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Radio World®

The Newspaper for Radio Managers and Engineers

October 28, 1998

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Radio Follows John Glenn Aloft

by Randy Stine

"Ready for launch." Those are the words United States Sen. John Glenn has been waiting to hear again for 36 years.

On Oct. 29, Glenn is expected to become the oldest person to fly in outer space, with a scheduled mission aboard the space shuttle Discovery. Glenn has captured the attention of Americans and the media with his flight, and major radio news networks are preparing to give his return to space much more than their usual shuttle coverage.

Officially considered a payload specialist, Glenn will act as a human guinea pig for NASA to study the effects of aging and space flight.

NASA workers help Sen. John Glenn (D-Ohio) into his spacesuit.

Glenn piloted his tiny spacecraft in orbit around Earth three times on Feb. 22, 1962. That flight lasted just under five hours. The Discovery mission will last 10 days.

As the 77-year-old Glenn arrives at the John F. Kennedy Space Center in Florida, he brings with him a massive amount of media coverage for the launch of Discovery. Not since the space shuttle program resumed flights after the Challenger tragedy has there been so much attention focused on the agency

See GLENN, page 8 ▶

'Perfect Paul': NOAA Voice Not So Ideal

by Lynn Meadows

WASHINGTON His name is Perfect Paul. But to broadcasters, he is anything but perfect.

Perfect Paul is the first of several synthesized voices that the National Weather Service will use as the voice of NOAA Weather Radio. He will read weather forecasts, updates and weather warnings.

The latter has set some broadcasters' teeth on edge.

"It is like one of those dolls from Wal-Mart where you push the button and cannot understand what it is saying," one long-time broadcaster said.

Replacement system

The new automated voice is part of upgrades taking place at the National Weather Service. Back in the late 1980s, according to Meteorologist Joanne Swanson, there was a push to upgrade facilities and implement Doppler radar and the best atmospheric information available.

Along with the upgrade came a desire to automate the interface between the meteorologist and weather radio for quicker warnings. With the old system, the meteorologist typed his forecast and handed it to someone else to read over the air or

See NOAA, page 3 ▶

◆ NEWSWATCH ◆

Clear Channel, Jacor to Merge

Clear Channel Communications and Jacor Communications have signed an agreement to merge in a tax-free stock swap. The merger was valued at about $4.4 billion, based on the closing price of Clear Channel stock (NYSE:CCU) of $37 on Oct. 7.

The deal is expected to close Sept. 30 of next year. At 454 radio stations, the combined entity would be second in the nation after Chancellor Media in terms of station count, and third-largest in terms of revenue after both Chancellor and CBS/Infinity.

If the deal goes through as planned, Jacor would operate as a separate subsidiary of Clear Channel, and Randy Michaels would continue as Jacor's chief executive officer.

NAB: 'No Interference'

WASHINGTON The NAB Radio Board voted to oppose an FCC proposal to allow stations to negotiate their own interference agreements in some limited cases. NAB formed an ad-hoc engineering group study the proposals; it recommended that the board oppose the agreements. NAB Science & Technology Vice President John Marino said, "They feel it's important to preserve the integrity of the FM band."

Marino said the board wants to avoid what he called "the AMization" of the FM band. Over the years, Marino said, "AM has become a band loaded with interference and we don't want that to happen with FM."

The proposal is part of a larger rulemaking proceeding on FM technical issues before the FCC. NAB expected to file comments at the FCC on this issue by the Oct. 20 deadline.

EEO Reports Suspended

WASHINGTON Station managers and their lawyers have less paperwork to file at the FCC. The FCC has suspended until further notice the requirement that radio and TV stations file annual station employment reports (FCC Form 395-B), Equal Employment Opportunity Program reports (Form 396) and EEO Model Program reports (Form 396-A). This comes on the heels of a ruling by the D.C. Circuit Court to uphold a previous ruling that found the FCC's EEO rules unconstitutional.

The FCC did not rule out a further appeal. Chairman Bill Kennard said he was confident the rules can be revised to satisfy the court by early next year.

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Radio Finds Voice Hard to Weather

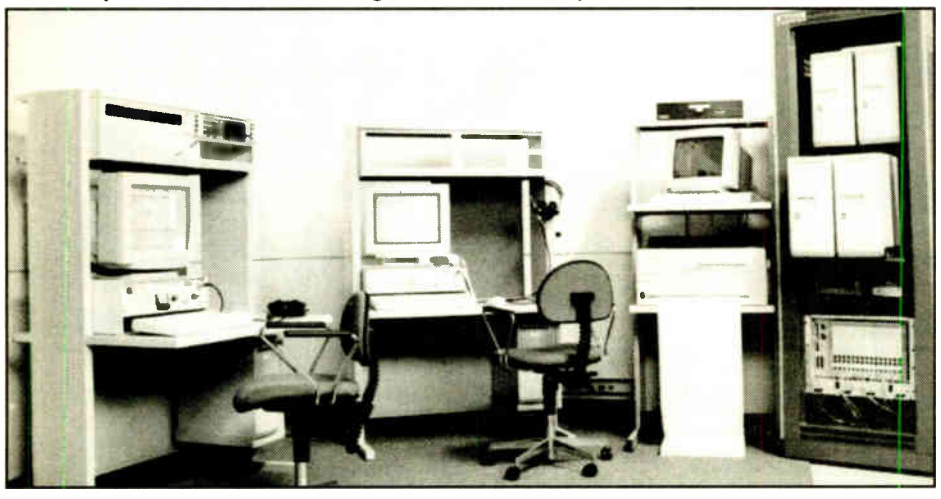
▶ NOAA, continued from page 1

record. An alert intended for several counties with slightly different information could take several minutes to get out to everyone affected.

With the new system — named the Console Replacement System — and its synthesized voice, the meteorologist will simply enter the forecast, press "send" and the information will go on the air.

Another reason for the timing of the CRS was the cost of maintaining the old NWR AMPRO consoles purchased in the mid-1970s. The console consists of two banks of cartridge tape players and record/playback units. Because of their age, parts were becoming harder to find.

According to Larry Krudwig, manager of field systems for the central region of NWS, the cost to maintain consoles in his 14-state region was $250,000 a year. That amount covers only parts, carts and electricity — not labor.



The NWS Console Replacement System

Plan for disaster

In the early 1990s when the Console Replacement System was in development, planners had a choice between using a synthesized voice or a concatenated voice on the air. Concatenated voices — like those heard when you call information for a number — are made up of prerecorded words pieced together.

Planners wanted the automated voice to have a complete vocabulary. The NWS is using DECtalk card, a product of Digital Equipment Corp. now owned by Compaq, in the CRS. The DECtalk voice card will try to pronounce any word it reads, said Jerry Stephens, CRS program manager for the NWS. The cards are used to assist the physically challenged in communicating. British physicist Stephen Hawking, for instance, uses one as his speaking voice.

Also to be considered, said Stephens, were the hundreds of river names and county names that would need to be recorded to make a successful concatenated system. There was concern, he said, that eventually more words would need to be added and the original voice would not be around anymore to record them.

"It was a big discussion even back in the early days," said Swanson of the voice automation decision. That discussion has resumed, but now the talkers are broadcasters who are not interested in airing synthesized EAS alerts from the National Weather Service. The NWS has made some adjustments to Perfect Paul's voice to make it clearer.

Frank Lucia of the EAS office said he heard the voice in a CRS demonstration this spring. He said he cautioned the NWS officials present that the broadcasters would have a concern about the voice. Anyone interested in hearing Perfect Paul's voice can visit the CRS information Web site at *www.nws.noaa.gov/oso/oso1/oso12/crs.htm*

Not now, not ever

"I'm not putting that voice on the air," said Steve Terry, station manager and chief engineer of WYPL(FM), Memphis, Tenn. He said every station in the area except his has disconnected NOAA Weather Radio from their EAS boxes. One station, he said, even held a little ceremony on the air to cut the wire.

Memphis broadcasters' concerns with the weather service go beyond the synthesized voice used in the CRS. In April, he said, the local NOAA weather radio station tried to put out a warning. In that incident, NOAA weather radio took over the station's airwaves with its EAS attempts five times in 13 minutes, but never actually got it right.

The problem, said Terry, is there is no quality control at the weather station. Prior to the EAS mandate on Jan. 1, 1997, when hundreds of broadcasters began using weather radio as a source for their EAS boxes, Terry said the weather service was a proprietary system so no one monitored it and no one caught any mistakes made.

The NWS is aware of criticism of the synthesized voice. The head of the service formed a task team to address the question of the voice in April. The group recommended that the NWS move forward on adding a concatenated voice to the system with a limited vocabulary at first.

Swanson and Berger both said that budgetary constraints mean concatenated voices will definitely not be added until at least fiscal year 2001.

Swanson said some places will continue to do weather warnings live and automate the rest of the NOAA Weather Radio programming if broadcasters agree to carry the in formation without delay.

That leads to another sore subject in the EAS system. Many broadcasters operate their EAS boxes in manual mode. When an alert comes in, the operator checks to see what it is all about before he or she puts it on the air. The station has the choice to put the original alert on the air or read the information themselves.

In some states, including New York, broadcasters are encouraged to let warnings for dire emergencies like tornadoes or flash floods bypass the manual mode and go right on the air.

Bob Hill, state emergency communications chairman of New York, is skeptical that the public will trust the new voice.

"I think you need a human voice to tell you of a life-or-death situation," he said.

"Hearing an emotionless and blatantly artificial voice utter an EAS life-safety warning is a bad idea," wrote Richard Rudman in an e-mail to **RW**. Rudman is Los Angeles County local emergency communications chairman, California South state SECC vice chairman and FCC EAS NAC appointee. "I would really like to see what scientific studies this decision was based on."

Lyn Williams, president of MTS Communications, said his company's software package EAS Encoder II uses a concatenated voice to read information. He said there are more than 3,800 words in the database. It took the man who recorded them one day to do it.

Williams said Perfect Paul will have trouble "knowing" how to say some words because he reads phonetically. Williams used the example of Beauford, N.C., and Beauford, S.C., two towns on the border in the same weather district. Locals pronounce one "Bewfort" and the other "Bowfort."

Stephens admits the synthesized voice may not always be right, but the meteorologists can correct a mispronunciation by spelling a name phonetically.

"They can. The question is, will they?" said Williams. He used the Virginia town of Galax, pronounced "Gaylax," as an example. Someone hearing the synthesized voice mispronounce the name of that town may think the warning applied to some other area.

Said Hill, "When there is a possibility of an error (in pronunciation), it's going to happen at the worst possible time."

Williams suggestion was to get the structure with all the phrases in it and have a professional broadcaster in each area record the words. The concatenated voice may sound a little halting, he said, but at least it would be intelligible.

Judging by online comments at *broadcast.net*, some broadcasters believe the NWS does almost nothing right.

"Unfortunately, we've never had a love affair with EBS and EAS," said Swanson. The NWS is accustomed to complaints about warnings being too long or the interrupting ball games, as well as complaints about the quality of the NWS announcer's voice.

"In some markets, the synthesized voice just added insult to injury," said Swanson. For now, she said, at the discretion of the local NWS employees, some NOAA weather radio stations can continue to air warnings live unless short staffing makes that impossible.

■■■

Tell us your opinion of the new digital weather voice. Send e-mail to radioworld@imaspub.com

The Golden Times for Engineers

From the Editor

Paul J. McLane

Radio engineering is enjoying a golden age.

The thoughtful reader might find humor in this thought. These are the good times? With consolidation, reduced staffs, salaries out of line with other technical industries, bottom-line managers and omnipresent pagers?

But consider.

Consolidation has opened opportunities that did not exist three years ago. Today, one person can hold the title of director of engineering for a group of 450 radio stations. (At the moment, there are only one or two such jobs, but that will change. Meanwhile, many more groups have dozens or hundreds of stations in their fold.)

The requirements of that job represent the highest level of corporate responsibility, including long-range planning, employee management expertise, budgeting, liability and many other considerations. In 1998, a DOE must be an exceptional communicator, a wise manager, savvy about money, someone who is able to sit down across the table from a Tom Hicks or a Mel Karmazin — who are themselves hard-edged men with billions of dollars invested in their stations — and set out strategies to help these owners meet their goals.

In the field

That's not to say that the traditional model of a radio engineer is out of date. The guy or gal with sleeves rolled up and mud on their shoes from the transmitter site remains a critical part of any radio operation. But now there's another career level to shoot for, should you choose to do so. In the past, our colleagues in sales or programming could hope for promotion to general management. Engineers generally did not have such a higher career path within their company, and prestigious network jobs were few. That has changed.

And let's consider the prospects for that field engineer. Are things better or worse today?

I argue that things are better. If that engineer has kept up his or her education, taken time to learn about computer networking, developed an area of expertise that is useful to the station owners, then he or she has better job prospects today than 10 years ago. Radio groups are hungry for such employees. They are offering good pay, interesting markets, better benefits, and potential for advancement to managing other technical staff.

Consider also the tools available to the engineer. In the past, when you were sitting at a transmitter site trying to decide how to fix a problem, you could pick up the phone and call the factory, or maybe call a couple of friends in your local SBE chapter. If you were lucky, you also had a mentor.

Now, if you work at a group like Chancellor or Entercom or CBS/Infinity, you have dozens or hundreds of colleagues in your own company to draw upon. Your peers form a substantial knowledge pool. You are in touch via e-mail, intranets and regular conference calls.

The DOE of one large group told me an anecdote that provides an example. One of his engineers had to deal with a diesel fuel spill at a transmitter site. Now, that's not something that happens every day. He had to think fast and learn, on the spot, how to handle the crisis. Afterwards, he typed up a list of things he had learned, and steps to take now to protect yourself if it should happen to you. The company put that information on its in-house Web site. End result: More information and better support for all engineers on staff.

That's not to mention the immense amount of support information available today through outside resources, in publications and Web sites like ours at **RW** and through industry associations like the SBE and IEEE.

Smart engineers also are playing up their specialized knowledge to make themselves more valuable. Another group engineering chief, in the Northwest, tells me his owners had planned to do fewer remotes in 1998. Now they're doing so many remotes that they have one engineer in the group who specializes in remotes, who does nothing else. He knows the tools, the problems and the solutions that go with this profit center.

This is specialization. Engineers are making themselves into specialists in wide-area networking, in the unique problems of AM arrays, in the process of managing budgets.

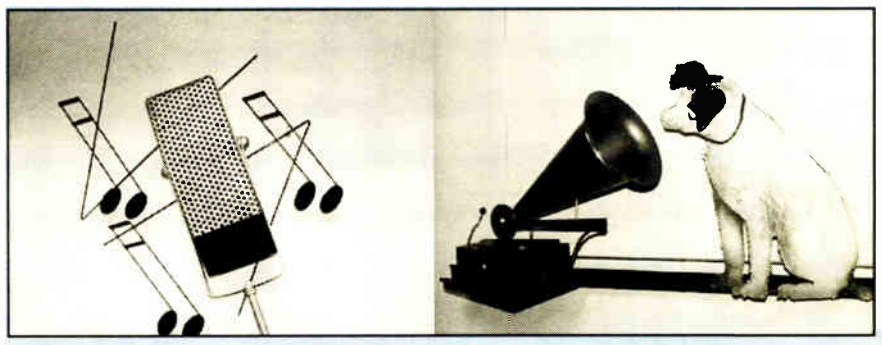
Corporate input

One group DOE related to me this week how he had recently delivered a presentation about radio technical issues to a gathering of managers from his many stations. He is pleased that his owners understand the value of this kind of communication, and he urges other groups to include their engineers in their overall company decision-making process.

In short, something has changed in the last few years. After a period of hand-wringing in which engineers wondered how they would fare in the post-consolidation world, after seeing many colleagues flee to pursue "better" opportunities elsewhere, the field has stabilized. Employers see the benefit of experienced technical help. Large corporations may have less "heart" than mom and pop did, but they understand the value of an investment, and how to protect it. Smart employers give their engineers reasons to stay. I anticipate this trend continuing.

As engineer Troy Pennington writes in a Guest Commentary in this issue, there are intangible benefits to being "The Chief." I go further: These are good times to be a radio engineer.

Last month I had the chance to visit the headquarters of Broadcast Richmond in Indiana, which was founded five years ago by its president, Joe Ziemer.



Joe was kind enough to show us around his 4,000-square-foot facility, from which BR sells new and used equipment, in systems and separately, to radio clients in the United States and abroad. Among its more interesting orders was the supply of an emergency, complete on-air radio studio to the U.S. Army for its forces in Bosnia.

One fun item that caught my eye were these hand-crafted metal wall hangings, suitable for your lobby, air studio or conference room. They are made by Artisan House of California.

The average price is about $290 delivered. The average size is 36 inches wide by 6 deep by 24 high.

"Big Mike" and "His Master's Voice," shown, are popular. There are other designs suitable for radio or TV stations. They can be viewed at *www.broadcast-richmond.com*. Click on "Special BR Offer Here."

READERS FORUM

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

DAT's nice

Dear **RW**,

Thanks to all at **Radio World**, for a great newspaper. It keeps me in touch with what's out there.

I find your articles on DAT usage very interesting. We use DAT quite a bit at our stations. As the creative services director, I find it a reliable and easy way to archive every single commercial we produce.

Because we can't seem to move into the digital commercial delivery direction as soon as I'd like, I can still keep a clean master for re-dubs. Also, both of our voice guys send DAT for promos, sweepers, etc. And perhaps our best usage is in the field. We collect audio from artists and listeners at concerts and events and even from school kids for a weekly "Pledge Of Allegiance" that airs on our country station.

I have yet to find anything — CDR, MD, etc. — that can provide the flexibility and reliability that we get from digital audio tape.

Thanks for your articles.

Craig Deboldt
Creative Services Director
WESC-FM, WTPT(FM)
Greenville/Spartanburg, S.C.

Dave and dinosaurs

Dear **RW**,

This letter is in reference to the Page 4 editorial, "A Dinosaur Frets About Extinction" (**RW**, Sept. 2). Unfortunately, I think Dave is correct. I am of the older radio generation (58), make my living designing AM and FM radios and spend most of every day listening to the radio.

The only stations in my area that are interesting are AM stations with talk shows, two FMs with unique local programming, and public radio because of the programming. I need to use a directional FM antenna with a preamplifier to receive the ones I like. The directional antenna helps eliminate the co-channel interference. My children all got turned off by FM and now use only the cassette or CD players in their cars.

It seems like the broadcasters would all like to put on the subscription tapes, automate the commercials and collect the money. I have often tuned across the FM band and heard the same music tape on two different stations — sometimes delayed slightly and sometimes almost in synchronization. The processing is always excessive and there are only three formats — new age, country or rock. It doesn't take long to get tired of any one FM station.

AM continues to deteriorate because of interference from all the other electronic devices around in addition to the power-line noise.

Fortunately, I live in the country with an external active antenna and filters on my power line. Digital radio will not solve anything, because the format will remain the same.

Jon GrosJean
Jon GrosJean Consulting
Hancock, N.H.

Instrumental correction

Dear **RW**,

I read with interest the "Radio Chronicle" article on the origins of the bazooka in your July 22 issue.

Being a former Arkansan and having a certain amount of familiarity with Bob Burns and his career, I feel compelled to set some of the facts straight concerning Burns and his contrived musical instrument.

First, it is unfair in the extreme to state that "part of Burns' act consisted of murdering a familiar tune." Burns was a competent musician. If the writer were to sample some of the Kraft Music Hall series programs alluded to, it will be found that Burns played a very "straight" bazooka rendition. The tonality of the bazooka can best be described as resonant and mellow.

The instrument's name did not come "after the sound it grudgingly gave out." Further, it was not invented by Burns.

In the early 1970s, I became interested in the origins of the bazooka and was directed to one Henry Hink residing in Burns' hometown of Van Buren, Ark. Burns made numerous references to Mr. Hink in his radio broadcasts, referring to him as his "Uncle Hink," the only one of Burns' assortment of denizens of Van Buren that existed in reality. I was afforded two interviews with Mr. Hink, the second of which occurred only days before his death in 1971.

Mr. Hink had been employed with Burns' older brother at the gas works in Van Buren before Burns' career blossomed into radio and motion pictures. According to Hink, the younger Burns was a frequent visitor to his brother's place of employment and was always something of a blowhard. It was these frequent visits, coupled with an indulgence in verbosity to the extreme, that resulted in the invention of the musical contraption and with it the name bazooka entering the English language.

Fed up with Burns' incessant gab, Hink took advantage of Burns' absence one day to assemble some assorted gas pipe sections and crown it with a whiskey funnel. On the occasion of Burns' next visit and hyper-exaggeration, Hink produced the assemblage and requested that Burns "shoot off his big bazoo into that." (Bazoo was a slang term at that time for a big mouth.)

The device was soon dubbed the bazooka and the name stuck. As Burns had a natural musical talent, he took a liking to the device and learned to play it in a manner similar to a slide trombone. (The pipe sections were chosen so that slid inside the other to vary length of the air column just as in a trombone.)

According to Hink, Burns' career track capitalized on his skill as a loudmouth. One of his first paying jobs was that of a midway barker. Later, he made the big time, appearing as a regular in comedy sketches with Bing Crosby on the Kraft Music Hall. He also starred in several motion pictures as well as hosted his own radio series. Burns never forgot his roots and his early friendship with Hink. The two remained friends for life, with Burns frequently inviting Hink to his movie premiers and other special occasions during his show business career.

James E. O'Neal
Alexandria, Va.

Follow The Rules

The sight of low-power radio proponents running up the Jolly Roger at NAB headquarters in Washington this month was a new twist on an old theme. Those involved in the micro-radio movement are using a high-profile strategy these days, embracing their pirate image even as they argue for a new legalized low-power service. But apparently they have nothing new in terms of organization for their cause.

The recent demonstration and workshops in the nation's capital did little to further the so-called pirate radio movement. Members are disorganized, lacking a clear direction, pursuing many agendas. For example, some still object to the pirate image itself, while their brethren embrace it.

Reflecting its anarchical roots and its diversity, the micro movement certainly is not united. In radio programming, perhaps that's good. But when it comes to lobbying Congress and realizing change in the political landscape, that's bad. The micro movement must work smarter or it will lose the window of opportunity it has to achieve real change in the radio landscape.

FCC Chairman Kennard has made it clear he has an open mind toward the goals of the legalized low-power movement. The FCC at this writing continues to ponder several proposals — and a great many comments — aimed at creating a new low-power service. This is the time for proponents to show they understand the need for responsible lobbying — not confused agendas and vandalism.

We have argued in this space that radio has lost diversity in programming and ownership, and that a new low-power radio service, properly thought out and regulated, could be one answer. Changes in the landscape of our industry have made it desirable for more voices to be heard. Consolidation has indeed driven up the cost of radio properties, making it even more difficult for anyone to own a station. The FCC and Congress seem to be listening to these arguments.

Micro-radio proponents have an opportunity to be heard. If they hope to achieve real change, they need to demonstrate that they can act responsibly and within the law. This is about more than sneaking a flag up the NAB flagpole. It is about demonstrating that proponents will not abuse the public spectrum once they have access to it.

— RW

Write to Us

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READERS FORUM

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Correction

The chart on page 12 of the Aug. 19 issue listed the flagship radio station of the New York Giants incorrectly. WFAN(AM) and WNEW (FM) now are the Giants' flagship stations. The original information was supplied by the NFL.

In our Sept. 30 issue, WDRC-FM was identified as being in Hartford, Colo. The station is in Hartford, Conn.

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GUEST COMMENTARY

What's It Like to Be the 'Chief'?

by Troy Pennington

The broadcast engineer. The "Chief." Let's see exactly what that means:

A late-night ominous ring of the telephone brings the frantic voice of the board op, or that oh-so-dreaded post-midnight beep or vibration of the pager, which displays the control room hot-line number.

You tune the bedside table radio. A sobering hashy sound confirms the station is off.

A frantic try by remote control to get the transmitter back up is unsuccessful.

You drive to the desolated transmitter site at 1 a.m., occupied with thoughts of "What could it be?" You troubleshoot in your mind while the miles slowly pass by.

Getting close to the site, you see tower lights. Power is on and you say, "Oh, no!" Mental troubleshooting is at double-time pace.

Spooky visit

Under a steady downpour of rain, you attempt to unlock the property gate with hopes of not getting mugged while you wrestle with the lock. It is dark, stormy — and scary.

Finally arriving safely at the transmitter building, you open the door. Inside, all is a spooky quiet. (Before entering the building, though, you make the typical scan for that chicken snake or other vermin lying in wait.)

No blowers; just a dead transmitter. All breakers are OK, but a number of overload flags confront you.

