitty-gritty of our industries is examined by moderator Brian Williams of MSNBC. Convergence and competition top discussions at this session. (TV)

Webcasting Ready For Prime Time
Ways to improve a station's bottom line by placing programming on the Internet, while avoiding pitfalls of the new technology. (RAD)

The Multiopoly Manager
Traditional management techniques must be tempered by the realities of today's changing environment. Find out how managers can make a difference, even in a rapidly consolidating marketplace. (RAD)

Time Management for Radio Managers
Not enough numbers on the clock for you? Prioritize and delegate responsibilities and learn how to run a station more efficiently. (RAD)

TUESDAY, APRIL 7

Annual State of Radio Sales Address
A look back at the growth rate of radio sales, and an examination of the changes to come.

Duopolies, LMAs and Ownership Changes: Acquiring Stations While Avoiding Regulatory Traps
Revised radio ownership rules can be confusing and tricky. A look at new rules and regulations. (BLR)

Building the Digital Radio Station
It's a sign of the times — and the more you know about digital technology, the better. This session focuses on studio and transmission facility design. (BEC)

Pirate Radio Stations: Will They Be Walking the Plank?
A review of the business end of radio piracy, interference issues and the positions of the FCC and U.S. Department of Justice. (BLR)

Contest, Lottery and Casino Ads — What's Legal?
Gambling is fine in Vegas, but there is a fine line between what ads and promotions you can and cannot run on your station. Find out what is legal and what is not. (BLR)

WEDNESDAY, APRIL 8

Countdown: 2000
A Telecom Technology Update
The latest in telecommunications technologies for industry professionals. (TELE)

Multi-facility Audio Networking for Radio
A look at effective program distribution among radio facilities — an issue that's come of age thanks to consolidation. (BEC)

Upgrading Your Radio Station
Options and opportunities for competition and growth; including power increases, facility upgrades and changes in license. (BLR)

Avoiding FCC Fines — Commission Rule Enforcement Primer
Learn the "hot list" of potential violations stations could be fined for as well as the latest on the FCC's enforcement policy and new base fine structure. (BLR)

THURSDAY, APRIL 9

Consumer Electronics for Digital Broadcasting
A glance at the consumer electronics industry and digital broadcasting services. (BEC)

(Anti-Panic Device)

Studer On-Air 2000
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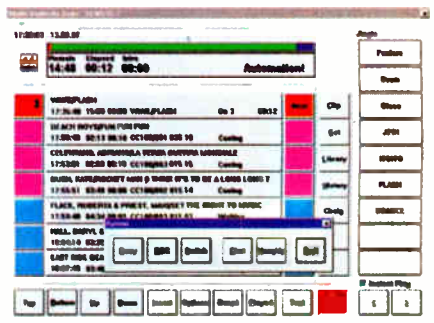

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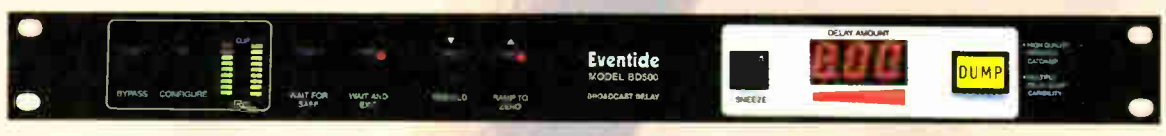

Want to increase creativity without adding personnel? Add life to drive-time shows? Win new advertisers with better station-produced spots? An **Eventide Ultra-Harmonizer®** brand effects processor really does all that. Designed specifically for radio and production, the new DSP4000B Ultra-Harmonizer features radio effects designed by production whiz Jay Rose. Hundreds of comic voices, sound effects, reverbs, pitch changers and more are instantly accessible at the touch of a button. Plus, the DSP4000B has superb Timesqueeze® time compression /expansion capability. Shorten a 60 second national spot to allow for a local tag. Squeeze or stretch a music bed to fit the spot. The DSP4000B has optional digital I/O to interface easily with digital editors and consoles. It's the radio effects box designed to bring stations more business and more listeners.

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A Focus on Consolidation, Digital

Mark Croom

When you've been to a few trade shows with engineering conferences, you expect a few things. First of all, you learn to expect a few pitches for new products. That's not so bad, as long as the information is factual. This year's NAB Broadcast Engineering Conference probably will have a few product pitches, but more likely, you will hear a lot of practical information from people who have been out in the field and understand the needs of broadcasters.

The spring convention is less focused on radio than the annual fall radio show, yet a look at the schedule of presentations shows good possibilities, with programs planned *by* radio professionals *for* radio pros.

NAB '98 Radio Boot Camp

The conference begins on Saturday, April 4, with a day of practical sessions for those who may be new to the business or looking for some practical refresher information on radio engineering. As a young engineer a few years back, I often wished I could benefit from the experience of senior engineers in learning some of the specific broadcast engineering techniques that weren't taught in tech school. Here is such a chance.

Rick Farquhar of RAF Associates in Columbus, Ohio, is the moderator, representing the Society of Broadcast Engineers Ennes Educational Foundation Trust. Farquhar said the goal is to give attendees practical information they can take home and use right away.

He said participants will start the day talking about power and grounding issues, with an emphasis on power conditioning. The afternoon will include transmitter and antenna installation, maintenance and repair. The finale of the day is a two-hour session covering the aspects of moving a station: legalities, permits and technical issues.

For more about the workshops, see Farquhar's comments on page 33.

Sunday, show planners turn to an important and fast-developing area in a day of sessions about "Digital Sound Broadcasting: Worldwide Expectations and Progress."

Digital broadcasting continues to evoke a lot of interest and emotion, in ownership circles and engineering departments alike. While TV broadcasters already know the schedule they're up against, radio professionals face uncertainty. The Eureka DAB system is being implemented in other parts of the world, while many U.S. broadcasters are hoping for a viable in-band, on-channel technology that won't require moving radio to a different part of the spectrum. At least two companies now are racing to provide such a workable IBOC system.

DAB to come

Direct digital satellite broadcasts are just over the horizon; the FCC has issued two licenses for service to U.S. listeners. The impact on the terrestrial radio industry remains to be seen. A notable team of experts will take part in these sessions to try to make some sense of the state of DAB and what's ahead.

The era of consolidation is upon radio, and just beginning for our TV counterparts. All of us who work in the field know that we can't engineer in the "same old ways" and still maximize facilities when several stations are brought together.

Monday morning sessions include "Consolidation: Engineering Management Perspectives," with panelists who have faced the realities of consolidation and have practical counsel for those of us facing the added challenges of more stations, and in many cases of bringing those stations under a single roof.

According to panel chair and **RW** Technical Advisor Tom McGinley of WPGC-AM-FM in Washington, the program committee realized that until now, consolidation had not been covered as well from the engineering side as from the management perspective.

McGinley said the eight panelists bring various views on the challenges in facility consolidation. They will cover the important topics of finding and developing engineering talent, and of using contract engineering firms.

McGinley said the last half-hour of the session will be reserved for questions and answers.

Most of us have heard presentations about the importance of maximizing revenue from our tower; this includes leasing space to users ranging from two-way systems to paging and cellular systems. Monday afternoon sessions include "Broadcast Towers: Managing Your Vertical Real Estate," which will focus on making the most of the tower and its available loading.

This year's convention has the theme "The Convergence Marketplace." While the convergence concept seems to have more serious implications for television broadcasters, the presence of Internet resources in desktop computers has also brought Web radio programming and radio Web sites. Tuesday morning, "Internet Technologies for Radio" focuses on how to use the Internet for profit, promotion and maybe plain fun.

Tuesday afternoon, a variety of presenters will talk about the tradeoffs involved in planning studio and transmission facilities. Some of us like to plan our studio facilities around the specifics of a particular format; others prefer to make

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RAB at NAB: On the Sales Front Lines

John Montone

When Gary Fries gives his annual "state of radio sales" speech during NAB '98 this year, he can look back on a notable, and high-profile, year.

Fries is president of the Radio Advertising Bureau. The RAB Sales and Marketing conference, part of the NAB convention, includes 13 sessions over two days, Tuesday and Wednesday, April 7 and 8. Fries will present his annual industry overview Tuesday morning.

Fries' report will cover the revenue side of the business, which appears to have a distinctly rosy tint to it these days.

"Radio has become the darling of media," he said. "We are in close proximity to the thinking and lifestyles of the American consumer while other media is growing apart.

"TV is segmented," he said. "People watch a particular show that interests them, but they no longer just sit and watch. Their time is too valuable."

Nor does Fries believe advertisers can reach consumers through print campaigns. "Very few people have a warm, embracing feeling for their newspaper. It's not part of their lifestyle like radio is."

Fries called the Internet an emerging media that hasn't reached its potential and may never get there. People, he said, are more mobile today, and that affects how long someone is willing to sit down at the computer.

According to RAB figures, radio revenue increased 10 percent in 1997 compared to the year before, to $13.65 billion. In his speech, Fries will explain radio's popularity with advertisers. His theory is that two simultaneous changes have taken place in this decade. First, radio stations began fine-tuning their formats to cover all interests.

"Stations used to duplicate each other's formats so that adult contemporary stations in the same market were playing the same songs," he said. "Now each station has a distinct appeal ... news, talk, sports, business for breakfast. And that is exactly what the advertising community wants."

The second important change, he said, is niche marketing.

"Advertisers went from a mass marketing strategy to niche," said Fries. "They used to buy spots to reach a hundred people, hoping that a few would be in their target audience. Now they can target the right message to the right people."

While sounding overwhelmingly bullish, Fries does have one major concern. He said he thinks some sales managers believe consolidation can solve all their problems, that mass in the marketplace means they can raise rates.

"It's not that simple," he said. "There are steps radio sales departments must take to continue their growth. Stations must help the advertiser connect with the consumer. To accomplish this they must train and educate their sales forces."

Micro marketing

Fries said this is important. In the past, a manager simply had to match an audience to a product and price it.

"Today advertisers have a much greater knowledge of their customers. Radio has moved from an advertising-sales environment to a marketing

See RAB, page 43 ▶

CLEARLY THE BEST THING TO HAPPEN TO AM RADIO SINCE DRIVETIME.

INTRODUCING THE FIRST 100% DIGITAL, FULLY PROGRAMMABLE, FM-LIKE SOUND FOR AM. Reaching a larger audience with bright, clear, punchy sound just got noticeably simpler. Because the new OPTIMOD 9200 offers a dramatic improvement in both voice and music quality, while giving you the ability to program AM sound exactly to your audience. Just push a button or program remotely via PC.

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It Was a Good Year For Sales

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environment. It's micro-marketing. The right message to the right people." For that reason, he believes training and education are vital.

Other sessions on April 7 include a presentation by Danny Fletcher of KFRQ(FM) and KKPS(FM) in Weslaco, Texas, titled, "So Your GM Just Quit — Now What?" Fletcher promised a "fantastic story of doing the impossible in small markets."

The RAB conference schedule allows attendees to go to Tuesday's NAB Radio Luncheon, featuring the latest NAB Broadcasting Hall of Fame inductee, Rush Limbaugh (*see pg. 25*).

There are two sessions after lunch on Tuesday: "Hiring and Developing Sales People in Small Markets" and "Special Events and Promotions — Marketing, Managing and Making Money."

On Wednesday, April 8, RAB Executive Vice-President of Training George Hyde offers a presentation, "What Your Sales People Tell Us When You're Not Around."

"We get a lot of interesting stories," Hyde said. "Young people express uncertainty and fear about their career decisions but often feel they cannot tell their managers about these feelings, but they are willing to open up to RAB sales trainers."

Another subject up for discussion with the RAB includes time management. "It's called 'How do I find the time to do it all?'" said Hyde. "We have time-management resources at the RAB that can be faxed out at a moment's notice."

Hyde said another frequent question is, "If sales meetings are so important, why doesn't my manager prepare for them?" Here Hyde has suggestions for the managers in attendance.

"Prep yourself using available RAB tools, bring in guest speakers and change the venue occasionally," he said. Hyde said he knows of broadcasters who have conducted great sales meetings while "touring a bottling plant or a car dealership or going to the race track."

According to Hyde, part of a sales manager's responsibility is to make work enjoyable for the staff.

"Sales people who are wrapped too tight aren't going to perform. If it's not fun then they should go sell cellular phones."

The schedule for April 8 includes seven other sessions. Among them: "Radio Gets Results" promises "a thousand new success stories you can take home and be on the street selling with on Monday morning."

"The Amazing New Listening Statistics from Arbitron" will give attendees more information about the recent Arbitron study of at-work listening.

Answers for Engineers

▶ ENGINEERING, continued from page 41

the design as flexible as possible, knowing that format changes often are just a book or two away.

This panel also is chaired by McGinley, and includes station engineers, equipment distributors and manufacturers.

Regulation and computers

If you have a need to be up to speed on the latest regulatory issues, then you might want to attend Wednesday's all-day sessions called "Hot Topics: Regulatory Issues in the Real World, Parts I and II." The discussions feature representatives from the FCC and legal communities, and will be chaired by Dane Ericksen of Hammett and Edison consulting engineers, who deal daily with the real-world implications of regulatory decisions.

Those who have survived in the radio engineering business without being involved in computer technology for administrative and management staff are few, in my experience. For those of us who need more knowledge in this growing area, Wednesday morning sessions during the NAB Broadcast Engineering Conference will help you develop and maintain cost-effective networked systems. Presenters at "Computer Networking and Media Management" are set to include station engineers, software suppliers and computer consultants.

Thursday morning sessions include "Consumer Electronics for Digital Broadcasting." David Layer, NAB senior engineer, will chair a discussion of the latest in FM subcarrier datacasting technology. These include high-speed data subcarrier systems and a special presentation by the U.S. Department of Transportation. The DOT and the Federal Highway Administration are developing what they call the Intelligent Transportation System; this includes possible subcarrier applications, which they will discuss. Also in this session: an update from the NRSC High-Speed FM Subcarrier Committee, which last year concluded testing of three such systems.

Hot topics with answers from real-world experts. Should be a great week.

■■■

Mark Croom is chief engineer of WNWC-AM-FM, Madison, Wis.

1998 NAB Exhibitor Directory

Exhibits: April 6-9

This abbreviated list of radio- and audio-related exhibitors at NAB '98 is based on information provided by each company at press time. Highlights are a paid service. Refer to the official convention directory for final details.

Booth number preceded by RL are located in the Las Vegas Convention Center Radio Hall; those preceded by S are located in the Sands Exhibition Center; those preceded by RS are located in Sands Exhibition Center Radio Hall; those preceded by M are located in the MultiMedia World Exhibition; those preceded by T are located outside the Las Vegas Convention Center; those preceded by I are located in the Internet Pavilion; those preceded by SP are in the Special Technology exhibits in the Grand Lobby. All other exhibits are located on the main floor of the Las Vegas Convention Center.

360 Systems **RL2025**

On Display: Instant Replay self-contained professional digital audio recorder that can access 1,000 individual audio cuts; DigiCart/II Plus hard disk recorder, mini audio workstation and digital cart machine; Short/cut, a self-contained, two-track digital audio editor; and D-NET file transfer network, allowing the high-speed transfer of audio files.

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Telephone: 818-991-0360
FAX: 818-991-1360
E-mail: info@360systems.com
World Wide Web:
http://www.360systems.com

615 Music Library **S9444**

Intro: 615 Music Library

A-Ware Software Inc. **RL2800**

On Display: MusicMaster music scheduling software.

Aardvark **RS5046**

Intro: Aark 20/20 eight-channel, 20-bit A-to-D/D-to-A interface for PC multitrack recording with Word Clock and video I/O; Studio88! PC audio card that interfaces TDIF with DA-88, S/PDIF and stereo analog; Studio12! PC audio card that interfaces ADAT, S/PDIF and stereo analog.

Also: Aard Sync II low-jitter master clock generator for digital audio; Sync DA Word Clock distribution amplifier that converts AES/EBU to Word Clock; Aardverter: Professional A-to-D/D-to-A converter; AardDDA AES/EBU 1-x-6 distribution amplifier; and AardScape analog tape saturation processor.

ABE Electtronica SpA **7862**

A.B.S. SpA **5545**

On Display: FM solid-state air-cooled transmitters; DAB transmitters; microwave radio links, FM solid-state air-cooled transmitters; DAB transmitters; microwave radio links.

AccuWeather Inc. **10357**

Acoustical Solutions Inc. **6815**

Intro: AlphaTec ceiling tiles, sound-absorbing ceiling tiles designed to drop into a standard ceiling grid or to be glued to an existing ceiling. NRC-75, STC21, Class 1 Fire Rated; five patterns.

Also: AlphaSorb wall panels; Soundtex fabric wall covering; Sonex audioseal sound barrier and blankets; AlphaPyramid and Wedge foams; and RPG products.

Acrodyne Industries Inc. **13420**

ADC Telecommunications **6047**

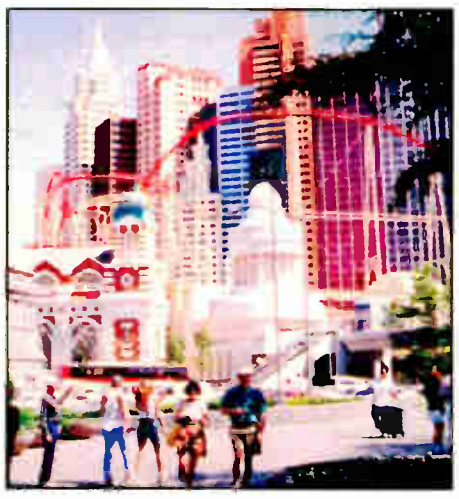
On Display: Audio and video connectors and patch panels.

Adrienne Electronics Corp. **12823**

Advent Communications Ltd. **9872**

A.E.Q. SA **RL3835**

Intro: MPAC-02 Portable Audio Codec, Mixer, POTS Encoder provides everything in one unit for your remote: ISDN, POTS, portable mixer and digital phone extender. ACD-4000 Audio Codec rack-mountable unit with ISDN, POTS and digital phone extender capability in a single unit. MAR4Win Information Management System For Windows 95. Advanced software optimized for the management of audio objects. Also manages texts, menus, external devices/events such as fader start, telephone



New York, New York

calls, time signals, juke box, telephone hybrids.

Also: Consoles 300, 500 and 2500 Series; Digital telephone hybrids TH-02 EX and TLE-02; portable mixers MP-10 and PME-02; powered audio monitor AM-03; audio distributors; power amplifiers.

AEV Srl **RL1420**

Intro: RDS 3500 low-cost RDS encoder programmable by PC and satellite; ITB 302 rack-mountable digital telephone hybrid; Telereport 10/20 D digital portable telephone hybrid reporter unit

Also: Excalibur broadcast console, MMS 412, BSM 622, Exclusive FM MPX, Mirage FM MPX, Luxor, Thunder, Starlight, Virtual Radio automation system, Telereport 10/20, ITB 202, UMR 6200.

Aircraft Production Libraries **7950**

On Display: The AirCraft Music Library, The American Music Series, ROCK Sweepers and IDs ADS UP! Music for Commercials.

AKAI Musical Instrument Corp. **RL3622**

Intro: DPS12 Digital Personal Studio portable 12-track random-access digital disk recorder capable of recording eight tracks of uncompressed digital audio to Jaz cartridges or SCSI hard drives.

Also: MPC2000 MIDI production center, S20 stereo phrase sampler, S2000 stereo MIDI digital sampler. S3000XL stereo MIDI digital sampler. CD3000XL stereo MIDI digital sampler. S3200XL stereo MIDI digital sampler, EW13020 electric wind instrument, DR8 digital disk recorder, DR16 digital disk recorder, DD8 digital dubber, DD1500 digital audio editor and IVM-1 in-ear monitor system with individual virtual acoustics IVA (TM).

AKG Acoustics **8343**

Intro: Solidtube, a pressure gradient transducer with one inch gold sputtered diaphragm, 12AX7 vacuum tube preamp, switchable 20dB pad, 145dB max SPL, external power supply, 12dB/octave LF cut, cardoid pattern; WMS 60/80 frequency agile VHF and UHF systems with up to 15 selectable frequencies; IVM-1 in-ear monitoring system with individual virtual acoustics.

Also: Microphones: C414B/ULS; C3000; C1000S; C535EB; C480B; C391B; D230; CK77; C577; CK97; C417. Headphones: K240M; K141M; K270S.

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http:// www.akg-acoustics.com

Alesis Corp. **RL2725**

Allen Avionics Inc. **12827**

Intro: AGL-600 (low impedance) and AGL-10k (high impedance) Audio Ground Loop Eliminator isolation transformers designed to provide distortion-free audio with no loss of original harmonic content; HEC4000 GBR + sync video hum eliminator; HEC3000 three-channel video hum eliminator.

Allen Osborne Associates Inc. **9837**

Intro: Hilomast telescopic pneumatic mast.

Altronic Research Inc. **RL1406**

On Display: Model 67150 150-kW air-cooled dummy load for MW and Model 6705 5-kW air-cooled dummy load for AM, FM and VHF.

AMCO Engineering Co. **7309**

Intro: Monitoring consoles with a wide variety of components to create enclosures and consoles that meet exact requirements.

Also: Vertical enclosures-STD desktop cabinets, data cabinets, shielded enclosures.

American Eagle Financial **4839**

On Display: Leasing services.

Ampex Corp. **S10603**

AMS Neve PLC **9610**

Intro: New hardware options for 55 Series console, including VCA faders, mix-minus matrix faders, new input pre-selector and new bar-graph meters; software

The Mirage

update for Libra live console, including enhanced IFB matrix, new split console mode, snapshot "scope," improved "on-air" logic and user-definable channel control; new hardware options for Libra Live, including standalone I/O units and fast reboot from Flash RAM.

Also: Logic DFC (digital film console) and Logic 3 digital mixer with AudioFile hard disk editor.

AMX Corp. **M7632**

Intro: Axcent3 and Axcent3 Pro multiport system controllers. Axcent3 combines six serial ports, six data ports, six I/O channels and eight relays in a single compact enclosure. Axcent3 Pro combines Axcent3 multiport power with four slide-in slots for AMX AXC control cards. Axcent3 RSP remote set-up panel uses a two-line, 16-character LCD display and four function pushbuttons to deliver visual, software-assisted system setup, status and testing from Axcent3 units.

Andrew Corp. **9857**

Antenna Concepts Inc. **6960**

Intro: Spanner, Full UHF-band dual analog/digital panel transmit antenna, for any power level up to 150 kW input.

Also: Complete line of broadcast antenna systems. Home of AnTek Design line, FM Ultra Tracker single-lobe antenna and Spanner full UHF-band analog/digital antenna.

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E-mail: sales@antennaconcepts.com
World Wide Web:
http://www.antennaconcepts.com/

Antex Electronics **M12918**

Anthro Corp. **RS4144**

Intro: Slant racks, tilted for easier visibility, can roll under desk, desktop model available; Keyboard Cart, telescoping legs, can hold the largest keyboards.

Also: Variety of sizes of AnthroCarts for use with personal computers, multimedia and broadcast equipment. All come with a lifetime warranty and ship in 24 hours.

Aphex Systems **RL1622**

Intro: Model 1788 studio-quality remote controllable eight-channel mic preamp with a patent-pending input limiter and remote control of input gain. Model FM PRO 2020 digitally controlled analog audio processor.

Also: Aural Exciter Type III, Compellor, Expressor, Dominator II, Aural Exciter Type III, Compellor, Expressor, Dominator II patented leveler, multiband compressor, base processor and peak limiter with analog stereo I/O. Options include: AES/EBU digital I/O, an innovative pre-emphasis processor and a patented stereo generator.

Apogee Electronics Corp. **RS4344**

Intro: AD-8000 eight-channel 24-bit digital audio conversion system featuring on-board AES/EBU and S/PDIF interfaces with optional two- or eight-channel D-to-A cards and up to four AMBUS interface cards, including ADAT, ProToc, Tascam, etc.; Apogee Master ADAT Tape; AA40, Master quality ADAT MDM tape, approved by Alesis for all ADAT-format machines.

Also: Apogee DAT tape; Apogee CD-R; Wyde-Eye digital cable; AD-1000 and DA-1000E-20 two-channel 20-bit converters; Production accessories including: CD Pens; head cleaners; and CD openers

Armstrong Transmitter Corp. **RL3911**

Intro: Ultrasound CD-quality FM transmitters with SNR greater than 90 dB. Available in power levels from 30 W to 30 kW; Digital STL encoder/decoder, that turns an analog STL system into a digital one.

Also: FM transmitters up to 30 kW; full line of FM antennas; studio-to-transmitter (STL) radio links.

Arrakis Systems **RL2606**

Intro: DL4 Digital Audio Engine Cart M/N replacement/live assist/music on hard drive automation with segue editor, a digital audio appliance, not a PC computer with a soundcard. Three play and one record, expandable to 96 play, 32 record; DL4-SASS Whole Station Audio Server, replaces analog and digital cart machines with a whole station audio server. Allows all studios/control rooms to instantly access a common storage unit. Each studio (up to 32) uses a Digilink 4 workstation, an R.U. audio appliance that functions like a triple deck cart machine and a record deck.

ATCi **T5156**

Intro: Simulsat multibeam antenna, which receives signals from 35 satellites simultaneously.

See USTINGS, page 48 ▶

UNTIL NOW, ROUTING AUDIO WAS POINTLESS.

Until now, routing audio between multiple studios was a mess, a jumble of wires, cables and junctions. Now, there's AudioPOINT® - the most advanced routing switcher in the radio industry. It maximizes your flexibility, lowers your installation and maintenance costs, and much more.

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▶ LISTINGS, continued from page 46

ATI — Audio Technologies Inc. **5720**

Intro: Digital AES/EBU audio distribution amplifiers in single 1-x-6 and 1-x-12 and dual 1-x-6 XLR output models; digital AES/EBU audio distribution amplifiers in single 1-x-12 and 1-x-24 and dual 1-x-12 BNC output models; digital AES/EBU studio metering and monitoring systems with three-color LED bargraph display and headphone output.

Also: Stereo field mixers, studio mixers, on-air consoles. Studio metering systems, balancing boxes, mic, line and monitoring amplifiers. Modular audio distribution, mic and line amps.

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Contact: Samuel B. Wenzel, President
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World Wide Web: http:// www.atiguys.com

Audi-Cord Corp. **RL2409**

Audio Accessories Inc. **5755**

On Display: Audio jack panels and jacks; pre-wired audio patch panels; patch cords; patch cord holders; Polysand; Edac connectors and accessories.

Audio Developments Ltd. **RL3025**

Audio Precision **RL3215**

Intro: Portable One Dual Domain audio analyzer, which tests interface, cabling; analog and digital audio.

Also: System Two audio test set; ATS-1 audio test set; System One audio test set.

Audio Processing Technology (APT) **RL3616**

Intro: BCF256 broadcast communications frame broadcast-quality audio codec for direct-dial ISDN and permanent links such as T1, E1, satellite and microwave. NXL256 broadcast network transceiver cost-effective broadcast-quality audio codec for distribution via fixed digital links such as STLs and permanent studio networks. NXL384D digital broadcast network transceiver codec for digital connections via fixed digital links. ADK200 PC apt-X audio card for OEM applications, such as digital audio workstations, radio automation and newsroom editing.

Also: DSM100 digital audio transceiver; ProLink ISDN manager; DRT128 digital reporter terminal.

Audio USA **RL1328**

Audio-Technica U.S. Inc. **6816**

Intro: 30 Series mics: the cardioid AT3525 studio condenser, the omnidirectional AT3527 and cardioid AT3528 small-diaphragm condensers; AT4054/AT4055 handheld mics with a true capacitor, large-diaphragm design; 1900 Series UHF diversity wireless systems, available as the body pack and handheld mic/transmitter.

Also: 40-Series studio capacitor mics; UHF and VHF professional wireless mic systems; AT4071a, AT4073a, AT815b and AT835b shotgun mics; AT822 and AT825 stereo mics; AT854R Quad Mic multichannel boundary mic; AT891R boundary mic with multifunction switch; AT-MX351 and AT-MX341a SmartMixer automatic mixers; ATH-M40fs and ATH-D40fs precision studio headphones; Uni-Tools in-line mic accessories.

Audioarts Engineering **RL2619**

Audiomation Inc./Sellmark **RL1319**

audiopak **RL2310**

Auditem SA **RL1022**

Intro: DARC1 DARC encoder to encode electronic data files for transmission on a 76 kHz subcarrier of the FM signal; DM1 100 Digital FM transmitter; and ITS3 FM-AM-TV automatic remote checking system.

Also: RXFM, MC3 mobile and automatic FM field-strength measurement and baseband analysis system with included GPS receiver and optional modules for local band scanning, RDS analyzing and cartographic carrying; RDS3 fully dynamic RDS encoder; CONF-SPB configuration software for any RDS encoder running under the UECP protocol; RDS SERV RDS encoder network management software; RXR1 FM and RDS receiver for rebroadcasting and monitoring.

Auditronics Inc. **RL2002**

Intro: NuStar 3001 Series digital console with new 30-position mainframe, new color and styling; all modular; upgraded VU meters; large clock and timer displays; full 48 kHz sample rate. TouchStar option for NuStar 3001 replaces conventional console control surface with a touchscreen. Digital Router true stereo mixing audio router that allows for synchronization and D-to-A/A-to-D format conversion. Comet 4000 Series analog radio on-air console, available in 12-, 18- and 24-position mainframes.

Also: 2500 Series modular on-air and production audio console; 801/851 Series console on-air and production audio console with 12-, 18- and 24-input position mainframes.

Austin Co., The **S1249**

Autogram Corp. **RL3802**

Intro: Solution-20 rack frame that holds up to 10 cards with self-contained power supply. Cards include RC-1 relay card, DA-3 distribution amplifier, SMA-10 10 W stereo monitor amplifier and MPC-1 mic processor.

Also: MM8-A slide pot, PM1032 Pacemaker series, AC-8 standard eight-pot rotary and RTV-20 consoles.

AutoPatch **M6429**

Intro: 8Y-XL high-performance, 64-x-64 video/audio/digital matrix switcher that is expandable to 256-x-256 in a Polypath configuration.; 1Y-16 16-x-16, 8-x-16, and 16-x-8 versions of the 1YDM model matrix switcher.

Avcom of Virginia Inc. **10961**

Avocet Instruments Inc. **RL4306**

Intro: AV-2000 delay canceller removes delayed audio from a live broadcast so that on-air talent can monitor. Eliminates the need for a separate mix-minus and puts control with the talent, not the studio. SAP-11 low-cost receiver.

Azden Corp. **S2827**

Intro: 400UDR-63 Channel True Diversity UHF Receiver featuring Camera Mount Receiver, balanced output, 63 selectable frequencies, adjustable output levels, 9 or 12 volt operation, RF & AF level indicators.

Also: Pro Series Wireless Systems; Producer Series Wireless Systems.

Baird Satellite Supporting Systems **T5065**

BARCO Communications Systems **M6719**

Intro: RE 8960 Audio Codec is a compact 1RU unit designed to transmit production quality digital and analog audio on a T-1 or E-1 network. Audio and data signals can be combined by the RE 8960 for transmission on the same network. The RE 8960 has the capability to transcode between analog and digital audio between input and output. The codec can interface up to four different types of audio and data formats.

Also: RE660/661 MPEG Layer II Audio Codec. COPERNICUS Element Manager and ROSA Network Management System.

Belar Electronics Lab. Inc. **RL2010**

Intro: DSP-based FM/TV composite spectrum analyzer; FM digital subcarrier demodulator and monitor; AM distribution amplifier.

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Belden Wire & Cable Co. **11881**

On Display: 1800A, 1800F, 1883A, AudioFLEX,

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1901A, AES/EBU 100-ohm digital audio snake cables.

Benchmark Media Systems **11067**
Intro: AD2404-96 four-channel, 24-bit, 96 kHz A-to-D converter. AD2408-96 eight-channel, 24-bit, 96 kHz A-to-D converter; AD2008 eight-channel, 20-bit A-to-D converter; ADA2008 bi-directional eight-channel, 20-bit converter with four channels of A-to-D conversion and four channels of D-to-A conversion; DAC2008 eight-channel, 20-bit D-to-A converter; PS2212 power supply for digital converters; DAC2002 two-channel, 20-bit D-to-A converter; UIB-1 universal interface board insert-point interface daughterboard for System 1000 modules; Desktop Radio Interface news-editor stereo interface for digital audio workstations.
Also: System 1000 Series of audio distribution amplifiers, mic-pre DAs, utility modules, frames, daughterboards, remote control gain and mode modules and power supplies; MicroFrame Series of line amplifiers and mic preamps; Benchmark SPM 220/320 meter systems; IFA Series interface amplifiers; and MPS 400/420 mic preamp systems.

Best Power/North Star **S1526**
On Display: Power protection products; uninterruptible power systems, standby power systems, line conditioners, surge suppressers, voltage regulators and emergency lighting,

Bext Inc. **RL3906**
Intro: XT301 300-W standalone transmitter. Available options include a stereo generator. Lex 25 25-W directly programmable FM translator.
Also: AT100, XT20, XT30, Lex25 exciter/transmitters; PJ300, PJ500, PJ1000 amplifiers; 1.5 W and 6 W STL systems; T Series compact tube transmitters from 500 W to 2 kW.

beyerdynamic **5707**
Intro: MCE 90 studio condenser mic designed primarily for vocal recording; MC 836 and MC 837 shotgun mics; MCM 800 Series of studio-quality modular condenser mics with a choice of three capsules.
Also: M 58 interviewer's mic, headsets and wireless systems.

Bi-tronics **8120**
Intro: Cable assemblies and interfaces, including new broadcast, audio/visual, industrial video and machine vision products; connectors and adapters for difficult interconnected applications.
Also: Cable, cable assemblies, connectors, patch panels and installation aids.

Bird Electronic Corp. **RL1727**

Bittree **S5021**
On Display: Analog and digital audio, video, data patchbay systems; audio and video patchcords.

Boom Box Corp. **NA**

Bradley Broadcast and Pro Audio **RL1601**
On Display: Full line audio dealer, showcasing Creamw@re Cutmaster, Digital Audio Labs V8, Presonus and Marantz products.

Brainstorm Electronics **T4867**

Brill Electronics **I11428**
Intro: Belden MediaTwist high-performance UTP cable for audio, video, data and RF applications. Multiple signals can be sent on the same cable in "shared-sheath" applications.
Also: XLR connectors, patch panels, multipair cable; BNC, tri-loc connectors; video jacks and patch panels; and coaxial cable.

Broadcast Electronics Inc. **RL1610**
Intro: AudioVAULT Version 6.6 supports Windows NT with the AVExplorer module, making AudioVAULT compatible with a wide area network (WAN); AirBoss new networked copy management system allows for elimination of paper from an operation; CallBoss talk show management system for smooth operation between call screener and talk-show talent; Talk*Port micro-cellular remote with three-channel mixer; GX440 compact four-channel telephone remote mixer with dual phone lines and four-channel versatility in one compact package; AudioPOINT analog/digital/MADI routing switch; StudioPOINT line of value-priced studio furniture designed by and for radio engineers; AM6A 6 kW AM transmitter with C-QUAM stereo.

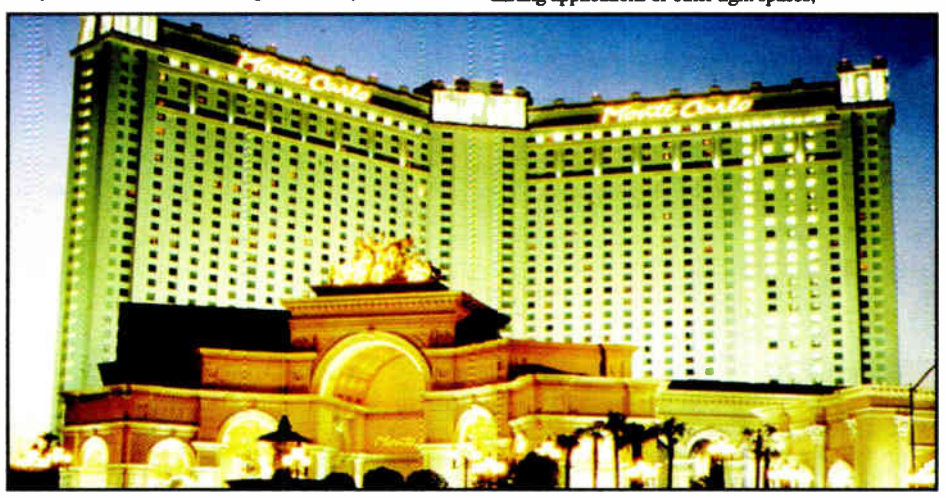
Broadcast Microwave Services **7803**

Broadcast Richmond **RL2409**
Intro: Pre-wired Program Racks with built-in processing and monitoring for A/B comparison pre- and post-transmission. Experienced Equip., a new division that buys, reconditions and sells good-quality used equipment with a warranty. Audicord custom manufacturing for the broadcast industry.
Also: Complete radio stations and pre-wired program racks.

Broadcasters General Store **10061**
Intro: Broadcast Tools SS8.2 8-x-2 stereo cross-point switcher to monitor speaker, headphone jack, LED VU meter, serial and parallel remote control.

BSW — Broadcast Supply Worldwide **RL1815**

BUD Industries **NA**
Intro: Seismic cabinet rack, designed and tested to withstand earthquake requirements listed for Zone 4 in the Bellcore #GR-63-CORE; cable management rack that solves cable and wire management problems encountered with standard open relay rack installations; swingframe relay racks.



The Monte Carlo

Burk Technology **RL1215**

Burle Industries Inc. **8107**
On Display: Power tubes and cavities for FM, VHF and UHF broadcasting.

California Microwave Inc. **8324**
On Display: A broad range of microwave systems for electronic newsgathering, central receive systems, analog STLs, outside broadcast and Internet connectivity.

Calrec Audio Ltd. **RL4208**
Intro: Calrec X Series digital on-air production console for self-operated use on-air and in radio production studios.
Also: C2 production console for medium-sized production facilities and vehicles where space is at a premium; T Series assignable digitally controlled analog console for busy studio and remote production facilities; S2 analog production console for production areas where space is at a premium.

Calzone Case Co. **12344**
On Display: Diamond Series; Escort cases; LD-ATA cases; Titan Series; EZ-Haul Series.

Canare **10976**
Intro: TS100E Coaxial Cable Stripper: a universal coaxial cable stripper offering five different pre-sets, each capable of accepting any coaxial cable with an OD between .173 and .402 inches. Also introducing new composite audio and video cables for ENG/EFP/OB applications. Offers three audio pairs and one video coax in a single .421 inch OD bundled cable.
Also: Single and multi-channel starquad mic cable, guitar/speaker cable, 110 ohm digital audio cable, 110 ohm-75 ohm digital audio transformers, mic snake systems, A/V jack panels.

CartWorks/dbm Systems Inc. **RL3727**
Intro: CartWorks MHD "Music on Hard Drive" digital automation/live assist system, allows for in-context voice tracks, overlapped audio and interfacing with any music scheduler.
Also: CartWorks live assist digital audio systems; CartWorks satellite automation systems.

Castle Transmission **S12034**
Intro: Broadcast transmission site development services; communications site development and management services; digital TV and radio network construction and services.
Also: Broadcast transmission services to the BBC; wireless telecommunications infrastructure provision.

CBSI/Custom Business Systems Inc. **RL2615**
Intro: Clickthrough Analysis for CBSI CustomReports provides access to multiple layers of radio station sales performance data with a simple click of the mouse; Graphical Schedule Planner calendar-style visual interface for managing the schedule for maximum revenue and fewer bumped spots.
Also: Station management packages covering traffic, billing, sales management; group-focused Premier solution; scaleable Classic system and the Elite package; InterAcct accounting package and CBSI options such as Laz-E Forms, Sales Analyzer and CustomReports.

Circuit Research Labs Inc. **RL1506**
On Display: Audio processing systems for AM, FM, TV and shortwave; FM stereo generator; SCA generator; PRO/SAP Generators; DAA-50 AES/EBU audio analyzer.

Clark Wire & Cable **8972**
Intro: SPA22GS audio cable and 800 Series digital audio snakes; redesigned remote composite cables (RCC) with improved flexibility and longer life; Custom Cable Assemblies to meet exact customer specifications; customized Hannay reels for mobile broadcasting applications or other tight spaces;
Also: Complete line of cables, ready for shipping, including Paladin Tools' audio cable tester designed to test the continuity of most audio cables; audio and video digital cabling; complete digital including XLR, quarter-inch phono (RCA), DIN, 3.5 mm assemblies and digital patchbay systems.

Clear-Com Intercom Systems **13664**
Intro: ICS-2003 Premier Matrix Plus 12-key display station with bright, high-resolution EL display panel, keypad and full programmability; TEL-14 two-channel autonulling telephone interface; MTX-D8 digital matrix card for Matrix Plus 3 digital intercom systems; TW-40 two-way radio interface links to connect walkie-talkies and two-way radios to Clear-Com or RTS party-line intercom systems; Matrix Plus total intercommunications solutions for broadcast and event production;
Also: Matrix Plus 3 digital intercom systems; complete line of party-line intercom systems.

Coaxial Dynamics Inc. **RL3423**

Comark Communications Inc. **8313**

Communications & Power Inc. **5904**
Intro: Eimac K3 IOT low-power, high-efficiency, air-cooled IOT optimized for 8-VSB transmission; three new RF transceivers for voice, video, data transmission, SNG and flyaway applications.
Also: Power vacuum electron devices: IOT; triode; tetrode; pentode; Klystron; MSDC Klystron; satellite uplink high-power amplifiers; traveling wave devices; and RF transceivers.

Communications Data Engineering **RL1121**
On Display: Broadcast engineering software to determine propagation and contours on topo scanned maps; Web-based and dial-up on-line broadcast engineering databases.

Computer Concepts Corp. **RL4413**
Intro: Visual Traffic 32-bit Windows-NT based hard disk-based digital audio storage system with multiple record/play channels and easy-to-read display; Newsroom captures text and audio from wire-services and network feeds for creation of newscasts; WebNews facilitates Web site management.
Also: DSC; Cutmaster; Voicetracker, DSC; Cutmaster; and Voicetracker.

Comrex Corp. **RL2612**
Intro: Vector POTS codec delivers 15 kHz full duplex audio on a single plain telephone line. Vector is compatible with the Hotline POTS codec and includes a three-channel mixer with three headphone feeds and an extra input/output for PA feeds and producer cues.
Also: Complete line of remote broadcast equipment, including Hotline POTS codec; Nexus and other digital audio codecs; Mix-Minus Bridge; and Codec Buddy mixer.

Comsat Corp. **13730**

ComStream Corp. **RS5347**
Intro: ABR202 digital audio receiver for SCPC broadcast of audio, data and relay signals. CD-quality audio with BPSK or QPSK via Ku- or C-band satellites.
Also: DR200 DBS digital audio receiver; DAC700 audio codec; AX801 signal switch; and Promocast.

Comtech Antenna Systems **T4856**
Intro: 2.4-meter completely portable fly-away satellite antenna for transmit/receive SNG applications. Available in C-, Ku- and X-band frequencies. Transit cases included.
Also: Satellite antenna systems from 1.8 to 7.3 meters. Fixed, motorized and transportable systems available. Satellite uplink and downlink converters and SSPA.

Comtek Inc. **13172**
Intro: DX 3-4 digital matrix IFB controller interfaces base station transmitters to audio from cellular phones, two-way radios, intercoms, off-air tuners, etc.

Connectronics Corp. **8102**
Intro: Hi-Q speaker installation cable in 16AWG and 14AWG with two or four conductors.
Also: Audio data communications network interconnect products.

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Continental Electronics Corp. **8333**
On Display: Television, AM and FM radio transmitters including studio equipment, monitoring equipment and full RF plants.

Crouse-Kimzey Company **RL2308**

Crown International **RL3816**
On Display: Crown Audio produces amplifiers and mics; Crown Broadcast provides FM transmitters, exciters, translators and RF amplifiers; Crown Satellite offers data multiplexers, satellite receivers, and software for audio and data broadcasting via satellite.

Crystal — a division of Cirrus **RS3741**
Intro: CS5360 low-cost 24-bit, 105 dB audio A-to-D converter; CS4390 24-bit, 106 dB audio D-to-A converter; CS4924 Dolby digital source product decoder for MPEG and AC-3.
Also: CS5396 24-bit, 96 kHz audio A-to-D converter; CS8403A/4A 96 kHz transmitter; CS8413/14 96 kHz receiver.

Cutting Edge Technologies **RL3606**
Intro: Omnia.FM digital signal processor appropriate for every radio format.
Also: Omnia.net digital signal processor tailored to the needs of Internet broadcasters; innovative DSP audio processing equipment for radio, television and Internet broadcasting.

Dalet Digital Media Systems **RL3610**
Intro: TeamRadio traffic and scheduling package fully integrated with the Dalet Digital Audio System to network the business of up to 1,000 radio stations; Dalet Newswire capture application to receive all standard newswire formats and sort stories to reporters for editing and preparing for broadcast; Dalet Remote Communications applications for radio stations in a group, allowing them to pool resources via ISDN, WANs or the Internet.

Dan Dugan Sound Design **RL3402**
On Display: Model D automatic mixing controller; Model D-1 live mic processor.

Danish ProAudio/TGI North America **RS4044**
On Display: Worldwide suppliers of Brüel & Kjær mics, 4003, 4006, 4007, 4011 and 4035 headset.

Datacount Inc. **RL3913**
Intro: Datacount 32 true 32-bit traffic and billing software system for Windows 95/NT.
Also: DARTS Datacount Accounts Receivable and Traffic System; Super Log traffic and billing software.

Datatek Corp. **10217**
Intro: D-2627 AES/EBU digital audio synchronizer for error-free switching of up to 64 asynchronous digital audio signals.

