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RadioWorld®



Studio Sessions

See pages 25-36.

Vol 20, No 14

Radio's Best Read Newspaper

July 10, 1996

Westinghouse to Acquire Infinity

Deal Sparks Speculation, Questions About Ramification of Merger

NEW YORK Only time will tell how the purchase of Infinity by Westinghouse/CBS will affect the radio industry.

But the announcement on June 20 of the pending \$4.9-billion deal, which creates an 83-station radio group with an estimated annual revenue in 1995 of \$973.5 million, was enough to send stock prices up on other publicly traded radio groups.

"That is a big deal for radio," said Dick Blackburn of Blackburn and Company Inc. "Forget the dollar amount, when you've got two or three groups at the top of an industry and two of them merge, that puts it far above the rest. It's an industry shaker."

Blackburn said that the merger will have a lot of impact.

"People looking to get into those markets will look at them differently," he said. "People looking to get into other markets might move faster now. If you're not making moves and other people are, then you're falling behind."

Charles Giddens, managing director at Media Venture Partners, said the merger "speeds up the clock on the consolidation," a fallout from the 1996 Telecommunications Act for which the industry was waiting.

"We'll see more of this," Giddens said, adding that it makes sense for the large groups to consolidate first as the industry strives to maximize profits.

In predicting the success of such

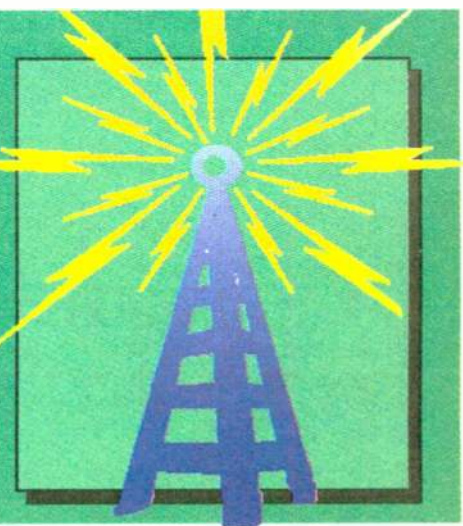
mergers, Giddens said that a lot of emphasis is on management. He said that Infinity President and CEO Mel Karmazin is seen as a good manager who will improve the lot of all the stations in the group.

Karmazin will be chairman and CEO of the combined radio group.

According to BIA Consulting, the new Westinghouse/CBS/Infinity group will
 continued on page 8 ▶

Heads Up in Michigan, Montana

Antenna structure owners in those states have until July 31 to register their towers with the FCC. For more information and the necessary forms, contact the FCC at (800) 322-1117.



Conference Answers EAS Questions

by Lynn Meadows

EMMITSBURG, Md. Security, monitoring assignments, redundant messages and the role of the National Weather Service — each was a hot topic during a nationwide Emergency Alert System teleconference hosted in June by the Federal Emergency Management Agency.

The two-hour conference began with officials from the Federal Communications Commission, FEMA and the NWS discussing features and rules of EAS, the emergency system that will replace the Emergency Broadcasting System.

The old EBS was initiated in 1963 by the late President John Kennedy. According to Frank Lucia, acting chief of the EAS staff, the EBS has been activated more than 20,000 times since 1976.

It is currently activated about 150 times each month almost always at the local level. But the old relay system could not keep pace, and several years ago the FCC began looking for something more modern. As one FEMA official explained, watching the movie "Twister" will give the public a good idea why a well-planned emergency system is necessary.

station will have two mandatory links. One could be a NOAA weather radio input if it is in the state plan. Stan Johnson, program manager for NOAA weather radio, said the overwhelming

majority of past EBS activations were related to weather.

NWS activation is a concern to many broadcasters. As it turns out, the NWS
 continued on page 12 ▶

Eureka-147 Continues To Spread

by Marguerite Clark

MONTREUX, Switzerland The third International Symposium on Digital Audio Broadcasting took an in-depth look at the current condition of radio and where it is heading.

Organized by the European Broadcasting Union (EBU) in association with the EuroDAB Forum and Eureka-147, the June gathering focused on worldwide technical developments and challenges to be faced in the digital era like new data services, new business, and the manufacture of digital components.


Optimism

Approximately 500 participants — all conveying a message of optimism — came to hear more than 50 speakers take part in seven sessions.

As keynote speaker David Witherow, president of the EuroDAB Forum, said in his opening address, "Eureka-147 is on its way to becoming — if it is not already — a world standard for digital radio."

The Symposium gave attendees a
 continued on page 9 ▶

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NEWSWATCH

WBA Summer Convention

GREEN LAKE, Wis. The Wisconsin Broadcasters Association is hosting its 45th Anniversary Summer Convention July 17-18 at the Heidel House Resort.

The 20th annual WBA golf tournament will take place July 17, along with a fishing derby, broadcast exhibit reception and opening night dinner, auction and entertainment.

On July 18, there will be a day-long engineers' workshop featuring current topics in engineering and an EAS Summit. Morning and afternoon convention workshops will take place on July 18, separated by a keynote

luncheon with a presentation by Marcus Conyers.

The WBA Hall of Fame Reception and Dinner on July 18 will conclude the convention.

Eighteen PCS Buyers Default

WASHINGTON The licenses of 18 winning bidders in the broadband Personal Communications Services (PCS) auctions are being reauctioned.

According to the FCC Wireless Telecommunications Bureau, the required down payments on those licenses were not received by the May 15 deadline and were deemed to be in

default by the bureau.

A simultaneous multiple round auction for the 18 licenses was tentatively scheduled to begin July 3.

Meeting the Challenge Of Change

LOS ANGELES The 1996 NAB Radio Show will take place Oct. 9-12 at the Los Angeles Convention Center. "Meeting the Challenge of Change" is the theme of this year's show, which will offer over 70 sessions covering all aspects of the radio industry.

The NAB will also sponsor several special interest sessions: The NAB Digital

Radio Seminar; Creating the Future; Engineering Management Seminar; Keeping Good People in Turbulent Times; and Internet Boot Camp.

Guy Kawasaki, best-selling author of "How to Drive Your Competition Crazy" and "Creating Disruption for Fun and Profit," will be the keynote speaker at the opening session.

Edward F. McLaughlin, chairman and CEO of EFM Media Management Inc., will receive the 1996 NAB National Radio Award.

Leeza Gibbons, radio and television personality, will host the annual NAB Marconi Radio Awards Dinner & Show on Oct. 12.

To register for the show, visit the NAB Website at www.nab.org or call (301) 216-1847.

continued on page 3 ►

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No Change in Talk Radio Audience

by Sharon Rae
Rover News Services

ANN ARBOR, Mich. Despite a widespread belief that the number of talk radio listeners has burgeoned, research shows that the talk radio audience has not grown all that much over the past few years.

That is one of the findings of a study by a University of Michigan researcher who studied 13 Times Mirror Center polls from 1993-1996.

Michael Traugott, professor of communication studies, found that the number of regular listeners to call-in shows whose topics include current events, public issues and politics remained fairly constant between 1993 and 1996. In May 1993, 17 percent of respondents said they listened to talk radio compared to 18 percent in March 1996.

Unconventional wisdom

The relative size of the regular audience for shows such as Rush Limbaugh, Bob Grant, G. Gordon Liddy and others has ranged from a high of 22 percent in June 1994, to a low of 15 percent in October of 1994.

"The conventional wisdom that the talk radio audience is growing is not supported," said Traugott. "Neither the size of the audience nor its demography and ideology seem to have shifted over time."

The study, which analyzed survey samples ranging from 1,000 to 3,800 respondents over the last three years, found that a higher proportion of men than women listen to talk radio on a regular basis. The numbers for men range from 18 percent to 26 percent in the 13 surveys, while women's numbers vary from 12 percent to 19 percent.

Traugott's research showed no difference in attention to talk radio among whites and minorities, but his results did show that Americans under 30 are less likely to listen regularly. The study also revealed that college educated people with incomes over \$50,000 are more apt to tune in.

In addition, more republicans (18 to 28 percent) than democrats (12 percent to 19 percent) or independents (14 percent to 22 percent) said they listened regularly to talk radio.

Traugott found no indication that the size of talk radio's audience increased since 1993 or that its composition changed significantly or regularly.

"White men are no more likely to be listening for long hours to right wing shows than they were 3 years ago," said Traugott. "Neither are republicans, nor the people who voted against (President) Clinton in 1992, nor the people who are unhappy with the way he's doing his job."

"It may be possible — even likely — that listeners now are more likely to attribute their political viewpoints to talk radio and that the psychological benefits they reap from listening, as well as the likelihood of their becoming politically mobilized, have changed."

The study found that frequent talk radio listeners were more likely to pay attention to government, politics and domestic news.

They were more apt to hold politically conservative views but were just as likely as occasional listeners to believe that politicians care about the opinions of ordinary citizens.

"The data do not suggest that the audience is composed of listeners with a wide range of political views," Traugott said. "In general, the listeners seem to have a clear sense of what they are looking for and what to expect when they tune in. There may be some heterogeneity in the range of offerings across the genre, but the content within a given show does not reflect an open exchange of political points of view."

According to Doug Silver, a news talk radio specialist with Silver Broadcast Consultants based in Orlando, Traugott's numbers seem right on the money. While he agrees there has been virtually no growth in the numbers of listeners over the past few years, Silver

said programmers "must realize that your callers are not your audience. They're a very tiny percentage — less than 1 percent — of your listening audience. And when you try to please your callers, you're not pleasing your listeners."

Not delivering

"Talk radio doesn't address what people really care about. It's not delivering. People want to hear about human relationship problems and concerns."

That could be one of the biggest challenges for talk radio.

"Talk radio hasn't changed with the times," said Silver. "New studies show the younger 25-54 adults are more apathetic toward politics than they have been in 30 years. Talk radio is still doing politics and stodgy old topics that nobody cares about except older demographics. And people listen to radio out of habit... Talk radio's mistake is it hasn't learned how to innovate."

Silver agreed with the study's general findings but questioned the research.

"What did they expect to find that was any different?" he asked. "Talk radio really hasn't changed that much so why should the listenership change? Why should the politics change? What happened here is that talk radio hasn't

changed enough with the times to attract a larger audience."

Rich Wood, director of WOR Radio Network which carries Bob Grant, agreed there really is not much new in Traugott's study. As he pointed out, "The suggestion that the callers are conservative... well, conservative talk politically is what drives this format."

Said Wood, "The numbers for Limbaugh and the numbers for Liddy are going down. But what you have to understand — particularly for Limbaugh — is that (the numbers) were so high... the show was such an outrageous success, that no one is going to stay at that level forever. They are just bound to come down."

"But to say that because those shows are going down and the number of stations that carry Joy Browne, for example, are going up, it doesn't mean that talk radio is getting smaller, it means that the topics are different."

Wood explained, "You can only bash Bill and Hillary so much and rehash the same topics over and over again before people begin to tire of it. That's why Joy Browne is growing. Because the topics of interest are personal, they're always changing. Everybody has a different problem."

That, according to Wood, never gets old.

"The confrontational political talk shows are beginning to lose audience. But that doesn't mean other things aren't coming in to take their place." ☺

NEWSWATCH

► continued from page 2

Station Totals

WASHINGTON According to the FCC, as of April 30, there were 4,890 AM radio stations, 5,345 FM radio stations and 1,834 FM educational radio stations.

That brings the total radio station count to 12,069. The FCC also reported that there were 2,589 FM translators and boosters as of that date.

Digital Audio & Video Workshop

PHILADELPHIA The Eighth Annual Digital Audio & Video Workshop will take place Oct. 1-4 at the Holiday Inn Select in Philadelphia.

The workshop is sponsored by the Consumer Electronics Manufacturers Association with the participation of the Consumer Electronics Society of the IEEE. The workshop will look at how broadcasting, telecommunications, computers, consumer electronics and cable converge on the digital audio and video engineering world. Last year's workshop gave

engineers one of the first previews of DVD technology.

Fees and registration vary from \$100 to \$625, depending on the number of sessions and membership. For more information about the workshop, e-mail Lisa Fasold of the EIA at lfasold@eia.org

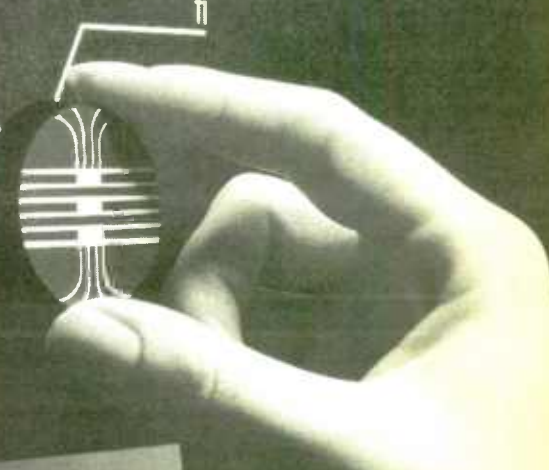
AWRT Annual Awards

NAPLES, Fla. American Women in Radio and Television (AWRT) presented its annual industry awards at the AWRT 45th Annual Convention in late June.

The AWRT Achievement Award is intended to recognize a well-respected AWRT member who has strengthened the role of women in the industry and contributed to the improvement of the community. Patricia Mahoney, senior manager, Iridium Inc., received the Achievement Award this year.

AWRT Star Awards recognize individuals and companies who have exhibited a commitment to the issues and concerns of women. This year, the "Company in Radio" Star Award was presented to Radio One Inc., Baltimore. ☺

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Keep Radio Diverse, Competitive

WASHINGTON The line between opportunity won and opportunity lost is suddenly more tenuous and fragile.

Many things are poised to happen; it is just a matter of how well they get executed that will determine if radio reaps the rewards or suffers the consequences.

What do I mean?



On the plus side. Consolidating ownership in a market allows radio operators to expand on the basic concept of an LMA. You package stations together and sell them for higher rates, thus bringing in more revenue to the business by elevating the rates.

Radio, after all, still garners the lion's share of media consumption — something in the vicinity of 40 percent of all media consumed. Rightfully then, it should garner the lion's share of the advertising pie. To date, it has not.

The key has to be, though, that the value radio delivers is enhanced, thus elevating the rates for individual stations as a rule, allowing standalone competitors that remain in the markets the chance to benefit from the changes and not be priced out of the market.

That is really the big negative here. Operators who have been in radio with only one or two properties in a market are in real danger of being driven out of business.

Theoretically, of course, radio is a local medium and stations, regardless of who owns them, compete locally. But the reality is that a standalone combo probably will not have the resources of a giant like Group W/CBS/Infinity. The playing field will not be a level one wherein excel-



Radio: Small . . .

SYRACUSE, Ind. Do You Know Who Your Listeners Are? WAWC(FM) in Syracuse, Ind., held a station take-over promotion recently at the Milford Stop-n-Go in Milford, Ind. (population: 600). Owner and General Manager Bill Dixon writes that the remote event had, as its focal point, lower gasoline prices. The station offered free gasoline to the first listener to drive to the station in something other than a regular car or truck. The winner was a listener on a 1956 Farmall MTA tractor, pictured above with WAWC Morning Man Terry Jacobs.

lence in broadcasting will equate to success in business.

Which is a dangerous thing for the health of radio. Look at its history here in the United States. It flourished as an entrepreneur's medium with engineers, entertainers and businessmen and women with ideas.

In fact, entrepreneurial companies like Mel Karmazin's Infinity, Bill Paley's CBS, Frank Conrad's Westinghouse were prime examples of what the Telecommunications Act of 1934 allowed you to become — but not at the expense of the small stations run by less well-funded entrepreneurs and minorities.

Many of today's top broadcast companies began small — usually no more than an idea and a love for radio and lots of hard work parlaying single station operations into groups of well-run radio stations.

Before you say that is essentially what is going on here, let me point out that time limits on ownership (remember operating a station for three years before selling it?) and local limits on ownership (duopoly rules) allowed for diversity of the airwaves.

It allowed for big players and smaller players to duke it out in a market and gave both players a fairly even shot and succeeding.

I am uncomfortable with the notion that one huge company is going to own such a large share of the revenue pie per market.

Relaxing the national ownership limits on how many stations one entity can own is one thing. Allowing such a huge concentration of resources and revenue in a single market disturbs the balance.

It's like beachfront property. There is only so much of it to go around. Once you give up the land to the huge developers and the high-rises go up — that is it. There ain't no more. And who will reap the rewards?

The developer of course. Not the little guy left with the bungalow for rent on the beach. There should be a better plan for exploiting one of this country's greatest resources: free, public-service oriented radio.

. . . And Big

BOSTON KISS CONCERT 17 — the self-proclaimed biggest radio station concert in the country — was another sun-soaked success this year.

A sold-out crowd of 19,900 attended the WXKS-FM 11-hour concert, which included performances by 24 national acts.

Proceeds from the concert — an estimated \$50,000 — were donated to The Genesis Fund. Over the years, the contributions have helped to establish the Jeffrey Osborne-KISS 108 Hearing and Language Disorder Clinic.

Additional beneficiaries include the Big Brother Association of Greater



Bryan Adams with
KISS 108's Bill Costa

Boston and the Big Sister Association of Greater Boston.

Seal, Melissa Etheridge, Bryan Adams, Gloria Estefan, Harry Connick Jr., Joan Osborne, All-4-One, Voice of the Beehive, La Bouche and Color Me Badd were just a few of the artists who performed.

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Local defense

Dear RW,

I have just read "Live, Local Radio: In Defense of the DJ" by Scott Clem in the May 29 issue of RW.

In it, Mr. Clem says he does not buy the premise that the role of the traditional local DJ is headed for certain death. He then launches into a splendid defense of that role.

Having been a local DJ myself for the last 15 years or so, (though, by my own choice, not any more), I heartily endorse each and every point scored by Mr. Clem in their defense. The collective thrust of all those points boils down to public service.

Now, having established my support, I must go on to say that I do buy the premise of the certain death scenario — or at least a nap of Rip Van Winkle proportions.

I offer some varying viewpoints in support of my opinion.

The small-market station owner: This person loves radio. He or she is a go-getter with a thumb on the proverbial pulse of the community. But, so do 15 to 20 other owners (and that's here in the central Shenandoah Valley of Virginia).

The local business person: These people can count on anywhere from 6 to 12 sales calls every week or so from the cadre of radio stations, not to mention the print and TV sales forces. That's a considerable chunk of time per week for the bare bones, hard-working, trying-to-survive local business person.

The radio sales executive: OK, you try to survive on a straight commission on whatever bones the house accounts throw your way. And then join the horse race with the rest of those sales execs from all those other stations.

And last but not least, the local DJ: Just how much do you think it takes to support one little ol' local DJ? Heck, they can live on eight, maybe nine thousand a

year, can't they? After all, they just do a four-, five-, six-hour daily air shift, six days a week. And maybe two or three hours of production related activity. Oh yes, then there's the weekly remote broadcast (usually on that one day off). Then there's the health plan — scratch up one for the industry — but no retirement benefits, at least not where I come from; and as far as radio broadcasting goes, there are a lot of places like the one I come from. Don't get me wrong; I think the vast majority of small station owners try, but the bottomline rears its ugly snout a few too many times.

Now, I ask you, just what kind of career is that for your average local DJ. The answer is: there is no career in that. That's why I got out. Nowadays, I am a professional voiceover artist/jingle singer. I also am involved in musical theater, theater and concert performance.

Now all of those lines of work may seem like a loosely woven way of life, and I may have a considerable way to go yet. But I swear, I believe it is more of a career than the path of your local DJ. And I don't put down the army of local DJs: they are truly a valiant lot.

One of the healthiest highs I know of is the act and art of radio broadcast. But the magic stops a pay day and the days when you get a few more footprints on your face or hours added to your day — with no compensation of a monetary nature.

I take heart in Mr. Clem's remark that the industry will see its mistake and swing back to more local DJ programming. He is in a position to survey the industry from a higher position than I. But, Mr. Clem, in the trenches it doesn't look so good.

If there is a truly local radio station in your neck of the woods, write them a letter of thanks for braving the storm and staying involved. Say something kind to the local DJ too, it may be his or her only Christmas bonus.

Three cheers for the local folks.

Brian D. Holsopple
Waynesboro, VA

AM association

Dear RW,

This note is aimed at AM broadcasters who have standalone investments or joint ventures with FM properties and believe their AM stations are still viable products.

Not so many years ago, I built what I consider a high-power AM facility because I believe in the future of AM radio. I, however, have come to the understanding that our industry is loaded with enemies of the AM spectrum. I believe the only future that AM broadcasters have is to band together and form an association. The goal would be the protection and enhancement of the future of AM radio.

I can already hear the groans from those that believe that only one association should represent us all, but that is truly not a viable alternative, as the majority of broadcasters today are so enthralled with FM they have forgotten the medium that put them where they are.

We have a great number of issues that apply only to AM that nobody wants to address. An association of AM broadcasters

ROC Take Charge

The decision by the developers of the USA Digital Radio digital audio broadcasting systems to withdraw from official DAB testing is another in a string of signals that the process is running amuck. (That's not saying USA Digital Radio did the right thing.) It is time radio broadcasters take control of their destiny.

While the National Association of Broadcasters is coordinating the testing with the Electronic Industries Association, the NAB has failed to maintain a balance between the vested interest of the EIA and its ties to the rival Eureka-147 system and that of the in-band proponents. The Federal Communications Commission also does not appear interested in the evaluation process, only wanting a recommendation from the industry.

So who should be in charge? The Radio Operators Caucus should step forward and take up the challenge. The ROC, an ad hoc committee of some of radio's most powerful owners and operators, has the clout and money to form a mechanism to guide the development of an in-band system for U.S. radio.

Though testing so far revealed some serious problems with second-adjacent interference with in-band systems, that does not mean the technology will not be feasible. And consider who is behind the in-band systems: AT&T, Westinghouse, Gannett.

Eureka-147 is on its way to becoming a worldwide standard. But that does not mean there cannot — or will not — be an in-band worldwide standard. Not every country in the world is on the Eureka bandwagon and not all broadcasters, especially the commercial operators in Europe, are sold on the new-band scheme.

The development of a DAB system for the United States that fits the needs of U.S. broadcasters is critical. If the ROC cannot put things back on track with the current process, it must salvage what it can and implement a new mechanism to guarantee that a solid, undisputed recommendation will be presented to the FCC.

— RW

strictly dedicated to AM could address these problems best.

Examples: Incidental radiation that has standards that nobody enforces anymore; and combination owners or FM-only owners who have a tendency to promote FM over AM and continually cite the noisiness of AM.

AM is noisier, but it certainly does not need additional help from new types of lighting, improperly shielded RF devices such as microwaves, improperly shielded CB systems, improperly constructed AM radio, improperly engineered automobiles with noisy ignition systems, improperly engineered TV sets or VCRs, two-way radios and everything else that generates noise in the AM band.

AM stereo has turned into a fiasco. Technical advances such as noise-free radio have received nothing but a nose-thumbing session from a bunch of elite engineers that don't have the foggiest idea what it takes to make a living with a standalone AM.

Other concerned broadcasters can contact me so that we can research the possibility of saving the AM industry. The daytime broadcast association did it themselves and we AM broadcasters can do it ourselves through the field of legislation.

If you are interested in saving your investment and the future of AM radio, please drop me a note at P.O. Box 49, Park Rapids, MN 56470. Maybe I will be surprised and no one will write.

Ed DeLaHunt
President/General Manager
DeLaHunt Broadcasting

Competition

Dear RW,

It is very disheartening to read that a station I used to engineer for is slammed in the pages of RW. I refer to the User Report from Paul Stenstrom on page 86 of the May 29 issue.

In the article, Mr. Stenstrom said, "We also compete with a local satellite-fed, low-budget country station."

I took that statement to be an insult to the station he is referring to, and am disappointed that RW did not exercise editorial judgment to remove the low-budget reference.

As the former engineer, I can attest that the station in question is definitely not low budget. It does, however, have a comparable budget to other stand-alone FMs in similar market sizes. I was able to work with a top-line transmitter, a top-line processor, a top-line console and top-line cart machines. When I needed equipment, parts or whatever, I was able to get them, period. I considered our sound quality to be on par with the major market stations, even though our processor was a few years older.

Even though the station used a satellite service part of the broadcast day, it was far from being a low-budget operation. I hope that RW will use better judgment before allowing radio stations to publish left-handed insults about their competitors.

John Hendry
Richardson, TX

Correction

The Gentner Communications Conference Call Center is not based on its TS612 multiline telephone system, as reported in "NASCAR Taps Gentner for Races," RW, June 12. Although the technologies offer similar benefits to broadcast shows, the capacities and costs of the two approaches differ substantially. For more information on the TS612 or Gentner Conference Call services, contact Gary Crowder at (801) 974-3624 or gcrowder@gentner.com



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Making Money Multiply on Towers

by Bob Rusk

CHATTANOOGA, Tenn. Radio stations with vacant tower space have a gold mine at the top of their guy wires.

The owner of an apartment building with several vacancies is going to fill them quickly to maximize cash flow. If there is room for a dozen additional antennas on a tower, and the station does nothing to market that space, thousands of dollars are lost every month.