You continue your frantic visual observation, but it shows nothing. You are by yourself.

Safety is foremost in your mind. You get somewhat apprehensive. Do you have the parts necessary to correct the problem, if you find the problem? You ask yourself, "Will I find the problem quickly? Will I find the problem, *period*? How long will I be here tonight?"

And: "How much of Murphy's Law will bite me tonight?"

You collect your thoughts: Keep a cool head. You are a professional. Many are counting on you to get the station back on the air. This is your job. This is what you get paid for. This supports your family. This buys your "toys"!

Don't stress out. No other person at the station can do what you have been trained to do. You bring years of professional experience into play. You realize there are resources available to you. You take a second breath. You persevere, you troubleshoot, and troubleshoot, and troubleshoot.

Fight discouragement

Will this lifeless transmitter ever work again? Wouldn't it be great to see current flow? It would be great to see some power output.

You get discouraged, but again you stick with it. You don't give up. You fight it.

Then, it finally comes — you figure out what happened. You find a spare part or make temporary repairs. The transmitter comes back to life, there is current flow — it is normal! Now everything is fine. The sound of blower mowers is comforting; normal meter readings are a welcome sight.

But are you the hero? No, it is part of your job. You are the "Chief." You are appreciated, but not the hero. It is what is expected of you. You are thankful for your job. You may fuss at times, but deep down, you know you received that 1 a.m. call because you were needed. What a great feeling!

You return home with the satisfying sense that only a broadcast engineer, the "Chief," has felt. Hoping, too, that you do not have to make another trek up to that desolate place again tonight! And a thought as you drive into the driveway leading to your nice home: All this is made possible by those 1 a.m. calls, and all seems a little bit easier to take.

Late-night calls

But at 8 a.m., after a few hours of sleep, you are back in the office and tackling the day-to-day duties of the broadcast engineer. The "Chief." And most folks at the station are never aware that you were out at 1 a.m., doing your part for the company.

We have all been there, and we'll be there again! That phone will ring, maybe at 3 a.m. this time, and that pager will beep maybe a different control room hot-line number next time. You'll be there to answer. Why? Because you are the "Chief."

It is what is expected of us. And we are thankful!

This is our chosen profession.

■■■

The author is SBE national vice president and chief engineer of Cox Radio in Birmingham, Ala.

Keep a cool head. This is your job. This is what you get paid for. This supports your family. This buys your 'toys'!

BUSINESS DIGEST

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

Harris Drops Seed Money Strategy

CINCINNATI Harris Corp. quietly has decided that it will not pursue investments in emerging-market broadcasters after all.

In May of 1997, Guy Numann, then the president of the Communications Sector of Harris, announced in an interview with **RW** at the spring NAB convention that Harris would work to create a pool of capital in the tens or hundreds of millions of dollars — money from Harris and from other investors — to help would-be broadcasters in those countries get started. Numann's plan was ambitious; at the time, he cited George Soros as an example of the kind of investor he hoped to involve in the enterprise.

But Numann has since retired after 35 years with the company, and Harris executives do not intend to pursue his strategy of seeking equity in those potential customers.

Last month, Bruce Allan, vice president and general manager of Broadcast Systems within the Communications Sector of the multibillion-dollar corporation, said his boss, Van Cullens, is not pursuing international investment in broadcasters. Cullens replaced Numann last year.

"We're not a big enough company to take on that role," Allan said. But he emphasized that Harris would continue to watch for manufacturing or supply-oriented companies that it might acquire.

— Paul J. McLane

DIGITAL NEWS

In Europe, DAB Moves — Slowly

by Susan Ladika

Throughout Central and Eastern Europe, digital audio broadcasting remains in its infancy, hampered by limited state budgets and pricey receivers that must be purchased abroad.

Although the public broadcasters in the nations that make up the Central European Free Trade Agreement (CEFTA) — Poland, Hungary, the Czech Republic, Slovenia, the Slovak Republic and Romania — are interested in developing DAB, thus far the technology has been used only on a limited basis.

Many obstacles

Antenna Hungária Rt. began test transmissions with DAB on Dec. 1, 1995, in honor of the 70th anniversary of radio broadcasting in Hungary, said András Őry, spokesman for the Budapest-based, state-owned transmission company.

Despite that early start, only one low-powered transmitter is used for DAB at present in this country of 10 million people. The existing transmitter covers just a portion of Budapest. The startup of a second transmitter, which will reach another section of the city, is planned for late 1998.

Hungary has six DAB channels, but only four are in use. Three simulcast programming from the public broadcaster, Magyar Rádió, while the fourth is a mix of programming, Őry said.

DAB, at least in Hungary and Slovenia, is hindered by a lack of receivers.

"The biggest obstacles for DAB transmission is that the receivers are not manufactured in serious numbers," Őry said. Compounding that problem, DAB receivers are not available in the Hungarian market, so residents must purchase them from abroad.

Őry's comments were echoed by officials at state-owned broadcasters throughout the region.

"The problem is with the receivers: They are not available or are so highly priced that they are not affordable," said Joze Manstnak, technical manager of Radiotelevizija Slovenija (RTV), the Slovene public broadcasting service.

Price is a particular issue in Central and Eastern Europe, where wages often are far below Western levels. While the average monthly wage in Slovenia — the richest country in the region — is close to $900, in Romania it reaches only about $100 per month.

Anyone listening?

However, many hope prices for DAB receivers will soon begin to slide as more units are introduced to the marketplace. This summer, the BBC announced that five radio manufacturers would start selling DAB receivers in the United Kingdom by year-end.

As with most high-tech consumer products, prices are expected to fall as more DAB receivers become available.

And as receivers become available, the radio industry is expected to offer more DAB programs. "Together with the large-scale manufacture of DAB receivers, the DAB transmitters will be spread in Hungary as well," Őry said.

In Slovenia, a nation of just 2 million people, RTV began test DAB simulcasts of its three public services last year. But, because of the lack of receivers, "We were not very satisfied with the results," said Manstnak. "Technically, the results were perfect, but we had no listeners."

Despite that, RTV has gone ahead with the purchase of a five-channel DAB transmitter from Swisscom, which was slated to be in operation by this month. From the new transmitter, RTV will simulcast its existing programming, as well as offer some original, DAB-only programming.

However, as in Hungary, DAB in Slovenia is hindered by the lack of receivers. Slovenes must go abroad to purchase a DAB receiver, where they cost twice as much as television sets sold in Slovenia.

"I cannot say what the future will be for this (kind of) transmission, Manstnak said.

In Poland, regular DAB transmissions were launched in the Warsaw area in

April 1996. But technological changes delayed the spread of the project.

The public broadcaster, using the Eureka-147 DAB system, began with test

See DAB, page 12 ▶

Radio Delivers Space Mission

▶ GLENN, continued from page 1

and the shuttle program.

Glenn's mission recaptures some of the aura of NASA's heady early days. The timing for the agency is good; it is also trying to move forward on the multi-billion-dollar International Space Station, a project that has been slowed by turmoil in Russia, a partner in that project.

Sen. John Glenn

"This is not a public-relations ploy for us to look good," said Daniel S. Goldin, NASA administrator. "If that was all there was to this, Glenn's mission would not hold up to scrutiny." Glenn was given the thumbs-up for the flight only after what NASA calls the most extensive battery of medical tests ever performed on a prospective astronaut.

Goldin said the added attention from the media will be beneficial. "It certainly is not a bad thing," he said. "Space exploration is still important to the future of not only the United States, but also the world." Glenn is one of seven astronauts making the flight.

ABC, NBC, CBS, and CNN Radio plan to carry the launch of Discovery live on Oct. 29. Officials at the networks report increased interest from local affiliates.

"This is definitely a great story. An uplifting story, if you'll pardon the pun," said Chris Berry, general manager for ABC News radio operations. The network will provide live coverage of the launch with veteran space correspondent Jim Slade handling anchor duties from the Kennedy Space Center. Reporters Vic Ratner and Bettina Gregory will contribute to the coverage.

"We will offer our affiliates a Chinese menu of programming options," said Berry. "We will offer long-form programs before and after the launch, with plenty of cut-ins and breaks for affiliates to join coverage."

ABC will air a one-hour instant special the evening of the launch, which will include a look at the Mercury days of Glenn.

Radio networks must work closely with NASA when it comes time to coordinate launch programming. The broadcast facilities are located on base at the Kennedy Space Center, about three miles from the launch pad.

"You can definitely feel the earth shake when it goes up," said Bill Holder, manager of technical operations for ABC Radio. He'll be in Florida for the launch of Discovery.

Holder has been engineering broadcasts from Kennedy for 18 years. "It's a very secure place and highly credentialed. You certainly don't go snooping around," he said.

ABC's broadcast will originate from an area called the "broadcast mound."

"Most of our equipment remains in place from launch to launch. We have our production facilities in a trailer. That's parked outside the ABC building, which holds our broadcast studio," said Holder. The radio booth measures 10 feet by 10 feet.

ABC and the other major networks will integrate audio provided by NASA into their respective broadcasts. The networks can choose from different elements of NASA's air-to-ground audio, which includes the official countdown. The launch pad is miked for maximum sound effect.

"Using a (Telos) Zephyr, we'll ISDN-link everything back to ABC in New York. That is where we will mix what we have from NASA and our own cover-

Broadcast Facilities at the Kennedy Space Center

age," said ABC's Holder. The network plans to have a reporter at a civilian viewing area near the launch site. "We will microwave the reports back to the trailer. Those sites usually give us good ambient sound," he said.

From New York, ABC will provide its affiliates with two different feeds via satellite on SEDAT. One will be a raw NASA sound feed. The other is coverage anchored by ABC announcers.

One of those ABC affiliates receiving the feed will be WDBO(AM) in Orlando, Fla. "We are just down the road from the Cape, so the shuttle business is big for us," said Marcia Taylor, news director at the news/talk outlet. The station has carried every space shuttle launch since the first one in 1981.

Taylor said the feel for this launch is different from that of past missions. "Considering the nature of the flight, I think that America is genuinely interested in Glenn's return to space," she said. WDBO will send two of its own reporters to Kennedy to supplement ABC's coverage on the station. They will file reports by cell phone and Switched-56 line from the radio mound.

CBS Radio News is marching out the big artillery when it comes to covering Glenn's flight. Retired CBS television news anchor Walter Cronkite will return to serve as special correspondent. Longtime CBS Radio anchor Christopher Glenn will anchor coverage.

"CBS Radio certainly is hitting this story very hard," said Michael Freedman, general manager of CBS Radio News. "We will focus on the current mission for the senator, but also the historic nature of what will be happening. That is where Cronkite will be at his best." Cronkite hosted CBS television coverage of Glenn's original earth orbit in 1962.

ABC News uses this radio setup at the launch site.

CBS, CNN

With correspondents positioned across the United States, including Mission Control in Houston and Edwards Air Force Base in California, CBS Radio plans live coverage of the scheduled morning launch of Discovery from Florida's Atlantic coast. "We will also open many of our newscasts from Kennedy," said Freedman.

ABC Audio Gear

CBS Radio News facilities at Kennedy are similar to those of ABC. The network maintains a production trailer and studio on government property. "NASA is really good to work with," said Freedman. "They keep an eye on things while we're not around. And they have good people in place to help the media coordinate our coverage."

You can also hear Cronkite on CNN Radio. The network plans to simulcast CNN Television coverage, which will feature Miles O'Brien and the veteran newscaster. O'Brien replaces John Holliman, who was killed in a September car acciden. Robert Garcia, general manager of CNN Radio, said the simulcast will occur on CNN Radio's Newslink satellite channel, which is set aside for special programming. The network's John Bisney will anchor launch coverage.

NBC Radio News will offer extensive coverage of the Glenn mission. A spokesperson for the news organization said the network's plans had not been finalized as of early October.

Born in Cambridge, Ohio, in 1921, Glenn is the favorite son of the Buckeye state. Many Ohio radio stations also plan extensive reporting on the October mission. "This is a huge story for us because he is so loved in this state," said Kathy Lehr, news director at WLW(AM) in Cincinnati. The station plans to have a reporter in Florida for the launch.

Lehr's station has a dozen newsroom staffers; she plans to be keeping most of them busy Oct. 29. "We will cover this story inside out. We'll have people in Glenn's hometown and in area schools to get the reaction of students. We'll also produce quite a few flashbacks of the senator's first time in orbit," said Lehr.

Rocket Science

What kind of equipment do radio nets rely on to cover NASA launches? For a taste, here is the gear list for the ABC studios at Kennedy Space Center:

Studio mics:
Sennheiser MD 421
EV RE11

Outdoor ambiance mic:
Audio-Technica AT835

Headphones:
Sony MDR 7506
RTS/Telex headset amplifiers (custom)

Mixers:
Main production: Neve 8x2 console
Trailer, roof studio production: Mackie 1402

Recording devices:
Otari 5050B reel-to-reel recorder
Marantz PMD224 cassette deck
Sony MDS-JE510 MD record deck
Sony MZ-B3 MD recorder

Transmission equipment:
Telos Zephyr ISDN codec
Musicam USA Micro 56 codec
Rood BAX 114 two-line telephone bandwidth extender
Shure M267 mixers

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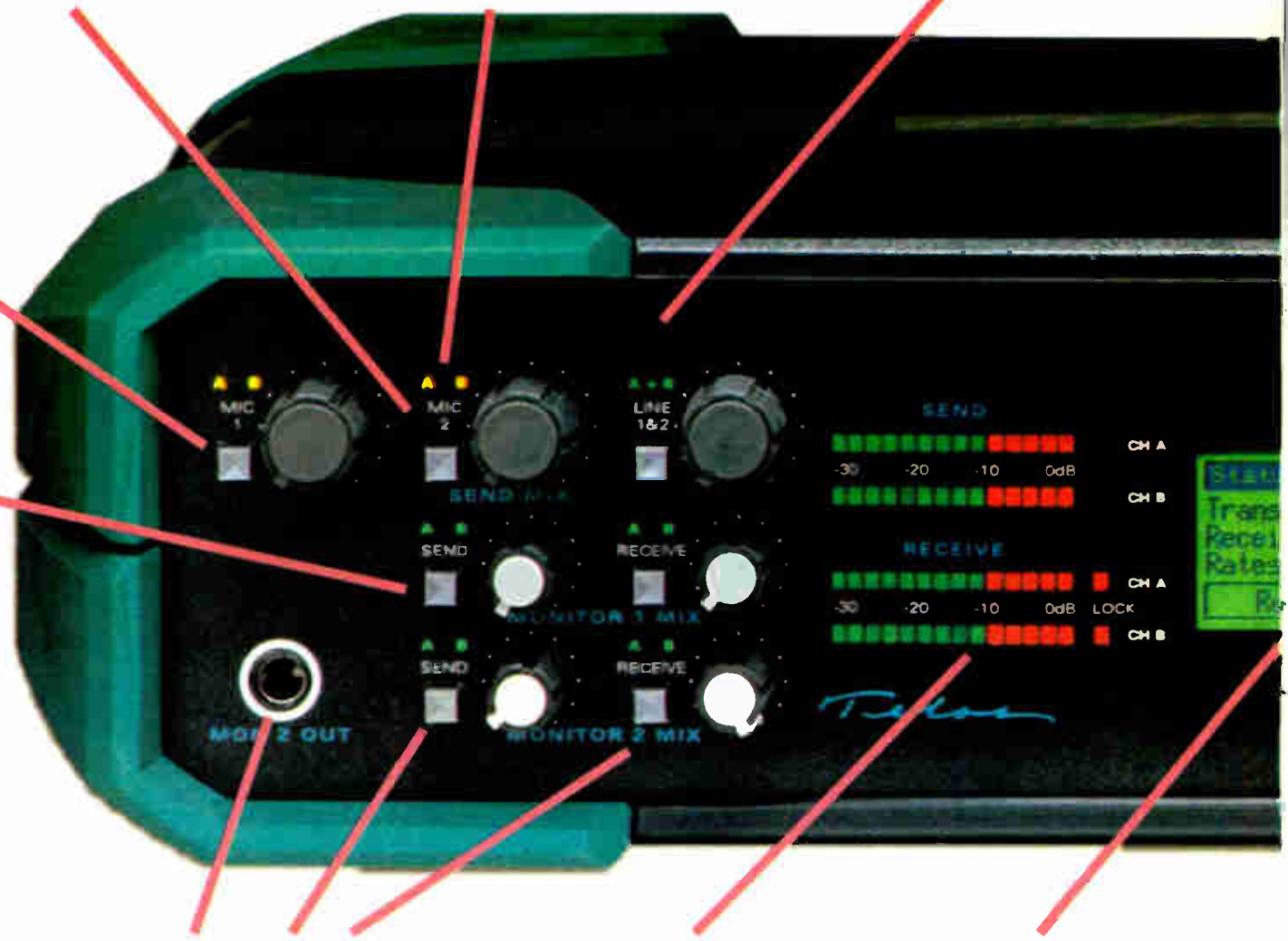

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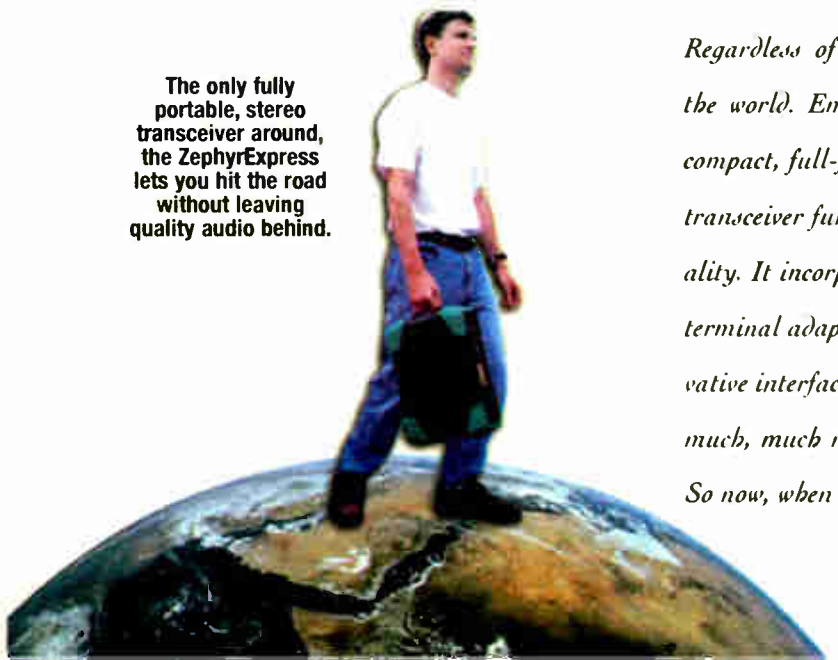

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Full-featured ISDN transceiver including three coding schemes (MPEG Layer 3, Layer 2, G.722) capable of simultaneous transmit and receive. Coding modes can be individually selected for transmit and receive paths.

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shown at actual size

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

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Circle (2) On Reader Service Card

Europe Implements DAB Slowly

▶ DAB, continued from page 7

and other early broadcasts on VHF Band II.

"The Eureka consortium treated VHF band II as very important, so we decided to broadcast on band II," said Janusz Sidorenko, of the Polskie Radio technical department.

But practices changed, and the emphasis for DAB implementation shifted to VHF band III. "The situation is very awkward because nobody can listen," to the simulcast of the four Polskie Radio programs, Sidorenko said.

In much of Poland, VHF band III is not available for DAB because it is used by television broadcasters in neighboring countries, he said.

However, in southern Poland, the research and development division of Polish Telecommunications is preparing a VHF band III DAB transmission project that will cover such major cities as Kraków, Wrocław and Katowice.

In the Czech Republic, officials are monitoring the development of DAB in other nations while preparing to launch a test run of their own. No date has yet been set for when such tests might begin, said Martin Zadrazil, manager for new technology at Česky Rozhlas.

Zadrazil said he expects the public broadcaster to start by using two or three low-powered transmitters to rebroadcast Česky Rozhlas' regular programming throughout Prague.

Demonstrate to officials

This test run should be used to "parliamentarians and others responsible for supporting public broadcasting that DAB exists and what it can offer," said Zadrazil. The effort also might help convince elected officials "we should invest some money in this project," he said.

Development of DAB in the Czech Republic has been hampered, said Zadrazil, because no group has been established in the country to champion the cause of the new technology.

He also said that introducing DAB is important to prevent Česky Rozhlas from losing frequencies that have been reserved for the broadcaster but that have not yet been put into use. Losing those "may get us in a very bad position," he said.

As in the Czech Republic, DAB is still in the talking phase at Slovenský Rozhlas, the public broadcaster in neighboring Slovak Republic.

Throughout Central and Eastern Europe, interest in DAB seems to be confined to state-owned broadcasters.

In Romania, state-owned broadcaster Societateà Română de Radiodifuziune hopes to have two DAB transmitters operating in late 1998 or early 1999, said Gheorge Belceu, head of the technical department.

Belceu said the public broadcaster wants to begin DAB testing in order to keep pace with the rest of Europe. "It is time for us. This is the future," he said.

Private radio

Throughout Central and Eastern Europe, interest in DAB seems to be confined to the state-owned broadcasters, which may receive both government support and advertising revenues.

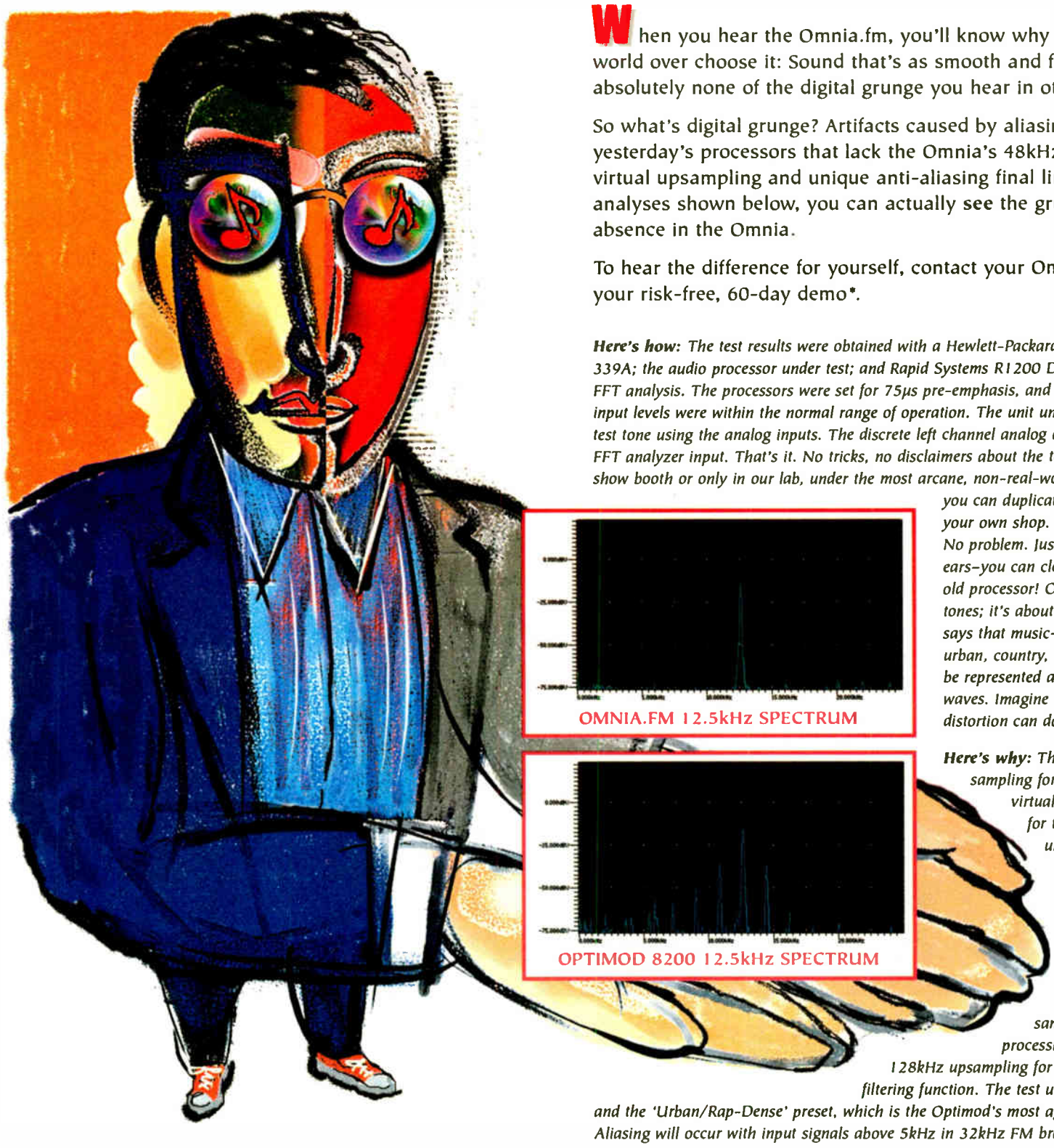
Private broadcasting is a fairly recent phenomenon here, and many of these stations have limited resources and still are working to develop a solid advertising base.