Dataworld **RL3015**
Intro: DataXpert comprehensive broadcast software contains AM, FM, TV/LPTV, translator records, contact information, contour coverage data, mapping and reporting capabilities. Also included are assignment of license, transfer of control and station ownership data, detailed population reports, AM night coverage contours, TV coverage for SHVA and receive antenna type determination.
Also: Worldwide terrain database; current year and five-year projected ethnic/demographic information; specialized digitization; custom full-color mapping; GIS-ready coverage data; engineering studies.

Dawn Satellite Inc. **T4953**
Intro: C Band LNB digital-ready amplifier mounts to antenna feed horn. Designed to receive digital satellite signals. High stability. New 3.0 meter satellite commercial downlink antenna. Coversat, snow and ice protection cover.
Also: 3.8 meter Comtech satellite antenna and Standard Agile Omni Satellite Receiver.

DBA Systems **RS5540**

DB Elettronica **RL1027**
Intro: PF-3000 and PF-5000 3 kW and 5 kW solid-state MOSFET-based FM transmitters.
Also: FM transmitters in all power levels; STL radio links; translators, digital encoders; decoders; fixed and portable microwave links; antenna systems.

dB Technologies **RL3923**
Intro: DA924 96 kHz 24-bit D-to-A converter; dB44-96 multichannel conversion system. The expandable dB44-96 system frame can be ordered with a variety of plug-in modules.

Delco Wire & Cable Ltd. **S2859**
On Display: 110 ohm digital audio cable; analog and serial digital; dual braid video cable PVC and plenum; analog audio cable; snake; quad 4 mic cable and composite; and custom cable from 300 meters.

Delta Electronics Inc. **RL2312**

Denon Electronics **RL1024**
Intro: DMD-1300P professional MiniDisc recorder for broadcast, recording/dubbing, DJ and sound reinforcement use; DN-M2000R professional MiniDisc recorder for DJs and project studios; DN-T620 combination CD player and cassette player/recorder in a single chassis; update of the DN-610F.
Also: DN-M1050 MD recorder with PC keyboard interface; DN-C680 Professional CD player with jog/shuttle wheel; DN-995 MD cart recorder with MD remote; DN-990R MD cart recorder; DN-981F MD cart player with Hot Start; DN-961FA professional CD player; and DN-951FA CD cart player.

Deutsche Telekom AG **T5566**
Intro: Digital long-, medium- and shortwave services
Also: ATM broadcast services; satellite services; and digital terrestrial transmitter services.

DGS Pro-Audio **5058**
Intro: Digital eight-pair cable for AES/EBU signals, smaller diameter for D-sub connectors; recall audio patchbay; MI patchbays
Also: Deltron XLR, RCA, DIN and quarter-inch plug connectors: Gotham double-shielded cable and multipair and digital multipair cable.

Dielectric Communications **10225**
On Display: FM and TV antennas; filters; combiners; transmission line and accessories.

Digigram Inc. **RL1901**
Intro: PCX440np professional PCI bus soundcard with four mono balanced I/O; PCX800np Series eight-channel PCI bus digital audio soundcards.

Digital Audio Labs **RS5547**
Intro: V8 DA88 interface for sync and digital audio transfer to and from Tascam DA88 machines; MX51 multichannel audio mixing for the PC includes SurroundSound capabilities, automation, waveform editing with V8.
Also: CardD product line.

Digital DJ **RS4341**

Digital Radio Express **SP 38-39**

Dolby Laboratories Inc. **9638**
Intro: DP569, Dolby digital broadcast audio encoder; DP567 two-channel digital encoder; and DP562 multichannel digital decoder.
Also: SEV4 Dolby Surround encoder; SDV4 Dolby Surround decoder; DP561B multichannel digital encoder; DP503 multiformat digital audio encoder; Dolby drive digital dubber.

Doremi Labs Inc. **12425**

Dorrough Electronics **13025**
Intro: Theater Loudness Meter for maintaining a precise loudness level in theaters; Power Line Meter to monitor AC power lines with extensive alarm functions.
Also: Dorrough loudness meter; stereo signal test set.

Doty Moore Tower Services **5639**

Drake Electronics Limited **5256**
Intro: 4000 Digital Series intercom system; Easi-Com II low-cost space-efficient matrix intercom.

E-N-G Mobile Systems Inc. **13735**

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E-Z UP International Inc. **RL4020**
On Display: E-Z UP instant shelter Eclipse and Encore models and accessories; E-Z UP instant pedestal and monitor stand; E-Z UP instant table; E-Z UP custom graphics.

Econco **RL3919**
On Display: High-quality medium- to high-power rebuilt power tubes and klystrons for radio and TV transmitters.

EDX Engineering Inc. **RL1725**
Intro: SIGNAL 4.0 for Windows 95/NT comprehensive general-purpose design tool for broadcast, PCS, cellular and wireless communication systems; AMW 2.0 for Windows 95/NT provides complete daytime groundwave and nighttime skywave frequency allocation studies.
Also: EDX SignalPro 1.0 EDX radiation limit calculations to both co-channel and adjacent stations. It is available as an add-on module to SIGNAL and EDX SignalPro or as a standalone application.

EEG Enterprises Inc. **13027**

EEV Inc. **13557**

Elenos SRL **RL3521**
Intro: New stereo exciter with a digital panel and high-customization potential thanks to plug-in boards; 10 kW FM tetrode transmitters; and 5 kW to 10 kW triode amplifiers.
Also: FM tube amplifiers/transmitters up to 25 kW.

ENCO Systems Inc. **RL4525**
Intro: DADpro32 digital audio delivery system for on-air and production use; DADjr limited functionality workstation, provides full automation capabilities for unmanned downlink applications.

Energy-Onix **RL3901**
Intro: PULSAR Series solid-state AM transmitters ranging from 250 W to 100 kW, 145 percent positive peaks, redundant modular design, output tuning and loading, four pre-set power levels, automatic power output control, VSWR foldback and protection, PDM design for best frequency response. SST 30 B Exciter front-panel frequency agile, plug-and-play installation, full metering of all operating parameters, LED modulation meter with peak indicator. FM Translator System modular design for maximum on-air time, carrier shut off when receive level below preset, frequency agile receiver and transmitter. Power levels from 30 to 500 W.
Also: FM transmitters: ECO, grounded grid, triode tube 2 kW to 50 kW, Legend. Solid-state 1 kW to 10 kW, SSA Series B solid-state amplifiers 100 W to 1 kW; Exciters: Stealth "Virtual Digital," SST Series; STLs: STL-1 Composite System.

Equi=Tech Corp. **S10541**
Intro: Equi=Tech Model ET 12.5 W allows for hard-wiring technical AC power in sound and video production suites.
Also: Rackmount products: Models ET1R, ET2R, ET3R, ET4R, ET5R 10-to 50 AMP capabilities; wall cabinet systems: Models ET5W, ET7.5W, ET10W, 50-100 AMP capabilities; isolation transformers: single- and three-phase sizes 15 through 250 kVA.

ERI — Electronic Research **5907**
On Display: Guyed and self-supporting towers; filters; combiners; lightning protection and grounding systems; structural analysis; tower reinforcing services; FM antennas.

ESE **8130**
Intro: Several new GPS-based timing products, including master clocks, time code generators and frequency generators; LX-5212 digital analog clock

for SMPTE, ESE, ASCII and IRIG-B time code to display time on a six-digit LED display,
Also: ES-185A GPS master clock, other master clocks, remote displays, clocks and timers; audio distribution amplifiers; level indicators; black burst generators.

Euphonix **RS4738**
Intro: CS3000 audio console with new broadcast capabilities, including 5.1 discrete SurroundSound busing, dedicated VU and phase metering for stereo or 5.1, backstop PFL overpress, and programmable GPI fader start triggering of external devices.

Eventide Inc. **RL1619**
Intro: DSP4500 Limited Edition UltraHarmonizer, featuring more than 1,000 presets from the DSP 4000, DSP4000B and GTR4000 models and the new Alchemy-101 Preset Library. Also includes an HS487 internal sampler and both AES/EBU and S/PDIF digital I/O. Alchemy-101 Preset Library, more than 225 presets for the 4000 series Ultra Harmonizer line; HF204 four-channel hi-fi broadcast logging recorder to record up to four days of continuous stereo audio signals onto DDS-3 DAT; BD500-100 broadcast delay with AES/EBU digital I/O.
Also: 4000 Series Ultra-Harmonizer line: DSP 4000, DSP4000B, GTR4000; H3000 Series Ultra-Harmonizer line: H3000D/SX, H3000D/SE, H3000B+, H3000B/LT, H3500DFX/E, H3500B-DFX/E; broadcast delays: BD500, BD941, BD942; Digital Loggers: VR204, VR240, VR320; and Chronometers: ECW40.

Exabyte Corp. **T3774**
Intro: Exabyte 230D Library, DLT library delivers cost-effective storage solutions for workgroups through mid-range servers with 2.1TB capacity and 20 Mbps throughput.
Also: Exabyte Eliant 820 Exabyte Mammoth; and Exabyte Automated tape libraries.

Fidelipac Corp. **RL2006**
Intro: New 12-channel digital console with up to 30 total digital and analog I/O; DCR10 digital recorder player that stores up to five hours of stereo audio on either 2 MB, ZIP or magneto-optical media.

Flash Technology Corp. of America **2016**
On Display: Tower lighting; obstruction lighting.

Garner Industries **8128**
Intro: The Eliminator Model 4000FS degausser features electromagnetic field EMF shielding to reduce EMF emissions by 50 percent without affecting quality.
Also: Model 4000 degausser; Model 682A degausser.

Gefen Systems **7652**
Intro: M&E Pro Intranet allows for online special effects and music searching, auditioning and transferring using Netscape or Explorer browsers; M&E Pro Quicksample provides instant special effects and music management from hard drives.
Also: Special effects libraries from Hollywood Edge, Sound Ideas, BBC, Digiffects, Big Fish, Omnifx, DeWolfe, Valentino, Network, Bits and Pieces, Dimensions, EFX Guns, Producers, L2 and Manhattan.

Gemini Inc. **510625**
Intro: Transport and equipment cases made from high-density plastic, custom foam cutting capabilities; Injection-molded equipment case, durable ABS. Three sizes available.
Also: Custom-made and stock cases for the transport and protection of delicate instruments

Gentner Communications **M8325**

George Massenburg Labs **RL3923**
Intro: GML 9550 digital noise filter, two-channel, all-digital system for the selective, real-time removal of noise and artifacts during the restoration of older optical sound tracks; GML9800 monitor control system to support stereo and Surround listening environments.
Also: GML 8200 parametric equalizer; GML 8900 dynamic range controller; GML 8300 mic preamp; GML 9500 parametric mastering equalizer; and GML HRT mixing system.

Gepco International Inc. **6360**
Intro: GFC Style multipair cable in 22, 24 and 26 gauge with pair counts from two to 52 pair; 5522M digital audio mic cable; 6600HS Series plenum multipair cable.
Also: Single-pair, dual-pair, multipair, multiconductor, speaker guitar/instrument, mic and digital audio cables.

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Golterman & Sabo Inc. **S10018**
On Display: Acousti-Tack 100, Acousti-tack 200 and Acousti-Tack 300 acoustic wall panels; Acousti-Baffle and Acousti-Color Baffle acoustical baffles; and Acousti Tile acoustic ceiling tiles.

Gorman Redlich Mfg. Co. **RL2119**
Intro: EAS1 EAS encoder-decoder with a telephone input for DTMF control; telephone control board option for EAS1.

The Stratosphere

Also: EAS encoder-decoder Model EAS1; NOAA weather radios for national weather service alerts; and digital antenna monitors for AM directional arrays.

Graham-Patten Systems Inc. **11670**
Intro: RAM Recorder Option for D/ESAM 820 mixer; D/ESAM 230/24 24-input version of the Model 230, featuring D/ESAM IV protocol.
Also: SoundPals digital audio building blocks; D/ESAM 400 digital audio mixer; and D/ESAM 820 digital audio mixer.

Groove Addicts **RL2527**
Intro: Award-winning jingle ID packages, featuring leading hottest session musicians and vocalists for alternative, AC, CHR, hot talk, country, NAC, urban and other formats; Mind Benders six-CD production elements library; and Groove News recent news music packages now in syndication.
Also: Several custom music and ID packages now in syndication.

Group One Ltd. GVC **12164**
On Display: SD Technologies super dispersion speakers with more power and dispersion.

Hafler **M7447**
Intro: TRM8 two-way powered monitor system custom-designed and produced by Hafler and the Rockford Acoustic Design Division for optimum performance.
Also: P4000 Trans-nova Diamond amplifier.

Harris Corp., Broadcast Division **6309**
Intro: Platinum ZD20CD solid-state 20 kW FM transmitter with DIGIT CD digital FM exciter combines two Z10s for redundancy and is available in 3 dB hybrid or switchless combiner versions; Platinum Z FM line adds two new medium-power levels, 3.5 and 7 kW; D-ACE multimedia source encoder and D-CAST2 second-generation COFDM encoder for DAB; Harris radio studio systems capabilities, including on-site custom-built working studio; DRC2000 digital radio console; Harris Digital Audio range of digital products, including digital audio distribution, routing, switching, clocking A-to-D/D-to-A converters and impedance matching panels; and Vortex MixPack POTS codec mixer for use with Comrex HotLine.
Also: Platinum Z FM solid-state transmitters; DIGIT CD digital FM exciter; CD Link uncompressed digital 950 MHz aural STL; DX 50 50 kW digital solid-state AM transmitter; GATES FIVE 5 kW solid-state AM transmitter; SuperCiter FM analog exciter; Quest 1 FM transmitter; Orban Audicy digital audio workstation; and Orban AirTime digital delivery system.

Harrison by GLW Inc. **RL 3619**
Intro: SMS Surround monitoring system auxiliary monitoring system designed to allow non-Surround consoles accurately to monitor 5.1 Surround.
Also: Series Twelve/MPC System fully automated consoles; PRO-950 radio production console.

Henry Engineering **RL2315**
Intro: Portamatch — the "Matchbox" that runs on batteries — converts unbalanced stereo audio to 600-ohm balanced lines; Audio On-line Version 4.0 caller-interactive multiline, multimessage telephone information system.

HHB Communications (USA) **RL3627**
Intro: Genex GXR48 remote control for the Genex GX8000 magneto-optical digital audio multitrack recorder; HHB CDR74 Gold audio-optimized phthalocyanine CD-R media; HHB DA113 DTRS digital eight-track cassette for Tascam DA88-type multitrack recorders.
Also: HHB Portadat DAT field recorder; HHB CDR800 low-cost, high-quality audio CD recorder.

Holaday Industries **RL2407**
Intro: Probe View RF data analysis Windows-based software provides real-time display, logging and analysis functions for EMF data with bar-graph format data stream information and field intensity vs. time chart data.

Hosa Technology Inc. **S1542**
Intro: Hosapro solid-silver cables with specially extruded, solid-silver center conductors for dramatically reduced jitter and stunning audio clarity.
Also: Cables and adapters.

IDB Systems **T4864**

Illbruck Inc. **RL3625**
On Display: SONEXclassic panels; SONEXpyramid panels; SONEXsuper wedges; SONEXone panels; SONEXmini panels; and SONEXprospec barriers.

Industrial Acoustics Co. Inc. **RL3519**
Intro: Noise-lock doors featuring a wide range of acoustics from a number of manufacturers including full glass or partial glass; acoustic windows in a wide range of acoustics and sizes; Quad Series studios offers finely tuned rooms with appropriate diffusion and absorption.
Also: Acoustical enclosures, doors, windows and ventilation air silencers.

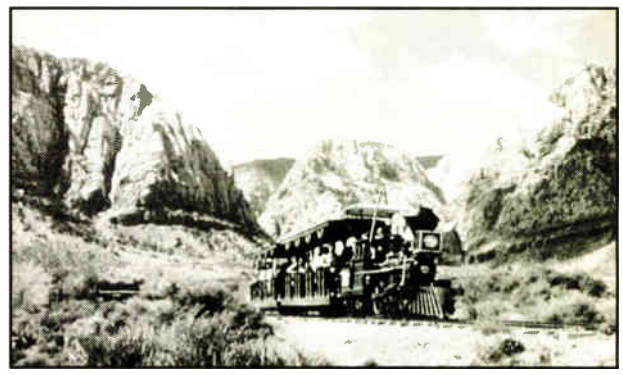
Inovonics Inc. **RL1401**
Intro: Model 235 audio processor for AM with "Gain-Riding" AGC, three-band compression and limiting, flexible EQ; Model 520 AM modulation monitor, a mono-only monitor with tunable preselector; PBX telephone switch, allows a single telephone line to serve several remote-control devices, modems, alarms, etc., for incoming and outgoing communications.
Also: Audio Processors; FM Stereo Generators; FM Mod-Monitor; RDS Encoders and Decoders; and FM Translator Receiver.

Intraplex Inc. **RL4216**
Intro: DCS-9500 digital cross-connect system to help broadcast groups share resources among production studios, broadcast studios and transmitter sites via Intraplex STL Plus and TDM-160 Series T1 multiplexers; Intraplex SynchroLink allows FM broadcasters to dramatically expand station coverage by simulcasting multiple transmitters on the same frequency.
Also: STL Plus T1 system; Intralink 6000 Series ISDN multiplexers; OutBack ISO/MPEG Layer II audio codec; and AudioLink XL.

Itelco **6043**
On Display: Solid-state FM transmitters, 30 W to 20 kW; solid-state FM translators, 30 W to 250 W; LPTV Transmitters 0.5 W to 10 kW; and UHF and VHF translators from 0.5 W to 10 kW.

Iwatsu America Inc. **S10626**
On Display: SS-7811 100-MHz, SS-7821 200-MHz and SS-7840 400-MHz analog oscilloscopes.

Jampro Antennas/RF Systems, **6313**
On Display: Full line of Penetrator sidemount and panel antennas. Rototiller sidemount ideal for icy conditions. Filters and combiners for any power level.



Bonnie Springs

Jazz Media Network **M7675**
Intro: Collaborative production tools for media professionals, including live media transfers, video conferencing, media mail, an active address directory and e-commerce via a cross-platform desktop application.

JBL Professional **RL3012**
Intro: LSR32 and LSR28P linear spatial reference studio monitors and LSR12 linear spatial reference powered subwoofer for multichannel music and surround mixing.
Also: 4200 nearfield monitors, 4400 broadcast monitors and 620b bi-amplified nearfield monitors.

JK Audio Inc. **RS5438**
Intro: RemoteMix 3-x-4 four-line telephone hybrid/mixer to manage IFB feeds from four locations while mixing talent mics. Three mic inputs and three headphone outputs.
Also: RemoteMix 3; RemoteMix C+; THAT-1; THAT-2; Tap-1; Pureformer; RemoteMix; Quick end mixer; Inline Patch telephone interface.

JRT Music LLC **S1051**
Intro: IMTEL Jingle CDs, 96 30-second tracks on each disc; Tele Music new releases: Music for News Broadcasts, Jazz, Trip Hop and Rock; collection of acoustic tracks performed by French musicians in honor of France hosting the World Cup; Essential Music 20-disc package of 60- and 30-second jingles.
Also: The 80-CD Tele Music Library, 35-CD Image Music Library and four-CD Sirocco Sound Effects Library.

JVC Professional Products **10201**

KD Kanopy Inc. **RL3027**
Intro: 9-foot, 6-inch square steel-framed Party Shade.
Also: KD Majestic; KD StarShade; KD StarStage; KD BannerPole.

Kintronic Laboratories Inc. **RL2319**
Intro: Model LPA-4/48-5K rapidly deployable AM antenna, which can be erected by two people quickly without concrete; Model DAC-MOD-12 menu-driven software programmable controllers; DSE-CBE-50AM dual digitally synthesized AM exciter adjustable from 0 W to 50 W into a 50-ohm load.
Also: AM antenna tuning units; AM directional antenna phasor cabinets; AM diplexers/triplexers; AM transmitter combiners; AM 1 kW to 1 MW dummy loads; AM folded monopole kits; rapidly deployable, man-portable antenna systems; miscellaneous RF components.

Klotz Digital **RL4101**

Kramer Electronics USA Inc. **S3314**
On Display: AAs; PC-controlled audio/video matrix switchers; signal processors; video, PC and twisted-pair interfaces; format encoders; fiber-optic transceners.

Kratek Corp.: Importers of KRK Systems Inc./Group One **12164**
Intro: KRK V8 self-powered, bi-amplified, video-shielded monitors with 130 W of power.

Lectrosonics Inc. **10481**
Intro: T1 256-frequency UHF IFB multichannel transmitter that is RTS and ClearCom compatible; R1 256-frequency UHF IFB multichannel receiver, UHF with five programmable memory settings and extended operating range; UH200 UHF frequency-agile "Plug-On" transmitter.
Also: UCR195D and UCR200D camera-mountable receivers; UM195B UHF and UM200 lavalier-style transmitters; and UM250B UHF 0.25 W frequency-agile transmitter.

Lightning Eliminators & Consultants **9725**
Intro: Sandwich Block surge suppressors provide a high-speed, direct-bus interface between the MOV components placed between thick, conductive plates, distributing the energy to all MOVs equally and simultaneously.
Also: Lightning and surge-prevention products, including the dissipation array system lightning prevention system, the Chem-Rod low-surge impedance grounding electrode and the Spline Ball Ionizer hybrid dissipator.

Lightware **10163**
Intro: GripStrip Belt System of uniquely designed pouches for film, cell phones, grip equipment, radios, lenses and more.

Logitek **RL3603**
Intro: ROC-5 new five-fader control surface for the Logitek digital audio engine; VMIX PC-based control surface for the Logitek digital audio engine; the Laser Snake concentrator box with multiple I/O for interconnecting studio equipment with a Logitek digital console.
Also: ROC-10 NUMIX digital consoles; Bright, Super and Ultra VU precision audio meters.

LTM Corp. of America **6747**
On Display: Telescopic and carbon-fiber mic poles and mic windscreens.

Lucent Technologies **RS5238**
Intro: Perceptual Audio Coder (PAC) digital audio compression coding algorithm provides high-quality compression at bandwidths appropriate for DAB. PAC is in use with the USA Digital Radio IBOC AM and FM systems.

M & C Systems Inc. **T5475**
Intro: Presence Windows NT-based satellite earth station monitor and control system with graphic user interface and LAN/WAN or TCP-IP communications.

Mackie Designs **M8138**

Majecal Plastic Cases **12344**
On Display: Rackmount cases featuring steel-topped rack rail, recessed handles and heavy-duty spring-loaded twist latches; commercial cases featuring high-quality plastic and hardware in 50-plus sizes with custom foam interiors.

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Manhattan Productions Music **9838**
Intro: BRg Production Music Library featuring 70-plus CDs in four categories of music — extreme, contemporary, urban and country — with 60- and 30-second lengths; BRg Premiere Promos Series featuring 576 cutting-edge cuts for use in TV promos.
Also: Apple Trax production music library; MPM music library; Audiophile sound effects series; Chesky Records classical series.

Martinsound Inc. **M7078**
Intro: 24-input, eight-bus console expander with audiomation, which includes EQ, filters, four auxillary sends, panning inserts, solo, direct-outs and dual inputs; MicMax precision dual mic preamp with 30 dBu output; MultiMax multiformat monitor controller, which adds SurroundSound capabilities to any audio console; LCRS, 5.1 and 7.1 main stereo nearfield and small mono speaker systems.
Also: Martech MSS-10 mic preamp; Neotek consoles, and Audiomate.

MasterDisc **I12124**
Intro: "AMP"-authorized CD manufacturing program for point-of-sale CD manufacturing for the resale/retail level.

Maxell Professional Media **12031**
On Display: Professional audio and video tape products, including MS Studio audio cassettes, open reel-to-reel and computer backup media.

Media Computing Inc. **13543**

MediaTouch **RL4503**
Intro: OPLOG 2000 digital air control panel for Windows 95, Windows NT and Novell networks; Pick N Play Windows 95 air and production software kit; Link N Lock synchronized on-air control via LAN or WAN.
Also: OPLOG, Mediadisk, Mphone and Medit automation and live assist systems for radio.

MegaDrive Systems Inc. **S3462**
Intro: EV-200 hardware-based RAID version of the award-winning E-8 disk array; Aria disk array with built-in Hub and eight-bay fiber channel.
Also: E-8 disk array; E-2 disk array; and EV-1000 RAID system.

Micro Communications Inc. **6713**
On Display: Panel and dipole antennas; coax switches; filters; diplexers; combiners; channel combiners; FM Multiplexer; directional couplers; waveguide and coax transmission line; and notch filters.

Microboards Technology **M7562**
Intro: MTI DVD authoring system, DVD authoring toolkit for Windows with software and 3.95GB DVD drive; DSR 8000 CDR duplicator; and CEDAR desktop publisher.

Micron Audio Products Ltd. **13165**
Intro: TRAM miniature electret lavalier mics and accessories for film, television, and ENG/EFP applications; SQN location audio mixers.

Milestek Inc. **10072**
Intro: RCA and SVHS wall/panel jack that snaps into wall plates or panels for quick installation; RCA Gold plugs for heavy-duty applications.
Also: Patch panels, cabling and tools.

Minerva Systems Inc. **M7232**
On Display: Audio compressionist real-time Dolby Digital AC-3 5.1 audio encoding system; Compressionist turnkey solution for real-time encoding of MPEG-2.

Miralite Communications Inc. **S2329**
Intro: 3.7-meter clear-aperture satellite antenna for C- and Ku-band transmissions.

Modulation Sciences Inc. **13143**
On Display: Pro Channel IFB system; stereo generator; stereo reference decoder modulation equipment; SAP equipment; spatial image enhancers; and composite processors.

Mohawk/CDT **13272**
Intro: Spectrum breakout boxes, interconnect trunks and fanouts in eight-, 12-, 16-, 24- and 32-channel configurations featuring binding posts for telecommunications; AES/EBU digital audio cables in one, two, four, eight and 12 pair.
Also: Wire, cable, connectors and assemblies.

Moseley Associates Inc. **RL3002**
On Display: Digital STLs, including the all-digital Starlink series SL9003Q QAM modulated RF link with 16-bit uncompressed audio; SL9003T1 telco circuits; SL9001SS 2.4 GHz spread-spectrum links; PCL6000 analog STLs; DSP6000 digital audio codecs; MRC-1620 remote control; MRC-2 remote control with MasterController software for Windows; and digital audio/video transmission equipment.

Multimedia Accessories Ltd. **10171**
Intro: The Synergy Series of RF and CATV accessories, including DAs, RF splitters, RGB cables, Kramer products and computer cables.

MUSICAM Express **RS5048**
Intro: An array of distribution services, including electronic distribution, local distribution, sweeps deliveries, satellite distribution services, dubbing and shipping services.

MUSICAM USA **RL1925**

Myat Inc. **6913**

Nagra Kudelski SA **S2029**
Intro: Nagra ARES-C Time Code portable two-channel audio recorder/player with time code and G.711, G.722 and ISO/MPEG Layer II capabilities; Nagra C-PP ISDN studio version of Nagra ARES-C.
Also: Nagra audio digital and analog recorders.

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FAX: +41-21-732-0100
E-mail: mury@nagra-kudelski.ch
World Wide Web: http://www.nagra.com

Narrator Tracks Music **S10521**
Intro: New releases include alternative, world beat, urban, environments, orchestrated, rock beds and more.

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Nautel Maine Inc. **RL1210**
Intro: XL60 AM solid-state 60 kW transmitter; XL12 AM solid-state 12 kW transmitter; FM5 and FM8 FM solid-state 5 kW and 8 kW transmitters; and digital FM exciter with analog composite or AES/EBU digital input.
Also: ND Series of 1 kW, 2.5 kW and 5 kW solid-state AM transmitters; FM series 3.5 kW to 20 kW solid-state FM transmitters; NE50 digital FM exciter; and NA Series 100 kW to 300 kW+ solid-state AM medium-wave transmitters.

Nétia Digital Audio **S8629**
Intro: Nétia Integrated Radio for audio and sound management runs under Windows NT 4.0 and includes news recording and editing, manual or automated broadcast, production and commercial/music management; Na-MX4 32-bit, Windows NT-based digital audio workstation; On-Air Station for preparing programs.
Also: News-Assist4 correspondence management and recording/editing system.

Network Electronics AS **S10309**
Intro: VD3232 540 Mbps serial digital routing switcher 540 Mbps, also available in analog version; A3232 analog stereo balanced audio router with 100 kHz bandwidth, also available in AES/EBU version; VD1602 serial digital 16-x-2 routing switcher expandable to 64-x-2.
Also: 16-x-2 routers; 8-x-8 routers; 16-x-16 routers for analog and AES/EBU digital 110 and 75 ohm.

Network Music Inc. **7732**
On Display: Network production music library; Short Trax library; classical library; production elements libraries; and sound effects library.

Neumann/USA **7447**
Intro: TLM 103 large-diaphragm, transformerless condenser mic; accessories for M-S recording with the KM100 modular mic series.
Also: U 87 large dual-diaphragm condenser mic with three directional patterns and 10 dB pad.

Neutrik USA Inc. **RL3413**
Intro: NaditBNC-F and NatidBNC-M; M 149 Tube AES/EBU digital audio adapters with digital dual-diaphragm mic with nine switchable audio impedance transformers; allows longer polar patterns; M 149 Tube dual-diaphragm cable runs over unbalanced lines instead of mic with nine switchable polar patterns, twisted pair cables.
Also: EaZyCon XLR cable connectors with soft, coated surface and pre-tinned and pre-fluxed coated surface and gold-plated contacts.

New England Satellite **T3856**

NewsMaker Systems Inc. **S2356**
Intro: NewsMaker 98 Java-based Web browser interface for news production service.

NPR Satellite Services **RL3502**
On Display: Comstream digital receivers, codecs, multiplexers; satellite space segment for radio broadcasters; portable/temporary uplinks; and satellite systems engineering.

NSN Network Services **T4053**

OMB America **RL4501**

Omnitronix Inc. **RL2406**
Intro: Digital solid-state shortwave/AM broadcast transmitter with conservative modular design.
Also: AM digital solid-state medium- and shortwave transmitters with power levels from 500 W to 100 kW.

On Air Digital USA **RS5440**
Intro: CallOut Windows 95-based music research program that integrates with A-Ware MusicMaster music scheduler; MediaSafe Windows 95-based database management program for articles and audio/video inventory.
Also: Ultimate Digital Studio (UDS) audio management and control system that interfaces with audio hard drives, CD jukeboxes and traffic scheduling systems for live assist or walkaway automation.

Orban **RL2702**
Intro: Optimod-DAB 6200 full-featured audio processor designed specifically for digital audio broadcasting, both radio and two-channel television.
Also: Audicy digital audio workstation; AirTime digital delivery system; and Optimod audio processors.

Otari Corp. **10341**
On Display: MX5050 Series tape recorders; RADAR hard disk recorder; VFC-24 format converter; Elite audio production console; Status audio production console; PD-20, PD-80 and DX5050 digital recorders; DTR-8S DAT machine; and Lightwinder fiber-optic transmission system.

Pacific Research & Engineering **RL3006**
Intro: Soundfire IEEE-1394 Firewire-based digital audio engine that simultaneously records and plays back multiple independent streams of digital audio.
Also: BMX III radio console; RadioMixer on-air console; ProductionMixer radio production console; Airwave on-air console; Integrity digital on-air radio console; and ADX digital audio workstation.

Penny + Giles Inc. **RL2316**
On Display: Penny + Giles Precision audio faders and potentiometers; P+G DC16 digital audio workstation controller; and Mosses & Mitchell jackfields.

Phasetek Inc. **RL1001**

PMI/Joemeek **S1052**
Intro: Joemeek/VC6 MeekBox solid-state mic pre/photo-optic Joemeek compression/enhancer; Joemeek/VC5 MeeQualizer stereo two-channel analog equalizer; and SC3 DAD stereo compressor.
Also: Joemeek VC-2 Tube channel; VC-3 Pro channel; VC-1 Studio channel; and VC-4 stereo enhancer.

Potomac Instruments Inc. **RL2412**
On Display: 1900 series directional array antenna monitor; AA-51A audio analyzer; AG-51 audio generator; SD-31/RX-31 frequency synthesizer and coherent detector; FIM-41 medium-wave field strength meter; FIM-71 VHF field strength meter; SMR-11 synthesized AM monitor receiver; QA-100 program audio analyzer; and 1750-TLM tower light monitor system.

Prism Media Products Inc. **S1840**
Intro: AD-2 96 kHz A-to-D converter with 96 kHz and 44.1 kHz, 24-bit and 10-bit outputs; DA-2 96 kHz D-to-A converter with full 24-bit processing and input jitter elimination via triple PLL System; MLA-2 analog compressor.
Also: DSA-1 handheld digital audio text system; and MR2024T 24-bit, 96 kHz interface for Tascam DA-88 and DA-38 digital multitrack recorders.

Pristine Systems **RL2416**
Intro: Rapidfire digital on-air studio system with easy-to-use Quick Pick music/commercial selection feature.
Also: Music Plus, a multipass music and playlist scheduling package; Timewarp! network timeshift hard disk audio recorder; VoiceTraxx advance voice track recorder; Audio Commander audio file recorder.

Production Garden Music **7057**
Intro: Music Street production library with a strong emphasis on live instruments; Air Assault II; and New Generation production elements.

Professional Label Inc. **7262**
Intro: Windows-based label producer for all media, including videotapes, CDs and audio cassettes; "Super Stick" videotape labels for bulk cassettes.

Professional Sound Corp. **RL1625**
Intro: M8 audio mixer with mic power, parametric EQ, limiters and auxiliary sends on each of eight inputs; and VDB carbon-fiber mic boom poles.

Promusic **S2629**
On Display: 2,000-CD production music library.

Prophet Systems Inc. **RL4406**
Intro: Audio Wizard Voice TRAC visual waveform placement and automatic segue system updated for 1998; WAN capabilities.
Also:<None> Crystal Ball; digital reel-to-reel recorder; and real-time editor.

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Contact: Todd Kirchner
Telephone: 308-284-3007
Toll-free: 800-658-4403
FAX: 308-284-5007
E-mail: prophetsys.com
World Wide Web: http://www.prophetsys.com

Propagation Systems Inc. **13767**
Intro: PSI-FL low-power omni-directional circularly polarized FM antenna available in power levels from 500 W to 4.5 kW; PSILPS low-power omni directional UHF slot antenna in eight-, 16-, 24- and 32-bay versions with input powers of up to 2 kW.
Also: Complete line of VHF/UHF antennas and transmission line components, including filters and diplexers.

Pulizzi Engineering Inc. **S2829**
Intro: Network remote manager to control and monitor AC power via PCs, LAN interface and modems.

QEI Corp. **RL2014**
Intro: Relocatable/portable frequency-agile RF transmitting systems for LMA upgrades, emergency sites or during major site construction; Millennium solid-state FM transmitters; and 695B-50 50-W version of the 695 FM exciter.

R-Columbia Products Co. Inc. **8049**
Intro: Expand-a-Com expandable talkback/intercom system that handles from four to 400 stations and one to 40 channels; Palm Talker wireless control for wireless intercom systems; and TR-55/2 wireless intercom headphone.
Also: Wireless IFB; ENG/IFB operators.

Radio Computing Services **RL4101**
Intro: Selector/WIN Windows-based version of Selector music scheduling system; Selectoreach software to combine Selector history data with Arbitron data to find out how often a song is heard by listeners in selected demographic groups; Storm Center automated school closings announcement system; and Winner! prize/listener database management system.
Also: Master Control-NT on-air system with "Real Feel" voice tracking, segue editor, Selector integration, accurate "Living Log," auto-scroll Script Screen and World Wide Web browser integration; RCS/Klotz Digital audio console; and Talkback call-screening interface with Caller ID interface.

Radio Express Inc. **RL2020**
Intro: BACKTRAX USA Radio Program. Two hours of '80s hits plus interviews and other features. U.S. New Business Development Disc/MA$ Monthly CDs of network-quality radio spots ready for customization. Red Hots from Brg Music Selection of the hottest tracks from the Brg Music Works catalog of production music. Weekly GoldDisc Music Library service. Euro Express fastest delivery of new hit-potential songs from Europe. Three new shows from the Hot Mix Radio Networks. MASTERDISC Superb audiophile sound quality custom music libraries for radio. GoldDisc Best of Dance includes digitally mastered CDs covering the major dance hits of the 1970s, '80s and '90s.
Also: Weekly PRG: The World Chart Show; The Rick Dees Weekly Top 40; Hot Mix Dance Mix Programs; American Country Countdown. Production Music and SFX: Sound Ideas (entire catalog); Supercharger Production Library plys Powergold Music Scheduling Software; HitDisc weekly music service; Exitos Express, weekly new releases from Latin America.

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Radio Systems Inc. **RL1515**
On Display: Consoles; complete line of master clocks and timers; DAs; and telephone hybrids.

Radio World **RL2000**
The industry's best read newspaper. Subscription and advertising information about the IMAS Publishing family of publications for radio, pro audio, television and related fields, plus **RW Online**, introduced in April.

Radiomation **RS4148**
Intro: A 32-bit version of Radiomation News 98 redesigned to take advantage of improvements in the Windows operating system.
Also: Computer-based system for live assist, automation, traffic, news, production and music rotation.

RDL — Radio Design Labs **RL4022**
Intro: STA-2 high-output line amplifier; ST-GLA1 gated line amplifier; ST-GSP1 gated speech preamp; ST-RX2 audio routing switcher; ST-MA2 muting monitor amplifier; RU-EQ2 two-band EQ; RU-EQ3 three-band EQ; RU-SX4A audio selector; TX-LC2 audio combiner; TX-MX2R audio mixer/DA; RU-SP1 rackmountable speaker; WDG1 table-top wedge mount; R-BZR piezo alert module; D-BZR piezo alert module; WH1 power supply mounting adapter; and PS-24K 24 V power supply.

Rean Products **RS5538**
Intro: MA 96 high-quality, hand-manufactured patchbays.
Also: Control knobs; sliders; switch buttons, Collet knobs; patching modules; patching cords.

Register Data Systems **RL2322**
Intro: Traffic 32 Windows NT-based traffic and billing system.
Also: Phantom digital automation system; Replicator digital network program delay system.

Republic Group LLC, The **S2927**
Intro: Equipment leasing services with 100-percent financing on hardware/software, seasonal payment plans, tax advantages, show specials, obsolescence protection and upgrade programs.

RF Plante Ind. e Com. Ltda. **RL3725**

RF Technology/Continental **13757**

RFS Broadcast **9867**
On Display: Flexwell coaxial cable and elliptical waveguide; rigid line, RF connectors; pressurization equipment; FM, VHF and UHF low-power transmit antennas; MMDS and ITFS transmit antennas; parabolic microwave antennas; and mounting accessories.

Richardson Electronics **7905**
Intro: beyerdynamic products, including mics, headphones, boom sets, and wireless systems
Also: Tubes; transistors; sockets; mics; capacitors; MiniDisc recorders; digital mixers; and headphones.

Rohde & Schwarz GmbH & Co. **4743**
On Display: Audio analyzer; modulation analyzer; and DAB systems.

Roland Corp. U.S. **RL4419**
Intro: VS-1680 24-bit digital studio workstation featuring 16-track, 24-bit audio recording, editing, mixing and effects processing in a compact tabletop workstation; VS-840 digital studio workstation; VS-880 V-Xpanded digital studio workstation with optional VS8F-1 effects expansion board; VS-880 CD recording system; SI-80S video-MIDI sync interface; VT-1 voice transformer effects unit; AR-2000 and AR-100 digital announcement recorders for any application requiring repeated high-quality digital announcement/audio playback.

RTI — Research Technology Rules Service Co. **8345**
On Display: Assistance with FCC, patent, trademark, copyright, FAA, state and federal courts and rules.

Russ Bassett **S1238**
On Display: High-density tape and disk storage cabinets.

Rycote Microphone **RL4206**

RYMSA **RL3019**
Intro: Omnidirectional DAB antenna.
Also: Broadcast radio and TV antennas and combiners; coaxial switches and connectors.

S & W Communications **5142**

Sandar Electronics A/S **13749**
Intro: Seecor scaleable digital audio rack for easy interconnection with high audio quality and high capacity; Seector digital mixer user surface.

Sanken Audio Systems **RL3923**
Intro: CS-3 shotgun mic featuring sharp directivity over a wide frequency range for the aimed frontal sound sources.
Also: COS-11 miniature lavalier mic; CSS-5 stereo shotgun mic; and CMS-7 MS portable stereo condenser mic.

Sascom Marketing Group Inc. **RS3848**
Intro: Augan OMX24 Master Recorder 24-track, 24 I/O, nondestructive random access recording and editing system; Stage Tec DARIS digital audio routing and interconnect system (formerly known as Nexus) is a digital audio crosspoint and interconnect/routing system with power supply redundancy and integrated safety monitoring; and Stage Tec Cantus digital mixer featuring 40-bit floating-point DSPs and proprietary 28-bit A-to-D converters.

SatCom Media Corp. **M6777**
Intro: SatNET, SatHUB, SatNC and SatNETPC corporate intranets/extranets using Ku-band satellite-based TCP/IP.

SCA Data Systems Inc. **RL2415**
Intro: SCAV Hi SPD FM subcarrier data broadcasting system for high-speed point-to-fixed-multipoint 64-kbps distribution.
Also: NT96 Series; P657 Series; 2R57RDS combined receiver; and RDS/MBS combined receiver.

Scala Electronic Corp. **11273**
Intro: FMO-CP circularly polarized FM transmit antenna that can handle severe environmental conditions while maintaining performance; flexible corrugated coaxial cable; and flexible and superflexible coaxial transmission lines and accessories for TV and FM.
Also: Low-power transmit antennas for TV and FM.

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Schoeps/Posthorn Recordings **4739**

Intro: Schoeps M222 AC tube mic; Schoeps BLC boundary layer adapter converts colette capsules and compact condenser mics for surface-mount boundary layer operation; and ÉAA PSP-3 mic preamp.

Also: Schoeps condenser and M-S mics; Sonotrim lavalier mics; ÉAA mic preamps and mixers with XLR-3 I/O connectors for field use.

Scientific-Atlanta **7713**

Scott Studios Corp. **RL3601**

On Display: Spot Box to replace tape cartridges with hard disk-based digital audio; AXS affordable satellite/CD control system Scott System digital studio touchscreen with up to 10 "walls of carts"; Voice Trax announcer record system; WinNews actuality recorder and editor; and digital long-form recorder.

Sennheiser **7447**

Intro: EM3532 computer-controlled, two-channel UHF true diversity receiver with 32 programmable frequencies and state-of-the-art circuitry incorporating PLL synthesis; HD570 fully modular high-definition stereo headphones with BioNetic design, neodymium magnets and detachable, single-sided cable.

Also: SKM3072-U UHF handheld transmitter; and 3050 Series In-Ear monitoring system.

Shively Labs **RL1806**

Shure Brothers Inc. **5913**

Intro: DFR11EQ Version 4 two-in-one EQ solution and feedback reducer with new capabilities, including a 30-band, constant-Q graphic or 10-band parametric EQ; PSM600 personal stereo monitor systems in both UHF wireless and hard-wired versions.

Also: DER11EQ Version 4 feedback reducer/equalizer.

Sierra Automated Systems **RL3613**

Intro: SAS 16000 Digital, 32-x-32 digital audio routing switcher compatible with the full range of SAS router control panels; CDS-8 compact alphanumeric audio routing switcher controller.

Also: SAS 16000, SAS 32000 and SAS 64000 audio routing switchers; GPI 1600 matrix automation system.

Silicon Valley Power Amplifier **RL3422**

Intro: B-150B 150-W FM amplifier with remote on/off and remote monitoring; B-2000, frequency-agile 2-kW FM broadcast amplifier with remote on/off and raise/lower.

Also: B-300, B-600 and B-1000 solid-state FM broadcast amplifiers; solid-state FM amplifier modules from 50 W to 700 W; and power amplifier modules up to 100 W.

SMARTS Broadcast Systems **RL2120**

Intro: SMARTS The Next Generation Windows-based billing, accounting and traffic software for individual and group stations; Smartscaster Systems stereo digital audio system; Spider Internet connectivity among Smartcaster systems.

Also: MPEG Systems; Generation 2000 Systems.

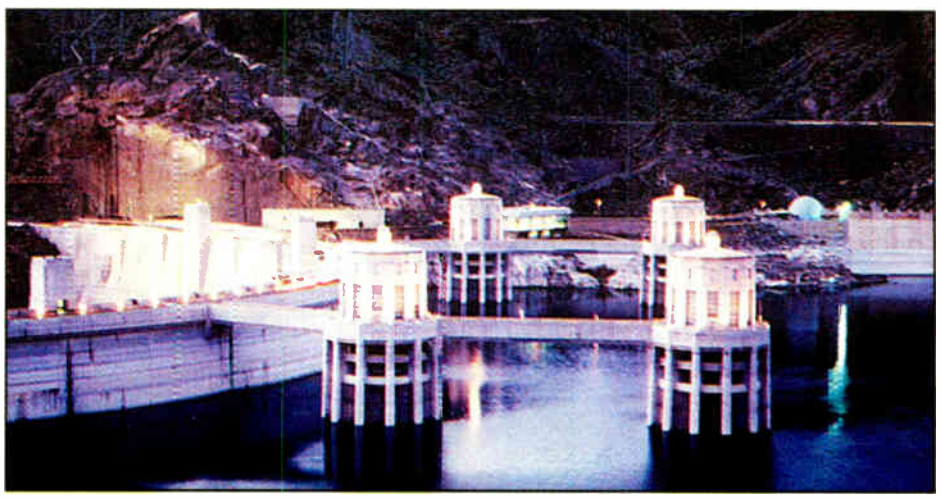
Solid Electronics Laboratories **RS4947**

Solid State Logic **RL3325**

Intro: Aysis Air 48-channel digital console designed specifically to meet the requirements of live broadcasters.