And that is the low end. A major market tower site can bring in more than \$1 million in rent each year. The trick for radio stations is getting the word out that space is available. Putting a "for rent" sign on the tower is one option although that might not be very effective.

Tower management

Another option is to engage the services of a management firm — like Chattanooga-based Signal One — to market the tower to large paging and cellular companies. Federal Express, AT&T Wireless and other users.

One estimate is that 10,000 new towers will be needed by the turn of the century.

"These companies need sites. They are not going to drive around the country looking for them," said Signal One President Larry Wells. "They're going to call somebody like me and ask what's available. When we sign a new tower site, we call or fax our customers to let them know about it."

Signal One represents tower sites in nearly 40 states. The rent each station receives varies. According to Wells, "A two-way radio system for Sprint maintenance trucks might pay \$300 a month because it's a small antenna. But a paging company might pay \$700 a month. In Florida (where there are fewer tower sites because of environmental regulations), it might be \$1,000 a month."

While Signal One, which also buys surplus towers from broadcasters, gets a percentage of the rent from towers it manages, stations still come out ahead, said Wells.

Do it yourself

"I know of FM stations that have rented to cellular companies for \$200 a month," said Wells. "They could have gotten \$1,500 to \$2,000 a month. I know the market rate. I'm one of the only people in the tower business that's been in the paging and cellular business. Cellular companies can make \$2 million a year off a cell site. Paying \$1,500 to \$2,000 a month for rent is nothing."

Wanting to get in on the big money that can be made in tower ownership and management, American Radio Systems (ARS), a major group owner with stations in markets like Boston and Baltimore, formed American Tower Systems (ATS) in 1995.

ATS now owns more than 40 towers and manages over 300 sites. The company is

building 10 new towers in Florida for the emerging personal communications services (PCS) industry.

"American Radio Systems recognizes that tower rental is a good business," said Gary Hess, ATS director of tower operations and the company's engineer in charge.

"Until a couple of years ago, the tower business was just a sideline. Some engineers were more aware of the market than others. Some intentionally under designed towers because they didn't want the nuisance factor. In most cases, engineers weren't compensated for that additional responsibility."

In addition to leasing tower space to the personal communications industry, a radio

station can make space available to other broadcasters — which used to be seen as taboo. Hess helped to change that attitude in the 1970s with a tower in Dallas.

"That was a real breakthrough," recalled Hess. "That tower paid for itself in about three years and in five years was producing a million dollars of cash flow annually. It has five TV antennas and eight FM antennas."

Hess added that "other than the RFR (radio frequency radiation) problems which we didn't anticipate because there was no such thing back then, it was the classic rental tower because we didn't put any prohibitions on it."

Today, said Hess, there is almost no

radiation problem with towers because "technology and regulation are keeping pace with each other."

Geared to FM

Consulting Engineer Michael Radovich of Owl Engineering Inc. in St. Paul, Minn., said that FM towers are best suited to holding arrays of antennas.

"Structurally, they are built to handle more weight," he said. "AM towers typically are older and weren't built to handle antennas mounted on them. The most critical problem with AM towers is the tower itself. If you try to mount an antenna on an AM tower, you have to isolate it from the AM antenna system. It's not as simple as mounting it on an FM tower."

Another important factor is how many antennas a tower can safely handle.

continued on page 11

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Radio Megamerger

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own a 36-percent share of market revenue in New York, a 40-percent share in Boston and a 44-percent share in Philadelphia.

"There was no question that the transaction that made sense was a combination of the Infinity company with the Westinghouse/CBS company," Karmazin said during a press conference announcing the deal.

Whether the transaction makes sense to the Federal Communications Commission, which must approve the merger, or the Justice Department, which is eyeing other transactions for potential anti-trust, remains to be seen.

"We're aware of the transaction," said a Justice Department spokesperson. "It is yet to be determined which agency (Justice or the Federal Trade Commission) would take a look at it."

Karmazin said he finds the talk about

radio groups getting too big "bizarre."

"The whole industry is not a big relative industry," said Karmazin. He said that if \$13 billion is spent in radio and the new Westinghouse/CBS/Infinity group makes \$1 billion in revenues, "We're looking at 8 percent, maybe. That's not Microsoft."

He added that in a market like New York City, there are 100 radio stations that someone can listen to, and that does not take video alternatives and the newspapers into account.

Perhaps. But the call letters of the new group's stations in that city speak to its power: WCBS-AM-FM, WNEW(FM), WXRK(FM), WFAN(AM), WINS(AM), WZRC(AM). According to BIA, in 1995, estimated revenues for the seven New York stations totaled \$168 million, while estimated total market revenues for the New York market were \$461 million.

The Westinghouse/CBS/Infinity group dwarfs the new number two group, Clear

Channel Communications, owner of 107 stations, by a ratio of three to one in terms of revenue, according to BIA Consulting Vice President Peter Bowman.

The Wall Street Journal reported that before the merger announcement, Westinghouse Chairman and CEO Michael Jordan had said he wanted to increase broadcasting operations by 20 percent a year. Jordan said in a press conference that Westinghouse defined radio as its "number one development priority." He cited the changes brought by the telecommunications bill and the faster growth rate in radio advertising as two of the reasons Westinghouse wanted to "develop very aggressively" in the radio industry.

Westinghouse will exchange 1.71 shares of its stock for each of the approximately 120 million outstanding shares of Infinity stock. The company will issue approximately 205 million shares valued at about \$3.9 billion. Westinghouse also will assume Infinity's debt — expected to be about \$1 billion by the end of this year.

The new group will have three AMs and

eight FMs in Dallas, according to BIA. In Chicago, it will own four AMs and six FMs. The company plans to arrange swaps to achieve compliance with FCC ownership rules.

A spokesman for FCC Chairman Reed Hundt said the commissioner traditionally does not comment on proposed deals on which he will have to rule. FCC waivers may be necessary, however, depending on how the acquisition plans are presented to the commission.

Last November, in the wake of the CBS purchase, the FCC granted Westinghouse permanent waivers of the one-to-a-market rule to allow common ownership of radio and television stations in Boston, Minneapolis and Washington/Baltimore.

The commission also granted 12-month temporary waivers of the one-to-a-market ownership rule for radio/television combinations in New York, Los Angeles, Chicago, Philadelphia, San Francisco and Detroit.

Westinghouse would face ownership problems in New York, Chicago and Los Angeles.

Just as shocking as its size was the secrecy of the merger. The expectation was that Infinity would continue to buy. In the past year, the company made plans to acquire Granum Communication Corp. for \$467 million and Alliance Broadcasting for \$275 million.

"Beginning in 1992, I had conversations with the management of Westinghouse about acquiring Westinghouse," said Karmazin. "I had conversations with Pete Lund and Larry Tisch about acquiring CBS."

He said after the telecommunications bill passed in March, the first call he made was to Westinghouse/CBS.

"It's a marriage made in heaven," said NAB President and CEO Edward Fritts. "It shows the Westinghouse/CBS commitment to radio as a strong, growing and viable medium."

Stu Olds, president of Katz Media Group, said he did not think the deal would lead to price-fixing of spots as was suggested by some in the advertising industry.

"Radio does not exist in a vacuum," he said. "Media buyers make decisions every day, and radio is just one of the choices."

"No matter how strong a lineup you have," he added "there's almost no radio station you can't buy around."

Olds suggested that one benefit of consolidations such as this one is the ability to package a station more creatively.

Westwood One, of which Infinity is part owner, will remain a separate company — nicely deflecting concerns about consolidating with CBS Radio Networks.

"We think that this is the kind of a deal that was intended when the telecommunications bill was signed, because for radio to prosper and grow, we needed this kind of critical mass," said Karmazin.

Bill Steding, whose Star Media Group is a long-time advisor to CBS, said that this merger gives Westinghouse the catalytic event to separate the entertainment and industry sides of the company.

Shortly before the announcement, Jordan had asked the Westinghouse Board of Directors to consider such a move. With the industrial and media sides combined, Steding said market analysts evaluate the company based primarily on the Industries and Technology Group.

"Right now, the media side is being painted with the same brush as the industry side."

If a split takes place as expected in the fourth quarter, Steding said the media side will get a much higher evaluation.

Martinsound Buys Console Maker

ALEXANDRIA, Va. Hot on the heels of its purchase of the Anatech company of England, Martinsound Inc. announced it would purchase the console manufacturer Neotek.

The deal, which Martinsound President Joe Martinson calls "a perfect fit," was scheduled to be finalized in late June.

Chris Walsh, director of sales and marketing for Martinsound, praised the Neotek line of consoles as "the most bang you can get for the buck."

Walsh said Martinsound will step up efforts to market Neotek consoles to the domestic market while continuing to

Martinsound will step up efforts to market Neotek consoles to the domestic market.

target the European market, which has a larger user base.

Martinsound recently opened a sales office in the United Kingdom, but Neotek

headquarters will remain in Chicago.

Martinsound plans to distribute Neotek products through its newly created Neotek Division. The company also has several other divisions under its umbrella: the Martech Division, supporting high-end audio and automation products; the Anatech Division; the Studio Division; and the Marketing and Sales Division.

Neotek installations include Todd AO/Glen Glenn, The Post Group, Polygram Nashville, Todd Rundgren, Swedish

Broadcasting-Radio/TV, Elton John's studio, The Beastie Boys, The Australian Broadcasting Corp., Kenneth Copeland Ministries and CTV in Canada.

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World Radio History

Eureka Picks Up Speed Worldwide

► continued from page 1

look at how DAB is progressing around the globe. In the United Kingdom, the BBC first demonstrated the Eureka DAB system to the radio industry at the Radio Academy Conference in Birmingham in 1991.

Allocations

The U.K. government allocated 12.5 MHz of radio spectrum in the VHF Band II, which will provide seven DAB frequency blocks.

The BBC launched its official DAB service in September 1995. The initial single-frequency network (SFN) of five transmitters serves about 20 percent of the U.K. population. In about two-and-a-half years, 27 transmitters will cover approximately 60 percent of the country's population.

In Canada, an experimental digital radio station was launched in Toronto at the second International Symposium on Digital Audio Broadcasting in March 1994. By late 1995, the Eureka-147 technology was adopted as the Canadian standard.

The transmitters in Montréal and Toronto are currently being used for demonstrations. In Winnipeg, Manitoba, a demonstration transmitter was installed in the fall of 1994 for two weeks.

Another was installed in Ottawa in the fall of 1995. The Ottawa site will be expanded into a four-station facility. Further, an installation will soon be completed in Vancouver, allowing more than 50 percent of the population to receive digital radio transmissions.

Marked result

David Soothill of the Special Broadcasting Service (SBS), the Australian multilingual broadcaster, explained that Australia strongly supports the use of the L-band spectrum for any reasons. Soothill said satellite DAB will be especially useful in Australia because of its ability to deliver radio services to rural and remote areas.

Telstra, the national telecommunications carrier, and the National Transmission Agency (NTA) are establishing pilot test facilities in Sydney, New South Wales, Melbourne, Victoria and Brisbane, Queensland.

The first L-band satellite trial of Eureka-147 used the Australian Optus B3 satellite. During these tests, a laboratory test vehicle covered about 10,000 kilometers taking measurements.

For a distance of nearly 1,300 kilometers between Adelaide, South Australia and Eucla on the South Australia/Western Australia border, they received the Eureka signal almost continuously in the test vehicle. There was only one short loss of signal at an underpass.

In France, since its founding in 1991, Club DAB France has focused on experimentation, reported Roland Faure of the Conseil Supérieur de l'Audiovisuel (CSA). While developing tools for providing data services, Club DAB France is paving the way for the success of DAB. Their efforts include public relations and lobbying actions to promote awareness of digital radio.

In the public sector, Radio France and two major networks, Europe 1 and Skyrock, are getting ready for digital radio.

For the past five years, the New Delhi-based Indian public broadcaster All India Radio (AIR) has investigated DAB. It has obtained one third-generation DAB

transmitter and a few test receivers and has initiated experiments and field observations.

The Indian Space Research Organization (ISRO) plans to launch a series of two experimental satellites: GSAT-I by the end of 1997 and GSAT-II later in 1998. For the project, India will use its own Geo-Synchronous Launch Vehicle (GSLV) for the first time.

GSAT-I will have two S-Band transponders, each with a basic power output of 100 W. If GSAT-I is successful, GSAT-II will be launched with an L-band payload.

In the Netherlands, according to Rein Simonse of the Dutch transmission authority, Nozema, the first experiments in the UHF band started in 1990. In 1993, Nozema installed a test transmitter on channel 7 and a gap filler on the same channel.

Next, the channel 7 transmitter was tuned to channel 12 and a second transmitter was installed. At the end of 1995 the network was refurbished: the antenna patterns became omnidirectional and another transmitter was added. In addition, two fourth-generation multiplexers were installed in 1996.

The test network consists of three transmitters. Altogether, about 40 percent of the Dutch population and 20 percent of the Netherlands is covered by the DAB test network.

Nozema intends to build a national DAB network and four regional networks to cover the entire country.

Steen Jensen of Danish Broadcasting Corp. reported that Danmarks Radio (DR) has conducted trials with DAB for almost two years; it has had a permanent DAB service since September 1995. At present, DR transmits from one transmitter in Copenhagen. It is estimated that 25 transmitters will be required to cover the entire country.

With financing from the Ministry Industry and Trade, DR ordered some 500 receivers and is planning to distribute them for a controlled evaluation of DAB. The receivers are expected to be ready by year-end.

Italy is carrying out several experimental activities. Radiotelevisione Italiana (RAI) has completed the development of a terrestrial DAB (T-DAB) network in the Aosta Valley that operates in the VHF band III.

The test-bed includes three transmitters in an SFN on channel 12 located in St. Vincent, Gerdaz and Blavy.

Government funds

Heinz Vogel of Swiss Telecom PTT reported that a three-transmitter SFN has operated since May 1995 on channel 12 in the Bern-Oberland area. In August 1996, a second L-band SFN will be ready to operate in the same region.

The pilot project is planned to last until the end of 1997. At that point, the beginning of a regular service will depend on government decisions and the availability of funds to commence DAB services.

In Germany, pilot projects are planned or underway in Baden Württemberg, Bavaria, Berlin-Brandenburg, Mecklenburg-Vorpommern, North Rhine-Westphalia, Rhineland-Palatine, Saxony, Saxony-Anhalt, Thuringia and Hesse.

With the official launch of DAB past, consumer acceptance is the next hurdle that will affect the success of DAB. In order to sell the product, it is necessary to understand what consumers want.

David Garforth of Canada's Digital Radio Research Inc., reported the results

of a survey of 1,200 Canadian car owners. The survey found 79 percent of car owners are interested in receiving digital radio in their car while 69 percent are interested in receiving it at home.

In terms of sound quality, 93 percent of those surveyed are most interested in the absence of interference or static in the car. Eighty-nine percent are interested in CD-quality audio and 89 percent are interested in stereo sound.

Eighty percent of car owners are interested in the "tell me more" feature of digital radio, which provides information about news and 75 percent want artist and song title information.

Safety concerns

Concerned about the safety of a display screen in the car, nearly seven in 10 car owners said they would prefer the information in the form of a voice announcement in addition to the screen.

Jane Logan of the Canadian Association of Broadcasters noted that "techthusiasts" have recently been identified as the key consumer group for the purchase of new technology equipment and services. They account for approximately 20 percent of the adult population.

With all these changes taking place,

Ford-Mercury Chooses Radio over Television

by Sharon Rae
Rover News Services

DETROIT Calling it a perfect fit, Ford-Mercury officials announced the choice of radio over television as the primary medium to introduce a new car, the Tracer, to customers.

The company selected ABC, CBS, Westwood One Radio Networks and syndicated programming network MediaAmerica for its national radio campaign this year.

"It's an easy way to get to the market that we're going after geographically and demographically," said Lincoln-Mercury spokesman Joe Koenig. "We can target the ads at the audience that we're looking at for the car ... a group really on the go ... in their cars, a lot of times listening to the radio."

In the Motor City, they are hailing the move as a first: one of the Big Three automakers selecting radio over television to introduce the new redesigned Tracer model, which went on sale last month.

"We found in research that these customers many times look at their cars from the inside out," said Koenig. "The Tracer is a car that has a lot of nice, comfortable interior features."

Ford-Mercury and the Detroit office of Young and Rubicam developed the campaign and selected radio because "people don't see the exteriors of small cars as being highly differentiated" and radio allows consumers to visualize those specific attributes that are important to them.

Christa Dahlander with the Radio Advertising Bureau said it is unique that a car company is focusing on radio.

"We're ecstatic," she said. "It's a great move on their part. Radio is great for targeting a specific audience and it's also the last medium people hear before they make a major car purchase."

commercial broadcasters must modify their economic strategy. According to Benoît Sillard with the Association of European Radios (AER), local broadcasters in particular will have difficulty finding a place in this new digital world because the specifications of the system do not leave room for these local broadcasters.

"It is necessary to develop new regulations to answer the needs of this new situation," he said.

A legal framework is needed to balance public and private broadcasting. Until now the control of technical specifications and development of various broadcast systems has been done primarily by the public sector.

Sillard noted that this has created a monopoly which, on the whole, has placed large public firms, manufacturers and certain national public networks in a position of force in many countries.

"The AER is very interested in developing new technologies," said Sillard, "but it must be aware when implanting the DAB system both in terms of competition and economic balance."

"Private operators are a fundamental part of European radio. They need new 'game rules' that are both fair and equitable and that guarantee the best conditions of access to and exploitation of DAB. Rules that will guarantee an efficient development of this new technology, that is essential to the future of radio broadcasting." ☺

Certain aspects of the radio campaign will be picked up in print ads that will feature cartoon sketches that depict the car and explain different features of the car. The ads proclaim "As seen on radio" in large type.

"Our (radio) campaign meshes with the print campaign very nicely," said Koenig. "(Radio) is a perfect fit. Obviously, it's a little less expensive to go after radio than it is for extensive national television. When they looked at all the options — print, radio and television — they decided (radio and print) was the perfect combination."

The radio ads feature fanciful situations that promote specific features of the redesigned Tracer. In one, as the Tracer descends the Parthenon, an announcer strapped to the roof of the car provides a play-by-play while the driver listens to the theme from "Zorba the Greek" on the car's CD player.

In a spot called "Doom," the announcer prepares himself for a pylon course to demonstrate how easily the Tracer handles.

"Wait," he says. "This is radio. Let's make it rotating razor-sharp blades."

Another ad features a human slingshot gearing up to launch himself four times around the earth and then land in a giant catcher's mitt. With sound effects, the spot paints a picture of how many times one could theoretically drive around the world — with just routine maintenance — before it is time for a tune-up in the new Tracer.

A catchy jingle clinches the advertising effort for the all-new 1997 Mercury Tracer sedan: "The small car that thinks big."

Speaking of big: In 1995, Ford-Mercury spent \$13 million on its Tracer television campaign. This year, the automaker expects to spend at least that much on radio and print. ☺

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Tower Space Translates into Cash

► continued from page 7

"That's a concern when you start putting a lot of hardware on towers," said Radovich. "Many times if the tower wasn't designed to handle much of a load, that can limit the revenue a tower can generate."

"Some of the older towers were designed to handle one station's antenna and maybe some auxiliary antennas, some STL equipment and not a whole lot more. When towers are installed nowadays, they have the capability of supporting many more antennas in the future."

Tower analysis

A good starting point for a station wanting to lease space on an existing tower would be to have a structural analysis done, said Pete Starke, vice president of sales and marketing for Stainless Inc.

"We designed and fabricated a lot of the big broadcast towers," said Starke. "A large portion of our business now is

analyzing those towers for broadcasters that want to locate other antennas on them."

Before new towers are erected, it also is

space can be rented," Starke said.

While nonbroadcasters are putting up their own towers, that is not by choice

FM stations have rented to cellular companies for \$200 a month. They could have gotten \$1,500 to \$2,000 a month,

—Larry Wells, Signal One

common for a market analysis to be done to determine what the future demand will be for antenna space.

"Capacity can be built into the tower so

according to Starke. He said the goal of the wireless communications industry is to "go on every existing structure they can. Their last resort is to build something."

Starke said he believes there are instances where money can be made from leasing space on AM towers.

"Location and height are the important considerations," he said. "A lot of wireless companies don't like to be located on AM towers, but if there is an AM tower in an area where they cannot get zoning approval for another tower — or if it is an ideal location for their cell — they will go on that tower."

Stainless, which is located in North Wales, Pa., sees the demand for tower space rapidly growing as more wireless services become available. One estimate is that 10,000 new towers will be needed by the turn of the century. That provides a golden opportunity for radio stations to make big money.

"Any radio station with tower space is a possible site for these people to lease space on," said Starke.

Radio Reading Services Meet

ROANOKE, Va. The National Association of Radio Reading Services (NARRS) held its 22nd Annual Conference in Roanoke June 6-8. The theme this year was "Building Partnerships."

The conference was more technical than usual, said one of the 100 attendees, because many reading services are exploring new ways of getting information to the people who need it.

In addition to discussions on volunteerism, the changing law and getting grants from the National Telecommunications and Information Administration, members attended sessions on the Internet, RDS and the future of digital broadcasting.

The group is not excited about an in-band, on-channel digital audio broadcasting solution, which it believes would benefit neither FM radio stations nor NARRS. The reading services, in fact, have come out firmly against an in-band, on-channel digital system.

Subcarrier delivery on 67 kHz or 92 kHz has been a traditional outlet for reading services for the blind. Additional methods of delivery include cable delivery and dial-in newspapers.

The organization is paying close attention to developing digital technologies, said former NARRS President Bill Pasco. He added that many new subcarrier technologies would allow reading services to coexist with them, which NARRS naturally supports.

NARRS is not too concerned about the adoption of a high speed FM subcarrier standard that the National Radio Systems Committee is currently working on. Pasco said that only about one-third of all FM stations currently use their subcarriers, so there is no reason why any new technology will necessarily be a problem.

Dial-up news services are another hot topic for NARRS. John Mulvihill, general manager of EIES in New Jersey, moderated a panel on the "Day to Day Nuts and Bolts" of operating such a service.

There are approximately 140 reading services in the United States. Representatives from reading services in Canada, New Zealand and Japan also shared their experiences at the conference.

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EAS Teleconference Covers Much Ground

► continued from page 1

will use a FIPS (Federal Information Processing System) code to activate new EAS boxes. However, the NWS will continue to use an approximately 10-second long NOAA Weather Radio 1050 Hz tone to activate its old boxes.

Old boxes

Their equipment is still in use at some nuclear power plants around the country. Lucia said the FCC will recommend the old boxes be replaced.

Even though the EBS/EAS two tone

will only last eight seconds, broadcasters were concerned that the old 1050 Hz tone from NOAA Weather Radio would mistakenly get on the air. Both of the companies with EAS certified products said their equipment will siphon out the 1050 tone.

Gerald M. LeBow, president of Sage Alerting Systems, said his company was "sensitized to this issue some time ago" since Sage owns 20 radio stations. The Sage equipment splices out the 1050 tone.

Products from TFT Inc. will not let the old tone on the air either. When it

receives the FIPS code, the TFT decoder decides if it is a message that should be forwarded, waits until the 1050 Hz signal completes and then records.

Right now, the public can buy NWR-SAME (NOAA Weather Radio Specific Area Message Encoding) decoders, but they are expensive and available only in commercial grade. Officials anticipate consumers will be able to buy EAS/SAME decoders at affordable prices in 1997. They are recommending that every school and hospital have one.

A caller from New Jersey said that his station gets weather information from one weather service office, but his EAS technically will be alerted by a different weather service office.

He was concerned that he would receive alerts that did not apply to his coverage area and miss out on those that did.

Larry Krudwig of NWS, one of the prime developers of WRSAME, used that example as one good reason why stations should participate and get involved in planning the new EAS system and have a say in what stations they will have to monitor.

Deadline

For radio and television, the deadline to purchase equipment is Jan. 1, 1997. For Cable, the deadline is July 1, 1997. One listener in Kentucky asked if the two manufacturers will be able to keep up with demand.

Lucia said he expects there will be more manufacturers and added that the manufacturers with certified equipment have said they can meet the demand. The deadline is not insignificant; the equipment costs more than \$2,000.

In a piece of news that will delight many station owners with co-located stations, Lucia said that if stations are both co-owned and co-located, they will be able to buy just one EAS box.

If stations are co-located but not necessarily co-owned, the FCC might grant a waiver if the stations prove they can get information back and forth.

But just purchasing an EAS box is not enough; broadcasters need to take an active role in planning the new web systems if they are to be really effective.

According to NAB Engineering Director Kelly Williams, stations have to have their equipment in place by Jan. 1, but they have a year to test their emergency plans.

Lucia said the FCC will still send out the authenticator list in a red envelope in 1997. The FCC wants to make sure they have it if they need it. By 1998, Lucia said he hopes the list will no longer be necessary.

One caller said he was concerned there were no security measures that could prevent mischief from taking place. As it stands, it would be possible to get a false message down an EAS system.

"It is," quipped one panelist, "if this makes you feel better, against the law."

Both Sage and TFT have password protection on their systems to prevent unauthorized origination of messages. But for received messages, the equipment has to assume the information is legitimate.