Mike Lonneke, general manager of Juventus Rádió, the first Western-owned station in Hungary, said Juventus officials have discussed implementing DAB, but in a country that still is adapting to FM radio, "there certainly is not any demand" for DAB.

Although Hungary is one of the wealthier countries in the region, "there are not enough people who have the disposable income to spend money on a receiver," said Lonneke. "I would be surprised if by the year 2000, anything has changed."

Susan Ladika, a free-lance journalist, reports on the industry for ***Radio World*** *from Vienna.*

LISTEN



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Here's how: *The test results were obtained with a Hewlett-Packard Audio Test Set, Model 339A; the audio processor under test; and Rapid Systems R1200 Data Acquisition System for FFT analysis. The processors were set for 75µs pre-emphasis, and were carefully adjusted so the input levels were within the normal range of operation. The unit under test was fed a 12.5kHz test tone using the analog inputs. The discrete left channel analog output was connected to the FFT analyzer input. That's it. No tricks, no disclaimers about the test working only in our trade show booth or only in our lab, under the most arcane, non-real-world test conditions. In fact, you can duplicate the test results yourself in your own shop. Don't have an FFT analyzer? No problem. Just use an oscillator and your ears–you can clearly hear the birdies in the old processor! Of course, this isn't about test tones; it's about music. And Fourier theory says that music–whether it's rap, oldies, urban, country, and yes, even grunge–can be represented as a combination of sine waves. Imagine what this kind of aliasing distortion can do to complex musical signals!*

Here's why: *The Omnia.fm utilizes 48kHz sampling for dynamics processing and virtual upsampling at 192kHz for the final limiter, which is a unique, anti-aliasing design. The test used version 1.02 software and the 'Cranked' preset, which is the Omnia's most aggressive stock setting. The Orban® Optimod® 8200 used for testing operates at 32kHz sampling for the dynamics processing and incorporates (4x) 128kHz upsampling for the clipping/low-pass filtering function. The test used version 3.0 software and the 'Urban/Rap-Dense' preset, which is the Optimod's most aggressive stock setting. Aliasing will occur with input signals above 5kHz in 32kHz FM broadcast audio processors unless mechanisms that cause aliasing are eliminated.*

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Circle (80) On Reader Service Card

The New XM Satellite Radio

by Leslie Stimson

ARLINGTON, Va. While broadcasters and regulators weigh the complexities of USA Digital Radio's request for rules to govern in-band, on-channel digital audio broadcasting, the providers of *satellite* DAB are moving forward with plans to go after a prime target of traditional radio: listeners in their cars.

American Mobile Radio Corp. and CD Radio, which hold the two licenses to provide satellite radio to U.S. listeners, aim to have their services running before IBOC DAB is a reality. CD plans to be operating and offering consumers its $10-a-month service by the end of 1999, with AMRC following in 2000.

USADR hopes the regulatory process for IBOC DAB is completed within two years.

When asked about competition from IBOC, AMRC President and Chief Executive Officer Hugh Panero said, "We're going to be out there in 2000. ... I think most people realize that radio going digital is a ways out."

Panero said IBOC DAB is an unproven technology. That is exactly what IBOC DAB providers have said about satellite DAB.

The question of which service is going to be operating first is not settled. Earlier this year, CD and AMRC each announced plans to double channel capacities to 100 offerings each. CD planned to accomplish this by using a second in-orbit satellite and a ground spare satellite, a change from its original proposal. NAB told the FCC that the change "could raise significant questions about whether the service they intend to offer differs from the proposals on which the commission granted their permits."

NAB said the technical change also raises the question of whether the satellite DARS proponents need to use terrestrial repeaters so their signal can be received in urban areas. NAB wants the commission to require both satellite DARS proponents to submit updated technical plans and allow for public comment on those plans before taking further action needed to initiate satellite DAB. The commission had not responded to the request by press time.

In its quest to gain those car listeners and prove that its technology works, American Mobile Radio Corp. wants to retool its image and appeal to youthful future car receiver purchasers. The company, owned by American Mobile Satellite Corp. and WorldSpace, planned to introduce a new logo and a new brand name on Oct. 12.

SATELLiTE RADiO

At the same time, the satellite-to-car service was set to announce programming agreements with broadcasting groups, including Heftel Broadcasting Corp. for Hispanic programming and Salem Communications Corp. for religious programming.

The company also planned to announce deals with USA Today, AsiaOne and C-SPAN.

On the new company name, President and Chief Executive Officer Hugh Panero said, "First there was AM, then there was FM, now there is XM Satellite Radio."

XM Satellite Radio

The name tested well in focus groups, Panero said, and conjures up images of Generation Xers.

Also, the "XM" portion of the name would fit on a receiver button, as do "AM" and "FM" now.

NAB wants to know whether satellite services need to use terrestrial repeaters to serve urban areas.

Panero said the company was close to signing contracts with two receiver manufacturers. He said approximately 8 million receivers were sold in the aftermarket last year, showing there is "a significant turnover of people who don't like their current (car) radio and want to upgrade." XM is targeting those consumers for its service first, rather than trying to persuade consumers to try to pick up the satellite digital signal on their analog receivers with a "plug-and-play" adapter — a sound card that fits into the CD or cassette slot.

The other license-holder for the satellite DAB technology, CD Radio, is pursuing the adapter option with Lucent Technologies, which is providing the digital signal processor chip for the adapter. Lucent RF chips also will be used in the wireless antenna that mounts to the car rear window.

Panero said his company was close to signing a chip agreement as well.

CD has signed a number of programming agreements and said it had begun deploying an FM repeater network in San Francisco for its satellite DAB service. System testing and a demonstration of the network was expected to take place this month (**RW**, Oct. 14).

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BUSINESS DIGEST

Intraplex Expansion Adds 10,000 Feet

by Brian Galante

LITTLETON, Mass. Autumn is viewed as a season to make changes. Intraplex exercised this philosophy by moving into a brand-new facility in late September.

The supplier's new facility in Littleton is located eight miles down the street from its previous dwellings in Westford. At 20,000 square feet, the new building is double the space of the old structure.

According to Christine Snyder, marketing communications manager for Intraplex, a move to a larger facility was inevitable. The generous size of the new facility gives Intraplex the ability to expand staff. The extra room is necessary to house more employees.

New Intraplex Facility in Littleton, Mass.

New space

"We've grown significantly in the last 18 months, and we needed more space, specifically for engineering," said Snyder. "We've increased our engineering staff quite a bit, as well as our sales and marketing staff."

Intraplex concentrates much of its efforts on the radio and broadcast industries, but it also has a focus on the wireless market.

"We sell to a lot of mobile radio users and PCS users," Snyder said. "Really across those three markets (radio, broadcast, wireless), we've expanded. We've doubled our revenue in the last year, and that's really been our goal — to expand the company." Snyder said that in doing so, the need for more staff grows, resulting in the urgency for a larger facility.

With the company growing, the possibility for enlarging the new facility was something to consider. Intraplex left open the option to add more room.

"We do have an option to obtain another 10,000 square feet in this facility if we need to," said Snyder.

Intraplex develops and markets integrated digital network access products for wireless communications and broadcast networks. Among its products are the STL PLUS system, IntraLink ISDN multiplexers, and the OutBack ISDN audio codec.

BUSINESS DIGEST

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Nevin Leaves BE

QUINCY, Ill. John J. "Jack" Nevin, former president and chief executive officer of Broadcast Electronics, has retired.

A statement issued by Robert Carroll, CEO of BE's parent company, BEI Holding Corp., said Nevin led the organization through an ownership transition that began last August, and he would now move into a consulting role.

Douglas David, formerly of Amtech Corp., has been named acting president of BE while a search for a new president/CEO is conducted.

GM Journal

Radio World — Resource for Business, Programming & Sales — October 28, 1998

RTNDA98 SACRAMENTO
What's Ahead For RTNDA?
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MARKET WATCH

Consolidation Hits St. Louis Radio

Rick Desloge

The World Series is over. But in Mark McGwireland, the slugger's record-breaking 70 home runs remain the talk of the town.

His feat also helped produce record revenues for some area radio stations and batted in business for the rest of the St. Louis economy.

In addition to helping restore faith in the national pastime, McGwire's accomplishment momentarily overshadowed a rapidly consolidating local radio market.

Since the Telecommunications Act of 1996, when changes in the law raised the limits on the number of radio properties broadcasters could own in a market, four national groups have staked out a dominant share in St. Louis — CBS Corp., Jacor Communications, Sinclair Broadcast Group and Emmis Communications.

(Earlier this month, Clear Channel and Jacor announced a merger, reportedly valued at about $4.4 billion, to be consummated next year. The united Clear Channel will own 454 radio stations.)

Combined, those four own 18 of the 20 top-rated stations in the market. Those 18 draw more than 80 percent of local listeners, according to Arbitron's 1998 spring book. They also attracted an estimated 95 percent of the $108.9 million in local radio advertising in 1997.

What makes a radio success story in St. Louis? Consider the recent experience of the top-ranked station, KMOX(AM), which holds the radio rights to St. Louis Cardinals Baseball.

CBS station KMOX was pulling in more than 22 percent of the radio revenue here through August. This news/talk radio station dominates St. Louis, the No. 18 market with 2.5 million people.

"Baseball was projected to do a huge increase over 1997," KMOX General Manager Karen Carroll said. "As you can imagine, with nothing happening with the team early in the season — they weren't even staying at the .500 mark — it was more difficult to sell.

"Then along comes Mark McGwire."

KMOX began creating special features around the home run chase. In September, the station co-sponsored pregame client events in Kiener Plaza, a block from Busch Stadium.

"Sports dollars for August alone topped $1 million," said Clint Hasse, KMOX general sales manager.

Photos courtesy of St. Louis Convention and Visitors Commission.

Busch Stadium is the home of the St. Louis Cardinals. Anheuser-Busch is one of St. Louis radio's biggest clients.

Downtown St. Louis and the Gateway Arch

Sports revenues already were north of $6.5 million through the first eight months of the year.

In addition to St. Louis Cardinals Baseball, KMOX broadcasts the St. Louis Blues and St. Louis University Billikens.

Sports programming has been going a long way toward balancing KMOX's large senior-citizen audience with younger listeners.

The only major sports franchise not on the station is St. Louis Rams football, an expensive deal that, ironically, Carroll negotiated for KSD(FM), prior to its sale to American Radio Systems and her move to KMOX in April.

The self-proclaimed "Voice of St. Louis" pulled in 13.9 percent of listeners 12+ Monday through Sunday, 6 a.m. to midnight, according to the spring Arbitron ratings.

Nevertheless, the figure has shrunk from the days in the last decade when KMOX accounted for one of four St. Louis listeners.

Smaller players have made runs at KMOX. Sports marketer Greg Marecek purchased KFNS(AM), an all-sports station, in October of 1997. A year before, Tim Dorsey led a group of former KMOX executives and others, to launch their own news/talk station, KTRS(AM).

Meanwhile, radio executives here debate whether St. Louis will see any more consolidation. In 1996, just prior to ownership deregulation, Heritage Media Corp. still operated three stations here, all of which are now owned by Sinclair.

Zimmer Broadcasting owned three stations before Emmis stepped in and bought their St. Louis properties.

Jacor owned three stations and Sinclair owned two. Each of these two now owns six. EZ Communications operated three stations and had not yet been purchased by American Radio Systems. In 1990. St. Louis' top 20 stations had 16 owners, according to the St. Louis Business Journal.

"We're pretty much done," said Bruce Kupper, principal of Kupper Parker Communications, one of the region's larger advertising agencies and biggest radio advertisers.

CBS, with three St. Louis stations, is

See MARKET WATCH, page 22 ▶

Radio's Rocky Third Quarter

Lynn Meadows

The bull that radio was riding up and down Wall Street for the past two years turned into a bear in the third quarter of 1998.

That was probably the biggest shock of the quarter, but there was other big news at the top of the radio heap, as the nation's biggest radio revenue producers announced changes.

CBS Corp. said it would separate its radio and outdoor businesses from its television division. The group plans to resurrect the name Infinity Broadcasting for its new radio/outdoor group.

Up to 20 percent of the new Infinity Broadcasting will be offered for sale in an initial public offering, which was expected to occur before the end of the year.

Observers believe it will be easier for investors and analysts to track the growth of the CBS radio and television divisions if they are separated.

Also, as CBS Chairman and CEO Michael H. Jordan said in a press release, the move "will unlock the value of our largest and fastest-growing operating segment — our radio and outdoor businesses."

He added that the offering would create a company with significant borrowing capacity for radio and outdoor acquisition opportunities.

Chancellor Media announced plans in the third quarter to merge with Capstar Broadcasting in a stock-for-stock transaction.

Because the private investment firm of Hicks, Muse, Tate & Furst Inc. is the largest shareholder in both companies, the announcement did not come as a big surprise, but it will create the largest radio owner as measured both by revenue and by stations held.

Hicks Muse owns approximately 15 percent of Chancellor and 59 percent of Capstar.

The Capstar deal was valued at $4.1 billion. The combined company will control approximately 463 stations nationwide.

The GM strike may have restrained radio sales a bit in Q3.

There were other announcements that caused some shuffling in the ranks of the top 10 radio groups during the third quarter.

Entercom (Entertainment Comm-unications Inc.), a privately held radio company, moved into the No. 7 slot as measured by revenue, according to BIA Consulting.

At the end of the second quarter, BIA ranked Entercom as the 12th largest radio group.

In August, the Philadelphia-based Entercom announced it would purchase five Boston-area radio stations from CBS Corp. for $140 million. It also announced plans to sell two Tampa stations to CBS for $75 million.

BIA reports that Susquehanna Corp. will move into the No. 10 slot once the Capstar name is retired.

The top ranks of ownership will shift again late next year when the merger of Clear Channel Communications and Jacor Communications takes effect (see page 2). That deal was announced after the end of the third quarter, and ended much speculation about the future of Jacor.

At 454 radio stations, Clear Channel would be No. 2 after Chancellor Media in terms of station count, and third-largest in terms of revenue after Chancellor and CBS/Infinity.

Taking a dip

But the biggest news of the third quarter was the stock market itself. The Dow Jones Industrial Average took a plunge at the end of August.

Stock prices of almost every publicly traded radio group traveled southward at the same time.

Mark O'Brien, vice president of BIA Consulting, said the markets had only gone up since the passage of the Telecommunications Act in 1996, so the market plunge was a first for many groups that have gone public since the beginning of the bull market.

The top two radio groups probably suffered the biggest declines. Stock in CBS Corp. (NYSE:CBS) fell from 33-13/16 points at the end of the second quarter to 23-1/4 on Sept. 29.

That was the lowest the stock price had been in one year. Likewise, Chancellor Media Corp. (NASDAQ:AMFM)

See Q3, page 19 ▶

▶ Q3, continued from page 18

saw its stock tumble from $51 per share to $35-1/2 per share.

Capstar, which issued its own IPO in June at about $22 a share, had fallen to $15-3/4 by the quarter's end. O'Brien pointed out the lower stock prices will affect radio on several levels in the short term.

On the one hand, owners of private companies are likely to put off issuing an IPO until they can get the price they want for their stock. Going public at $20 per share rather than $12 per share translates into millions, said O'Brien.

Others note that any group owners who may have been thinking of selling will be less motivated to do so while stock prices remain low, preferring to wait until the price of their stock goes up.

Radio ad revenues continued to grow in late summer and early autumn. The communications cellular category heated up, according to George Nidel Rivin, partner in charge of broadcast services for Miller Kaplan Arase & Co.

That was important particularly in light of the General Motors strike, which lowered auto advertising, Rivin said.

Talk is not cheap

Car advertising usually is the top category for radio sales. In July, automobile revenue was running neck-and-neck with the communications cellular category, Rivin said. Prior to that, cellular advertising had been a distant second place.

Rivin said the eight months that ended in August showed that radio revenues year-to-date were up 11 percent but that the figure could well have been higher were it not for the GM strike, which affected advertising from the factories right down to the dealerships.

The Radio Advertising Bureau reported an 11 percent gain in combined local and national radio sales year to date.

Also in the third quarter, the D.C. Circuit Court of Appeals decided not to rehear a constitutional challenge to the FCC's equal employment opportunity rules.

EEO

In a speech before the Radio and Television News Directors Association, FCC Chairman William Kennard said he was working with the Justice Department to decide whether to appeal that decision to the U.S. Supreme Court.

In a statement issued after that speech, Kennard said he expected the commission to issue a proposal for revising the broadcast EEO rules by early next year.

Kennard told the RTNDA that 21 of the nation's leading media companies had pledged to him that they will "continue to abide by EEO principles, whether required by law or not."

The National Association of Broadcasters is serving as a facilitator between Kennard and broadcasters to find ways to bring minorities not just into jobs, but into ownership, an NAB spokesman said.

The Commerce Department reported in mid-September that minorities own 2.9 percent of the commercial radio and television stations in the country. That represents an increase of 15 stations over last year, but the number of owners is down.

According to the report, there were 182 minority owners last year. This year, there are 160.

Below are the stock prices for the top 10 owners according to BIA (at time of publication), showing the price at the beginning of the third quarter and ending on Sept. 29. The group rankings are provided by BIA Consulting.

Group	July 2	Sept. 29
1. Chancellor Media Corp.	51	33-3/8
2. CBS Corp.	33-13/16	24-1/4
3. Jacor Communications	61-1/4	50-5/8
4. Clear Channel Communications	111	47-1/2
5. ABC Radio Inc.	106-1/4	25-3/8
6. Cox Radio Inc.	44-5/16	35-1/8
7. Entercom	n/a	n/a
8. Heftel Broadcasting Corp.	42-13/16	37-3/4
9. Emmis Communications	48-1/16	37-3/4
10. Susquehanna Radio Corp.	n/a	n/a

Will Commercial Success Spoil Public Radio?

Carl Lindemann

This is a time of tremendous opportunity for public radio. Phenomenal growth in listenership and changes in commercial radio open new possibilities. Public radio programmers who wish to capitalize on these opportunities must face certain risks.

That was one of the many messages from the 10th annual Public Radio Program Directors convention in St. Petersburg, Fla.

The PRPD is the only public radio event dedicated to programming issues.

Arthur Cohen, PRPD board member and general manager of WETA(FM) in Washington, said, "Most program directors work in isolation. The PRPD lets us build a network of colleagues willing to go out of their way to help."

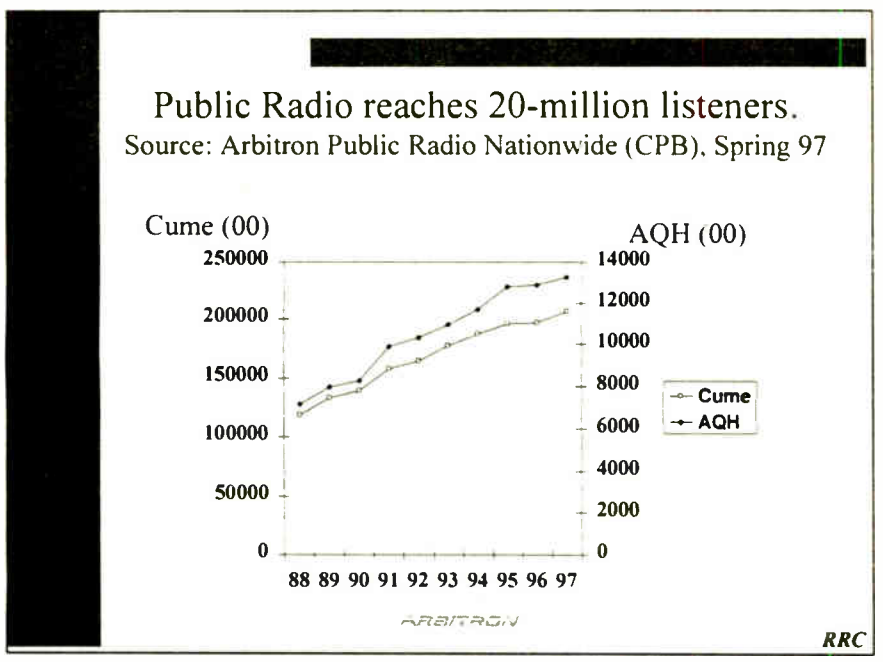
This year's gathering of more than 400 "pubcasters" looked at ways to help each other to continue public radio's phenomenal growth in listenership, while preparing for intrusions into their markets from "new media" competitors.

Arbitron General Manager Pierre Bouvard delivered the keynote address, sketching the larger context of "The State of American Radio."

Bouvard analyzed public radio's place amid consolidation in commercial radio, and he identified numerous opportunities.

"Commercial stations are so focused on competitors that they don't notice the power of public radio," said Bouvard.

Over the past 10 years, public radio has enjoyed substantial growth — a 70-percent increase in the cume, and 100-percent growth in quarter-hour listening (see Figure 1).



Comparing public radio's listener profile against listening habits, Bouvard sees the at-work audience as the greatest window of opportunity for continuing this growth.

"Public radio's (listener) profile matches the profile of the American worker. You just have to get creative about asking them to listen."

Despite these opportunities, Bouvard warned about the consequences of ignoring possible challenges from satellite radio and the Internet.

The best way to inoculate against possible market erosion is also the way to take advantage of commercial

See PUBLIC RADIO, page 20 ▶

PubRadio's Fund-Raising Strategies

▶ PUBLIC RADIO, continued from page 19

radio's consolidation, according to Bouvard.

Given public radio's decentralized structure, Bouvard said programmers should emphasize each station's local identity and mission to the community to create a market niche.

Capital politics

Part and parcel with increased listenership is the ability to build underwriter revenues.

Bouvard underscored the potential to attract support for corporate contributors looking to reach public radio's exceptional demographics.

Some attendees took issue with Bouvard's insistence on capitalizing on public radio's success. Larry Josephson of the Radio Foundation, who is the host and executive producer of the public radio program, "Bridges," worried that most sources for public radio support are politically sensitive.

"What happens when we start getting 5 and 10 shares? Mel (Karmazin) starts talking to Eddie Fritts who starts talking to Billy Tauzin. Suddenly our 14 percent (of total funding from Congress), $340 million in fiscal 2001, starts to get a bit shaky," Josephson said.

Others also noted that what amounts to commercializing noncommercial radio creates "underwriter anxiety" among listeners.

Commercial support for public radio is tempting but likely will cause diminishing returns.

Other sessions addressed the primary challenges of the programmer's task: developing talent and programming that serves and enhances public radio's core audience, and fund-raising.

Suitable methods of fitting financial support into a public radio format surfaced again during the "Audience '98" session.

Panelists Jeff Ramierez, Doug Berman and Jeff Hansen

David Given of Audience Research Analysis, a market research firm specializing in public radio, said the distinction between on-air fund-raising and programming was illusory.

Commercial stations are so focused on competitors that they don't notice the power of public radio.

— Pierre Bouvard, Arbitron

"All fund-raising is programming, all programming is fund raising," Given said.

Harmonizing these into a more coherent whole, Given said, would fix the strange, schizophrenic quality of having "programming" suddenly preempted by "fundraising."

Given said listeners do not necessarily understand or appreciate the behind-the-scenes reasons that give rise to this public radio peculiarity.

Other workshops looked at ways public broadcasters could learn from other industries in conducting business.

A session mediated by a panel including J.J. Yore, executive producer of Public Radio International's "Marketplace" and Doug Berman, producer for NPR's "Car Talk" and "Wait Wait — Don't Tell Me," discussed the need for creating new models for developing public radio programming.

Yore said the existing "system" forces sophisticated producers through an unsophisticated process.

Berman said other industries spend at least 5 percent of their gross revenues on research and development.

Other broadcasters, like commercial television, invest closer to 15 percent. At present, public radio spends only some 2 percent on R&D.

Without a greater commitment to develop, test and introduce new programs, public radio runs the risk of becoming stale.

Questions about how public radio's most venerable offerings are holding up were raised in an outline of a new research project aimed at "Strengthening NPR's Newsmagazines."

NPR Director of Strategic Planning and Research Jackie Nixon discussed how NPR will carry out a study recently funded by a $275,000 grant from the Corporation for Public Broadcasting Program Fund.