Sonic Foundry **RS5544**

Intro: XFX 2 Plig-In Pack includes 6 discrete plug-ins: noise gate, Graphic Dynamics, Multi-Band Dynamics, Paragraphic EQ, Parametric EQ and Graphic EQ. ACID real time tempo adjustment, automatic matching of loop tempos and pitch.



Hoover Dam

Unlimited loop tracks (based on system RAM). Soft Encode provides cost-effective Dolby Digital (AC-3) encoding for multi-channel audio delivery.

Also: Sound Forge, CD Architect, Acoustics Modeler, Sound Forge XP, Batch Converter, XF1 Plug-In Pack and Spectrum Analysis.

Sonic Science **RS4944**

Intro: Sonic Search version 2.6 adds compatibility with MacOS System 8, ProTools 4.0 and QuickTime media files, as well as new databases and continued support for CD autochangers, DATs, HFS drives, audio routers and networking.

Also: Dynamic Range; The Works; Foley Footsteps; Sonic Source; CD-based sound effects and music libraries.

Sonic Solutions **S2338**

Intro: Sonic DVD Creator DVD premastering system consisting of four modules for high-quality MPEG-2 and MPEG-1 video encoding, audio prep and encoding, authoring and proofing; SonicStudio family of PCI-based digital audio workstations customized for specific applications, including CD mastering, audio-for-video post production, radio broadcasting, sound for picture, high-definition audio and DVD premastering and authoring.

Sonifex Ltd. **RL1427**

Intro: Courier portable recorder/editor for recording high-quality digital audio to removable PCMCIA cards and transferring audio as data via mobile phone, standard telephone, ISDN or by removing the PCMCIA card.

Also: Sentinel+ Index audio loggers; DHY-02 digital telephone balance units.

Sony Electronics Inc. **6332**

Intro: 800 Series Wireless Mic components for TV, live theater and concert sound; "Oxford" OXF-R3 large-scale record/mix console with 24-bit digital I/O and up to 120 input sources for mixdown; PCM-3348HR high-resolution DASH PLUS multitrack tape recorder, with 48 channels of 24-bit audio recording.

Also: MZ-R3 portable MiniDisc recorder with combined stereo headphone/controller; MZ-B3 portable MiniDisc business recorder with voice-activated recording feature; MDS-B5/B6P MiniDisc record/play deck.

Sound Ideas **6956**

Intro: "Rocky & Bullwinkle and Friends" three-CD collection of sounds from the TV show; Sci Fi Series 8000 four-CD collection of science fiction effects by sound designers who worked on "Starship Troopers," "Contact" and "Mars Attacks;" Mix IV and Mix V broadcast music libraries of royalty-free production music and sound effects.

Also: Sound Ideas and Sound Effects libraries Series 1000 through 8000; Mix broadcast music libraries I through IV; Hanna-Barbera; Lucasfilm; Universal; Turner Entertainment Co.; Warner Bros.; Twentieth Century Fox; and Disney Ideas.

Soundscape Digital **M1859, RL1419**

Intro: Version 2.01 software adds punch in/out and loop in playback features, as well as Windows NT drivers, compressor limiter gate and expander plug-in; SS8 I/O-1 and SS8 I/O-D audio interface box with TDIF and ADAT ports and eight balanced XLR I/O and 20-bit Crystal A-to-D/D-to-A converters; Rosendahl WIF sync box for conversion from SMPTE to MIDI time code.

Also: SSHDR-1 and SSHDR-1 Plus digital audio workstations; Rosendahl VIF, BIF and MIF synchronizers.

4478 Market Street #706
Ventura, CA 93003
UNITED STATES
Contact: Ken Dewar
Telephone: 805-658-7375
FAX: 805-658-6395
E-mail: us-sales@soundscape-digital.com
World Wide Web:
http://www.soundscape-digital.com/

Southern California Leasing **M5723**

Intro: Equipment financing for the entertainment industry.

SpaceCom Systems Inc. **T5473**

On Display: Point-to-multipoint satellite communications; FM squared; HyperCubed; and FM Cubed.

SSE Telecom **T4267**

On Display: MediaStream Network WAN multimedia networking, including a complete uplink earth station, broadcast file server and Internet/intranet solutions; SM3000 and SM4000 variable-rate digital satellite modems; StarLinK and StarLinC integrated satellite transceiver and modem.

Staco Energy Products Co. **13157**

Intro: True-On-Line KVA three-phase UPS Series; AVR or MVR Series of voltage regulators and PLC or MLC Series of power conditioners in front-accessible, floor-mount enclosures.

Stainless Inc. **7805**

StarGuide Digital Networks **RS5048**

Intro: StarGuide III satellite receiver featuring a 128 kbps minimum aggregate rate for SCPC operation with variable rate increments up to 12.288 Mbps; new Ethernet interface option module.

Also: StarGuide II digital satellite receiver.

STM Wireless Inc. **T3868**

Intro: Systems integration and technical services for the telecommunications industry.

Also: VSAT networks for voice, data, Internet access, video and multimedia applications; SMR-2000 digital wireless networks; terrestrial networking products; satellite earth stations; transportable and mobile earth stations; satellite and microwave systems; and systems design and integration services.

Studer Professional Audio **8343**

Intro: On-Air 2000 digital broadcast console featuring easy-to-learn "Touch n' Action2" user interface; D950 digital mixing console that is fully scaleable and configurable with DSP-Core; and V-Eight 20-bit, eight-channel digital studio recorder based on the ADAT type II format.

Also: A807 two- and four-channel tape recorders; A827 analog 24-channel tape recorder; D827 48-channel digital tape recorder.

Studio Systems Electronics **S1039**

Intro: Medialink500 Series multimedia cable distribution product for bi-directional broadcast-quality audio/video distribution; Fibrelink600/700 Series multimedia fiber-optic distribution system for voice, video and data distribution over multimode fiber; and Lazerlink800 Series modular multimedia fiber-optic distribution product.

Also: Viewlock/Audiolock video and audio line cut and rotate encryption systems for use with microwave transmission units.

Studio Technologies Inc. **RL4019**

On Display: IFB Plus Series talent cueing system designed for use in ENG/SNG production vehicles; Model 750 audio mixer and Model 770 audio mixer/IFB controller for portable use.

Survey Technologies **T5068**

Svetlana Electron Devices, **RL4311**

Intro: 4CX12000A power tetrode for FM transmission; 4CX20000A and 4CX20000C power tetrodes for FM transmission; 4CX20000B power tetrode for AM transmission.

Also: Complete line of broadcast, industrial, audio and amateur radio vacuum tubes.

Switchcraft Inc. **RL2525**

Intro: TTP96 patch panel with front-panel access to jacks; TT96 EDAC connectors; TT253NC screwless large-cable clamp; and heavy-duty 3.5 mm plug.

Also: Audio connectors; jacks; plugs; patch kits; patch panels; patch cords; cable assemblies.

See LISTINGS, page 56 ▶

▶ LISTINGS, continued from page 55

S.W.R. Inc. **5909**
On Display: FM antennas; RF components; and rigid transmission line.

Symetrix **RL2019**
Intro: 565E dual compressor/limiter/expander with in-line dynamics processing; 552E dual parametric EQ with proprietary topology that delivers extremely low noise and distortion.
Also: EQs; vocal processors; mic preamps; audio delays; effects processors; compressor/limiters; mic/line mixers; audio amplifiers; and A-to-D converters.

SystemBase Ltd. **6957**
Intro: C400xr codec for bi-directional 15 Hz stereo audio links over ISDN; MUX256 two-port multiplexer with automatic data rate detection and delay compensation between channels of 2 seconds.
Also: C300xr ISDN audio codec; C100xr X.21 audio codec; and RG70 two-wire converter.

Systems Wireless Ltd. **13270**
Intro: RI/TI frequency-agile UHF wireless IFB system that interfaces to most intercoms or audio sources; synthesized studio UHF wireless mic with autotracking front end to filter out RF interference.
Also: Wireless UHF intercom system; digital intercom system.

Talk America Radio Networks **T4168**
Intro: Talk America Hispanic Satellite Network featuring Hispanic music, 24 hours a day. Talk America Hispanic News Network Hispanic with news on the hour, 24 hours a day.
Also: WorldWeb News Network — World and National headlines on the hour and half-hour, 24/7; sports on the hour, 24/7; customized weather, 24/7. Talk America Radio Networks — live Talk Programming, 24/7. Both available on C5, G4 and Spacenet 3.

Tannoy/TGI North America **S4044**
Intro: Tannoy Reveal 6.5-inch, two-way shielded studio monitor; Tannoy System 600A fully active, fully powered studio monitors featuring Tannoy dual concentric technology.
Also: Tannoy System 600, System 800, System 1000, System 1200 and AMS Series studio monitors; Limpet amplifiers.

Tascam **12962**
Intro: MMR-8 modular hard disk-based multitrack recorder with direct ProTools session file support; TM-D8000 digital mixer; MMP-16 16-track hard disk player with direct support to ProTools session file.
Also: DA-98 digital multitrack recorder; DA-302 DAT recorder.

TBC Consoles **4757**
Intro: Production series console with mix-and-match module constructed design; Freeform consoles in free-flowing amorphous shapes and unique materials to meet aesthetic and ergonomic requirements; modular consoles with adjustable work surfaces and a choice of finishes.
Also: Custom consoles for audio suites and video post production.

TC Electronic Inc. **RL4213**
Intro: DB Max II 24-bit digital multiband dynamics processing for broadcast and post production; Gold Channel digitally enhanced mic preamp/processor with 24-bit D-to-A and 96 kHz equalization and dynamics special processing; Fireworx advanced multieffects processor.
Also: Finalizer Plus; M5000; M2000; 1128; DK AU810; Tube Tech; and Carl Martin.

Technosystem SpA **RL4416**
On Display: TV and FM transmitters and transposers; turnkey network and station design services; DAB and DVB systems; 50 GHz analog and digital radio STLs.

Tektronix Inc. **11614**
On Display: MTS200 Series MPEG test systems; NewStar newsroom automation equipment, including EditStar; Lightworks V.I.P. 4500 on-line editing system; and Grass Valley switchers and routers.

Telect Inc. **5053**
Intro: Digital/analog audio umbilical patch panels with punch-down IDC connectors.
Also: Comprehensive line of professional audio and video modules, controllers and patch panels; VersaFrame 2000 modular signal management system; programmable remote controllers; audio/video patch cords and accessories.

Telex Communications Inc. **9729**
Intro: RTS Zeus 2400 DSP intercom system for auditorium and stadium installations, as well as broadcast and simulator situations and military and industrial applications;
Also: Radiocom BTR-600 two-channel encrypted digital intercom system; BTR-500 two-channel UHF wireless intercom system.

Telos Systems **I12420**
Intro: The Zephyr range of ISDN audio transceivers, including the new ZephyrExpress single-unit full-featured codec, ISDN terminal adapter and audio mixing/monitoring system in a road-rugged chassis; Audioactive professional hardware and software solution for transmitting real-time and stored audio streams over the Internet.
Also: 100 Delta digital hybrid, Telos ONE digital hybrid telephone interface; ONE-x-Six talk show systems.

Teracom Components AB **RL 2425**

TFT Inc. **RL2812**
Intro: EAS 943 telephone access unit for EAS 911 EAS encoder/decoder for recording and encoding EAS messages from any DTMF (Touch-Tone) telephone, as well as for remote testing.
Also: 884/844A FM baseband stereo, 923 AM, 930A MultiMod, 850/851 BTSC Aural and 855 SAP/Pro modulation monitors; 860 multifunction audio analyzer; 911R and 911T EAS encoder/decoders; DMM-92 STL digital encoder/decoder modem multiplexer; 8300/8301B, 7700/7707 and 9100A/9107B STL composite receivers and transmitters; and 9200/9205N Mono receivers and transmitters.

THAT Corp. **S9718**
Intro: Digital BTSC audio system featuring all-digital stereo and SAP subsystem and state-of-the-art separation and frequency response without requiring alignments; FlexNet modular networking products for adding network control capability to OEM products; and THAT 2002 modular VCA upgrade to 202 VCA.

Thermodyne International Ltd. **12231**

Thomcast **8313**

Thomson Components & Tubes **7726**

Tiesseci Snc **RL1003**

Tiffen **12945**

TimeLine Vista Inc. **RL1919**

TRF Production Music **7953**
Intro: Powersound production music library of acoustic background and theme music in multiple styles, including technopop, alternative rock, new age, rave, R&B, holiday and reggae music; CDM production music library of instrumental combinations ranging from full symphony orchestra to small acoustic groups and single instruments with packages for sports, news, rock, blues and jingles; 20 new CDs of production music and sound effects, including classical fusion, riverdance, epic movie themes, retro, new age, contemporary, top 40, sports, news, technopop, rock, blues and dance music.
Also: Production music libraries featuring more than 50,000 selections in collections such as Bosworth, MP 2000, Musictrack, Pyramid, Powersound and CDM; comprehensive sound effects library.

Triple Crown Products Inc. **S10218**

TWR Telecom/Lighting Inc. **RL2413**

See LISTINGS, page 58 ▶

YOU MOVE ME

The 16000D Digital Audio Routing System is the powerful new compact switcher from Sierra Automated Systems.

This spirited performer really moves AES/EBU or S/PDIF digital audio around with operational ease and long-term reliability.

Completely self-contained, the 16000D handles 32x32 routing in a mere two rack-units. Through a variety of schemes utilizing off-the-shelf, pre-made cable assemblies and cross-connect blocks, system interconnect is now faster than ever before.

This switcher gives you full-system access 'XY' controls; plus a bright read-out for displaying inputs/outputs, and system settings. A digital receiver and D to A converter provide confidence monitoring via a convenient front panel speaker!

The 16000D makes everything easy—with programmable salvo switching, PC software control, scheduled event switching, universal serial ports for distributed control networks, and employs the full range of SAS remote control panels.

The 16000D moves with high-octane performance. The control system is versatile and thorough. Quality and reliability are never compromised.

Wired thing... We think you'll love it. For more information about the SAS 16000D, please give us a call.

SAS

Sierra Automated Systems and Engineering Corp.

2112 No. Glenoaks Boulevard Burbank, Ca 91504
818 840 6749 Voice 818 840 6751 Fax
www.sasaudio.com

See Us at NAB Booth # RL3613

Circle (54) On Reader Service Card

▶ LISTINGS, continued from page 56

Tyros Trade Srl **RS5542**
On Display: FM radio broadcast transmitters; antennas; consoles; and audio processors.

UDT Instruments **5258**

USA Digital Radio **SP30-33**
Intro: Audio Technology. Committed to the establishment of a universal digital audio broadcasting (DAB) system. In-Band On-Channel (IBOC) DAB technology is designed as an enhancement to current analog radio broadcasting and is the best option to assure a cost-effective, enhanced quality sound, compatible digital audio broadcasting system.

Utility Tower Co. **RL3401**

V-Soft Communications **RL2428**
On Display: SearchFM; InterDLC; IDCensus; IDCity; IDTower; IDStations; Contour; FMCont; LRStudy; InterDLG; RFHaz; SearchAM; and TVFile.

1600 Picturesque Dr.
Cedar Falls, IA 50613
UNITED STATES
Contact: Kate Michler, Business Assoc.
Telephone: 319-266-8402
FAX: 319-266-9212
E-mail: kmichler@v-soft.com
World Wide Web: http://www.v-soft.com

Valcom Ltd. **RS4948**
Intro: AM broadcasting tower; free-standing AM/FM fiberglass antenna with a mechanical length of 74 feet to 80 feet but an electrical length of 140 feet to 450 feet, depending on the frequency.
P.O. Box 603
175 Southgate Dr.
Guelph, Ontario N1H 6L3
CANADA
Telephone: 519-824-3220
FAX: 519-824-3411
World Wide Web:
http://www.valcom-guelph.com

Valentino Music and Sound Effects **7315**
Intro: Valentino production music and sound effects, which are now Internet accessible, as well as available on hard disk or CD ROM.

P.O. Box 534, 500 Executive Blvd.
Elmsford, NY 10523
UNITED STATES
Contact: Francis T. Valentino
Telephone: 914-347-7878
Toll-free: 800-223-6278
FAX: 914-347-4764
E-mail: tvmusic@ibm.net
World Wide Web: http://www.tvmusic.com

Videoquip Research Ltd. **RL1302**
Intro: RS-3200 32-x-32 crosspoint routing switcher with local push-button control or remote control via RS-422; DM-1 AES/EBU portable digital audio monitor.
Also: Phase 3 half-rack products; DAVE-2000 audio editing system; and various routing switchers and distribution/duplication amplifiers.

W. Clark & Associates Ltd. **5041**
Intro: GPS-200 master clock; GP referenced time code generator; TCR-500 time code reader card for PCs and file servers that reads SMPTE, EBU and IRIG-B time codes and locks PC clocks; and TCI-232A time code interface/converter.

Ward-Beck Systems Ltd. **RL2200**
Intro: ABS-1 audio bit splitter low-cost portable digital and analog audio signal generator; D8201 1-x-8 digital audio DA with cable equalization, data reclocking and error detection in 110- or 75-ohm versions; D8202 AES D-to-A converter with cable equalization and 24-bit conversion technology.

Warner Electric **RL1627**
On Display: Stabiline WHR Series automatic voltage regulators; WHC and PPC Series power conditioners; uninterruptible power supplies; PQI Series transient voltage suppressers and RFI filters.

WaveFrame **M7840**
Intro: WaveFrame 408 Plus with eight tracks per SCSI bus and real-time crossfades; WaveFrame Version 6.20 software with support for multichannel digital I/O, fast waveform display, multiformat file translation and OMF import/export.

The Luxor

Wheatstone Corp. **RL2619**
Featuring: An extensive product line of broadcast audio consoles.

Whirlwind **7352**
Intro: Qbox audio line tester combines in a single battery-powered box, mic, speaker, test tone generator, outputs for standard headphones or a 2K earpiece, and voltage presence monitoring for phantom or intercom power; SC48NL and SC48EP cable checkers for EP or NL speaker and standard XLR cables.
Also: Medusa Snakes; US Audio MIX-5s; IMP2; Director; HotBox; Leader cords; and PM tubes.

WHo DId THaT MUSiC Library? **RL2527**
Intro: Seven new CDs, including Dance/Techno/Jungle Vol. 2, Film/Scores Vol. 2, Sports Vol. 2, Alternative, Orchestral, High-Tech/Sci-Fi and Sound Design; a new library project.
Also: 21-CD production music library for audio and video producers; 21-CD production music library designed for those with extreme tastes.

Will-Burt Co., The **13600**

Intro: D-Tec three-in-one safety package for telescoping masts, including a 35 W look-up light to illuminate the area above the mast, an AC sensor that actively scans for nearby exposed high voltage and provides a warning signal if voltage is detected, and an anticollision system to detect obstructions and stop the mast extension; 9.5-56 56-foot telescoping mast.
Also: Pneumatic telescoping masts for RENG mast models.

Winsted Corp. **S2928**

Wohler Technologies **12178**

WorldSpace **RS3844**

Wormald Technology **RL4325**
Intro: D-Radio computer-controlled, digital on-air console system that interfaces to other equipment, such as switchers and digital audio storage devices; BM300 mixing console featuring a fully digital control bus that gives flexibility to the way it is configured and operates; D-CART multi-user digital audio recording, editing and playback system designed to replace reel-to-reel and cartridge tape machines.
Also: Time zone delay; PC GUI interface.

Yamaha Corp. of America **RL1206**
Intro: 03D VEK, ESAM upgrade to the 03D digital mixing console to allow for control by a video editor; 01V digital mixing console with digital I/O option cards, scene memory, built-in effects and 24 inputs; GA32/12 10-bus mixing console.
Also: 02R Version 2 and 03D digital consoles.

Zaxcom **9672**
On Display: Arria and DMX 1000.

Workbench

Radio World, March 18, 1997

Punch Block Walls and Optical Pickups

John Bisset

Are you ready to save some money? (What engineer isn't?)

Longtime friend, engineering associate, and **RW** columnist John Diamantis shared a real find from the pages of the MCM Electronics catalog. On page 64 you will find original Sony optical pickups for Denon CD players at prices less than $50!

For 951/961 Denon machines, the KSS-240A (MCM part number 35-440) is used. For Denon 950 machines, use a KSS-210A (MCM part number 35-430). MCM also stocks a wide variety of belts, gears, and popular parts for cassette and VCR machines, too.

John reports that these pickups were almost $100 in earlier MCM catalogs, but have recently dropped in price in the most recent catalog. These are the exact same lasers, so stock up! Contact MCM Electronics at (800) 543-4330, fax (937) 434-6959.

Their catalog lists more than 36,000 items. They offer same-day shipping, and now stock Sony, Tektronix, Philips, and Magnavox products and components.

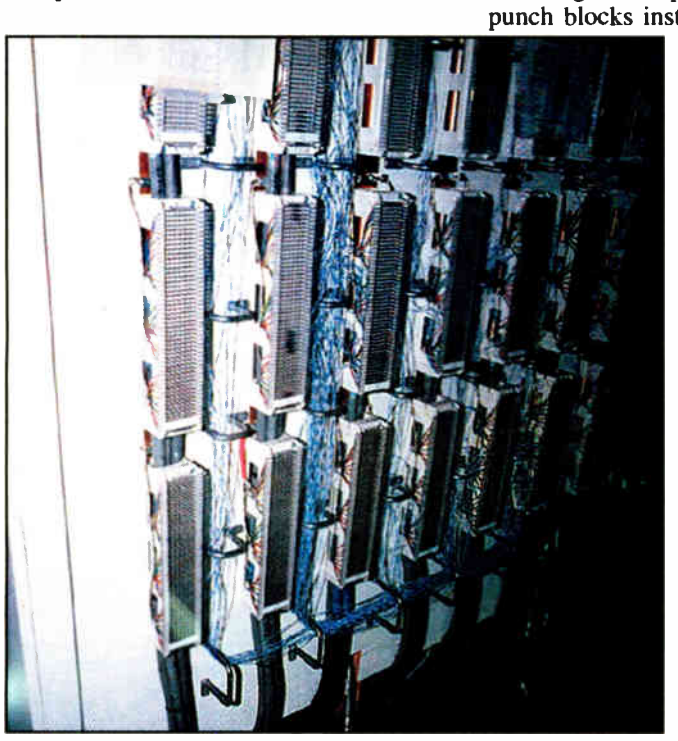


Figure 1. Doing it right: The audio and control circuit punch block wall installed at WBQB, Fredericksburg, Va.

★ ★ ★

Figures 1 and 2 show the audio and control cable routing that John used at WBQB(FM), Fredericksburg, Va., during his recent transmitter plant refurbishment.

Though my associate Tom Ringer is responsible for the bulk of the wire punching, the layout was John's. Not shown are the plastic covers Tom added after the job was done.

Before you dismiss the plastic covers as a waste of money, consider the client whose blocks were mounted under a console. A jock threw away a rolled-up aluminum gum wrapper, which fell into the punch blocks instead of hitting the trash can, shorting a remote input that was used once a week. Days later, the line was dead when potted up.

As Tom remembers, it was one expensive service call to remove the "short." The plastic covers went on the next week! You can reach John Diamantis at WBQB at (540) 373-7721.

★ ★ ★

Paul Kaminski is the news director for Motor Sports Radio Network, and another regular **RW** writer. Paul e-mailed a neat way to provide a mic boom counterweight when no accessory stores are open.

If your booms are drooping, visit a hardware store and ask for some wire rope clips. These clips are basically steel threaded u-bolts, with a channel in which the wire rope lays. The bolts will fit nicely around the back end of a Radio Shack mic boom and two of them will balance out an AKG-D3800 on a gooseneck. Some mics may need more than two clips.

The wire rope clips have two nuts on each end of the threaded u-bolt, and they need only be finger-tight and placed near the rear of the boom. Paul picked up two of these clamps for $4.50 (including tax).

Before you buy the clips, be sure to measure the diameter of the boom to ensure the channel is wide enough to permit the clips to fit over the boom. The clips with bigger diameters work better, and have more weight to them.

Paul Kaminski can be reached on-line at *motorsportsradio@compuserve.com*

You can e-mail your favorite tip, pick up a modest remuneration from **RW**, and earn SBE recertification credit by addressing your submission to *wrwbench@aol.com*

■ ■ ■

John Bisset is a principal with Multiphase, a technical services company. Reach him at (703) 323-7180.

Printed submissions qualify for SBE recertification credit. Fax submissions to (703) 764-0751, or send them via e-mail to wrwbench@aol.com

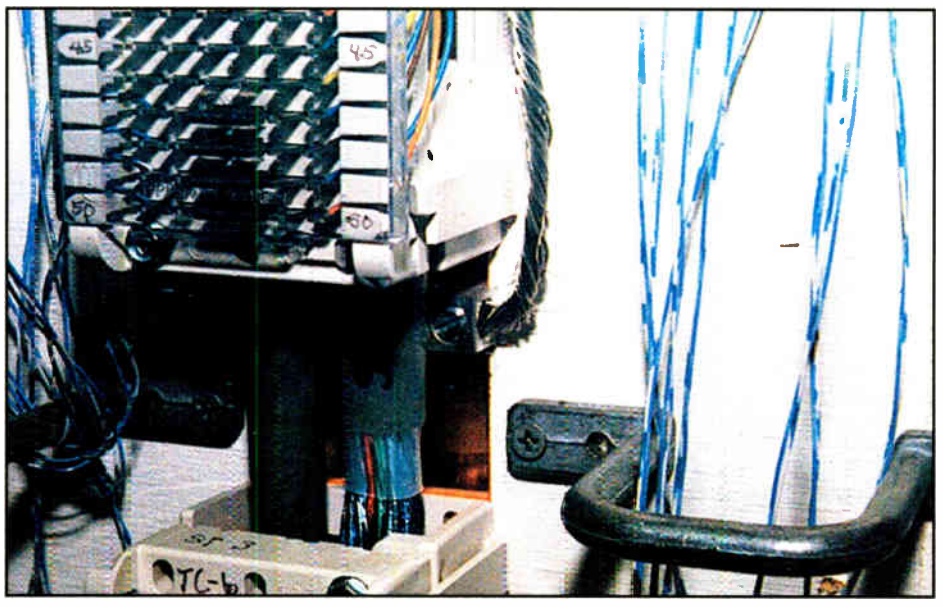


Figure 2. Punch block detail. Note the copper ground strap behind the blocks. Shields from multi-pair cables are tied together to this strap.

"WE CHOSE DALET" The Wo

Paul Sanchez and Jim McGivern at Emmis New-York (Hot 97, Kiss FM, CD101.9)

Leading broadcasters all over the world rely on Dalet. Dalet has more installations than any other system.


Full Redundancy Servers

Reliability

Dalet has the proven expertise to guarantee that your station stays on the air. Choose from a wide range of security options (RAID array, mirrored servers, local backup) to meet your specific requirements. Dalet's digital audio system has been running on Windows and networks for eight years, at hundreds of sites – from stand-alones to hundred-plus workstation networks. It works for them, it can work for you.

"Dalet has improved the way we do business. It's easier to maintain, and has changed the capabilities of the radio station. But as far as the on air product is concerned, we really didn't want to change the way it sounded. We had very good sounding radio stations before. This has been maintained using the system. And as time goes on, we're getting better at maximizing the use of the system."

Jim McGivern,
Chief Engineer, Emmis New York
(Hot 97, Kiss FM, CD 101.9)

Cost Efficiency

Whether you are a large or small market station, Dalet offers a completely integrated suite of software which allows the entire staff to work together. All departments – traffic, production, programming, news and on-air – have simultaneous access to all audio, copy and logs. With modular software options, the Dalet system can meet your specific budget requirements – growing with your business needs. Standard hardware also means cost savings. The system is not proprietary, and will grow with the industry. Finally, with Dalet's easy-to-use interface your staff will be operational in no time.

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- Unlimited Storage/Users
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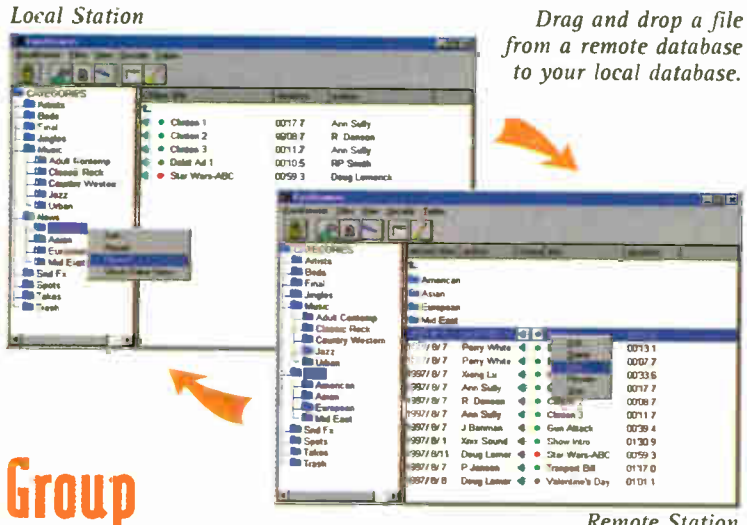

Group Connectivity

Consolidation can generate huge productivity gains, provided groups have the right tools. Dalet is continuously developing new solutions to meet the evolving needs of our clients. With TeamRadio – Dalet's traffic and billing software – the business of over 1000 radio stations can be linked together. Intranet applications allow stations within a group to access each other's orders and audio remotely.
The production work done by one station can be used by another, only minutes later.

Dalet On Air Workstation

Exchange Files through an Intranet Audio Server

Unprecedented Support

Dalet is a service-driven company. With more than 70 engineers, we guarantee your station stays on the air. Dalet's support experts are on call, 24 hours a day. Clients have on-line support over the Internet. We can also provide on-site visits to upgrade an existing system.
"Support on any of these systems, I think, is imperative...
Dalet support has been excellent."
Jim McGivern

Free Demo At Your Office

Call us to set up a date. We'll bring the demo to you or make arrangements for you to visit an installation that best fits your needs.

Call (212) 226-2424
or visit
www.dalet.com

Circle (126) On Reader Service Card

WIRED FOR SOUND

Lessons in How to Wire an XLR

Steve Lampen

All XLR-style 3-pin connectors are compatible. The wiring for each is almost identical. There are a few tricks you should learn about soldering these connectors.

The first thing to remember is this: the order in which the connector comes apart should be reversed when you are putting the connector back together. That may seem ridiculously obvious, but if you solder more than a few of these connectors, you will find your most beautiful job ruined by not reassembling the connector in the appropriate order or forgetting something. You will have to either do without the part (not advisable) or unsolder the thing and start over.

The take-apart order for the three most common XLR connectors follows. Once the wire is inserted (last step), go back up the list in reverse order to reassemble.

ITT Cannon XLR

1. Remove the two screws at the back of the connector and remove the strain relief bar.
2. Remove the single screw on the shell of the connector.
3. Pay attention! Some of these screws have tiny washers.
4. Using a small screwdriver or something similar, push up the back of the connector until the insert is dislodged.
5. If the connector is a female unit, you can also remove the insert from the front of the connector. (If you have a female connector, you can accidentally make the lock and lock spring fly off if you pull the metal housing from the outside of the neoprene. You don't want to do that!)
6. If removing the insert does not also remove the cardboard or phenolic protection tube, look inside the shell and remove it with a small screwdriver.
7. Place the raw cable to be connectorized through the neoprene tube and strain relief and place the cardboard or phenolic tube on the cable.
8. The cardboard or phenolic tube should fit snugly around the now soldered pins after soldering the cable.
10. Now do steps 5 to 1 above in reverse.

Switchcraft A3

1. Loosen the two headless screws at the back of the connector. If the cable you will be inserting is large, you might have to remove them completely.
2. Turn the headless screw that holds the pin insert. Remember, this is reverse-threaded. To take it out, turn the screw clockwise. To put it back, turn counter-clockwise.
3. Push the insert with a small tool or screwdriver until it comes out the front. The female version can be pulled out from the front.
4. A clear plastic tube should come with the insert. If not, check inside the body of the connector and pull it out with the appropriate tool.
5. Push the raw cable through the back of the connectors. If it does not go, see step 1.
6. Put the clear plastic tube loosely on the cable.
7. After soldering, push the plastic tube around the three soldered pins.
8. Repeat steps 3 to 1 in reverse.

Neutrik NC3

1. Unscrew the back boot.
2. Inside you will see the black plastic strain relief. Pull it out the back.
3. You should then be able to push the male or female insert out the back.
4. Put the raw cable through the boot.
5. Put the cable through the strain relief (or put it on later, as it is split on one side).
6. When your soldering is down, repeat Steps 3 to 1 in reverse.

Your most beautiful soldering job can be ruined by incorrectly reassembling the connector.

Soldering of all three connectors is almost identical. Both the front and back of each insert numbers the pins so you cannot confuse which pin is which. It is simply a matter of the type of cable you will be soldering.

When choosing cable to put in your XLR, you have three basic types to consider: the twisted-pair with braid shield, the quad or star-quad with braid shield, and the twisted pair with foil shield. (A fourth type is twisted-pair with no shield. We will get to that one later.)

Standard microphone cable is a twisted pair with a braid shield. This cable is made to be quiet while in motion, which is why it has a braid shield. (The foil shield cable is for permanent interconnects that are not in motion while in operation.) Here's how one might prepare a twisted microphone cable:

1. Using a razor blade or similar tool, remove approximately 1 inch of jacket.
2. To separate the braid, use a small nail,

See XLR, page 66 ▶

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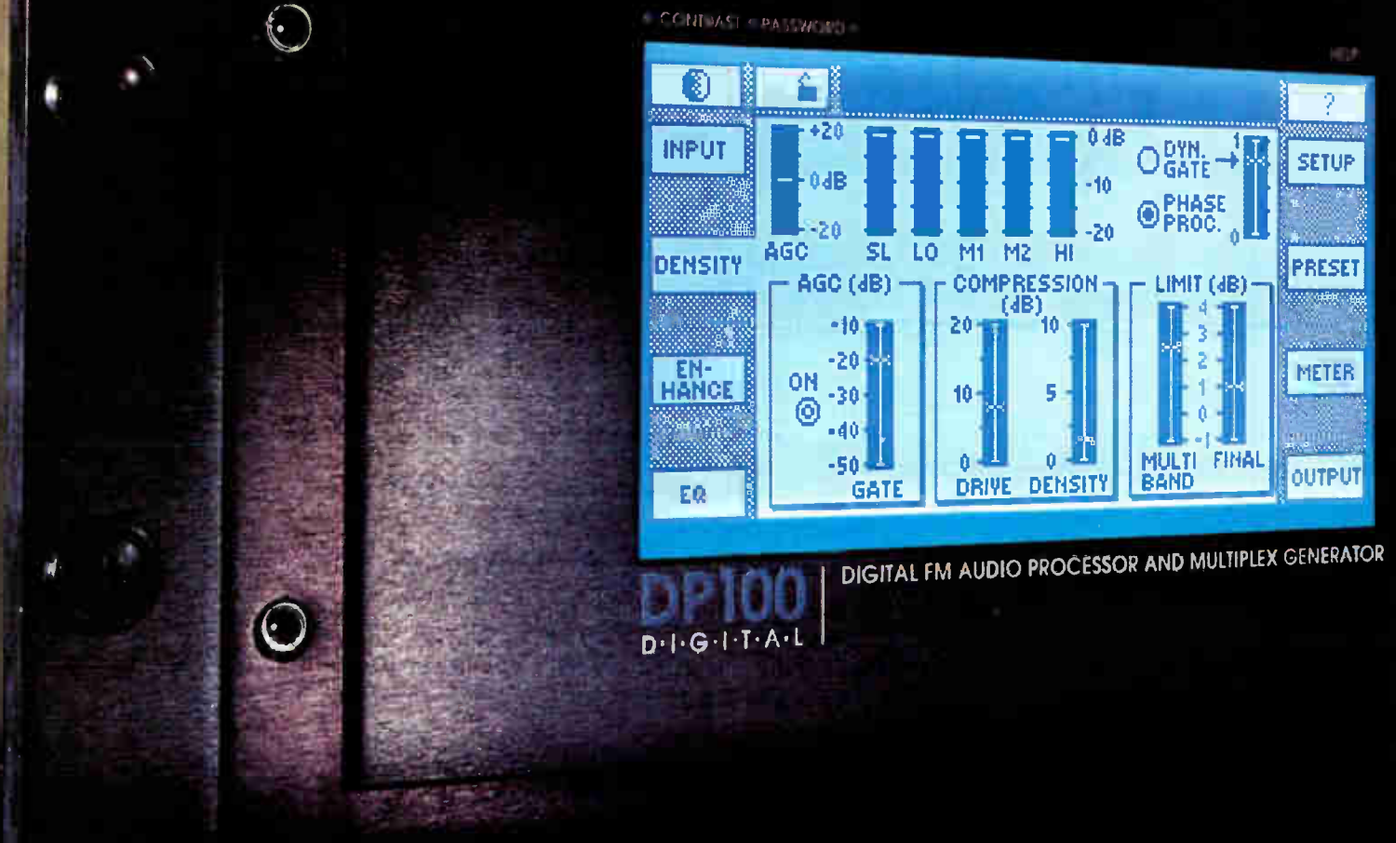

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AM Hybrid IBOC DAB System

David C. Hartup, Daniel M. Alley, Don R. Goldston

The authors work for Xetron Corp.

This paper describes the current state of the USA Digital Radio AM Hybrid In-Band On-Channel (IBOC) Digital Audio Broadcasting (DAB) system. This is the first in a multipart series, printed as a service to the industry by RW.

According to its developers, the system permits the simultaneous transmission of a digital signal and an analog signal within an AM radio station's current spectral allocation. The digital signal can be used to transmit high-quality audio and digital data services while transmission of the analog signal permits continued operation of existing radios.

The digital signal is modulated using OFDM (Orthogonal Frequency Division Multiplex), and the analog signal is modulated using conventional AM. The digital signal is modulated such that interference with the analog signal is minimized. The system is designed to operate in the presence of typical AM channel impairments and interference conditions.

This paper presents results of an AM channel characterization effort, a description of the AM IBOC waveform and spectral characteristics, results from a computer simulation of the system, proposed forward error correction (FEC) for the system, and a blend-to-analog with time diversity feature.

Introduction

Digital audio broadcasting can provide higher-quality audio than is currently available from existing analog broadcasting. The digital signal can produce audio with increased bandwidth, higher dynamic range, and less susceptibility to noise and interference than analog signals. In addition, digital broadcasting provides the opportunity to deliver auxiliary information such as station ID, program-related information, traffic and weather information, and emergency alerts.

The method chosen to deliver DAB must meet the needs of consumers, broadcasters and government regulatory agencies. As will be described, the IBOC approach to DAB accomplishes this goal.

The IBOC approach transmits the digital signal within the currently defined emission mask for a station. The current state of the AM Hybrid (meaning both analog and digital signals are simultaneously transmitted) IBOC system is described in this paper. USA Digital Radio (USADR) is also developing an FM Hybrid IBOC system, described earlier in **RW**, as well as AM and FM All-Digital IBOC systems.

Because the AM Hybrid IBOC system simultaneously transmits the analog and digital signals, existing radios can continue to be used during the time the upgrade to digital radios is made. This provides a smooth transition path to the DAB system. Consumers also will benefit from the higher sound quality and auxiliary data services available with DAB.

The AM Hybrid IBOC approach also has several advantages for broadcasters. Broadcasters can retain their current listener base while transitioning to DAB. Also, the investment required to transmit IBOC DAB is minimal, because much of their current transmission equipment can be reused and there is no need to obtain a new spectral allocation.

The IBOC approach also meets the needs of regulatory agencies because there is no need to allocate scarce spectral resources for DAB. Also, the process of analyzing station-to-station interference scenarios is not needed because IBOC DAB is designed to operate properly with the current allocation scheme.

The first section presents results of a study to characterize AM channel impairments resulting from structures such as bridges and power lines. Also, characteristics of AM nighttime interference are described briefly. The second section describes the AM Hybrid IBOC waveform and data rates. In subsequent sections we will describe a computer simulation of the system, which is being used in

See IBOC, page 65 ▶

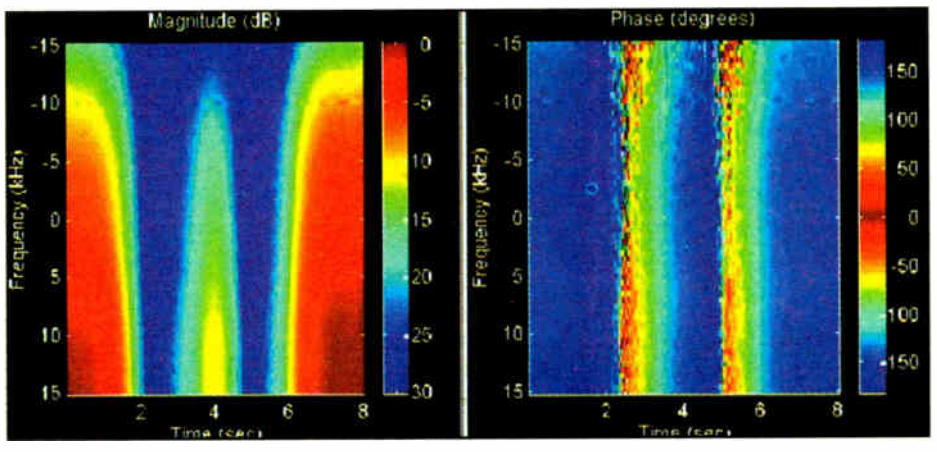


Figure 1: Channel Magnitude and Phase, 740 kHz, Dual Freeway Overpass Recorded at 27 mph

▶ IBOC, continued from page 64

design trade-off studies; briefly discuss candidate error correction schemes for the system; and describe a blend-to-analog feature.

Channel characterization

A study was performed to characterize wave propagation impairments in the AM channel. AM broadcasting is limited to 540 to 1710 kHz. Therefore, unlike high-

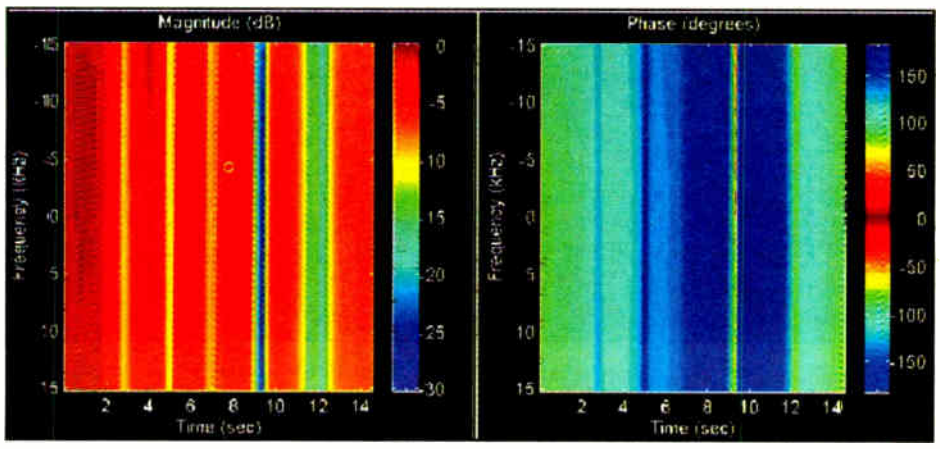


Figure 2: Channel Magnitude and Phase, 1150 kHz, Multiple Overhead Wires in an Urban Area, Recorded at 30 mph

er frequency channels, traditional multipath is rarely seen in the AM channel because of the large structure size required to reflect an incident wave. However, certain structures such as bridges and power lines can cause the magnitude and phase of the incident wave to change. The goal of the study was not to determine the physical mechanism causing these channel perturbations, but rather to measure and characterize the magnitude and phase changes caused by the impairments in order to minimize such effects in the system.

A digital test waveform consisting of 61 tones spaced by 500 Hz, resulting in a bandwidth of 30 kHz, was broadcast. There was no analog signal broadcast during these tests. The magnitude and phase of each tone was set to minimize the peak-to-average power ratio of the transmitted waveform; see reference note [1]. Minimizing the peak-to-average power allowed for maximal use of the transmitter and receiver dynamic range.

A mobile receiver was used to record the time-domain signal. At the receiver a portion of the time-domain waveform was processed so an operator could monitor the channel magnitude and phase. Data was recorded continuously into a circular buffer so that when an impairment was encountered, the operator could press a button to store the previous 10 to 15 seconds of the time-domain waveform.

Measurements were taken using center frequencies of 740 kHz and 1660 kHz in Cincinnati and 1150 kHz in Boston. The choice of these frequencies was sufficient to obtain measurements at the low, middle and high sections of the AM band. For each center frequency used, measurements were taken in a variety of locations including urban, suburban and rural.

The collected data was processed to determine how the channel had changed the magnitude and phase of each tone. The data was analyzed by synchronizing to the transmitted waveform and taking the FFT (Fast Fourier Transform analysis) of the waveform in 2 ms sections. The effects of the transmitter, antenna and receiver were taken out of the data records by processing a record taken in a clear channel and subtracting the results from the impairment data. In this way only the effects caused by the channel resulted.