Vern Wingert, chief of the Technical Services Branch of FEMA, was asked if FEMA will help pay for station EAS equipment. Wingert said the agency gives money to state and local governments every year that they could possibly use to assist with EAS purchases.

The FCC is providing an EAS operating handbook, EAS script examples and test

procedures as well as the 1997 code words. Those interested also can purchase an EAS Primer from the Society of Broadcast Engineers.

A caller from Arizona asked about public service announcements to educate the public. Other than changing the text message, Lucia said the FCC has not done any PSAs. He said stations are welcome to make their own.

One advantage of the new system also might be a bit frustrating for some automated stations. Emergency personnel like sheriffs and fire officials will be able to activate the system at the scene of emergencies.

A caller with an automated station in North Carolina suggested that something like a tornado could generate multiple alerts if it was reported by a local sheriff, the national weather service and somebody else.

"Am I going to end up with three messages from three separate people back to back?" he said.

Williams, however, said stations do have choices. If an area is apt to get tornadoes, he suggested that an automated station could set the EAS up so the owner is notified when a message comes in. He said that owners could call into the unattended station to double check the message.

A manufacturer's rep suggested that it really is not a bad thing to get multiple messages.

"The idea is to save lives," he said. ☺

DOC Moves on EAS Patent

WASHINGTON The Department of Commerce has been studying a patent issued to Quad Dimension in 1992 for its geographically specific alerting system.

John Raubitschek, patent counsel for the DOC, said his office found other patents and documents that they think could affect the validity of the Quad Dimension patent.

On May 28, the DOC sent that information to Quad Dimension asking the company to comment on the materials presented. Raubitschek said there is no established reply date but added that the DOC does not want to let the issue drag.

In June 1992, Quad received a patent for its Storm Alert for Emergencies (SAFE) System that uses Frequency Shift Keying (FSK) to send information indicating a hazard message as well as the affected geographic region.

SAFE is similar to NWR-SAME (NOAA Weather Radio Specific Area Message Encoder), the basis of the new EAS. Quad Dimension sent letters to EAS manufacturers informing them that they will need a licensing agreement to use technology covered by the patent.

Larry Ganzer, vice president of Quad Dimension, said the firm forwarded the DOC letter to its attorney. ☺

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Learn Grounded-grid Circuitry

by Tom Vernon

HARRISBURG, Pa. A heartfelt thanks to the many readers who responded to my recent column on tuning FM transmitters. Several of you requested a similar treatment for grounded-grid devices, so here goes.

As with many innovations in RF circuitry, grounded-grid (GG) amplifiers were first developed by radio amateurs. In the ongoing quest to make transmitters work at higher frequencies, GG circuits solved some problems inherent in earlier designs.

The grounded-grid transmitters you see in the field today represent the third generation. The first generation of broadcast transmitters for the current FM band were initially built in 1949. They were grounded-grid, but utilized low-mu triodes, such as the 5762 and WL473. The RCA BTF series (not to be confused with the BTF*E series of later years) is a classic example, with transmitters in the 250 W, 1, 3 and 10 kW power levels. Westinghouse transmitters of that day also were GG.

The low Q of these circuits made stability one of their strong points. Poor efficiency was their main drawback. Excessive drive was required to achieve rated power output. For example, a 1 kW driver was required to produce a 3 kW output, and 3 kW of drive was needed in the RCA BTF-10 for 10 kW of output.

In 1958, the second generation of FM transmitters was introduced. The Gates FM*G series is a typical example. Engineers replaced the inefficient triode with newly developed high-gain tetrodes. The Eimac 4CX series of tubes were used in many transmitter designs. These required minimal RF drive but needed to be neutralized.

Neutralization and instability, especially at the high end of the FM band, were ongoing problems as was maintaining sufficient bandwidth when stereo and SCA transmissions became commonplace in the '60s.

In the mid-'60s, a third generation of broadcast transmitters was developed by CCA, and these units returned to the grounded-grid configuration. This time, there were high-mu zero-bias triodes in the Eimac 3CX series.

These tubes were originally developed for linear SSB service but also worked well in FM applications. Class B was the preferred mode of operation, and gains of about 20 were common. Older units almost always utilized a tetrode for the IPA stage because of its higher power gain. Contemporary transmitters use solid-state drivers.

Because the RF drive is applied directly to the cathode (filament), there must be a means of keeping it out of the filament transformer. Two schemes are used. Inductors may be placed in series with the filament leads, as shown in Figure 1. This is an easy matter because the inductance can be very low. Physically, these chokes can simply be silver plated rods. The second method feeds the filament power through the input tank circuit inductor.

The manufacturers of "third generation" grounded-grid FM transmitters include: CCA, AEL, CSI, QEI, McMartin and Energy-Onix. AEL, CSI and McMartin are no longer in business. These transmitters are inherently broadband and have simpler circuitry than their tetrode

We could go on from here and say that today's all solid-state boxes are fourth generation devices. However, when it comes to wailing out 10 to 20 kW of FM, tubes are the only way to go.

Figure 1 shows a typical transmitter. Tuning a grounded-grid transmitter is very straightforward. First, tune the exciter into the IPA input by adjusting the IPA tuning and loading controls for best match on the exciter's directional cou-

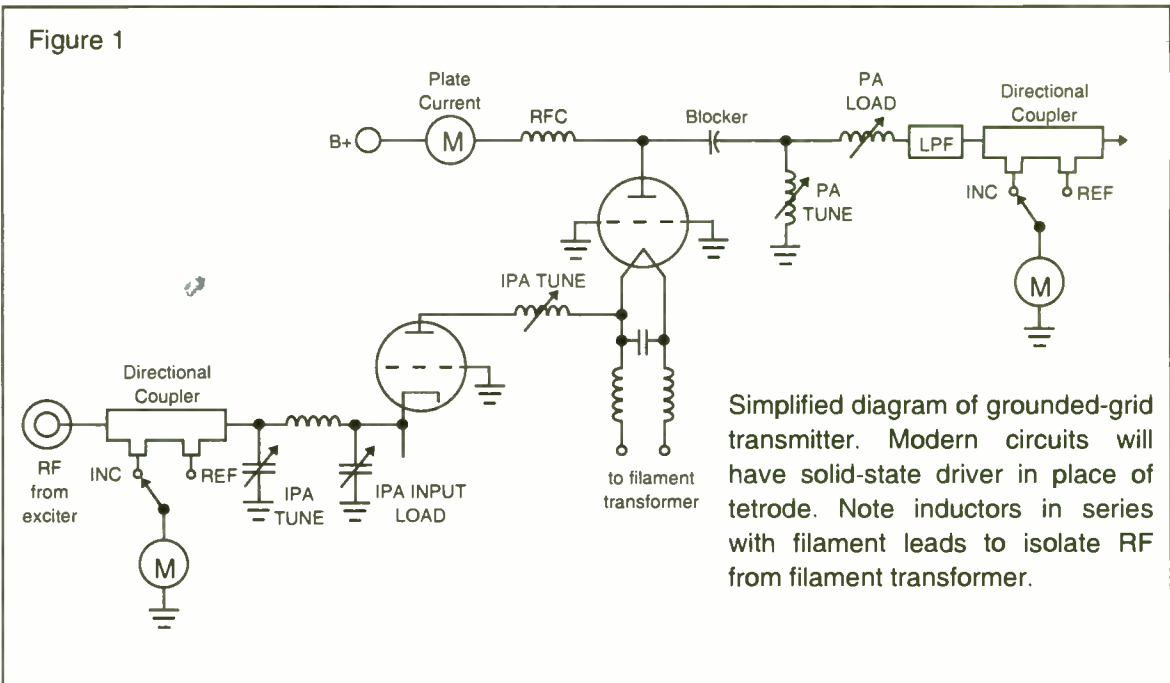


Figure 1
Simplified diagram of grounded-grid transmitter. Modern circuits will have solid-state driver in place of tetrode. Note inductors in series with filament leads to isolate RF from filament transformer.

cousins, both in the RF path and power supply, by virtue of having no bypass capacitors, bias or screen supplies. With sufficient RF drive, efficiencies of 80 percent are not uncommon.

You should get a reading of 1.2:1 or better.

The point of maximum drive current, as read on the IPA input circuit, may not

continued on page 18

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Circle (28) On Reader Service Card

SIGNAL TO NOISE

Cancel Noise with New Headphones

by Frank Beacham

NEW YORK A new generation of ultra lightweight integrated noise canceling headphones recently introduced by Sony offers quiet new possibilities for monitoring sound, whether inside a broadcast control room or on a noisy street.

Prior to the introduction of Sony MDR-NC20 and NC10 headphones (\$199 list each), the noise canceling electronics of such devices were usually placed in a clumsy external box. Now, Sony has integrated those electronics into the headphones themselves for a far simpler, more elegant portable monitoring system.

The MDR-NC20 is a standard headband-style phone set that is comfortable to wear and offers excellent sound quality. It folds in half for easy packing. A tiny AAA battery compartment sits atop the right ear piece, and an on-off switch is just below. Within a second or so of turning on the switch, outside noise diminishes dramatically.

Reduced outside noise

The MDR-NC10 version, which is electronically identical to the NC20, features tight fitting ear plugs that seal the ear canals for even greater outside noise blockage. The battery and a switch for this model are

in a small in-line connector module. Though the NC10 earplugs definitely reduce outside noise effectively, I found the ear buds uncomfortable for wearing over

The MDR-NC10 version features tight fitting ear plugs.

long periods of time. This, however, is a matter of personal preference.

Sony's new headphones are consumer products designed to reduce low-frequency

sounds in the 40 to 1,500 Hz range. This covers devices like air conditioners and electrical appliances in the home and the noisy rumbles of airplanes, trains and buses. The maximum cancellation level is more than 10 dB at around 300 Hz, which Sony said means that the noise level is reduced by a maximum of approximately one-third.

Each headphone contains a microphone for picking up ambient noise, the noise-canceling circuit, a headphone amplifier and a drive unit. The noise-canceling circuit analyzes outside sounds, and the drive units produce the audio output. An alkaline battery runs the headphone electronics for about 60 hours.

Though marketed for consumer Walkman-type applications, in my opinion, these new designs also are equally useful as general purpose headphones for monitoring sound in broadcast studios and at noisy outdoor locations. In fact, in my informal listening tests, these headphones performed best on the noisy streets of New York City where a low-frequency sound track is a constant fact of life. In this constant drone of urban sounds, the ability to hear detail in an audio mix was substantially improved by the noise-canceling circuitry.

Noise-canceling

Initially, noise-canceling technology was developed as a result of research that revealed that the constant drone of air-



Sony MDR-NC10 and MDR-NC20 Headphones

plane engines caused in-flight fatigue. The first headphones were created for pilots to improve the comfort of flying by attenuating noises from the body of the plane.

Noise-canceling headphones work using a wave synthesizing principle. The noise-canceling circuit produces an inverse phase that cancels out ambient noise in the surrounding environment.

While noise-canceling headphones are operating to dampen noise, they also simultaneously allow music and other audio to be heard more clearly. One of the advantages of this is that sound can be monitored at significantly lower levels, causing less strain on the ears.

As useful as Sony's new headphones are, it would be nice to see a professional version that allows the wearer to manually adjust a broader sweep of frequencies throughout the audio spectrum. Then I could take the headphones to the dentist to dial out the sound of the drill and on commercial airlines to zap the drone of the flight attendants as well as the plane's engines.

□ □ □

Frank Beacham is a New York-based writer and producer. Visit his web site at: <http://www.beacham.com>. Mail: 163 Amsterdam Ave. #361, New York, NY 10023. E-mail: frank@beacham.com

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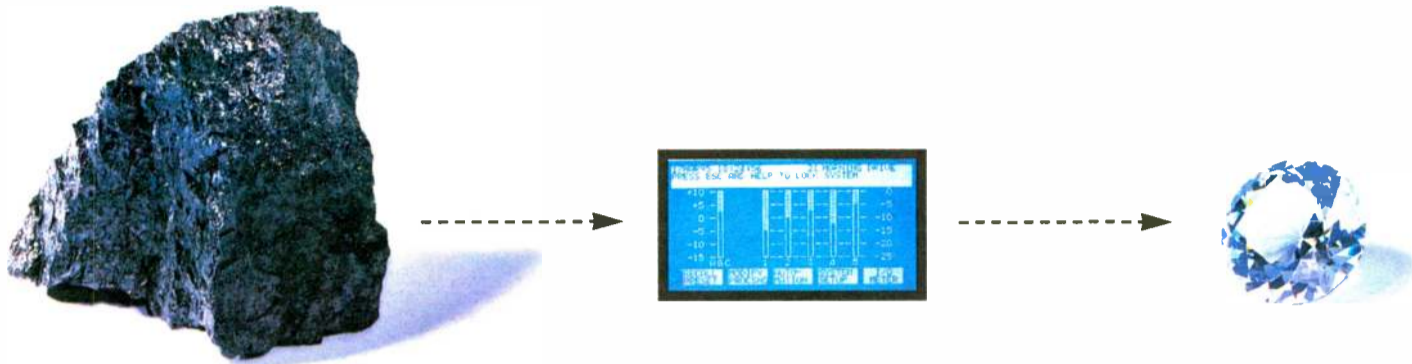
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FEEDLINE

Eradicate the Noise from Next Door

by W.C. Alexander

Part II of II

DALLAS Last time I discussed ways of tracking down sources of noise in you car and home and the means for reducing that noise.

There are also ways to track down noise that comes from an external source, and ways to deal with that noise once you find it.

Once you have determined that the noise is external, the next step is to DF or direction-find it to its source. If you have a field strength meter at your disposal,

you are all set. You can, however, use any good portable AM radio with a built-in ferrite bar antenna.

Start at a point away from the building and rotate the meter or radio (still tuned to an unused AM frequency) for strongest noise. If using a field strength meter, a much sharper null can be found than a peak, so it may be better to rotate for deepest null. The noise source will then be perpendicular to the plane of the antenna (or in line with it, if rotating for a peak).

The next step is to move to another location, preferably some distance away — say, 100–200 feet — and take another bearing on the noise. What you want is a location

where the bearing to the noise is close to 90 degrees from that of the first point.

When you find this location, look to the point where the two bearings cross and look there for the noise source. You may have to repeat this procedure several times, using higher scale settings on the field intensity meter (FIM) as necessary, until the location is pinpointed.

If you are using a portable radio, you may not be able to take close-in bearings, as the AGC in the receiver will make it impossible to discern a peak or null as you rotate the antenna. Another thing to keep in mind is that noise often propagates along power lines, and a peak field

strength may occur some distance from the actual source.

If you are unable to pinpoint the source of the noise with a receiver or FIM because it is too strong or seems to come from every direction, you may have to resort to Plan B. This requires a VHF receiver, such as a portable scanner that works on aircraft frequencies (and thus has an AM detector) and a hand-held yagi antenna.

I use a five-element hand-held yagi I made out of piano wire and a broom handle. Because the power contained in a broadband noise source decreases with

There are ways to deal with noise once you find it.

frequency, by DFing the noise at a higher frequency (above 108 MHz), its source may be much easier to locate. Again, take two bearings, triangulate and repeat until you locate the source.

Should your search lead you to another house or building, you will have to (diplomatically) enlist the assistance of the owner or tenant in repeating the "circuit-breaker test" in that location. There are ways to do this effectively, and unless your search has led you to Oscar the Grouch's trash can or a crack house, you should be able to talk your way inside.

What you do when you find the offending ballast, aquarium heater or electric blanket is a different matter. It could be that the noise source has been tearing up the owner's TV or radio reception as well as that of the rest of the neighborhood and he or she would be willing to replace the device.

On the other hand, if the owner is not having problems and doesn't feel very neighborly, you may have to resort to a commercial AC-line filter or replacing the device at the station's (or other listener's) expense.

Should you find that a power line is at fault, call the utility repair people responsible for that area. They will have on-staff people skilled at tracking and dealing with such problems. Usually, if you can isolate the problem to one or two city blocks, they can take it from there. A cracked or broken insulator, loose splice, faulty wire-tie or loose hardware can cause such problems.

Whatever the case, let the utility people handle the problem. If they are uncooperative, you should then (and only then) enlist the help of the nearest FCC field office. Chances are, they can get the utility company off the dime with a phone call.

Radio station general managers shouldn't expect their engineers to spend a lot of time running around town tracking down electrical noise problems. That simply is not our job. From time to time, however, it may pay big dividends to clear up a certain problem — especially the one in the general manager's neighborhood or the one around a big client's business. (After all, would you buy airtime on a station you couldn't hear clearly?)

Finding a noise problem can be tough but, using these guidelines, you should be able to run most problems of this sort to ground.

□ □ □

Cris Alexander is director of engineering for Crawford Broadcasting in Dallas. He can be reached at (214) 445-1713 or by e-mail at 76440@compuserve.com

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Tower Tips from the Experts

Due to a printing error in the June 26 issue of *RW*, *Man of Steel* did not appear in its entirety. The feature article runs its course in this issue.

by Troy Conner

BRASSTOWN, N.C. "Why am I here?" I thought vaguely.

This was not some comfortable, philosophical "What is the meaning of life? Why am I here?" question, but a more realistic "What in hell am I doing here?"

"Here" was the side of a massive transmission tower some 1,300 feet above the Houston skyline, thoroughly slathered in grease, standing with another man on a three-foot square platform suspended by finger-sized wire.

Haunting and disgusting

The block we hung from had been fitted to one of the nearly two-inch diameter guy cables. We boarded the platform at the guy anchor and, as always, it had been an exhilarating, high-speed magic carpet ride to the top of the tower.

On a rope around my neck I wore a two-way radio, which had been carefully taped up inside a plastic bag. With a yell into the radio, we began our slow, agonizing descent.

It had been an exhilarating, high-speed magic carpet ride to the top of the tower.

The task ahead of us was daunting — disgusting in fact. In order to slow corrosion of the guy cables, we had to rub with wire and manually apply a coat of D-OX-ID, "A Special" grease to 45,060 feet (eight and a half miles) of cable.

By the time we finished, we had used more than 500 gallons of the stuff. The "Special" grease is a wax-based product of paraffin production.

It has the vilest viscosity and a consistency like the stickiest axle grease. Hoping with bare hands into one of the one-gallon buckets also occupying our platform, one man shoveled grease while the other smoothed it onto the wire.

Two hours later, we reached the guy anchor and our waiting ground man. By then, we were both so slick with grease that one slip left both of us hanging by our safety lanyards. All we could do was lounge there, laughing uncontrollably, cause neither of us could even stand to re-board the platform.

Working for cable

Looking back, I have to wonder about the effectiveness of after-market guy cable treatments as corrosion inhibitors. There are basically two schools of thought with regard to galvanized steel guy cable care.

Some engineers feel that any type of treatment of aging guy wires is a prudent preventative measure given the replacement cost of a set of guy cables. Engineers on the other side of this issue feel that the chemically self-sacrificial nature of the zinc in the galvanizing makes cable treatments unnecessary.

The latter group also feels that any cable

treatment could possibly trap moisture and thereby create a potential problem where none might otherwise exist.

Most manufacturers and engineers alike agree that spot treatment of rusted areas with cold-galvanizing is appropriate to restore the lost zinc.

The most critical factors involved in guy cable life are environmental. A tower subject to severe environmental conditions like those found in an industrial or coastal location or an area subject to acidic rain can reduce the effective life-span of a cable by half. Any drop in pH greatly accelerates the sacrifice of zinc in the galvanizing.

Bob McCrossen of Florida Wire Rope and Cable estimated the effective life span of a galvanized steel cable at between six and 15 years depending on its location.

Keep in mind that many of the transmis-

sion structures standing today are between 30 and 40 years old. This is particularly true with older AM stations. It is this group of tower owners who should rightly be concerned with the structural integrity of their guy cables.

Termination hardware

Actually, the termination hardware of guy cables is far more likely to fail than the cables themselves. By nature, almost all types of termination hardware reduce the effective breaking strength of the cable. For example, wire rope clips will hold approximately 80 to 90 percent of the wire rope strength if properly applied.

On the other hand, improperly applied, they may only develop 40 percent of the cable strength.

Swaged or socketed terminations are indeed stronger but are somewhat unusual in structures shorter than about



400-500 feet and they do not allow internal inspection of the cable.

Typically, small towers have more guy-related problems than larger structures.

continued on page 18 ►

PRODUCT GUIDE

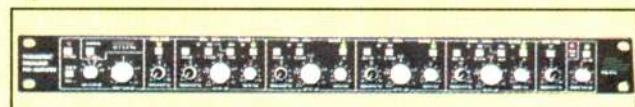
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BSS Preamp/EQ

BSS Audio, a division of Harman Pro North America, has the FCS-916 preamplifier/parametric EQ.

The FCS-916 can be used in digital recording for mic to workstation input or in analog recording for mic to mixer or direct to tape.

The high-quality preamp stage has gain controls and phantom power and is switchable between mic and line levels. Equalization is performed by six filters, each with independent in/out switching. Each parametric band can notch up to 30 dB, with bell and shelf selection on the top and bottom bands.



Suggested price of the FCS-916 is \$999.

For more information, contact Harman Pro at (818) 830-8278 or circle Reader Service 8.

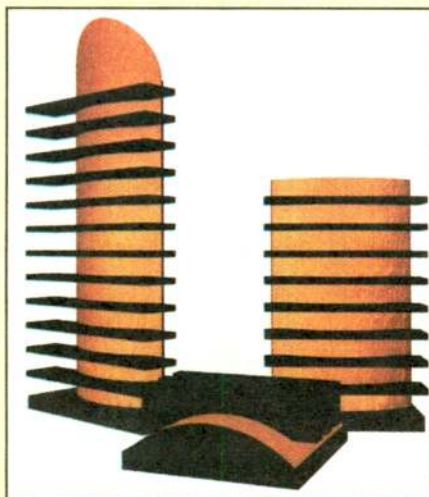
ASC Acoustic Furniture

New from Acoustic Sciences Corp. (ASC) is the "Mobilier" designer series of acoustic furnishings for studios and recording spaces.

The new components draw on design philosophy from ASC's original Tube Trap bass absorption mechanism. The Zavorra is a three-tier end table occupying a two-by-two-foot square space. The Gavittello is a bust table composed of five tiers with a footprint of 16-by-16-inches.

Both components are finished in a mat lacquer and both have the same bass reduction volume and performance as the larger ASC 16x4 Tube Trap.

For more information, contact ASC at (541) 343-9727 or circle Reader Service 33.



Tascam Production Console

Tascam is distributing the M1600 series of eight-bus recording consoles.

The console is available in both 16- and 24-channel configurations and is designed specifically to complement modular multitrack studio equipment. Each channel

includes three-band EQ with mid-sweep, TRS balanced line inputs and one stereo and four mono Aux sends. The first eight inputs feature XLR mic inputs and phantom power.

Balanced and unbalanced tape returns are mounted on 25-pin D-sub connectors and are switchable in eight-channel blocks.

The 24-channel configuration as shown has a suggested price of \$2,199, plus \$650 for the meter bridge. The 16-channel version is \$1,699, plus \$500 for the meter bridge.

For more information, contact Tascam at (213) 726-0303 or circle Reader Service 84.



Digitech A/D, Vacuum-Tube Preamp

The VTP-1 from Digitech performs several functions in one box. It is a combined stereo vacuum-tube preamplifier, four-band semi-parametric EQ and 18-bit analog-to-digital converter.

The preamp utilizes separate 12AX7 tubes in each stage. Front panel Gain and Trim controls dial in the amount of tube sound desired. Switches for phase, phantom power, mic/line level and a 20 dB pad are mounted on the front.

The semi-para EQ section consists of two fixed and two sweepable bands. Each band provides up to 15 dB boost or cut. A low-cut switch removes noise and rumble under 75 Hz. An EQ in/out switch is provided on the front panel.

The onboard A/D converter allows outputting program material direct to digital in AES/EBU or SPDIF formats. Sampling rates are switchable between 44.1 and 48 kHz.

An optional transformer circuit replaces the balanced electronic inputs with high-precision transformer balancing circuitry.

For more information, contact Digitech at (801) 566-8800 or circle Reader Service 59.

Expert Tower Tips

► continued from page 17

This can probably be attributed to several distinct factors. Generally speaking, larger-tower owners tend to recognize the critical nature of tower and cables and budget accordingly.

In addition, larger cables and their associated hardware generally have more margin before corrosion becomes a significant structural concern. This is partly because of the greater number of strands in the cables and the higher tensions which inhibit moisture penetration.

Greater weathering

Unfortunately, inspection of the ground hardware is not always an effective measure of the condition of the remainder of the cable. More critical is an inspection of the upper guy hardware, which is subject to greater weathering.

Few people realize the difference that 200 or 300 feet of elevation can make with regard to corrosion.

An important part of any annual tower inspection is a critical look at the guy cables and termination hardware. A photographic inspection is often invaluable in giving the tower owner an accurate understanding of the tower condition.

Any discussion of guy cables and their importance in the structural integrity of a tower would not be complete without at least some mention of plumb and tension.

Cable tension

Correct cable tension and tower plumb are as critical as the actual condition of

the cables and hardware. The process of tower plumbing and guy cable tensioning will be the subject of a future article.

Also of concern is the condition of the anchor itself. This is particularly true with regard to smaller towers which have screw type anchors where the anchor steel is exposed to the soil.