Nixon discussed some of the preliminary findings about long-term changes in "All Things Considered" and "Morning Edition."

Over the past decade, story segments have become shorter. Still, the key elements remain: informative, intelligent content with an emphasis on presentation, not personality.

Future listeners

Another major issue at the conference was how America's changing demographics will affect public radio.

Today, most public radio listeners are aging Baby Boomers. Will "Gen-X'ers" take to it as they rise up in importance?

J. Walker Smith of Yankelovitch Partners showed that, in fact, Gen-Xers are taking to public radio in even greater numbers than Baby Boomers did.

Still, this does not mean that maintaining the status quo ensures success. A significant proportion of the Gen-X audience is drawn by stations offering non-traditional music programming.

This is not what's generally considered public radio's main fare.

How that audience can be incorporated into the mainstream of public radio listeners without alienating the existing core group will remain an open question.

While much of the conference focused on marketing and other business issues, the mission of public broadcasters was underscored by Bill Siemering's session, "Building Community for Citizens Around the World."

Siemering is known as the "father" of "All Things Considered" and has since devoted himself to using radio to serve the public from Mozambique to Outer Mongolia.

His presentation brought the sights and sounds of people's lives uplifted by local — and often primitive — radio broadcasts.

When Siemering finished his presentation, many expressed their appreciation for reminding conference attendees of radio's social significance.

■■■

Reach Carl Lindemann c/o RW.

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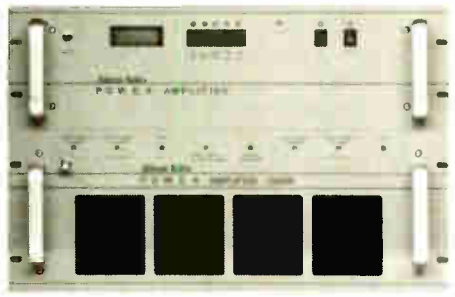

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6X1G
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8X2D
Active crosspoint switcher for 8 stereo inputs, 2 stereo and 2 mono outputs, 3 switching modes, I/O trimmers, internal silence monitor with SPDT relay, remote control/status, multi-drop RS-232 serial port, pluggable screw terminals and input expansion port.

SS 12·4
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READER SERVICE NO. 117

Radio Consolidation In the Heartland

▶ MARKET WATCH, continued from page 17

nearing the unofficial revenue limits of the U.S. Justice Department, and had to divest two stations here to complete its combination with American Radio Systems.

FCC limits ownership

Sinclair and Jacor are approaching the FCC limit for stations in one market.

Of the group owners, only Emmis, with three stations, has plenty of room to expand. But independent radio properties are becoming harder to find, and more expensive.

Among the stations that have not sold are KFUO-FM, the region's sole classical music station, and its sister station, KFUO(AM), a religious broadcaster. The Lutheran Church-Missouri Synod put them on the air decades ago.

KFUO recently appeared in the news when the station won a decision from the U.S. Court of Appeals for the District of Columbia saying the FCC cannot require the broadcaster to hire more minorities.

"I'd say we've had 10-plus offers during the last two years from all the major group operators. We tell them all the same thing. We're not interested," said Dennis Stortz, director of operations for KFUO-FM.

"If someone did get that station, they'd probably turn it into a rock (format)," said John Beck, senior vice president of Emmis in St. Louis.

Just as Eskimos have multiple words for snow, Beck said, "St. Louis radio has multiple formats for rock and roll."

He should know. Emmis station KSHE(FM) had the rock field almost to itself a dozen years ago. Now at least nine stations have some version of rock.

Karen Carroll, Vice President and General Manager of KMOX Radio

Emmis itself converted one of its stations to "Extreme Radio" in July when it brought Howard Stern's syndicated morning show to town.

Sinclair reformatted KXOK-FM, which it purchased in September, to "The Rock."

Solid rock

Sinclair already owned new rock station KPNT(FM), "The Point" and adult rock station WVRV(FM), "The River," and '70s rock station KIHT(FM).

Jacor has oldies station KLOU(FM), and classic rock KSD(FM). CBS owns adult hit station KYKY(FM) and soft rock station KEZK-FM.

"They're chasing those ad dollars," said Kupper. He said rock stations are a natural advertising vehicle for some of the growing industries in St. Louis: movie theaters, restaurants, bars and casinos.

"We're doing more in the entertainment area which fits well with rock formats. That's why nearly every (station) owner is moving to rock."

Religious formats, jazz, black and other ethnic formats are all stronger in other parts of the country, Kupper said. "Jacor has a lock on urban contemporary. Sinclair has the leading country station, WIL-FM.

"We basically have expensive country and inexpensive country (Emmis' WKKX-FM)."

Sinclair Regional Vice President Lon Bason said the format situation has more to do with what the audience wants.

"This is one of the best rock and roll towns in the country. People can't get enough," he said. "I'm sure there are some people who would like to see polka music. They'd consider that a void."

Sinclair has 22.4 percent of the audience with six stations, following its $13.5 million purchase of KXOK-FM, Mix 97.1, in September.

The Baltimore-based broadcaster has been a force here since it took over River City Broadcasting's rock stations, KPNT-FM and WVRV-FM.

Sinclair added three stations to its St. Louis roster with its $630 million purchase of Heritage Media Corp.'s five TV and 24 radio stations in the last year.

The St. Louis properties included WIL-FM, the leading country station. WIL's morning team, Debbie Conner and David Craig, have the largest audiences in that time slot. Sinclair's other two Heritage purchases: KIHT(FM), a '70s rock station, and WRTH(AM), a nostalgia station.

Sinclair is the only radio broadcaster here to also own a local TV station, ABC affiliate KDNL-TV.

We want more stations

Jacor was the beneficiary of an antitrust ruling that took oldies station KLOU(FM) and classic rocker KSD(FM) out of the CBS-ARS merger.

Jacor purchased the stations, giving it six in St. Louis and 21 percent of the audience share, nearly equal to CBS.

Jacor also operates KMJM, the dominant urban contemporary AM station, which broadcasts here as Majic 105.

Lee Clear, general manager for Jacor's St. Louis radio properties, continues to oversee the urban contemporary stations.

He hired new managers for KLOU and KSD. "We want more stations. We can't buy any more FMs," he said.

See MARKET WATCH, page 23 ▶

St. Louis
Radio Market Overview

Stations	Owner	1997 Est. Station Revenue in $mil	Format	Spring 1998 12+
KMOX(AM)	Infinity Broadcasting	20.7	Nws/Tk/Spts	13.9
WIL-FM	Sinclair Communications	9.0	Country	8.6
KEZK-FM	Infinity Broadcasting	8.0	Soft AC	7.0
KMJM-FM	Jacor Communications	8.0	Urban	6.6
KYKY(FM)	Infinity Broadcasting	9.1	AC	4.9
KSHE(FM)	Emmis Communications	8.0	AOR	4.7
WKKX-FM	Emmis Communications	4.0	Country	4.7
KLOU(FM)	Jacor Communications	5.5	Oldies	3.9
KSLZ(FM)	Jacor Communications	1.4	CHR	3.9
KPNT(FM)	Sinclair Communications	4.4	Alternative	3.8
KIHT(FM)	Sinclair Communications	3.1	70s Oldies	3.1
KTRS(AM)	Charter Comm. Radio	2.0	News/Talk	3.0
KFUO-FM	Lutheran Church-Mo. Synod	1.9	Classical	2.8
WRTH(AM)	Sinclair Communications	1.4	MOR	2.6
KATZ(AM)	Jacor Communications	0.6	Rhythm/Blue	2.4
KSD(FM)	Jacor Communications	6.0	Clsc Rock	2.4
WVRV(FM)	Sinclair Communications	4.4	Progressive	2.4
KATZ-FM	Jacor Communications	1.0	Nostalgia	2.2
WXTM(AM)	Emmis Communications	3.3	Rock	2.0
KXOK-FM	Sinclair Communications	3.0	Alternative	1.9
KFNS(AM)	Missouri Sports Net. LLC	1.6	Sports	0.9
KZJZ(AM)	Northside 7th Day Adventist	N/A	Jazz	0.6
KWRE(AM)	Kaspar Broadcasting	N/A	Country	0.5
WEW(AM)	Metropolitan Radio Group	0.6	Nostalgia	0.5
KJSL(AM)	Crawford Broadcasting	N/A	Talk	0.3
KFAV(FM)	Kaspar Broadcasting	N/A	Country	0.3

BIA RESEARCH

▶ MARKET WATCH, continued from page 22

Blacks make up 20 percent of the local population, and Jacor stations reach 95 percent of them.

But even with its dominant position, Clear said it has been difficult to raise advertising rates.

"St. Louis has been a sluggish market," he said. "Up until last year, St. Louis was less than a $100 million radio market. The fear was (among advertisers) consolidation would allow us to raise prices. But it's never happened."

Lower prices

Radio advertiser Kupper agreed. "The reality is the prices are coming down," Kupper said. "In order to get more share of an advertiser's money, the group owners will give away the weak stations."

And while radio revenue figures show growth, Kupper said consolidation among advertisers was making it harder for stations to find new advertising because other industries are consolidating as well. "Furniture companies are merging, banks are merging. Hospitals are merging," he said. "I see all those categories as flat."

Historically, leading commercial categories in St. Louis have been fast food, autos and auto services.

After all, St. Louis is the No. 2 auto production town after Detroit. Beer and soft drink makers also are heavy advertisers.

Broadcasters said top categories tend to be the same at most radio stations.

"St. Louis' (radio audience) is a middle-class, blue-collar urban," said Jacor's Clear. "We give 'em black soul music, the country stations give 'em white soul music."

Marketing-driven Fortune 500 firms in the area, including Anheuser-Busch, the largest brewer in the country, and Ralston Purina, the leading dog-food firm, also push the local media market.

St. Louis has virtually no cross-ownership between media. Pulitzer Publishing Co.'s flagship paper, the St. Louis Post-Dispatch, is the leading local paper in circulation.

Decades ago, Pulitzer swapped its St. Louis broadcast properties to comply with federal regulations barring cross-ownership.

Big Head Todd & The Monsters play a free River Show concert at Union Station for FM101, The River.

Pulitzer kept its broadcasting management here, but its TV and radio stations were in other markets. Earlier this year Pulitzer announced it was selling its broadcast operations to Hearst-Argyle Television Inc. in a $1.15 billion stock swap.

Newspapers, including the Post-Dispatch, made up an estimated $186 million in metro St. Louis advertising revenue last year, according to Duncan's Radio Market Guide.

TV ad revenue hit $203 million, while outdoor advertising was at $23 million and cable TV at $9.6 million.

St. Louisans also listen in their cars. The metro area's population of 2.5 million continues to spread out further into the suburbs, making wheels a necessary part of most commutes — and expanding drive time.

The added traffic also has attracted a new advertiser. The Missouri Dept. of Transportation launched a humorous radio campaign in the summer to explain its construction schedules.

■■■

Rick Desloge is senior reporter for the St. Louis Business Journal where he regularly writes on marketing and media. Reach him c/o ***RW****.*

St. Louis Radio Snapshot

Market Rank: 18
Revenue Rank: 18
Number of FMs: 21
Number of AMs: 24

Estimated Revenue:
1994: $84,700,000
1995: $95,400,000
1996: $101,400,000
1997: $108,900,000
1998: $116,500,000

Revenue Growth:
'91-'96: 8.8%
'97-'01: 6.9% (est.)

Local Revenue: 82%
National Revenue: 18%

1996 Population: 2,551,000
Per Capita Income: $16,860
Median Income: $37,415
Average Household Income: $44,728

BIA RESEARCH

Garcia Plans 1999 RTNDA Show

The Radio and Television News Directors Association 1998 International Conference and Exhibition in San Antonio drew 3,841 attendees, exceeding last year's record by 200.

For several years, the RTNDA took part in the World Media Expo concept, timing its conference and coordinating exhibits with other conventions, including The NAB Radio Show.

RTNDA officials said they are determined to meet the challenge of a potential drop in radio member attendance now that their show is once again held separately.

*During the conference in San Antonio, RTNDA officials told **RW** the organization has not forgotten about its radio members. "We want to make a home for them here," RTNDA President Barbara Cochran said.*

*Robert Garcia, general manager of CNNRadio, is RTNDA's conference chairman-elect. **RW**'s Naina Narayana talked with Garcia about his goals for next year, when the RTNDA show will be held in Charlotte, N.C.*

***RW:** What do you hope to accomplish in the coming year?*

Garcia: My immediate responsibility is to executive-produce the convention. It's an incredibly significant convention symbolically because it's the last RTNDA convention of the millennium. I want to take the convention into some areas that perhaps we have not visited in the past.

Besides a free-wheeling, broad and open-minded discussion about where the communications and news industries may be headed in the next century and the next millennium, I also want to give our minority journalist organizations and journalists of color an opportunity to have their voices heard at our convention in '99.

***RW:** Do you have a theme for the convention yet?*

Garcia: I see ... a three-pronged vision for the '99 convention. One is the millennium, another is diversity and I think another one is media credibility and ethics. I would like to see some sessions that will address the issue of credibility and ethics. I think it's really critical for RTNDA to take the lead in helping establish dialogue in this regard.

***RW:** What type of sessions will you plan on diversity for 1999?*

Garcia: One of RTNDA's major premises is to get journalists of color onto the management track — because without that happening, I don't see how you increase or make changes in hiring and the decisions regarding coverage of minority communities. All those things are done, not by anchors, but by managers and news directors, and so none of those basic things can change unless you have people of color in management.

***RW:** The last time a person working in radio held the position of chairman was six years ago. Coming in with an extensive radio background, what are you going to do to help RTNDA's Radio Task Force increase attendance from radio stations?*

Garcia: We just recently separated our convention from the National Association of Broadcasters radio show. When the conventions were being held simultaneously, we really attracted a lot of radio people as well as television people. This (year's) is one of our first conventions on our own since that arrangement.

***RW:** How will you address the concerns of the television attendees?*

Garcia: While I confess to having solely a radio background, my involvement, on the network level, with both CBS and CNN, has always put me in very close proximity and thrust me into working relationships with TV people on the network side on a regular basis for the last 12 years. So I do feel that I have a handle on some of the issues facing television broadcasters and news people — both on the network side and on the local side.

***RW:** Are you planning on having more technology-oriented sessions about digital television and audio broadcasting next year?*

Garcia: I absolutely guarantee that RNTDA's focus on developing technologies will be very intense at the '99 convention. There are some immediate issues that people must know about regarding the digitization of our media.

(Next year) is going to be a time of assessment to see how the first wave of (digital television) is working. It's a very critical issue for ... the smaller local broadcasters. We'll have, I believe, a much better understanding in '99 of what direction this whole thing is going to be taking.

***RW:** For this year's convention, RTNDA invited engineers to participate in a roundtable discussion on digital television. Will you have more sessions that include people outside the traditional membership of RTNDA?*

Garcia: (RTNDA's) core membership is news managers. But around that core, there's a bigger circle. We really want to

See RTNDA, page 25 ▶

ONLINE RADIO

Catch the Buzz at These Sites

Kim Komando

All the news that's fit to print has no trouble finding a home on the Internet.

Whether you're looking for the latest gossip and rumors or another career opportunity, Web sites big and small have been designed to keep the world well informed of late-breaking radio happenings.

Radio World is online. The site (*www.rwonline.com*) contains breaking industry news, a comprehensive directory of suppliers and industry organizations, including important, often hard-to-find contact information.

The site also includes an events calendar, columns by masked engineering columnist Guy Wire, and back copies of popular features and columns.

New features include online classified ads and a weekly survey on a topic in the news.

Useful resources

If you can't find what you're looking for at **RW Online**, drop by RadioDigest.com, at *www.radiodigest.com*

The home page offers links to subsections that cover the moves, stories and rumors for nearly 30 regional markets — from Atlanta to Washington.

In addition to news, each regional section offers listings of both AM and FM stations, as well as which stations carry which sportscasts.The only major problem here is that the site is not quite as complete as it may first appear.

As of this writing, if you click on Milwaukee, for example, you're transported to a page that reads: "Coming Soon: Radio Digest Milwaukee. We're putting the final touches on Radio Digest/Milwaukee. Watch for our debut soon!"

Similar messages are displayed for Minneapolis, Portland, Ore., Sacramento, Calif. and San Diego.

Additionally, although the Phoenix page looks pretty much like all the other regional pages, none of the links to the directories of AM, FM and sports radio stations work.

There's no way to tell for sure if this is an area of the site that has yet to be completed, or if it's just an error on the part of whomever programmed the site.

Despite its minor shortcomings, RadioDigest.com is a comprehensive site — especially if you're interested in a market for which one of the regional sections is already up and running.

Based on the quality of both the Web site and the information it contains, I have to believe that these folks really mean it when they say, "Coming soon."

If you are looking for strictly a regional gossip slant, try poking around for a Web site that deals specifically with radio news from a particular region or city. This is as easy as searching the Web (more about widening searches later).

For example, while RadioDigest.com is a commercial site obviously supported by online banner advertising, Phoenix Radio Dial (*www.angelfire.com/az/amfm*) is just as clearly a labor of love brought to the Internet by local DJ Jason Remington.

He provides the happenings and links for the Phoenix metro area. This site should be on the "favorites" list of every Phoenix radio head.

The site of Airwaves MediaWeb (*www.airwaves.com*) is another must-see for anyone in the radio biz.

Airwaves

While this isn't a news site in the same sense as others mentioned, it offers a couple of services that could prove valuable.

The first of these is the Airwaves Radio Journal. This is an online discussion group for radio professionals and para-professionals.

One of the more interesting aspects of the Airwaves Radio Journal is that you can participate in one of three ways: through a Web-based interface, through e-mail, or through the *rec.radio.broadcasting* Usenet newsgroup.

Before you jump in, I suggest you read the Airwaves Radio Journal FAQ at *www.airwaves.com/faq.html* as the operators of this discussion group offer guidelines by which you are expected to abide.

The second feature worth checking at Airwaves MediaWeb is a section called the Radio Career Connection.

Here you will find listings of both help wanted and positions wanted in the radio industry.

On the day I checked, there were about 50 jobs posted and about 70 job seekers with posts. As long as you follow the specified guidelines, you can post your own ad for free. The posting will be kept online for about 30 days.

A couple of paragraphs back, I mentioned that you can access the Airwaves Radio Journal as a Usenet newsgroup.

There are other radio-related newsgroups out there. These include *alt.radio.talk, alt.sports.radio, rec.radio.noncomm* and others.

It's the nature of the Usenet, and the Web in general, that you can never be sure what you're going to get in terms of a quality discourse.

Check a couple of these radio newsgroups and see if any of them have anything to offer you.

No Web-surfing expedition would be complete without a stop at the Radio Advertising Bureau Web site (*www.rab.com*). The Radio Facts area provides statistics about our industry that will help you attract the attention of sponsors.

After all, as the RAB reports, the average American listens to radio three hours and 18 minutes every weekday and five hours and 45 minutes every weekend.

U.S. adults spend more time with radio between 6 a.m. and 6 p.m., prime shopping hours, than with any other major medium.

Sports

If you are interested in one particular area of broadcast radio, you can probably find a Web site made just for you.

For example, Gameplan (*sportscast.hypermart.net*) bills itself as "the sports broadcast resource."The home page for this site reads: "Here, you'll find a vast array of sites, resources and books that can help you succeed in the sports broadcast industry." And that's no lie.

Among the many features of this site is a special area for play-by-play broadcasters. This section includes a four-part tutorial designed to assist the aspiring PBP'er.

There's also a play-by-play broadcaster mailing list to which PBP'ers can subscribe.

For more general topics, this site also offers a Web-based discussion group.

Finally, you have the option to subscribe to a monthly sports broadcaster's e-mail newsletter.

I've commented many times on how the Internet is changing the way in which radio stations interact with their listeners.

However, if you're only using the Internet to exchange information with your audience, you're missing out on half the benefit.

Just as important as communicating with your listeners, the Internet has revolutionized the way radio people interact with each other.

Thanks to the Internet and especially the Web, the world of radio is now a little smaller.

▶ RTNDA, continued from page 24

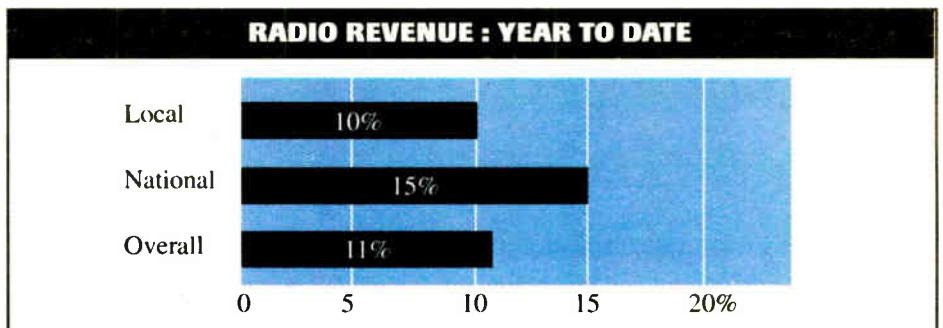
be inclusive. We do want to include engineers and we do want to include new media.

The whole face of electronic journalism is changing. I feel it's really important for RTNDA to reach out to perhaps some non-traditional areas that we haven't been before. If that means engineers, Webmasters, as well as radio and television, that's fine. Electronic journalism is what we're about. And electronic journalism is changing as we speak.

***RW:** Based on your contact with both TV and radio broadcasters, what are the attendees hoping to get out of the RTNDA convention?*

Garcia: People want to get caught up. They want to know what the trends are. They want to get involved in discussions of the issues that we're going to have be dealing with down the pike. A lot of that, especially in the television world right now, revolves around technology.

A universe of multiple channels and local markets is something that is a real unknown and a real challenge to a lot of folks in the local television industry. A convention is a place where we can showcase our services to people. One of our primary missions to educate people.



Radio Sales Up Despite Wall Street Dive

The radio industry continued six years of uninterrupted sales growth in August despite recent turmoil in the nation's economy and on the stock market.

For the year, local advertising is up 10 percent, and national business is up 15 percent, for a combined increase of 11 percent over the first eight months of 1997.

This marks 72 months of revenue growth, according to Radio Advertising Bureau figures.

Technology and Price Breakthrough

NEW- Your Complete Digital Solution!!!

Perfect Cart machine replacement: play, stop, pause, loop, link . . .

Perfect for Live Assist: Jingle Box, Phoner Editor, & much more . . .

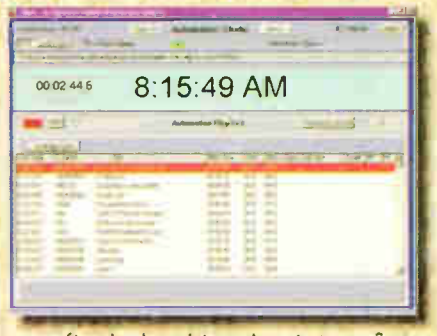
Perfect for Automation: Voice Over Recorder, Segue Editor, & more . . .

From the #1 manufacturer of Digital Workstations in Radio !!!

Live On Air
$495

Live Assist $1,995

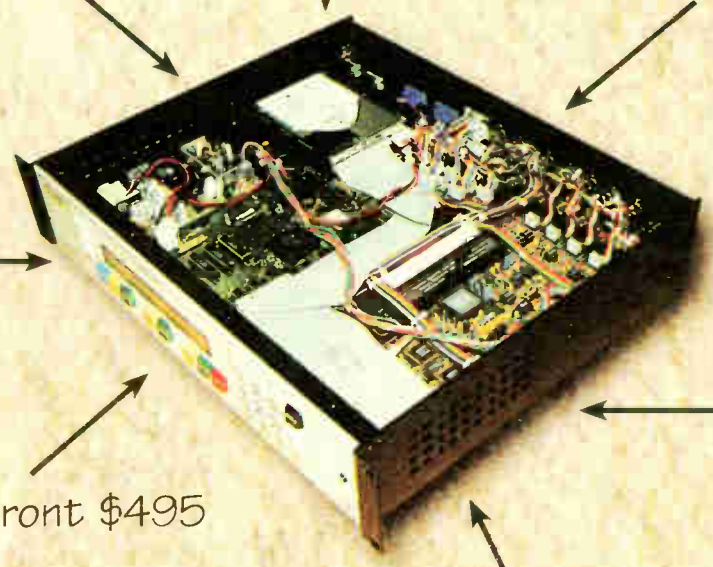
Hard Disk Automation
$2,995



(includes Live Assist software)

Triple Play & Record

Cart Machine Control
$750



Jingle Box Control
$1,195

Optional Front $495

DL4 Digital Audio Engine

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

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

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

Circle (7) On Reader Service Card

PRODUCT EVALUATION

The Ultimate Positioning Statement?