The data collection process revealed that, for a high percentage of the time, the AM channel is nearly ideal. Data was stored when impairments occurred, which was close to 2 percent of the time data was collected. Of the stored data, only about 10 percent of the time is the channel impairment evident. The other 90 percent of the stored data is of a relatively clear channel before and

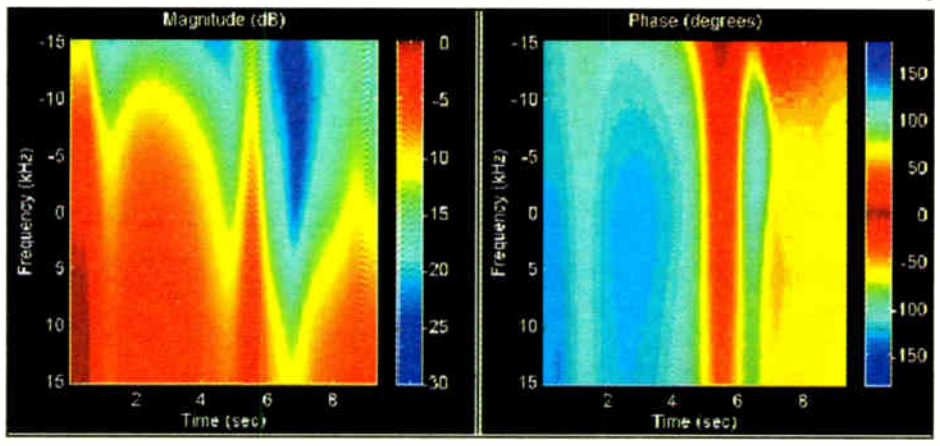


Figure 3: Channel Magnitude and Phase, 1660 kHz, Freeway Exit Signs, Recorded at 55 mph

after an impairment. This means that impairments in the AM channel occur approximately 0.2 percent of the time.

Figures 1-3 show examples of channel behavior when an impairment is encountered. The horizontal axis is time in units of seconds and the vertical axis is frequency in kHz. The left plot in each figure shows the channel magnitude in terms of dB and the right plot shows the channel phase in degrees.

Figure 1 shows a plot of the channel magnitude and phase as the receiver passed beneath a dual-freeway overpass (two sets of four lanes). The data record was taken using a center frequency of 740 kHz and was recorded at 27 mph. The magnitude plot shows the effects of the two overpasses. At the beginning and end of the data record the frequencies near -15 kHz are attenuated more than the frequencies near +15 kHz. This shows the frequency—selective nature of this impairment. The phase plot shows that the most severe phase changes occur for the largest attenuation. For all of the data collected, the largest phase changes were commonly seen near the largest attenuation points. The phase plot also shows the effects of limited receiver dynamic range in the deepest part of the fade. Although this data is somewhat noisy, the general characteristics are apparent.

Figure 2 shows a plot of the channel magnitude and phase as the receiver traveled beneath several overhead wires in an urban area. The data was recorded at 30 mph and the center frequency was 1150 kHz. As can be seen, the fades are nearly flat in this case. The first three fades have an attenuation of approximately 10 dB. The fourth fade has a deep null of about 30 dB and the fifth fade has 2 nulls of approximately 15 to 20 dB. The phase plot shows that the phase changes also are nearly flat and the largest phase change occurs for the largest attenuation.

Exit here

Figure 3 shows a plot of the channel magnitude and phase as the receiver traveled beneath freeway exit signs. The data was recorded at 55 mph and the center frequency was 1660 kHz. The first fade is a flat fade of about 20 dB and the second fade shows some frequency selectivity with a variation of about 5 dB across the channel.

During the data collection process it was noted that approximately 5 percent of overhead wires, 50 percent of overhead signs such as freeway signs, and almost all overpasses resulted in channel impairments. It was also noted that channel impairments resulting from overhead wires were slightly more severe at higher center frequencies. For example, a typical fade at 740 kHz was approximately 3 dB, at 1150 kHz it was approximately 6 dB, and at 1660 kHz it was approximately 9 dB.

Data also was collected at the three locations to measure the spectral characteristics of nighttime interferers in the AM band. The signal from the local station was turned off so that interference to the local station could be measured. The received signal was digitized at 64 ksamples/second into 30-second-long files, with recordings periodically made over a several-hour duration.

The instantaneous and average power spectrum of the nighttime interferer data was analyzed using FFTs with a bin spacing of 500 Hz. Power spectral data was merged into a histogram based on bin power vs. time in order to estimate the distribution function for the power in each FFT bin.

Based on this analysis, the energy in the AM carrier bin was found to be Rayleigh distributed as expected for combined carriers from multiple stations received on the same frequency. *(Ed. Note: Rayleigh distribution is a standard mathematical analysis that defines how deep and how often fades will occur in multipath situations.)* Due to the presence of adjacent channel stations, the data clearly showed signals at 10 kHz increments within the passband of the data collection system. Additional signals at 9 kHz spacings were also seen, which appear to be European stations received on the American East coast. The histogram of bins outside of the AM carriers were found to be approximately Gaussian in nature.

Both the channel characterization data and the nighttime interference data are used in the computer simulation of the system.

We will continue the discussion in the next issue of **RW**.

■ ■ ■

References:

[1] D. R. Gimlin and C. R. Patisaul, "On Minimizing the Peak-to-average Power Ratio for a Sum of N Sinusoids," IEEE Trans. on Comm.,

FEED LINE

More on Special CP Conditions

W.C. Alexander

This is the ninth in a series of articles about constructing an expanded-band AM facility. The previous part appeared in RW March 4.

If your expanded-band site is the same as an existing directional AM site or is in close proximity (less than 3 km) to a directional AM array, a special condition may be included on your construction permit that requires you to do two things. First, you must notify the licensee of that other station so that the licensee can begin determining power by the indirect method until an antenna resistance measurement can be made. Second, you must take steps to ensure the other station's directional pattern(s) has not been disturbed. This may include detuning of the expanded-band tower on the other station's frequency.

The CP special condition likely contains language requiring you to make partial proof-of-performance measurements, as defined by §73.154(a) of the FCC rules, both before and after construction of the expanded-band tower or installation of the diplexing equipment. In short, a partial proof entails measuring 10 points per radial, between 3 and 16 km from the transmitter site.

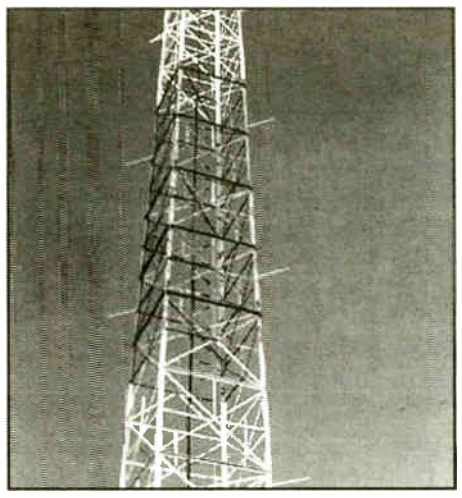
If diplexing on a co-owned regular-band station, you should have all the materials on hand to make the partial proof measurements. If the directional station is owned by another, you will have to enlist that station engineer's cooperation in obtaining the proof maps, point descriptions and the like.

In some respects, proofing a directional station that is co-owned is more burdensome because you not only have to show that the expanded-band construction has not affected the directional pattern, but also that the directional pattern is properly adjusted. Because you must show the array in proper adjustment, however, you may omit the before-construction measurements.

Proofs

In cases where the directional station is owned by another, your measurements need not show the array in proper adjustment. You only need show that no change occurred as a result of the construction.

Make the required partial proof of performance measurements both before and after construction. Omitting the before-construction measurements means you are out of compliance with the special condition of your CP and have no point of reference for determining whether the other station's directional pattern has been affected by the expanded-band construction. Should the other station's pattern show to be out of adjustment in the after-construction measurements, the burden of fixing it will be on you, whether or not the expanded-band construction had anything to do with the pattern distortion! Think of the before-construction measurement as cheap insurance. Retuning an array can cost upwards of $50,000.



AM Tower Detuned With Skirt

A complete report on the results of the partial proof-of-performance measurements must be submitted with the expanded-band license application to satisfy the special condition. This report should include a narrative describing the measurements, identifying the FIMs used in making the measurements and listing their dates of calibration (and a statement that the meters were compared and found to be in agreement). The report should identify the persons making the measurements and include a tabulation of the before/after-construction measurement and the before/after ratio for each measurement.

Antenna resistance

Another special condition that may appear in diplexed situations, and perhaps even in circumstances where the expanded-band station is in close proximity to another AM station's site, refers to the measurement of antenna resistance on the regular-band station. The construction of a large-aperture metal structure in the near vicinity of another AM radiator or array has the potential to alter the self-impedance of both structures, because of mutual coupling between them.

In diplexed situations, the addition of traps and filters may alter the base impedance of a diplexed non-directional radiator and the driving point impedance of each element in a diplexed directional array. This change in impedance can cause the direct power measurement method normally used to yield false power computations. Until the antenna resistance has been measured with the nearby structure in place, the affected station will have to use the indirect method of determining operating power.

An impedance bridge or meter is needed to comply with this special condition. The easiest and most accurate means of measuring antenna resistance is to use an operating impedance bridge (OIB). This type of bridge works in the circuit, with power being applied through the bridge. Insert the OIB in the common point, apply power to the system (be careful not to exceed the OIB power rating, typically

See PROOF, page 69 ▶

Make Room for Sleeving

▶ XLR, continued from page 62

pick or similar tool and *slowly* unbraid or "comb out" the braid until you have it all unbraided. Then pick one place and move the braid to either side (just like parting your hair — assuming you have any). Take the braid and twist it into a tight conductor, or "pig tail." (Note: There are a few microphone cables which have a braid for low noise and a drain wire under the braid, for quick connection. In that case, you can cut off the braid and just use the drain wire.)

3. If you are wiring up line-level cable (i.e. foil shield with a drain wire), you just remove the foil and use the drain wire. Some of these cables make it even easier by bonding the foil to the jacket. When you strip the jacket off, the drain wire comes with it.

If you want to increase reliability, you can put a piece of sleeving on the bundled-up braid or the stranded drain wire to prevent strands from accidentally touching the other two pins. Stray ground strands could unbalance your balanced line, or even short it out altogether.

While some people put on a piece of heat shrink, that is a poor choice because it can melt off if it overheats while the ground pin is soldered. Especially with a gathered braid, you will apply more heat to connect it than any other pin, even if you have meticulously gathered, twisted and tinned it. The next-best choice is PVC tubing. It is inexpensive and comes in various colors, which can be of some help in different applications.

The best choice for sleeving is Teflon tubing. It is the most expensive choice, but you only use a half-inch in each connector, and that is a minor cost compared to a mic line gone bad in the middle of a live broadcast or important recording. Put sleeving on all three pins to be really safe. Just remember to put the sleeving on each wire before you solder them.

And herein lies a little problem. All these connectors work best when the twisted pair and braid (or drain) are exposed as little as possible. The strain relief then has maximum jacket area to grab onto. But if you only expose a small section of wire or braid, you will not have enough room to put on any sleeving. All the more reason to use Teflon, because it melts at 200 degrees Celsius or higher.

■ ■ ■

Steve Lampen is a technology development manager for Belden Wire & Cable Co. in Richmond, Ind. His book, "Wire, Cable, and Fiber Optics for Video and Audio Engineers" was published by McGraw-Hill. He can be reached at steve.lampen@belden.com

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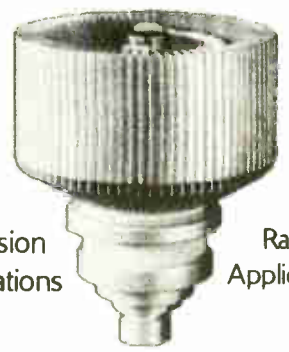

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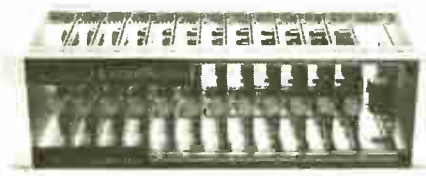

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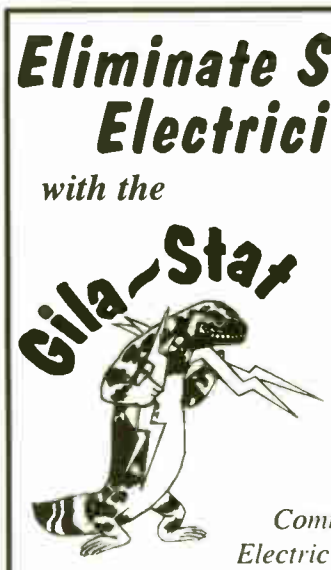

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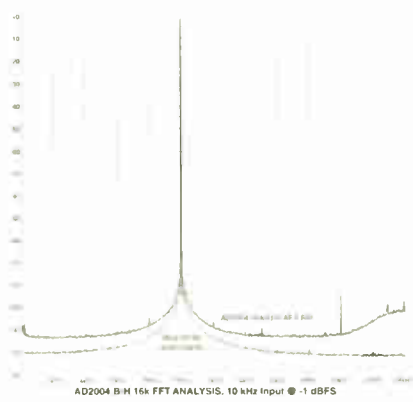

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READER SERVICE NO. 115

PIONEER PROFILE

Swede Invented Modern Transmitter

Barry Mishkind

Based on my broadcast industry experience, I suspect that most station staffers have never seen a transmitter.

Perhaps transmitter technology is more important for technical folks than for others, but the invention of the transmitter is a fascinating story that involves a relatively unknown industry pioneer: Dr. Ernst Alexanderson.

Wireless pioneers like Hertz and Marconi developed spark transmitters that opened up the airwaves to telegraphic communication. Morse code soon filled the air, crossed the ocean and brought the world much closer. News could be transmitted instantly, but only using the inefficient "crashes" of the spark machines.

The real breakthrough that led to the vibrant industry of broadcasting was the ability to send voice and music to receivers. Dr. Ernst Alexanderson developed the high frequency generator that made this possible.

Education

Alexanderson was born in Uppsala, Sweden, in January 1878. He developed an early interest in electrical engineering, attended the Royal Institute of Technology in Stockholm, and did postgraduate work at the Technical University in Berlin.

While in Germany, Alexanderson read "Alternating Current Phenomena" by Dr. Charles Steinmetz. Alexanderson was inspired to come to the United States to meet Steinmetz and seek work with him. Thus began a career of invention that brought Alexanderson a total of 344 patents, third only to Thomas Edison and Elihu Thompson, who would become the founders of General Electric.

Professor Reginald Fessenden initiated one of Alexanderson's first assignments. Fessenden sought to improve on the spark transmitters by building a transmitter that produced a continuous wave. A human voice could be carried upon the wave. Most alternating generators of the time were limited to about 60 Hz. Fessenden knew he needed a much higher frequency.

Fessenden's own experiments failed to create the necessary machine. In 1904, Fessenden turned to Alexanderson, who was working for General Electric. Fessenden asked him to develop a machine that would generate a frequency of 100,000 Hz.

It took two years, but Alexanderson constructed a 2 kW, 100 kHz alternator. Fessenden installed it in his transmitter at Brant Rock, Mass., and a historic Christmas Eve broadcast took place. Following a series of "CQ" transmissions in Morse code, radio operators were astonished to hear Fessenden's voice reading the Bible and poetry. As wireless rooms filled with the curious, a woman was heard to sing! The program concluded with a violin solo and short speech.

RCA

The Alexanderson alternator became the basis for all sorts of experiments and broadcasts. Marconi bought a 50 kW, then a 200 kW Alexanderson alternator for his transatlantic station at New Brunswick, N.J. In 1918, this station would be used to transmit President Woodrow Wilson's ultimatum to Germany, bringing the World War to a close. The station also permitted Wilson to stay in telephonic contact with the United States during his trip to the Peace Conference at Versailles, France, and back.

To show how much Marconi understood the importance of the high efficiency achieved by Alexanderson's alternator, he tried several times to buy exclusive rights to the alternator technology from GE. Interestingly, it was Wilson himself who appealed to GE not to do so, eventually helping organize a new company with Dr. Alexanderson at the helm to continue the development of his alternator: the Radio Corporation of America (RCA).

During the next five years Alexanderson worked at both GE and RCA. Focusing on the new technology of broadcasting, he developed a set of 12 multiple tuned directional antennas on Long Island, one of them 10 miles long. He did the pioneering work on transmission of pictures by radio, television and much more.

George Michael, who interviewed Dr. Alexanderson in 1947 on the NBC radio network, told me, "Alexanderson was ready for TV in 1922, but his bosses said, 'Let's get radio off the ground first.'" WGY(AM) in Schenectady, N.Y., became the testing ground for much of Alexanderson's work, including the development of higher power transmitters: 50 kW, 100 kW, all the way up to 500 kW.

However, Alexanderson could not stay on one project for long. A "mild-mannered, unassuming man," according to Michael, "Alexanderson would set out his theories and move on to something else, letting the GE labs finish off his projects." Interestingly, he said, "It appeared he did not realize how important he was in terms of the inventions. He saw them merely as just another challenge."

As one challenge after another was surmounted, Alexanderson moved from audio to video. In 1926 he sent the first facsimile transmission to go around the world. Passing through successive relays, the picture was reproduced on a machine in the same room as the transmitter after a mere two minutes.

Experiments

Alexanderson's experiments reached into all sorts of electrical engineering: an audio recording system using film in 1927, a mechanical system for color television in 1930, a telephone system to connect trains, light transmission (in 1927, he developed a "multiplex system" so radio stations could send four channels on light beams), and a secret telegraphy system used by the military. In 1928, Alexanderson discovered the radar altimeter, the forerunner of the radar developed by the British almost 20 years later. He even foresaw a time when electricity could be transmitted through the air.

In 1945, when Michael was new at WGY, he found himself with the opportunity to be the first to field-test another of Alexanderson's inventions: the portable sound recorder. Up until that time, recording audio in the field required a large van with disk transcription equipment. Michael was able to carry this new unit out and bring back audio from all sorts of venues.

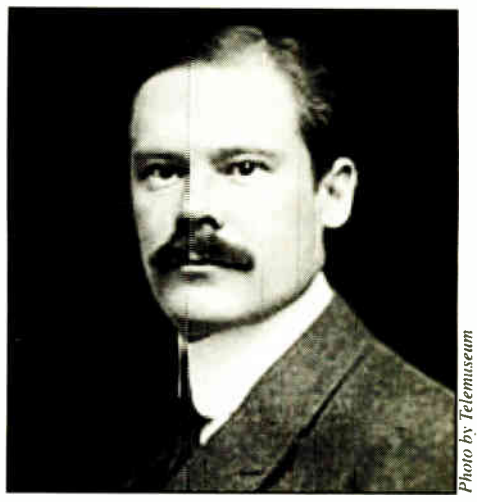


Photo by Telemuseum

Dr. Ernst Alexanderson

"Over the years, Alexanderson virtually invented everything GE did in the field of AM, FM and TV," Michael said.

Dr. Alexanderson was recognized with one honor after another for his contributions. He was elected to the Royal Academy of Science in Sweden, received the Medal of Honor from the Institute of Radio Engineers in 1919, Knighthood in Poland in 1924, the Edison Medal from the American Institute of Electrical Engineers in 1944 and the Royal Danish Medal in 1946.

Several of the original Alexanderson alternators can be found today in the museum set up in Grimeton, Sweden.

Spurred by his contact with Alexanderson, Michael has done a lot of research into the history of this broadcast pioneer, some of which is found at Union College's Schaffer Library in Schenectady and at the American Wireless Association Museum in Holcomb, N.Y. My sincere thanks to Michael for sharing his efforts with me.

■ ■ ■

Reach Barry Mishkind at (520) 296-3797, through e-mail to barry@broadcast.net *or through his home page at* www.broadcast.net/~barry/

Measurements Can Save Your Station Money

▶ PROOF, continued from page 66

5 kW), and follow the manufacturer's instructions for measuring resistance and reactance. Note the resistance and reactance reading, then correct the reactance reading for frequency by dividing the dial indication by the frequency in MHz. The dial resistance and corrected reactance need to be submitted to the FCC for the affected station on a Form 302.

Get good help

Because the Form 302 is, in effect, an application for modification of license of the other station, the other station's licensee will have to make the actual filing (at the expense of the expanded-band station licensee). It is a good idea, however, to obtain a copy of the filing and include it with your Form 302 to demonstrate that the special condition has been complied with.

Other special conditions on your expanded-band CP may relate to the site's specific location. What we have discussed here are the most common special conditions. If there is any doubt as to how to satisfy a special condition on your CP, enlist the assistance of a reputable consulting engineer. Ignoring special conditions or cutting corners when complying with them will only lead to trouble and delays.

■ ■ ■

Cris Alexander is director of engineering for Crawford Broadcasting in Dallas. Contact him at (972) 445-1713 or via e-mail at cbceng@compuserve.com

Learn to Service Your DAT Decks

The First in a Multipart Primer on How to Service Your Station Digital Audio Tape Machines

Jeff Johnson

Our network of stations relies heavily on digital audio tape for "net catch" time shifting, or recording network feeds for delayed playback. A number of programs we produce are recorded on DAT for later air dates. Our numerous machines became unreliable due to heavy use and inadequate, expensive outside service. I acquired service manuals for the various models and attempted to service the machines in-house.

This series of articles will outline the workings, malfunctions and mysteries of DAT. With this information in hand, you too should feel competent to bypass the potential expense and aggravation of outside service. I will cover theory, basic maintenance and cleaning, trouble symptoms, and how to detect and fix problems.

My goal is to strike a middle path between an overly simple tutorial and one so complex that it scares you away.

The transport

Mechanically, a DAT machine is like a miniature VHS machine. It originally was called R-DAT to describe the rotary head drum used.

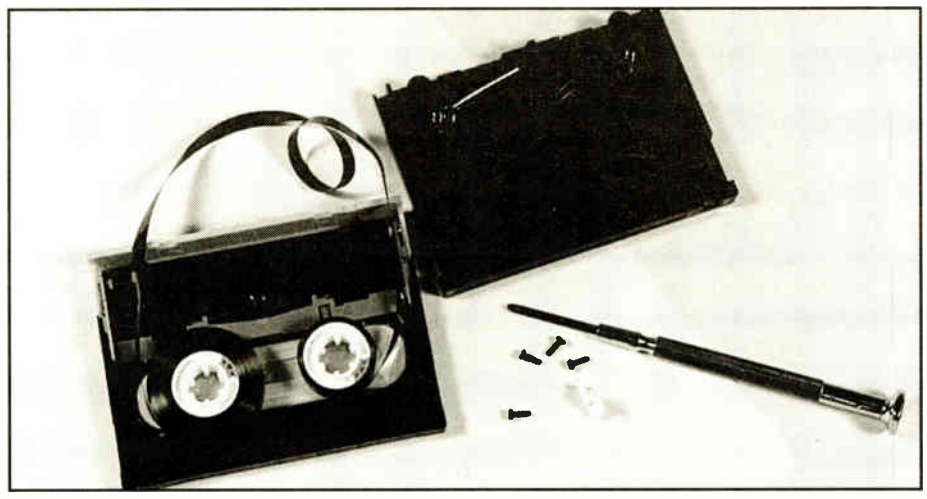
As in VHS, the DAT tape moves slowly through the mechanism, past a rotating drum containing the heads. In this manner, high head/tape relative speed is achieved. The tape moves past the head drum at an angle, allowing the heads to swipe across the tape at an angle. This design is called helical scanning. It results in narrow magnetic tracks at an angle, the skew angle, across the width of the tape.

These narrow tracks are recorded and played by two heads, called A and B heads, in succession as the drum rotates and the tape moves past. The heads record data headers at each end of the track, containing tracking, timing and program information. This is how the machine produces the familiar program numbers and time display. Because this information is in the headers, it can be changed without altering the audio.

The DAT format has no erase head, no linear audio track, no "tracking" track. The erase function is performed by recording over existing data. You cannot bulk-erase a DAT tape using a conventional broadcast tape eraser. For most users, the way to erase a DAT tape is to record over it with the input level turned down.

DAT cassette

The DAT cassette resembles a tiny VHS cassette, with the addition of a dust door on the bottom of the cassette. The machine opens the cassette and pulls the tape out of the cassette with two post rollers. These rollers position the tape against the drum, with a bit more than 90 degrees of wrap. Unlike VHS, the pinch roller also pulls its segment of the tape out of the cassette and up to the capstan. Other rollers and guides complete a precise tape path within the mechanism.



Use a jewelers' screwdriver to take apart a DAT cassette.

Study a DAT cassette. Open the dust door by pressing with your thumbs the two latching nubbins while sliding the door open. Then open the hinged door and inspect the tape. You will notice that it is narrow and thin. This fragility is the major drawback of DAT. It is easy to damage a portion of the tape, ruining the entire cassette.

Splicing, while possible, should be considered a last resort. Wrinkled portions will iron out to a certain extent when they pass under the pinch roller, but the damage will be audible in the form of undecoded digital hash and dropouts. You can turn the hubs most easily with a pencil eraser passed through the holes.

Take a cassette apart to repair it. This would be necessary if, for example, the tape broke at a hub. Use a jewelers' Phillips screwdriver. The hubs have a pie-shaped tape retainer section, just like a VHS cassette. Snap it out, place the tape in position and snap it back in.

The problem here is that the DAT system senses the clear portions of tape located at each end of the cassette. Eliminating this clear piece causes the mechanism to fail to stop at the end, and tear the tape or stretch it at the capstan. After an emergency repair of this nature, dub the cassette and discard it.

The hubs may bind, causing the tape to tighten too much on the head drum, thus slowing or stopping the tape. Check that hubs are moving freely. Open the protection doors of the cassette to unlock the hubs and turn them with a pencil eraser. A binding supply hub can cause reverse cue problems that are difficult to trace.

Routine maintenance

I recommend that you never use a cleaning tape, wet or dry. A wet tape will merely smear crud around. The dry type essentially is fine sandpaper. Ouch! The only time the dry type should be used is if your heads are plugged and you have no other machine to use. If your heads are plugged, you are running old, flaky tape. Don't do that, either!

A cleaning tape cannot do anything about the capstan or pinch roller. Plan to open the machines periodically for cleaning.

Your first forays into your DAT machines should be for the purpose of routine cleaning. You will become familiar with each model and feel competent to troubleshoot. Some DAT machines are easy to disassemble; others are a bear, or one of those other "B" words. The shop manual will help here.

In the accompanying box you will find some tips to follow before you open the first machine. Also important: a reliable source of parts. One good source is Mike Buchanan at Zack Electronics, (888) 329-0225, ext.102. If you know of others, drop us a line.

We'll continue with our discussion of DAT service next time.

■ ■ ■

Jeff Johnson is network engineer at WVXU(FM), Cincinnati, and the eight-station WVXU Network. Contact him at Jeff.Johnson@goodnews.net

Good Advice for DAT Service

When you are preparing to work on a DAT machine, take time to prepare. All of the caveats of mechanical repair apply:

Always use a light touch and proceed slowly. Replace fasteners in their respective holes for temporary safekeeping. Use several 35mm film canisters and envelopes for parts storage. Stick very small screws and retainers to tape when removed. Work in a shallow tray like a dish-washing tub to keep those extremely small parts out of the carpet. Acquire a magnifying hood; you will need it!

Use the right tools. A miniature screwdriver set is required. You also will need tiny needle-nose pliers. Wipe your tools with alcohol when finished.

Acquire miniature foam-tipped swabs and 99-percent isopropyl alcohol. Do not use anything else! The alcohol can be purchased at a good pharmacy. Other types of alcohol have water and who knows what else.

Acquire the factory service manual for each model of machine you have.

When buying parts, order the associated springs and fasteners. When you drop them or when a spring hops across the room, you will be glad you did.

— Jeff Johnson

Pinnacle Pack Worth the Trouble

Val Davis

I had set my expectations pretty high when I got the cool box containing the Pinnacle Project Studio from Turtle Beach. I mean, this *is* Turtle Beach/Voyetra, one of the most respected computer audio companies in the world.

The Pinnacle Project Studio consists of both hardware and software. The Pinnacle soundcard is a great-sounding WAV audio card, but it also has an onboard TBS Pro Kurzweil synthesizer for creating MIDI tracks. The voices are amazing, but the card unfortunately outputs them to eighth-inch audio jacks. Adapter cables are included to provide stereo RCA in and out connections.

The software is Digital Orchestrator Plus, a combined music/audio package from Voyetra. It features 1,000 possible MIDI or audio tracks (hardware-dependent), mono or stereo digital recording/playback with Volume, Mute, Solo and Pan control and tons of MIDI capabilities.

Snag City

In my defense, I am a PC technician for a large company, building and repairing computers all day, every day. It's a given that I know what I am doing. But installing Pinnacle was a challenge. After configuring, reconfiguring, uninstalling, reinstalling and rebooting everything umpteen times, it was time to contact Turtle Beach support.

I e-mailed *support@tbeach.com* but received only an automated response. So I picked up the phone and called the support number. I got a recording saying that their offices were closed.

Apparently, due to time zone differences, the tech support center was closed by the time I got off work. This was not looking good. I pressed "0" hoping to find a living person. Evidently the phone gnomes were on my side this time, as I got a human voice.

I explained to the representative that I was reviewing the Pinnacle Project Studio for **RW**. She said no one was available, but within minutes a very pleasant guy called me back and we were on the way to solving my problem. The tech support person worked with me for about 45 minutes.

After trying different IRQ and memory addresses, new drivers and even a little utility that uninstalls the drivers and cleans the Windows 95 system registry, still no soap.

Then I told him I had an Adaptec SCSI card. As it turned out, Adaptec cards sometimes created problems. I pulled the card, disabled plug-n-play, set the addresses and added a command to *EMM386.exe* in the config.sys file (which protects the card's memory address). Voila, I had a working sound card.

With the card successfully installed, I began to install Orchestrator Plus. I typed in the registration number from the box and got, "Not a valid registration number."

Swell. Back on the phone with Turtle Beach. The tech person sent me another registration number that worked.

Okay, so my tech support experience left me with a bad taste. But within 10 minutes of getting the Pinnacle Project Studio running, I had forgiven Turtle Beach for any problems I had or may have in the future.

Up and running

The Pinnacle Project Studio is the slickest out-of-the-box package I have seen. It boasts the ability to track digital audio and MIDI files side-by-side. Every

The Pinnacle Project Studio From Turtle Beach/Voyetra

time I had tried this with other software, the system surged and slowed as the internal clock struggled with the digital audio and the MIDI time clock.

I started by importing an existing MIDI file with the intent of recording an audio track along with it. Because of the density of the MIDI file, this never worked well before. But it did this time.

I had 12 MIDI tracks in place, so I clicked on the picture of the DIN connector on Track 13, which immediately changed to a wave image. Clicking on the Record field brought up a letter "R" to let me know I was in Record Ready mode. This was way too easy.

I then opened the Mixer, selected the mic as the recording audio source, then clicked the Record icon. The system started running and I bellowed out the vocal I always wanted to hear with that MIDI file. When I hit Stop, then Play, I played back the worst vocal of all time, but it worked the first time in real time with no glitches, bumps or jumps. I was impressed.

In order to increase the volume of my bad vocal — so I could torment my children with it — the image of the WAV file that ran under my MIDI line was clicked on. This placed the Pinnacle Studio in the Wave Editing window.

Here it is possible to highlight all or part of the wave, then transform it. Volume, pitch, chorus, echo, delay, compression, gate and more are all available under the Transform menu.

Some effects are fast; others offer the opportunity to use the bathroom or refill the java mug. I am running an AMD K-5 PR166 with 32 MB RAM; a faster processor would speed up some of these audio manipulation tools.

I thought I had seen all of the neat bells and whistles until I stumbled across the Mixer module, complete with faders and knobs. While manipulating my MIDI files with the mixer, I noticed the two knobs marked Chorus and Reverb. What could these do?

I soloed the drums, turned up the reverb and I was hearing a kick and snare with some nice ambiance. I added chorus to the piano, and it sprang to life. I began panning one track here, one track there. Now this was one cool little mixer. It actually was controlling the DSP features on the Pinnacle card. It could do so for any audio source, not just the onboard Kurzweil voices.

You can record CD audio in, do voice work, pitch-change the track, paste the WAV multiple times, chorus it, delay it, add MIDI sounds or actual sounds and mix it all down with reverb, chorus or delay.

You can choose which effects are assigned to the effects returns; and with its 20-bit D/A converters and >97 dB S/N ratio, the card boasts audio quality more than good enough for broadcast.

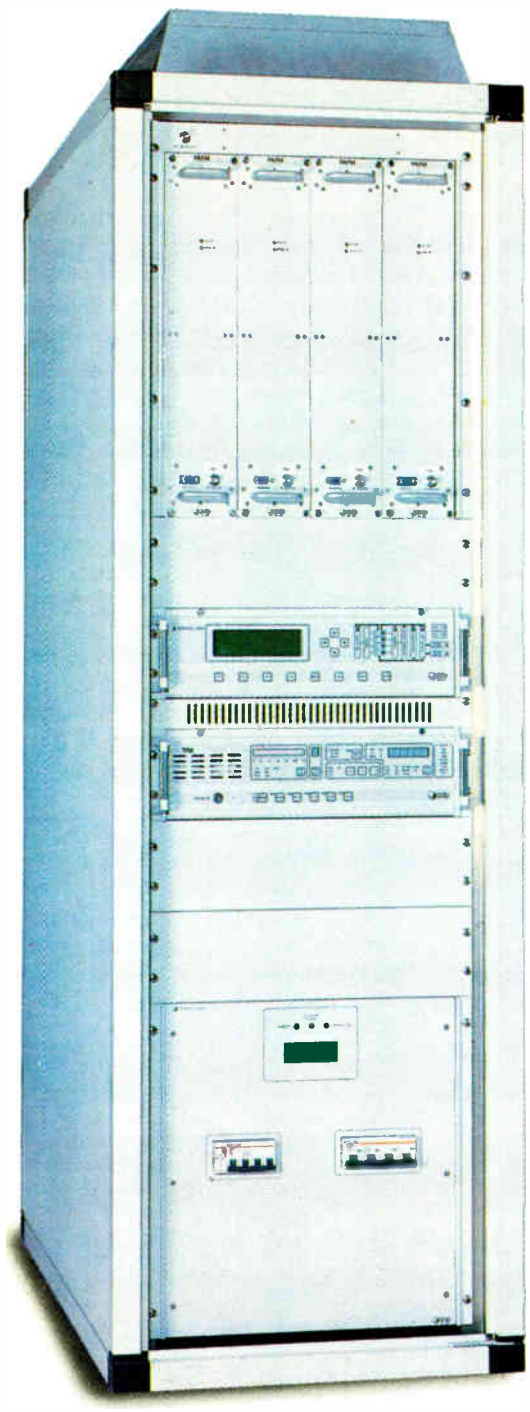
Timing

In addition, the system can sync up to external devices via MIDI Time Code (MTC) or SMPTE. You can master to DAT digitally with the S/PDIF interface on the Pinnacle card.

In terms of ease of use and power, I would dare to compare this system to the Digidesign Session 8. It is far superior to

See PINNACLE, page 74 ▶

It's Easy



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Match the Money With the Music

Part IV of IV

Stephen Wilke

I have to admit that I do not want to think about the business side of my music experience. Being in the pure essence of musical flow, I find it difficult to remain anchored in business negotiations. But one doesn't exist without the other.

The creative use of a budget is essential to provide clients with the best possible product. It is more and more difficult to do your best work and still make money. Budgets for original music seem to have shrunk.

Part of the reason is an increase in competition. Also, we now can accomplish decent music tracks on computers, minimizing the need for real musicians. Advertising agencies have trimmed staffs, and the dollars are just not there as in the past.

Will play for food ... chain

What makes music a target for smaller budgets?

Music is at the end of the post-production food chain. When an agency goes over its budget in film shoots, editing and graphics, it will start to scramble for whatever money is left to patch the holes.

Photo by Alan Peterson

You Deserve a Check Today: The Business Side of Commercial Music

Often, music money has not yet been delegated. At this point, the agency asks a music house if it can do a track, but only *this much* money can be spent. It makes one wonder why they didn't set aside more in the first place.

I have good friends who are producers. They tell me their woes. I will try to give some examples of some creative money management, but let me first tell you how a music house makes money. Note I am using "music house" here interchangeably to describe both the business entity and the collective minds behind the scenes.

Some say music houses make too much money. They see the high creative fees that are charged and hear the word residuals, and they think all that money goes right in the house's pockets.

The truth is, the staffs of music houses make money on creative and arranging fees, and by playing on the sessions as musicians. Most music houses now also have their own studio and fee structures. In most cases the studios do not bill enough to make money, but just enough for the music house to pay off their equipment and prepare themselves for reinvestment into other equipment.

Most music houses have their own studios because the creative writing process is linked more directly to computers and sound equipment than in the past. This allows musicians and composers to sit in their own space without the threat of an outside recording service eating up their budget. The creative fees justify the salaries of the employees and services provided, including real estate.

The musician fees become one way composers can make extra income, but not all jobs provide a flow of residual checks. The rate is not as much as you think. Uncle Sam is also hanging around, waiting for his fair share.

You get the idea. Making money and providing all the services is not easy. Also, the marketplace offers some good music libraries and good engineers on highly flexible editing equipment. I should know; as an engineer, I can pull off many tricks to make a library track seem post-scored. This creates an illusion that music houses are asking too much when the agency can get a track for a library usage fee.

Mickey-D and me

Many music houses are cutting back staff, using free-lancers to help limit costs, and figuring out how to do the same for less.

Here are two examples of how a house must be flexible in rates and budget. I will refra.
cies to prote
negotiation proc

First, the "home
hired a 20-piece
McDonalds job. I could
how to use the budget they s
the spot. I played on the track with three different instruments and sang vocals too. The piece is being used on 15 spots. There are payments to musicians for using the track for these different spots. The track will run over a period of time, a schedule that should translate to residuals. This is a job that keeps on paying.

Musicians and singers drool over such jobs. But each of these musicians faces a personal struggle between that job and getting hired again. On most jobs, computers have replaced musicians.

See MUSIC, page 75 ▶

Hard Drive Maker Says 'Hey MO!'

Alan R. Peterson

Seagate Technologies has announced the development of new hard-drive storage technology with the potential of many times the capacity of current Winchester-style disk drives.

The new technology is called OAW, or Optical-Assist Winchester. The process was created by Quinta Corp., a wholly owned subsidiary of Seagate, and combines magneto-optical techniques, proven hard-drive internal machinery and innovative new micro-machinery. OAW drives essentially place the mechanics of magneto-optical technology into the flying head of a disk drive.

The technology will not be ready for release as a product for some time. In a Feb. 17 teleconference, officials from Seagate claimed to have achieved "functional technology" only in the lab. But the possibilities OAW offers for low-cost mass storage of digital audio are thought-provoking, with hundreds of gigabytes potentially available on a single drive.

Upper limits

Hard drives experience a "brick wall" known as the "superparamagnetic limit," the highest amount of information that can be written to a given space. If magnetic data were compacted beyond this limit, the information contained in adjacent "bit cells" would self-destruct.

Based on what is known about magnetic media, the eventual superparamagnetic limit is to be 20 Gbits per square inch. Current Winchester drives have a density of approximately 2 Gbits per square inch. With disk-drive capacity improving at a factor of 1.6 every generation, the limit is not far from being encountered.

The drive with the largest capacity is the 47 GB Seagate Elite. That may be about to change.

According to Seagate representatives, optically assisted hard drives can have a superparamagnetic limit of as much as 250 Gbits or perhaps greater when the process is perfected.

The new technology replaces the magnetic read/write element with a laser element, fiber optics and a new vertical magnetic sensor. The platter is replaced by a hybridized plastic substrate with the tracking data already printed right to it — a more efficient process than today's drives now having to write tracking information to the platter.

The slider and actuator arm float on a cushion of air only a few microns above the disk surface. If the drive is jostled or struck while in use, the sensor can contact the surface and damage the drive. With conventional drives spinning at 90 times per second, the result is catastrophic.

The newly designed head on an OAW drive will fly 20 millionths of an inch over the platter — many times higher than current models. This will offer space to accommodate the optical components and provide some buffer in the event of an impact against the drive case.

Hot hot hot!

OAW drives borrow from magneto-optical technology by using a laser to heat the surface of the platter to its Curie point (the temperature at which a magnetic material loses its magnetic properties). The read/write head then records data onto the heated region.

On playback, the optical sensors scan the surface of the spinning media. Because the reflective properties of a digital "1" are different from those of a digital "0," the sensors detect the differences optically, translating them into data and moving it off the drive.

Part of the difficulty in designing the OAW drive has been the creation of parts never seen in MO technology. Quinta representatives said they had to mold and grind "the world's smallest lens" to read the platter, and combine fibers and digital optical switches that could shift states at speeds of 1 ms.

Seagate and Quinta must shift the technology out of the lab and into an actual working unit. But when OAW is ready, there is the potential for disk drives to move effortlessly into the range of hundreds of gigabytes, perhaps even into terabyte territory.

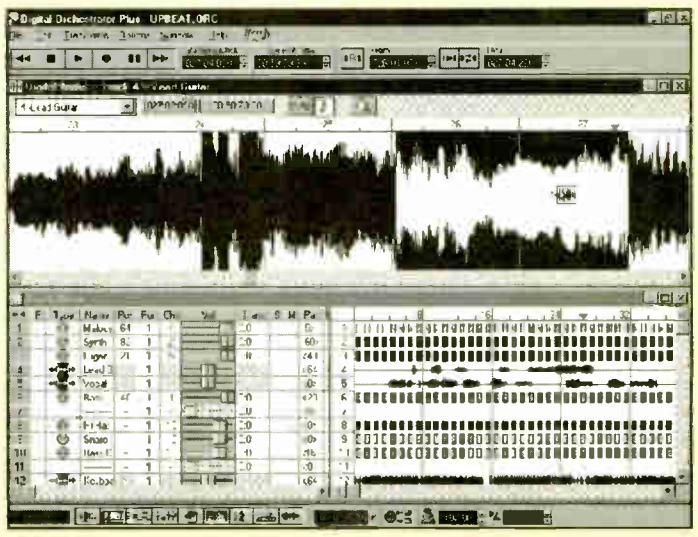
More information can be found at *www.seagate.com/quinta.shtml* or *www.quinta.com*

Turtle Beach Pinnacle

▶ PINNACLE, continued from page 71

many other products in the same price range.

Granted, most day-to-day radio production does not require serious MIDI integration or SMPTE sync capability. But why limit yourself? Audio production for radio can lead naturally into producing for multimedia and Webcasting. MIDI skill is a plus these days.



The Other Half of the Package: Digital Orchestrator Plus

The multitrack audio recorder in Digital Orchestrator is as familiar to a production person as any other audio program available now. Having both audio and MIDI in an integrated package keeps things simple and easy to understand.

Minimum system requirements for the Pinnacle Project Studio are at least a 486-66 PC with 8 MB RAM; Windows 3.1, 95 or NT; a CD-ROM drive; and 8 MB free disk space for software installation. The company recommends a Pentium with 16 MB RAM and fast EIDE or SCSI for the maximum number of audio track playback.

If you are looking for a powerful, easy-to-use digital editing system that also offers killer sounds and thorough MIDI functionality, the Turtle Beach Pinnacle Project Studio is a system that deserves a close look.

■ ■ ■

For information contact Voyetra Technologies at (914) 966-0600 or circle ***Reader Service 180.***

Val Davis is a broadcast automation consultant and producer based in Iowa. Reach him at vdavis@nerds.com

Commercial Music-Making

▶ MUSIC, continued from page 73

Performers wait for this type of job to justify being in this business.

Many voice talents are surprised that they can get paid so little for auditions and demos, and so much for saying a few words on other occasions. In all cases at this point, the high-paying jobs as well as the low-paying ones seem to balance out.

The downside of the equation is the many demos that music houses do for agencies to try to land a job. Agencies will pay a small fee to cover some of the expenses for these demos, but this does not cover the expenses of staff and real estate if the demo never translates to a real job. And frankly, agencies don't always play fair. You usually get polite little lies because they spent their budget and cannot ask their client for more money.

We're on a budget

A second example of creative money management is a job I find myself in now. The client had no real budget for original music for 18 TV tracks and five radio cuts.

I had the option of using library music, but I did not feel I could give them the best product and satisfy all their requests. They were handcuffed by the original promise to their client on budget.

Because of the bulk of spots and the fact that they would likely run throughout the year, this job could offer good residuals. I managed to strike a deal under which I would charge minimal creative fees, and throw our studio in for free. This is where I could absorb costs.

This left the payment for musicians. Because my partner and I would occupy most of the musician slots, we could make some money up front. The client had no issue with original music and residual payments later, because that portion of the budget would be supported at that time with the media buy.

But if they do not use the spots throughout the year, we may make little money for a lot of work. We will just have to see if this works out.

Support your local musician

After working on these spots all day, I went to watch an Irish band play in Chicago. It was a great band, mixing traditional with many other influences. A woman played remarkable flute and violin, and sang wonderfully to boot.

She inspired me with her talent and made me realize how necessary it is to support the business side of music, to hire these talented people and bring out the best that the community offers.

The business is necessary, but when all is said and done, I just like to write and play music.

■■■

Stephen Wilke writes music for Open Sky Music Productions and is a sound engineer at Swell, a post-production facility in Chicago. Reach him in care of RW.

SHORT TAKE

Desktop CD Publisher

With a look that suggests a futuristic orange juice squeezer, the new Desktop CD-R Publisher from Cedar Technologies, distributed by Microboards Technology, began shipping in January.

The name perfectly suits the size of the new unit: small enough to fit on a desktop, while providing all functions of CD authoring and labeling.

The basic Desktop CD-R Publisher system is priced at $5,690 and includes a 4X CD recorder, the Cedar autoloader, two CD holders, software for editing CD labels, audio premastering software for Windows 95 or NT and a number of other components. A $6,985 version includes a color printer for printing high-resolution graphics, text and photographs directly onto printable-surface CD media.

The Desktop CD-R Publisher is appropriate for radio stations requiring mass duplication of audio and/or graphics for sales demos, businesses backing up important records to CD-ROM, and production houses creating small-scale syndicated programming. The Publisher can create different format CDs (audio, CD-ROM and so forth), and the premastering and duplication software has an intuitive interface for rapid selection and execution of the desired format.