In many cases the shaft of a screw anchor is severely pitted. Because it is below grade, it is not typically inspected. By merely digging about a foot down around the shaft and examining it closely, it is possible to determine if there may be a potential problem with the anchor.

□ □ □

Troy Conner is the owner of Tower Maintenance Specialists. He can be reached at (704) 837-3526.

An inspection of the upper guy hardware is critical.

Tune GG Transmitters

► continued from page 13

coincide exactly with minimum reflected power.

This is because solid-state exciters may put more power into a complex load than a purely resistive 50 ohm load.

While observing PA cathode current, next adjust the IPA output tuning for a peak. Next, adjust the PA tuning control for a dip in plate current.

Finally, adjust the PA loading and power-out controls for rated-power output consistent with the dip-in plate current and desired plate circuit efficiency.

Control interaction

There's always some interaction between controls, so you'll have to make a few iterations. Remember that most of the drive power is fed through the tube and appears at the output. Thus, any disturbances to the output loading will affect input tuning as well.

As with tetrodes, it's important to go back and fine tune all these adjustments for minimum synchronous AM noise. This is done while modulating the transmitter with a 400 Hz tone at 100-percent modulation. You may notice that the noise null is somewhat less pronounced on grounded-grid transmitters than

tetrodes. This is because the GG circuit is more broadband to begin with.

If you've tried to calculate the efficiency of a grounded-grid transmitter, you may have come up with some unbelievable numbers. That's because the conventional formula for efficiency doesn't work. Because the driver supplies power to the output in a grounded-grid circuit, that power must be subtracted to get accurate efficiency figures. Hence, the true efficiency for grounded-grid transmitters is determined by the formula:

$$E_{gg} = \frac{P_{out}^1 - P_{out} (E_g/E_p)}{n} \times 100\%$$

where P_{out}^1 is the power output of a grounded-grid amplifier, and P_{in} is the power input. The power being contributed by the driver is represented by the factor: $P_{out} (E_g/E_p)$

Special thanks this month to Bernie Wise, president of Energy-Onix and fellow Penn alumni, for sharing his thoughts on grounded-grid transmitters with me.

□ □ □

Tom Vernon spends his time consulting and writing the dissertation for his Ph.D. at the University of Pennsylvania in Philadelphia. You can e-mail Tom at TLVernon@aol.com; or call (717) 367-5595.

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Prepare Towers for Stormy Season

by John Bisset

SPRINGFIELD, Va. We recently assisted a client who was replacing a number of MCI JH-110B reel-to-reel tape machines.

In evaluating the machines for the new owner, I noticed that the low frequency response of the machines was nowhere near spec.

I'd seen this problem before, and it took a few minutes to remember the fix — the cue relay! This relay is wired directly to the record and playback head, and permits monitoring of the record head when the "CUE" button is depressed.

Because the head output runs directly through this relay, the signal level at this point is minimal. Any amount of oxidation or dirt on the relay contacts will destroy your low-end reproduction performance.

Although a new relay is the best cure, the existing relay contacts can be burnished. This relay fits in a socket, with pins that just love to break, it seems. Use care and caution when removing the relay.

★ ★ ★

With the stormy season upon us, now is a good time for AM station engineers to visit the ball gaps at the base of each tower.

Check to make sure that the gap is set properly (no "sparks" during your heaviest modulation). It goes without saying, this is a two person job — one to turn the transmitter on and off and one to adjust when the transmitter is down. Keep the base current meter "on" so you know when the tower is dead. A fluorescent tube will also work.

Early in my career, I watched as two seasoned engineers switched a transmitter using a big knife switch. The first engineer pushed the "off" button, yelled OK, and the second engineer threw the knife switch.

I'll never forget the blinding blue flame that arced across the opening — and

made me wonder if I really wanted to get into engineering. The first engineer had hit the "on" button by mistake. No one got hurt, just shaken, but a valuable lesson was learned.

"Johnny Balls" or static gaps can be a lifesaver when your tower builds up static, but if they are three inches apart for a 1 kW transmitter, the static surge may look for ground elsewhere (read: through your ATU).

While you are at the tower base, check for holes in the ATU box, fill them with RTV, construction adhesive, putty or that foam filler in a can.

I make it a habit to spray hornet killer under the eaves or overhangs of the ATU box, and repeat these applications throughout the summer.

Don't forget your quarterly tower inspection, either. While you're basking in the sun anyway, check your tower condition — the second quarter expires the end of this month.

If you have the luxury of a day to spend in the field, check for cracked insulators and, with the power off, tight connections.

★ ★ ★

Looking for what has to be the world's cheapest off-air alarm? I ran into this recently and marveled at the ingenuity.

An engineer had taken an old Lafayette FM stereo tuner and bridged a relay across the little lamp that lights up the "STEREO" indication. The relay went to a warning light and piezo alarm.

If the FM signal died, or for that matter, if the STL was lost, the pilot would not be detected, the STEREO light would extinguish and the relay would drop out, sounding the alarm.

★ ★ ★

Speaking of FM, owners of CCA FM-20,000E series transmitters should add checking the shunt resistors that are across the overload relays to their periodic maintenance.

One of my associates, Scott Taylor,

had a situation recently where the PA OVERLOAD shunt resistor opened.

The "change" in value caused the relay to "sense" an increase in overload current, shutting things down. After finding nothing wrong, Scott turned his attention to the relay itself. Though the resistor looked fine, replacing it eliminated the problem.

Overload relays can be a life saver, but in cases like this, you can pull your hair out chasing a non-existent problem.

★ ★ ★

I spoke to the folks at CAIG Industries, the manufacturers of Cramolin and other contact cleaning products recently.

I was reminded of their Gold wipes, little 1x1 squares of cloth impregnated with a gold plating restorative. The Gold wipes may be a little more expensive than a pencil eraser, but considering that some erasers have sulphur compounds in them, you may be doing your gold card-edge contacts more harm than good by not cleaning contact edges with the proper product.

★ ★ ★

Here's one for the textbooks! Take an ITC Series 99 cart recorder, the one with the ELSA function that erases the cart, locates the splice and aligns the heads for proper azimuth. The machine works great, except when it's in the "splice find mode" of the ELSA cycle.

As soon as the machine starts to ramp

up into its fast forward splice find mode, it stops — like it found a splice. The problem is, there was no splice. It would "splice locate" any cart at the same spot, approximately a half-second after switching into the splice find mode.

While looking over the manual and getting ready to spend the evening with the machine, I was checking the alignment of the splice finding coil, along with what seemed to be 100 other possibilities, when I noticed the pinch roller. Talk about looking for the simple things — the bottom of the pinch roller had a little 1mm notch chewed out of it. I held the "cart-in-place" switch closed and pressed PLAY. With my other finger resting on the splice-find arm, I could feel the ever so slight thump-thump-thump as the pinch roller made contact with the capstan.

ITC's splice finding circuitry depends on the slight "wobble" caused as the splice passes between the pinch roller and the capstan. The same wobble was being produced by the bad pinch roller, and being sensed as a splice. A new pinch roller solved the problem — and saved my evening.

□ □ □

John Bisset is a principal in Multiphase, an engineering services company based in Washington, D.C. He can be reached at (703) 323-7180. Tips for this column are encouraged. Fax them to (703) 764-0751, or on line at WRWBENCH@aol.com

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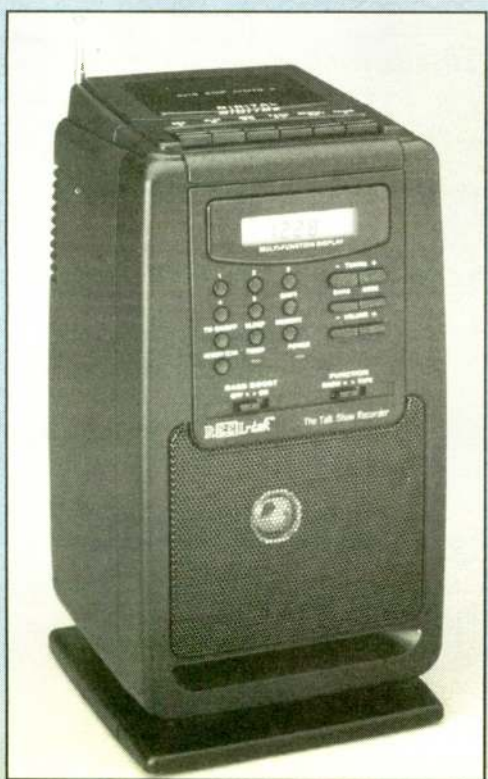
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INTERNATIONAL UPDATE

International Shortwave Survives

Shortwave Broadcasting Is an Effective Way For Countries to Reach out to the World

by James Wood

LONDON Is international shortwave broadcasting in terminal decline?

Is this classic transmission medium in danger of being replaced by emerging technologies like Digital Audio Broadcasting (DAB) and WorldSpace Radio?

If these questions were not already being asked, the near-fatal budgetary cuts meted out to Radio Canada International

and to other international broadcasters over the past two years are sure to raise them.

I have been involved with and studied international shortwave (SW) broadcasting for more than five decades. I have seen how world politics has acted as a spur to the technology and how SW reaches millions of people around the world. I do not believe the medium is in danger of being replaced by another form of delivery.

I cannot foresee any technology — existing or in development — that can even come close to achieving what SW can do: span massive distances to be heard by means of inexpensive, ubiquitous receivers.

This is not to say that there will not continue to be advances in this 70-year-old science. However, there will always be a need for a medium that enables powerful, and even not-so-powerful, nations to project foreign policy around the world.

Politics will continue to spur the improvement of the technology, and international broadcasting in the high-frequency spectrum using the ionosphere

will continue to be an important gateway to the world.

The post-Cold War world is already seeing signs of the new order of priorities for SW broadcasters. Major broadcasters, like the BBC World Service (BBC WS), the Voice of America (VOA), Deutsche Welle (DW), Radio France Internationale (RFI) and others, collaborated during the Cold War. Nowadays they are, in a sense, competing for the same world market.

Strongest signals

SW listeners gravitate to the strongest signal in the broadcast band. If they like what they hear, then they may become dedicated to a particular station.

Countries strive to maintain a strong signal in areas of the world where they have a particular interest. The BBC WS is building a powerful SW station in Thailand and has spent UK£30 million to build a new relay station in Oman.

RFI and DW are both increasing their SW transmission capacities: France and Germany have many powerful business interests around the globe.

Another reason to continue SW broadcasts is to promote the culture of a nation to the rest of the world, although other forms of media can be used for this purpose too.

As new technologies emerge, there is a tendency to believe they will threaten the survival of the old. However the history of communications media proves the opposite is often the case.

For example, when telegraphy by cable was introduced in the early 19th century, newspapers feared for their survival. But worldwide telegraph capabilities brought about a growth in newspapers by facilitating syndication.

Similarly, when news of Marconi's transatlantic wireless transmission reached the stock exchanges in London and New York, cable company stocks declined in value. But cable outlived long-wave wireless telegraphy.

Keep pace

When the Atlantic was bridged by SW in the late 1920s, it did not replace the telegraph cable. In fact, cable traffic expanded to keep pace with newer means of communication.

In the case of SW broadcasting in the high-frequency spectrum, the introduction of global communication via geostationary satellites raised doubts about the survival of SW. That was nearly 50 years ago.

Instead, satellite communications boosted the effectiveness of SW broadcasting. The VOA was able to ring the world with SW transmission bases to which it delivered programs by satellite. Before this, programs were distributed by a combination of landlines and SW circuits using 10 kW communications transmitters.

Keeping pace with emerging technologies, VOA was the first foreign-service broadcaster to introduce a digital audio system for programming. This began in 1991, although experiments were conducted for a while prior.

In the past, the VOA used 5-meter earth stations to deliver a single audio channel; now it can use digital technology to transmit CD-quality signals from a much smaller satellite earth station.

With the easing of world tensions after the Cold War, the BBC WS, DW, VOA and others turned to local AM and FM stations to rebroadcast their programs in

continued on page 24 ►

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PIONEER PROFILES

Debating over the Oldest Station

by Barry Mishkind

TUCSON, Ariz. It has an official state marker proclaiming it to be "The Oldest Station in the Nation." It can even trace its roots back to the earliest part of the century. Does this mean WHA(AM), Madison, Wis., was the first to broadcast?

This interesting question drives many discussions among broadcast historians. As the 1920s progressed and broadcasting began to catch the public fancy, few stations worried about who was first. Indeed, as more and more stations filled the few open frequencies, their primary concern was staying on the air and not losing any of their time share allotments.

In early 1923, 576 stations were sharing the two available frequencies. By far, the majority — nearly 40 percent — were run by radio manufacturers and dealers. Just edging out newspapers and publications as a category, 72 stations were listed as being operated by educational institutions. Of these, perhaps the oldest is WHA.

In a booklet issued in 1969, the University of Wisconsin correctly calls WHA a Radio Pioneer. Commenting on the debate over the definition of oldest, the booklet refers to the "controversial puzzles: When does an 'experiment' become a 'broadcast'; and 'What do the words 'regularly scheduled' mean?"

It was quite interesting to see the author of the booklet take the high ground and declare, "We were all responsible for the birth of broadcasting."

Those questions of definition are certainly worth discussion, and yet, such discussion might cause us to lose sight of the tremendous industriousness exhibited by the pioneers back then at the beginnings of broadcasting. Whether in living rooms, bedrooms, laboratories or wherever, the fact is many individuals struggled long and hard to overcome the challenges of sending voice and music through the airwaves. Parts stores were few and far between.

The University of Wisconsin physics department started wireless telegraphic experiments under the direction of Professor Edward Bennett in 1902. In 1914, Bennett sought to license the station under the Radio Act of 1912. The Department of Commerce (DOC) issued the experimental license for operation as 9XM. The following year, Professor Earle Terry took over operation of the station.

Over the years, the code transmissions on the spark transmitter gave way to radiotelephony. This was facilitated by Terry and his students developing their own homemade triode tubes, with which they were able to achieve successful transmissions of music, and later, voice.

However, many of those early power tubes were rather feeble and unreliable,

Sometimes the students had to work through the night to have enough spares ready for each day's use. Though some worked well, others burned out after only a few minutes of transmission. Overall, though, the tubes were so successful that

the University of Wisconsin became well known as a source for other institutions seeking tubes for their transmitters.

At first, fidelity was not the primary concern. Student Malcolm Hanson recalled that at first, 9XM played "only Hawaiian music because any other kind would become distorted and tinny." Undaunted, Terry prophesied "... the time will come when wireless receivers will be as numerous as bathtubs in Wisconsin homes."

Like 8XK, 9XM was permitted by special arrangement with the US Navy to stay on the air during WWI after other stations were ordered off the air. That helped provide communication between Navy installations and vessels, especially in the Great Lakes region. That also provided a basis for WHA's claim of "oldest continual operation in the nation."

After the war, broadcasts of weather and stock markets were set up on a regularly scheduled basis. Converted to the new "Commercial" license status and granted the call sign WHA on January 13, 1922, the station was issued license number 276 by the DOC. Professor William Lighty was tasked with the shift in the emphasis of the station from scientific development to "taking the University to the people."

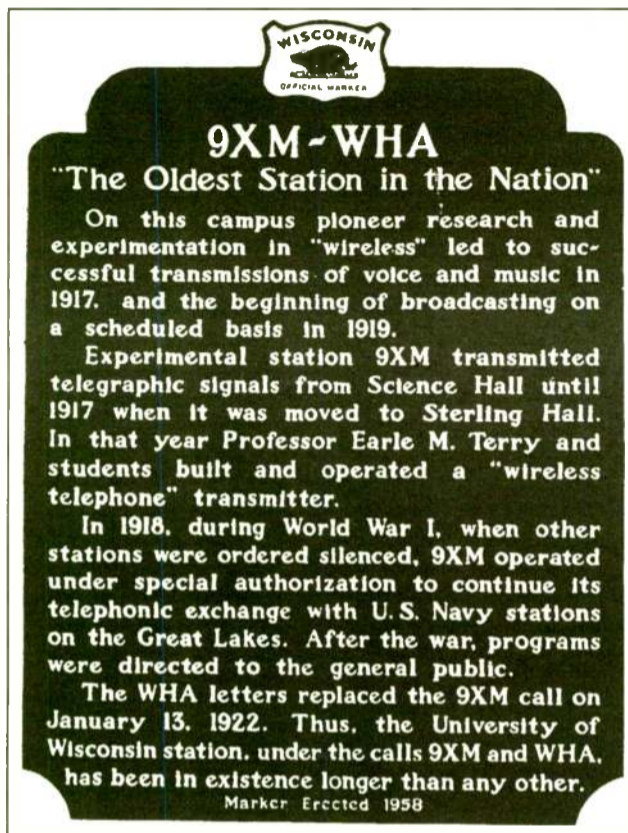
To meet this need, WHA began to develop various programs of interest to farmers and homemakers. The

"Wisconsin School of the Air" and "College of the Air," among other efforts, helped many rural listeners gain an education or learn more about what was going on in the state. In particular, the "Political Education Forum" was noteworthy, offering free air time to all qualified candidates for statewide office.

When the DOC started to expand the broadcast band, WHA moved for a time to 1090 kHz. Later moves mandated by the DOC and the Federal Radio Commission (FRC) took WHA to 560 kHz, 940 kHz, 900 kHz, 570 kHz, 940 kHz again, and finally in 1941 the FCC moved it to 970 kHz, where it has been ever since with 5 kW during the day.

Nevertheless, it was not always easy for WHA. In the mid-20s, there was a lot of pressure toward developing radio as an advertising medium. University stations

continued on page 22 ▶



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Foreign-service Broadcasting

by James Wood

LONDON Foreign-service broadcasters place great emphasis on achieving good audibility in all target zones.

One way to increase audibility is to radiate a single sideband (SSB) signal, which, in theory, can improve the signal-to-noise ratio (SNR) by up to 12 dB.

SSB also provides other advantages in selective fading, while enabling better utilization of already overcrowded broadcast bands in the high-frequency spectrum.

Theoretically, if SW broadcasters can use only one sideband to carry the same program as a double sideband, the

broadcast bands could accommodate twice the number of channels.

In 1979, the World Administrative

would render millions of SW receivers virtually useless.

Passage of the resolution encouraged

WARC delayed full implementation of SSB until 2015, much to the relief of broadcasters.

Radio Conference (WARC) passed a resolution urging broadcasters to help improve spectrum utilization through the use of SSB. Broadcasters were reluctant to welcome this because it

transmitter manufacturers to develop high-power transmitters with SSB facilities, but broadcasters, concerned about losing listeners in developing nations, remained opposed.

To overcome the problem of losing millions of SW listeners, WARC-89 moved to adopt a form of compatible AM. This would allow ordinary AM receivers with SW capabilities to receive the SSB transmissions.

This seemed to solve the problem. Transmitter manufacturers went ahead and developed transmitters with a range of options.

Because of the hundreds of high-power transmitters around the world that could never be made suitable for SSB, the International Telecommunications Union (ITU) and WARC agreed to delay full implementation of SSB until 2015, much to the relief of broadcasters.

By 1989, a handful of European broadcasters, including Radio Austria International and Radio Norway International, had begun experimental SSB transmissions.

However, the BBC World Service, the Voice of Russia, the Voice of America and other major broadcasters have yet to follow suit. These broadcasters command large audiences, and they want to keep them.

Today, the situation remains unchanged. Broadcasters and manufacturers both have to grapple with how to produce a SW receiver that is vastly superior to the average AM receiver.

The next generation of receivers must include extremely high frequency stability, SSB capabilities and sophisticated digital tuning, while remaining as functional as possible for listeners in developing nations.

Moreover, these new capabilities must be within the financial reach of citizens of the poorest nations in the world if the introduction of SSB is to be a success with major broadcasters.

Debating Radio's Age

► continued from page 21

were often left behind, as less important in the commercially desirable evening hours, and for much of its life WHA was a daytime only station, forced to fight for its share of airtime. Finally, in the 1980s, nighttime service was added at several post sunset levels, down to 44 W overnight.

Over the years, WHA has continued to be active in serving the state with programs of interest to persons of all ages and interests. Using WLBL-FM at Stevens Point, Wisc., to reach other sections of the state, FM, and later TV, the University of Wisconsin has set an enviable record of broadcasting for well over seven decades. So, whether we credit WHA as 74 this year, 79, or even 94, its place as true pioneer broadcaster is secure.

□□□

Please share with us anything that would help illuminate the pioneer stations and the men who built them. Information can be sent to: Barry Mishkind, 2033 S. Augusta Place, Tucson, AZ 85710.

Barry Mishkind can be reached at (520) 296-3797, and invites e-mail to barry@broadcast.net. You can find his home page at <http://www.broadcast.net/~barry>

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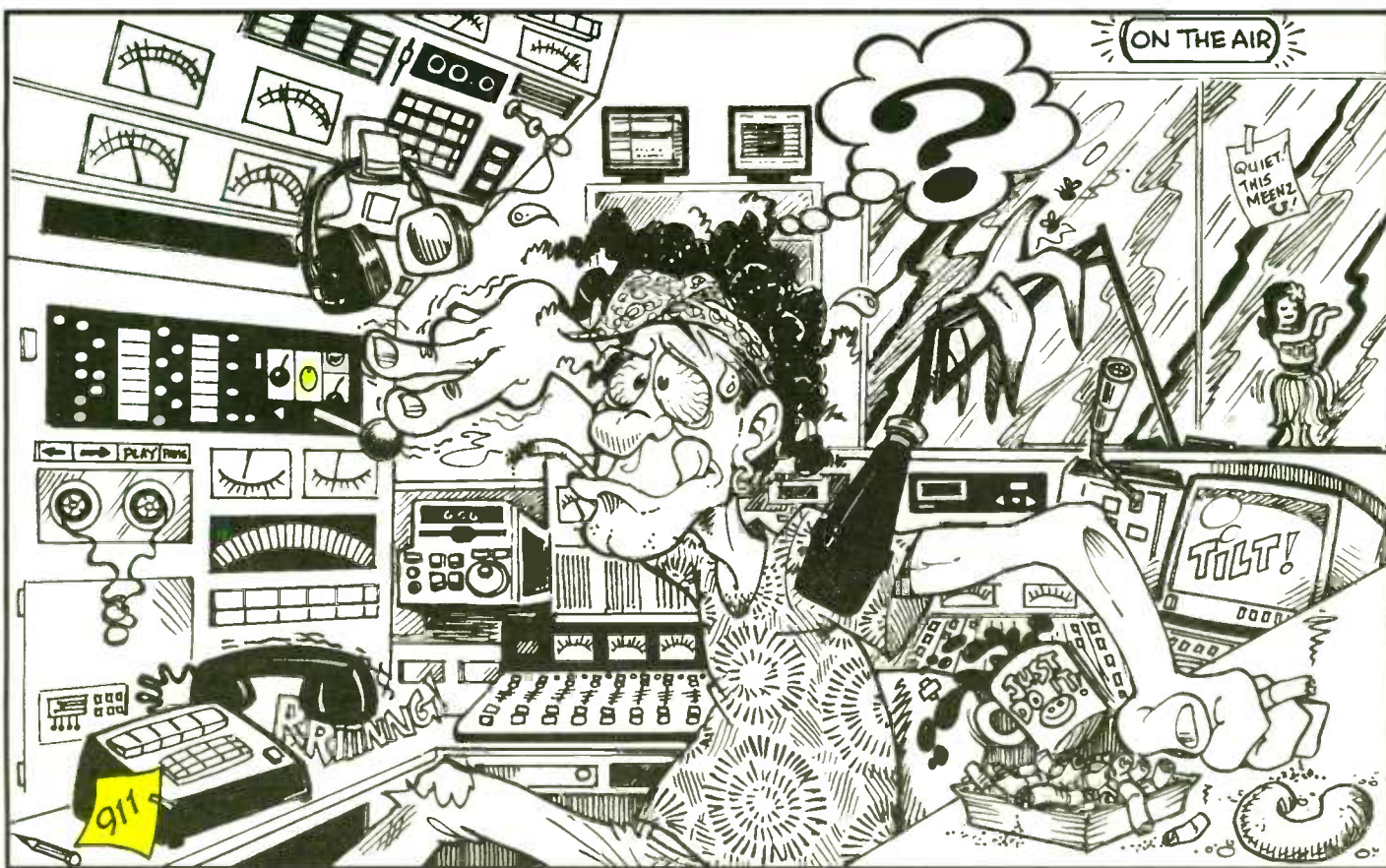
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 **HARRIS**

Shortwave Survives

► continued from page 20

targeted countries. This is a cost-effective way to increase audiences without building more SW transmitters, but it does have limitations and drawbacks.

The cooperation of the host country is required, for example, and if it does not like what you are telling its citizens, the host country can revoke the invitation to broadcast there.

Western broadcasters are quite aware of the possibly volatile changes in the political scenes of some of their new markets.

For this reason, and others, all international broadcasters must maintain a means of reaching people in countries as

diverse as those in the Caribbean, Latin America, Africa, the Middle East, Asia and the former Soviet Union.

Politics will continue to spur the improvement of the technology.