The Gulf War Is Long Over, But the Hummer Is Still an Eye-Catcher and a Useful Tool

Paul Kaminski

When we road-tested the Hummer for the Motor Sports Radio Network program "Radio-Road-Test," we had a good idea how these vehicles were used by Uncle Sam's military. We discovered that the Hummer has a place in a radio station promotional arsenal as well.

The Hummer began its life as the replacement for the Jeep, the military's principal mover of soldiers in the field. The acronym describes its function — High Mobility Multi-Purpose Wheeled Vehicle — HMMWV. Its drivers and maintainers hung the name "Humvee" on the vehicle, from which comes the name "Hummer."

The first production version was built in April 1984; the first civilian production was delivered in July 1992. The vehicle is made by AM General. More than 150,000 military and civilian military Hummers have been produced.

The Hummer draws and keeps attention. It clears the ground by 16 inches. It can ford a 30-inch stream, and climb a 22-inch vertical step. The curb weight is in the 6,000-pound range. This vehicle, with its boxy look and 72-inch track width, will flat out go almost anywhere.

Is this your next promotional vehicle? Shown: The Hummer Wagon

The Hummer of WPLT-FM in Detroit

We put 946 miles on our test Hummer this July. We got 13 miles per gallon of diesel fuel on the highway, and 11.5 miles per gallon in town. Our time from zero to 60 was 19 seconds, measured in traffic on a handheld stopwatch.

You don't use a Hummer for its acceleration; you use it for its ability to move people and cargo.

WPLT(FM) in Detroit, otherwise known as Planet 96.3, moves people with its Hummer. Mark Wuggazer is marketing director for the ABC station. He says it attracts attention, especially to his logo and the sponsor's location.

The Planet 96.3 Hummer doesn't go off-road, like its military ancestors.

"We have a custom-airbrushed paint job on ours, and simply can't afford to scratch it," said Wuggazer.

Planet 96.3 uses its Hummer as a promotion vehicle and ambassador of good will when the weather gets rough. Wuggazer said it's nice to be able to go anywhere in a snow storm.

"Michigan winters make normal roads challenging a few times a year," he said. "Occasionally, we'll take the Hummer out during a storm, and we'll go and pull people out of ditches as sort of a 'Good Samaritan' promotion."

With a hefty towing capacity and options like a six-ton winch, the Hummer is suitable for that mission. And if you equip it with the optional Monsoon audio system with CD ($1,671), you could almost run your appearance without a PA system.

For such a large vehicle, the Hummer is maneuverable, a strength for any station vehicle.

"It takes up a lot of space, but it has no body panels or fenders that you can't see," said Wugazzer. As for reliability and durability, "It's engineered to military specifications."

A military policeman in Bosnia told me he hit a mine while driving one, and only suffered bruises. Although the Hummer is not an armored vehicle, this anecdote says a lot about its construction and durability.

The station Hummer isn't equipped with an RPU for remote broadcasting. The wagon model and hardtop could easily accommodate one, although a pneumatic mast for the antenna might adversely affect the center of gravity.

The four-passenger hard-top Hummer we tested had a base price of $68,878. The sticker price with options was $85,941. Such a vehicle is an expensive undertaking for any station, whether through a purchase or a trade exchange arrangement. Wuggazer's advice for stations considering their own Hummer was succinct: "Save your pennies."

It will hit better than 70 mph with an optional 6.5 V-8 turbo-charged diesel. Hummers are used as fire trucks, military police vehicles, ambulances and communications vehicles.

Undeniably, the Hummer costs big bucks. Such an investment would require a steady revenue stream to justify the purchase. One such idea involves using the Hummer on roadside Good Samaritan calls as the Planet does, with sponsorship from a local auto club or insurance concern. Strap a cell phone or news-style RPU into the Hummer, and you have an on-scene traffic reporter, news vehicle and promotional tool. If the weather gets so bad that no one can move, the Hummer could buy even more good will by traveling through the snow and provide help where needed.

Also consider how useful this vehicle would be in moving your own staff around when the weather gets contrary — for instance, to climb that mountain road to the transmitter on a snowy weekend.

The Hummer certainly is different than any other all-wheel-drive sport utility vehicle. It will go where others can't or couldn't even try. Perhaps that image of confidence might dovetail with your station's promotional scheme.

■ ■ ■

Paul Kaminski is the news director for the Motor Sports Radio Network.

Product Capsule: Hummer by AM General Corp.

Thumbs Up
- ✓ Go absolutely anywhere
- ✓ Instant crowd magnet
- ✓ Reasonably easy to drive on street
- ✓ Acceptable fuel economy for size and weight

Thumbs Down
- ✓ High price
- ✓ Small dealer network

For more information contact AM General Corp., 105 North Niles Ave., South Bend, IN 46617; call (800) REAL4WD (732-5493) or visit the Web site at www.hummer.com

FEED LINE

What Do We Do Until Digital Arrives?

W.C. Alexander

This is the conclusion of a three-part series. The first two articles appeared Sept. 30 and Oct. 14.

What positive steps can stations take now, rather than waiting for digital audio broadcasting to arrive, so that they sound as good as they possibly can?

Stations today find themselves competing not only with other broadcast stations, but with digital media such as CDs, direct broadcast satellite, and MiniDiscs. Digital satellite radio is coming. To remain competitive, stations must do all they can to close the gap between various digital sources and our analog broadcast medium.

Last time, our focus was on STL and processing topics. We will wrap up with a look at transmitter and antenna issues.

Digital FM exciters like the Nautel NE50 can make a big difference in your sound. They can also be misused.

Focus on exciters

Last year, I installed a new, all-solid-state transmitter with a digital exciter in one of our major market stations. This was one of two FM stations we have on the air in that market, both with similar formats. The other station was operating with a late-model transmitter with an analog exciter.

With the new transmitter on the air, I did some listening and was surprised to hear that our new station sounded head and shoulders above just about all the other stations in the market, including — somewhat to my chagrin — our other FM in the market. The digital exciter made that much difference!

Exciter technology has come a long way from the early days. Today's direct digital synthesis is light-years ahead of the AFCs and PLLs of earlier-generation exciters. Direct digital inputs are another big advantage of today's digital exciters. Like digital STLs, however, there may be problems in some installations with using certain digital exciters.

I was visiting a large FM site in one western U.S. market when the engineer showed me his new digital exciter. I noticed that it was not on the air, and that the older, analog unit was in use. The engineer there told me that the digital compression delays on the STL, and that the digital delays in the new exciter added up to more than the station could tolerate. The DJs were hearing the delay in their headphones and it was "messing them up."

One other caveat: Watch out for overshoots resulting from sample rate conversions. Again, research before buying!

What if you can't afford a new digital exciter? Analog exciters can sound very good if they are in proper working order. Like many other pieces of equipment, however, they tend to operate in a relatively high-temperature environment; this dries out electrolytic capacitors. This occurs slowly, so you may not be aware of your frequency response slowly eroding.

If the exciter is more than five years old, it is probably a good idea to bench-test it thoroughly and, if necessary, re-cap it. If you find one or two bad electrolytics, it is best to change them all. As I mentioned in the first part of this series, tantalum capacitors are good alternatives to electrolytics in many audio applications.

Transmitter needs

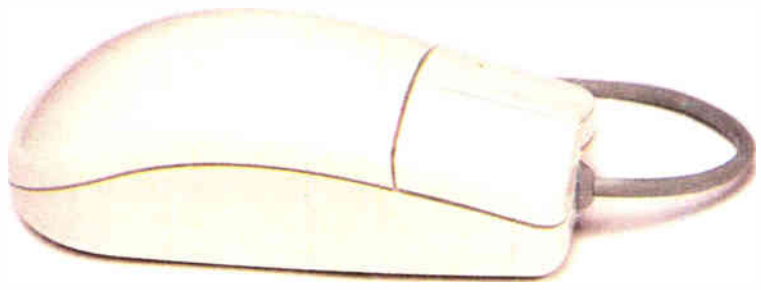
In FM transmitters, bandwidth is the single most important parameter when it comes to producing good sound. Narrow bandwidth will contribute not only to a degradation of the transmitted audio, but also to the generation of AM and other undesirable products which are demodulated as noise and distortion. A properly tuned and neutralized transmitter is the key to good bandwidth and transparent transmission of the exciter output.

Here are some things to look for:

Reflected power back to the exciter

See FEED LINE, page 30 ▶

TO DIAGNOSE OUR FM TRANSMITTER, ALL YOU NEED IS THIS...



INSTEAD OF THESE.

Exclusive RTDS Means Fewer Trips and Shorter Repair Time

Now you can monitor and diagnose your BE T-Series High Power FM Transmitter from the convenience of your own PC. BE's superior technology has resulted in a Remote Transmitter Diagnostic System (RTDS) that eliminates unnecessary trips to the transmitter site, saving you time and money.

The new Windows - based RTDS technology easily monitors one or more BE transmitters through your PC with only one phone line. It can even store operating histories and "snap-shots" of parameters before, during and immediately after an event. The RTDS is easy to use, inexpensive and available only on BE T-Series High Power FM transmitters - the most reliable high power FMs in the market.

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Circle (163) On Reader Service Card

Improve Your Station Now

▶ FEED LINE, continued from page 28

should be minimal. One manufacturer I've worked with insists that it be no more than a needle's width on a 1-watt scale. That's a tough standard, but that particular transmitter has no trouble achieving it. IPA inputs can be real bottlenecks, and proper tuning at that point will affect how the remaining transmitter stages will operate.

IPAs are notorious for being narrowband. Solid-state IPAs generally are better than tube-types, but either can cause problems. In transmitters with tube-type IPAs, look for peak PA grid current and IPA screen current while adjusting IPA tuning. PA grid current is an indication of IPA output, while IPA screen current is an indication of IPA loading.

In solid-state IPA transmitters, adjust for proper PA grid current with minimum reflected power to the IPA. In both cases, it is best to follow the manufacturer's published instructions when tuning, but check with the manufacturer for any field service bulletins that may outline an updated procedure.

Final amplifier stages usually have the broadest bandwidth of any stage in the transmitter. Still, improper neutralization and poor tuning can cause problems. Adjust PA tuning and loading in accordance with the instructions. Monitor PA screen current for activity during modulation as an indication of proper neutralization. Some engineers install thermometers in the intake and exhaust air ducts and use the temperature rise as a tuning indicator. While tuning in this manner is an indicator of efficiency, the point of peak efficiency may be considerably different than the point of the best, most symmetrical bandwidth.

Digital compression delays on the STL and digital delays in the new exciter added up to more than one station could tolerate. Lesson: Do your homework.

Last stop, antennas

The antenna is the last point in the transmission system of which the broadcaster has control. Once the signal leaves the antenna, it's "Hasta la vista, baby" — there is nothing more you can do to influence how the demodulated audio sounds. The antenna is another potential choke point for bandwidth, and a poorly-matched antenna can cause more problems for a station's signal than almost anything else.

One of the best investments a station can make is a good, state-of-the-art antenna. Those using antennas with less than 4 MHz of bandwidth or with narrow-band matching sections should consider investing in something better.

Whatever type of antenna you are using, the match back to the transmitter is of paramount importance. Power reflected back to the transmitter can cause all sorts of problems, most of which will degrade the demodulated audio of the station to one degree or another.

Tuning the matching sections for minimum indication on the transmitter's reflectometer may not be the best method for achieving maximum performance. It may be worthwhile to retain a consultant with some test equipment to tune for a combination of best match and best bandwidth. A consultant worth his salt will tune the antenna and the transmission line as a *system*, resulting in maximum overall performance.

As I drive around the various major markets, I listen to many stations. Several sound very good; others are so-so. This is evidence that there is plenty stations can do to maximize audio performance. With the competition no longer coming exclusively from across town, but also from satellites, CDs and other digital media, we've got to sound good, *really* good, to remain viable and competitive.

Perhaps someday, when digital radio broadcasting comes to this country, many of the issues we have considered here will no longer be factors. Until then, stations owe it to themselves to do all they can to sound as good as possible.

■■■

Cris Alexander is director of engineering for Crawford Broadcasting in Dallas. He reviewed the Gentner SPH10 phone hybrid in our July 8 issue.

BUSINESS DIGEST

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

Itelco Sets Aggressive Targets

ORVIETO, Italy In the presence of Italian national and local authorities, Itelco started operation of its new, larger headquarters in the outskirts of this small central Italian town last month. At that time, the president of the company said he wants to make Itelco the second largest global supplier of transmission equipment within five years.

The new plant, which cost approximately $4 million, covers 80,000 square feet over two stories and is surrounded by land for parking and expansion. The facility includes a test and quality control area equipped with 400 kW of power, allowing tests of up to 18 transmitting systems at the same time.

Eugenio Fumi opens expanded Itelco plant.

Founded in 1961 by Eugenio Fumi, who remains its president, Itelco began as a manufacturer of small transmitting systems for military and government use, at a time when in Italy broadcasting was still a state monopoly. However, the company's growth received a boost in the mid-1970s, with the initially unregulated liberalization of Italy's airwaves. When regulation was introduced several years later, the consequent slowdown in its domestic market pushed Itelco to increase its export activity.

Itelco has 300 employees in manufacturing facilities in Orvieto, Rome and Denver, Colo. U.S. sales offices are located in Denver and Miami, and abroad in Istanbul and Beijing. The company reports annual sales of $35 million per year, with a recent growth rate of between 15 and 22 percent. Fumi said these figures make Itelco the No. 4 manufacturer of transmitting equipment in the world. He set out plans to reach the No. 2 position within five years.

— Dario Calabrese

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"It's mature technology. It's stable. We like the software functionality."

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"It's almost like the Maytag repairman, we don't really call them that much. But when we do have problems, they respond right away." Steve Densmore

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PIONEER PROFILES

A Pause for Station Identification

Barry Mishkind

This is the conclusion of a two-part look at the history of call letters in the United States. The first part appeared in our Sept. 30 issue.

It's virtually automatic: Every broadcast station in the United States must identify itself each hour it is in operation.

This rule appears in Section 73.1201 of the FCC Rules and Regulations. Unlike most countries, the United States continues to utilize a station's call letter assignment as the primary identification.

This rule is not particularly complex. To summarize, each station must identify itself by call letters and location each hour of operation, "as close to the hour as feasible, at a natural break in program offerings." The station is permitted to add the name of the licensee and the frequency between the call letters and location. Nothing else. Therein hangs our story.

From its humble start as a "shorthand" way to identify a radiotelegraph station (Morse Code), call letters became a large part of a station's image in the "glory years" of radio. Young announcers lived for the day they would be permitted to announce their first set of "heritage calls." In more recent times, many stations seem to change or swap calls on a regular basis.

Early days, early calls

In the early 1920s, when all stations shared the single frequency of 833 kHz, call letters identified program changes. Most were assigned sequentially from the available pool of calls. When the Department of Commerce ran out of call letters, it began to reuse those that had gone off the air. In those pioneer days, calls could be recycled quite rapidly. By early 1922, a turnaround of less than two weeks was not uncommon.

Sunken ships presented another source for call signs. Due to superstition, no ship wanted the call KGB after the steamship D.H. Luckenbach was sunk by the Germans in 1917. The same was true of KOB after the SS Princess Anne went down. Eventually they were transferred to the Broadcast Service. Other calls that came from sunken ships include WOC (SS Oregon), KGW (SS Isabella) and WSM (SS Fair Oaks).

Stations quickly developed slogans and logos that keyed on the call letters to try to help listeners recall them more easily. WJR may have been called the "Goodwill Station," and WHB might have had the "World's Happiest Broadcasters," but WPG was the "World's Play Ground" and KSL was located in Salt Lake City.

Actually, most three-letter call signs were assigned sequentially. Yes, WGH was chosen as the "World's Greatest Harbor" and WMT was the "Waterloo Morning Tribune," but there is no real evidence that WHO was anything more than a sequentially issued call. Ditto for WOC, although Col. B.J. Palmer, the famous chiropractor, apparently liked the calls enough to purchase the station shortly after it was built.

Photos by Library of American Broadcasting Univ. of Md.

Leroy Miller was a disk jockey at WFIL(AM) in Philadelphia.

Eventually, the supply of three-letter calls ran out; with many in nonbroadcast use, only about 200 were available for broadcasters. Four-letter calls became more common. This presented many more opportunities for requested calls. Although some of the most famous stations kept their sequentially assigned calls, owners managed to turn them into logos in clever ways.

When the First Baptist Church in San Jose, Calif., bought KQW from Charles "Doc" Herrold, they began to identify the station as the "King's Quickening Word." And when the Los Angeles Times Mirror received KHJ, it announced the calls would represent "Kindness, Happiness, Joy."

On the other hand, WEAF was not selected as meaning a mystical "Wind, Earth, Air, Fire," and WBBM was not chosen because "We Broadcast Better Music." They were simply sequential calls issued in June 1922 and early 1924. Other examples include WEAP, Mobile, Ala.; WEAT, Tampa, Fla.; WFAA, Dallas; WMAZ, Macon, Ga.; WHAT, Yale, Okla.; and KFCC, Wallace, Idaho.

More natural references for calls include KGRS for the Gish Radio Service, and WMAL, requested by M.A. Leese, a Washington, D.C., optician. Other calls referring clearly to the station owner included KECA in Los Angeles, for Earle C. Anthony, and WABD in New York, for Allen B. DuMont.

Network gymnastics

As radio networks grew stronger, they sought call letters for their lead stations that reflected the network. We see this today in the calls containing CBS and ABC. Getting those calls was not easy. Sometimes, owners had to pay a significant amount for another station to give up its calls. Ted Turner paid a college station to get WTBS, for example.

CBS paid an Illinois station to give up WCBS. Oddly enough, this was not the first time the station had paid to change its calls. Original owner Al H. Grebe first chose WAHG, for both his initials and the slogan "Wait And Hear Grebe." However, when Grebe launched the Atlantic Broadcasting Co., he paid an Asheville, N.C., station for WABC, which was originally the Asheville Battery Company.

As for NBC, their WEAF calls changed to WNBC, WRCA and back to WNBC, before GE sold it and it became WFAN. Yet, no broadcaster used the calls WNBC from 1935 to 1946 or 1954 to 1960.

How was it possible for desirable calls such as WNBC to be available when the network decided they wanted them? The answer is found in the RCA Frequency Bureau, a department set up to keep track of licenses for RCA properties and — get ready — the ships of the United Fruit Company, among others. When the New Britain, Conn., station (WNBC, get it?) gave up the calls in 1935, the RCA Frequency Bureau filed to attach the calls to a ship in the Atlantic Ocean. Hence, they were "ready" when NBC wanted to use them.

The same procedure was used in 1954 when WRCA was adopted, until WNBC was again pressed into use in 1960. However, someone "goofed" and forgot to "park" WRCA in 1960, and a station in Massachusetts grabbed it!

Without a doubt, one of the more popular categories of requested calls concerns localities.

One can easily see Salt Lake City in KSL; Miami Beach, Fla., in WMBF; or St. Paul, Minn., in KSTP. Tulsa got KTUL; Baltimore, WBAL; and Wilmington, Del., WDEL. Where else would you expect to find WARE except in Ware, Mass.? This is a rare case of the call letters exactly spelling the city name.

Other examples of location name calls include WNYC, New York City; WBOS, Boston; WCAM, Camden, N.J.; WILK, Wilkes-Barre, Pa.; and WFIL in Philadelphia. Sometimes, the spelling may have gotten in the way: KTHS in Arkansas was said to mean "Kum To Hot Springs."

Fran Pettay cues up a record at WJR(AM) in Detroit.

It was 1931 when the owners of KFUM decided it wasn't a particularly "lilting" call, and the Colorado Springs station obtained KVOR, the "Voice Of The Rockies." Other "Voices" came to include KVOA in Arizona, KVOO in Oklahoma and KVOD in Denver.

Corporate identity

An overwhelming number of requested calls concern the identity of a corporation, church or other organization. After all, most early stations were accustomed to selling the products or services of the station owner. Examples are the aforementioned WRCA for RCA, WTIC for Travelers Insurance Company, and WEEI for Edison Electric Illuminating Company.

Newspapers were well-represented by co-owned stations until the FCC ordered divestiture. So we have station calls like WBEN, Buffalo Evening News; KEHE, the Los Angeles Evening Herald Express; WTMJ, The Milwaukee Journal; and WSBT, South Bend Times.

Churches show up in KTAB, which belonged to Tenth Avenue Baptist Church in Oakland; KFSG, for Aimee Semple McPherson's Four Square Gospel Church; and KPOF of Denver's Pillar of Fire Church.

Organizations: WCFL, Chicago Federation of Labor; WEVD, Eugene V. Debs Memorial Radio Fund; and WTRC, Twelfth Assembly District Radio Club in Brooklyn, which moved and became WTFF, reportedly for The Fellowship Forum, a Ku Klux Klan publication, in Virginia. This eventually ended up as "Top-of-the-dial" WTOP in Washington, D.C., which paid a police department in the Midwest to relinquish those calls.

See CALLS, page 34 ▶

Call letters can have many meanings, including World's Happiest Broadcasters, World's Greatest Harbor and Wait And Hear Grebe. But 'Kain't Find Enough Likker'?

Call Letter Resources

As you can imagine, many legends and myths have grown up over meanings and sources of call letters. Where do you go to find out whether a "meaning" for a call came from a requested call, an adaptation of a sequentially issued call, or a slogan? Bob Nelson has built and maintains an ever-growing list of call letter meanings and slogans. He calls the file "Origins," and you can find it at *www.oldradio.com/archives/general/*

A researcher who has done some tremendous work researching early broadcast history is Thomas White. I've found his efforts extremely helpful in tracing station histories and learning about the beginnings of broadcasting as we know it. For information on early regulation, dates of licenses for the first stations, or an informative narrative on the mystique of three-letter calls, check out his site at *www.ipass.net/~whitetho/index.html*

Finally, please do browse *www.oldradio.com* This site is an outgrowth of an article we did about five years ago and lists a lot of historical information, including the Oldradio infobase, a chronicled look at the facility and ownership changes of the pioneer stations.

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

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

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Radio History From A to Z

▶ CALLS, continued from page 32

There were also a number of "wandering" call signs. "Portable" stations existed until 1928. Many of them were taken to cities and fairs around the Northeast and Midwestern states; some were eventually "anchored," and WIBM, WCBS (now WCVS) and KGGM ranged over hundreds of miles.

Perhaps the longest distance traveled by call letters controlled by one company was KYW. This station started in Chicago and moved to Philadelphia. The calls were then taken to Cleveland in a station swap, which eventually ended, and the calls were returned to Philadelphia. That dust you see is from all those miles on the road!

We can't overlook the pattern of using calls to identify a station's format or dial position. Among the first was KIOI in Northern California at 101 on the dial. KXIV was 1400 and WXIA was Channel 11 in Atlanta, both of which work as Roman numerals. KIIS leveraged its dial position into a logo: "Kiss Radio." Easy listening formats have longed used "EZ" in their calls. There also have been many permutations of "Rock": KROK, KROQ, KKRK, KRKK, etc.

Country stations seem to like calls like KIKK, KICK and KIKX. Sports stations seem to like having a "fan" around: WFAN, KFFN, etc. News formats could be built around KFYI, KNUS, KNWS, and other combinations.

In the late 1960s, KCBQ's "Q" format started a run on calls including "Q." Stations began using Q-93, X-100, and similar logos, which made the stations sound more international, at least until the top of the hour brought them back to their "official" names.

Some calls just seem crazy: KRZY, for example. There is also WAKY, KUKU, or KOOK, all calls that have been used over the years. Some Pennsylvania TV viewers were able to watch a station which may have been a bit Orwellian in asking for WICU (I see you!).

There is also the persistent story that Eugene O'Fallon, owner of KFEL, insisted his calls meant "Kain't Find Enough Likker."

Gordon McLendon took KABL in Oakland, added the sound effect of a clanging cable car, and began announcing, "This is KABL, Oakland, in the air everywhere over San Francisco." This did not amuse the FCC, which for a time tightened up what stations could or could not say in proximity to the station ID.

Meanwhile, what could be more comforting to Arizona desert dwellers basting in the heat than to listen to their local CBS affiliate and be assured that "It's KOOL in Phoenix" or that "It's KOLD in Tucson!" If you're sad, listen to WKBI, where "We Kill Blues Instantly."