The Desktop CD-R Publisher requires a host computer running Windows 95 or NT, 16 MB RAM and a busmaster SCSI host adapter.

For information, contact Microboards Technology in Minnesota at (612) 470-1848 or circle **Reader Service 14.**

— Alan R. Peterson

Saving Spike Jones and Company

Imagine Carting a Huge Box of Records With You Throughout Your Career and Never Playing One

Alan R. Peterson

Now that I am getting a brand-new computer — specially optimized for high-quality audio rather than Internet noodling — it is time to get serious about a lot of stuff I have laying around the Peterson Palace.

Among my clutter are several sound cards, a few MIDI interfaces and who knows how much freebie software from the World Wide Web. Once I decide what goes in and what stays out of the new machine, I should regain at least a cubic yard or two of space.

That still leaves me with several dozen 78 rpm records I was given years ago that I still don't know what to do with.

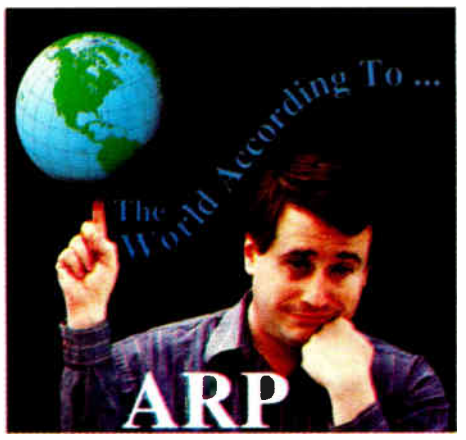
Spin that platter

Ages ago, when it came time to hit the road and begin my career, my parents gave me a stack of their old 78s. All were songs that made me laugh as a child — "Cocktails for Two," "Fuddy-Duddy Watchmaker" and "Cement Mixer (Put-ty Put-ty)" for example — that they wanted me to have, to maybe play on the air "somewhere."

I never found the right show on which to play the old discs, but I dutifully trucked them from one residence to another, one job to another. Not one place I worked had a turntable that could ramp up to 78 rpm.

I ended up at an adult standards station during the early '80s. This would have been the perfect place to drop in one or two of the old gems, but all music formatting was closed-ended and on reel. No studio turntable to be found.

Besides, the man who created and



syndicated the format actually lived within listening distance and would hotline us when we messed up even a little. If I wanted to keep my job, no Spike Jones would be played there.

One day, along came the compact disc and digital audio. Even if I could find a station with a 78 rpm turntable, I could not play these old novelty classics because the issue now became "listener tuneout due to audio quality." Apparently, it was assumed people would bail out and change stations the moment they heard a pop or a scratch. Plus, the fidelity of "Hot Nuts" on wax just wasn't up to the technical standards of the latest Janet Jackson CD. So I hung onto the discs even longer.

Then I found out about noise reduction software. I could now dump a 78 into a computer and strip out as much noise as was possible at the time. Maybe this would be my answer at last.

Peanut PC

Well, not yet. The hottest computer I could afford then was a peanut-powered 386 with 4 MB RAM and almost no drive space. Plus the software was still prohibitively expensive. The discs gathered more dust in my closet.

Not one place
I worked had a turntable that could ramp up to 78 rpm.

Suddenly out of left field, it became fashionable for jocks to cart up slivers of old-time music and use them as bumpers to rejoin a show after a break. But by this time, I was employed in a production-only position and did not have an on-air show. I didn't want anyone else to have "my" music, and there was still the slight problem of no turntables that would run at 78 rpm. Another year in the box for the old discs.

Noise reduction software eventually became affordable to the point of being downright cheap. I was set to load up my machine, until it was revealed I would soon need a whole new computer to handle a little something coming out soon called "Windows 95." Besides, I had been off the air full-time since 1993 and had no outlet anyway.

By this time, I began hearing a prominent Washington radio personality who routinely dropped in funny old songs for stopset bumpers and for the "Oh wow" factor they created. Nobody tuned out

See RECORDS, page 78 ▶

◆ PRODUCT GUIDE ◆

Products for Radio Production

Mail info and photos to: RW Product Guide, P.O. Box 1214, Falls Church, VA 22041

JBL Microphones

JBL Professional introduced three inexpensive and rugged microphones as an outgrowth of its EON public address product line. These dynamic cardioid mics are appropriate for remote broadcasts and vocal performance in locations where durability is important.

Leading the new series is the M100S ($135 list), with a neodymium magnet system, dual density diaphragm and a response of 60 Hz to 18 kHz. Following up is the M80S ($99), also with a neodymium structure and response of 70 Hz to 16 kHz.

Rounding out the line is the general-purpose M60S ($69), with a diecast zinc case and a response of 70 Hz to 15 kHz.

For information, contact JBL Professional in California at (818) 894-8850 or circle ***Reader Service 38.***

Fostex CD-R Recorder

Fostex is shipping the CR200 universal CD-R recorder for professional and consumer applications.

The CR200 is a stand-alone recording unit with XLR balanced +4 dBu inputs, AES/EBU connections and RCA -10 dBv jacks. An internal sample rate converter accommodates any digital input signal from 32 to 48 kHz and converts it directly to the CD standard of 44.1 kHz.

Three digital Synchro Recording Modes allow the CR200 to be armed and synchronously started from a DAT player with a S/PDIF connector. The unit easily and precisely places Start IDs on discs; on-air playback is instantaneous and seamless.

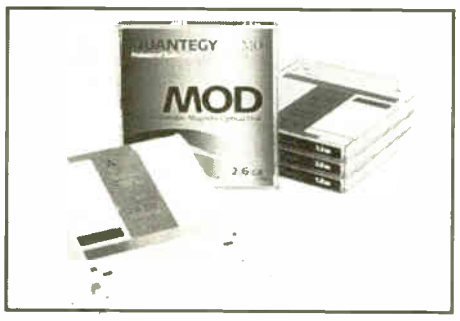
Suggested price of the Fostex CR200 is $2,195.

For information, contact Fostex in California at (310) 921-1112 or circle ***Reader Service 62.***

Quantegy MO Media

Quantegy Inc. introduced several new capacities for its line of Magneto Optical (MO) disks.

The new disks are available in capacities from 1.2 to 2.6 GB. The media offers high transfer rates and low bit error, a hub designed to withstand repetitive handling and an anti-static coating on both shell and disk.



Quantegy is the manufacturer of a line of analog tapes and the successor to the Ampex name and 3M/Scotch product lines. The company also makes MiniDiscs in both Audio and Data formats, DAT tapes and DA8 digital cassettes for DA-88-compatible machines.

For information, contact Quantegy in Georgia at (770) 486-2800 or circle ***Reader Service 86.***

DirectX from TC Electronic

Two new DirectX signal processing packages were introduced for use in PC-based audio recorders and editors by TC WORKS, the software plug-in division of TC Electronic.

TC NATIVE EQ WORKS consists of a 10-band parametric EQ and a 28-band graphic EQ. Both plug-ins are equipped with SoftSat, a proprietary algorithm that simulates the saturation characteristics of tube audio circuits.

TC NATIVE REVERB provides reverberation for programs supporting DirectX plug-ins; at present, this includes Sound Forge, Cakewalk, Wavelab and Cubase VST.

Both processors require a minimum 200 MHz Pentium, 32 MB RAM and Windows 95 or NT 4.0.

For information, contact TC Electronic in California at (805) 373-1828 or circle ***Reader Service 11.***

PRODUCER'S FILE

In Session With the MixWizard

Allen & Heath Offers a No-Frills, No-Nonsense Mixer for Project Rooms and Production Studios

Part II of II

Ty Ford

In the Feb. 18 issue, I covered the architecture of the Allen & Heath MixWizard 20:8:2 mixer. This time I'll get into what happened when I tracked and mixed an ADAT project.

The MixWizard eight-bus interface makes it a logical choice for anyone who has a single eight-track reel or MDM recorder. The Mixdown and Tape Rev switches make it easy for the beginner still trying to figure out routing paths and patch bays.

At the flick of a button, the mixer goes from tracking to mixing without patching anything but outboard effects. As easy as this sounds, the manual could stand a healthy dose of user-friendly application text and graphics.

Essence of a preamp

The first thing I like to do with any piece of gear that has a preamp is listen to what the preamp sounds like.

The preamps in the MixWizard are not neutral. They are thick on the bottom and put a slight edge on the mids. API mic preamps — at about $1,000 each — have as much coloration. But although they too have an edge, they are clearer on the bottom.

Listening directly with my old and flatter AKG K240 headphones through the MixWizard headphone amp, the coloration is more apparent than through the monitors.

I spent some time recording a Manley Reference Cardioid tube mic and a Gefell UM70; once through the MixWizard mic preamp, then a GML preamp to the MixWizard line input, and finally from the GML through the bus insert of a Mackie 1604. The greatest coloration occurred through the MixWizard mic preamp. The GML Line out to the MixWizard showed less coloration. The GML Line out to the Mackie bus insert was brighter and clearer on the low end. I expect that thin-sounding mics will sound fatter, and fat-sounding mics will sound even thicker.

Few mic preamps pass the dreaded RCA 77DX test. Again, it proved more than the MixWizard preamps could handle. With the channel and master faders set at unity gain, the preamp trim pots needed to be wide open to hit 0 dB at the master output for a speaking voice. Edging the preamp trim pot past three o'clock brought up the level, but it also brought up too much noise. The ribbon might have generated enough juice with a horn section or even a close-miked sax.

Project time

The session was a simple, one-song music demo, consisting of a mono drum machine, a Kurzweil stereo keyboard and a mono electric guitar with vocal overdubs.

I pulled out the Alesis ADAT, fired it up and began setting up the rig. Not to belabor the obvious, but the eight bus output jacks on the back of the MixWizard are numbered — left to right — 8 to 1. On the ADAT, they are the opposite: 1 to 8, left to right.

After connecting the ADAT to the MixWizard I/O busses, we were ready to attach mics and run the Directs. I used a Neumann U89 for the scratch vocal, took the stereo Kurzweil direct to two inputs and used the direct out from the guitar amp to another input. I would later re-mike the guitar track for the mix by sending the guitar track to a Fender Vibrolux amplifier and miking the cabinet.

Using the meters in the ADAT, I set record levels for the individual channels with the faders on the MixWizard. The rotary pots are all surface-mounted and have a nice, solid feel. Then I used the two Cue sends to set up a stereo headphone mix and set a master Cue output level to feed a Rane HC 6 headphone amp for the players. I tracked dry with no EQ or effects.

The guitar amp had built-in effects that required a bit of tweaking to get right, but that was mostly a case of getting a slightly less-distorted sound, which would work better with the rest of the arrangement.

Once all musicians were happy with the sound in their cans, I hit the Record button. Assigning and recording tracks was done by hitting the proper button on the mixer and having the appropriate ADAT track in Record Ready mode. We tracked the song three times, improving the performance on each pass.

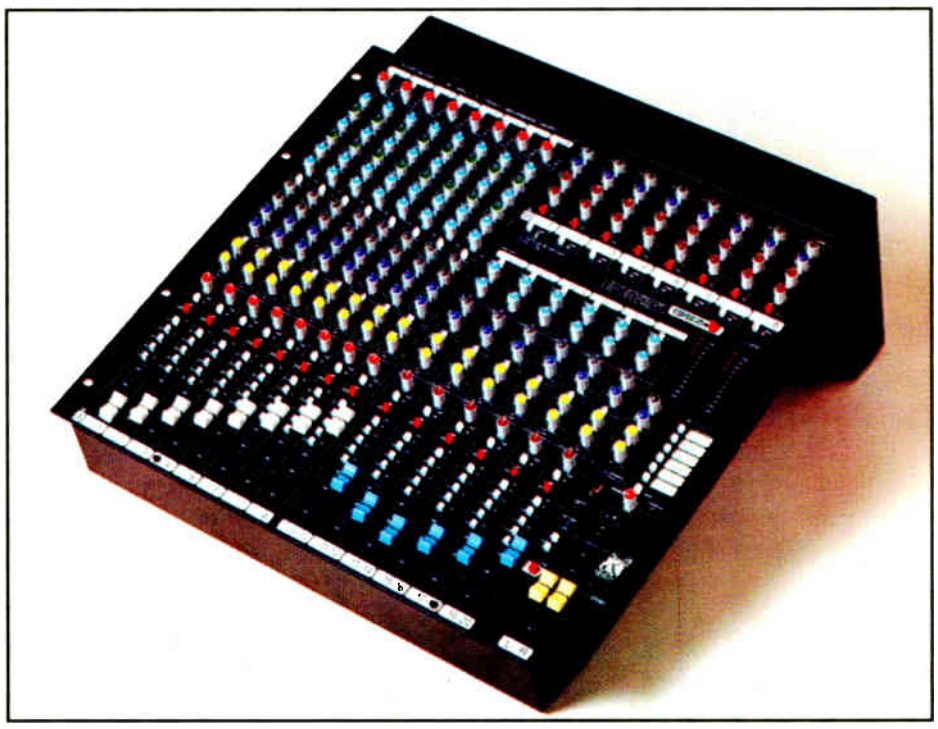
One or two mistakes occurred in the guitar track, but they were pretty much in the open and we could edit the master on my workstation after mixing. I created a rough mix for the vocalist, recorded several takes and was done tracking.

I kept the alternate vocal takes and used them as "chorus background" vocals behind and slightly to the side of the main vocal.

Straight to the mixdown

We did not need to bounce any tracks, so the Tape Rev feature that brings individual tape returns back to the eight main inputs was not needed.

I hit the Mixdown button, automatically throwing the eight tape returns into the MixWizard's first eight channels. These eight channels offer more EQ and Sends and they also have effects Inserts. I did a bit of EQ work to smooth and join the elements, stuck an Aphex Compellor on the main vocal track, set up one reverb for the vocals using Sends 3 and 4 and another reverb for the instrumentation using Sends 5 and 6.



The Allen & Heath MixWizard: Lots of features for an easy mix.

The MixWizard has two 2-Track I/Os, so you can connect both balanced and unbalanced units at the same time. After mixing, the monitor select buttons let you select which to listen to. I mixed to DAT several times to get the moves right, and was done.

Conclusion

I sort of wish there was something amazing or tragic to report, but it was a relatively straight-ahead session. I also like that the MixWizard has a stereo monitor output, and master inserts after the L/R mix amps and before the L/R master faders. Putting the inserts there lets you plug in a compressor or some other processing gear while allowing you to use the master faders to set final output levels.

The MixWizard is a no-frills, no-nonsense mixer that is well-designed for the eight-track facility. I could ask for more metering, more transparent preamps, more radical EQ, group faders and balanced Tape Ins, but that would kick the price up another, what, $1,000?

For the price, the MixWizard is a good bargain.

■■■

Ty Ford's recent review of the Neumann TLM 103 — as well as a 16-bit, 44.1 kHz audio sample of the mic — is available at www.jagunet.com/~tford *along with an upgraded list of production music and SFX library companies. Reach him by e-mail at the same site.*

Scratchy Records Out on a Spree

▶ RECORDS, continued from page 76

because of the scratches. At last, maybe the time was right for the 78s to see the light of day.

Then last year, I received word of another new computer program that would deliberately inject surface noise *into* a digital recording. Why? *To make it sound like an old record!*

Scratch here

I suppose somebody thought there was no longer any heart or soul to modern recordings, and that cycling a scratch in and out every 1.5 seconds or so would give the recording a degree of emotional legitimacy or a perceived warmth lacking in the digital domain.

As you can imagine, I felt a little raw. Here I sat on these 78s for nearly two decades because of lack of fidelity and surface noise. Now it was trendy to put noise back in? Who came up with that one?

To blazes with the whole deal. I had waited long enough. It was time to drop some inexpensive Windows 3.1 noise reduction software into the old PC, play the records into the computer at whatever speed I darn well felt like, speed-shift the whole mess back to pitch later on and be done with it.

The technology was there, but unfortunately, the audio was not. As a youngster, I was a lot more forgiving about audio quality and still heard all the funny honks and toots through the noise and pops. But after decades of blunt styli and tonearms heavy from assorted fishing weights taped to them, there was not a lot left to the original recordings. I could not tell it then but I can now.

The noise far outstripped the program material to the point where I could not even recognize the lyrics that made me laugh way back when. Sending these recordings through the noise reduction program would have been like bailing the Titanic with a turkey baster. Heavy-duty reduction and digital reconstitution was judged too expensive and there simply was not enough material on these 60-odd-year-old discs to recover.

In spite of the shiny new machine soon to be delivered, I am still hanging onto my moldy oldies. Maybe out of sentimentality, or maybe out of optimism that somehow, someday, some powerful new software yet to be written will rescue the performance frozen under the layer of noise.

When it does, it will probably be time to also de-noise my albums from the 1960s and '70s. By then, those cuts may be just as quaint and perhaps just as hilarious to the audience of a day yet to come.

PUBLIC DOMAIN

'Code Blob' Handles MPEG Audio

Rich Rarey

A year and a half ago, National Public Radio commissioned an Internet site for the express purpose of receiving news actualities in the form of audio files.

The files arrive by File Transfer Protocol (FTP), and are played back to analog audio from the Record Central computer. The filed actualities usually were intended for the newscast unit that produces the hourly five-minute newscasts.

At the time, the concept of receiving non real-time audio was somewhat novel, and we wrote a three-part series for **RW**, explaining how the site worked, the origins of this idea and the scheme's real-world limitations.

In perhaps the last six months, the use of the site has mushroomed as NPR reporters from around the world use it to file complete audio pieces for air. In addition, the reporters are using international Internet service providers such as CompuServe to e-mail the audio files to their editors as file attachments, when connecting to the FTP site is impracticable.

Field report

In Mexico City especially, where no ISDN service is available, the Internet or surface mail is the only practical way to get quality audio back to NPR.

NPR Foreign Editor Bob Duncan says reporting in a foreign country is a challenge in itself, so the goal is to realize a filing method that doesn't extend the reporter's day.

"Until we can upgrade our laptops with faster CPUs, more memory and disk space for audio files, we will be dealing with frustrated reporters who like the idea of having their pieces aired in quality, but do not like the extra time it costs."

Duncan said that the frustration is based on experience. At one time, reporters simply dubbed their actualities, tracks and ambiance onto a cassette, called the air freight company and they were done with the story.

"Digital audio via the Internet is an advantage to the NPR home office, said Duncan, "in that we don't pay international air freight charges and wait between three and seven days for delivery."

Socked in

Duncan also said experience has shown the Internet is *not* the way to go when under deadline.

"We no longer plan to file on deadline for 'All Things Considered' because of high volume on the Internet. It slows transmissions. Our best results come from filing between 3 and 9 a.m. EST," he said.

For example, there is an eight-hour time difference between Moscow and Washington. A 45-second file takes about 4-1/2 to five minutes to upload onto the FTP site, allowing time for the unpredictable Moscow telephone lines.

Technology has improved our filing methods too, as MPEG-encoded audio files (196 kbps, mono) are supported by more laptop audio recorders and soundcards.

Using higher bit rates, the resulting audio is generally faithful to the original sound, with the exception of subtleties such as reverb decay.

For typical field news gathering, smaller audio file sizes make for faster transmission. Some countries charge for using telephone lines for data transmission, so in the long run it saves a few pennies as well.

Reporters using laptop shareware like CoolEdit record each actuality, each ambiance bed, and sometimes each voice track (narrative) as a separate file. By doing so, transmission headaches are minimized, because any interruption will affect only a relatively small (about 500 kB) file, and not ruin hours of time trying to send a multi-MB audio piece over dicey connections.

In some remote locations around the globe, NPR reporters are using CompuServe access to attach their audio files to e-mail to their editors. The editors in turn save the attachments as audio files, and FTP them from their desk to the NPR site for playback.

Here again, breaking the audio elements into smaller files is more efficient because it prevents choking the destination mail server with a file that is too big to handle.

"In Ankara," recalled Duncan, "the node modem speed is 9600 baud. Our stringer there loads up all the files to send as E-mail attachments, then goes to bed. His program shuts off after successful transmission of files. Sometimes he has to

See FTP, page 80 ▶

Ride on the Compression Express

▶ FTP, continued from page 79

re-send some of the files the next day, but the bulk come through okay."

Downloading e-mail from CompuServe is always faster at the NPR end, due to the faster domestic Internet connection.

"The NPR Berlin correspondent sent five MPEG Layer II audio files (average 784 kB) via CompuServe e-mail. The modem transfer took two hours. The download on the NPR end took only 15 minutes," Duncan said.

Performance varies when CompuServe gets busy from other Internet traffic. Duncan described receiving an audio file from the NPR reporter in Beijing: "A 584 kB E-mail attachment took 14 minutes to download in the afternoon. The next morning a slightly larger file — 601 kB — took an hour and 20 minutes to download."

Making it work

To handle MPEG encoded files for playback, we added MPEG support to the RCAudio Player, now in version 3.0.

The player is an application developed in Visual Basic that uses the Win95 Multimedia Control Interface (MCI) to play, rewind, cue and manage the audio. The RCAudioPlayer has an FTP-enabled front end that automatically logs into the NPR Audio site, presents the technician with a list of supported files and waits for a double-click on the desired filename.

The file is then downloaded to the *C:\Windows\Temp* folder and the RCAudio Player loads up. This gives the technician the ability to check levels, recue, play, stop and display file characteristics. When the technician exits the application, the local copy of the file is deleted. The original on the FTP site remains until someone — normally the reporter's editor — manually deletes it using an FTP client application.

Interestingly, in researching what it would take to support MPEG Layer II audio in the RCAudioPlayer, I found a blob of code that does everything I needed it to do, and more.

The sophisticated control — actually an ActiveX control from Microsoft called ActiveMovie — can play audio and video MPEG encoded files, WAV files, animated bitmaps and more. It is installed on your computer when Microsoft Internet Explorer is installed, and it adds MPEG functionality to the MCI control so that trivial code revision in the RCAudio Player was all that was necessary to support MPEG.

When given a URL and filename, the ActiveMovie control can reach out to the Internet, start downloading the file and immediately start playing when enough data has been received. Truly one of the shining stars of ActiveX technology.

In the coming months, we hope to be able to relate to you how the Audio site itself has been upgraded with more capability, and of course, more hard disk space.

Dis 'n' Data

Have you ever searched the Internet for the text of an International Standard, such as the one that describes MPEG encoding?

We did recently, and not because we were building a better MPEG codec. We wanted to know exactly how to read the bits and display the characteristics of an MPEG-encoded audio file. It was a futile search.

Amazingly, one can easily find hacked serial numbers for registered software, noxious images of primitive human acts, investment advice and plenty of programming tips, but International World Standards are not to be found. For free, anyway.

ISO 11172-3, known as "Coding of Moving Pictures and Associated Audio for Digital Storage Media at Up to About 1.5 Mb/s Part 3: Audio[1993-08]" is listed as the defining standard document for MPEG audio encoding/decoding.

As far as bit-compression algorithms go, MPEG is useful and growing in popularity, even with the digital TV folks. But if you just want to browse the standard to see how it works and why, even if you have no use for its finer points, you actually must order the entire printed paper document from the American National Standards Institute (ANSI) or from the International Electrotechnical Commission (IEC). They will happily supply you with the world standard documentation of your choice, in French or English, if you will only give them your credit card number and shipping address.

From our naive perspective, we always assumed "world standard" was the same as "breathing air": free for everyone. We had no idea a world standard would cost, in this case, more than $100 in Uncle Sam's currency.

So this fruitless research has prompted us to give you this pledge: When this author establishes a world standard for something — like ISO *whatever-2* — you have our promise that you can read it for free on whatever Web site we happen to subscribe to at the time, and the hundred dollars you would have spent on us can go to charity instead.

Until next month, I remain,

Your ob'd't eng'r.

■ ■ ■

Are you using the Internet for audio transfer? Tell ***RW*** *about it. Send e-mail to* radioworld@imaspub.com

Rich Rarey is the technical director of NPR's "Talk of the Nation." Reach him at rrarey@npr.org

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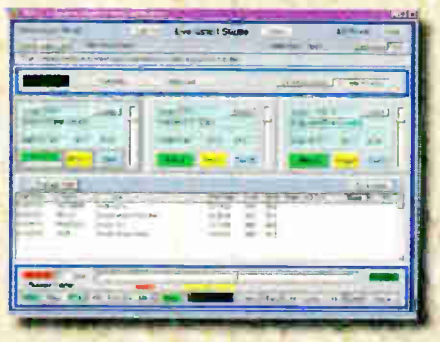

Hard Disk Automation
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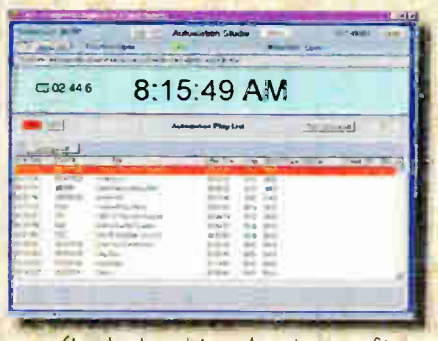
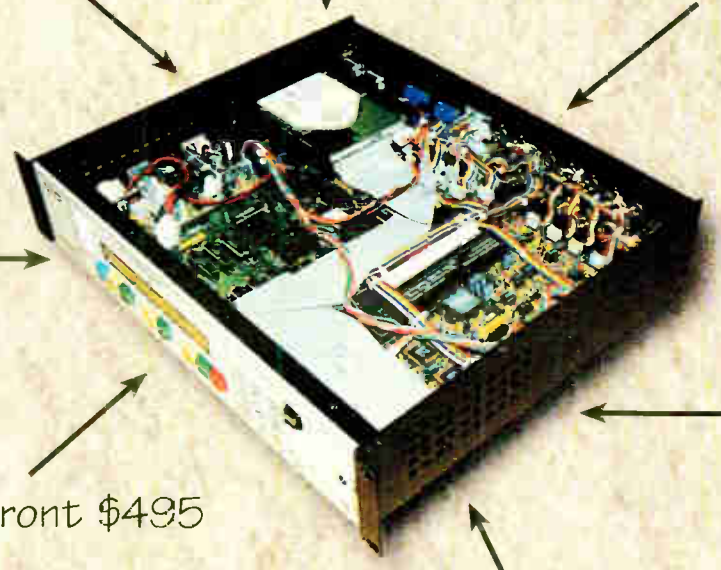


(includes Live Assist software)

Triple Play & Record

Cart Machine Control
$750



Jingle Box Control
$1,195

Optional Front $495

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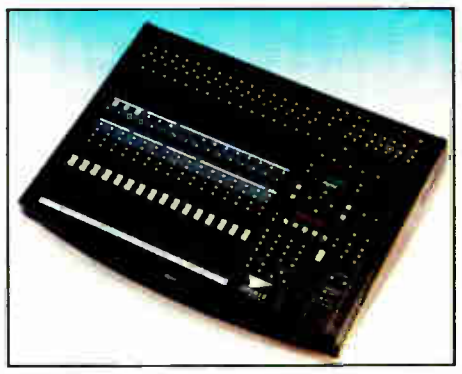
Circle (8) On Reader Service Card

SHORT TAKE

Spirit Launches New Digital Mixer



A new digital mixer has arrived on the scene from Spirit by Soundcraft: the Digital 328.

Scheduled to ship in May, the Digital 328 is a 32 x 8 x 2 frame. Rather than use a screen-based approach popular among digital mixers, the Digital 328 is designed to operate as a familiar analog eight-bus console.

The mixer includes 16 mic/line input channels with Ultramic+ preamps, high-pass filters and channel inserts. Five pairs of stereo inputs bring the console's input count up to 42.

All linear faders are automated and motorized, with automation controlled via timecode or MIDI clock signals. The Digital 328 provides machine control by reading SMPTE code and by reading and writing MIDI time code (MTC). A large readout indicates timecode position and all store/locate points.

Two internal Lexicon effects units provide reverb and other effect processing. Two floating stereo dynamics units can apply compression or limiting to any input or output. Two Tascam TDIF and two ADAT optical interfaces are standard on the Digital 328. Other planned interfaces include a ProTools option on a pair of AES/EBU connectors.

The "E-Strip" — shown as a horizontal band of rotary encoders and backlit buttons in the center of the mixer — keeps the board simple to operate. All EQ, Aux and pan assigns are done through the rotary encoders. Each encoder has a ring of LEDs to indicate status and signal level.

Especially helpful are the 16 10-segment bargraph meters, showing individual mic/line, tape return or group/master levels. Instead of trying to figure out which fader is running hot when the master VU meter peaks, the individual meters let engineers quickly find the offending input.

The Spirit Digital 328 will carry a suggested price of $4,999.95. For information, contact Spirit by Soundcraft at (916) 630-3960; on the World Wide Web at *www.spiritbysoundcraft.com* or circle **Reader Service 154**.

—Alan R. Peterson

Nothing Quite Like Homemade Laser Blasts

Gowan Gray

If you are still being influenced by the front office to remove the old reel machine from your studio — "once and for all" — here is one more trick that may preserve your old friend for a few more months. I call it "Buck Rogers and His Cheap Laser."

For a long time, my boss would not buy the station a fresh collection of zaps and laser bursts. One day, a part-time jock threaded a tape on our Otari 5050, totally missing the tape path between the capstan and pressure roller. He hit Record, and the reel motor made the tape race ahead as if it were in Fast-forward.

When he played back the tape at regular speed, the bias signal — normally supersonic and completely inaudible — was made audible due to the high speed of the tape when in Record mode. The bias was now a loud, steady, spooky tone.

We felt as if we suddenly became 1950s-era movie sound engineers working on a science fiction "B" movie. By loosely threading the tape through the heads and plucking at the slack like a bass fiddle string, a half-chirp, half-laser sound emerged. Dumping the Otari output into the delay effects box gave me the very "zap" effect I wanted.

By rocking the reels rapidly *and* plucking the tape, we got a clean, contemporary version of the old heterodyne whistle effects heard on the shortwave band.

To experiment with this technique thread your machine, but slip the tape out from between the drive elements. With the reels now in free-wheel mode, you may proceed to record audio at whatever speed your fingers on the reel dictate.

You may not get something useable every time, but you will be creating something uniquely yours, with direct fingertip control over the sound.

■■■

Gowan Gray is a former radio production director and now produces audio for cable television productions. Reach him in care of ***RW****.*

Running Radio

Radio World — Resource for Business, Programming & Sales — March 18, 1998

Polkas Equal Profits Page 96

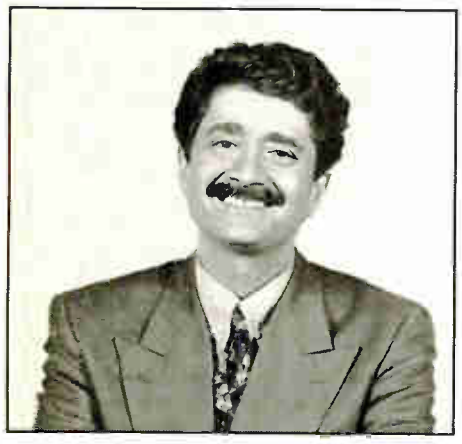
Sneak Preview of Medved's Show

Chris Hamaker

"I never planned to make my work the focus for some organized crusade, but I will confess to considerable satisfaction that, in my own small way, I seem to have been able to rattle the cage."

Those words appear in the paperback edition of Michael Medved's controversial best-seller "Hollywood vs. America," a tome that shook the entertainment industry with accusations of an elitist mentality that alienated the public, rather than serving its interests.

With the national launch of "The Michael Medved Show" this month



Michael Medved

from the Salem Radio Network (3 to 6 p.m., EST), listeners can find out if Medved stirs up controversy with his radio show to the same extent he did with his book.

"I enjoy rattling cages," Medved said. "Part of what I want to rattle cages about is people's expectation of what conservative talk radio is."

Right hook

Medved's cultural criticism has earned him a following in conservative circles among others, but Medved has his own take on what the term "conservative" entails.

"I honestly believe that part of what our mission should be as conservatives is to conserve that which is best, to ... exalt that which is best in the civilization that we have been handed," Medved said.

So what — and who — in Medved's opinion comprise the best among contemporary media figures? On the radio front, Medved pays homage to Rush Limbaugh, whose national show Medved has guest-hosted before, and Dennis Prager, host on KABC(AM) in Los Angeles. But it is author Herman Wouk whom Medved singles out as "the only American of this century of any prominence at all who has, in connection with that prominence, remained religiously Jewish."

Similarly, Medved is open about his Jewish faith. He plans to incorporate into his show discussion of "comparative" religion, an area of life central to many Americans but usually overlooked in mass media.

History is another of Medved's interests, particularly presidential history. With breaking news each day about the more unsavory aspects of the current administration, Medved thinks his show will be the only place listeners can get a historical perspective on presidential scandals and sort through the political grandstanding on both sides of the political fence.

Medved said the notion that sexual scandal was pervasive among past presidents

See MEDVED, page 87 ▶

STOCK ANALYSIS

The Golden Age of Radio (Stocks)

Jonathan Hoenig

The author hosts "Capitalist Pig," a radio program of investing and financial tips aimed at college students. Hoenig offers his perspective on how radio stocks may do on Wall Street.

You've seen it. Station consolidation.

No matter what size market you work in, chances are your group owner has been acquiring other groups or already been acquired.

After years of functioning as a loose patchwork of networks, station groups and independent owners, the industry quickly has become a veritable supermarket of swap. The economies of scale long present in other broadcast media have come to radio. Loyal employees, beware: Station groups are implementing cost-cutting strategies that will translate into higher margins, greater earnings and fewer jobs.

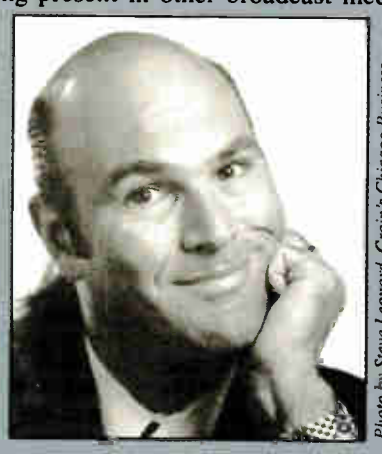


Photo by Steve Leonard, Crain's Chicago Business

Jon Najarian

Those looking to work in radio ultimately may find investing in the stocks of radio companies to be a more profitable approach. In short: Don't call your agent; call your broker!

Smokin' stocks

The stocks have been hot, and although significant consolidation already has taken place, there is still substantial upside potential. According to a report published in January 1998

See INVEST, page 85 ▶

MARKET ANALYSIS

Sunny Opportunities in Europe

Steve Pruett

The author is senior vice president for Communications Equity Associates, an investment bank that manages media transactions, mergers and acquisitions. RW asked him for his analysis of radio investment opportunities abroad.

Privately held radio station companies are faced with a dilemma. Deregulation and access to public capital have made it possible for a few companies to acquire most of the radio stations in the ranked markets in the United States.

With the prices these stations command, these private companies find it nearly impossible to contemplate growth through acquisition unless they go public as well. However, there may be a solution that lets them deploy capital in the radio industry.

Privately held companies hear the rumblings. They see fast movers like Clear Channel and MMI starting to build a presence overseas. They hear it is like the "old days," when they were buying start-up and turnaround FM stations without revenue and market share but were sure they could build a business with them. Should they make the leap into markets overseas? How do they get started? Whom do they call?

This article will provide a few insights, an overview of the best countries to consider, a list of the players and a few tips on how to get started.

Martin Brisac

Industry in Europe

In most of Europe, commercial radio remains in a developmental stage. Even in mature economies, such as those of the United Kingdom and France, radio is far from fully developed.

Despite these obstacles, radio revenue in the United Kingdom grew 17 percent in 1997, according to London-based media-buying service Venith Media. That growth figure would make U.S. operators dance in the streets. Economically, emerging countries such as the Baltic States, Russia and other former communist countries offer greater growth and substantially more risk. Sources contacted for this article agree that the most stable and best countries to invest in now are the United Kingdom, Czech Republic, Germany and a few that are firming up, such as Poland and Romania.

The entire U.K. commercial radio market is only about $600 million — about the size of the Los Angeles market. The rest of Europe combined barely exceeds $4 billion — approximately the total radio advertising volume of the top 10 U.S. markets combined.

So there exists a small, relatively undeveloped, fast-growing marketplace that, more than anything else, needs American-style finance, according to Martin Farmer of CEA London, the London arm of Communications Equity Associates, for which I work.

Travis Baxter

"The popular belief is that what European commercial radio needs most is American management expertise," Farmer said. "That may have been true 10 years ago, but it is really no longer the case."

Both France and the United Kingdom long have had aggressive commercial media companies that quickly took to commercial radio and have developed a solid core group of European managers. What is lacking is the access to entrepreneurial financing to allow many of these companies to expand aggressively.

According to Travis Baxter, managing director of CLT UK Radio, "In the last 10 years radio groups have grown and consolidated at a great rate throughout Europe. This has improved training, attracted better talent to the sector and brought substantial talent into radio from other disciplines, especially marketing and advertising."

Active investors

There are only a few serious U.S. players active in Europe. The list includes Clear Channel in the Czech Republic. The company actively is seeking additional opportunities. Metro Media International is active in the Baltic States, Berlin and Russia, and is seeking additional investments in Central and Western Europe. Emmis is active in Hungary.

Most of the commercial radio development of Europe has been at the hands of EC-based companies operating in a multinational environment, such as Europe Development International, a division of the French Defense and media giant Matra-Hachette, which now has about 25 stations in eight countries.

Other aggressive E.C.-based developers are Luxembourg-based CLT, NRJ of France and DMG Radio, an affiliate of the U.K. newspaper The Daily Mall.

Martin Brisac, chairman and CEO of Europe Développement International, said the international expansion of Europe 1 Communications, a division of EDI, mostly has been achieved through "the strategy of positioning ourselves with a local partner early on in the process of deregulation and developing a position in a market that has very strong growth prospects."

Are partnerships necessary?

With many of the key properties already in the hands of smart, aggressive, E.C.-based entrepreneurs, and with the European Community subjected to less stringent ownership rules than the United States, company partnerships may be the best alternative to going it alone.

The greatest obstacle for American companies investing with foreign partners is the typical American need to fully control the company. Controlling interest by foreign nationals is prohibited in most of these countries.

The other reason that finding partners may be desirable is that almost all of the new licenses have been issued.

About finding partners, Martin Brisac of EDI said, "We aim to be perceived as local operators rather than as foreigners where possible, and our approach is always to associate with a local partner when we are entering a new market. Our group brings its expertise in programming, management, operations and advertising sales to the venture, and our local partners assist in tailoring the product to the local markets."

One of the most important things to remember when attempting to do business in Europe is that the culture and business environment are different. Sure, business is just as rough and tumble in Europe as it is anywhere, but on the surface things tend to be much more polite and less direct. What Americans may think is an honest expression of interest and enthusiasm Europeans may deem as pushiness.

Carol O'Connor, managing director of CEA, London, said, "With such a diverse mix of cultures, languages and tastes, the European radio market can be very different from one region to the next. The recipe for success in one country, or indeed in the United States, may not be the right recipe for success elsewhere."

Rules to invest by

In sum, here are a few rules of thumb for investing in radio in Europe:

- *Hire local business and legal counsel first.*
- *Look for local partners who have tied up good projects but need financing help and senior management help.*
- *Check everyone and everything out in detail, then check again.*
- *Ascertain whether other foreign investors are operating successfully in your country or region of choice. Ask what their previous attempts have been.*
- *For major investments, get your own people in-country as soon as possible.*

Europe holds truly good opportunities for U.S. investors, but also more risk. The good investments can be hard to find, but they are there.

■ ■ ■

Contact Steve Pruett at (212) 319-1968.

'Pig' Is Bullish on Radio Stocks

▶ INVEST, continued from page 83

by Frank Bodenchak, analyst with Morgan Stanley Dean Witter, the top five radio groups at the beginning of 1998 controlled roughly 32 percent of industry revenues, a comparatively modest concentration compared to broadcast television or even cable.

As consolidation continues, so will owners' ability to maintain pricing pressure on ad revenue. The Radio Advertising Bureau predicts 1998 will see continued demand for radio advertising, so the industry seems poised to continue its upward trend.

The outlook for radio stocks is favorable, especially the media groups that have fully leveraged the cost cutting efficiencies of strategic consolidation. Dr. John Najarian, principle at Mercury Trading in Chicago, Ill., finds a historical precedent.

"The airline industry went through same transformation in the early 1990s that the radio industry is going through now, (where) cost cuts, mergers, increased traffic and consolidation yield increased profits and stock prices," he said.

Questions from overseas

One of the major reasons Wall Street has tuned in to radio stocks is that domestic advertising revenue should remain largely unaffected by economic turmoil overseas. Volatility in the Asian markets has prompted many investors to set their investment sights much closer to home. In an increasingly jittery stock market, radio stocks provide a defensive haven of stable cash flow and predictable earnings. Also boosting shares is the absence of significant capital expenditures, which can drag down earnings and significantly affect shareholder value.

In 1998, the financial markets will be impressed by consistency. Radio companies with dependably strong cash flow will continue to attract investor interest. Looking for specific picks? Here are a few names that have been mentioned recently on my program "Capitalist Pig." These observations are based on the market as it stood in mid-February. Subsequent market activity may not be reflected here; but barring a major correction, these conclusions should apply.

Aggressive acquisitions

Jacor Communications (OTC: JCOR) has been on a tear. CEO Randy Michaels' program of aggressive acquisitions has more than tripled company revenue in a period of months. In a research report issued last year, Merrill Lynch analyst Jessica Reif Cohn wrote, "In general, radio operators are expected to report strong gains, led by Jacor's estimated increase of nearly 40 percent."

Cost cuts, mergers and consolidation have translated into higher radio stock prices.

Recently, Jacor agreed to purchase 17 stations from Nationwide Communications Inc., a move that strengthens an already formidable ownership group.

Improving profit margins, continued acquisition and strategic divestitures continue to explain Jacor's repeated presence on most analysts' "buy" lists.

With station holdings in several major markets and an aggressive management team lead by Stuart Subotnick, Big City Radio (AMEX: YFM) also looks to be a winner. The company's innovative style of regentrifying less-expensive suburban stations has proved successful in top markets. According to Dennis H. Leibowitz, analyst at Donaldson, Lufkin and Jenrette, "Investors can expect attractive returns based on existing markets, along with a potential home run if Big City can enter new markets cheaply."

Worthy of note is that Subotnick owns more than 59 percent of Big City's common stock. According to the experts who regularly appear on "Capitalist Pig," significant insider ownership is a bullish indicator demonstrating management's confidence in its ability to create shareholder value and competitive returns.

CBS (NYSE: CBS) has outperformed in recent months, building on a strong franchise and quality brand recognition. The "Capitalist Pig" consensus, however, is not particularly glowing. There is concern the stock could come under pressure; the recent NFL contract will most certainly have a detrimental impact on earnings.

Current valuation also is a concern, as shares have already rallied following moves to divest the company's broad cadre of industrial concerns. The company's recent plans to suspend its cash dividend and buy back shares are positive signs, although Standard and Poor's consensus of Wall Street analysts rates CBS a "hold."

Lots of listeners

Under CEO Scott Ginsburg's eye, Chancellor Media (OTC: AMFM) has been a major winner. With AM and FM stations scattered around the United States, Chancellor commands an audience of 41 million listeners. In a December 1997 report, Morgan Stanley Dean Witter's Frank Bodenchak favors several radio picks, including Chancellor Media, a company that "has demonstrated strong revenue, broadcast cash flow, and after-tax cash flow growth (above) initial expectations." With the development of the much heralded AMFM Network, the company is poised to create significant shareholder value. A 2-for-1 stock split also has given the shares a recent pop. (Disclaimer: My program "Capitalist Pig" airs on a Chancellor Media-owned station.)

Even after rising 60 percent in 1996 and 90 percent in 1997, Clear Channel Communications (NYSE: CCU) still looks promising. For better or worse, the company is well diversified, holding significant domestic as well as international broadcast properties. Additionally, Clear Channel's 1997 acquisition of Universal Outdoor Holdings and Paxon Communications make it a dominant player in the billboard advertising industry. The natural synergy between billboard and radio advertising should bode well for earnings. Wall Street agrees. According to records filed with the Securities and Exchange Commission, mutual fund giant Putnam Investments bought a significant amount of CCU earlier this year.

■ ■ ■

Jonathan Hoenig is host and executive producer of "Capitalist Pig," heard nationally on the PRI program "Marketplace" and locally on WMVP(AM) in Chicago.

Hoenig may hold long or short positions in the stocks mentioned, and under no circumstances does the information above represent a recommendation to buy or sell any securities.

INTERNATIONAL UPDATE

Growth, Change for U.K. Radio

Lawrence Hallett

For the British radio industry, 1997 was a year of expansion, consolidation and change — particularly within the BBC — perhaps reflecting the broader economic climate of the country.

In terms of expansion, the U.K. commercial radio industry traditionally has been slowed by its regulators. Although this changed to some extent in the early 1990s with the introduction of the Radio Authority, the pace of expansion has yet to reach projected levels.

Even so, there are now approximately 100 additional services in operation, and the reach of some stations improved greatly with the introduction of national stations, such as Classic FM, Virgin 1215 AM and Talk Radio AM, and of some very small-scale operations serving potential audiences of less than 20,000 people.

Private vs. public

The radio audience in the United Kingdom now is split approximately in half between private broadcasters and the publicly run BBC. The most popular commercial service in Great Britain, however, remains the long-wave station Atlantic 252, which is based in the neighboring Republic of Ireland.

Revenue for commercial radio has continued to grow at a rate of more than 10 percent per year, and radio remains the fastest growing advertising medium in the United Kingdom.

Also during the past year, the Radio Authority and the BBC have been proactive in getting Eureka-147 digital audio broadcasting operational in the U.K.; several digital services are on the air.

The DAB system continues to be beset with problems of frequency allocation, both in vast urban areas that require multiple multiplexes, and in some rural areas where international clearances are not easily obtained.