SW is also being used to reach nations where large numbers of expatriates live. Jordan, for example, has a number of expatriates living in North America. To provide good audibility over the

15,000 kilometer path from Al Karanah. Radio Jordan uses two 500 kW SW transmitters that can be phased to feed an HR 8/4 high-gain curtain antenna.

Another role for SW broadcasting in Europe is to keep travelers in touch with

news from home. However, the rapid growth of services such as CNN, which has satellite feeds to most major hotel chains across Europe, has all but replaced shortwave in this regard. Still, a small, portable SW receiver remains fairly popular with business travelers throughout the Middle East.

According to Daniel Bouchont of RFI, DW and Radio Nederland Wereldomroep are now using SW to reach the large numbers of Dutch and German tourists who migrate to Southern Europe for their summer holidays.

□ □ □

James Wood is a consulting engineer in broadcast transmission and a writer on shortwave and high-power AM based in Bracknell, Berkshire, England. Contact him in the U.K. at telephone: +44-1344-54938.

65 Years Ago

Reprinted from Radio World
July 18, 1931.

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

World Congress Tells Results

Copenhagen.

At the conclusion of the International Radio Congress at the Christiansborg Palace here it was announced that definite conclusions had been reached on eight points, namely, comparison of frequency standards, standardization of wave meters, reduction of disturbances within common wave bands, methods of annulling foreign currents in receivers, further organization of commercial radio telephone services between movable and fixed stations, stabilization of wave bands of senders for various radio electrical services, recommendations regarding the latest developments of technique, and reduction of radio disturbances general.

The congress will make recommendations to the Madrid congress to be held in 1932 and the results obtained in Copenhagen will serve as a basis for deliberation in Madrid. One of the unsettled problems is more effective utilization of the available wavelengths, which will be considered by the national committees and later to be acted on by the Madrid congress.

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Studio Sessions

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LINE OUT
CD Dyes:
Blue vs. Gold
See page 31.

PRODUCT EVALUATION

Denon Mixer Has Turntable Feel

by Alan R. Peterson

WASHINGTON DJ mixers and radio production consoles are designed for different purposes and normally are not considered interchangeable.

Still, Denon created a clever little mixer you might find useful if your station does any urban "scratch" music mixing for air or in production. The Denon SMX-2000 Digi-Scratch mixer is a three-input, 5U rack-mountable mixer with clean specs and a nifty digital sampler that you are going to have fun using.

DJ mixers often come with rudimentary sampling capability but usually are based around "telephone chips," commonly found in tapeless answering machines. These have limited bandwidth and high noise figures.

The SMX-2000 sampler is built around a higher quality 16-bit circuit with Toshiba chips handling A/D and D/A functions. A fistful of 4570 chips performs low-pass filtering very admirably; no clock noise artifacts leak through to the SMX-2000's output.

Playing back a sample is fun. Check out the wheel in the upper left corner of the unit. This functions as a miniature turntable that lets you "scratch" the sample backward, forward or both. Sample recording time can be adjusted from five to 16 seconds with the Pitch slider. This lever also controls sample playback pitch.

While lacking the ballistics and response of an actual analog turntable, the wheel offers a degree of tactile control over

sample manipulation and is a gas to operate. Spin the disc fast or slow, and the SMX-2000 responds in kind.

effect sound.

Do not expect extensive editing features. DJ mixers are designed to grab



The Denon SMX-2000 Digi-Scratch Mixer

In comparison, DAW jog wheels and data dials normally are optical data encoders and have a "clicky" feel to them. The wheel on the SMX-2000 feels more like a free-spinning pot. Grab it once, and you are hooked.

Denon's big trademark green and red buttons found their way onto the SMX-2000. They are used here to write and play back a sample the way most conventional DJ samplers do.

A Write Enable button sets up the sampler to capture a slice of sound. Hit the green to start recording, then press the Write button again to stop. The red button is a Stutter key for classic sample

a sample on the fly with little or no trimming. Good jocks make this look easy.

Denon did include some basic editing via a Position button that writes a marker at the start of the sample. This works with the red Stutter key to play a sample from a chosen point.

Two-band EQ is included on the sample

channel and all inputs. It is very easy to go overboard with these; the tendency to add fat bottom and shrill highs is all too common. Practice some restraint here.

Gripes? Only one. Sample playback is in mono. An especially wide, spacious sample will go flat when summed. And while not an actual gripe, I would have liked seeing a footswitch jack to remotely fire the sampler.

Mixing up

The rest of the SMX-2000 mixer is as basic as DJ boards go, but it still does the job. All three channels have switchable inputs and two-band EQ. The two RIAA phono inputs are internally preamped, and the unbalanced mic channel scopes out nicely to 25 kHz.

Denon put in an effects loop, allowing connection of a stereo processor such as a limiter. A separate processor line for the mic channel lets creative jocks plug in a vocal processor such as a reverb or pitch changer.

A nice feature on the back panel is a set of two main outputs. In a club setting, this can be for Main and Zone outputs. In a studio, these can feed Monitor and Line Out connections.

The LED meter is accurate, very easy to read and came properly calibrated. A single Mono output jack on the rear normally feeds a subwoofer system in a

continued on page 28 ▶

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Audio Shareware Making WAVs

by Val Davis

EMMETSBURG, Iowa Ten years ago I was digitally recording and editing on a Synclavier from New England Digital. This was the very first hard disk recording/editing system, and it sold for more than \$500,000.

Two years ago I was working on a Session 8 from Digidesign. It was — and still is — a very powerful recording/editing system, and it sells for more than \$5,000.

This month I downloaded two pieces of shareware off the Internet. They are Cool Edit and Goldwave.

Low-priced power

Both pieces are Windows-based audio editors, able to record and edit two-track stereo. They both feature built-in audio processing, and — get ready for this — the basic versions of each sell for less than \$75. These two pieces of software could very well redefine the cost of two-track production in every small-market station across America.

If nothing else, they allow anyone to use and understand the basics of digital audio editing before taking on the big workstation at the studio.

I am not going to compare the two pieces because they are both remarkable and both have their own unique strengths. Instead, I will give overviews of each program.

Cool Edit is from Syntrillium Software in Phoenix. It is beautiful to look at and has an easy-to-use interface.

As any Windows program, you start by selecting "New" under the File menu. You are then prompted for the sample

rate, mono or stereo recording and whether you want to record 8- or 16-bit resolution.

Once the file parameters are defined,



Cool Edit works like any tape recorder.

There is a transport control with Record, Play, Stop and Pause functions. You can monitor your audio input with a bar-like display at the bottom of the screen.

If you make a mistake in the recording, just back up and start again. Then highlight and delete the mistake afterward.

Once you have successfully recorded a cut, it is time to begin the fun.

Cool Edit lets you add distortion, echo, delay, reverb, flanging, EQ, compression or noise reduction. Most functions require some transform time to accomplish, especially reverb.

If you are used to the instant gratification of sending audio through an outboard processor, you may find the wait to be inconvenient. Very slow machines make it almost unbearable, but stay with it. You will not be disappointed.

In addition, Cool Edit performs time compression. For the price Syntrillium is asking, this is rare.

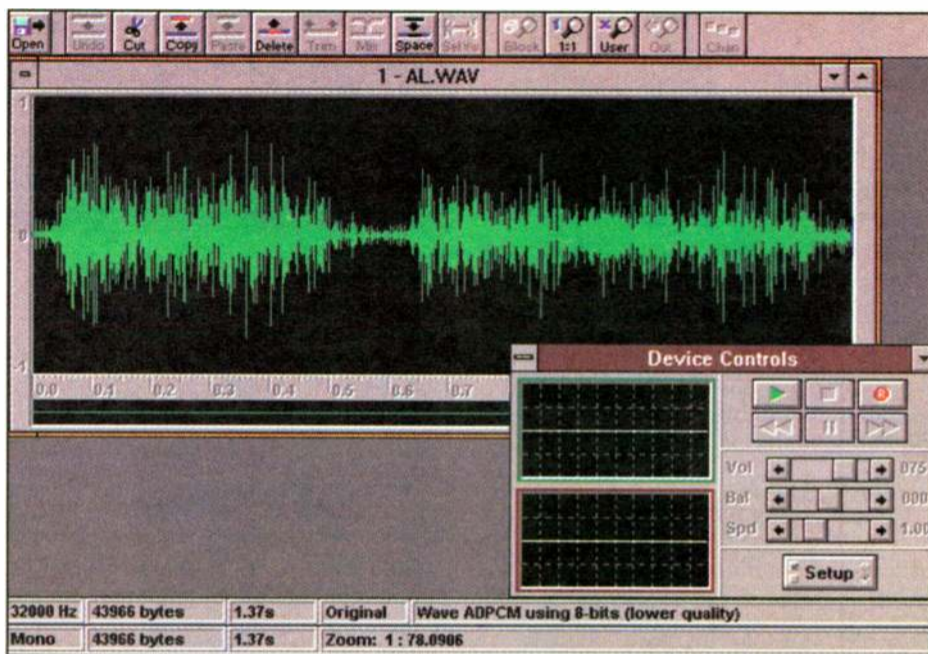
Say you are recording a :30 second piece and your actual time comes out to :33 seconds. No problem, just adjust

playback speed. Pitch remains unaffected. This is one of the neatest tricks I have seen in inexpensive software.

You also can slow audio down without affecting the pitch. For more fun you can raise the pitch without affecting the playback speed. The possibilities are endless.

To remind you, you will be sitting through a few moments of transform time. But it is still faster than noodling with a varispeed dial on an analog deck.

Once your cut is recorded and edited, you can save it in one of 16 available formats. These include several types of ADPCMs, WAV, VOC, VOX, RTF, and surprisingly, MPEG Layer II. Again, for the price, this



is pretty remarkable.

This software is exceptional, and there are lots of great upgrades on the way.

Goldwave is another very impressive piece of software. It is similar to Cool Edit in operation, but I think Goldwave was first.

Again, select File, then New. Now input the information on sample rate, mono or stereo, 8- or 16-bit and overall length of the piece you intend to record.

Once the info is entered you are ready to record. You can record, delete any mistakes and begin editing.

Faster file access

Goldwave is a little faster with its file access time, but it does not give us as many options for file formats. However, Goldwave offers a couple of neat effects that are unique.

Features like Mechanize and Doppler add a robotic touch to the track. You can also add echo, flange and distortion.

Goldwave will allow you to pan your tracks. You can work with the left or right tracks individually and also insert cue points for "punches."

As with Cool Edit, you can save your

audio files in many different formats. These include WAV, VOC, AU, SND and RAW for PC; AFC and AIF for Apple and IFF for Amiga.

Cool Edit and Goldwave represent new benchmarks for reasonably priced computer-based audio production.

With some two-track reel machines still costing around \$3,000 and most digital editors still well over \$1,000, these two pieces of software bring full digital recording and editing capabilities to the broadcast community for under \$75.

Naturally, this presupposes you already have a computer ready to load either program into. As a minimum, you will need at least a 486 with 8MB RAM and a Sound Blaster or Sound Blaster-compatible sound card.

To download either COOLEEDIT or GOLDWAVE, go to <http://www.netins.net/showcase/grainbin> and click on the Digital Editor button.

Remember, these are coming to you as shareware. If you like either program and wish to continue using them, register your copy and pay for it. By doing so, you will receive manuals, support materials and product upgrades when available.

You can then choose your software, download it and enter the world of digital editing.

□ □ □

Val Davis is a producer, writer, broadcast automation consultant and a father of five. Reach him at vdavis@worf.netins.net or at (712) 859-3736.

Major-League Pitch Control.



Whether you need your music high and tight or low and slow, the Marantz PMD320 and PMD321 CD players are certain to brush you back. That's because the PMD320 and PMD321 can change the speed and pitch of CDs. Which is pretty remarkable for CD players.

For instance, they're perfect for adjusting the pitch of soundtracks to match the vocal range of performers. Or changing the tempo of music to match choreography. And that makes them invaluable to everyone from choral directors to DJs to aerobic instructors.

Both models are pro-level CD players. With features such as a fader start trigger, an all-metal 2U rackmount chassis, (and on the PMD321, a cue-to-music feature and balanced XLR outputs) you simply can't find something comparable in a consumer retail store. Plus, their out-right versatility and convenience is simply unmatched.

So when your music needs a major-league change-up, count on a major-league CD player: Marantz.

Both the PMD320 and PMD321 Pitch Control CD Players offer:

- ± 12% pitch control in .1% increments.
- CAL key for quick speed calibration.
- Fader Start Trigger input so an engineer or DJ can start a track simply by bringing up the associated fader.
- All-metal 2U rackmount chassis.
- 32X oversampling and 4th-order noise shaping.
- Cue and review keys for audible searching.
- Connection to the Marantz CD-R system via the IEC958-II digital interface for convenient digital copies of both music and track information.
- 10-key direct track access.
- Optional wired remote control. RC-5 bus for IR or third-party remote.

The PMD321 adds:

- Cue-to-music feature for starting a track from the first bit of musical information, rather than at the pause or subcode start points.
- +4 dBu balanced XLR outputs.

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World Radio History

PRODUCT EVALUATION

Dual Cassette Deck from Marantz

by Chris O'Brien

MANASSAS, Va. Marantz is a name widely known in broadcast circles and for years has manufactured quality, reliable equipment. The PMD500BL stereo double-cassette deck is yet another in a long line of outstanding Marantz products.

I was quite impressed with this deck and highly recommend it to other broadcasters. But don't take my word for it; let's just look at the facts.

Features

While the Marantz PMD500 offers the standard features such as Dolby HX-Pro, Dolby B/C noise reduction and some cool-looking digital peak indicator lights, it also offers a feature I was particularly excited about: parallel recording.

While many other manufacturers offered this option in the past, the quality and consistency of the recordings from some of these decks has been rather spotty. The PMD500 is the exception.

I found the parallel mode quite useful when recording cassette dubs of commercials for clients, agencies and sales representatives. Numerous cassettes were recorded in parallel mode with no negative results.

Kids, do not try this at home.

In addition to parallel recording, the PMD500 offers Normal/High Speed dubbing from deck A to deck B. Once again I was pleased to discover that I had no problems with the end product after dubs were made in both modes.

Also prominent in the "cool category" is Programmed Playback. With this function, the user can select up to 16 musical numbers located between the first and 15th positions on a tape and play them back in desired order.

Programmed Playback works hand in hand with the Quick Music Search (QMS) function. Musical tracks are counted by detecting the blank spaces between them. A "dead space" of at least five seconds is required, otherwise the QMS will not work properly.

Put through the paces

When reviewing a new product, I always like to get it to do things it was not designed to do. Kids, do not try this at home.

I was impressed enough with the quality of recordings coming out of the PMD500. I decided I would attempt the unforgivable: playing a cassette on the air.

Yes, I feel your shudders. Normally I would scoff at the idea of airing a cassette recording, especially up against the sound of WRCY-FM's all-digital facility.

Nevertheless, I thought this test would prove most fruitful.

I dubbed "Standing Outside the Fire" by Garth Brooks onto a metal grade cassette then waited for my opportunity. Each afternoon I host an all-request show and, sure enough, the Garthman turned up one day on the request list.

I must say I was surprised by the quality of the playback. There was a noticeable

difference between the recordings from the hard drive and the Marantz when auditioned prior to airing. Once the

cassette audio traveled through airchain processing and into our broadcast monitor, the difference was very minimal.



The PMD500BL stereo double-cassette deck

Let me say here I do not endorse using this deck — or any other — on the air in a broadcast situation. But the record and playback quality of the PMD500 merits a prominent place in the equipment rack of any production room.

While it may seem the analog cassette will go the way of the 8-track cartridge, that day is still very far in the future.

The fact is, broadcasters still need basic equipment like cassettes and decks to get the job done. Cassettes are used on a daily basis to dub spots for clients and agencies, bring specs out to prospective advertisers ... even run off a few airchecks.

Stations are often tempted to buy or trade out inexpensive consumer decks at the neighborhood audio superstore. The PMD500 is by no means inexpensive —

continued on page 28 ▶

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Denon 'Scratch' Mixer

► continued from page 25

club setting but can be used for anything in the studio. There are features that broadcast users hardly ever need but Denon included for the benefit of club and scratch jocks. After all, they will be the primary users of the SMX-2000.

A field-replaceable Crossfade slider couples channels 1 and 2 together. Radio jocks normally use the channel faders only but should still find this useful.

Same goes for the Talkover switch. Throwing this toggle drops the music level -14 dB so the jock can be heard above the mix. Radio jocks simply ride the gain with faders. Still, it is there and is actually very handy for doing no-brain gain riding.

If you ever thought those little goose-neck lights that plug into disco mixers were cool, you will not be disappointed. The SMX-2000 has a BNC connector for such a lamp. Denon designed the SMX-2000 specifically as a performance mixer for club and scratch mixmasters. But there are enough broadcast applications to suggest a good look at this mixer.

To accommodate live DJ "mix" shows, lots of major market urban stations keep a set of turntables and a mixer set up in the main studio as an adjunct to the main console. An SMX-2000 would be right at home here.

The unit was not intended to be a production mixer and would not be your first choice for the main room. But every

station has — or should have — a booth for quickie mixes and voice projects to take the load off the main room.

In this respect, the SMX-2000 should

Product Capsule:
Denon SMX 2000 Digi-Scratch Mixer

<p>Thumbs Up</p> <ul style="list-style-type: none"> ✓ Heavy-duty construction ✓ 16-bit sample playback ✓ Digital turntable ✓ Easy-to-read LED meter 	<p>Thumbs Down</p> <ul style="list-style-type: none"> ✓ Mono sample playback
--	--

For more information, circle **Reader Service 9**

be given some thought. It is relatively inexpensive and durably built, and that

sampling feature is just too much fun to ignore.

If aiming for a booth in an ultra-small space, outboard components such as a compressor/limiter and budget digital reverb can be connected to the effect loops to give the SMX-2000 a sound approaching your main room.

Home studio mixer? Sure. A PC or Mac with a stereo soundcard coupled with the SMX-2000 can form the basis of a nice miniature home hip-hop music workshop.

I would love to see Denon (or any company for that matter) put a Ramp feature on that Talkover switch. Key it in and the gain drops its 14 dB over a short period; say half a second. Take it out and the audio level recovers over a one-second period.

Trimmer controls accessible from the bottom would allow the jock to tailor his own suppression and recovery curve. Just a thought.

The sampler cannot be triggered by MIDI. But then, most samplers cannot be freewheeled the way the SMX-2000 can.

It was suggested the wheel lacks the heft of a classic turntable. There is no room inside the chassis to mount a weighted flywheel to offer that kind of feel. But why would you want that? A CD-sized wheel with heft would be incongruous and would be difficult to control.

Like any other station purchase, weigh your needs carefully. But do treat yourself to a spin around the block on that sampling wheel. That feature made me like the Denon SMX-2000 enough to keep it a week longer than the company wanted.

□ □ □

For more information, contact Denon Electronics at (201) 575-7810 or circle **Reader Service 9**.

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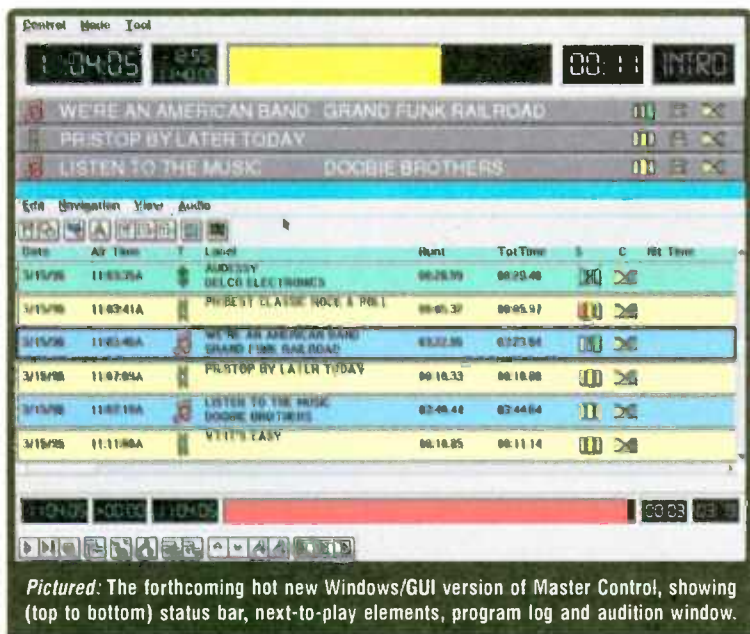
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GM, WTMX/Chicago



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Marantz Dual Deck

► continued from page 27

about \$640 suggested price — but it beats anything you will find in the hi-fi places.

The Marantz PMD500 stereo double-cassette deck is ruggedly built and has the Marantz name and registration backing it.

□ □ □

For more information, contact Marantz/Superscope Technologies at 708-820-4800 or circle **Reader Service 110**.

Chris O'Brien is program director for WRCY-FM, Washington. He can be reached at (703) 631-2577 or by e-mail at thndr107@erols.com

Visit the Thunder 107 Web Page at www.thunder107.com/T107

Product Capsule:
PMD500BL Cassette Deck

<p>Thumbs Up</p> <ul style="list-style-type: none"> ✓ Easy operation ✓ Parallel recording ✓ Excellent quality 	<p>Thumbs Down</p> <ul style="list-style-type: none"> ✓ Pricey
---	--

For more information, circle **Reader Service 110**



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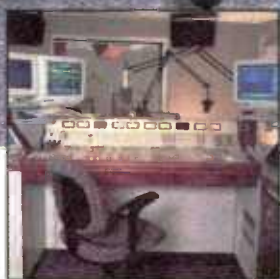
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Circle (56) On Reader Service Card

LINE OUT

Blue vs. Gold: CD Dye Technology

by Bruce Bartlett
with Jenny Bartlett

ELKHART, Ind. My two recent columns on recordable CDs (CD-R) generated a lot of phone calls. Apparently, many of you want to burn your own CDs.

This month I will look further into the topic and explain some of the fine points.

Spiral groove

Inside a blank CD-R disc is a layer of dye in a preformed spiral groove. The laser burns pits in the dye.

Two types of dye are in use: blue and gold. The blue dye, which appears green, is cyanine. The gold dye is phthalocyanine.

What are the differences? Mitsui claims that gold dye is more durable and reliable than blue dye when exposed to heat, humidity and light.

According to information provided by Mitsui, "Unlike a cyanine-based CD-R, which shows degeneration from continuous exposure to light and heat under carbon arc lamp testing, Mitsui's phthalocyanine-based CD-R remains durable and remarkably stable throughout the entire test exposure time of 180 hours."

The projected longevity of the Mitsui CD-R was tested by the Orange Book Standard for Block Error Rate (BLER) set by the industry for CD-Rs.

Consistent

"The phthalocyanine-based Mitsui CD-R was subjected to 80 degrees Celsius and 85 percent relative humidity for over 1,000 continuous hours, the equivalent of more than 100 years under normal use. The Mitsui CD-R was consistently able to retain data and outperform the Orange Book Standard."

According to Dana Paker in the Incat Systems Web pages, "Cyanine (blue) dye is the de facto standard; the Orange Book was written based on the original cyanine dye discs from Taiyo Yuden."

Most CD Recorders are optimized for cyanine dye. Cyanine discs are compatible with a wider range of laser powers.

Paker continued, "Phthalocyanine (gold) dye has performed better than cyanine dye in accelerated age testing, and may work better in higher-speed recording (which requires higher laser powers)."

"However, all of these differences aside, it appears that in most cases, the two types of discs perform in essentially the same ways — it is at the extremes and in the worst-case scenarios where these differences appear most marked."

Speed and space

Most CD-R writers can burn discs at two or four times normal speed. Contrary to intuition, high-speed CD-R writers create discs with fewer errors.

How can this be? At high speeds, the laser burns for a shorter time and so has less time to drift.

Also, the rapid high-power heating of each pit creates sharper pits, which are more readable.

When you prepare an audio program for transfer to CD, you first have to dump the audio to hard disk. Audio consumes a lot of space. While a 74-minute data CD-ROM holds up to 650MB, a 74-minute audio program fills about 781MB.

Here is how to calculate the disk space

of an audio program sampled at 44.1 kHz, 16 bits.

This will get a little busy so follow along carefully: 44,100 samples per second x 2 bytes per sample x 2 channels =

**Contrary to intuition,
high-speed CD-R writers create discs
with fewer errors.**

approximately 17KB per second, or 10,560KB per minute.

That works out to about 11MB per

minute of digital audio, 634MB per hour, or 781MB in 74 minutes. Additional bytes are used for error correction.

According to Incat Systems, the transfer rate of audio is 172KB per second, not

176 as calculated above.

In any case, a hard drive of at least 1GB is recommended. Double that if you want

to write an image file to disk.

An image file is a copy of all the audio tracks, in order, that you will transfer to CD-R.

Here is some advice on preventing data errors when you burn a CD.

Any data interruption during CD writing can cause errors. Before you record, turn off any TSR programs, screen savers, networks, alarms, reminders and incoming faxes.

Defrag the hard disk after recording the WAV file so the disk can read faster. Avoid getting fingerprints on the blank disc.

Most hard disks do a thermal recalibration every so often. This pauses the hard-disk operation up to 1.5 seconds, which causes errors in CD writing.