Then there was the fellow in New England who thought that by using WFCC, he could avoid hassles with the government agency. Yes, and no.

In the early 1980s, the FCC tired of mediating disputes between stations claiming another's call letters sounded too similar and were designed to steal ratings points. Later, the FCC allowed "disconnected" calls, where WXXX and WXXX-FM no longer had to be in the same city, or even under the same ownership.

The FCC also decided it would no longer pass judgment on whether call signs were appropriate. This led to the use of calls with possible sexual connotations, like WSEX, and previously "off-limits" calls like WUSA or WJFK. Complaints are now directed to the local court system, as the FCC generally doesn't want to be involved.

Miscellaneous

Call letters have provided many interesting tidbits over the years.

When stations merged in the 1920s or 1930s, combined calls began to appear. WHO-WOC was one such combination. Others include WENR-WBCN and WDWF-WLSI, Providence, R.I., which later merged again as WPRO-WPAW.

Sometimes, looking at call signs might lead to wrong conclusions. WIND was not named for the "Windy City" of Chicago, but for "INDiana." Another similar case is WGAY, Washington, D.C., which was named for the owner, Western music promoter Connie Gay.

We could also have an interesting discussion of call signs used in movies, on television shows, and even radio plays. Perhaps one of the most famous non-calls is WKRP in Cincinnati.

One of my favorites concerns a station on 980 that was allegedly heard all the way from Denver to California, day and night. It even had the ability to turn on the car radio when the DJ wanted to talk to the driver. Remember KOW in the movie Vanishing Point? Curiously, there was a KOW in Denver in the late 1920s. I doubt there was a connection.

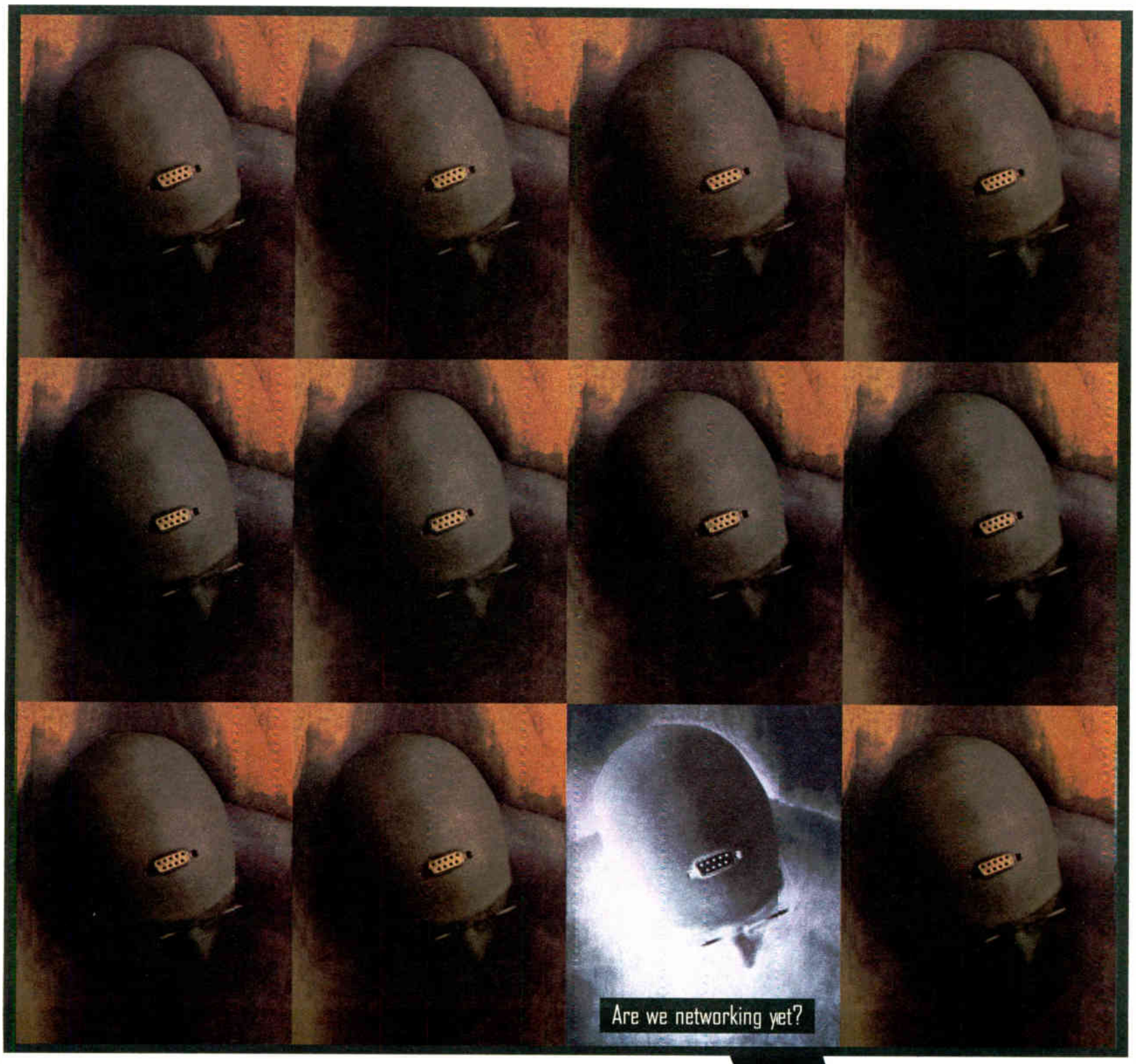
However, the Fountain of Youth can really be found next door to WFOY.

The FCC is making plans to allow electronic call letter selection and changes. This will no doubt lead to more heritage calls being changed, and even the number of three-letter call signs slowly is eroding. There are fewer than 60 AM stations left with three-letter calls, and about a dozen FM and TV stations.

■ ■ ■

Barry Mishkind is a long-time contributor to RW. He is looking for more interesting call letter combinations already.

Share your favorites with him at his e-mail box barry@broadcast.net *or write to 2033 S. Augusta Place, Tucson, AZ 85710.*



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Workbench

Radio World, October 28, 1998

Solve These Problems on the Cheap

John Bisset

Here's a problem that has a quick fix.

Many consumer CD and cassette players have removable AC cords, which periodically pull out of the AC socket.

Whether a jock moved the player, or by magic, the machine is dead, usually until the engineer comes to the rescue. A slick way to keep the AC cables in place is to affix one of those "stick-on" wire tie holders to the back of the player. You then plug in the AC and loop the cord through a wire tie fastened to the plastic holder. The cord stays put, and if you ever need to remove the unit for service, simply snip the wire tie with a pair of dykes.

This idea works well in remote cases, as Randy Kerbawy of WTNJ(FM), Mount Hope, W.Va., showed me a while back. With all the movement remote equipment gets, it's easy for AC plugs to fall out. With this in mind, the two- and three-prong electrical plugs will usually stay put, but wall-warts are another story.

The mass of these plug/transformer assemblies combined with one good drop of the remote case will cause disaster. To keep wall-warts in place, take a couple of long wire ties, and pass them under the power strip, securing the tie over the top of the wall-wart. One tie usually will work, but for safety, a second never hurts.

If you aren't using "wart removers," especially in your remote kit, call your supplier and buy a few. Dr. Ferd's Wart Remover is one brand. It consists of a flat plastic plate into which the wall-wart plugs, and a short piece of zip cord running to an AC plug. Because of the size of the typical wall-wart, two plug positions are taken on AC outlet strips. The "wart removers" free up outlet space by occupying only one AC socket.

★★★

Figure 1 shows a simple, inexpensive auto-dialer from Radio Shack. Having the budget for a dial-up remote control for all your sites is great, but in this day of squeezing dollars, your desires may not be practical.

In this case, an intercity relay site uses the dialer to report power failures and generator usage. Tied into a battery, diode and resistor for trickle charging (located on top of the transfer switch), the alarm sensors are tied to the generator. When the generator trips on, the autodialer dials the engineer's pager, alerting him to the problem.

Perhaps the most helpless feeling is having a generator dead in the water because it has run out of fuel. If you are managing remote sites that may be visited only three or four times a year, this pager-alert system helps keep track of both generator run time and fuel usage.

The spare set of contacts can be wired to an intrusion alarm, a fire or smoke detector, or to alarm contacts on the STL itself.

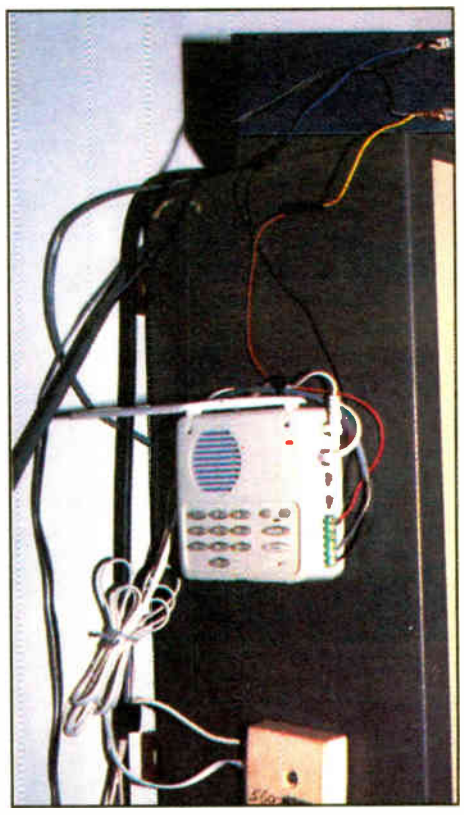


Figure 1: An affordable Radio Shack 'auto-dialer' can alert staff to remote tower site problems.

★★★

Allen Sklar is the chief for a group of stations in Idaho owned by Impact Radio Group. He recently wrote about a problem he was having with ESPN Sunday Night Baseball. He asks the *Workbench* experts — you, our readers — to help diagnose the problem.

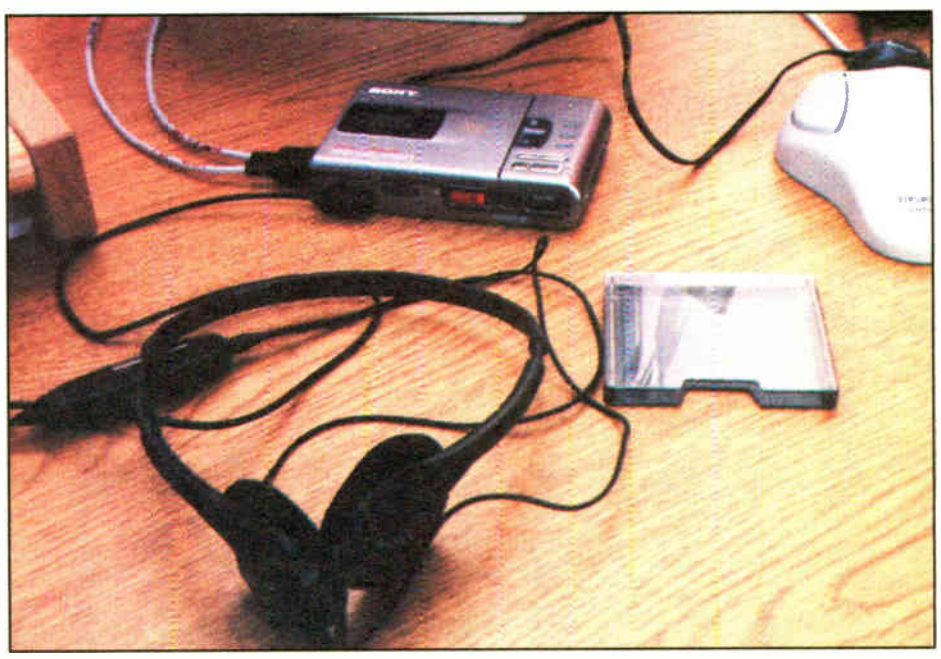


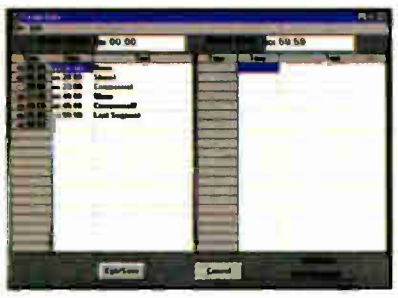
Figure 2: Use a Sony MiniDisc deck to record calls, traffic feeds and remote broadcast bits inexpensively.

Allen is using an SA Encore 3610 with an ABC Netcue box. For some reason, Allen gets tones firing for no reason; other times, the system works fine. ABC reported extra tones on its computer printout one night but not on others. This is a recurring problem. Allen's most recent calls to both ESPN and ABC have turned up no other complaints. Any ideas? E-mail your suggestions to us at *jbisset@harris.com*

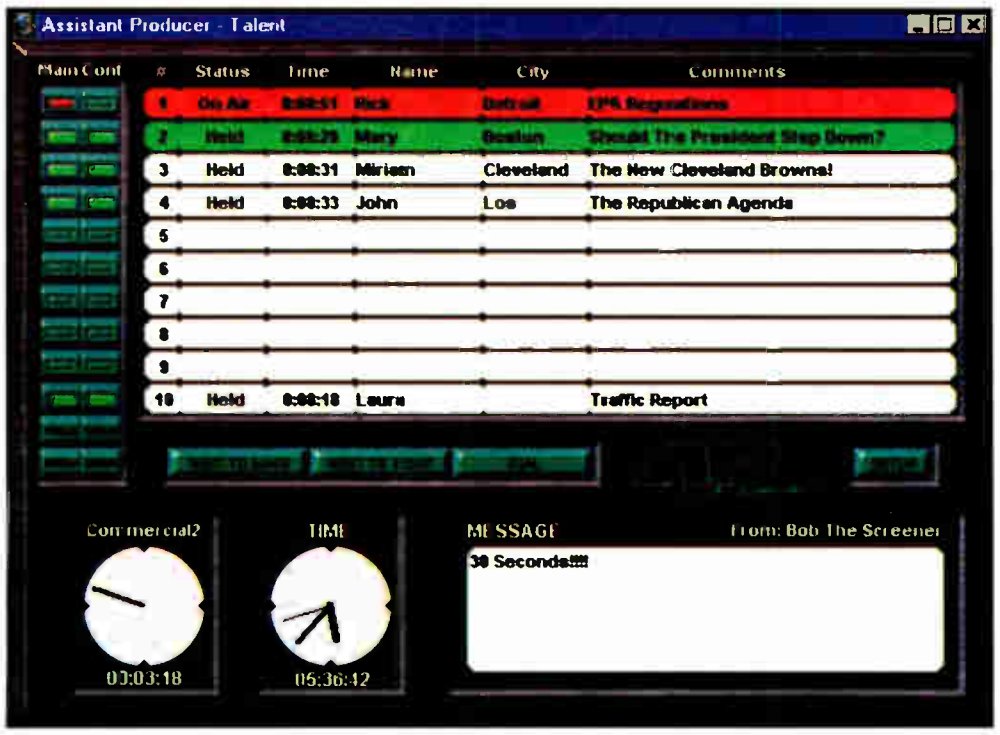
Many years ago, when satellite programming was in its infancy, I experienced a similar problem on nearly a daily basis. The program provider kept saying mine was the only complaint. I knew I wasn't losing my mind; I could see the tones firing, so I got smart. I called the station relations department, and got a list of other stations carrying the same programming. A few calls to the larger markets, where I would still find full-time CEs, and I found out we *all* were experiencing the same problem. Some

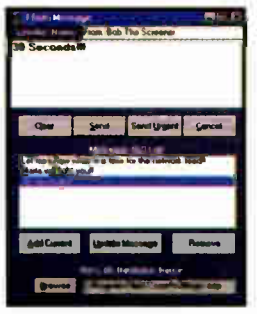
See WORKBENCH, page 39 ▶

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



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





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

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

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

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- **Writes database files using Microsoft Access files for easy analysis and conversion to other formats**
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Assistant Producer controls any Telos telephone interface and hybrid combination, such as those pictured here.

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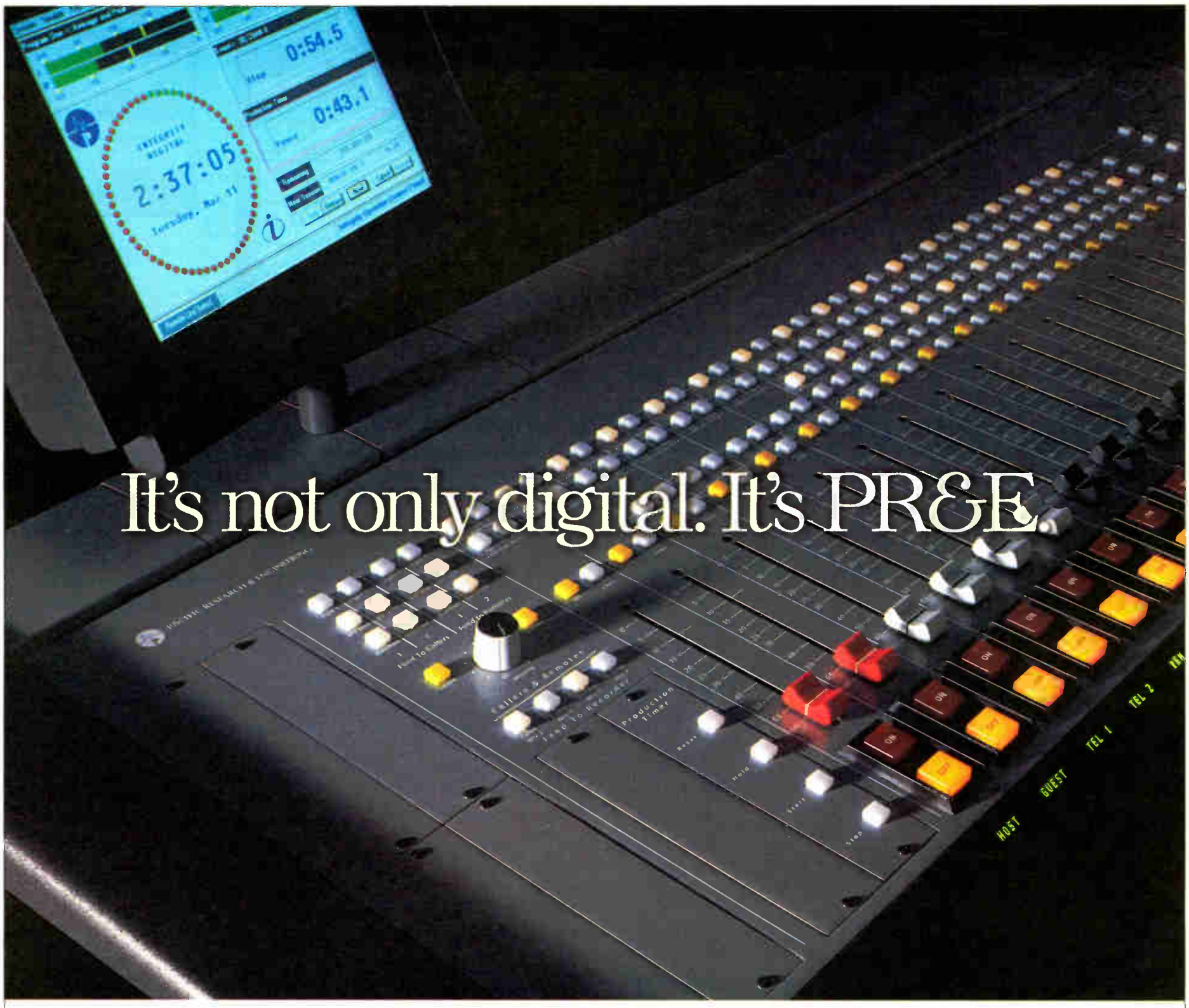

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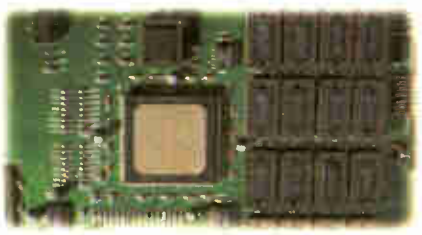
Now you can get digital technology and PR&E reliability in the same console. Integrity.™ It's the first digital on-air board that also speaks fluent analog. All 16 inputs can handle analog signals. Ten can also accept digital inputs at any sample rate. So you can deal with the hodge-podge of equipment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

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

For a brochure, call us at 760-438-3911, visit www.pre.com or e-mail sales@pre.com

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

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



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

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

PACIFIC RESEARCH & ENGINEERING

Circle (198) On Reader Service Card

Your Net Network

▶ WORKBENCH, continued from page 36

of the other stations complained, while others didn't bother.

I explained the situation to my general manager, who was really on my butt — you know the story, "It's engineering's fault!" We placed a conference call to the program provider, with managers from two other stations that also experienced the problem listening quietly on the phone. When we were told there were no other complaints, the GM asked the other two station representatives to speak up. The provider no longer used the excuse that "no one else has complained," and eventually got his air staff properly trained to hit the right button.

I'm not insinuating that Allen's providers are playing this game. These guys are busy and may not know what happened. Perhaps Allen's problem is unique. But checking with a few engineers who receive the same feed can keep you from losing your mind trying to find problems that may not be in your equipment.

We've all been there and understand the frustration. Today's engineer must budget his or her time carefully, and spending half a day on a non-existent equipment problem doesn't make any engineer a happy camper.

★★★

Arnie Clawson is the technical director for Family Educational Broadcasting. He writes that most computers are not designed for use in a noise-controlled environment, such as a radio studio. The hum and ticking of the hard drive, combined with the relentless whine of cooling fans, have taken over the isolated quiet studios that we worked so hard to build.

Arnie's solution was multifaceted. First, he noted the biggest culprit was the weather satellite computer. The hard drive was so loud, it came through the studio mikes. Arnie removed the drive from the computer, and placed 1/8-inch high-density weather stripping along the drive bracket, so the metal portion of the drive was not in direct contact with the metal case. He also added small rubber washers on all the mounting hardware for the drive. While the case was open, he cleaned and oiled the cooling fan. The final result was impressive! There was an 80 percent decrease in noise coming from the unit — not a bad return on $5 worth of stuff from the hardware store!

★★★

Is a Sony MiniDisc is in your future? Sony is running a special, providing you with three recordable MiniDisc media disks when you buy any Sony MiniDisc player or recorder. The offer is provided via coupon sent to Sony after you buy the equipment.

What, you ask, can I use a MiniDisc for? Articles in past issues of **RW** have addressed this question, and I run across many applications. Dave Bowling at Winner Broadcasting uses a portable MD recorder to record and playback his telephone calls. The setup is simple, the quality is great, and a MiniDisc full of calls provides his production guy with plenty of listener reaction that can be spun into promos later.

These MiniDisc recorders, especially the portable units, provide great sounding phoners, traffic reports or pre-recorded bits from a remote.

★★★

Rolf Taylor is a senior customer service support engineer with Telos. He would like to pass on to *Workbench* readers that the Carrier Access "Pic" codes used to force a call through a given long distance carrier have now changed from 10+3 digits to 10+5 digits. (Perhaps you have seen commercials for 10-321 long distance now becoming 10-10-321.)

These codes will work with both POTs and ISDN data calls, and are used extensively for troubleshooting ISDN long distance problems. Among the codes used most often for data are MCI's, which is now 1010222. AT&T's code is now 1010288, but the code may not work unless you have an account. Sprint's code is now 1010333.

Users who have no long distance carrier may be using these codes for all calls, and may need to reprogram their auto dials. Both sets of codes have been active until recently, but some of the carriers have discontinued the old codes as of July 1. Rolf adds that users who have a "1+" default carrier will be unaffected for normal operation.

■■■

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

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

Robert George, Owner, Robert George Productions, Naples, Florida

"If you can buy only one piece of equipment this year for your studio, make it a CDQPrima digital audio codec from MUSICAM USA."

And Robert George should know—the CDQPrima increased his revenues by about 50%!

George writes and produces radio commercials and masters CDs, audio for video and jingles. "As the owner of a small business, I'm cautious about purchasing new equipment, but buying the CDQPrima was one of the smartest business moves I've ever made," he says. In addition to boosting his revenues, George says the Prima has more than paid for itself and allowed him and his voice-over talents to "live the lifestyle we want to live."

The Prima also helped George expand his pool of voice-over talents almost instantly. The people he works with have ISDN at their home studios, so he needed a codec that was compatible with most of the others on the market. "The Prima was the only one flexible enough to communicate with everyone on my talent roster," he says. The fact that, unlike the competition, the Prima performs well at 128 and 256 kb/s and offers SMPTE time code capability was also a big bonus to George. "When sound quality is key," George says, "the competition is not even close. The noise floor on the competition is simply too high. I've seen the waveform on my computer."