If digital radio as it is currently proposed fails for international reasons, such as the lack of a worldwide standard, or for regional reasons, such as competition from multichannel digital TV or Internet-based services, it will not be the fault of U.K. regulators.

But if the system does fail, U.K. companies such as transmitter manufacturer Eddystone Radio will lose out along with broadcasters. Eddystone has backed DAB technology heavily. Coincidentally, its parent company, Marconi, withdrew from the high-power AM broadcast radio systems sector during 1997.

Small-scale licenses

Meanwhile, in the realm of traditional FM broadcasting, the Radio Authority continues to push ahead with a program of offering small-scale, alternative-location (SALLIE) FM licenses, as well as offering more regional and traditional local licenses. The SALLIE licenses typically are limited to 100 W.

Temporary Restricted Service Licenses (RSLs) also remain popular, both for covering special events and as trial licenses for potential full-time operators. At the smallest of levels, 1997 saw the Radio Authority announce an experiment in freely radiating AM services for universities, hospitals and similar institutions.

Such establishments, until recently, were limited to induction-loop or wire-based program delivery systems. Only those hospital radios located in rural areas were granted limited 50 mW FM licenses.

To date, four stations — two hospitals and two universities — are broadcasting under the trial license scheme. If the tests go well, the program could be expanded to cover most of the U.K.

Away from the commercial sector, the BBC itself saw some dramatic changes in 1997, including the privatization of its transmission section. Castle Transmission International (CTI) is now responsible for managing domestic BBC radio and TV delivery systems, while Merlin Communications has taken responsibility for BBC World Service transmissions.

CTI took on the biggest of the commercial radio transmission providers, National Transcommunications Ltd. (NTL), almost immediately by providing the latest London FM station, XFM, specially installed facilities at the CTI Crystal Palace transmitter station.

One problem

Britain also has seen several smaller companies continue to compete with these larger players. Sound Broadcast Services (sbs), Alice Soundtech and Radica Broadcast Systems Ltd. continue to offer transmission services and products throughout the U.K. and Europe.

In fact, Radica recently received ISO 9001 certification, and signed cooperative agreements with U.K.-based STL manufacturer Wood & Douglas and Canadian telemetry provider Davicom.

In a move to make their customers less reliant upon expensive telecom circuits for studio-to-transmitter links, sbs, Radica and NTL have all provided digital microwave link equipment to some of their customers.

This technology is fairly easy to license in the U.K., and it is now mature enough to offer full 15 kHz stereo audio. When necessary, back-up analog radio links or ISDN circuits are being added to ensure redundancy.

A measure of the continuing confidence of the British radio industry was the expansion of the annual Sound Broadcast Equipment Show (SBES) held in Birmingham, England.

The 1997 show was bigger than ever, lasted a day longer than in previous years and was held at the National Exhibition Center (NEC) for the first time.

Outside the world of licenses and regulation, pirate broadcasting remains a major problem here, particularly in larger cities. The DTI Radiocommunications Agency continues to attempt to track down and prosecute offenders, but incidents continue.

At one point in late 1997, one of the runways at London's Heathrow Airport was closed for nearly three hours when a nearby unlicensed FM broadcaster interfered with the landing systems.

As suitable frequencies gradually are filled by legitimate signals, pirates move closer to licensed stations, inevitably increasing interference with legal broadcasters.

Regulators also are troubled that, in recent years, criminal elements have become involved in some pirate broadcasting activities. The results are higher-power pirate operations and less regard for good engineering practice, coupled in some cases with violence towards enforcement officials.

In general, observers say the U.K. broadcasting industry is in good shape as it approaches the millennium. Expansion continues at a modest pace, and the BBC is holding its own against increasing competition.

The new Labor government may wish to make alterations to the regulatory framework, if only to increase opportunities for some smaller new players to get in on the act. At present the industry would appear to be in a good position to cope with any such new dose of change.

Religion, Politics Fuel Talk Show

▶ MEDVED, continued from page 83

is"ludicrous," citing only John F. Kennedy and Warren Harding as presidents whose infidelities were well known during their respective terms.

Shadows from the past

Lest anyone think Medved's interest in politics suddenly developed on the eve of hosting a national talk radio show, his credentials indicate otherwise. During the 1970s, Medved worked on the political campaigns of liberals such as George McGovern and Ronald V. Dellums, shifting his political affiliation to the Republican Party by 1980.

His diverse writing background includes a book on White House chiefs of staff, "The Shadow Presidents," and "Hospital," an account of 30 people who worked together in the same hospital.

It was not until Medved's "The Golden Turkey Awards," which lambasted some of the poorest movies ever made, that Medved became known for his insight on movies. The book attracted the attention of CNN, which hired Medved as its on-air film critic. Twelve years co-hosting the PBS movie-review program "Sneak Previews" further established Medved's film criticism credentials.

Medved has scripted several TV and feature film projects, but he acknowledged that large discrepancies develop during the creative journey from screenplay to final product. Medved no longer writes for the big or small screens.

"It is the most frustrating work in the world," Medved said, "because you have no control over what you do. One of the things I despise about American life right now ... is the tendency to claim victimization, to blame other people for everything that is wrong. ... The problem is that when you are a screenwriter, it is usually true!"

Editors and headline writers also can misrepresent an author's intentions, as Medved has found out during his time as film critic for the New York Post and member of the USA Today Board of Contributors. This helps explain why Medved is excited about radio, a medium where "no one does the headline for you."

There are a lot of interesting people who have radio shows. ... Some are friends of mine.

— Michael Medved

"The Michael Medved Show" will tackle all sorts of subjects, as long as they interest his listeners and befuddle his critics. "When you are interested in a range of subjects as I am, and have written books on it, I don't know of any other arena (like radio) where you can so readily flex all those different muscles.

"The approach I have always had in my career is that it is harder to hit a moving target."

Déjà vu

SRN hopes to build on Medved's track record on KVI(AM) in Seattle, where "The Michael Medved Show" debuted in July of 1996. Salem was impressed enough with Medved's KVI numbers to pick up the show for national syndication.

But why would Salem, which already syndicates "The Oliver North Show" and "The Alan Keyes Show," roll out another talk show that presumably appeals to the same audience?

Leigh W. Dowe, director of Affiliate and Administrative Services for Salem Radio Networks, said Medved's perspective offers stations something different, which is why early interest in the program has been strong. "There are a lot of Rush Limbaugh stations and rated markets" among the prospects, Dowe said. Salem is confident the Medved program will launch on 50 to 100 stations.

SRN may be carefully pitting which shows it puts its latest offering up against, but Medved does not take an aggressive view of his competition. "There are a lot of interesting and good people who have radio shows locally and nationally at the same time that my show is going out, but I don't see them as competition, partially because some of them are friends of mine."

Christian stations may be interested in carrying Medved's moral message (SRN's "The Alan Keyes Show" attracted several Christian stations, according to Dowe), but Dowe said Salem needs to "go for numbers" and is targeting stations with broader listenership. "I see this as one of the most marketable shows in the country, very long-term," Dowe said. "It isn't one that's going to be around for just a year. ... I really think this is a slam dunk."

Radio Sales, Down to the Letter

S.D. Yana Davis

In this world of radio acronyms, you may have noticed a new one.

The Radio Advertising Bureau has adopted a new sales certification program, developed by The Lytle Organization of Madison, Wis. A new certification designation — Certified Radio Marketing Master, or CRMM — now is awarded to sales people who complete the required course.

The new designation represents a "consolidation" of RAB's former certifications of Certified Radio Marketing Consultant (CRMC) and Lytle's Radio Marketing Manager (RMM), according to a statement from The Lytle Organization. CRMM is the highest certification available through RAB.

Early grads

Certification will continue to be sanctioned through RAB, with The Lytle Organization providing materials and testing and reporting results to RAB.

Chris Lytle, president of The Lytle Organization, said the first graduates to earn the CRMM designation were certified in February. His company based the new CRMM certification course on a similar program it developed in Canada. Lytle said "about half" of Canadian radio sales people have been trained in the program.

The new course is available for sales people to complete on the job as they call on clients, make presentations and schedule advertising. The RAB estimates there are 55,000 radio sales people in the United States. Approximately 5,000 hold the CRMC status; approximately 1,000 hold the Lytle RMM designation.

"The course materials include a 300-page manual and 12 hours of audio tapes. Sales people take it on their own time, complete projects in the field and report on what they did" to complete the certification, Lytle said.

Not everyone is happy about the new CRMM designation. CRMC and RMM designations were permanent; once earned, the recipient needed no further formal training to maintain certification. The new designation requires participants to take The Lytle Organization seminars on a regular basis.

Dick Taylor

"This new CRMM designation will force ongoing commitment and training," Dick Taylor, general manager at WLIC(FM) in Ocean City, Md., said. Taylor, who has written occasionally in RW, said he holds Diamond CRMC certification.

Taylor said that a "minimum number" of required future updates and seminars would impose "additional expenses" in fees for radio sales people, who will be "stripped of the designation" without ongoing training.

Fries explains

RAB President Gary Fries took exception to Taylor's comments. He told RW that the new certification process is "absolutely not a way to make more money (for RAB). We'll probably end up making less per certification," due to higher costs associated with the new program, Fries said.

RAB Executive Vice President/Services Mike Mahone said those certified as CRMCs since June 1996 each will receive a voucher worth $200 toward the cost of new certification; those certified prior to June 1996 each will receive a $100 voucher toward the cost.

The charge for CRMM certification is $799 as opposed to $175 for CRMC certification.

"This is a whole different type of course," Fries said, noting that the previous certification levels involved basic sales proposal writing only. He said the new CRMM designation involves "multi-faceted, interactive learning."

Fries contended that many industry leaders had pushed for the new CRMM program to raise radio sales training to the level found in real estate, investments and other similar sales professions.

Sales support

Taylor claimed that neither the RAB nor The Lytle Organization had directly consulted working radio sales representatives about changing the certification process, and that the present system is working well.

Neal Trotter, general sales manager at WMYU(FM)/WWST(FM) In Knoxville, Tenn., favors the program.

"I believe if you don't have some kind of regular training, you're really not sure if you're staying up to date," Trotter said.

■■■

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Should You Stay in the Sales Game?

Barry Kase

The author spent several years in radio advertising sales before changing careers earlier this year. He shares the self-examination process that led him to reconsider his career choice.

Is there a new way to skin a cat?

You cat lovers, please forgive the ol' cowboy expression, but if you are in radio advertising sales, take a few minutes to take stock in your hourly, daily and weekly routine. If you manage salespeople, these ideas can be of service, too.

Let me relate some of the wisdom I gleaned during my years on the front lines. I've been there, and I want to help.

Drive time

How can you find more energy or motivation? Maybe that little voice in your head is saying, "I know I should have this down. After all, my friends think I'm really sharp and personable, so why have my sales figures dropped off? Not just last month, but throughout last year? What am I doing wrong? Where's my checklist from all those motivational seminars? How about some extra vitamin C or complex B vitamins?"

Wait. Maybe you just need to go back to the basics.

I cannot offer documented, scientific proof that my ideas will help you in your job. You may want to go to that article on CDs or digital players for that kind of info. But I have found that the basics really do seem to make sense when applied to a job in radio advertising sales. Consider the following factors.

Mood and Motivation. If 90 percent of the sale is based upon the emotion of the buyer (and we've all heard that it is), doesn't it stand to reason that your own internal emotional quotient, daily mood or energy should be rather high?

Internal and External Relationships. We need to have powerful relationships with our client. Consider the relationship you have in the work place, where each day starts. You need an injection of encouragement to get "psyched" before talking with clients. Do you feel like a valued member of the team?

Is Money Everything? The phrase "Show me the money!" will always perk the ears of those ol' sales hounds (professional account executives). Your daily mood can come from the success of closing the sale, but what happens when you don't close with frequency? You still need encouragement about your ability to contribute.

However, this drop-off may be a warning flag. Some take weeks before they lose encouragement either about the product or the goals. Others take months. For me it took years. And some keep plugging along!

As my previous boss said, sales covers a multitude of sins. Don't look for the exact scripture on that, just know it is true in general market radio and even Christian radio.

There is a bit of Hollywood in the radio ad sales profession. Those who bring in the money to the stations are treated like celebrities by co-workers, or, sometimes, management. Just remember that one day you may be something less. Gaffer, perhaps?

Remember: Even the gaffer has a job to do. In sales, you are either the star or are trying to keep your modest star shiny. You have a certain amount of control over your sales, but if you do not make the calls you do not pass go, and do not collect $200.

When Is It Time to Look Elsewhere? The input about our future does not always come from loved ones or professionals. When someone says, "You know, you would be great at ...," or "Have you ever considered ..." or "You are so good at ..." don't brush aside the comment.

Deeper questions

But you're saying to yourself, "What, give up my dental plan and 401K? Do you know how much monthly insurance costs under the COBRA plan?!"

Take a different approach. Ask yourself:

Am I unmotivated and feeling depressed? Is it affecting my work? Have I talked to a friend or seen a counselor?

Am I unmotivated about life in general, or specifically my work? Could it be my job?

Am I one of the sales celebrities at the station? If not, why?

Have I been making the number of sales calls necessary for success? If am not meeting my goals, how long can I sustain the slow sales?

Most important, is management helping me meet my sales goals by spending time with and encouraging me?

If the answer to the last question is no, talk to your boss. Make sure to voice your concerns before jumping to any conclusions about your future.

I realize not everyone will love their job. However, life is short. There really is something to be said for being encouraged and motivated in our jobs.

I've been encouraged and motivated in the past to sell ad time on the radio. Not any longer. I needed a change. What about you?

Only you can say, but I hope I have at least "sold you" on some serious reflection. It will make you a better salesperson, or it will lead you to something even better!

■■■

Barry Kase is a former announcer/senior account executive at WAVA(FM) in Arlington, Va. He is owner of Kase Communications, offering media relations, publicity and production. Contact him at (703) 758-4036.

***RW** welcomes other points of view.*

Risks and Rewards of Webcasting

Carl Lindemann

Webcasting your station signal gives you global reach on the cheap. But how much of that signal is yours? As has been reported in **RW**, ASCAP and BMI have raised this issue with music stations. Likewise, big-league sports wrestle with how to maintain control of their properties online.

These same issues affect radio syndication.

"We ask our affiliates not to" put ABC programming on the Web, said Frank Raphael, vice president for Network Programming, ABC Radio Networks. "When I find an affiliate that does, I call them. We have had a few cases, and never had an affiliate decline. They understand they have the rights to their local market, and that's all."

Great expectations

For most, reasons for going online are based more in possibility than profitability. Not being able to simply put the on-air product online is an added complication. For some, that is good reason to wait and see how things develop. For others, this anxious atmosphere of risk and opportunity is just too great to stay on the sidelines.

Talker WLS(AM) in Chicago took the leap and began Webcasting local programming last summer. According to Mike Elder, operations director, "Everyone's afraid not to be involved with it, but no one's figured how to make a profit off it."

Doing without syndicated programming presents a practical challenge. Pulling syndicated shows from a station's Webcast leaves major holes in that station's online schedule. "We don't have our plan put together yet, but we're going to try to delay broadcast of some of our own local programs to keep a continuous feed to the Internet," Elder said.

Substituting local shows for syndicated programming is a viable option for major-market players with a commitment to local programming. But medium- and small-market stations depend on syndicated programming. It seems that smaller talk stations more in the business of distributing, not creating, shows will be cut out of future Webcasting possibilities. If so, is that necessarily bad?

For those that see Webcasting as essentially at odds with the radio business today, the answer is no. Syndicators maintain broadcast rights within specific territories for their own good, and for the good of their affiliates. Cyberspace wreaks havoc with such business models rooted in geography.

Westwood One personality Bruce Williams sees the downside for affiliates if in-market listeners tune in to out-of-market Webcasters.

"Their audience is diluted, so their local spots are worth less," he said. "Why shouldn't they just cancel the network show and put something else on that's not diluted?" For Williams, the core issue goes even deeper. "We don't get paid unless we can take credit for an audience. (Webcasting) allows people to listen who cannot be measured. We're in a business that's dependent on measurement."

Just say no?

For some, the "just say no" approach to Webcasting may be the best solution in today's environment. Still, some syndicators maintain existing business while seeking new media hybrids that can include their affiliates.

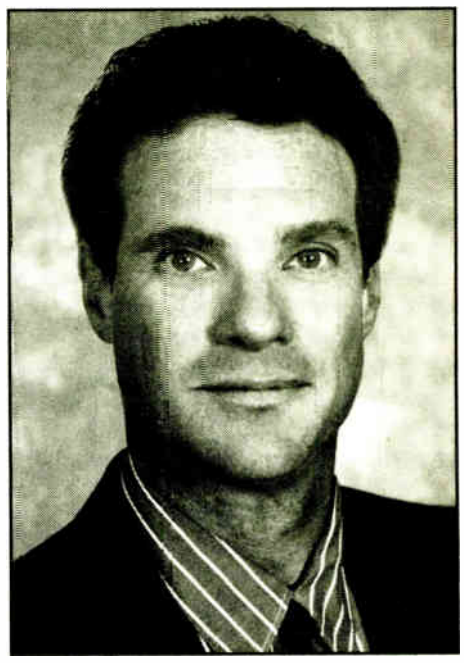
"We've thought a lot about Webcasting and what it means to syndicators," said Nick Miller, vice president of marketing for Jacor. "It is a sensitive issue. It's early, and there's so little evidence of losing listeners to it. I don't know that I've heard a single complaint from the field. We've heard reports of Arbitron debating how to credit a diary entry for a Webcast listener in a specific market. Outside of that, it has not happened enough to be a problem. There is no question that it is going to have to be resolved.

"We're interested in what opinions our station managers are forming. One of the best things I can do is stay tuned to the volume of those kinds of concerns."

What's the feeling from the field? "Most of the managers want us to be progressive, but not too 'out front' on the Web site," Miller said.

For Jacor's progressive strategy, Miller deferred to Steve Lehman, president/CEO of Jacor's recently acquired subsidiary, Premiere Radio Networks.

"I believe that the Internet is part of the next platform of network radio. It's a global network," Lehman said. "You will end up in a scenario when the Internet will be rated just as television or radio is now. You'll have a rating system in place. Once advertisers are able to quantify what a 'hit' means, we will be able to go to advertisers and, essentially, offer them two mediums: network radio and the global network fed via the Internet."



Steve Lehman

But will this additional "platform" help or hurt radio? Lehman aims to develop synergy through Webcasting that will be a winner for both syndicator and radio station affiliates. Part of this will come through Jacor's stake in Audionet, a Webcast developer/network. Already, radio affiliates can Webcast Jacor programs (including Dr. Laura and, soon, Rush Limbaugh) if they also affiliate with Audionet.

Lehman's philosophy is about growing, not protecting, the radio market. He sees opportunities for reaching listeners otherwise inaccessible.

"Say someone is unable to listen to Rush

See WEB, page 91 ▶

Who Owns What?

Questions about Webcasting rights affect all content carried over to the new medium, including voiceovers. Though Steve Tishman said this is not a major issue with his voice talent agency, he said it should be made part of contract negotiations. "You don't just assume the Webcasting is thrown in. You negotiate the rights you want when you want somebody.

"There are people using the rights (to Webcast) without even asking," Tishman said. Such unauthorized use seldom arises with more sophisticated clients. "If the commercial is done with a major ad agency, they're aware of these rules. There has to be extra monies to get the rights to do that. It's just another facet of what they want to do, and they pay a bit extra to do it," Tishman said.

Jason Terrel, president of Audio Image, sees a potential for conflict elsewhere. "My contracts do not mention Webcasting. However, they do mention market exclusivity," Terrel said. "Technically, a station could argue that Webcasting infringes upon their market. So, if a station complained, then the problem would need to be addressed." As yet, Terrel has not had any such complaints.

Given the relation of radio to television, this probably will not become a major issue, according to Jeff Schmidt, owner of Creative Production Works. He pointed to the existing practice: "You will often hear a major voice talent doing sweepers on a radio station, as well as many others in other markets, and then turn on the TV and hear the same voice talent, in the same market, doing a commercial or network promo." For Schmidt, "The voice talent's business is not threatened by being on the Web."

Far from being a threat, Mike Carta of Super Sweepers sees the Internet creating a new market for his services. "I have recently done a package of sweepers for a 'net station that broadcasts only on the 'net."

This also means additional revenues from broadcast clients. "Quite a few of my client stations are on the 'net in some fashion using some of my sweepers. Most of my rates take the 'net into consideration," Carta said.

— Carl Lindemann

▶ WEB, continued from page 90

Limbaugh or Dr. Laura while at work. You can pull up Audionet and rebroadcast programs. Or, if you're in a building that you can't get AM signals, you can actually listen to live audio streaming."

According to Lehman, the "huge response" to Dr. Laura on the Internet only feeds her radio presence. "When we put Rush up on the Internet as an experiment, he received over a million hits the first day!"

Consolidating broadcast and Internet presence also means tying together show Web sites and their content. This unified presentation can make for powerful marketing. Even "official" Web sites are often not closely integrated with the rest of the program's content. Jacor's Miller sees drawing these together as a way to solidify listener loyalty — and memory.

"Radio's power to paint pictures in people's minds is always going to be important," Miller said. "But being able to couple this to a visual component like pictures and information of the day's guest gives additional reinforcement. That reinforcement is good for diary purposes, too."

■■■

Carl Lindemann is developing "Cyberscene," a daily feature for syndication. He also is the former production director for WCDQ(FM) and WSME(AM) in Maine. He can be reached at (207) 676-8525; e-mail carl@radioshow.net

Statewide Networks Spread News

Bob Rusk

From fires to floods, from events on Wall Street to Main Street, radio immediately breaks in when news breaks out. Unlike television, radio effectively reaches people who are in their cars or even at home during power outages.

Radio coverage can be made even more effective when a network of stations pools its resources to blanket an entire state with news and information. In 1996, for example, listeners in North Carolina tuned in the North Carolina News Network for the latest on Hurricane Fran, which wreaked havoc on the state. The network, which has some 90 affiliates, was honored for its coverage with the prestigious Edward R. Murrow Award, given by the Radio and Television News Directors Association.

Group owners

NCNN distributes its programming on satellite Satcom C5 and is one of 26 statewide news networks in the country. The oldest is CBS-owned Texas State Networks, started in 1938. Other major group owners in the state network business include Clear Channel Communications, owner of Kentucky, Oklahoma and Virginia networks, and Emmis Broadcasting Corp.

The Indianapolis-based Emmis entered this niche last year with the purchase of by Wabash Valley Broadcasting Corp. The parent company of Wabash owns the Indianapolis Motor Speedway.

"Network Indiana was attractive to us because of (Emmis-owned) WIBC(AM), which has the largest (radio) news department in the state," said Tom Severino, vice president and general manager of WIBC and Network Indiana. "We are a very news-intensive radio station. The network did not have an affiliate in Indianapolis, which is the state capital."

Severino said Network Indiana, with before Emmis moved on it.

"Part of the reason was because it is very difficult to have a state radio network when you do not have an affiliate in the state capital. So the synergies between WIBC, which is now the flagship of the network, and a state news network seemed to marry each other perfectly," he said. "One product can enhance the other product. We can run it somewhat differently and more efficiently than it was run before."

Severino expects "more major broadcasters" will enter the state network

Clayton Henkel, news director for the North Carolina News Network, accepts the Edward R. Murrow award. Bev Holt (left) and George Habel of Capitol Networks join her.

louder ☮ lower noise

no grunge

less distortion

"It blew away the 8200, both in loudness and clarity."

Robert Mallery, Technical Consultant, Communication Service and Supply

"Heads above all the processors we evaluated."

Ray Baker, Chief Engineer, Ace Radio Broadcasting, Melbourne, Australia

"Super powerhouse processing and a big, tight, bone-jarring bottom end."

Pete Partenio, Audio Specialist, Odyssey Communications

"The station pops right off the dial–it didn't do that before."

Tom Sittner, Chief Engineer of KSJL-FM, San Antonio, Texas

"We're getting calls from listeners commenting about the improvement in reception."

René Engel, General Manager, KCSN, Los Angeles

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Find Hidden Money at Your Station

Tom Osenkowsky

Commercial ad time need not be the sole source of income for a broadcast station. Creativity and imagination can yield additional income. A complete examination of your facility may result in substantial savings.

The following suggestions on using technical resources can positively influence the bottom line at your station.

Co-locate. Consider co-locating your transmitter facilities with other broadcasters. It is not uncommon to find multi-user FM and TV towers. Less common, however, are diplexed AM stations. AM stations, directional or nondirectional, can be made to operate from a common antenna system.

Selling your AM transmitter site property and co-locating with a neighboring station's AM antenna system may be worthwhile. Conversely, a neighboring station may wish to lease your AM facilities to save money, particularly if a tower or towers are in deteriorated condition or where the land is too valuable for tower space (i.e., zoned commercial land). Many operations in the United States and Canada have two or more AM stations transmitting from common towers.

Examine your channel allocation. Over the years, the rules have changed for AM and FM stations with respect to co-channel and adjacent channel protection requirements. Some stations have gone permanently dark, offering improvement opportunities for other broadcasters. Some healthy stations have bought co-channel or adjacent-channel neighbors and turned them off, in order to gain coverage and/or add nighttime service.

WWRL(AM) in New York purchased several co-channel and adjacent channel stations, turned them dark and increased their power. Your allocation is like a property boundary: You may erect a house within the required setbacks. If your house is too far from any setback, you lose living space. If your signal is deficient in revenue-generating marketplaces, you lose income. Remember: What used to be cow pasture or woods when the station was designed years ago may now be condominiums, shopping malls or residential developments. A check of your channel allocation may be beneficial.

This study also will tell you if a site move is feasible and what gains may be realized by moving or diplexing. Many older AM directional arrays were designed inefficiently. This was not due to poor engineering practice; rather it was a lack of sophisticated computer programs that now can design arrays in minutes. The old-fashioned manual method often consumed weeks or more of calculation time. Some older arrays may be redesigned to afford the necessary protection to other stations with fewer towers.

In one instance, I recommended that

See RESOURCES, page 96 ▶

RADIO BUMPERS

How can you best illustrate that your signal reaches cities as well as rural areas? WRFD(AM) in Columbus, Ohio, claims to reach 80 of the 88 counties in the state, and the WRFD window sticker conveys "both aspects of signal coverage by depicting the city and rural areas of Ohio," according to General Manager Dan Craig.

The graphic elements do not directly relate to the WRFD format, which mixes agricultural news with Christian teaching and talk. "We needed to keep our sticker design fairly generic," Craig said.

What message does your station bumper sticker convey? Send the sticker, and a 100-word explanation, to: RW Bumper Sticker, 5827 Columbia Pike, Third Floor, Falls Church, VA 22041.

State News Rustles Up Ad Money

▶ NEWS, continued from page 91

business. "That influx of resources and expertise will improve the health of the business."

Midwest view

One company that takes a different approach is Missouri-based Learfield Communications, owner of state news networks in Missouri, Wisconsin and Iowa. Learfield does not own any radio stations and does not plan to buy any.

"We are very good at running various kinds of radio networks; but I suspect we would be only so-so at operating a radio property," said Clyde Lear, president and CEO of Learfield. "We want to be the best at what we do."

Radio Iowa News Director O. Kay Henderson, who helped start the network in 1987, said state networks do much the same thing that national networks do, but the content is regionalized. "(We follow) the principal of ABC news," she said, "only in our case we are doing just Iowa news."

Radio Iowa, with studios and offices in Des Moines, the state capital, operates with four full-time reporters and a sports director. In addition, reporters at the affiliates often contribute stories to the network.

Another company quickly becoming a major player in the coverage of statewide news is Houston-based Metro Networks Inc., best known as a drive-time traffic reporting service. Metro Networks management felt it was a natural addition to begin covering news, because, Metro said, its reporters often arrive at the scene of an event before other broadcast journalists.

Metro currently operates in more than 70 U.S. markets, with about one-third of its 1,500-plus radio affiliates taking its news feeds. According to Kelly Barton, vice president of communications and product marketing at Metro, the company does not have a working relationship with any of the state networks, "but we have been talking to several of them about a partnership."

There has been a "slight increase" in the number of state news networks formed in recent years, with Ohio the newest addition, according to Neal Gladner, president of the National Association of State Radio Networks.

Giving clout to the NASRN is its national advertising rep firm StateNets Radio, which works exclusively for member networks.

"Buying state networks is very cost-effective and delivers great reach into 'C' and 'D' counties, beyond just the 'A' and 'B' counties," said Gladner, who also is vice president and manager of the Arkansas Radio Network. "It takes a rep firm that knows how we work and understands the needs of our kind of clients."

While clients are buying time on networks owned by commercial broadcasters such as Citadel, CBS and Clear Channel, networks owned by noncommercial operators also are getting in on the business. Radio Pennsylvania, for example, is owned by WITF Inc., which operates noncommercial stations WITF-FM-TV. But many Radio Pennsylvania affiliates are commercial stations, and the network sells advertising time on those stations.

"That's how we make our dollars. We go out and sell to statewide advertisers," said Radio Pennsylvania General Manager Doug Easter. Non commercial stations that are affiliated with the network pay "a very nominal monthly fee."

■■■

Bob Rusk is a regular contributor to RW.

News networks operate in the following 26 states, according to the National Association of State Radio Networks.

Alabama
Arkansas
Florida
Georgia

Iowa
Illinois
Indiana
Kansas

Kentucky
Louisiana
Michigan
Minnesota

Mississippi
Missouri
North Carolina
South Carolina

North Dakota
South Dakota
Ohio
Oklahoma

Pennsylvania
Tennessee
Texas
Virginia

West Virginia
Wisconsin

According to Rhett McMahon, vice president of technology at the Louisiana Network, satellite became the preferred program distribution method when lease-line telephone rates went "through the roof." The Louisiana Network is uplinked on Galaxy 4.

AP Chooses IMAKE For Audio News Feed

IMAKE Consulting Inc. said it won a contract with **Associated Press** to produce a software system associated with IMAKE's three-tier, Internet/Intranet architecture, to translate text news feeds to digital audio and distribute it. Voice elements are recorded in advance and MPEG-encoded.

The company said its source code sharing business format gives clients affordable, quality technology that is Internet/Intranet-enabled. The system includes an Internet/Intranet-accessible Java graphical user interface and IMAKE Java Web server.

For information, call the company in Maryland at (301) 896-9200; or circle Reader Service 36.

WCPN Chooses SSL

Public radio station **WCPN(FM)**, serving northeast Ohio out of Cleveland, purchased a 24-channel **Solid State Logic** SL 8000 GB console for its new control room.

Director of Engineering Jim Young said the console was chosen for its flexibility to handle numerous types of projects. "Each of the individual console channels has equalization, dynamics control and very flexible routing structure."

He said the console is suitable for live broadcast, multitrack recording and production of programs recorded in the field.

For information about Solid State Logic, call the company in New York at (212) 315-1111; fax (212) 315-0251; or circle Reader Service 12.

SED Signs International Datacasting For DAB Project

SED Systems Inc. of Saskatoon, Saskatchewan, ordered 14 digital audio broadcasting Baseband Subsystems from **International Datacasting**. The supplier put the value of the satellite contract at $3.4 million.

The subsystems will be integrated as part of Processed Feeder Link Stations under an SED contract with WorldSpace Management Corp. The PFLS will be used by WorldSpace customers to broadcast audio content over the WorldSpace satellite network.

WorldSpace seeks to provide satellite digital direct audio and multimedia services to emerging and underserved regions. Its first satellite, AfriStar, is slated for launch in October.

For information from International Datacasting, call the company's U.S. office in Georgia at (770) 446-9684; fax to (770) 448-6396; or circle Reader Service 202.

BSN Signs Commercial Affiliates

The **Beethoven Satellite Network**, the classical music format service of the WFMT Radio Networks, signed two major-market agreements to carry portions of its feed. The hosted music hours will be heard on KKHI-FM serving San Francisco, and X-BACH, serving San Diego and northwest Mexico. The stations are owned by **Mt. Wilson FM Broadcasters.**

The Beethoven Satellite Network provides hosted modular hours of classical music from the WFMT library of more than 65,000 recordings, available to both commercial and public stations.

For information from the WFMT Radio Networks in Chicago, call (773) 279-2111 or circle Reader Service 60.

TexRock Gears Up With DAD

Equicom Inc., d.b.a. Texas Eagle Radio Networks and familiarly known as **TexRock Radio**, a new radio group, ordered 34 **ENCO** DADpro32 digital audio delivery systems to be installed in its facilities throughout Texas. The sale was finalized through ENCO dealer Giesler Broadcasting Supply.

Texas Eagle will uplink five formats via DAD from its Bryan headquarters, and use DAD systems at each of their downlink sites for live origination in the morning and automated local insertion into the master feeds at other times.

For information, contact ENCO in Michigan at (800) 362-6797 or (248) 476-5711; fax: (248) 476-5712; e-mail to lamoray@enco.com *or circle Reader Service 226.*

Continental High-power Projects

Continental Electronics Corp. announced two significant contracts outside of the broadcast industry. The company received a contract from **International Isotopes Inc.** for the manufacture of high-power klystron modulators. The company estimated the value of the contract at $1.5 million.

The modulators will be the upgraded power source for a Drift-Tube-Linac being acquired by International Isotopes; it will produce radioisotopes used in radiopharmaceuticals to provide nuclear diagnostic and therapeutic medicines. The company said it was selected based on its experience in making high-power RF and microwave transmitters.

Separately, Continental completed the first phase of a high-power transmitter project driving the **HF Active Auroral Research Program** Ionospheric Research Instrument. The IRI and several other 1 MW and larger facilities around the world study ionospheric physics. The contract value to date is estimated at $8.7 million. The completion of this segment of the program finishes a "developmental prototype" array in Gakano, Alaska. More information about this unusual project is available on the Internet at *http://w3.nrl.navy.mil/haarp.html*

For information, contact Continental in Texas at (214) 381-7161; fax to (214) 381-4949; or circle Reader Service 178.

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

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

Classical Format Rolls Out Nationally

WCRB (FM) of Boston and radio program provider Superadio combined their resources to launch the WCRB format in seven markets. The national incarnation of the WCRB format combines well-loved classical pieces with feature programs such as "Kids Classical Hour" and "Dinner Classics."

Pictured left to right are General Manager Bill Campbell, Superadio VP/Dir. of Sales E.J. Gore (front), Superadio President John Garabedian (rear) and WCRB Program Director Mario Mazza.

At WNBF, Polkas Equal Profits

Bill Flynn Provides Full-Service Radio With a European Accent to Binghamton

Paul Kaminski

The Sunday morning program begins with a bit of harmless schtick.

"Time to open the front door; open the back door; let out the dog and cat, get out on the sidewalk, look up and down, cup your hands around your mouth and shout, 'Bill Flynn's on the radio!'"

For six-and-a-half hours, polka broadcasting legend Bill Flynn presides over a mix of polkas, live news, sports, weather, community service and Arthur Godfrey-esque live commercials, as he has for 22 years on Wicks Broadcasting station WNBF(AM) at 1290 kHz in Binghamton, N.Y. That full-service mix brought nearly $120,000 through the door in 1996. The formula seems to defy every bean-counting trend for smaller radio markets (10 in a row, satellite delivered music, and so forth), and it works, with almost fanatical loyalty from advertisers and listeners.

From top 40 to polka

How many air people even know what an oberek is? (Flynn defines it as a style of ethnic music somewhat like a waltz, popular in the polka world.)

Flynn (Irish dad, Ukrainian mom) was familiar with the music, growing up in the Scranton and Wilkes-Barre area of Pennsylvania. An old-time 1960s "beer war" between local brewers Stegmaier and Gibbons helped him gain more familiarity.

"Gibbons bought time on three stations in Wilkes-Barre, Scranton and Carbondale from 6 a.m. to midnight on Saturdays and Sundays to promote its product. I was a part-time top 40 disc jockey at WICK, going to Wilkes College, and when I was told I'd be playing polkas during my 6 to midnight shift, I reacted with two words: 'Excuse me?'"

Total immersion

Through what could best be described as total immersion, Flynn learned the music, enjoyed it and gained such a knowledge of polka music trends, styles and personalities that he is in constant demand as a master of ceremonies at polka festivals up and down the East Coast. He hosts a polka television show produced by public station WVIA-TV in Scranton. Besides WNBF, Flynn's radio program is heard on WWCC(AM) in Honesdale and WCDL(AM) in Carbondale, both in Pennsylvania.

He combines his knowledge of the music and polka scene with folksy, ad lib radio commercials that reach his audience and get results. "My advertisers are mom-and pop businesses. They don't have big budgets, but they're proud to be on the program. What helps me when I ad-lib my commercials is my knowledge of the advertiser. I'll go there, meet the boss, the managers, workers, and find out what's on sale so I can do an intelligent commercial like Godfrey and Paul Harvey. When they buy time on my program, they buy me as their salesman. You won't find a Wal-Mart on my program."

Bill Flynn works the crowd during Boone County, N.Y., Ethnic Day.

As for loyalty in a business where a long-term contract is 13 weeks, many of Flynn's advertisers have been on his program for years. His approach and audience allow WNBF to charge a premium price for that long block on Sundays, which, he says, seems to give ad agency media planners fits.

"Agencies are spoiled. If they buy Monday through Friday, they want the weekends as a bonus. Our audience isn't just polka fans. We have listeners who depend on us for the news, road reports, sports and weather and make an active effort to tune in. We get many calls in the wintertime thanking us for the road and traffic reports, many of those thank us for telling them about problems ahead of time. This is a desirable audience, and one for which we charge a premium."

Flynn's style includes lots of community events, sponsoring bus trips and an active fan club. The most important of his listener outreaches, perhaps, are the many church festivals around the Binghamton area. From June to late October, he is booked solid with Sunday remotes from these festivals. It presents the classic win-win promotional arrangement: Both the church and WNBF benefit from increased revenue.

The Rev. Dennis Ruda, pastor of the Polish National Catholic Church in Johnson City, N.Y., asked for his help with a fund-raising festival. Flynn said he and Ruda thought about it.

"Then I told Father I'd promote the festival, and get sponsors, at no cost to

See FLYNN, page 98 ▶

A Beefed-Up Bottom Line

▶ RESOURCES, continued from page 93

a client in Cape Cod, Mass., relocate his Class B FM transmitter site inland to cover more of the inland marketplace. Although the site move would require a power reduction from 50 kW ERP to 25 kW ERP, the move would nearly quadruple the population served! Unfortunately, ratings companies do not survey fish as listeners.

Some FM stations may benefit from exploring mutual consent agreements with co-channel neighbors whereby both stations can increase power or transmit nondirectional if both agree to accept some interference. FCC FM rules have changed recently.

Put up a "For Rent" sign. A popular source of income for broadcasters is tower space rental or site leasing. Before adding any antennas to your tower, be certain to have a structural analysis performed by a competent, licensed structural engineer. Renters will require space and AC power for their transmitter, repeater and so forth. Your station may wish to restrict access to the site building by providing a separate area for renters exclusive of the broadcast equipment.

Don't forget your subs. Subcarrier leasing is another profit center for many stations. FM SCAs can transmit background music, digital data or differential GPS data. I have set up SCA networks for foreign-language groups that cannot find a vacant commercial AM or FM frequency. By using an FM SCA service, the renter can profit from receiver sales and commercial ad sales while the broadcaster collects a monthly rental fee. Leased subcarriers also can transmit paging messages, market quotes and other data for private users. Some broadcasters have set up shop as paging service providers. At least one provider now leases RDS subcarrier space on FM stations.

Get the OK to turn off the lights. If your tower is in close proximity to taller terrain or buildings, you may be able to apply to the FAA and FCC for permission to extinguish tower lighting. This can yield significant savings. The process first involves filing FAA Form 7460 at the nearest FAA office. Should you be successful with the FAA, you must then file an application with the FCC, which then issues a modified license.

■ ■ ■

Tom Osenkowsky is a consulting engineer based in Brookfield, Conn.

*How can **RW** readers save money in their station operations? Share your ideas. Send e-mail to* radioworld@imaspub.com *or write to the address on page 5.*

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'Mom-and-Pop' Businesses Support Polka Program

▶ FLYNN, continued from page 96

the parish, if the parish would pay the band. He agreed. That festival was so successful, that other churches in the area asked whether I could help them." How did he find enough advertisers to sponsor the remote? "I looked on the back of the parish bulletin and contacted the advertisers." Flynn figured that those companies, by advertising in the parish bulletin, had already demonstrated a propensity to support the parish.

Road crew

Flynn is the road crew for his remotes. He begins the program in the studio, leaves for the remote, sets up the Marti RPU system or hooks up the phone, and broadcasts the last three or so hours of the program from the site. He has help from the in-studio newsman, who plays board op. Flynn stays after the remote and acts as master of ceremonies, sometimes staying until 10 p.m. That can make for a long Monday. He also carries an account list for Wicks' station WYOS(FM) in Binghamton as well as for his program.

Flynn says hard work and smart thinking make his program go.

"Many ethnic programs on the air are basically requests and dedications. When you can show a station manager that they (ethnic programs) can bring revenue and build an audience, you won't have a problem. To do that, you have to get involved with your audience and your advertisers. You also have to know the music, the different styles, the musicians and what they're doing. That's hard work."

Flynn's success as a programmer and salesman seems to be the product of effort, development of opportunities and sincerity. Not every broadcaster can move between the programming and marketing areas as easily. His numbers suggest there are opportunities even today for those who wish to put forth an effort to program and market equally well.

■■■

Paul Kaminski is the news director of the Motor Sports Radio Network, and host of its nationally syndicated "Race-Talk" and "Radio-Road-Test" programs.

Send e-mail to him at motor sportsradio@compuserve.com

BE Consults Tom Creighton

Acting as a liaison capacity between **Broadcast Electronics Inc.** and major consulting engineering groups, **Tom Creighton**, of THC Associates of Gaithersburg, Md., will hold the position of Consultant Re-lations Manager for BE, and handle company updates, relay product information and field questions.

A representative to the Association of Federal Communi-cations Consulting Engineers, Creigh-ton currently acts in a similar capacity for Jampro and Acrodyne.

Arbitron Promotes Rose

The Arbitron Company announced the promotion of **Bill Rose** to the new position of vice president, marketing, radio station services. Rose will lead marketing initiatives for radio stations, including the continuing development of Maximi$er 97, MapMAKER and Arbitrends. Rose also will direct company efforts to enhance services to radio station program directors.

Bill Rose

Rose joined Arbitron in 1981 and left in 1986 to pursue a career at radio stations in Sacramento, Calif. Later, he rejoined Arbitron, but left in 1996. He returned to Arbitron in 1997 as manager, market development and research communications.

Koilpillai-Greene Speaks for NPR

The new director of corporate communication at **National Public Radio** is **Jaya Koilpillai-Greene**. She serves as corporate spokeswoman and chief media liaison, reporting directly to President and CEO Delano Lewis.

Koilpillai-Greene's responsibilities include media relations, advertising, corporate publicity and promotion, community partnerships and internal communication. She also will work with other NPR departments to position NPR programs and programming streams.

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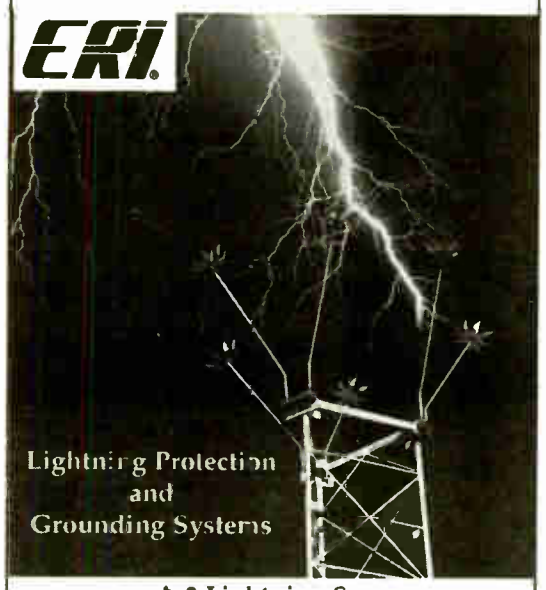

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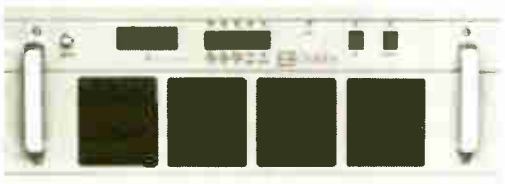

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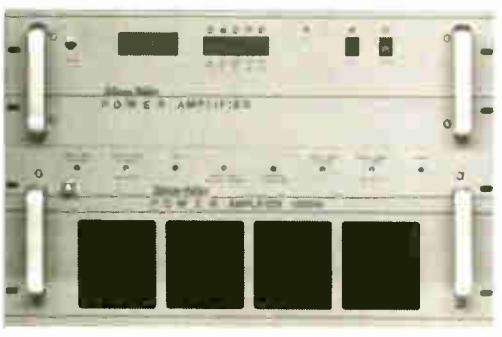

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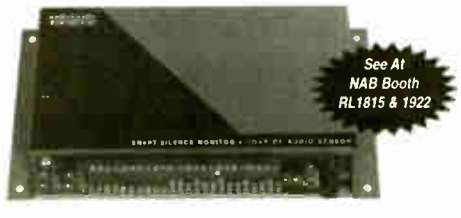

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READER SERVICE NO. 112

Buyer's Guide

Does your software measure up?
Page 108

SPECIAL REPORT

DAEs Deliver the Editing Goods

Bern Solnik

The days of shaky hands, blunt razor blades and ragged splices on reel-to-reel machines are waning fast.

Nowadays, audio equipment that digitally records and edits is replacing these tools. This equipment — some of which was designed specifically for radio production — has vastly improved the ways that radio stations can create audio products.