Some drives, such as Fujitsu and many

continued on page 32 ▶

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Preparing and Writing Your CD-R

► continued from page 31

Micropolis units, postpone thermal recalibration when the disk is in use. These are known as A/V (audio video) type drives, which are essential for digital audio work.

Product updates

Several new products related to CD-R technology recently become available.

For example, ProSource makes a CD-R label applicator that is low cost and easy to use.

They also sell blank CDs. Address: 1395 Greg St., #108, Sparks, NV 89431. Telephone: (800) 903-1234.

MTC America offers a model ALW-501

CD Auto Recorder that automatically records up to 50 CD-Rs at a time. It runs off a PC with Windows 3.1. Address: 2500 Westchester Ave., Suite 110, Purchase, NY 10577. Phone: (914) 253-0777; fax (914) 253-0790.

Disc-at-Once, which lets you vary the length of gaps between songs.

Also recommended is the Yamaha CDE-100 that writes up to 4X normal speed.

Similarly, there are many CD-R programs for PCs, but only a few are meant

Defrag the hard disk after recording the WAV file so the disk can read faster.

Although there are many CD-R writers, only a few work well for audio. One is the Yamaha CDE-102, a 2X writer. It has

for audio. Audio CD-R software allows Disc-at-Once recording and PQ encoding. Disc-at-Once lets you set the length

of pauses between tracks, or eliminate them. PQ encoding is the timing info for tracks on an audio CD (see RW May 1, pg. 21).

To control the length of pauses, you need a CD-R writer with Disc-at-Once in its firmware and software that allows Disc-at-Once writing. The Track-at-Once feature is undesirable: It always puts a two-second gap and a click between songs.

The click is caused by a WAV editor, which adds ASCII data to the end of the WAV file. Usually this data is the name of the editor software and the creation date.

To prevent this, go to the Options menu in the WAV editor and turn off that function.

Software

Two PC programs allow Disc-at-Once and PQ encoding: Red Roaster (for Windows) by Microboards of America and DAO.EXE by Jeff Arnold (for DOS).

Download DAO.EXE from <http://www.mainstream.net/~jarnold/cdro m/dao.html>.

The registration fee is \$45.

To register, address a fax to Jeff Arnold at Golden Hawk Technology. In his Web page, Arnold lists CD-R writers that work with DAO.

I downloaded DAO.EXE to check it out. It is a beautifully simple all-text DOS program. DAO lets you record all your mixes as one long WAV file, then define the separate tracks by their start times.

You begin by transferring your edited program to hard disk as a WAV file.

Two WAV file editors worth mentioning are SAW Plus from IQS and Syntrillium's CoolEdit. The latter is shareware on the Net.

Using your digital audio editor, go into the WAV file with a cursor, and note the start/stop times of each track.

Exit that program and load a word processor.

Write an ASCII text file called CUELIST that notes the start time of each track. For example:

```
FILE D:\ songs.wav
AUDIO 2352
```

```
Track 01
Index 01 00:00:00
[Start first song]
```

```
Track 02
Index 00 05:49:65
[End first song]
Index 01 05:53:65
[Start second song
after 4 sec. pause]
```

```
Track 03
Index 00 09:45:50
[End second song]
Index 01 09:49:50
[Start third song after
4 sec. pause]
```

And so on. To cut the CD, all you do is go to DOS and type:DAO CUELIST. Couldn't be simpler.

□ □ □

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

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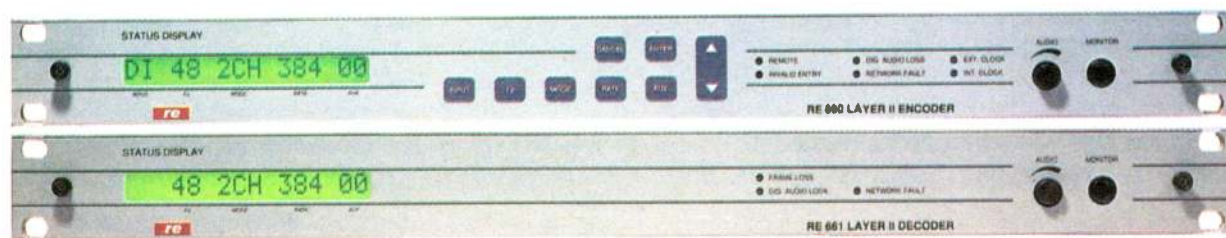


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DIGITAL DOMAIN

Standardizing Digital Audio Media

by Mel Lambert

LOS ANGELES While preparing last month's column on the features and functions that a digital replacement for an analog two-track might offer, I had reason to ponder the integration of various types of all-digital record/replay systems.

By the way, please feel free to complete the questionnaire included in the previous *Digital Domain* column (RW, June 12, p. 29). I plan to present some significant conclusions in an upcoming column.

By "integration," I mean the ability to accept a new event. A station jingle, commercial, news story or music cut could go in as easily as if we loaded a reel-to-reel tape or an NAB cartridge.

There are so many different media formats being considered for use in mastering and replay within the broadcast environment — not to mention various types of data compression schemes. At the heart of the discussion is a simple question: How can we mix and match fixed and removable media?

The wave of the future would seem to be leading us in two directions. One is toward the use of central, high-capacity servers that store the elements we need during a broadcasting day.

The other takes us toward distributed storage, with studios connected via a high-speed serial network to a master store of audio cues.

But how do we then ensure easy inload of material that is delivered in analog or digital format but which needs to be made available from a hard-disk playback system?

We turn to the production studio.

Here, with access to a suitable terminal for the master server software and digital-transfer I/O port, we might be able to replay the materials onto the central hard drives, tag them with a name and designation and make them available to the appropriate air studio.

All of which is a shade cumbersome.

What is the alternative? Maybe some form of standardized, removable media that is flexible and cheap enough to be attractive for transfer/inload.

It also must be fast enough to be used in a broadcast environment for real-world playback via a suitable general purpose interface (GPI), parallel or serial remote-control scheme.

It also must be simple enough for ad agencies and non-technical personnel to handle. Otherwise, there is little chance of it being readily accepted across a wide range of potential users.

I still consider a closed, hard-disk system to be only part of the solution. While it provides fast, random access to just about everything we might need to play back during an average broadcasting day at K-Hits or W-News, it just does not offer the flexibility we need.

In terms of "standardized" file formats, I would consider a variety of current digital audio file structures, including WAV, AIFF and Sound Designer II formats, for example, as well as the outstanding work being done in the multimedia industry on Open Media Framework (OMF) and its variants.

As I mentioned in previous columns, OMF is attracting a great deal of interest from manufacturers around the world. OMF provides a non-proprietary means of exchanging data between proprietary systems, as well as assisting firmware

and software developers in reducing another layer of complexity on the price/performance equation.

In essence, OMF's digital audio file- and data-exchange format is designed to allow various media to be freely exchanged between systems from different makers. These include sound files, graphics, data, video, film and other multimedia elements.

Standardized protocols and physical materials would dramatically streamline the exchange of audio and information via a fast, high-capacity and cost-effective exchange medium.

To date, several leading manufacturers

have developed transcode utilities that take their proprietary format and produce an OMF-compatible file.

Others are even utilizing techniques for recording in OMF-native file structures to allow plug-and-play compatibility between devices. For example, the production studio and the primary replay server could benefit from this compatibility.

But maybe we are forcing a solution that will never reach critical mass.

Not surprisingly, the radio station environment uses a mixture of static and time-dependent audio elements. Random-access via a high-speed server can handle the bulk of our replay material, but maybe

we should also consider other techniques.

Consider integrating a small number of removable drives that can be loaded with late-breaking materials such as news items or revised commercials. This also could provide the air talent with a higher degree of autonomy during the broadcasting day. All that remains is a standardized, simple-to-implement remote-control protocol for all of these various replay systems. One that must provide bi-directional communications between the server software and the remotely located player.

But that is a topic for another column.

□ □ □

Mel Lambert is now principal of Media&Marketing, a Los Angeles-based consulting service for the professional audio industry. He can be reached at (818) 753-9510 or at mediapr@earthlink.com

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NPR Affiliates Link via Internet

The Internet Gets Pressed into Use as an Audio Courier for NPR Stations in Northwestern U.S. As Facilities Continue to Adopt Digital Technology

by Rich Rarey

WASHINGTON File Transfer Protocol, FTP.

Those three little letters make quick binary transfers of all kinds of files possible. In our case, audio files.

I became familiar with FTP last summer, when NPR's New Media guy suggested I contact Northwest Public Radio (NWPR).

NWPR was doing interesting things

with the Internet, he said, and they wanted to know if NPR had the ability to send and receive audio files on the Internet. News spots, actuality material and the like.

The New Media guy asked me to determine if audio files sent over the Internet could pass technical standards for our air. It sounded interesting.

I did not realize then that determining technical quality would involve delving into bytes of data or the eventual

commissioning of our own FTP site for receiving audio files.

But, I digress.

To begin this story about FTP, we go to the state of Washington. NWPR is comprised of seven radio stations and seven translators, all owned and operated by Washington State University in Pullman, Wash.

News Director B. Dale Harrison told me



PUBLIC DOMAIN

the stations and translators receive audio by terrestrial microwave and his three news offices — in Pullman and Richland, Wash., and Moscow, Idaho — are linked in this manner.

Harrison faced an interconnection problem: How could he distribute the Pullman station's AP wire copy to the other stations' newsrooms?

Printers were not an option as the offices were not staffed full time. Additional AP satellite drops were not a cost-effective option.

Harrison found the Washington State University had existing fibernet lines that connected to the NorthwestNet; an original backbone of the Internet.

By connecting the AP satellite data to the serial port of a 386 PC running Mercury News Messenger, then connecting the computer network port to the fibernet lines, he was able to use the Internet as short-hop data carrier.

News staffs in the Washington and Idaho offices could then easily read the AP wire copy, write stories and communicate through text to all NWPR news offices.

Moving across the lines

As NWPR was migrating to digital workstations, Harrison began looking for reliable, high-quality transmission techniques to move news actualities and features between offices and eventually to air.

ISDN service was not available, and the cost of audio codecs seemed prohibitive. Real-time audio could be placed on an unused channel of the terrestrial microwave, of course, but that depended on a human being present at the receiving end to record it.

The natural solution was to look to

Could audio files sent over the Net pass our technical standards?

computer technology to accomplish audio file transfers, using the existing high-speed data paths.

One specific technique of transmitting data through the Internet is called File Transfer Protocol (FTP) and can be used to send files of any kind between two Internet-connected computers.

FTP is transparent to the humans that use it: the FTP application transfers the file, corrects transmission errors as they are detected and alerts the user upon completion.

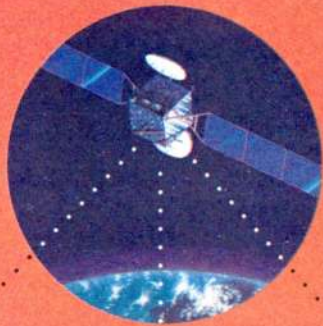
We need not know or care the route the data takes from sender to receiver, nor do we care how the errors in transmission have been detected and corrected. All we know is, the file has arrived, and it has such-and-such filename.

Because FTP is robust and works well, we need only concern ourselves — in this case — with the quality of the original audio and the important content of the human words and sounds contained within the digital audio file.

Harrison's typical audio workstation is a Dell 486/DX66 PC with 16MB RAM, a

continued on page 36 ►

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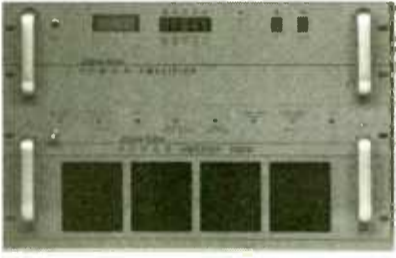
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Using FTP to Transmit News Audio

► continued from page 34

540MB IDE hard disk, Intel EtherExpress 16T adapter, CardD-Plus audio card and Fast Eddie workstation software.

He settled on a 32 kHz audio sampling rate because "it gives us a 15 kHz mono signal, which is better than our transmitters, translators and microwave STLs deliver."

Using a workstation in Richland, a reporter can voice and edit a complete news spot or feature and save the material as a conventional 32 kHz mono WAV file on the local computer's disk.

When the reporter starts the FTP software, he or she can connect to a main

server computer in the Pullman station's Master Control.

The reporter can then click and drag the audio file from the local hard disk to the

more efficient," said Harrison. "We don't have to hire people to wait around to capture the audio when it arrives and digital editing is much quicker. The fed-

The natural solution was to look to computer technology to accomplish audio file transfers.

remote site, and the file is copied at speeds Harrison says is "twice real time."

That is, a 50-second news spot will take 1:40 seconds to transfer.

"It has made our operation considerably

eral cutbacks have not hurt us as much because we're able to work more efficiently."

Harrison said using FTP to send audio files in non-real time meant NWPR only had to set up accounts and passwords, rather than outfit studios with timer-driven recording machines and expensive analog equipment.

History lesson

Probably the first real use of FTP audio file transfers for NWPR was in the winter of 1994.

NWPR was involved in producing a public affairs journal with Seattle public station KUOW. The only way to get timely material to KUOW was by using FTP.

Harrison said NWPR now routinely exchanges stories with stories with Oregon Public Broadcasting-Radio, BSU Radio in Boise, Idaho, KLCC in Eugene, Ore., and KUOW, Seattle.

As with any new process, I wondered if NWPR had problems with FTPing files.

"Computer nets don't work all the time. Servers die," said Harrison.

"It's all happened so fast — we don't have all the backup systems as if you'd

designed the whole system from scratch. And we had to develop filing systems and conventions so we could easily find our audio files and text files. We also had to make ways to make material available to our reporters but still secure."

Harrison found he definitely needed a server to act as a repository of audio files.

"Before we put in the server, we were simply FTPing files to each other's computer. If you were editing a piece when someone tried to send you an audio file, a lockup could happen.

"Now we simply send out-of-house files to the server, which happens to be the master control computer — our only Pentium — and the files can be grabbed later for further editing," he said.

Harrison pointed out that the files also could be put directly on the air.

The host reads the lead from one screen window, then checks the Fast Eddie window to confirm that the audio is ready.

Interestingly, Harrison said the FTP techniques for broadcast have the honor of being ahead of its time.

"One of the biggest hurdles is convincing other organizations that it is worthwhile to set up a system to receive the material," he said. "We've had to wait, while others play catch-up."

Unforeseen by Harrison, there was a systemwide slump in performance once the project went up. How did this happen? And how was this resolved so NWPR had the speed and flexibility it needed?

You'll find out in the next Public Domain.

□ □ □

Rich Rarey is the technical director of "All Things Considered" on National Public Radio and the author of "Public Domain" for RW.

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For dubs to sound their best, levels must be right. Putting 1 kHz and 10 kHz tones (referenced to zero) on tape help considerably.

If your production console lacks an oscillator to lay down reference tones, drop in an ST-OSC2A dual oscillator module from Radio Design Labs (RDL).

This module from the RDL "Stick-On" product line puts out precision 1 kHz and 10 kHz sine waves, accurate to 0.5 percent. Level is adjustable from zero to +14 dBv into 600 ohms and is maintained by an internal AGC circuit.

Multiturn trimmer pots set levels for each oscillator, and each side has two separate outputs to drive stereo lines.

The ST-OSC2A requires 24 vdc to operate. Space permitting, the module

can be stuck inside the production console and powered from the board's internal power supply. An RDL PS-24A wall-wart power supply can be ordered separately.

An ST-OSC2A can be routed to a patchbay or wired to an unused input on the console. Channel strips with A/B source selection can be set up to switch between either tone.

When setting record levels on the tape deck, 10 seconds of each tone should do it. The recipient of the dub sets

his/her playback level by the reference tones.

RDL also makes the ST-OSC2B, which generates 100 and 400 Hz tones. Both are relatively inexpensive with a suggested price of \$98.

For more information, contact Radio Design Labs at (602) 778-3554; or circle Reader Service 136.

— Alan R. Peterson



Radio Design Lab ST-OSC2

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



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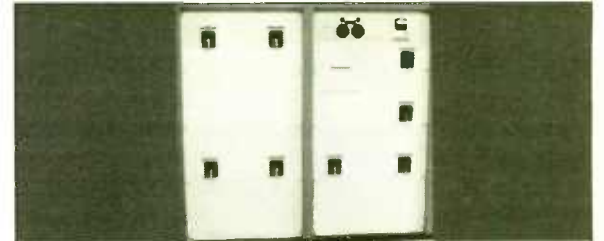
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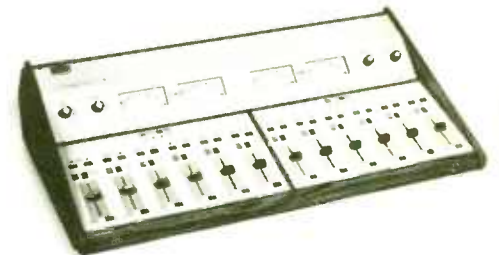
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READER SERVICE NO. 142

Your Resource for Business, Programming & Sales

Automate Your Way around Traffic Jams

*Evaluate the Options of the Systems Available
To Match What You Want to Accomplish*

by Sue Jones

BURKE, Va. Have you been considering acquiring an automated traffic system for your station? Sure you would like to have one, but can you justify the cost? Will there be enough advantages to offset the costs? What specific savings could your station expect if you invest in an automated system?

These are certainly the types of questions a station owner/general manager should be asking before purchasing such a system.

Let's take a look at some of the benefits of automated traffic systems. There are several systems available with various features and prices. This is not an all-inclusive list, but it highlights some of the most desirable functions.

1. Most systems automatically intersperse spots in time sets.
2. Most systems have the ability to categorize types of business: for example, two car dealers' spots do not run back to back.
3. The system should have the capability of scheduling PSAs, the weekly EBS test, news, special sponsorships or special events such as the stock market closing figures at the end of the business day.
4. They all automatically generate weekly/daily reports for the sales manager.
5. They all automatically generate

hourly logs for the jocks. The system should also check for make-goods and adjust the monthly billing accordingly.

6. They also automatically generate invoices and monthly reports that, at a minimum, should include: revenue reports, sales generation reports, accounts receivable reports and individual sales associates figures. Some systems may generate several other types of reports or have a customized report capability.

There are several staffing and operational advantages of having an automated system, including a significant reduction in staff time required to generate reports and logs, and increased accuracy.

With a manual system, a person with a sharp mind and good memory is required to perform all of the tasks. Because it is so labor intensive, it can take one person the whole day to complete the traffic duties. Automated systems reduce the necessary time so dramatically that the business manager can also handle the traffic scheduling. One person can usually handle both tasks.

Computerized memories usually work better than human memories. This can improve accuracy in billing on make-goods and accuracy of reports to the sales staff of spot availability.

However, remember that computers simply perform the programmed tasks with the information keyed into them.

They do not have the ability to make judgment calls as a human mind does. If the information keyed in is incorrect, the invoices and reports will also be incorrect (garbage in, garbage out).

If you looked at automated traffic systems in the past and decided they were too big and too expensive for your station, it may be wise to take a look at them again and see the improvements

made. You will most likely find that the cost of computer hardware has dropped considerably in the last few years. The cost of hard drives, memory and storage capacity is down. The systems run on desktop-sized personal computers and do not require special oversize computer equipment.

Also, today's advanced technology has
continued on page 42 ►

Traffic and Billing Systems Manufacturers

The following is a list of companies that manufacture traffic and billing systems. The list is comprised of companies that responded to RW's request for information.

Airwaves

Radio Computing Services
20 Garden Road, Fendalton
Christchurch, New Zealand
Phone: +643-355-3838
Contact: Matthew Reid

A-Ware Software, Inc.

22600 Arcadian Ave.
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Waukesha, WI 53186
Phone: (414) 521-2890
Fax: (414) 521-2892
Contact: Joe Knapp

CBSI/Computer Business Systems, Inc.

P.O. Box 67
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Fax: (503) 271-5721
Contact: Steve Kanagy

Columbine JDS Systems, Inc.

1707 Cole Blvd.
Golden, CO 80401
Phone: (303) 237-4000
Fax: (303) 237-0085
Contact: Mike Oldham

Computer Concepts Corp.

8375 Melrose Dr.
Lenexa, KS 66214

Dalet Digital Media Systems

251 rue du Faubourg Saint Martin
75010 Paris, France
Phone: +33 1 40 38 01 39
Fax: +33 1 42 05 18 66
Contact: Astrid Carver

Datacount, Inc.

508 South 7th St.
P.O. Box 3078
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Phone: (334) 749-5641
Fax: (334) 749-5666
Contact: Debbie Hamby

Electric Works Corp.

P.O. Box 136457
Fort Worth, TX 76136
Phone: (800) 334-7828
Fax: (817) 625-4975
Contact: Adrian Charlton

Enterprise Systems Group, Inc.

5475 Tech Center Dr.
Colorado Springs, CO 80919
Phone: (719) 548-1800
Fax: (719) 548-1818
Contact: Rob McConnell

Radio Computing Services

919 Oberlin Avenue
Raleigh, NC
Phone: (919) 839-4141
Contact: Harlene Shaw

Register Data Systems



P.O. Box 5858
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ROOTS OF RADIO

Radio Station Was Life For Simon Geller

by Richard W. O'Donnell

PORT RICHEY, Fla. No person deserves a special pedestal in radio's Hall of Fame more than the late Simon Geller. He died only a year ago on July 12 at the age of 76.

The big names — Jack Benny, Arthur Godfrey, Lowell Thomas, to name a few — all have been honored, and deservedly so.

But no man loved radio more than Simon Geller. He devoted his life to sending beautiful music out over the airwaves.

From 1967 to 1988, Geller, a short, lean individual with a wry sense of humor, was the owner and manager of WVCA(FM) in Gloucester, Mass. He also was the station's only DJ, if such a term can be used when playing classical music.

In addition, he was WVCA's entire sales staff, its sole engineer, publicist, chief cook and bottle washer, janitor and anything else you may care to mention.

Simply stated, Geller operated the classical music station all by himself, day-in and day-out, for more than two decades. WVCA went on the air at 7 a.m., when Geller got out of bed and had his first cup of coffee, and remained on the air daily, until about 10 p.m., when he went to bed.

The station was his life. Between long-playing records, he would rush over to a nearby diner for breakfast.

The local McDonald's was his lunch spot and in the evening, he generally devoured a frozen dinner, fresh from his freezer. In between, he played Brahms, Mozart, Beethoven, Chopin and all the great ones.

"Simon used those six-hour VCR tapes to record music," said Doug Tanger, who bought the station from Geller in 1988. "He used only the audio; he never used the video. For six hours, he would play music and get it on the tape. Simon was then able to play those six-hour tapes when he wanted to go shopping or see a movie or had business that had to be done. There was even time enough for him to make a trip down to Boston, if necessary."

Geller put suitable commentary in between the selections on these long-running audios, and that gave the impression he was on the job at the station.

Tanger, after purchasing the station, changed the call letters to WBOQ(FM), upgraded its signal and moved it to nearby Beverly. "We have enjoyed great success," he said.

"When I bought the station I promised Simon I would only play classical music. I have kept my promise. And don't let anybody tell you there isn't a market for such music. When I started out I had only nine employees. I now have 30 people on the payroll."

As for Geller, he operated the station for several years in the basement of the local police station. Later, he moved to a second-floor flat over a car wash. He had sleeping quarters at both locations.

Once, when asked his opinion of rock and roll, Geller responded, "I think parents who allow their sons and daughters

to listen to such music should be arrested for child abuse. I am thankful I was raised in a family where classical music was appreciated."

Born in Lowell, Mass., close to the New Hampshire border, Geller worked as a radio engineer in New York and Boston after a hitch in the military.

"I always wanted to have my own station," he once told an interviewer.



Simon Geller, left, and Doug Tanger hold the purchase agreement the day Geller sold the radio station.

continued on page 41 ►

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Geller Devoted Life

► continued from page 39

"In the '60s, FM was relatively new and there were openings. I applied and ended up with 104.9 on the FM dial. I was in seventh heaven, I think. I had a collection of classical music records. I now had a chance to play them over the air."

And so he did, but only after he put together all the transmitting equipment needed, all by himself. Geller built his radio station by hand.

In 1967, the station went on the air. Geller, by right, should have fallen flat on his face. To a degree, he did.

He wasn't the best announcer in the world. His sales techniques were weak. Two local banks and a candy store, and McDonald's from time to time, were his sponsors. All things considered, his weekly income was only \$30.

Still, when financial help was needed, he would remind listeners that the light bill or some other bill was due, and funds would be contributed to help out. He never went broke. Almost, but not quite.

Several times he rejected offers for the station. One group, loaded with funds, challenged him for the rights to 104.9. Geller fought back on his own, without help from lawyers. The FCC battle lasted 11 years; Geller survived the ordeal and won the game.

Though there was little in the way of an opportunity to get to know him, by word of mouth Simon Geller became a hero in the Gloucester area.

He had challenged a giant all by himself and won the day, while operating his radio station daily, without ever missing a symphony, concerto or string quartet.

His local fans decided to hold a fund raiser for him back in 1981.