George says the CDQPrima has helped him to "swim with the sharks" and bring in accounts he couldn't have landed without it. When a car dealer with eight dealerships began taking its business to Miami looking for fresh, distinctive voices, George was ready. With the Prima, he was able to bring in big talent and win the account. "It's a great piece of equipment," he says. "No studio should be without it."

Here's Why Audio Professionals Worldwide Choose CDQPrima Over Any Other Codec

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- Up to 384 kb/s Contribution Grade Audio
- 256 Speed Dial Locations with 32 Factory Quick-Configuration Presets
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- ISO MPEG Layer II, Layer III, and G.722 Coding for Full Compatibility

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Studio Sessions

RØDE Mic Gets Workout
Page 46

PRODUCT EVALUATION

RoKit: Little Guys, Little Price

Rick Barnes

Got a small space where you need a big sound but don't have a lot of cash to spend? The new KRK RoKit speakers may be the answer for you.

These speakers are extremely economical and compact in design — but bear in mind you get what you pay for. KRK produces these speakers for home studios and small spaces, and after testing them in many situations, that is where I found them most effective.

The RoKit is a small monitor speaker made by KRK. Its trapezoidal design is based on that of its big brother, the K-RoK. The RoKit sports a 6-1/2-inch woofer and a 1-inch silk dome tweeter, with each speaker weighing only 14 pounds. It can handle up to 75 watts and produce 104 dB of sound.

KRK RoKit Nearfield Monitors, Put Through Four Real-World Tests

What the ear hears

According to the book "Advanced Audio Production Techniques" by **RW** contributor Ty Ford, human hearing response has a rolloff in both the low end and the high end.

This natural phenomenon needs to be compensated for by boosting these far-flung audio frequencies. When using a multiband graphic equalizer, the "California Smile" (where the frequency band controls are set to a "smiley face") best compensates for this normal hearing profile.

The frequency response of the RoKit is nearly flat from 70 Hz to 24 kHz, which perhaps is a problem. The frequency response is a little *too* flat. While listening to these speakers in most studio situations, the comment heard most often from DJs and production people alike was that there was not enough bottom end.

We all know the story of diminutive David slaying the giant Goliath with a single shot. In this speaker comparison, however, I found that bigger was always better. My first comparison test for the KRK RoKit speakers was in the production studio of Radio One, the home of WKYS(FM), WMMJ(FM), WOL(AM) and WYCB(AM) — all stations with an urban slant and all located in the outskirts of Washington.

I took the RoKits and placed them next to the pair of Electro-Voice Sentry 100As located on pedestals on either side of the control board. With a simple A/B box purchased from Radio Shack, and with no changes in equalization for either pair of speakers, people could come into the studio and compare the two sets of speakers.

Bear in mind that the E-V Sentry 100As have a larger 8-inch woofer and a cabinet with about twice the cubic space of the RoKits. Furthermore, they weigh twice as much and have a much larger price.

See ROKIT, page 47 ▶

PRODUCT EVALUATION

Spirit Moves Digital Effects Into Mixer

Ty Ford

The Spirit by Soundcraft Folio FX8 mixer ($699) has been shipping since March of this year. According to Scott Wunschel from the Spirit sales and marketing team, "We saw the need for an eight-channel tabletop mixer for location sound, video post, small bands and basement studios. People also like the internal effects."

Those effects — 16 combinations of various amounts of stereo reverb, delay and chorus — are derived from programs used in the Lexicon Reflex. Each effect has two adjustable parameters, just enough to change the effect without letting you get hopelessly lost. There are no menus to navigate and the adjustments are simple and can be stored as presets.

There are three Aux Sends; a dedicated Lexicon Send and two conventional ones. The Lexicon Send has its own Return section, in which there are two knobs that allow the effects return to be routed to the other two sends, presumably for multi-effects processing or creating a monitor mix.

The other two Aux Sends do not have dedicated Returns, but the FX8 has a few tricks up its sleeve.

Spirit by Soundcraft FXB Mixer With Built-In Lexicon Digital Effects

You would expect a mixer with a name like FX8 to have effects and

See SPIRIT, page 42 ▶

Spirit Mixer Features Digital FX

▶ SPIRIT, continued from page 41

eight channels or eight busses. The FX8 has a stereo Mix Bus Output, mono Sum Output, separate stereo Sub Group Outs, stereo Insert and stereo Monitor outputs. In this case, the "8" refers to mic inputs, each with direct outs and inserts, three-band ±15 dB EQ with sweepable mid-band and a Q of 1.5, two Aux sends for external devices and one for the internal Lexicon FX section, a pan pot, mix/sub group routing switch, 100mm fader, PFL switch and On/Off switch.

A special switch by the first fader lets you switch the eight direct outs to Pre-fader or Post-fader position. A footswitch jack lets you turn the Lexicon effects on and off.

Coming in

There are two extremely versatile stereo inputs. Each stereo input has both unbalanced RCA jacks and balanced/unbalanced TRS jacks and independent input trims for each set of jacks. The TRS jacks are wired so that any source plugged into the left input becomes a pannable mono signal.

You can feed two sources simultaneously to both the RCA and TRS jacks and, using the independent trims, adjust their relative levels. Only the quarter-inch inputs are routed through Balance controls. So, counting the double-acting stereo inputs, the FX8 has 16 inputs.

The PFL solo metering is post-EQ, which helps keep track of the gain changes that may result from drastic EQ adjustments. The submasters can be switched to feed the submaster outs or through the submaster faders to the master stereo outs. I do not like the little latching buttons for PFL, Sub/Mix and AFL, as they can be pushed in such a way that they do not work. I sometimes found myself poking at them relentlessly before getting them to change state.

Each effect has two adjustable parameters, just enough to keep you from getting hopelessly lost.

The mic preamplifiers are a tad bright with a full bottom. A subtle shift of the high and low shelving EQ knobs flattened the response. The limited EQ works well, forcing the user to work more on mic placement and selection.

The line-lump power supply is a nice change from a wall wart, but the power socket on the back of the mixer and the plug on the end of the supply cable look a bit frail. A ham-fisted roadie could splinter the whole thing simply by grabbing for that pack of Marlboros as it toppled from the mixer towards the beer-soaked floor. They also saved a few bucks by not having a power switch.

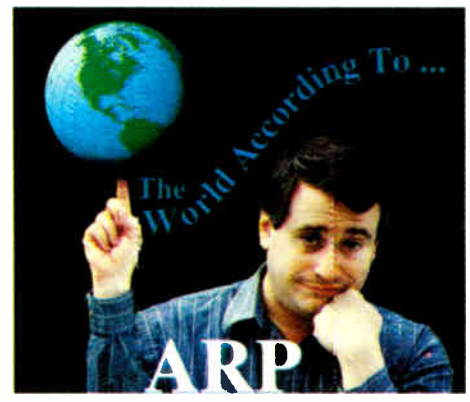
In conclusion

In the past, I would normally have discounted any mixer with built-in effects, but the designers of the FX8 sneaked in a nice feature that will probably save a few bucks and result in having one less piece of outboard gear to lug around. Need a basic utility mixer? Don't want to pull out all of your rack gear to do a remote at to the local club? Try the Folio FX8.

■■■

Ty Ford can be reached at www.jagunet.com/~tford *where you will also find his commercial and narration demos, updated lists of copyrighted mic and mic preamp reviews and a new list of production music and SFX libraries.*

Volunteer-Built Station Hits Air



Alan R. Peterson

So, as you can see by the picture of Bill Bordas, the new WEBR studio is at last complete.

If you are joining us late, let me recap. A group of hardy volunteers and I have spent the last two months constructing a radio studio at the TV/radio facility of Fairfax Community Access Corporation (FCAC) in Northern Virginia. The audio is only heard on Channel 37 on the local cable TV system and on the Internet at *www.fcac.org*

The old room was hanging on by a thread and only $20,000 was budgeted for new equipment, furniture and construction. Rather than bust the budget further, FCAC tapped its pool of volunteers for the technical and construction crew. Somehow we pulled it off and the new room went live in mid-September. But as the old travel ads used to say, getting there was only half the fun.

Through the top

In the Sept. 30 issue, I bemoaned the impossible task of locating a set of grommets for the console surface. Rather than punch some XLR connectors onto the surface and give announcers something

'The Audio Attic With Bill Bordas,' broadcasting live from volunteer-built WEBR, Fairfax.

to noodle with (and break), we ran our mic and computer cables down through those decorative flush-mount caps you normally see on office furniture and computer desks.

These cap and grommet combinations were impossible to find anywhere. Office supply stores and home improvement centers were no help. One dealer stopped returning calls because we were not going to buy his expensive brass-capped hardware; all we wanted were black plastic components.

Smoot point

Finally, a local company with the charming name of Smoot Lumber came through. This outfit claims it can find anything, and it located five such grommets at a really good price. That company made major points with me for that find, and inspired a name for the liner guy on the WEBR overnight CD jukebox: "Smoot Grommet."

Just about the time I declared there was no longer any serious black-boxing done in radio, along came a Denon cassette deck to shut me up.

In the past, engineers cobbled up their own devices to perform functions for which no commercial product was available. Knowledge of time-delay relays and resistor pads once were as necessary as tonearm weighting and azimuth adjusting skills. Today, off-the-shelf boxes activate tally lights, interface telephones with mixers and control darn near everything else. Except this tape deck.

At one time, studio devices included a rear-mounted multi-pin connector to accommodate a remote-control box. To remotely control this particular deck, a specific resistance had to be presented across a TRS mini-jack on the rear of the unit. It was decided Stop and Play were the only functions necessary to be controlled from the Logitek ROC-10 console, so it was off to Radio Shack for parts.

We cooked up a double-relay black box that would momentarily drop one resistor across the jack at a time, depending on the board's logic state. It was actually a simple project — a wall-wart negated the need to build a separate power supply, and the timing of the relay closure was handled within the ROC-10's internal instruction set. This meant no design of an RC timer circuit to maintain closure and release.

The first few attempts at the box were annoyances. The resistor values were at 20 percent tolerance, causing the deck to not behave as we wanted it. The first relays we chose were heavy-duty jobs that closed with an audible clack, making them totally unsuitable for the studio. We replaced them with 5 V reed relays which did not seem to activate, until someone noticed the protection diodes were wired in backwards.

Black boxing is not a lost art. Sometimes I believe it was happily let go by folks tired of fixing the fix.

Everything works ... kinda

Following the dedication of the new room and its subsequent shakedown cruise, we are discovering the little bugs we had hoped to find along the way before going live.

Our WaveCart computer did not fit under the turntable pedestal ("But it looked like it would have!"), so the old PC chassis was gutted and the innards placed into a mini-tower. The studio telephone line hums like a hornet's nest and telco audio sounds phasey. We may have the mix-minus wired out of phase and it is a good bet the excess telephone wire up inside the ceiling is coiled against a fluorescent light ballast. I will know when I go back in this weekend.

We can have bands come in and play through the production room, but not until we string the cable between both rooms. We have a beautiful vocal/news booth in the studio, but with no mic, no line back to the console, and probably most importantly, there is no newsperson to go inside.

The console introduces an almost imperceptible delay on the mic channel, but just enough for folks to say they sound hollow. This is the same group that silently put up with mic distortion, bad levels, AC hum and HVAC noise in the old room. One of the tradeoffs of working in the digital age.

Airchecking? Sorry I mentioned it. Most WEBR air talent used to roll a two-hour DAT on their shows. Once they found out the cassette deck can be modified to skim their shows when the mic is open ... well, you know.

But the result has been a bright, pleasant sound on Channel 37 here, and a crisp signal over RealAudio as well. The talent seems pleased with the new room and have vowed to maintain its appearance with no posters or artwork more suitable for college facilities than a community-access studio. When the wiring documentation is complete and overnighter Smoot Grommet is in place, the project will be finished.

And by then, I will be just as tired of doing buildouts as you are. As I said in Part One, I hope this studio and its related technology lasts at least five years. Thankfully, unlike broadcast radio, our owner is franchised by the county, which means WEBR should be here for a while to come.

Not bad for a volunteer job. Imagine if we got paid for this.

Basics of Audio Processing: Mics

Keith Spencer-Allen

Part I of III

By dictionary definition, *processing* means a "systematic series of actions directed to some end."

The overuse of the word in audio terms has tended to mask the fact that processing is not — or should not be — simply a repetitive procedure applied to an electrical signal. Processing should be a situation where a skilled operator makes informed decisions that shape an audio signal so that it is closer to the desired end result. Or at least in theory.

The real skills in signal processing are to know what can be achieved with the tools and program material, when to use it and when to stop. However, these skills still imply a preferred end result does exist.

Three reasons

In broadcast terms, what that preferred end result might be is always changing. If this rationale were analyzed, three reasons to process sound are likely to be seen.

Originally, the idea of signal processing was to overcome deficiencies in the audio chain. The very term "equalizer" (EQ) was for a device that would *equalize* the response of a microphone for a more natural sound. Dynamics control was needed to protect transmitters and to improve intelligibility through the prevailing high noise levels of equipment and the noisier RF bands.

Although necessity drove the development of basic signal processing tools, their role as a creative tool grew as the need to correct deficiencies declined with improving technology.

Used creatively, signal processing can make something sound like something it is not. And when it comes to preparing a signal for broadcast, unfortunately there are few naked sounds that do not need some improvement.

There is nothing wrong with optimizing certain qualities in a signal, but it is best to have an idea of why processing is being applied. That way you know if processing improves or worsens a sound, and when you are as close as possible to the desired end sound.

The reasons for processing are wide-ranging; however, this does not mean that the decision to apply processing is also independent and standalone.

Microphone processors such as the Symetrix 528 (shown) combine EQ, limiting and noise-gating in a single unit.

No matter what the goal of using signal processing, some permutation of the same audio tools is used to achieve the new sound. Only the order of priority and maybe the point in the signal chain where the processing takes place will be different from one task to the next.

When it comes to processing, decisions can be complex and depend greatly upon the specific situation. However, a good illustration of how, why and when processing might be used can be found by following the output of a microphone through the typical signal chain.

Ground rules

For the sake of the example, assume a microphone is picking up a solo voice and that it will be mixed with a variety of other sounds to create fairly complex program material. Also assume that the production is being recorded, eliminating any concerns about on-air audio. Still, we would like to record this program without resorting to any post-production.

Listening to the raw output of the mic at the input of the mixing console would be the first step. If there are any major problems at this stage, it is probably best to consider changing mics or altering the position for better pickup. A few changes here can reduce the time taken later, vastly improving the final result.

If the output of the microphone sounds like useful raw material, then it is time to begin adding processing.

The first action would be to apply a high-pass filter to remove low-frequency rumble and air-conditioning noise from the signal. If a voice is being processed, we do not expect to find any wanted information present in the signal below 80 Hz. Any sound in that range would muddy the final program even if it is not clearly audible.

There is also an element of safety here because, unless a large monitor speaker system is being used, very low frequencies present in the signal are inaudible. And if we cannot hear unwanted noise, we do not want anybody else to either.

The next possibility might be to increase the difference between the voice signal and other signals present at the output of the microphone. This can be tackled in a number of ways at this point.

If there are long gaps between voice signals from the microphone, then manual processing might be preferred, simply lowering the console fader when the voice is not present and raising it as the vocal talent prepares to speak again.

If the background noise is at a fixed frequency, such as fluorescent light buzz or AC hum, then it may be preferable to tackle this with EQ, in the form of a very steep notch filter to remove a very narrow band of frequencies from the voice signal.

Dynamics controllers

If the background noise consists of a wider range of frequencies, then we must turn to the dynamics controllers as the use of broadband EQ would start to affect the vocal recording.

If the background noise is of a fairly low level in relation to the voice, the preferred option would be a noise gate. One may be adjusted so that when the voice stops and the total signal falls below the set threshold, a predetermined cut in level, or a complete mute, is introduced. This maximizes the relationship between the voice signal and the background noise.

If the background noise level is high but not constant, a dynamics unit with an expander option would be the preferred option. This is superior to a noise gate, which exhibits abrupt closing and opening of background noise.

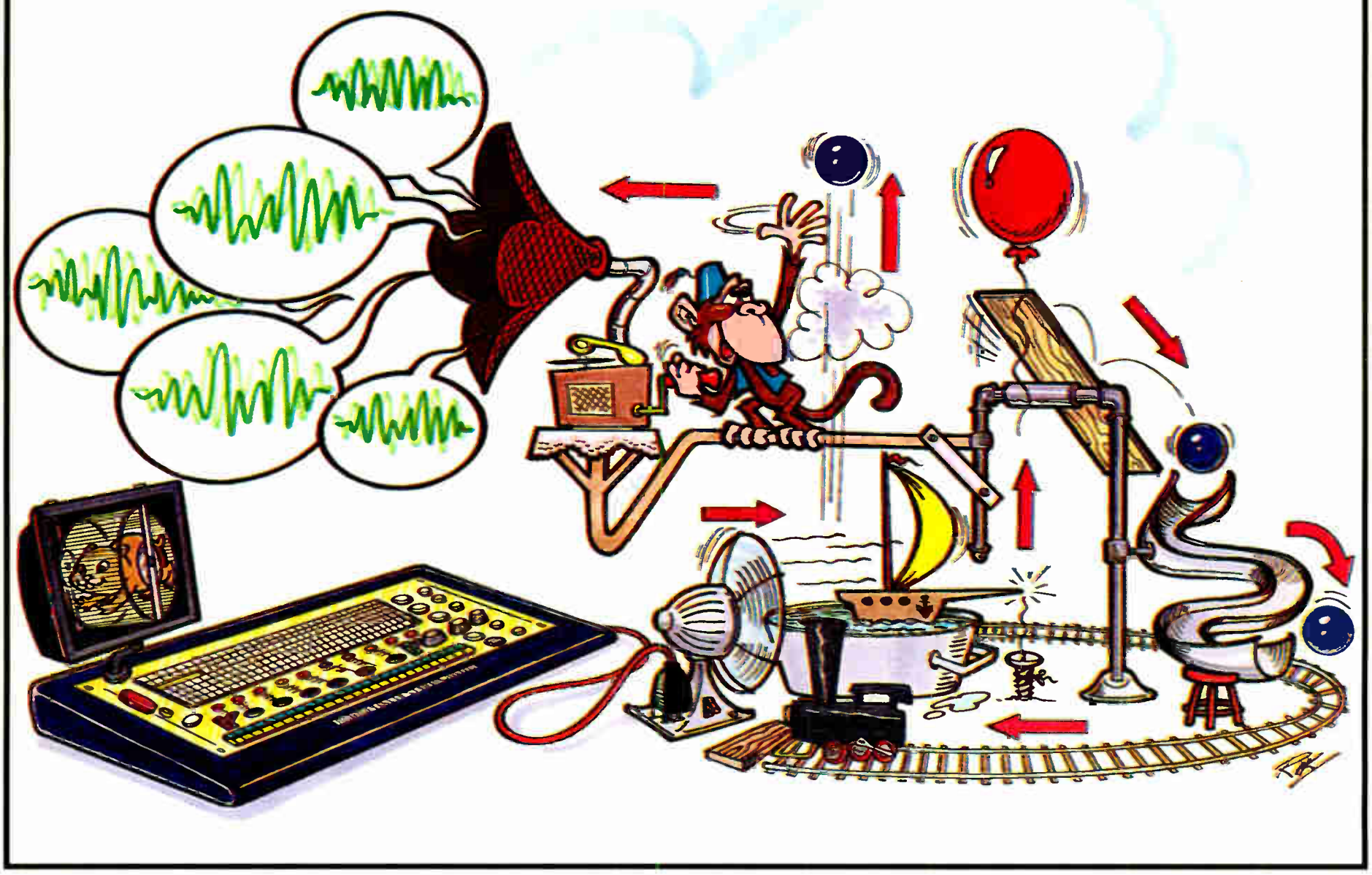
An expander tracks the level of the main signal. When the signal falls below a set threshold, the expander ramps down the levels while still tracking the signal. With this setup, the background noise is not lost entirely, but it does create a more natural reduction in high background noise situations.

It also would be possible to use more complex frequency-dependent dynamics

See MICS, page 47 ▶

When it comes to processing, decisions can be complex and depend greatly upon the specific situation.

Your digital console should meet your specifications.



You expect more out of a digital console than simple operation, analog feel, or a hybrid analog/digital design. Hybrid consoles that depend on analog are brought to market by manufacturers who have no faith in the integrity of their digital abilities.

When the first Harris digital console went on the air over two years ago, it was a welcomed change, because Harris developed the DRC line by listening to the requirements of broadcasters like you.

You will easily recognize the sonic improvement of true digital when you hear the Harris DRC2000. No other on-air radio console can give you the capabilities you need today with the strength to fill your future needs. Each channel has audio effects processing that is the best in the business. The DRC2000. Nothing else comes closer to digital done right.

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PRODUCT EVALUATION

RØDE Mic Makes Radio Inroads

Ty Ford

I remember when I would be on the air and reach for the mic switch as the record ended — this was before CDs and music on hard drive, kids — only to find the mic was (gasp) *already on!*

If I had been using the RØDE Broadcaster cardioid condenser microphone ($599), I might have trained myself to look for the glowing red LED mounted right on the mic housing.

The Broadcaster condenser mic is made by RØDE and distributed exclusively by Broadcast Supply Worldwide specifically for radio broadcast. The mic won the **RW** Cool Stuff award at this past Spring's NAB show in Las Vegas.

The Broadcaster has a one-inch gold-sputtered diaphragm. RØDE lists the noise at 14 dB A-weighted and sensitivity at 18 mV/Pa. The low cut filter is a 6 dB per octave filter with a 75 Hz knee. There is no pad.

The head grille consists of two layers of metal screen. The outer screen is extremely sturdy and capable of weathering the hard life of a broadcast mic. Inside the head grille, a circle of foam just slightly thicker than one-half-inch acts as an integral pop filter.

The integral pop filter worked well for me, but I do not pop all that much. If you do, avoid panty-hose pop screens, as you cannot get close enough without bumping the screen right into the mic.

The RØDE Broadcaster Condenser Mic: When the light is on, so are you.

The capsule is mounted in a circular, four-point, stiff rubber suspension mount. One end of the double-thick circuit board is snugly glued into the bottom of the suspension mount.

The lower end of the board is keyed into holes in a solid threaded metal baseplate, and secured by two countersunk set screws. The layout is neat and the solder work is very clean.

The module containing the LED and bass roll-off switch straddles the edge of the circuit board, and is attached through two holes in the board by two nuts and bolts. The threads in the baseplate allow the bottom cap of the body and the mic clip to be screwed on. This is a structurally impressive microphone, even this early in the series; the mic I reviewed was serial number 0038.

Two pins on the five-pin XLR carry juice for the Broadcaster's LED. If you break out the conductors from the cable, you can connect them to the On switch on many consoles.

Talking in the wrong end

The LED serves another purpose: it reminds you that the RØDE Broadcaster is a front-fire mic. You talk into the end of it, as you would an EV RE20. If you can see the light, you're talking right.

Don't laugh, I once walked into a college station and found the jock talking into the bottom of a side-address condenser mic!

I compared the Broadcaster with a Gefell UM 70, my mic of choice for my voice. All tests were done using GML mic preamps. The RØDE Broadcaster is 10 dB louder (more sensitive) than the UM70. The UM 70 carries well to about a 160 to 170 degree arc. The Broadcaster arc is about 90 to 100 degrees, but the peakiness of its off-axis response reaches out to almost 180 degrees for some sounds.

I had my laptop computer running on a stand three feet to the side of where I had the mics set up. To a greater extent than the UM 70, the Broadcaster picked up the sound of the higher frequencies made by the spinning hard drive.

It occurred to me that, with its peaky upper midrange, the Broadcaster might have a lot in common with a Sennheiser 421. I set up both and adjusted the preamps to provide equal output. That meant adding another 17 dB gain to the 421.

With the phones on, in the quiet of the studio, the added gain of the preamp also made the 421 noisier. The 421 channel noise was mostly hiss. The Broadcaster had noise, but it was lower in frequency and volume. The difference in the noise was much less apparent when I recorded tracks from each mic on my Audicy workstation and played them back through the monitors.

The 421 develops its peak a bit lower than the Broadcaster. The 421 and Broadcaster share similarly tight cardioid patterns. At just the "right" distance from the mics, the proximity effect made the two mics difficult to tell apart. But even very minor changes in distance to the mic made the higher frequency peaks of the Broadcaster stand out. While the higher peak did put a nice edge on the track, I would be careful about using this mic on sibilant voices.