"There is no question that digital recording and editing can be faster, better and cheaper than analog," said Tom McCarthy, product marketing manager for Sonic Solutions. More radio stations are switching to digital recording and editing, McCarthy said, "now that the reliability of (these) products is up and they have a track record."

Digital advantages

One of the most apparent advantages of digital machines is the absence of rewind and fast-forward buttons. Instead, the machine can quickly play from any location specified by the user. Other favorite features, said McCarthy, are that "edits can be undone instantly if you don't like the way they turned out," and that often a single machine can handle many tracks simultaneously, "so you don't need an expensive multitrack reel-to-reel."

"Two of my favorite benefits of going digital," said radio spot producer Peter Fox, "are that I can easily shift a music bed to sync with the voice track and, with the push of a button, I can compress or expand a recording by a few seconds so that it is the exact length I need."

In most cases, digital recording and editing gear is contained in a single unit. These products are available as both standalone equipment and as integrated components of broader computerized radio playback and traffic systems. Stand-alones exist in three forms: pure software, dedicated pieces of hardware and software/hardware combinations.

A number of considerations affect a station's choice between a standalone unit or an integrated component. *(See related story, page 106.)* Some of those factors include user friendliness, depth of features, portability and — everyone's headache — cost.

Some manufacturers said a standalone machine designed specifically for broadcasters is the easiest to use. Geoff Steadman, a product manager at Orban, said that some dedicated systems are "designed so that you're not aware that you're working through a computer operating system at all. All the machine's primary functions are accessible through physical buttons and knobs on its face, and the function of each of these is easy to figure out."

Lee Facto, of Radio Computing Services said, however, that for those already familiar with the computer environment, integrated recorder/editors can be just as easy to learn. He added that with integrated systems, it is easier and faster to transfer the finished product to your playback system because you do not have to load the finished product into another system.

Pros and cons

Some standalones offer more features than their integrated counterparts. For instance, products from SaDiE, Orban and Roland incorporate high-end reverb and other special effects not commonly found on integrated systems. Jeff Boggs from SADiE said that with in-depth features, "you can do far more than a simple 30- or 60-second spot."

Because many users at the station cannot spare more than a few minutes to learn to use the machine, manufacturers said that a number of radio stations prefer just the basic features. According to Steadman, the key to including more features is providing them in a way that does not interfere with less complex productions. Loading the features on the product sometimes makes for bogged-down programs and limited-to-studio use.

While some units such as the SADiE Portable are designed for use outside of the studio, many recorder/editors are not practical for field use. But some of the purely software standalones can run on a laptop computer equipped with a sound

See DAEs, page 106 ▶

In This Issue

Buyer's Guide looks at Digital Editing and Production in this issue.

Have you been thinking about purchasing new software? Carl Lindemann talks with several software manufacturers who say you should think carefully about your system's hardware before making any decisions. They also explain their philosophies behind software design. Lindemann offers tips on purchasing hardware and shopping on the Internet.

Val Davis writes about soundcards and what he describes as the three main components of soundcard function: resolution, compression and configurability. We also list the latest products and tell you how to reach the manufacturers for more information.

Plenty of additional information about digital equipment for radio production can be found in our Digital Audio Management Sourcebook, which accompanied your Dec. 10, 1997, issue of **RW**. It's one in a series of reference sourcebooks coming throughout the year. Keep them close at hand.

As always, we welcome your feedback to e-mail *skreis@imaspub.com*

— Susan Kreis
Buyer's Guide Editor

The Ballad of Tape and Razors

(Sung to the tune of "My Favorite Things," with apologies to Rodgers and Hamerstein)

Razors and capstans and brakes that caused lurches,
Buttons that popped off five months after purchase,
Cheap crummy tape that would stretch into strings,
These *were* a few of our favorite things.

Now we've got digital power that's ample,
We can cut vocal tics down to the sample,
Fly in some echo or timestretch some sings,
These *are* some of our favorite things.

When the client says, "Change the spot now,
Last week's tag is bad."
I simply retrieve it and drop in a track,
Making my sales boss glad.

— Alan R. Peterson

Photo by Alan R. Peterson

SPECIAL REPORT

Resolve, Compress and Configure

Val Davis

The broadcast industry continues its steady march into computerization. PCs have become ubiquitous for on-air automation, live assist with music on hard-drive, and production with PC-based digital editors. These applications rely on innovative software and state-of-the-art computer architecture. But what the listeners actually hear is the product of the soundcard contained in the system.

Soundcards have evolved considerably during the past 10 years. The original 8-bit audio cards — which can be bought *new* today for $8.95 — now are relics better suited for the Smithsonian. Today's cards are powerhouses capable of recording high-resolution audio and compressing it in real time.

While many companies manufacture automation/live assist/digital editors for the PC, surprisingly the market contains few soundcard manufacturers. Two contributing factors to this fact are the specialized manufacturing processes, which few organizations can access, and the quality of the actual product. The few companies that turn out better cards distance themselves considerably from the competition.

The functionality of soundcards can be summed up in three words: resolution, compression and configurability. Each component interacts with the others to create the audio eventually heard by your listeners. If one of the components is inferior, both you and the listener will know it.

Resolution rates

Most soundcards today have a resolution (the bit rate at which audio is recorded) of 16, 18 or 20 bits. However, some soundcard companies manufacture 24- and 30-bit soundcards. Generally, the higher the bit rate, the better the audio quality.

Soundcards contain digital signal processing chips that perform audio processing; DSP chips are manufactured by companies such as Motorola, Yamaha and Kurzweil. Quality and features vary from one manufacturer to another.

New to audio card producers is use of the PCI (peripheral component interconnect) bus. This is a high-speed, 32-bit internal bus typically used for video and SCSI cards. Until now, soundcards used the computer's 8- and 16-bit ISA (industry standard architecture) bus.

While many other hardware manufacturers have been utilizing the PCI bus, this is fresh territory for soundcard makers. If properly utilized, it can allow the creation of 32-bit audio. Two manufacturers — Antex and Digigram — already have PCI bus audio cards available. Others are coming.

Compression is big

Sound files are, by nature, *big* files. A high-quality recording of a 30-second commercial may use as much as 15 MB of disk storage space. When you deal with an inventory of 700 to 1,000 30- and 60-second commercials, these files can eat up a lot of disk space.

Digital audio compression uses a special algorithm to shrink the size of sound files while retaining as much of the original audio quality as possible. MPEG Layers I, II and III are among the more popular compression schemes in use today. MPEG can deliver up to 20:1 compression with little or no discernible loss in audio quality.

Compression also facilitates the movement of audio files from one location to another. An uncompressed 15 MB audio file is too big to consider moving via electronic transfer, while its compressed 1 MB counterpart can be transferred more easily over the Internet, phone or ISDN lines.

Several soundcard manufacturers now produce MPEG audio cards that will convert a real-time analog or digital audio stream into MPEG audio on the fly.

Radio stations are like fingerprints: No two are exactly alike.

While many aspects of broadcast have been standardized, PC-based broadcast and production have not. Stations need to configure their systems to their own working environment. Some of the many soundcard configurations possible include single stereo in/out, single stereo in/dual mono out, and single analog stereo in and out/single digital out.

Configurability

Most soundcards have non configurable outputs. This basically means, "If you buy it, figure out a way to use it and make it work." Some card manufactures have introduced eight-in/eight-out solutions that allow stations to do whatever they want with the soundcard. The SEK'D ARC 88 is one such audio card.

This *carte-blanche* approach provides the ability for multiple on-air audio streams and multiple production rooms to be working simultaneously on the same card. If the cards are not expensive, it may be possible to put three or four cards in the same system to enable the functionality you need.

However, if you spend $3,000 or $4,000 on a card, you should make sure it is capable of the configurations and functionality necessary for your system.

Soundcard quality has advanced to the point where trying to find a truly bad card would be difficult. You can purchase some outstanding soundcards — such as those from Turtle Beach or Digital Audio Labs — for approximately $500. For $1,000 or more, you can get digital ins and outs, built-in MPEG and multiple file playback on one set of outputs. The Antex SX-34 is one such card.

And while lacking the frills, even the most affordable $29.95 board can produce adequate audio. As bottom-line oriented as radio is, that is good news.

■■■

Val Davis is a broadcast technology consultant and free-lance producer who can be reached at vdavis@vdomains.com

Milkmen, E-Mail and Cereal-Sized Software

Before long, software packaged in cereal-sized boxes may go the way of the milkman delivering glass bottles directly to your doorstep: off to the land of obsolescence.

Shopping via the Internet has changed the software industry the way direct mail transformed the retail industry some years ago. Most audio software manufacturers have Web sites that detail products, features and options, and offer online help and training that fill gaps between telephone technical support and user manuals. Few, however, offer direct buying via the Internet. Often, shareware, or demo versions that users can download for trial use, is the common method for obtaining the software.

The online forum

Two such companies — Syntrillium Corp. and Innovative Quality Software (IQS) — have embraced the Internet.

"One of our chief sales tools is letting people try it out online," said Syntrillium President Robert Ellison.

This strategy is part of a larger company philosophy. "It's direct communication between the software designer and end user," said Ellison. "We have discussion groups and constant e-mail interchange. It's an amazing change in the way we connect with users."

The end result is software better tuned to end-user needs. Syntrillium products, he said, grow out of "a few concepts and a lot of drive from a few people, but also a huge number of suggestions."

Ellison's faith in that business model is simple: "If you commit yourself to direct connection, the product improves continually."

Bob Lentini, president of IQS, is in the middle of moving his business into cyberspace. "It's a complete revamp of the company," he said. Buyers who opt for downloading get a $50 price break for helping cut the cost of packaging and inventory.

It also improves customer service. "We will be hiring people from all over the country to be available at the online forum. The idea is to make the customer feel that they're not out there all by themselves. If it's 2 a.m., they should be able to get help, or send e-mail and get an answer in a few hours," Lentini said. Plans also include conducting interactive online training.

Proceed with care

Despite such advantages, the Internet is not for everyone, at least not yet. Some are not happy sacrificing paper manuals. "This is an issue that divides the analog and digital generations," Ellison said.

"If you want a hard copy, we'll send it if you request it with the registration card." So far, approximately 20 percent have requested a paper manual. "We think it's because of the effort we put into online help, a better source of information," Ellison said.

Online ability also makes product updates, patches and fixes easily available. Neil Glassman, Digigram vice president, North America, sees the opportunity as both good and bad. "Getting the latest version may not be the most appropriate for what you're doing, and may create incompatibilities," he warns.

This adds to the production director's role. "You're becoming an MIS (Management Information Systems) director when you're downloading stuff from the web," Glassman said.

He also offered some helpful advice. "Think twice. Be sure to ask the company — via e-mail — before upgrading. And *never* download rev. 1.0."

— Carl Lindemann

SHORT TAKE

Audio Hose and Nozzle

Everyone is familiar with the one-hand drink dispenser used in bars and restaurants, dispensing Coke, Sprite and ginger ale through one single nozzle. Think of the AudioScience ASI4111/ASI4113 audio interface as that hose and nozzle when it comes to streaming audio playback.

"We designed this card specifically for the big, consolidation-merger companies," said Richard Gross, president of AudioScience. "When radio stations consolidate, they might receive 38,000 minutes of audio, all sampled at different rates than their card can handle. Radio facilities may have standardized on two different sample rates or formats. We have created a card that allows that station four playstreams able to handle any sample rate, without re-recording all of the files."

The ASI4111/ASI4113 is a one-record/two or four-playback MPEG audio adapter card that utilizes mono or stereo audio streams. According to Gross, "A stream may use any supported sample rate — MPEG 32, 44.1, 48 kHz — and may be set to any supported format, currently PCM and MPEG."

The AS14111 has three available analog streams as well as digital in and out. The record stream is user-definable; it can be set to PCM 44.1 stereo and play a combination of two different sample rate MPEG streams simultaneously that will be mixed down to one for delivery on-air.

The analog inputs/outputs are balanced with software adjustable levels. Digital inputs/outputs support both AES/EBU and S/PDIF interface formats. Software selectable sample rates range from 8 to 48 kHz with 100 Hz resolution, in PCM and MPEG playback.

The card requires Win 95 or NT 4.0 driver support and it is currently shipping.

For more information, contact AudioScience in Delaware at (302) 324-5333; fax: (302) 738-9434 or circle **Reader Service 35**.

— Susan Kreis

TARGET: EDITING

Digital Audio Editing Made Easy

Editing techniques that previously took hours to complete can be done in a few minutes, or even seconds, with the advanced digital editors now available. Here is a sampling.

360 Systems

Adding new and updated features, **360 Systems** now offers Version 2.0 of the Short/cut, a self-contained, two-track digital audio editor with built-in hard disk, speakers and large waveform display. It offers cut/copy/paste editing, a jog/shuttle wheel and transport controls as found on conventional tape editors.

Version 2.0 adds support for an external Zip drive and comes equipped with D-NET file transfer capability, which provides the electronic transfer of audio files and related information. Transfers of single cuts or an entire disk drive from Short/cut can be sent to other Short/cuts, the Instant Replay, DigiCart/II and DigiCart/II Plus.

The new version also features the ability to assign Hot Keys and increased hard disk storage capacity.

Existing Short/cut clients may receive a free software upgrade by contacting 360 Systems.

For more information, contact 360 Systems in California at (818) 991-0360; fax: (818) 991-1360 or circle ***Reader Service 37.***

BSI

Based on Cool Edit 96 — the Windows-based digital audio recorder, editor and mixer from Syntrillium Software — Cool Edit Pro from **Broadcast Software International** can mix as many as 64 tracks using a sound card of the user's choice. The software allows recording, playing, converting and editing files as large as two GBs in any of more than 25 formats.

With 32-bit processing and 32-bit resolution file support, the system features ActiveMovie/DirectX Plug-In support, Amplitude and Pan envelope controls for each track, a beat finder, CD player controls and Cue/Play lists.

The program requires Windows 95 or WindowsNT, a 486 or better CPU, and at least eight MB RAM (16 MB recommended). Cool Edit Pro also needs four MB of free hard-disk space and a stereo soundcard. BSI recommends speakers or headphones and a mouse, and considers a multitrack soundcard, CD player and microphone optional gear.

For more information, contact BSI in Oregon at (541) 338-8588; fax: (541) 338-8656, via e-mail: info@bsiusa.com *visit the Web site:* www.bsiusa.com *or circle* ***Reader Service 108.***

Orban

Featuring RAM-based editing, a hardware operating controller, 24-bit digital effects and optional SMPTE time code facility, the second-generation **Orban** Audicy workstation performs all editing functions with transparent background shadowing to hard disk or removable Jaz drive. RAM-based editing also allows "analog-like" sound in fast-wind modes so the user stays connected to the audio.

The hardware controller is designed for tactile operation with minimal hand motion in frequent tasks. The contoured surface includes 10 long-throw faders for primary mixing channels, additional faders for two input channels and the stereo submix, which allows as many as 14 channels of simultaneous mixing.

The transport control buttons and scrub wheel mimic the feel of analog tape.

For more information, contact Orban in California at (510) 351-3500; fax: (510) 351-0500, via e-mail: amyhuson@orban.com *visit the Web site:* www.orban.com *or circle* ***Reader Service 85.***

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Editing Equipment

▶ EDITING, continued from page 103

Roland

A 16-track random-access digital audio recording, mixing, editing and effects processing system, the **Roland** VS-1680 offers 24-bit audio resolution. The system features 16-track playback, 8-track simultaneous recording, a 26-channel fully automated digital mixer, 256 virtual tracks for recording, nondestructive audio editing, automated digital effects and EQ, optional CD recording capability and two optional multi-effects boards offering four independent stereo effects processors.

The interface features an LCD and the MT-Pro recording mode, a 16-track, 48-kHz, 24-bit audio recording mode with 256 virtual tracks. As many as eight tracks of linear audio can be

recorded simultaneously, and recording time on the internal 2.1 GB hard drive is allocated dynamically.

Users may choose from six recording modes: Master, MT-Pro, MT 1, MT 2, LV 1 and LV 2, which offer between 404 and 1,616 total track minutes of recording time at 44.1 kHz, using the hard drive.

For more information, contact Roland in California at (213) 685-5141; fax: (213) 722-0911 visit the Web site: www.rolandus.com *or circle **Reader Service 109**.*

Dalet

Continuing to develop the functions of the track editors SURFER, SURFER4 and SURFER8, **Dalet** has added several features to the updated versions.

Newly integrated features implemented to all standard Dalet software include time stretching; simultaneous record and play (SURFER4 and 8); segment editing: moving segments, beginning/end offset adjustment; pitch-shifting; import/export other formats, such as: Windows PCM, Microsoft ADPCM, A-law Wave and A-law Raw, PCM Wave, Raw PCM, Raw G711; import from Nagra flashcard; simultaneous editing and recording; and audio setup: advanced setup, which sets a maximum length for a single recording, and transport, which modifies the speed of play.

Dalet also has beta versions underway of new features to be added. These include a functions tool bar, time counter and volume curves.

*For more information, contact Dalet in New York at (212) 226-2424; fax: (212) 226-1673 or circle **Reader Service 13**.*

Smarts Broadcast Systems

Offering the digital interface to different editor systems, the AES/EBU and S/PDIF digital I/O is available from **Smarts Broadcast Systems** for its Smartcaster. Customers can use any digital editor that provides those digital outputs. Users can choose on-screen editing from a PC-based editing system or a standalone, dedicated system that edits with a jog wheel, emulating a tape editor.

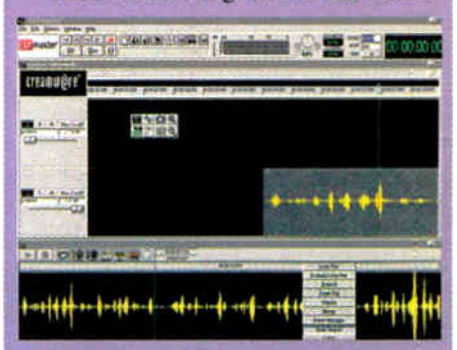
Smartcaster uses ACE Pro cards with apt-X processing to move the data into the on-air system from the editor, usually using AES/EBU, 16-bit at 32 kHz-sample rate. An optional sample rate conversion can be used to convert data edited at any sample rate to the Smarts rate.

For more information, contact Smarts Broadcasting Systems in Iowa at (800) 498-0487; fax: (712) 852-5030, via e-mail: sales@smartsbroadcasting.com *visit the Web site:* www.smartsbroadcast.com *or circle **Reader Service 110**.*

Computer Concepts Corp./ CreamWare

Consisting of hardware and audio workstation software, tripleDAT from **CreamWare**, distributed by **Computer Concepts Corp.**, allows the user to edit four to 16 stereo track arrangements on the hard drive, based on processing speed, hard-drive speed and the storage capabilities of the computer. Record digital audio directly to the hard drive, from any live source or any pre-recorded source. The tripleDAT audio card gives the user optical and S/PDIF I/Os with optional AES/EBU.

Edit in the digital domain and



process the tracks in real time. The tripleDAT has a MIDI interface that allows internal or external MTC sync in slave or master to other MIDI and SMPTE devices.

*For more information, contact Computer Concepts in Kansas at (800) 255-6350 or (913) 541-0900; fax: (913) 541-0169 or circle **Reader Service 84**.*

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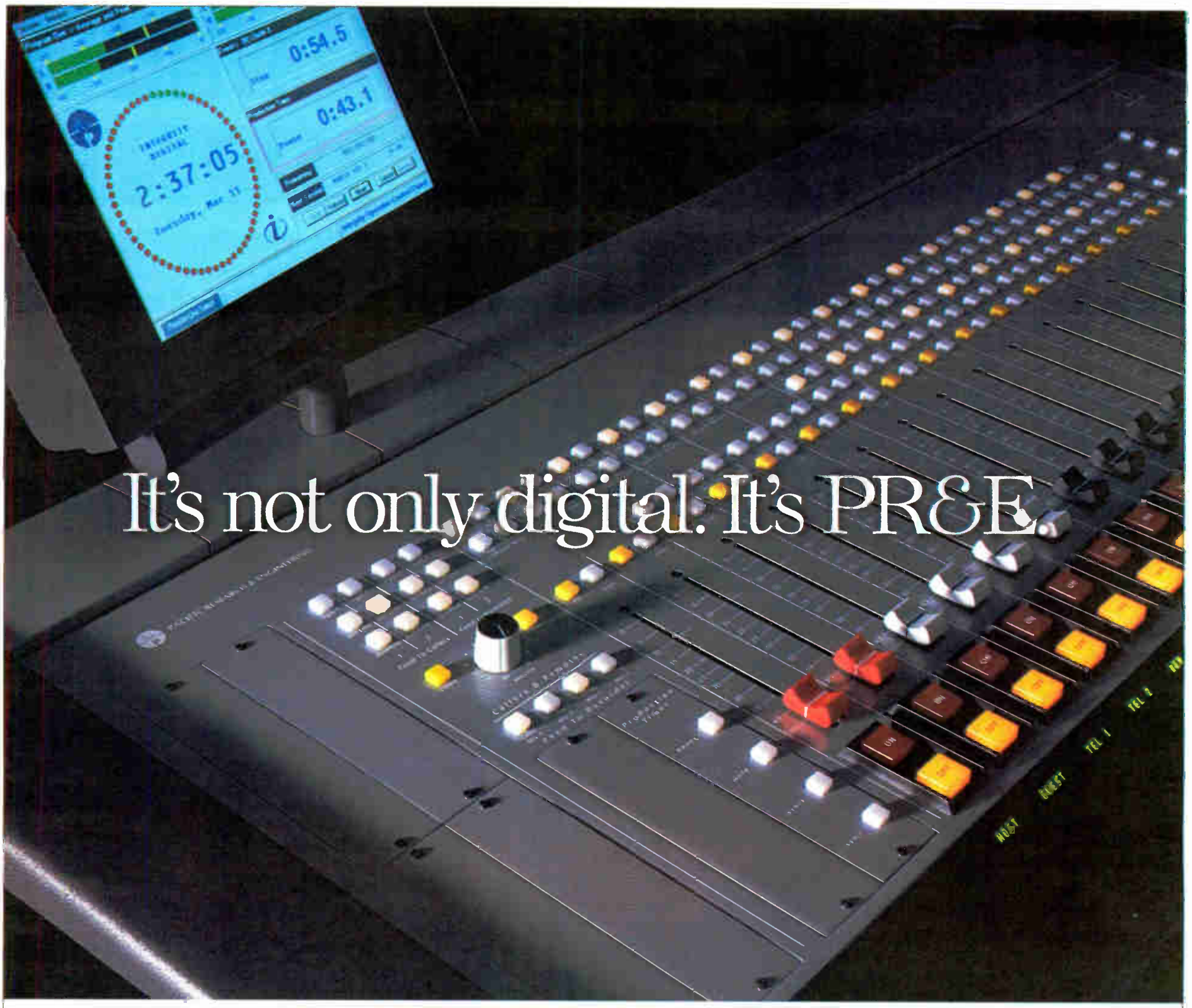


It's not only digital. It's PR&E.

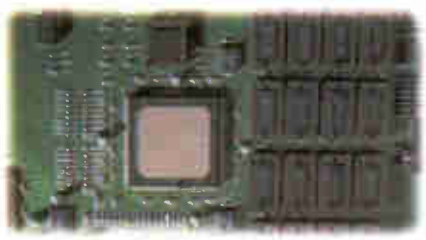
Now you can get digital technology and PR&E reliability in the same console. Integrity.™ It's the first digital on-air board that also speaks fluent analog. All 16 inputs can handle analog signals. Ten can also accept digital inputs at any sample rate. So you can deal with the hodge-podge of equipment 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 IFB.



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

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

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Production Options Abound

▶ DAEs, continued from page 101

card. Facto said some RCS standalones can also run on laptops equipped with the proper hardware.

Laura Tyson, product specialist for Roland, said hardware stand-alones can be portable. If you want to record and edit in different rooms within your broadcast facility, said McCarthy, "an integrated system like Sonic On-Air can be preferable because you can run the recorder and editor on any workstation throughout your facility."

Because standalones focus only on digital editing and recording, they usually cost less than a complete system that offers additional functions such as scheduling and playback.

Down the audio path

None of the experts interviewed for this article projected dramatic changes in actual digital recording and editing processes. They did, however, reveal trends that may affect your digital recorder/editing purchasing decision.

Perhaps the most important and obvious trend is a constant reduction in computer disk storage prices. For radio, this decline means that the cost of storing music in digital form will continue to fall, making digital recording and editing even more cost-effective. Decreasing storage prices also curb the need to store data in a compressed format .

Accelerating computer processing speeds enable digital machines to work on audio segments at a faster pace. The trend also may result in higher quality features, such as better reverbs and time compression/expansion.

Manufacturers have seen some consolidation of production operations. "We see some radio groups creating a central production facility that sends out products to the various stations in the group," said Facto. "These central facilities often desire more powerful and more integrated products than individual stations in the group might opt for."

How would you transit a finished product to other locations? The Internet is one of many options. Satellites and telephone lines also can send sound digitally from one location to another. These methods rapidly are replacing the delivery of analog tapes by courier and the U.S. Postal Service.

"The market will demand greater compatibility," said Gary Beebe of dealer Broadcast Supply West, "(and) this will increase a station's ability to mix and match products by different manufacturers."

Inevitably, your station will purchase or upgrade digital recording and editing devices. There are many products to choose from, and each seeks to address the needs of the radio station in different ways.

These considerations and trends should help you determine which equipment is best for your station. The actual decision, of course, is up to you.

■■■

Bern Solnik is owner, engineer, sound editor and composer for say YES! productions, LLC, in Silver Spring, Md., specializing in music and sound for TV and radio spots, documentaries, interactive CD-ROMs, Internet Web sites and corporate videos. Reach him via e-mail at sayYESprod@aol.com

Other Attributes Worth Considering

Some manufacturers and dealers of digital editing and production equipment who spoke with **RW** mentioned several particulars that should factor into your decision to purchase a digital recorder/editor. These include:

File format compatibility: Audio data can exist in many different file formats. Brian Queen, a market development manager for the Media and Entertainment division of IBM, said, "If any part of your facility operates in the digital domain, you should make sure that whatever recorder/editor you use can intake and output using file formats that can be read by the rest of your system."

Compression: Some digital recorders and editors operate only with compressed audio. Not to be confused with traditional audio compression, this might be better termed audio data reduction. The process removes or modifies certain audio data, retaining enough to expand and play back the desired segment without substantial sound degradation.

The purpose of audio compression is to reduce the file size, allowing faster processing and smaller storage requirements. According to Tom McCarthy, product marketing manager for Sonic Solutions, compression is not always desirable for your recorder/editor because a file that is repeatedly compressed and expanded may experience noticeable sound degradation. That problem has been the focus of substantial debate and analysis since the introduction of digital audio algorithms.

Repeated data compression, said McCarthy, is likely to occur when audio is sent over a digital feed — via satellite or Internet, to name two examples — and then stored on a computer system of a local station.

Technical support: Radio production typically operates on tight deadlines; stations cannot afford downtime. Manufacturers need to provide accessible and knowledgeable technical support and repair services.

"For those stations that record and edit around the clock, it is not unreasonable to expect the manufacturer to staff its tech support line 24 hours a day, seven days a week," said Queen.

Cost of upgrades: Many manufacturers periodically release product improvements that incorporate new technological advancements or design efficiencies.

If you are interested in acquiring these improvements, Gary Beebe of Broadcast Supply Worldwide suggested you look into the manufacturer's upgrade policy before purchasing its initial product.

"A product that may seem more expensive on the surface," said Beebe, "may actually be cheaper if the upgrades are provided for free or at a very low price."

Manufacturer reputation: Beebe said the track record for manufacturer reliability is definitely worth taking into account.

To help assess a manufacturer, Beebe suggested that you ask the manufacturer for its customer list. Beebe said, "The manufacturer's experience specifically in the radio market" can be relevant.

— Bern Solnik

Just Click and It's Gone

▶ EDITING, continued from page 104

Scott Studios

Lazer Blade from **Scott Studios** lets you record, play and mix WAV and MPEG files; track waveforms; adjust levels and lengths; cut; paste; loop; solo and mix recordings. Other features of the program include scrubbing, time stretch or squeeze with or without pitch shift, noise reduction, equalization and simultaneous record and play on the same tracks for punch-in and punch-out.

Lazer Blade labels information, such as account name, ending cue, announcer initials, rotations, start and end dates and times; places and adjusts End-of-Message to start the next event. For several stations under one roof, recordings can be locked to play on designated stations, days and times.

Assign user-defined name and number to each track and check the tracks with the Solo button prior to mixing. Any tracks can be muted and each level control can be enlarged. Low-, medium- and high-frequency equalization options are available. Mix linear and/or MPEG inputs or outputs in real time.

For more information, contact Scott Studios in Texas at (800) SCOTT-77 (800) 726-8877 or (972) 620-2211; fax: (972) 620-8811 or circle ***Reader Service 132****.*

Sonic Foundry

With multitrack loop-arranging and editing, ACID, a new digital audio loop sequencer for Windows 95 and WindowsNT from **Sonic Foundry**, allows the user to preview any loop before adding it to the mix, automatically matching the tempo and key in real time. The program specializes in loop arranging, allowing real-time pitch and tempo adjustments on multiple loops simultaneously.

Changing the pitch of a project involves selecting the desired key from a drop-down menu. Tempo changes are made by adjusting the beats-per-minute slider. Multiple algorithms allow users to choose the setting best suited to the source material. A tempo map is included for loop slow-down or speed-up.

ACID supports unlimited tracks, based on system RAM. Each track includes volume, pan and effect envelopes for editing control. ACID also supports non-looping audio. For real-time effects, ACID features DirectX Audio Plug-In support. It also generates and chases SMPTE time coding, allowing it to work with other software products and external hardware.

The program requires a Pentium 133 with a Windows-compatible sound card. A Pentium II processor is recommended for real-time effects.

For more information, contact Sonic Foundry in Wisconsin at (608) 256-3133; fax: (608) 256-7300, visit the Web site: www.sonicfoundry.com *or circle* ***Reader Service 111****.*

Spectral Inc.

Pre-built Prisma systems are now available from **Spectral Inc**. Each editing system includes Prisma hardware, Express user interface software and ADDA-2218, a two-channel A/D-D/A converter housed in a Pentium-class computer with a 17-inch SVGA monitor and a 2 GB SCSI drive.

The systems can be tailored to user needs by adding compatible components from a list of options including Producer user interface software, eight-channel A/D-D/A converters MediaMaker CD CD-ROM burning software, JL Cooper CS10/2 worksurface controller, removable Jaz drive storage and Power Technologies DSP-FX digital effects processor system.

For more information, contact Spectral Inc. in Washington at (800) 407-5832 or (425) 487-2931; fax: (425) 487-3431, via e-mail: sales@spectralinc.com *visit the Web site:* www.spectralinc.com *or circle* ***Reader Service 143****.*

The Blue Group

With the PhoneByte from **The Blue Group,** it is possible to record callers, play the clips, label the bytes and locate audio files on the main screen. The main screen also provides details about the recording such as time and date and the duration of both edited and raw material. Selected files can be marked with an "S" for Special or a "K" for Keeper to make recordings stand out or for other housekeeping functions.

Start Marks and End Marks can be inserted like leader tape while recording and allow instant playback of edited files. Cuts and splices are similar to what is done with the razor. All editing is nondestructive and can be changed.

PhoneByte allows the user to "stack" or group calls, click and drag them into the desired order. The custom colorized keyboard has a built-in track ball.

For more information, contact The Blue Group in Florida at (813) 442-1665 or circle ***Reader Service 205****.*

TARGET: PRODUCTION

Produce Digital Audio Easily

Often the line between two distinct functions blur, allowing one unit to fulfill several services. So it is with digital editing and production tools. A workstation can be used to record, edit and process the audio, and the user never has to leave the same computer.

Some people, though, like to have a dedicated unit that performs one task well.

Here are a few examples.

Alesis

The **Alesis** XT20 is an eight-track modular digital multitrack (MDM) that records true linear 20-bit digital audio onto tape without external converters or multiplexers. The company says the resulting audio has wider dynamic range and lower quantization distortion, with quality 16 times more detailed than 16-bit compact discs.

To complement the 20-bits-to-tape capabilities, the XT20 uses ultra-high fidelity 20-bit oversampling digital converters. The XT20 uses the same ADAT Optical Digital Interface and ADAT Synchronization Interface as other ADATs for implementation into an existing system.

For advanced work, the XT20 provides Track Copy, Tape Offset and Track Delay features and a 10-point autolocator/10-key numerical input system. It offers a six-pound die-cast aluminum chassis designed for heavy-duty applications. To get signals in and out, the XT20 provides both a servo-balanced 56-pin ELCO connector and unbalanced -10 dBV inputs and outputs on RCA connectors.

For more information, contact Alesis in California at (800) 5-ALESIS or (800) 525-3747, via e-mail: alecorp@alesis1.usa.com *or circle* ***Reader Service 133.***

Arrakis

The **Digilink 4** from **Arrakis** is a series of multi-deck hard-disk digital audio recorders in a self-contained, 2RU system. The unit combines a digital audio recorder and three independent players simultaneously sharing a station's hard-disk audio library.

The DL4 operates independent of PCs and uses MPEG compression. The DL4 can be linked to a redundant shared hard-drive storage library, providing up to 96 simultaneous plays and 32 simultaneous records.

The unit has remote start/stop and channel on/off console logic, analog and AES/EBU digital I/O.

For more information, contact Arrakis in Colorado at (970) 224-2248, fax: (970) 493-1076 via e-mail: sales@www.arrakis-systems.com *visit the Web site:* www.arrakis-systems.com *or circle* ***Reader Service 156.***

Antex Electronics

The latest Series 2 digital audio processor from **Antex** is the SX-34. Featuring multi-channel, high fidelity, direct-to-disk digital sound sampling and reproduction, the SX-34 can be used with the Antex Audio Developers Toolkit.

The SX-34 offers dual device capabilities, allowing the board to record on one stereo channel while playing back the other. Fully ISA-compatible, the processor is a half-size, add-in card with sample rates up to 48 kHz. Input resolution is 16-bit with 64 times oversampling delta-sigma conversion.

The SX-34 processor contains multiple compression formats, multiple inputs, a 20 Hz to 20 kHz frequency response and an onboard buffer for "glitch-free" data transfer at 44.1 kHz in stereo. The processor has an audio mixer with multiple inputs and multiple mixing capabilities. The card works on a 386 or better PC under DOS or Windows.

For more information, contact Antex Electronics in California at (800) 338-4231fax: (310) 532-8509, visit the Web site: www.antex.com *or circle Reader Service 157.*

Audio Processing Technology

To increase the amount of audio storage on digital media by a factor of four, the ADK200 audio card from **Audio Processing Technology** uses apt-X audio data compression. Designed for DAWs, the ADK200 provides the OEM with advanced audio manipulation features such as discrete four-channel analog or digital playback, simultaneous multi-channel playback and record, onboard buffering and floating point DSP.

The ADK200 may be specified with a number of options including 16-, 18- or 20-bit versions with a choice of coding algorithms to complement apt-X. The ADK200 operates under Windows95 with plug-and-play capability.

For more information, contact APT in California at (213) 463-2963; fax: (213) 463-8878, visit the Web site: www.aptx.com *or circle Reader Service 229.*

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SPECIAL REPORT

Software Solutions for Tomorrow

Carl Lindemann

Sophistication makes for complication.

This year, many production directors finally will replace their first-generation, 486-based digital audio editors and/or multitrack workstation products that weaned the industry from reels and razors.

Back then, DAWs induced a virtual quantum leap — pardon the pun — from analog that was nothing less than a revelation. Now, the current crop of software makes the original systems seem as basic as a four-function calculator. Some of the vast array of features are suited to multimedia developers or pro audio producers and may not pertain to radio broadcast. Still others may add new techniques that widen your production palette.

Shopping for software? Which operating system will you choose — Windows 95 or Windows NT? That should be among your first considerations. "We're really focusing on getting everyone over to 32-bit processing," said Bob Lentini, president of IQS. "That's where all the excitement and energy is." Technically speaking, both Win95 and NT are 32-bit; however, NT is fully 32-bit.

Many developers, including Lentini, recommend the industrial-strength flagship of the Microsoft fleet because of increased system stability and speed. "NT, on a properly set-up machine, really makes SAW32 and SAWPlus32 fly," said Lentini.

Tomorrow today

The drawbacks? NT requires more RAM than Windows 95; you will need at least 64 MB before NT can shine. Backward-compatibility also is an issue, as NT will not run old 16-bit programs. However, NT will allow you to read archived soundfiles, and, depending on the software, old edit list files.

Consider another infrastructure issue: sampling rates. The standard rate of CD sound is 16-bit/44.1 kHz. In other words, information is carried on a 16-bit-wide data path with 44,100 samples taken per second. The analogy can be created using a printer's dot-pitch density. The more dots per inch, the greater the resolution. Likewise, with sound, a wider data path and higher sampling rate can yield greater frequency response, wider dynamic range, and more elusive audiophile qualities like soundstage, or the ability of "true" stereo to create a three-dimensional feel.

Digigram Xtrack

Martin Ucik, president of SEK'D America, considers the recently introduced Samplitude 24/96, a full 24-bit/96 kHz editing/multitrack system, to be an invitation to the post-CD era. "We're getting set for the DVD future. We feel that having 24/96 capabilities puts us there already," he said.

The high-resolution capabilities of the Samplitude 24/96 integrates a CD mastering module with 24-bit floating point architecture. "We pioneered CD burning on the Windows platform. We try to keep ahead to the next development," said Ucik. Other manufacturers, including Sonic Foundry, IQS and CreamWare, also offer CD mastering.

Too much?

While 24/96 is sure to become important to Grammy hopefuls, is it overkill for radio production? Radio sound quality is determined by the weakest link in the broadcast chain. If your on-air system samples at 32 kHz, any gains made in the production studio will be lost.

The increased size of 24/96 soundfiles affects memory as well. At CD-quality (16/44.1), one minute of audio takes up nearly 12 MB of storage. The same minute recorded at 24/96 balloons to some 40 MB. Add lots of RAM and a huge hard drive to make that practical.

However, if 24/96 seems excessive now, you may find yourself wishing you had that capability a year from now. In the meantime, Samplitude 24/96 can record at rates of today while being set for rates of tomorrow.

By integrating various functions closely with soundcards, the processing power is distributed, which is another strategy in software design. Many digital sound processing functions can be performed though "chips" on the soundcard itself.

The Digigram Xtrack multitrack editor — which is branded differently in bundled solutions from RCS, ENCO and Scott Studios — uses this synergistic approach with their audio cards. Neil Glassman, vice president North America of Digigram, said it makes more CPU power available.

"Most of the operations are performed on our cards, making it less demanding for the processor. Raw processor speed is less critical. Our DSP will take care of the 'heavy lifting' so that the processor doesn't have to," Glassman said.

No strain here

Typical digital editors/multitrackers demand a great deal of the host computers and maximum output requires the best host available. The "Cool Edit" product line from Syntrillium Software aims to get more output with less strain on system resources. Robert Ellison, president of Syntrillium, said this strategy fits many budgetary constraints.

"We've done very well with broadcasters because of the easy interface," said Ellison, "but also because they don't always have fancy machines. They're not tweaking their system with SCSI Ultrawide (disk drives). The broadcast industry has really latched on. They're middle-market users that don't need 10 discrete inputs."

Other packages address the day-to-day reality of broadcast production work: voice-over music beds. In addition to the TuneBuilder music editor software package, AirWorks Media produces TuneFinder, a "music search, audition and project manager."

Matching a music bed usually means popping and playing CDs. TuneFinder lets the user browse a music library database instead. These are not just written descriptions of the music. Beds entered into TuneFinder can be auditioned. Anyone who has been "in the trenches" knows that having music at the ready makes life easier.

ACID loops

Some producers have found that no music library is ever enough. Sonic Foundry introduced a product that takes a new approach to an old problem — make your own library with ACID, a loop-based music production system.

According to company spokeswoman Stacey Moran, "Custom beds and stingers can be created at any tempo from any pool of audio loops. Hundreds of high-quality loops are included with ACID, but users may also create and use their own."

Moran said she sees DirectX Audio Plug-Ins moving the industry away from proprietary sound processing effects.

"DirectX ... allows each company's DirectX plug-ins to work with all DirectX applications," she said. "It is a new era of openness in the audio software industry that benefits everyone, especially the end user."

Sorting through your specific needs for Windows NT, 24/96 sound quality, and DirectX Plug-Ins can be confusing. Finding the right mix will make for a faster, more functional setup than any "legacy" 486.

The latest technology may not make your job easy, but it will let you tackle more — and more interesting — projects.

■ ■ ■

Carl Lindemann produces the syndicated radio show "Cyberscene" and manages its Web site: www.radioshow.net/

Hardware Optimizes Performance

The right central processing unit and hard drive can make a good application great. Likewise, great software can become frustrating and cumbersome if the CPU and hard drive are inadequate. Audio applications in particular are sensitive to hardware performance.

Finding a suitable price that fits your budget and unearthing the required performance ability for your anticipated usage probably involve tradeoffs. If you know how hardware affects overall performance, you can choose an appropriate system.

Pentium wars

Currently, the hardware market is in transition between the Pentium-class and Pentium II chip. The latest Pentium II system can easily cost twice that of leading Pentium 200 chips. Is it worth the premium? That depends.

CPU speed is crucial for processing sound effects like EQ, reverb and volume. Carrying this out over multiple tracks increases the demand on the processor. If your chip is not fast enough to accomplish this in real time, you have to create an image file — a finished piece with all the "tweaks" burned in. This additional step kills the feel of sitting at a real, live console. Worse, it wastes valuable time, productivity and, ultimately, money.

The venerable 486 could not process much in real time — maybe a few effects on two tracks. Today, most software developers recommend a Pentium 166 as the bare minimum. A Pentium 200 will carry multiple effects over several tracks, which is fine for most quick-and-dirty work. However, if you do a lot of tweaking and run a lot of tracks, a Pentium II is a necessity.

Consider an additional factor. The ability of the computer to perform multitrack playback is dependent on hard-drive access time — how fast data can be drawn from storage. Faster access means more tracks can be played in real time.

Speedy and costly SCSI drives are the most popular drives, and are the traditional choice for audio production. Now, the latest IDE drives give near-SCSI performance at less cost. But beware; unlike SCSI, IDE drives achieve speed by tapping processor power. If you plan on saving money with an IDE drive and opting for a bottom-end processor, you may find yourself stuck burning image files.

Buyer tips

Get specific with vendors about the kind of tasks that make up your work. The more specific you are, the better your chances of finding an appropriate system. What if those needs change? What if working in real time inspires you to take on more challenging projects? Will saving money by holding off on a Pentium II become a mistake?

Do not panic. Chip prices drop rapidly. Before long, the added cost of upgrading to a Pentium II, complete with motherboard, will be less than the additional cost of buying it today. Just be sure to steer clear of proprietary designs. Upgrading those can be more problematic — and pricey.

Again, ask the vendors. They usually are explicit concerning the amount of memory needed for software running on a specific operating system.

A final note: Do not skimp on RAM. A Pentium 200 processor with memory aplenty will outperform a Pentium II with memory deficiency.

— Carl Lindemann

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• MARKETPLACE •

Products for the Radio Broadcast Professional

Mail info and photos to: RW Marketplace, P.O. Box 1214, Falls Church, VA 22041

Sonic Foundry Dolby Digital Encoder

Soft Encode, a new software-based Dolby Digital encoder from **Sonic Foundry**, is a stand-alone program that provides AC-3 encoding for multi channel audio delivery.

The software operates on Windows 95 and Windows NT and can operate alone or coupled with an editor, allowing the editing, mastering and file encoding process to be handled on a single Windows-based machine.

Soft Encode is available in two versions: the Dolby Digital 5.1 Channel version and the Dolby Digital 2 Channel version.

*For more information from Sonic Foundry in Wisconsin, call (608) 256-3133; fax: (608) 256-7300; or circle **Reader Service 59**.*

Omnitronix Solid-State Shortwave AM Transmitter

By using low-level digital signals to drive high-power AM radio frequency amplifiers, the **Omnitronix** shortwave transmitter will allow tropical-band radio stations to improve their signal and cut operating costs.

Available in power levels from 500 W to 100 kW, the product lines are AM digital solid-state medium-wave and shortwave transmitters. Because Omnitronix uses commonly found parts to manufacture products, the user can save by using local suppliers to replace standard components.

Omnitronix engineers used a combination of integrated circuits and discrete FET driver circuits with a careful layout to minimize stray inductances.

For more information from Omnitronix, contact the company in Pennsylvania at (215) 699-2400; via e-mail: info@omnitronix-inc.com; *Web site:* www.omnitronix-inc.com; *or circle **Reader Service 83.***

Otari Professional CD Recorder

Looking to record on compact disc instead of tape? The CDR-18 Compact Disc Recorder is the newest addition to the **Otari Corp.** line of professional digital recording products.

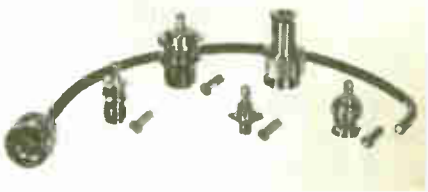
The unit features an on-board digital sampling rate converter, which allows digital source audio with a sampling rate other than 44.1 kHz to be recorded automatically to 44.1 kHz.

The separated audio and digital circuits lower distortion over a broad range and improve channel separation and level linearity. The recorder uses 1-bit type A/D converters, which minimize zero-cross distortion and reduce nonlinear distortion over the entire frequency range.

For more information from Otari in California, call (415) 341-5900; fax: (415) 341-7200; visit the Web site: www.otari.com; *or circle **Reader Service 107**.*

RF Connectors LMR-195 Cable Connectors

Designed to interconnect RG-58/U type low-loss coaxial cable, the LMR-195 series of connectors from **RF Connectors**, a division of RF Industries, is available in nickel-plate, gold-plate and sliver-plate versions.