It was held at Gloucester's famous Blackburn Tavern and was a great success, except for one thing: The guest of honor failed to show up. Some equipment at the radio station had fallen apart, and Geller, the man of the hour, chose to remain at the station and repair it.

Not up on TV

Once, when asked about TV, Geller said: "I don't watch it very often, but when I do, I keep my eyes closed and hope for the best."

Geller was a diabetic and once in early 1987 he had an insulin reaction and drifted off while on the air. Fortunately, he had one of his six-hour tapes on, and managed to return to reality after awhile. "I don't think anybody noticed the difference," is the way he put it. "I finally got to the phone, called a neighbor over, and got some help."

On young people, he said, "They're lucky. They can look forward to becoming old people." As for old people, he said, "The older you are, the better life is, because you don't have to live as long."

On Gloucester: "I've been here 24 years, and I've been bored for 23 of them."

In between these bits of philosophy, Geller continued to operate his radio station. His two brothers, Eli and Irving, both of Rockville, Md., urged him to sell it. Geller's health was headed downhill.

"He was stubborn," recalled Doug Tanger. "People would make offers, and he'd tell them to buzz off or beat it. That's what he told me when I first approached him in 1986 about buying the station."

"But I kept coming back, and got to know him. We became friends, and we'd often go over to McDonald's for lunch. I think after awhile, he began to like me. We started negotiating, and it took awhile, because I think he did not know what he would do with himself without the station to run. In 1988, we finally came to an agreement. He sold WVCA to me. I had to promise it would continue to

be a classical music station."

How much did Geller receive for his one-man operation? He received \$1 million.

What did he do with all that wealth, after 20 years of being confined to a radio station, seven days a week, without a vacation?

What would you have done? He spent his final years enjoying himself in the Big Apple and out in Las Vegas. He had a grand time for himself.

Then as his days dwindled down, he settled in Washington, D.C., not far from his brothers, and lived out his life.

If any man was pure radio, it was Simon Geller. He is gone now. Perhaps, posthumously he might be awarded a place of honor in radio's Hall of Fame. No man ever loved radio more. It was Simon Geller's life.



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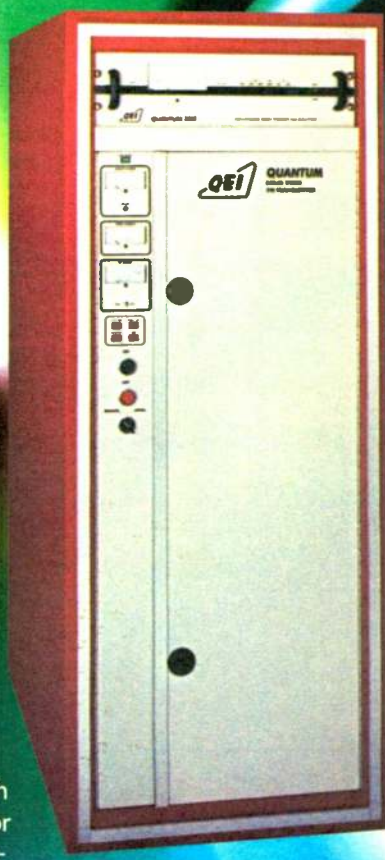
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Automate around Traffic Jams

► continued from page 38

made the systems much more user friendly. They do not require special technical skills to install and operate.

Many dealers have purchase or leasing options. If the purchase price for hardware and software is a budget buster for your station, consider a leased system. Leasing may be a preferable way to acquire the advantages of the automated system.

Monthly leasing payments may be more easily absorbed in your budget than a one time purchase price. Many business minds discount the leasing option because it is like paying rent. At the end of the term, you do not have

anything for your money. That is not exactly true. As in renting a house or apartment, you have the use of the living space for the term of the lease and it

technology at the lowest possible cost.

Technology is advancing so rapidly that the system you buy today may be obsolete three to five years from now. If

Today's advanced technology has made the systems much more user friendly.

generally is a lower cost than paying a mortgage loan payment. The added advantage of leasing high-tech equipment is taking advantage of the latest

you bought the system, you may discover five years from now there is no used market for your aging system and it must be junked. If you lease the

equipment, at the end of five years you trade your aging system for the latest system with all the new upgrades. You have had the use of the most advanced system for the least amount of money. In addition, you do not have a white elephant to sell in order to upgrade to the latest system.

Other things to look for and think about:

1. Check the warranties on the hardware and software. Hardware sometimes fails and software has been released with programming bugs.

2. Does the software vendor provide the computer and printer as an integral system? If you provide the hardware and the system fails, the hardware and software vendors may point to the other vendor as it is their problem, not ours.

3. Technical support. Does the vendor/developer provide help desk technical support for your staff? Is there a tollfree or 900 number for the technical support line? Is there a technical support contract?

4. Is training offered? If so, where is the training and what is the cost?

5. Look at the system documentation before you buy. Ask for the user manual, open a page and really read it. Does it make sense to you as a novice user? Visualize yourself working with the system with that set of instructions. The number of pages of documentation is less important than the clarity of the directions and explanations.

Most software developers recognize the importance of having their system documentation written by a writer instead of the technical programmers and developers.

If the documentation is difficult to understand, your staff will become frustrated in setting up the system or make mistakes in setting it up.

A system that is not functioning properly may be a costly mistake that can absorb hours of staff time trying to make it work or undoing mistakes.

6. Ask the vendor/developer to provide references of current system users. Talk to at least three of them. Have a list of questions so that you ask all the references the same questions.

Be sure to inquire about the quality of ongoing technical support and the ease or difficulty in obtaining technical support.

Ask the references if they would buy/lease the same system again. Inquire about the amount of time required to switch from a manual to automated system.

Find out about the traffic scheduling improvements or problems encountered.

These types of questions will help guide your choice of system and alert you to some of the problems other stations had in implementing the system. You may be able to avoid the same problems with this knowledge and some pre-planning.

Check out several systems before you make a decision. Make cost comparisons with the features as they are related to your station's needs and budget.

You may discover the cost savings in staff time and error correction more than offsets the cost of the system.

□ □ □

Sue Jones is a principal in Bisset Communications, a communications management firm located in the Washington area. She can be reached at (703) 503-4999.

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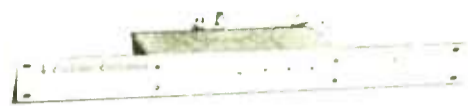
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PROMO POWER

Do You Take Your DJ Out in Public?

by Mark Lapidus

WASHINGTON Some disc jockeys are great at appearances. They're charismatic, well groomed, funny and warm. Others stink (both figuratively and literally).

Because most radio stations have fewer than six full-time jocks, schedules are usually set up on a straight rotational basis. This makes no sense. It's like taking your overnight jocks and putting them on morning drive regularly just because it's "their turn." Here are a few suggestions on how to improve your public persona.

Payment: Ah yes ... like many things, our problems begin with money. When hiring talent, program directors sometimes try to boost DJ salaries by making promises about so many appearances per quarter. Frequently these guarantees are made prior to even ascertaining public performance ability. DJs should understand that appearance fees are not part of a regular salary. These fees should be viewed as a simple payment for a performance well done.

Market rate

The kind of rates you pay should be determined by your marketplace. I've heard of rates as low as \$50 an hour for small markets and as much as \$500 per hour in the big league. For medium to large markets a typical appearance fee is about \$100-\$150 per hour. Many stations will have clients pay jocks directly. Even when this occurs,

management should remind jocks that they are receiving taxable income. Many of those clients will file with the tax boys, and your DJs could get nailed.

Who is assigned? Those that have the talent and fit the specific requirement for a particular appearance. This policy has to be discussed openly in one-on-one interviews with DJs. They need to understand that the promotion director is going to assign those most requested by clients and those most appreciated by a live audience.

I had a situation once where I had one DJ who was constantly requested by clients. He was very good ... so good that he was overworked. Nobody else on the staff came close. Unfortunately, I was working him to exhaustion. He loved the money and the attention, but we hit a limit.

Out of desperation I tried something unusual. I used an actress that was a DJ part time. It worked! Yes, it created tremendous animosity among the rest of the full-time air staff. There was only one solution.

In individual meetings, I made it clear that if they got better, they would get more appearances. If they're never assigned, how will they improve? Easy ... assign them to the easy "free" station appearances, and then go and watch. A jock can do lots of fun stuff at movie premieres or before bringing on bands.

How do you improve talent? Some jocks are really hopeless. A live audience just scares some people. That's OK. Those folks

are better off putting their energies into their air shift and production. I had a talent once that didn't bathe regularly and would wear clothing for several days before washing it. Even after discussing the problem, the situation didn't improve. However, much of appearance technique can be taught.

Be prepared

Preparation can make a significant difference for most people. This is one of the things that made my part-timer so good. She knew everything about her assignment. She would call the client directly (with a salesperson), and find out first hand what they wanted to accomplish during her appearance. She would always arrive with fresh jokes and stories that were appropriate for the event. She had new trivia questions written each time and fresh games to play.

If your talent is doing a lot of bar appearances, they should go watch a good club jock work. There are many standard bar games that radio personalities can learn. A smart jock who wants to work a lot also will do what he or she can to help a promotion director: He or she will help get the prizes together before the appearance, get directions themselves and talk to the salesperson about the specifics. I've even had extremely helpful jocks put up public address systems and banners and drive vans. Yes ... even in major markets there are some DJs without egos the size of a broadcast tower.

Follow-up: After it's over, every appearance should be reviewed by the promotion director, talent and account executive (if there is one). This can take place on the phone. Discuss the size of the crowd. Did business improve during or after the event? Any problems?

Who works appearances? This can be a touchy situation between a general manager and a promotion director. The bottom line depends on the nature of the appearance. It's not rational to think that a promotion director can be at every station event. If your promotion director is there for every appearance, your station probably isn't busy enough!

Promotion should be represented by somebody each time. This can be a responsible part-timer or, if it's a small activity, maybe the jock can even represent promotion. For events that involve clients, account executive attendance should be mandatory. AEs are the only ones who really can solve problems for clients.

Your entire staff should be invited to show its support by attending your promotions. If you're not doing a station newsletter with appearance details, at least post the information on a bulletin board. The healthiest stations even will have the support staff coming out regularly for station activities.

What to wear? "You won't believe what Frank wore to that Ford remote last weekend! He had on torn cut-offs and no station logo." This comes up at every station. Yes, jocks need nice logoed clothing. However, don't force everyone into a station T-shirt. It may not look good on them.

It's a good idea to have every jock bring you two items of clothing that they'd like to have logoed. They should also be supplied with a station jacket for cooler weather.

Hey ... don't forget the guy who wrote this article the next time you outfit your air staff!

□□□

Mark Lapidus is vice president of marketing at Liberty Broadcasting. Reach him at e-mail: Liberty_HQ@aol.com; or FAX: (301) 899-3014.

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MANAGER'S NOTEBOOK

What to Do When Crises Strike

by Sue Jones

BURKE, Va. Imagine one morning you walk into your office the day after the quarterly ratings show that your station just moved a point up only to find the morning headlines blast the news that your highest rated jock was busted for cocaine possession the night before. So much for celebration. Instead you instantly are thrust into crisis management.

There are several areas where the general manager's performance can be evaluated, but none measures his or her management ability as effectively as crisis management. Need proof? Look no

further than Richard Nixon's handling of Watergate. His cover-up of the break-in created a bigger crisis than the original misdeed alone would have produced. Handling it another way may have created a winning situation for him instead of the devastating failure and eventual resignation from the presidency.

Battling the storm

The success of your station can depend on how expertly you handle a challenge. Remember, the station owner(s) are not interested in the storms you have encountered but in whether you brought the ship in safely.

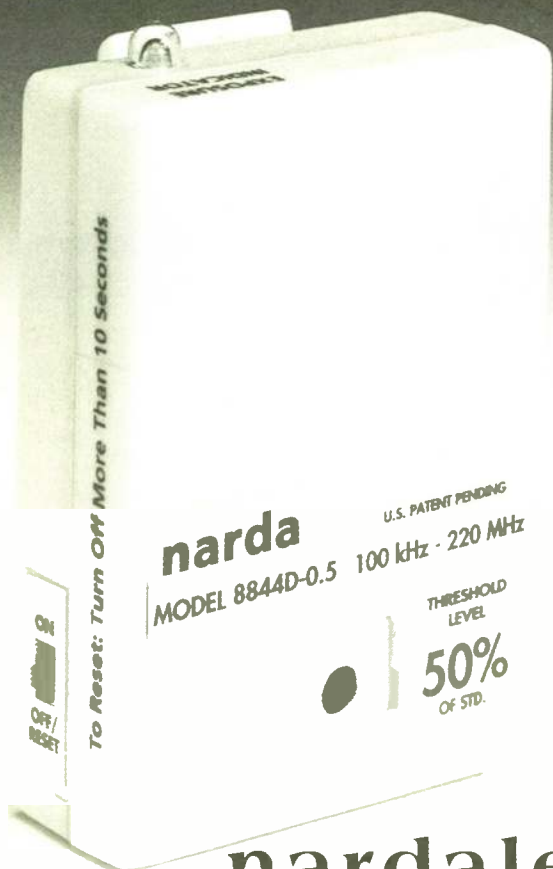
For instance, consider how prepared you would be to handle the following problems. A natural disaster severely damaged your tower, antennas or transmitter site. After a week of record heat this summer, the power company in your area experiences a blackout that lasts for 15 hours. Another station in your area is sold, and the new owners choose your same format competing for the same listeners and advertisers while taking part of your market share. Your aging transmitter shuts itself off for the last time during the afternoon drive time, and your engineer is on vacation. How about a computer virus in your sales computers or a hard disk crash on your traffic system. How would you explain to the

about the reasons school systems conduct fire drills with the students. Cool heads that have thought through a crisis in a nonchaotic environment are more capable of proceeding in an orderly manner if the crisis presents itself.

Discretion and privacy will be critical to avoiding some kinds of crises, such as preventing leaks before you are ready to make an announcement. To avoid a leak crisis, limit involvement to as few people as possible and certainly only those whose discretion can be absolutely trusted. Each participant should be required to sign a nondisclosure agreement. The negotiations should be completed as quickly as possible. Release as much apparent uncertainty (noise) as possible into the process so that any real leak will be drowned in false leads.

2. Have a plan. In a recent Fortune 500 survey of CEOs, 89 percent agreed that crises in business is as inevitable as death

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The success of your station can depend on how expertly you handle a challenge.

station owner(s) that the significant drop in revenue is due to a declining economy and not your mismanagement of the station.

Another surprise could be new government regulations that require expensive tests, equipment, new reporting or new compliance. We are all aware of FCC deregulation of station ownership and the impact it has had on the industry. Human failure, misjudgments and accidents also account for many crisis situations. Technically charged crises involve the failure of advanced technologies that the public has come to believe are foolproof (i.e., radio broadcast capability right after a major natural disaster that informs the public about the scope of the disaster or where they should go for assistance).

Out of your control

Looking over this noninclusive list, it is obvious that many of these events may be outside of your control. Nonetheless, they create a crisis situation that you have to manage. So how do you protect yourself and the station against such disasters? Here are some management steps that could turn a crisis into a benefit.

1. Prevent the crisis. Certainly, natural disasters are outside of your control — but your response to those events is very much within your control. Lacking control over the origin of the problem does not exempt you from living with its consequences.

Make a list of everything that could become a crisis at your station. Consider the possible consequences, and estimate the cost of prevention. Develop a step-by-step strategy for how you would deal with potential problems. This is not a fun exercise, and it can be time consuming. However, you will be amazed at how fast your mind will begin thinking through previously thought through corrective steps if you have completed this exercise. It can serve you well when swift decisions are needed to move the crisis to resolution.

Consider the out-going federal Emergency Broadcasting System (EBS) — now the Emergency Alert System (EAS) — and how the tests already have your staff prepared to handle the emergency as if they were on autopilot. Think

and taxes. It is incredible with those types of odds that more than 50 percent of business leaders confessed to not having a plan to deal with crises. Nevertheless, a whopping 97 percent felt confident that they could handle any crisis.

Making plans

If you think that all of this work is a waste of time to prepare for a predicament that you think is extremely remote, consider Winston Churchill's comment, "Nothing in life is so exhilarating as to be shot at without result." A plan to deal with a specific crisis should include action items, communication steps, fire drills and development of essential relationships. Most airlines have crisis teams ready, along with special telecommunications and detailed contingency plans.

Almost all companies have a backup computer system or contingency plan in case of a natural disaster or other catastrophe. General managers of radio stations should be just as prepared, especially because the service provided involves a considerable amount of public trust.

Your crisis management plan should be written so that you can share it with appropriate staff if the crisis develops. The best laid plans are worthless if they cannot be communicated. Consider also that a crisis may occur when you are out of town.

In addition to the written plan, you should have identified which staff members would be part of a crisis management team and the roles they would play for a specific situation. Any communication systems should be thoroughly tested before they are needed. Part of your prevention program should include routine and periodic testing of backup transmission and generator equipment.

Next time I will discuss the remaining steps of effective crisis management: correctly recognizing the extent of the crisis, containing the crisis, resolving the crisis and profiting from the crisis.

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Sue Jones is a principal in Bisset Communications, a communications management firm located in the Washington area. She can be reached at (703) 503-4999.

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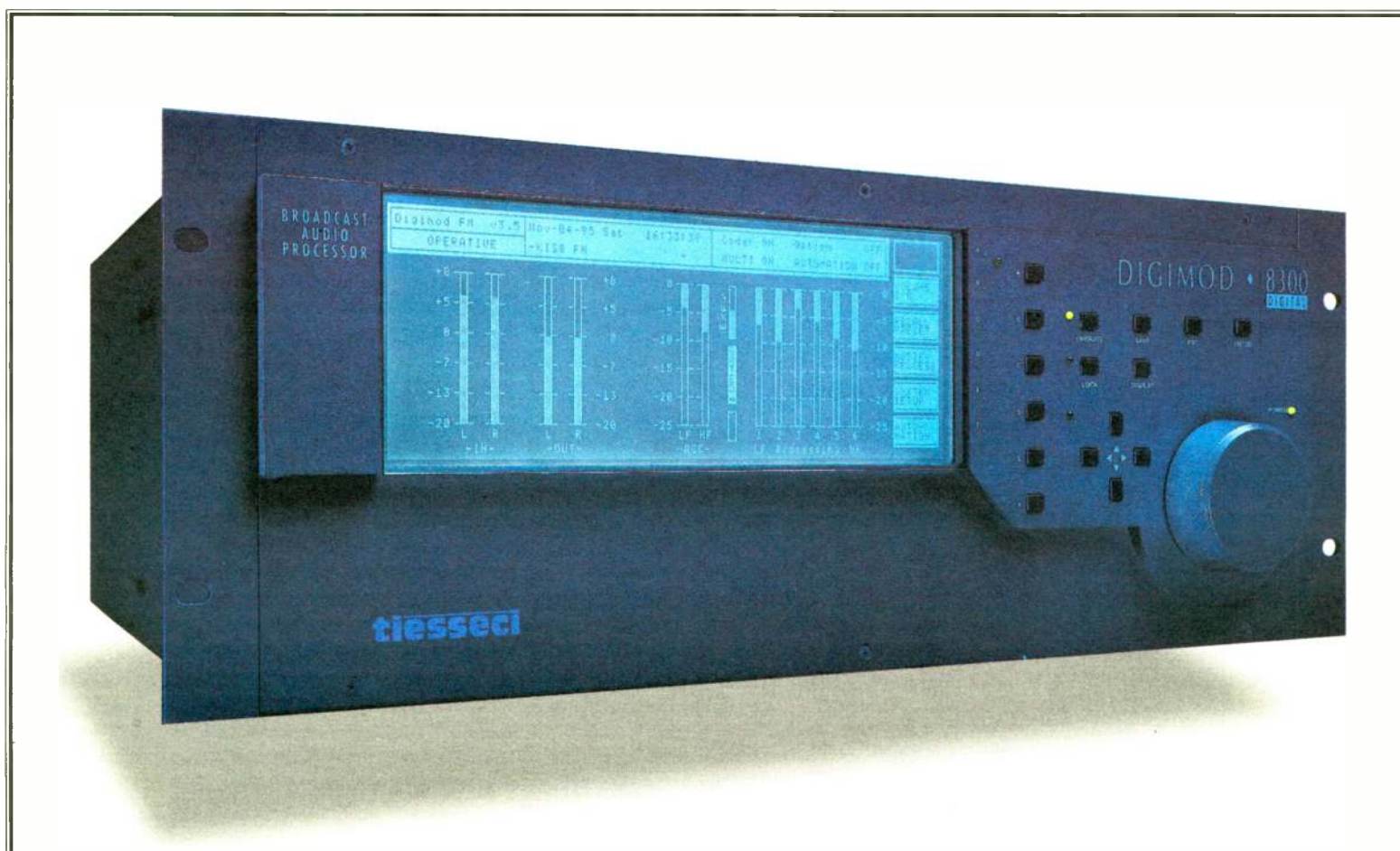
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BE FS30, \$350 +shpg. B Glenn, KGDN, POB 3258, Tri Cities WA 99302. 509-783-8600.

Advertise!
Call 800-336-3045 for details

TAPES/CARTS/REELS & CD's

Want To Sell

Scotch 7 & 10.5" reels, classic rock library, \$250 +shpg; empty EIA 7 & 10" reels. Call 703-764-1460.

Lots of big reels, country 7 oldie rock. L Robinson, WPAX, Thomasville GA. 912-226-1240.

Pams Jingles reference tapes from the years of 1951-1976, avail from every radio market in the US, Canada & Europe, call after 3PM CST, 214-271-7625.

TAX DEDUCTIBLE

Non-profit, non-commercial, educational FM seeks used FM translator equip, donations only, we pay shipping. G Welsh, KANW, 2020 Coal SE, Albuquerque NM 87106.

Studio equipment such as mixers, TT's, tape decks, mics, cart, etc. needed to start community radio station in university town. R Wenzel, Lawrence Community Radio, Lawrence KS. 913-842-6382.

SATELLITE SERVICES/EQUIPMENT

Want To Sell

Wegener 1806-015-003-001 stereo receiver w/tone decoder. P Baillon, KMCM, St Paul MN, 612-222-5555.

MBN
SATELLITE TIME
on **SATCOM C-5**
Transponder 3
Frequency 81.9
Available on
The Middleburg Broadcasting Network
Information contact Vicky Petty • (540) 687-8000

For details on space availability contact Simone at 1-703-998-7600 Ext.154

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Audio Cartridge Rebuilding Division

Rebuilding/reloading, like new, all brands, any length up to & including 3.5 minutes, \$2.05 for Standard Tape, \$2.25 ea. for HOLN Tape. FOB out plant, 48 hrs delivery. (New rate effective 3/1/96)

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http://www.comm-data.com
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Falls Church, VA 22044

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- we help you line-up guests

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1, 2 & 3-Line Extender Systems
Now With The New TELOS ZEPHYR
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ISDN & Switched-56 Systems
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WELLER AUDIO-VISUAL ENGINEERING
Baltimore, Maryland
Phone: (410 or 800) 252-8351
FAX: (410) 252-4261

TEST EQUIPMENT

Want To Sell

Tektronix 2215A 60MH. never used. \$950. H Safaie, KFSN TV, 209-455-5795.

Tektronix TM-500 audio test & measurement system, TM503, SG502, AA501, mint cond: Delta OIB-1 operating impedance bridge. R Lankton, 4027 Cochise Ter, Sarasota FL, 34233.

Tektronix 466 digital storage scope 100 MHz. as new w/probes. manuals & UPS shpg. USA 48 via air, \$500. Mid-Lo Bdctg. 941-473-2256.

TUBES

Want To Sell

Econco 5CS1500B newly rebuilt & never used. C Springer, KLMR, POB 890, Lamar CO 81052. 719-336-2206.

D and C Electronics Co.

Lowest Price on Tubes including:

4-1000A 3-1000Z
8877 4CX250B 833A
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4CX 3500 5CX1500
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Factory Warranty!

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(352) 688-2374

Se habla Espanol
FAX: (352) 683-9595

EIMAC, AMPEREX, RCA
4CX250B, 4-400, 4-1000,
4CX300, 4CX350A, 807, 833,
3CX400A7, Westgate 800-213-4563.



Svetlana
ELECTRON DEVICES

Quality Power Tubes

3CX2500A3	4CX15,000A
3CX2500F3	4CX15,000J
3CX2500H3	4X150A
3CX3000A7	5CX1500A
3CX3000F7	5CX1500B
3CX10,000A3	572B
3CX10,000A7	5U4G
3CX10,000H3	6550B
3CX15,000A3	6550C
3CX15,000A7	6AS7G
3CX15,000H3	6BM8
4CX250B	811A
4CX250BC	833A
4CX250BM	833C
4CX250R	EL34
4CX350A	SV811-3
4CX350AC	SV811-10
4CX400A	TH5-4
4CX800A	TH5-6
4CPX800A	TH6-3
4CX1500A	TH6-3A
4CX1600B	YC130 9019
4CX1600U	8560AS
4CX3500A	SK300A
4CX5000A	SK1300
4CX10,000D	SK1320

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- Shipment from USA stock.
- Manufactured in Russia's largest power tube factory.
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- Honest prices based on quality at low cost.