The connectors are made of machined brass with gold-plated contacts and Teflon insulation. They enhance cable performance and include interfaces such as BNC, TNC, N, SMA, MCX, mini-bayonet and Mini-UHF.

In addition to regularly stocked items, custom applications for the cable are available by special order; cable assemblies using the LMR-195 cable and RFI connectors are available from stock and in custom lengths.

For more information from RF Connectors in California, call (800) 233-1728; fax: (619) 549-6345; e-mail: rfi@rfindustries.com; *or circle **Reader Service 131**.*

Want to see your product in Marketplace? Send us your information:

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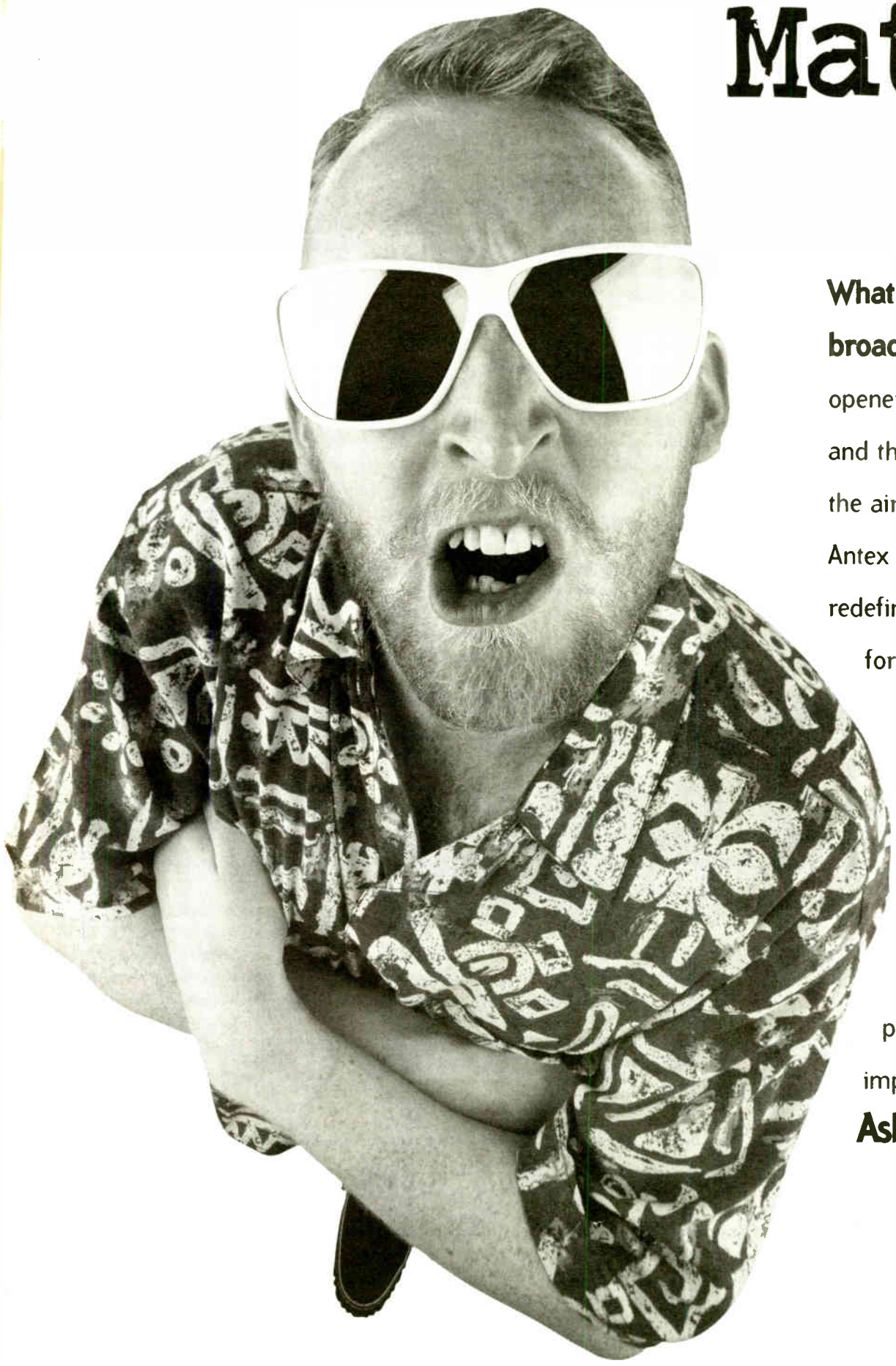
Falls Church, Va 22041

Does it Really Matter?



What kind of soundcard does your digital broadcast system use? It's a critical matter. For openers, even with a new production suite, transmitter and the latest satellite links, the audio quality that hits the air is only as good as your soundcard. Fact is, Antex soundcards have continuously redefined PC-based digital audio quality for more than a decade. Antex offers field-proven technology that exceeds expectations. Plus, Antex cards provide all the most popular compression formats for digital broadcast. Ask people who know. The industry's most respected software and hardware developers and manufacturers have Antex plugged in. And they show it. So you see, it's important to know your soundcard. It matters.

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Digital Studio Tools

▶ PRODUCTION continued from page 107

Digital Audio Labs

Comprised of a set of PC cards and external system components, the V8 workstation from Digital Audio Labs can be customized to the needs of the recording and production environment. A V8 MainBoard and one or more V8 I/O peripherals allow 16 tracks of hard-disk recording and 32 channels of digital mixing. The V8 was designed to operate using third-party software and plug-ins for greater versatility and function.

The V8 MainBoard is a full-length ISA card that performs three main functions: hard-disk recording, mixing and routing and interfacing to the hardware DSP modules. The hard-disk recording engine supports as many as 16 discrete channels of playback. The MainBoard also has two on-board Motorola DSPs that bring 80 MIPs of processing to the system.

The system bus supports 16 inputs and outputs simultaneously from outside the computer.

For more information, contact Digital Audio Labs in Minnesota at (612) 559-9098; fax: (612) 559-0124, via e-mail: dalinfo@digitalaudio.com *visit the Web site:* www.digitalaudio.com *or circle* ***Reader Service 136.***

E-mu Systems Inc.

A sampling/audio system consisting of a Windows 95 PCI card, an audio access bay front panel and bundled software, the **E-mu Systems Inc.** Audio Production Studio provides sampling/SoundFont creation, a 64-voice/32 channel MIDI synthesizer and real-time effects and audio processing.

The PCI card contained in the system is called the E-Card, which is based on the new EMU10K1 multimedia audio processor. The custom chip is designed to handle high-level audio functions. The system integrates samples from the computer's RAM and streaming digital audio from the hard drive, blending sampling and hard-disk recording.

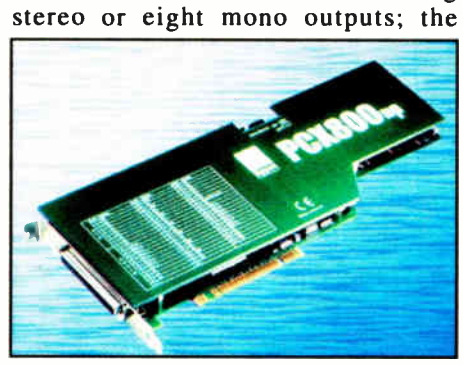
The system is capable of simultaneous playback of up to 64 voices, supporting 8-bit or 16-bit audio at any arbitrary sample-rate. The E-Control mixer's multiple inserts and auxiliary sends allows routing of voices to separate effects, real-time mixdowns and routing to analog and/or digital outputs.

For more information, contact E-mu Systems Inc. in California at (408) 438-1921; visit the Web site: www.emu.com *or circle* ***Reader Service 137.***

Digigram

Taking advantage of enhanced performances of new digital signal processing boards, **Digigram** designed its new PCXnp series 800 and PCX440np cards with a new driver — np — and the ability to operate on the PCI bus in master mode. All PCXnp cards are available with a set of development tools, Xtrack multitrack editor other Digigram applications.

The PXC800np series includes the PXC800np (shown), a playback-only soundcard with four balanced analog stereo or eight mono outputs; the



PCX801np, an all digital playback-only soundcard with four stereo AES/EBU outputs; PCX820np, a record/playback card featuring four balanced analog stereo or eight mono outputs, one stereo analog balanced input and one digital stereo AES input; and PCX821np, an all-digital record/playback card featuring four balanced stereo AES/EBU outputs and a single digital stereo AES/EBU input.

The PCX440np is a two-stereo or four-mono analog balanced channel record/playback card for the PCI bus.

For more information, contact Digigram in Virginia at (703) 875-9100; fax: (703) 875-9161, via e-mail: input@digigram.com *visit the Web site:* www. digigram.com *or circle* ***Reader Service 160.***

Audio Processing Technology

To increase the amount of audio storage on digital media by a factor of four, the ADK200 audio card from **Audio Processing Technology** uses apt-X audio data compression. Designed for DAWs, the ADK200 provides the OEM with advanced audio manipulation features such as discrete four-channel analog or digital playback, simultaneous multi-channel playback and record, onboard buffering and floating point DSP.

The ADK200 may be specified with a number of options including 16-, 18- or 20-bit versions with a choice of coding algorithms to complement apt-X. The ADK200 operates under Windows95 with plug-and-play capability.

For more information, contact APT in California at (213) 463-2963; fax: (213) 463-8878, visit the Web site: www.aptx.com *or circle* ***Reader Service 135.***

Akai

A 16-bit, linear random-access recorder, the **Akai** DSP12 contains editing functions, integrated internal effects and a 20-channel mix master. It records on as many as eight tracks simultaneously and features 12 simultaneous playable tracks. The DSP12 contains a maximum of 250 virtual tracks.

With sampling frequencies of 48, 44.1 and 32 kHz, the DSP12 features either an internal JAZ drive or an external SCSI JAZ/hard disk. The A/D converter is an 18-bit, 64-times oversampling delta-sigma system and the D/A converter is a 20-bit, 8-times oversampling, 1-bit delta-sigma system.

Total harmonic distortion at 1 kHz is 0.05 percent or less and the channel crosstalk ratio is 75 dB or better at 10 kHz. The DSP12 power requirements are 100 to 240 V, 50 to 60 Hz, 22 W.

For more information, contact Akai in Texas at (817) 336-5114; fax: (817) 870-1271, via e-mail: akaiusa@ix.netcom.com *visit the Web site:* www.akai.com/akaipro *or circle* ***Reader Service 134.***

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

Circle (234) On Reader Service Card

Illbruck white acoustical studio insulation, $1/sq ft. J Coursolle, 920-236-4242.

AMPLIFIERS

Want to Sell

Precision Electronics S35 tube type audio amp, $100; Sony TA-AX500 stereo audio amp, $40; Belar RFA-2 RF amp, $500; Design Radio Labs NRSC-PR pre-emphasis amp, $50. JC Goggan, KBNV, POB 87, Washington MO 63090. 314-239-0401.

Crown straight line two stereo preamp, excel cond, $80. P Russell, 207-725-3066.

Radix DA 1600 dist amp, $200; Marti 67 kHz amp mounted in mini box, $20; TC-4 audio digital delay amp, $800. J Coursolle, 920-236-4242.

ANTENNAS/ TOWERS/CABLES

Want to Sell

Harris 20FMT-101011 antenna tuning coil, $200; Cablewave coaxial cable, 1-5/8" foam, 20', new, $100; Cablewave coax cable, 7/8" aircore, 200', painted, $400; (2) antenna tuning units for directional AM, $2400; Two tower AM phaser unit, $1200; Delta TCTR-1 rectifier assembly, $200. JC Goggan, KGNV, POB 87, Washington MO 63090. 314-239-0401.

Jampro 3 bay, 104.1 MHz; 12 bay Phelps Dodge 107.3; 2 bay ERI low pwr 106.5; 8 bay Cellwave 98.1; ERI isocoupler 100.7 MHz, 25 kW; 260' Rohn J tower 18" face; 2 base insulators. GR Mead, WJSB, POB 267, Crestview FL 32536. 850-432-1004.

Andrew ARF78 female end connector for Andrew 3" Heliax, gd cond w/re-attachment kits & instructions, $60/BO; Andrew 1761B gas barrier for 1-5/8" Heliax, new in box, $45/BO. D Payne, 317-816-4000.

Allen Dick 6 bay 99.5 MHz 10 kW, $400; RCA/Dielectric 6 bay 99.3 MHz, 20 kW, $1000. J Coursolle, 920-236-4242.

Circle (233) On Reader Service Card

HELIAX FOR SALE: Andrews LDF7-50A 1-5/8" foam; (3) 300'+, $1500/ea; (2)·200'+, $1000/ea; (6) N-Female Silver connectors for mentioned cable, $135/ea. All mentioned cable & connectors in excellent condition, used in low power application, approx 2 yrs old. **STATELINE COMMUNICATIONS**, West Plains, MO. **800-467-2346.**

AUDIO PRODUCTION

Want to Sell

UREI 1117 AGC unit, $300. A Baker, Bdct Prod of America, 804 E 38th St, Indianapolis IN 46205. 317-925-7371.

Valley Micro FX series NR units (6), vgc w/rack adapters, $40 ea. R Habegger, WAWZ, Weston Canal Rd, Zarephath NJ 08890. 732-469-0991.

dbx 760X stereo mic pre w/phantom, new in box w/mounting hardware & manual, $150; MXR pitch transposer w/digital readout module, excel cond, $300; Stanton 310 TT, R/P preamp w/input load matching, mint cond, $100; ATI M-1000-2 precision desktop mic dual preamp, new cond, $200. M Shea, 212-989-2684.

Digital Audio Labs stereo waveform editor v.3 for Windows 3.1, 16 bit to 48 kHz, zoom, on screen help, includes CardD, never used, $240/BO. D Michaels, 530-926-1332.

Panasonic DAT-3700, $600; Thunder Bay effect library, $50. J Coursolle, 920-236-4242.

UREI 535 dual 10-band graphic EQ, $250. J Borden, 414-482-8954.

Want to Buy

Neve, API, Gates, Longevin, Collins, Lexicon & other mic preamps, EQs, reverbs, delays. T Coffman, 619-571-5031.

AUTOMATION EQUIPMENT

Want to Sell

Air Century automation controller, $700. J Coursolle, 920-236-4242.

M01B **Arrakis Digilink GEM-600** Gemini System w/1.2 gig + network board & software w/cart wall; Arrakis TS-8C Trak Star workstation w/270 MG w/network board & software, units are 1 yr old, currently on air & working, $7,500/BO. L Zeve, WHYL, Box WHYL, Carlisle PA 17013. 717-249-1717.

IGM EC on air unit w/ (3) Harris play carts, (3) ITC 750 tape players, (2) IGM 24 Go-Carts, (5) Conex HT pass filters w/25 Hz filters, CBS 4450 Audimax unit, patch bay, (3) Harris 6' racks, IBM compatible computer & software, monitor, Okidata printer, $1985. P Willey, 413-663-6567.

Circle (232) On Reader Service Card

AUTOMATION continued...

Skylight Skycue & Skydata interface systems for use with Skylight network automation system, BO. R Howard, 520-797-3700.

Smartcaster 2000 w/ (2) R/PB audition units, (2) prod units, D-4000 SCS, (4) Akai digital editor, (2) SC-45 Smart Touch, SS-1 traffic/billing system, (2) SW-4 switches, (2) MOD-2 modem, SC-500-5 network node, (4) IPF plus all necessary cabling & wiring, $50,000. E Swanson, 920-236-4242.

CART MACHINES

Want to Sell

Assorted cart racks, gd cond, many brand new, BO. R Habegger, WAWZ, Weston Canal Rd, Zarephath NJ 08890. 732-469-0991.

BE Phase Trax 90 player, $350; (3) BE Spotmaster 2100 Series w/manuals, $450 ea; BE triple deck player, $400; Dynamax CTR100, $150; Harris 994-7995-001, $150; Dynamax EDS10 eraser, $350; many new carts, $1 ea. D Brou, 318-445-4843.

ITC Delta PB mono 2 cue, gd cond, $450; ITC Delta R/PB mono, 2 cue, gd cond, $550; Audicord DL-RM R/PB mono 2 cue, gd cond, $350; Audicord TDS-1 dual deck, twin play, gd cond, mono 3 cue, $450; Tapecaster 700-RP, R/PB, mono, 2 cue, gd cond, $250. R Chambers, KSUE, 3015 Johnstonville Rd, Susanville CA 96130. 530-257-2121.

ITC SP single play mono, vgc, $295. P Willey, 413-663-6567.

ITC triple deck, $900; ITC Delta R/P, $875; SMC 712, $200; Dynamax ESD-10 splice locator, $500; various cart racks, $10-$150. J Coursolle, 920-236-4242.

PR & E Tomcats (3) in rack w/spare set of cards, one rcdr w/o rack cage, all working, BO. M Shea, 212-989-2684.

Tapecaster X-700RPS stereo R/P, like new cond, $350; Tapecaster X-700PS PB (4), gd cond, $150 ea; Fidelipac ESD10 Dynamax eraser/splice detector, excel cond, $400. M Gollub, 410-535-2201.

CD PLAYERS

Want to Sell

Denon DN-2200F dbl CD player, needs minor repair, $300/BO. Mtn Bdctg, 516 Shenandoah Dr, Brentwood TN 37027. 615-376-9040.

Pioneer PD-M403, $50; JVC XLV 211, $50. J Coursolle, 920-236-4242.

COMPUTERS

Want to Sell

Apple Macintosh 512k w/various technical software, $50. JC Goggan, KBNV, POB 87, Washington MO 63090. 314-239-0401.

Grid 386 laptop w/monochrome screen, hard drive, built-in modem, BO; 386 desktop w/100 meg hard drive, 1.2 & 1.44 drives, BO. Jim, 717-842-6065.

CONSOLES

Want to Sell

BE Spotmaster 5BE100 5 chnl, $400. JC Goggan, KBNV, POB 87, Washington MO 63090. 314-239-0401.

Quantum QM-168 & QM-120 16x8 w/patch bay, $2000; Gatley 16x8 w/quad monitoring, in custom console, 4 effects returns, $500. A Baker, Bdct Prod of America, 804 E 38th St, Indianapolis IN 46205. 317-925-7371.

Broadcast Audio top of line tri stereo unit, 12 chnls, 3 inputs per chnl, slide pots, metered outputs of PGM, audition, utility & mono, refurbished, $2295. P Willey, 413-663-6567.

Radio Shack mixing console, small, stereo w/VU meter, $50. Jim, 717-842-6065.

Yamaha MC 1604 II, $2200. J Coursolle, 920-236-4242.

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.

Want to Buy

Info on Raytheon RC-11 bdct console, circa 1940-50's, transformers, UTC info mostly. E Davison, 6083 Bahai Del Mar Circle #559, St Petersburg FL 33715. 813-866-2635.

WE 25B & parts, will pay $5000-$6000. 1-800-251-5454.

DISCO-PRO SOUND EQUIP

Want to Sell

Avedis Zildjian 24" turkish USA made cymbal w/pre-drill rivet holes, $190 +shpg. W Dougherty Jr, WLD Rcdr Std, Music Valley Rte 1, Mill Spring MO 63952. 573-998-2681.

Radio Shack speakers in walnut, $50. Jim, 717-842-6065.

FINANCIAL/LEASING SERVICES

LIMITERS

Want to Sel

Harris rack mount mod enhancer, $200; Design Radio Labs NRSC-FL, 10 kHz audio filter, $50; Inovonics 220 audio level optimizer, $200. JC Goggan, KBNV, POB 87, Washington MO 63090. 314-239-0401.

Ashley peak detection/compression/limiting rack mount units in excel cond, $100. Jim, 717-842-6065.

Microcon Flexmod composite processor, $750. J Coursolle, 920-236-4242.

Orban Optimod 8000A, factory updates & reciped, great cond, $1000/BO. D Payne, 317-816-4000.

UREI LA4 compressor limiter stereo w/silver panel, mint cond, $1295. P Willey, 413-663-6567.

CONSULTANTS

Want to Buy

Altec 436C mono limiting amps, have one, need pair. M Schackow, 605-374-3424.

Teletronics or UREI (LA 2, 3, 4, 1176) Gates, RCA, dbx (160-165), Altec, Collins. T Coffman, 619-571-5031.

Teletronix LA-2A's, UREI LA-3A's & LA-4's, Fairchild 660's & 670's, any Pultec EQ's & any other old tube compressor/limiters, call after 3PM CST, 972-271-7625.

MICROPHONES

Want to Sell

Audio Technica 813R phantom powered electret cardioid mics w/case, like new cond, $50; Radio Shack hand-held dynamic mics, $25. Jim, 717-842-6065.

Light duty mic crane, $20; Telex V220 sportscaster headset mic, $145; Atlas desk stand, $10. J Coursolle, 920-236-4242.

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.

Want to Buy

RCA 77 & 44 or other ribbon mics, dynamics & tube mics. T Coffman, 619-571-5031.

Langevin 5116's, 5301, EQ's and more! 818-887-6600 fax 818-887-4700.

MICROPHONES continued...

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

Gorman Redlich EBS encoder/decoder, $200; Ronk 70, 17.5 HP, single to 3 phase pwr w/control relay, rebuilt, rotary transformer, $1500; record library, 6000, 45's & 33's, CW, Pop, Gospel, Classical, Rock, Jazz, $900. JC Goggan, KBNV, POB 87, Washington MO 63090. 314-239-0401.

Jason Jennings Series 2000 radio sales training tapes, entire set, new, $800/BO. Mtn Bdctg, 516 Shenandoah Dr, Brentwood TN 37027. 615-376-9040.

Olivia Newton-John album collection, 15, 33 rpm records, $30 +shpg; 20 Christmas albums, $30 +shpg, all in excel cond; 16' Lapp Stuttgart olflex cable w/021010 metal 10 pin connectors, $5 +shpg; Pioneer stereo amp w/AM-FM tuner, right chnl very weak, otherwise gd cond, $25 +shpg; Pioneer DT-510 audio/digital timer, $20 +shpg. W Dougherty Jr, WLD Rcdg Std, Music Valley Rte 1, Mill Spring MO 63952. 573-998-2681.

Altec 1567A portable case, vgc, $75. J Morinelli, 610-715-1720.

Circuit Werkes AC-12 coupler bay w/3 cards, $700; Koss TD/75 headphones, $10; Henry super relay, $75; Pyramid 12v 3A pwr supply regulated, $50; Gorman Redlich CD EBS decoder, $10; Intertel PBX KTU + telephones, 20 extensions, $8500. J Coursolle, 920-236-4242.

Gentner TS-612 6 line hybrid w/screenwair, $2000; Gentner TS-612 network interface, $275; display cases, $50; 7" home rack, $400; 6'x2"x2" gray Panduit, $2/lin ft; Pelican case, $50. J Coursolle, 920-236-4242.

Jerrold VHF audio & video modulator, $95. G Wachter, 602-817-1030.

RE America RE-522 Slimline RDS/RBDS encoder for FM, composite loop-thru, new w/all software & documentation. D Payne, 317-816-4000.

ADC TT (Bantam) Patchbays, $149; TT or 1/4" cords, $10; new short MRL test tapes, $229 for 2", 1/4", $79; Gates dual stereo tube limiter, $1200; Gates top level, $595; Allen & Heath GL2 rack mixer, mint, 14x4, $795; CBS Labs Audimax, $400 ea; tube preamps, $300-400; MX10 mixers, $795. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

Want to Buy

WE 639A & CBS or NBC original call-letter flag/plate for RCA 44 mic. M Harrington, POB 250995, Little Rock AR 72225.

Old radio tubes, 2 & 3 number digit types, new & used. C Siegenthaler, 509-453-5492.

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

Collins 900F-1 67 kHz SCA mon, $400; Belar AAM-2 mod mon, $700; Potomac AM-19 3 tower antenna mon, $1000; Potomac RMP-19 remote antenna mon meter, $200. JC Goggan, KBNV, POB 87, Washington MO 63090. 314-239-0401.

Used Mod Monitors, McMartin & Belar. Many to choose from, tuned & calibrated on your frequency, full guaranteed. Goodrich Ent. 402-493-1886.

POWER/SURGE

RECEIVERS & TRANSCEIVERS

Want to Sell

Moseley TRL-1 telemetry return link rcvr, vgc, BO. R Habegger, WAWZ, Weston Canal Rd, Zarephath NJ 08890. 732-469-0991.

Marti SCG-10 (2), (2) SCD-10 67 kHz subcarrier equip, $400 ea; Moseley 110 kHz subcarrier demod, $200; Racom 1300 AP Morse identifier, $50. J Coursolle, 920-236-4242.

Want to Buy

Dymek DP40 or DP4044 RF preselector. K Tunks, Tunks Bros Recd, 6102 Dorcas Pl, Hollywood CA 90068. 213-467-5834.

RECORDERS

Want to Sell

Ampex AG-350 mono r-r rackmount w/custom console & solid state electr, $300; Ampex 350 r-r mono w/Inovonics solid state electr rackmount, $250; Ampex AG-440B _" 4 trk r-r in custom console, $1100. A Baker, Bdct Prod of America, 804 E 38th St, Indianapolis IN 46205. 317-925-7371.

Marantz PMD-222 pro mono cassette deck, new cond in sealed boxes, $225. B Petruzzi, A-Z Music, 5132 Pebble Beach Blvd, Las Vegas NV 89108. 702-646-2634.

Nagra 4.2 7.5 ips only, $1500. A Baker, Bdct Prod of America, 804 E 38th St, Indianapolis IN 46205. 317-925-7371.

RECORDERS continued...

Scully 28 mono r-r (2), $150; Tascam 22-2 R/P r-r, $100. JC Goggan, KBNV, POB 87, Washington MO 63090. 314-239-0401.

Scully 280-B mono r-r in custom console, 7.5 ips & 15 ips, $500; Ampex AG-440 mono r-r in custom console, 7.5 ips & 15 ips, $500. A Baker, Bdct Prod of America, 804 E 38th St, Indianapolis IN 46205. 317-925-7371.

Sony MDS-B3 MD R/P, excel cond, $2000/BO. Mtn Bdctg, 516 Shenandoah Dr, Brentwood TN 37027. 615-376-9040.

Studer A-80 1" audio for video layback, low hrs, excel cond, BO. G Morgan, Master Audio Prod, 2 Robin Ct, Morristown NJ 07960. 973-539-5200.

MCI 110 record & repro heads in sets, 1/4" 2 trk, $200/pr; 1/4" 4 trk, $200/pr, 1" 8 trk, $500/pr, all new. M Shea, 212-989-2684.

MCI JH-110A 1/4" r-r, new heads & meters, excel cond, $1200. J Borden, 414-482-8954.

MCI/Sony JH-110C8 1" 8 trk w/full feature controller, $1495. G Wachter, 602-817-1030.

Scully 280 4 trk r-r in cabinet w/(3) spare audio channels, $450. J Borden, 414-482-8954/

Sony MZ-R2 Mini Disc rcdr, never used, w/lithium-ion rechargeable battery & accessories, $300. J Morinelli, 610-715-1720.

Tascam 38 1/2" 8 trk r-r, $1950; JVC TDW 201 cassette deck, $50; Telex ACC-4000 (2), $1800 ea. J Coursolle, 920-236-4242.

AMPEX 350. Reconditioned in 1977, slightly used for one year. Beautiful! Best offer over $1000. Bill Lewis, 516-368-1197.

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.

New & used Ampex 350 style tape transports, motors & parts, various prices. M Crosby, 408-363-1646.

Want to Buy

MCI JH-110A, B, C parts, transport, cabinets. J Borden, 414-482-8954.

Stancil-Hoffman minitape portable tape rcdr w/printed material, photos, etc; Minifon miniature German wire & tape rcdrs & access w/original literature, manuals, photos, etc; Uher CV-240 & CR-210 cassette portable complete operational or parts sets; Technics RS-1500, must have 1-7/8" speed. J Morinelli, 610-715-1720.

Ampex ATR100 tape-recorders 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

Pioneer RT-1011L 10.5" r-r tape deck in walnut case, 4 trk, stereo, $200; Pioneer RT-701 7.5" r-r tape deck 4 trk stereo in metal case, free-standing or rack mounted, $200. Jim, 717-842-6065.

Revox A77 2 trk in wood case & or rack mount, vgc, $395; Otari MTR 10 4 trk in roll around, w/new in box remote control & editor unit, $2400. P Willey, 413-663-6567.

Moseley MRC-1600 remote control units (2), vgc w/manuals, BO. R Habegger, WAWZ, Weston Canal Rd, Zarephath NJ 08890. 732-469-0991.

STL, FCC certified, Microcontrols rcvr PRS-10, Microcontrols xmtr PTS-10, 950 MHz, $2000; Moseley MRC 1600 SCA/telephone xmtr & rcvr STL controller, $800; TFT 7610-R digital telemetry control, $400. JC Goggan, KBNV, POB 87, Washington MO 63090. 314-239-0401.

Telos Zephyr w/built-in terminal adapter, 20-bit D/A converter, new cond, $2995. B Christensen, Paragon Eng, 11142 Raley Creek, Jacksonville FL 32225. 904-619-3899.

Comrex 2-line, used 6 times, $1200. T Balistreri. 1-800-822-7502.

Comrex LTX-R (2), $700 ea; Whirlwind Mix-5S stereo mixer, $225; SKB rackmount case-4 unit, excel cond, $120. K Starks, 313-480-9981.

Moseley SCD-8 subcarrier modulator, $250; Moseley subcarrier main frame, $75; (3) Orban 245F stereo synthesizer, $200 ea. D Brou, 318-445-4843.

TFT 7610 digital remote control system w/7610-R, 7610-C, 7615-R & 7615-C status & control units, $395/all; INC Switched 56 CSU/DSU for Zephyr & other Codecs, $95. G Wachter, 602-817-1030.

SATELLITE EQUIPMENT

Want to Sell

Wegener 1601-50 main frame w/pwr supply, $100. JC Goggan, KBNV, POB 87, Washington MO 63090. 314-239-0401.

Drake ESR1240 rack unit, audio/video C-band rcvr, $175. G Wachter, 602-817-1030.

Dolby DP 5503/DP 5504 4 chnl digital STL system, gd cond, clean, 2 yrs old. J Vilkie, 814-724-1111.

Hallikainen & Friends DRC-190 digital remote control system w/studio & xmtr units, terminal, manuals, $900/BO. R Howard, 520-797-3700.

Marti RMC remote control, $500; Telos Zephyr 9200 w/ISDN & x.21/v.35 interface, $3695; Comrex Codex Buddy, $1200; Comrex TCB-1A telephone coupler, $95; Adtran ISDN interface ISU 2x64-5, $485; Assend ISDN router, $7000; Adtran NT-1 ACE ISDN termination, $100. J Coursolle, 920-236-4242.

Europlus digital Ku band digital rcvr for Intelsat K Italian, $50. P Russell, 207-725-3066.

Scientific Atlanta DSR3610 rcvr, $2500; Scientific Atlanta Sedat decoder 4228, $700; Sat Data rcvr mainstream data MS 1130, DR11, $400; Westwood One data demod, $100; ABC network decoder, $10. J Coursolle, 920-236-4242.

Wegener 1806 sat rcvr, freq agile, 2 mos old, $220/BO. D Michaels, 530-926-1332.

SCA RENTALS

TAPES/CARTS/ REELS/CD'S

Want to Sell

SOFTWARE/ DATABASES

Want to Sell

STATIONS

Want to Sell

1000W daytimer AM, upstate NY, reasonable. 315-891-3110.

Florida AM CP on 780 kHz, 500 W sub, Tampa, St Pete, over 1mm people coverage. F Gauthier, WPNP. 787-264-3802.

Florida AM CP on 780 kHz, 500W sub Tampa, St Pete, over 1mm people coverage. F Gauthier, WPNP, 787-264-3802.

1 KW AM IN OCEAN CITY, MD. (301) 299-5383.

Licensed non-commercial 10 watt AM station in Southern New England, $80,000. (401) 348-9222.

STEREO GENERATORS

Want to Sell

Kohler 15 KW generator 120/208 3 phase with transfer nat gas $2850. Dave, 800-500-8055.

Fidelipac carts, gold & grey, varied lengths, gd cond, $1 ea. R Habegger, WAWZ, Weston Canal Rd, Zarephath NJ 08890. 732-469-0991.

Adult contemporary music library on 10.5" reels, 2 trk stereo, prof rcdrd w/music sheets, has 25 Hz tones for automation, individually boxed, BO; numerous 10.5" reels, all need to be bulked, BO. Jim, 717-842-6065.

Ampex 1/2" 499 on 10" metal reel, $30; various length carts, mostly AA-3, $1 ea. J Coursolle, 920-236-4242.

Audiopak AA-3, dark blue shell & lt blue shell, misc lengths; Scotchcart II's in various lengths, uncleaned & as-is, price based on length. A Wasilewski, 509-248-1460.

Black Scotchcart II's, (300) 3.5 min, gd cond, @ $1.25 ea +shpg. B Lord, 206-932-4839.

Microtran table top tape degausser, handles 1"-2" tapes, $150/BO; mechanical tape timers, Lyrec & Seike/Spotmaster, new & used. M Crosby, 408-363-1646.

TAX DEDUCTIBLE

Non-profit IRS 501 Radio Corp seeks contributions only from individuals or organizations desiring to foster character building broadcasting in East Central Missouri. JC Goggan, KBNV, POB 87, Washington MO 63090. 314-239-0401.

TEST EQUIPMENT

Want to Sell

EICO 460 DC-wide band oscilloscope; EICO 324 150 kHz-435 MHz signal gen, $50; HP 523B electr counter, $70; SWR Transel Corp pwr meter, $75; EICO 950B resistor-capacitor comparator test bridge, $50; TS-382 c/u audio

TEST EQUIPMENT continued...

oscillator, $50. JC Goggan, KBNV, POB 87, Washington MO 63090. 314-239-0401.

Bird 43 elements 10B, 250B, 25D, 50D, $25 ea; Bird 460, new meter & case RC58 cable, $50. P Russell, 207-725-3066.

Fluke 8520A 5-1/2 digit precision bench digital voltmeter, $95; Tektronix 7903 500 MHz rack mount scope frame w/7A26 dual trace & 7B92 timebase plug-ins, $495. G Wachter, 602-817-1030.

TUBES

Want to Sell

EIMAC, RCA, AMPEREX, 3-500, 3CX1500A7, 4-400, 4X150A, 4CX250B, 572B, 807, 833C. Westgate 800-213-4563.

TURNTABLES

Want to Sell

Russco Cue-Master w/tone arms (4), $150. JC Goggan, KBNV, POB 87, Washington MO 63090. 314-239-0401.

TRANSMITTERS

Want to Sell

Harris MW-5B 5 kW AM, $15,000. JC Goggan, KBNV, POB 87, Washington MO 63090. 314-239-0401.

ITA FM 1000-C 1 kW FM w/exciter & solid state rectifiers, as is, buyer picks up, $1500. D Carmine, WKKM, POB 549, Harrison MI 48625. 517-539-7105.

MX15 exciter, $1200 firm +shpg. K Russell, Boogie Bad Audio, Harrisburg IL 62946. 618-253-3139.

Harris MW-1 1 kW w/remote panel & manuals, $2500. B Caithamer, 312-329-4304.

LPB 25C AM, vacuum tube, 25 W w/coupler & (2) crystals, very little usage, $600. J Morinelli, 610-715-1720.

McMartin BA1K, 1 kW AM, in service since 1985, still working when removed, $1500 +shpg. R Howard, 520-797-3700.

NORTHLAND RADIO: MW1A-CCA 10,000D-BTA10U-BTF5E-BTF20E, etc. AM-FM-TV-SW transmitters. Lots of parts and various used equipment. No middlemen, no brokers. We pass the savings to you. Deal directly with stocked warehouse. We tune, test, certify, crate, ship. No worries, no guessing or wasted time. Plug-and-play! **Visit us at www.lks.net/~radio** or call 613-473-3019. We also buy used equipment, and we remove it too!

Used PTEK 500W FM amplifier, $2950, full manufacturers 2 year warrentee. Other power amps and exciters also available. 408-448-3342.

Gates BC5P 5 kW, 1950's vintage, some solid state modifications, excel working cond until removed from service, $2000/BO +shpg. L Knight, 541-747-5673.

Want to Buy

50 kW shortwave xmtrs or larger. G Richardson, WJLR, POB 91, Upton KY 42784. 502-369-8614.

Used 5 kW FM w/exciter. Steve, KDJR, 314-586-0101.

Pre-war or slighty later WE xmtr, parts, etc. S McDanel, 1-800-251-5454.

McMartin AM/FM xmtr, any model, exciter or stereo modules. Goodrich Ent., 11435 Manderson, Omaha NE 68164. 402-493-1886.

Want to Buy

Empire 598 gold TT w/Empire top-of-line cartridge & base, excel cond, $300. J Morinelli, 610-715-1720.

Cooke binaural tonearm. J Morinelli, 610-715-1720.

SERVICES

EMPLOYMENT

HELP WANTED

CHIEF ENGINEER
For a large Los Angeles audio production facility. Must have extensive experience in studio maintenance, digital work station operation and maintenance, as well as computer network skills. Position requires experience in designing and building new studios and familiarity with all building support systems i.e. air, power, etc. Strong people skills and work ethic a must. Full benefits, moving costs and a very competitive salary discussed upon formal inquiry. Send resume to: Radio World, POB 1214, Falls Church VA 22041. Attn Box #97-10-15-1RW.

MARKET CHIEF ENGINEER
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SYSTEMS/PORTLAND

Fast growing radio cluster with 5 FM's and 1 AM in Portland, Oregon, a jewel of the Pacific Northwest, offers attractive living environment. Responsible for overseeing and working hands-on with a team of high caliber engineers. Minimum of 10 years of progressively responsible duties in radio broadcast engineering including project management, budget administration, supervisory and people skills. Plus extensive knowledge of FM/AM transmitters, RF and studio systems, Novell computer networking, mass storage, and automation systems.

Send resume: Stan Mak/VP/GM
KUPL FM/AM, KKJZ, 222 SW
Columbia, Suite 350, Portland, OR
97201 or fax 503-497-2331 or
e-mail smak@kupl.com

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Chief Engineer
Major Midwest broadcaster seeks hands on, well organized engineer. Three studios, three towers, six transmitter sites, mobile units. Competitive salary, company vehicle, outstanding benefits package. Reply to: Radio World, POB 1214, Falls Church VA 22041. Attn: Box # 98-3-1B-1RW.

Radio Broadcast Technician

Sinclair Radio of St. Louis, Inc. is seeking an experienced Technician to work in its expanding St Louis MO facility. The candidate should provide a minimum of five years experience in the radio broadcast industry with knowledge of advanced electronics, computers & computer networks, audio & RF technologies. Applicants should be knowledgeable in the maintenance of high power AM and FM transmitters, microwave, studio & related equipment. FCC license & SBE certification helpful.

Qualified applicants please send or fax resume & cover letter to:

Sinclair Radio Division
Attn: Lynn Deppen
2000 West 41st St
Baltimore MD 21211
Fax: 410-662-5678

No calls please
Sinclair Radio of St Louis Inc. is an equal opportunity employer

General Manager

Are you an entrepreneur-minded, result oriented Sales or Marketing Manager? If so, we would like you to join us and set-up our US subsidiary, recruit support personel, set up distribution channel & develop our US sales. We are AETA, an international leader in Audio compression and data communication technology with a history of industry firsts: first 15kHz ISDN Codecs, first with a 7kHz POTS Codec. If you have a technical degree & proven sales, marketing & management experience in the field of radio broadcasting equipment, please send your resume in confidence to AETA, 1936 E Morrow Dr, Phoenix AZ 85024 or email to cosma@neta.com. Excellent compensation package. Location to be determined.

Assistant Director of Engineering: #1 combo in sunny San Antonio seeks hands-on engineer with digital audio and RF experience. Novell or WinNT a plus. Send resume or letter telling about yourself plus salary history: DOE, KTSA/KTFM, 4050 Eisenhauer, San Antonio, Texas 78218. Fax 210-599-5575. 401K, EOE/Minorities encouraged.

Morris Communications stations KGNC AM & FM in Amarillo, Texas seeking Chief Engineer for 10,000 watt full-time AM and 100,000 watt FM. Computer and digital broadcast experience is important. Fax resume to Bob Russell, 806-354-8779.

Come live in the rich hills of Vermont - ski the mountains, hike the trails. Vermont's leadingstation seeks Regional Sales Manager to coordinate four station statewide system. Right candidate must be self-directed, self-motivated and entrepreneurial in nature. Fax resume to Vermont Radio network, (802) 223-1520.

POSITIONS WANTED

CE seeks group or stations, lots of exper, digital upgrades, station buildouts, ongoing maintenance. GRB, POB 6753, Avon CO 81620.

I'm that bright, articulate, informative & witty Morning Personality you're searching for. Currently working in major market, desire challenge/community involvement, consider all markets. 216-398-6532.

New voice for your station promos, commls, IDs, etc, new '98 demo, low rates, 25 yrs radio/TV Nashville based. J Swafford, 615-384-4121 or jp53@nc5.infi.net.

Oklahoma City area, just out of school & looking for my first chance, trained, mature, reliable w/positive attitude. Tom, 405-794-0516.

Relocated to Houston TX. Award winning news broadcaster, copywriter, 10 yrs exper radio sales, news, on-air production, seeking sales, news, on-air, production position, glowing references! S Hanks, 281-367-3398.

Voice of tomorrow, ready today, bdctg school grad ready for radio station work, great on-air persona, Oklahoma stations preferred. Robert, 405-737-5959.

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. There is an immediate opening in Washington state and others possible as we expand. 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.

Computer Expert: Broadcast group in sunny Florida seeks networking expert to run IT department. Resume and salary history to: POB 39454, San Antonio, Texas 78218-1454. Fax 210-805-8990. EOE/Minorities encouraged.

AM Antenna Products

Results only sales position for manufacturer of AM antenna products. US & Int'l, languages desirable, excellent commissions. Expected to develop new markets, support rep network, sell direct accounts. Resume to LBA-HR, POB 8026, Greenville NC 27834.

Broadcast Engineer Needed

Learfield Communications, Inc., owner of ten College Sports Networks, three Statewide News Networks, and an Agricultural Network is seeking a qualified Staff Engineer or possible Assistant Chief to join our engineering team in Central Missouri. Must have extensive troubleshooting, component level repair experience along with all aspects of studio/audio chain maintenance. Must exercise good judgment in an emergency situation, be resourceful and have good problem solving skills. Must have good communications skills and be able to help affiliates troubleshoot problems over the telephone. Strong people skills and work ethic a must. Satellite uplink/downlink experience a plus. Full benefits, moving costs and a very competitive salary discussed upon formal inquiry. Contact: Charlie Peters, Learfield Communications Inc., 505 Hobbs Road, Jefferson City, MO 65109, Telephone number (573) 893-7200 or e-mail cpeters@learfield.com

THE WORLD IS LISTENING...

...to WorldSpace: the company that is building and launching the world's first global, satellite-based digital audio broadcast service (DAB). A privately-held, early stage company based in **Washington, DC,** we are in an exciting and aggressive sales/marketing mode as we prepare to bring programming to over 4 billion listeners (throughout the Middle East, Africa, Asia, The Caribbean and other emerging regions). Currently, we are conducting a search for key individuals who will assume Directorship positions in our Programming and Content Department.

DIRECTOR OF NEWS & INFORMATION CONTENT

This highly visible position will coordinate all acquired news and information services and will develop and manage the News and Information Services for the global WorldSpace system. **(Job Code: 298SHDNI)**

DIRECTOR OF SPOKEN WORD SERVICES

Our selected Director will coordinate content produced by outside entities and identified as WorldSpace Spoken Word Entertainment Services. Spoken Word content will include radio drama, documentaries, talks, games, comedy and other appropriate non-musical material not normally defined as news and information. **(Job Code: 298SHSWS)**

DIRECTOR OF CHILDREN'S CONTENT

The Director of Children's Content will coordinate content produced by outside entities and identified as WorldSpace Children's Content Services. The Director will develop and manage branded Children's Content for the global WorldSpace system. **(Job Code: 298SHDCC)**

The positions above will be based out of Washington, DC. Successful candidates will act as principal monitors of content providers' compliance with the WorldSpace Code of Content and will evaluate the competitive position of WorldSpace-associated services in their various beam markets. We seek at least 5 years experience in radio programming and/or production in the specific content area for which they are applying, experience in station or production management and a solid background in international broadcasting. Fluency in one or more non-English languages preferred. Positions may involve significant international travel. Undergraduate degree required, advanced degree preferred.

CONTENT LIAISON, AFRICA

The WorldSpace Content Liaison, Africa, will be responsible for providing consistent coordination of programming and content activities in the beam areas of the AfriStar satellite. You will maintain records of all services offered on the AfriStar satellite, provide assistance to WorldSpace format managers working with AfriStar Regional staff in training and development assistance and remain in constant contact with WorldSpace Headquarters staff. The individual in this position will spend time in Africa and in Washington, D.C. You will have at least 5 years experience in African regional activities, with radio experience preferred. Fluency in one or more non-English languages preferred. Undergraduate degree required; graduate degree preferred. **(Job Code: 298SHCLA)**

We offer competitive compensation and a complete benefits package. For consideration respond with cover letter, resume and salary requirements, indicating job code, to:

WORLDSPACE

Human Resources • Attn: (Job Code) • 2400 N Street, NW
Washington, DC 20037 • Fax: (202) 969-6980 • E-mail: jobsinfo@worldspace.com
EOE • *For more information on WorldSpace, visit us at www.worldspoce.com*

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Showcase Coordinator ..... Vicky Baron
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Desktop Management ..... James Cornett
Ad Traffic Assistant/
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