Broadcasters

Phone: 800-239-6900
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FAX: 205-880-8077

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FOR THE BEST PRICE

& 24 Hr service on transmitting tubes call Goodrich Ent Inc at 402-493-1886 day or night, FAX 402-493-6821.

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Approximately $\frac{1}{2}$ the Cost of New

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Call 800-414-8823

Int'l. (415) 592-1221

or Fax 415-592-9988



TURNTABLES

Want To Sell

Russco Studio-Pro mdl B, 45/33 w/tonarm, \$100 +shpg; Ramko SP-8E stereo preamps. \$25, Ramko MA-7 mono preamp, \$15 +shpg. H McDonald, KKJV, POB 807, Veradale WA 99037. 509-484-4531.



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Reach radio professionals worldwide by advertising in **Radio World's** international edition.
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800-336-3045

Ext.154

ACTION-GRAM

EQUIPMENT LISTINGS

Radio World's Broadcast Equipment Exchange provides a FREE listing service for radio stations and recording studios only. All other end users will be charged. Simply send your listings to us, following the example below. Please indicate in which category you would like your listing to appear. Mail your listings to the address below. Thank you.

Please print and include all information:

Contact Name _____
Title _____
Company/Station _____
Address _____
City/State _____
Zip Code _____
Telephone _____

I would like to receive or continue receiving **Radio World** FREE each month. Yes No

Signature _____ Date _____

Please check only one entry for each category:

I. Type of Firm

- D. Combination AM/FM station
- A. Commercial AM station
- B. Commercial FM station
- C. Educational FM station
- E. Network/group owner
- F. Recording Studio
- K. Radio Station Services
- G. TV station/teleprod facility
- H. Consultant/ind engineer
- I. Mfg. distributor or dealer
- J. Other _____

II. Job Function

- A. Ownership
- B. General management
- C. Engineering
- D. Programming/production
- G. Sales
- E. News operations
- F. Other (specify) _____

Brokers, dealers, manufacturers and other organizations who are not legitimate end users can participate in the Broadcast Equipment Exchange on a paid basis. Line ad listings & display advertising are available on a per word or per inch basis.

WTS WTB Category: _____

Make: _____ Model: _____

Brief Description: _____

Price: _____

WTS WTB Category: _____

Make: _____ Model: _____

Brief Description: _____

Price: _____

*Closing for listings is every other Friday for the next month's issue. All listings are run for 2 issues unless pressed for space or otherwise notified by listee.

Broadcast Equipment Exchange

PO BOX 1214, Falls Church, VA 22041 • Tel: 800-336-3045 • Fax: 703-998-2966

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Transmitters
"Now in our 30th year"

**116 AM & FM
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in Stock**

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- ✓ ALL - Manufacturers
- ✓ ALL - Instruction Books
- ✓ ALL - Complete
- ✓ ALL - Spares

Call and take advantage of our liberal trade-in plan. Tune and test on your frequency, available on site. Complete inventory on request.

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**NEW
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BF-5K**

Lowest priced
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5500 W FM, broadband grounded grid output circuit, VSWR protection, excellent efficiency 75-80% automatic recycling & overload status. Fully remote controlled. FCC approved to 5500 watts.

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Omaha, NE 68164
402-493-1886
FAX: 402-493-6821

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call now!**

New McMartin 20W, BFM-5000 FM exciter, New McMartin BFM10050 FM relay rebroadcast PCARS, also some used McMartin B910 exciter, 15W, Goodrich Inter., 11435 Manderson St., Omaha, NE 68164, 402-493-1886 fax 402-493-6821

CONTACTOR SALE

GCR-201: \$250
GCR-701: \$400

GELECO

PH: (416) 421-5631
FAX: (416) 421-3880

TRANSMITTERS

Want To Sell

Collins 20V3 1 kW tuned to 1290 kHz, in service & powered down to 500 kW, \$2500 +shpg; Collins 21E 5 kW tuned to 1290 kHz, in service, spare tubes, \$5000 + shpg, J Michaels, POB 539, Sparta WI 54656, 608-269-3100.

QEI amplifiers, exciter and stereo generators. All are reconditioned and are tuned and tested on your frequency. 6 month warranty is included. If you want quality used equipment, call or fax 609-232-1625 and ask for Bob Brown.

Harris 5 KW solid state AM in excel cond. K Carreker, WACL, POB 858, Waycross GA 31502, 912-283-1380. (6PM-8:30PM EDT).

ERI Super Power 4-bay w/radomes & shorting stub 92.1 mHz, excellent. 816-628-5959. Harris solid state exciter from FM2.5, \$750, 504-751-9800.

CSI Electronics EX-20F solid state FM exciter, R Lankton, 4027 Cochise Ter, Sarasota FL 34233.

Tepeco J-316-M FM translator w/manual in excel cond, 107.7 MHz receive, 101.7 mHz transmit, \$1250, Bob, 802-649-3510.

LPB AM-60P 60-watt AM transmitter, solid state, like new. Call 816-628-5959.

Used equipment for sale: Belar SCM-1, Belar RFA-1, Belar FMS-1, Belar FMM-1, Moseley MRC 1600 system, TFT EBS receiver/generator, Gentner patch panel, and Harris racks. Call Transcom Corporation 800-441-8454 or 215-884-0888.

Want To Buy

McMartin AM/FM xmtr, any model, exciter or stereo modules. Goodrich Ent., 11435 Manderson, Omaha NE 68164, 402-493-1886.

CCA ELECTRONICS

**NEW SPECIALS!
3 YEAR WARRANTY!**

AM 1000D 1kw AM \$10,500
FM 1000SS 1kw FM \$12,000
Compact Solid-State

**CCA NAB '96 DEMOS
FULL 3 YEAR WARRANTY!**

CCA FM 60G 60w \$3,600
Exciter

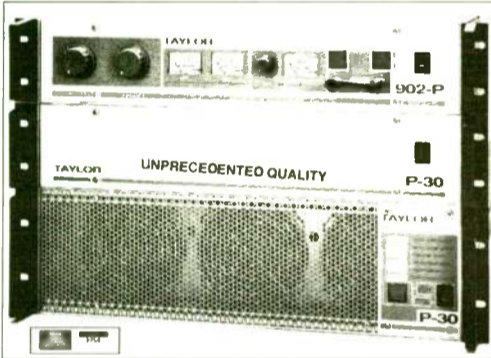
USED TRADES

85' Cont. 816R-3b \$28,000
25kw FM w/802a exciter
Harris FM10G 10kw \$9,500
FM w/Collins 310Z exciter
CSI T3F 3kw FM with \$7,500
EX-20 exciter

Call Darrin, Steve, or Charles

770-964-3530

INCREDIBLE TRANSMITTERS



TV TRANSMITTERS

1Watt	\$1,114
2Watt	\$1,664
4 Watt	\$2,138
20 Watt	\$3,890
40 Watt	\$5,046
100 Watt	\$6,206
200 Watt	\$9,874
400 Watt	\$13,171
800 Watt	\$18,295
1KWatt	\$22,900

**FM RADIO
TRANSMITTERS
Including Stereo Encoder**

1Watt	\$1,138
30Watt	\$1,499
300 Watt	\$3,174
600 Watt	\$5,960
1K Watt	\$8,716
2K Watt	\$11,905
4K Watt	\$20,741

TAYLOR
The Transmitter People

Taylor Bros. (1996) Limited, Inc. 4
Orlando, Florida Tel: 407-952-1221
Fax: 407-626-1736

Contact Radio World Newspaper for advertising space availabilities

P.O. Box 1214 ▪ Falls Church, VA ▪ 22041

**703-998-7600
Ext. 154**

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HELP BUT BLOW YOUR OWN HORN!**



There comes a time when a company knows it has a break through product. And for Energy-Onix, that time is now.

The **ECO** 15-30, Single tube, High Power Grounded Grid Transmitters up to 32 KW.

- ◆ Solid State driver up to 2 KW serves as emergency transmitter
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◆ BEST OF ALL THEY ARE ECONOMICALLY PRICED!

"The Transmitter People"
Energy-Onix

**518-828-1690
FAX: 518-828-8476**

752 Warren Street, Hudson NY 12534

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Serving the Broadcast Industry Since 1978

Fine Used AM & FM Transmitters and Also New Equipment

For the best deals on Celwave products,
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1 kW FM 1978	Collins 831C-2	1 kW AM 1982	Harris SX1
2.5 kW FM 1983	Harris FM2.5K	1 kW AM 1978	Harris MW1A
5 kW FM 1981	McMartin BF-5K	1 kW AM 1963	RCA BTA 1R1
5 kW FM 1969	RCA BTF 5D	5 kW AM 1977	RCA BTA 5L
10 kW FM 1968	RCA BTF 10D	10 kW AM 1974	CSI T-10-A
10 kW FM 1976	RCA BTF 10E	10 kW AM 1980	Harris MW-10
20 kW FM 1974	Collins 831G2/Cont 816R2	10 kW AM 1976	Continental 316F
20 kW FM 1968	RCA BTF 20E	25 kW AM 1982	CSI T-25-A
		50 kW AM 1978	Harris MW50C3 (1100 KHZ)
		50 kW AM 1978	Continental 317C1
		50 kW AM 1973	Continental 317C
		50 kW AM 1981	Continental 317C1
		50 kW AM 1982	Harris MW-50B

1077 Rydal Road #101, Rydal PA 19046

800-441-8454 • 215-884-0888 • FAX No. 215-884-0738

IF YOU WISH TO CONTACT OUR HOME PAGE, WE ARE AT WWW.VOICENET.COM/~TRANSCOM
IF YOU WISH TO E-MAIL US, WE ARE AT TRANSCOM@VOICENET.COM

EMPLOYMENT

To place ads in this section, use the ActionGram form. To respond to box numbers write Radio World, PO Box 1214, Falls Church, VA 22041. Attn: _____

HELP WANTED

Engineer wanted for Full Service Consulting/Contract Engineering Service serving Northeast. Must be licensed, reliable, communicate well & take interest in clients needs. Digital, studio & Hi/Lo pwr RF experienced. Resume to: Radio World, POB 1214, Falls Church VA 22041. Attn: Box #96-7-10-4RW

COLORADO SPRINGS CHIEF ENGINEER
Top-rated, heritage CoSprings Country Station has immediate opening for Engineer with strong audio, digital & maintenance. Good salary, great lifestyle. Resumes to GM% KKCS, Box 39102 CoSprings, CO 80949. EOE

Experienced Chief Engineer
Assume all engineering responsibilities for 3-4 FM radio stations and 1 AM all in same market on Texas Coast. Must know all aspects of radio engineering including transmitters, studios, computers, installation, and FCC regulations. Strong group ownership, competitive salary, great benefits. EOE. Send resume to: Radio World, POB 1214, Falls Church VA 22041. Attn: Box#96-7-10-3RW

WANTED: Engineer needed for growing fulltime radio network based out of Chicago, Illinois area. Applicant must have strong knowledge of the latest in Digital Technologies as it relates to satellite delivery and Point to Point Digital Telco Circuits including ISDN and switched 56 Data Circuits. Applicant should have strong studio construction and maintenance skills and be willing to travel nationwide on occasions to set up equipment for remote broadcasts. Applicant must be willing to be on call 24 hours a day with an nationwide pager and be able to work long hours when necessary. Salary range \$35k to \$60k annually. Send resumes and salary history to:

Jerry L. Heckerman
Director of Engineering
One-On-One Sports
Radio Network
1935 Techny Rd Ste. 18
Northbrook, IL 60062

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1-800-336-3045
call now!

Chief Engineer Needed
For three stations in beautiful Lexington, Kentucky.
Organized person needed to oversee the operation and maintenance of 2 FM's and 1 AM facility. Minimum 3 years of engineering experience that includes RF, AM Directional Antenna Systems, Satellite Equipment, Computers and Computer Automation required.
Send Resume to:
Bob Hogan
Trumper Communications of KY
3549 Russell Cave Road
Lexington, KY 40511 **EOE**

Sales - Technical
Incentivized sales and technical support on new products from established manufacturer for broadcasting and cable TV. Excellent working environment in a fast-growing, high-tech company. Earn up to \$100K annually, depending on skills and experience. Full employment benefits, 401(k) and bonus.
Send resume to:
ATTN: Human Resources
530 Lawrence Expressway
Suite 531
Sunnyvale, CA 94086

WCOL AM-FM has an opening for an **Assistant Engineer**. Qualified applicants should be familiar with high power FM, studio maintenance, PC systems including Novell 4.1 and possess good troubleshooting skills. SBE certification a plus. Reply to Kevin Surgeon, Chief Engineer, WCQL, Two Nationwide Plaza 10th Floor, Columbus OH 43215. No phone calls please. **W C O L / N a t i o n w i d e** Communications Inc. Is an Equal Opportunity Employer

The Westwood One Companies has an immediate opening for an Operations Manager in our Arlington, VA facility. Individual must have 3-5 years experience in the operations of broadcast facility, with at least one year supervisory experience. Must have understanding of technical operations; computerized switching; traffic; production and satellite distribution. Must have ability to work all shifts including weekends, holidays, evenings and have valid driver's permit. If you meet the above qualifications please forward your resume to Westwood One Companies, Personnel Dept., 1775 S. Jefferson Davis Highway, Arlington, VA 22202. EOE/M/F

Program Director
Are you interested in working in a station with one of the largest audiences in the country...with an adult contemporary/inspirational music format? Do you have proven track record as a Program Director with strong communication skills; able to model and develop your staff to build and maintain audience involvement; loyalty and response? Position will include a daily air shift; oversee music selection and placement; creative development and execution of on-air promotions and building team involvement in "selling" the station on-air. If you have these qualities along with a personal commitment to ministry and spiritual character, call Roger Booth at WERN, at 1-800-933-0501. EEO Employer

OPERATIONS MANAGER
Charisma Radio Corp. POB 1389 Highlands NC 28741 EOE

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This listing is provided for the convenience of our readers. Radio World assumes no liability for inaccuracy.

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 U.S. West: Dale Tucker916-721-3410 Fax: 916-729-0810
 U.S. Midwest: Sandra Harvey-Coleman317-966-0669 Fax: 317-966-3289
 International: Stevan B. Dana+1-703-998-7600 Fax: +1-703-998-2966
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 Free Subscriptions are available upon request to professional broadcasting and audiovisual equipment users. For address changes, send current and new address to RW a month in advance at P.O. Box 1214, Falls Church, VA 22041. Unsolicited manuscripts are welcomed for review; send to the attention of the appropriate editor.

ABOUT OUR EMPLOYMENT SECTION

HELP WANTED

Any company or station can run "Help Wanted" ads for \$1.95/word or buy a display box for \$65/column inch. Payment must accompany insert, use your MasterCard or VISA; **there will be no invoicing.** Blind box numbers will be provided at an extra charge of \$15. Responses will be forwarded to listee, unopened, upon receipt. Call 800-336-3045 Ext.154 for details.

POSITIONS WANTED

Any individual can run a "Position Wanted" ad, FREE of charge (25 words max), and it will appear in the following 2 issues of Radio World. Contact information will be provided, but if a blind box number is required, there is a \$15 fee which must be paid with the listing (**there will be no invoicing**). Responses will be forwarded to the listee, unopened.

Mail to: **BROADCAST EQUIPMENT EXCHANGE,**
PO Box 1214, Falls Church, VA 22041 Attn: Simone Mullins

POSITIONS WANTED

15 yr pro Keven Hillely avail now to jumpstart your morning show, fun, great phones & team player, willing to relocate. T&R, 717-944-7673.

Afternoon air talent for #1 radio station in Gallup, NM, avail immediately. K Garrett, KXTC, 2495 E Aztec, Gallup NM 87301.

Creative personality & outgoing broadcaster ready to start ASAP, looking to get into sports, on-air, etc. Jay, 405-787-5736.

Grant writer & consultant to producers & stations. Develop, enhance & fund training, news/arts/public affairs, programs, equipment, special events. Betsy Lenke, 212-929-1231.

Studio/xmtr plant construction, directional antennas repairs, construction & proofs. 412-942-4054.

POSITIONS WANTED

Young, enthusiastic graduate ready to use skills & training to bring you a different angle & personality. Greg, 405-964-5169.

30-yr pro seeks small market management opportunity in SE. Broad knowledge, creative, organized, high integrity. Send inquiries to potential at POB 14706, Greenville SC 29610.

Atlanta GA & Ohio: 6 yrs exper as jock, news guy, PD, MD, seeks FT position in these markets preferably. On-air or PD sought especially, hard-working, creative & dedicated. Ron, 419-893-7968.

Experienced tech seeks bdct engrg or tech position, possible mgmt, FCC General lic, tower climber, AS degree, 32 yrs old, willing to travel. S Youngblood, Rt 1 320A, W.WA FL 32465. 904-648-4098.

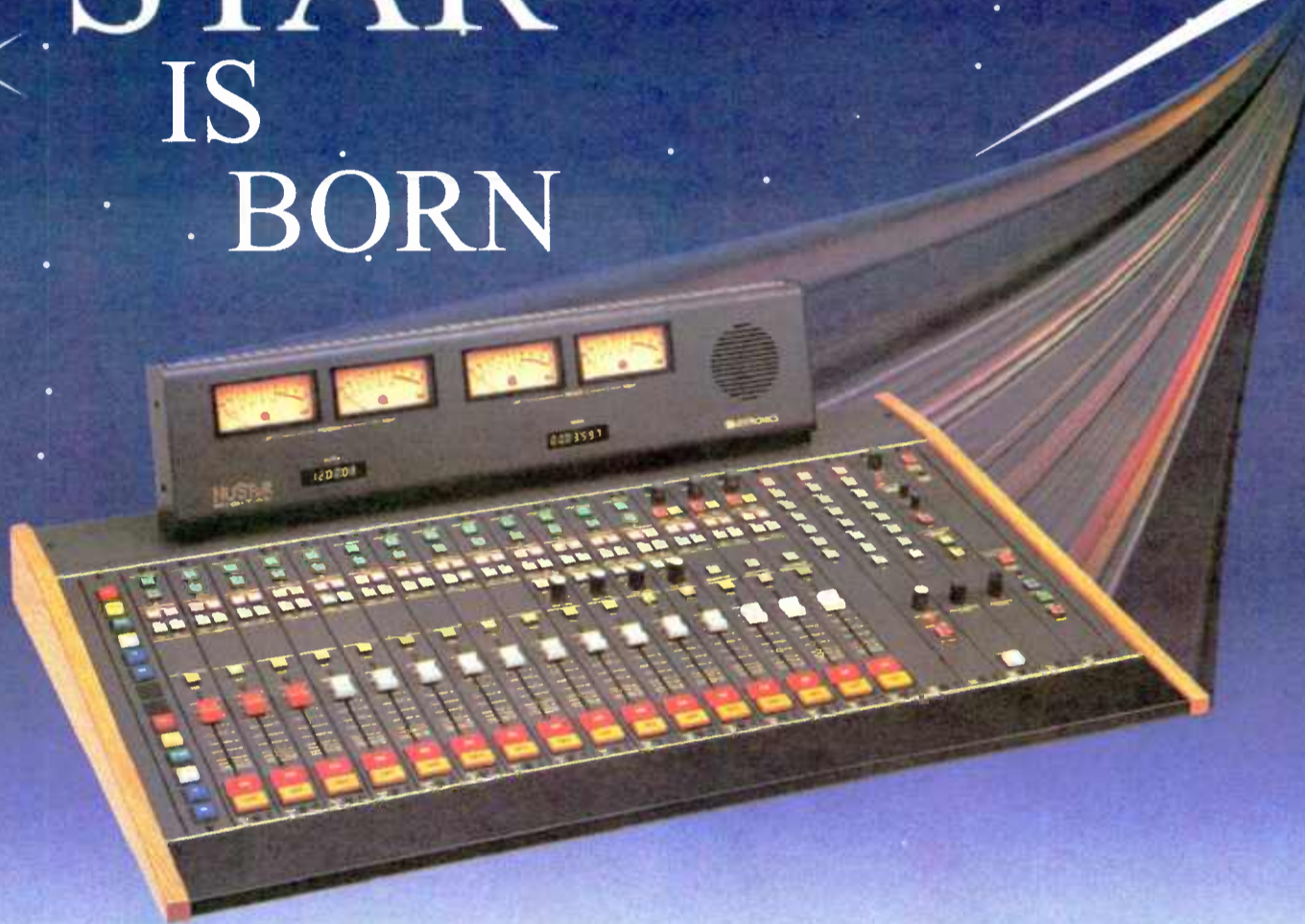
Kevin Hillely, 15 yr pro, avail now to jump start your morning show. Fun, great phones & a team player, willing to relocate. T&R, 717-944-7673.

22 years on-air, MD, PD, currently GM/GSM of small market AM/FM combo, seeking bigger challenge, prefer Midwest. Inquiries to: Radio World, POB 1214, Falls Church VA 22041. Attn: Box #96-07-10-1RW.

Manager avail now for Christian radio, will help you go from a CP to a top 10 station, or a complete turnaround at your FM station, salary negotiable depending on compensation plan, will also consider investing in, LMAing or buying CP or existing FM, commercial or non, exper in computer automation, satellite tech & the Internet. Mac, 206 Hunters Mill Ln, Woodstock GA 30188.

Proven sportscaster looking for new challenge. Talk show host, reporter, anchor, play-by-play, or behind the scenes work. Enthusiastic & knowledgeable. Eric, 614-291-5081.

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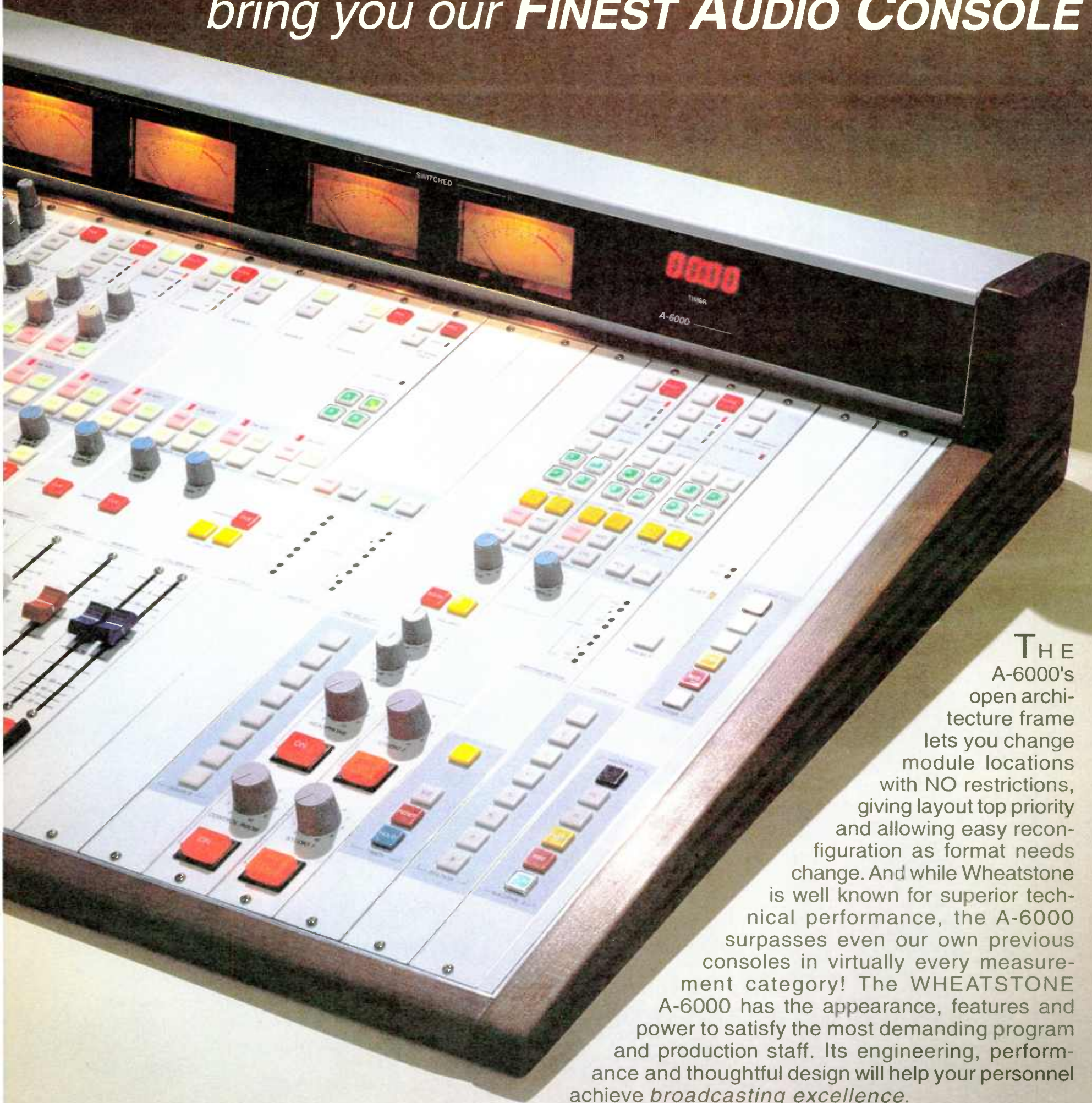
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