The Broadcaster has a bass roll-off switch on the back of the LED housing. It was mild, but enough to let me all but eat the mic. I recorded into the Audicy with the bass rolled off and my lips on the grille. My voice sounded huge, very intimate and not the least bit muddy.

Thinner voices might benefit from the full bass response without the roll-off. At more than two inches, I did not need the roll-off, but I sounded more edgy. It is as if this mic was *designed* to be eaten.

Against an EV RE27 with all EQ switches at normal, the RØDE Broadcaster had 17 dB higher output. At a distance of 2 inches, the RE27 and the RØDE sounded similar, with differences making themselves evident with as little as a half an inch here or there. The closer I got, the more proximity I got from the RØDE.

In the end, my preferred position was with the tip of my nose on the RØDE grille, lips about 3/4-inch off — full, but not woofy.

In conclusion

This is a mic designed to take on the RE20 and RE27 in the broadcast market. When worked closely, it fills in the bottom even more than a Sennheiser 416 shotgun.

Make sure you readjust the threshold of any compressors and limiters you have in the mic chain when you demo this mic. Depending on the output of the mic you have been using, the increased output of the RØDE Broadcaster may overdrive these units. Whether the Broadcaster can break the hold of the RE20 and RE27 remains to be seen. It does deserve a chance.

■ ■ ■

For information, contact Broadcast Supply Worldwide in Washington State at (800) 426-8434 or circle ***Reader Service 93.***

RoKit Monitors in Real World

▶ ROKIT, continued from page 41

In most cases, the chief complaint from the DJs and production crew was "not enough bass" in the RoKits. In this urban environment, the general consensus was that the low-end frequencies were lacking in the KRK RoKit speakers. The exception to this rule was from one producer who noted greater clarity for vocals in the RoKits over the E-V Sentry 100As.

Our next stop was at the home studio of Mike Richardson, assistant production director for Radio One.

Mike is a skillful audio producer with a deep set of pipes. He has a full professional studio at his house and he is carving a niche for himself by producing commercials for various agencies around town.

In his home studio, Mike uses a pair of the Yamaha NS-10M speakers — essentially on an equal footing with the RoKits. Both speakers have similar-sized woofers and cabinets.

We put on some of the newer, funkier Miles Davis stuff, a CD called "Doo Bop," and did the A/B test. There were no changes in EQ for either pair of speakers. In the words of Mike Richardson, "There is no contest. The RoKits win hands down." Clearly, there was more bottom and much more presence in the KRK RoKits.

Freestyle

I traveled next to Annapolis, Md., to the studios of progressive free-form station WRNR(FM). The station is pretty much unformatted; the air talent can play whatever they want to, for the most part. I have a high regard for each air talent's diverse musical knowledge and I knew that I would get some definite comments from them about these speakers.

At WRNR, the air studio has a pair of JBL 6612s — the ones with the massive 12-inch woofers — about 5 to 6 feet in front of the jock. When I put the RoKits on either side of the console, some of the jocks were, at first, intrigued by the closeness of the nearfield monitors.

But the novelty quickly wore off. The jocks were not shy about making their comments known. While some could see the capabilities of the RoKits elsewhere, all agreed that the JBL 6612s were far superior. Some commented that listening to the RoKits for the duration of an air-shift was "fatiguing."

The final stop for the KRK RoKits was my home "studio," a corner computer hutch with a lot of MIDI and amateur radio gear. Although I can use this little corner for digital commercial production with the IQS SAWPlus program, it gets used more extensively for MIDI music creation and publishing.

The ham gear primarily is used for U.S. Army MARS (Military Affiliate Radio System) participation. I also like to listen to music here, too.

Back home again

The corner hutch, with speakers on the ends of the shelves, is like listening to a big set of headphones. I use a pair of Radio Shack Optimus bookshelf speakers to monitor through, which is not uncommon for many home recording facilities.

Once again, I set up the A/B box with the KRKs and, just like the situation at Mike Richardson's home studio, it was no contest at all. The RoKits delivered a much fuller sound with increased bottom as I listened to a Brecker Brothers CD.

I also heard a much improved sound with the KRK RoKit when I connected to the Internet and listened via RealAudio to the afternoon jazz show on my old college radio station, WICB(FM), in Ithaca, N.Y.

In the midrange, greater clarity was achieved when I checked in to the Maryland state Army MARS net. The single-sideband voices on 4.0 MHz were easier to discern through the crackly static prevalent on that band. I added a Rane 15-band graphic equalizer to the audio chain and the RoKits really came to life.

Using Ford's California Smile on the equalizer, I listened to some of my MIDI files, an acoustic Jerry Garcia/Dave Grisman CD and the Brecker Brothers CD again. With the enhanced EQ, the RoKits produced a full-range sound that was enjoyable to listen to in the confines of my computer hutch.

Last, here is the best part of the KRK RoKit speakers. They carry a list price of $329 for a pair, and I found street prices at my favorite broadcast distributors and music stores of $259 to $275.

If you are putting together a home studio, if you have limited space or limited funds, listen to the KRK RoKit speakers. You may like what you hear.

■■■

Rick Barnes, CBRE, is the chief engineer for WRNR(FM)/WYRE(AM), Annapolis, Md.; chief operator with Radio One, Lanham, Md.; and is a retired U.S. Army band officer. He can be reached via e-mail at KE3QJ@msn.com.

Product Capsule:
KRK RoKit Nearfield Monitors

Thumbs Up
- ✓ Good price
- ✓ Works well in confined space
- ✓ Full sound when used with EQ
- ✓ Cool trapezoidal design

Thumbs Down
- ✓ Flat sound when used with no EQ
- ✓ Small for commercial broadcast use

For more information contact KRK Systems in New York at (516) 249-1399 or circle **Reader Service 166**.

I have a high regard for the air talent's musical knowledge and I knew I would get definite comments from them about these speakers.

The Fundamentals of Microphone Processing

▶ MICS, continued from page 44

controllers, but these are likely to be outside the application in situations like this.

Enormous difference

The human voice has a large dynamic range. The difference between a whisper and a full-blown shout is enormous and presents a problem for recording and the signal chain alike.

It may be necessary to consider controlling the dynamics of the voice signal at this stage to ensure that it makes it through the audio chain. If the dynamics of the voice are right, but an occasional word is too loud, a limiter would be placed in the path to stop excessive levels from passing beyond the unit's set threshold.

If the dynamics are too wide, which could be a problem later, a compressor can be introduced at this point. However, most engineers would prefer not to introduce any compression on a voice until the rest of the program is added. At this point, setting any reduction in dynamic range on the voice would most likely be a guess.

Other signals benefit from a small amount of compression at this stage, but voices generally do not, in spite of the numbers of announcers that love hearing heavy compression on their voices.

Once these steps are taken and the resulting signal has been molded into a workable shape, more creative processing can be considered.

■■■

Keith Spencer-Allen is a free-lance consultant and recording engineer based near London.

Products & Services Showcase

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

PRODUCT GUIDE

Products for Radio Production

Mail info and photos to: RW Product Guide, P.O. Box 1214, Falls Church, VA 22041

BST Rackmount Mixer

BST America, a division of Ultrak, offers the Atlanta 16 Professional DJ Mixer, a 19-inch rack-mount mixer for club use, dubbing suites and smaller production booths.

Small rooms can use the Atlanta 16 with a pair of mics, CD player, tape deck and PC-based recorder/editor to create a well-equipped and functional basic production room. The mixer can also be used in the main studio for "mix" shows that depend on vinyl and live club-style DJs.

The Atlanta 16 has nine inputs on five separate channels, including four possible mic inputs. CD and phono channels are routed through a crossfader for contemporary "scratch" mixing. A high-quality digital echo and three-band EQ on the output are among its features.

BST manufactures other mixers and variable speed turntables for broadcast and club use.

For information, contact BST in Texas at (888) 278-0014 or circle ***Reader Service 205****.*

New Eventide Products

Eventide has two new products for air and production use.

The VR204HF is a broadcast logging recorder that replaces slow-speed reel machines or VHS videocassette recorders that stations have used for logging their broadcast. The unit can record as much as 200 hours of FM-quality audio on a single DAT tape, or up to 800 hours of "logging quality" (20 Hz-3.5 kHz) audio. A built-in disk drive stores audio when tapes run out or are changed, then transfers the contents onto the tape when ready.

The Eventide DSP4500 UltraHarmonizer is the next in the popular Harmonizer series of products. It combines the features of the three previous 4000 Series units: the original 4500 studio model, the GTR4000 guitar processor and the broadcast-specific 4500B. More than 1,000 program presets are included as standard in the new DSP4500. It includes a versatile 87-second sampler that may be combined with other presets in the DSP4500.

For information, contact Eventide in New Jersey at (201) 641-1200 or circle ***Reader Service 128****.*

Telex Wireless Mic Technology

Ideal for live remotes or sports broadcasts, the Telex Communications USR-100 UHF wireless mic system is a microprocessor-controlled system designed for frequency flexibility in crowded bands.

The USR-100 microprocessor maintains frequency specific accuracy which minimizes interference, and automatically self-tunes to exact factory-set frequencies. The USR-100 works in the frequency range equivalent to television channels 47, 48, 58 and 59, found to be the least-used channels in the United States.

The handheld version of the USR-100 combines a Telex condenser element or an Audix OM3 dynamic element and a belt-pack transmitter driven by two AA batteries.

For information, contact Telex Communications in Minnesota at (612) 884-0043 or circle ***Reader Service 89****.*

Akai Digital Workstation

The Akai DD1500 is a self-contained, dedicated audio recorder and editor, configurable for any recording application from conventional audio production to motion picture Foley recording.

The DD1500 can store to magneto-optical disk or hard disk and is capable of 16-track playback. Edits can be made to all 16 tracks simultaneously and all fades and crossfades are done in real time with no fade files to calculate.

The signal processing unit handles all data I/O and timecode synchronization. Four AES/EBU connectors can be increased to 12, supporting up to 32 audio channels. The remote-control surface features dedicated function keys for transport, playback operations and editing, without the need for a mouse. The jog wheel performs synchronized scrubs across all 16 tracks.

The DD1500 can synchronize up to 16 Akai DD8 digital dubbers for a total of 256 tracks of digital audio controlled through one surface.

For information, contact Akai Musical Instrument Co., in Texas at (817) 831-9203 or circle ***Reader Service 167****.*

Generalmusic Falcon Digital Mixer

The LEM division of Generalmusic introduced the low-cost Falcon digital mixer, offering digital control and signal processing for a suggested price of $1,395.

The Falcon features 20-bit A/D and D/A converters and 40-bit internal processing. The mixer features a high-tech work surface, six mono mic/line inputs, two stereo line inputs and a single AES/EBU input. Two multi-effect processors offer reverb, 3D ambiance, compression/limiting and multiple EQs.

Scene management and effects libraries are handled by the Falcon internal processor. Download and acquisition of data from external sources may be done via MIDI or RS232 port.

The output section includes one master stereo output, two Aux outputs, user-assignable outputs and a S/PDIF port. A backlit 128-by-64 pixel panel displays snapshot presets for EQ, Pan, Aux assigns and dynamics.

For information, contact Generalmusic in Illinois at (630) 766-8230 or circle ***Reader Service 11****.*

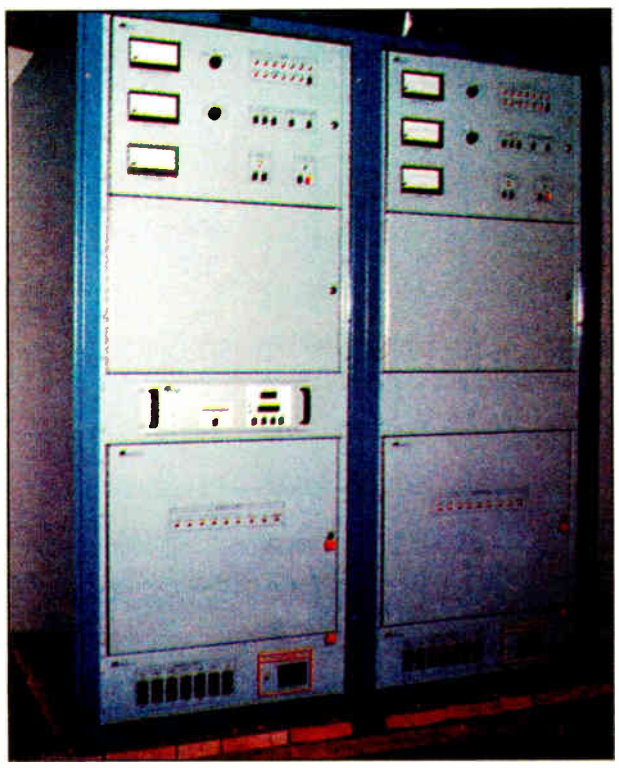
SPECIAL REPORT

FM's Big Ticket: The Transmitter

by Jeff Johnson

Makers and buyers of FM transmitters face numerous pertinent issues in late 1998.

Certainly, the path to digital is among them. The audio chain is evolving into a digital domain. At least three organizations are working on developing an in-band, on-channel digital audio broadcast (IBOC DAB) technology that could revolutionize the U.S. broadcast industry. When DAB does become a reality, observers say, it will still be necessary, for a period of years, to combine analog and digital broadcast components in a single "hybrid" system before the U.S. radio industry can truly transition to all-digital.



The FM20 Transmitter From Nautel

But that's down the road. What are the important trends in FM transmitter manufacturing today?

The question is broad. For example, for several years there has been a migration to solid-state technology in FM transmitters. How high in power can a buyer confidently go and still buy solid-state?

How has the growth of remote unattended operation affected considerations of monitoring and control of the transmitting equipment?

And all the familiar quality and reliability questions remain — particularly important because such capital equipment is expected to last for 25 to 30 years. Buyers must think ahead about the adaptability of new equipment to future use.

These factors must be weighed to arrive at a reasoned purchasing decision. Let us consider some of the issues that the buyer of an FM transmitter must face today.

Questions

The first factors have been with us since the days of the spark transmitter: cost, reliability and support. It is the old scenario: "Good/fast/cheap: pick two."

My colleague Jay Crawford, chief engineer of WVXU(FM) in Cincinnati and the X-Star Radio Network, places high priority on long-term support from the manufacturer. He asks, "What time period does the manufacturer plan to support the transmitter with parts as well as tech info?" Crawford makes purchase decisions based on this criterion above all others. Quality is presupposed, its presence necessary to enable long-term support.

Paul Jellison of Jacor in Cincinnati sums up his approach in five questions: How much? How fast? Who are the manufacturer's customers? What is the vendor's service and support record? Will the company be around in five to 10 years?

Control flexibility is important. In the modern regulatory environment, few transmitting plants are manned facilities. Ron Bartlebaugh, director of engineering for WKSU-FM at Kent State University in Ohio, considers "internal self-diagnostics and interfacing to computerized monitor/control systems" an important trend in transmitter design.

Tim Bealor, manager of transmitter products for manufacturer Broadcast

See TRANSMITTERS, page 56 ▶

USER REPORT

Just Turn It on and It Works

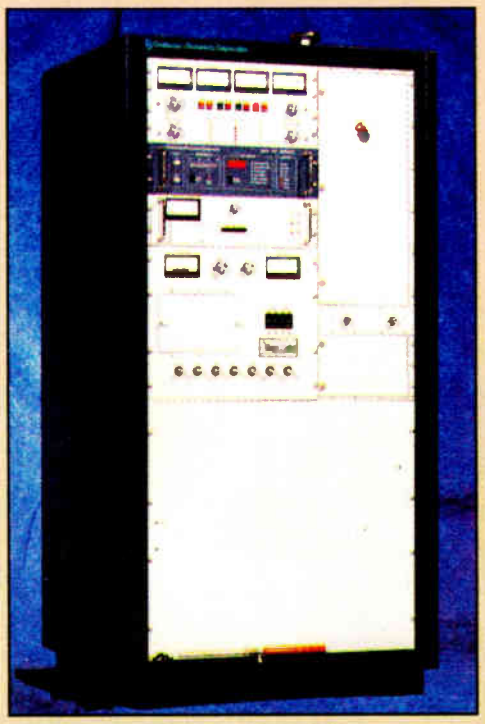
by John Paoli
Chief Engineer, KYSR(FM)
Chancellor Media Corp.

LOS ANGELES This installation at the new KBCD(FM) site was my last major project for KACD(FM)/KBCD, Kelsho Radio Group.

The 815C 5 kW solid-state FM transmitter from **Continental Electronics** is a combination of solid performance and clean, uncluttered design. Remote control via computer saves trips to the transmitter site and simplifies maintenance.

KACD and KBCD are co-channel, short-spaced, Class A stations operating in the Los Angeles market. KACD is licensed to Santa Monica, Calif., and KBCD is licensed to Newport Beach. In 1991, the stations were purchased by Ken Roberts and began simulcasting programming and operating synchronously using the TFT Reciter system.

The transmitter facilities of KBCD are located on city property in the Newport Beach. The KBCD transmitter plant was rebuilt as part of a massive construction project by the city's utility department.



The 815C 5 kW Solid-State FM Transmitter From Continental

Several options

When planning the new facility, Roberts was emphatic that the new plant must be "state of the art."

With a TPO of 2.4 kW, we had a lot of choices in solid-state FM transmitters. A 5 kW transmitter was chosen because of pending upgrade applications at the time of purchase and the desire to have plenty of headroom. We chose the Continental 815C for several reasons, not the least of which was Continental's outstanding customer support.

When the transmitter was delivered to the site, the compact design proved its value. The transmitter suite was a split-level design with only stairs for access. Additionally, the roof system didn't have the capacity for us to install a hoist and trolley of sufficient capacity to lift

See CONTINENTAL, page 55 ▶

USER REPORT

FM10 Performs Well for KOST(FM)

by Marvin Collins
Chief Engineer
KFI(AM)/KOST(FM)
KACE(FM)/KRTO(FM)

LOS ANGELES For more than 30 years, KOST(FM) used a tube-type transmitter, which performed to our satisfaction.

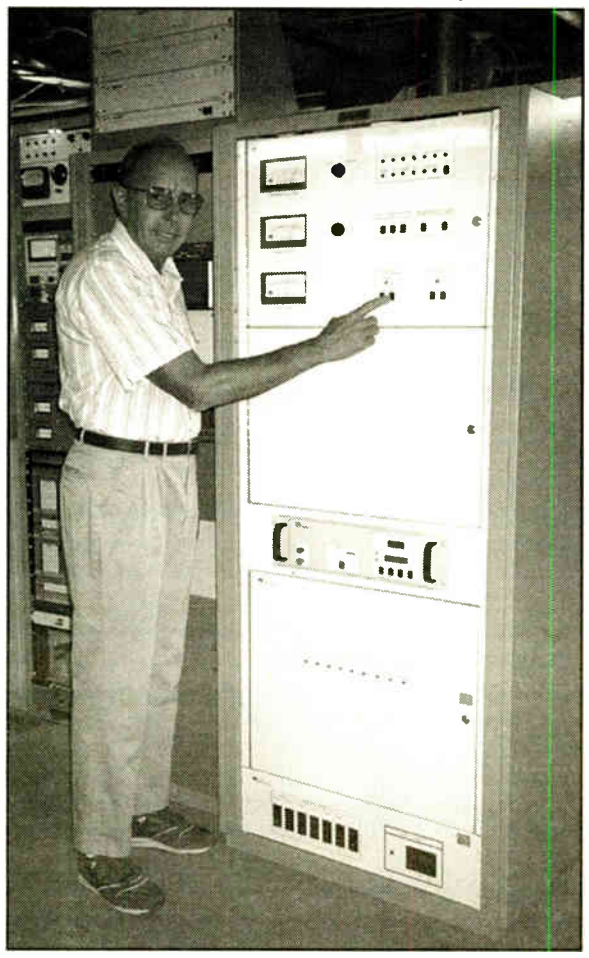
Time and technology have marched on, and I could see it was time to replace the old transmitter before it became impossible to obtain replacement parts. My goal was to buy a new all solid-state transmitter. I did not want to deal with any more tubes.

Five years ago at the NAB show, I found an all-solid-state transmitter made by a major manufacturer, but it was too expensive for serious consideration. At the same show, **Nautel** displayed a 7.5 kW FM transmitter which caught my attention. The price was right, but I needed a transmitter that could deliver 9.4 kW. I was told by Nautel that they were in the process of developing a 10 kW transmitter, two of which could be combined to provide 20 kW.

At NAB the following year, I was delighted to see Nautel showing a 10 kW transmitter. I liked what I saw and the price was right. After going through the usual budgeting process, I was able to place an order the following year.

If I remember correctly, Nautel quoted six to eight weeks delivery after receipt of order. As promised, the transmitter arrived on time. It was shipped via motor freight and required about a week to make the cross-country trip to Los Angeles.

Upon seeing the transmitter, I was shocked to discover extensive vibration damage. The shelves for the six power modules and the IPA module were shaken loose and several nuts, screws and lock washers were missing. I salvaged some missing pieces and reassembled the shelving after contacting the factory for replacement nuts, bolts and screws.



Marvin Collins at the Helm of the FM10

I should mention, a year and a half later I purchased a Nautel FM5 for KACE(FM), another of our stations. Nautel shipped this FM5 transmitter via air freight and it arrived in perfect condition. Nothing was shaken loose. Air freight is a reliable option.

Installation was relatively easy and fun to do. After my assistant, Norm Pilawski, and I had the transmitter assembled, it was time to turn it on. Upon turning on all the circuit breakers the transmitter did not come to life. The day was ending, so Norm and I decided to tackle the problem the next day.

When I awoke the next morning, my subconscious had figured out the problem and told me, "You dummy, you forgot to plug in P1." This connector carries many conductors to and from the power-supply module. Upon arrival at the transmitter site the next morning, P1 was plugged in. The circuit breakers closed and the transmitter came to life.

After making a startup adjustment per the instruction manual, the transmitter did not put out full power. I soon realized I had misread a meter scale. Upon setting the startup adjustment to the correct meter scale, the transmitter reached full power. Norm and I shook hands and congratulated ourselves on completing the easiest transmitter installation we had ever done.

After years of clunking relays when a transmitter starts, it was a surprise to have the transmitter reach power quietly. There are no big, noisy blowers. I like the small muffin-type fans that are used, with one in each of seven modules.

Someday when a fan needs to be replaced, it should be an easy task with one possible exception. There are two large muffin-type fans that push air through the power supply section. They are located near the bottom and center of the transmitter where they appear to be difficult to reach. I spoke to Nautel about this and was assured they would not be difficult to replace. Regardless, I am hoping they last a long time.

Disposable over washable

The transmitter comes equipped with washable air filters. I suggested to Nautel that they switch to disposable filters. I am sure many transmitter sites, like the KOST transmitter site, do not have running water available. I figured out an easy modification whereby I now use Farr Filter Model 2020 pleated disposable filters. The filters do a much better job of air filtration than the original filters supplied by Nautel.

Have there been any problems with the FM10 after it was put into full time service? Only two minor problems. After the transmitter had been running for several months, one of the six power modules shut down after turning on its alarm light.

This shutdown did not take the transmitter off the air — it only reduced the power from 9,400 W to about 7,700 W. I installed the spare power module that was ordered with the transmitter and full-power operation was restored. I could not find any hard failure in the defective module, and since it was still under warranty, I decided to send it back to the factory. Nautel fixed the problem and promptly returned the module. It only needed a slight retuning of a trimmer capacitor. Upon being returned, I put the module back into the transmitter where it has since been working fine.

The other minor problem was that the remote control input was too sensitive, and inductive spikes from control relays at the KOST transmitter site caused false turn-off of the transmitter. This was easily fixed by adding a resistor and creating a 20 milliamperes remote control switch loop which was no longer sensitive to small inductive voltage spikes.

When ordering a Nautel FM10 I suggest you discuss the color of the front panels. All the Nautel FM transmitters I had seen at past NAB shows had gray front panels mounted in a blue rack cabinet. When the KOST Nautel FM10 arrived at the transmitter site and was uncrated, I was surprised to see it had cream-colored front panels in a blue rack. I was further amazed to find that the Nautel NE50 exciter to go in the transmitter had the gray panel.

Summarized, KOST has a transmitter with cream-colored panels and a gray exciter panel in the midst. It would have cost a few hundred dollars to change out the panels. The transmitter is remote-controlled in a building which is not a show area, so it is not worth the expense to correct the color scheme of the transmitter. I believe Nautel no longer uses the cream but instead uses their standard gray color. It is worth clarifying this point when ordering.

You may ask, would I purchase another Nautel FM transmitter? I already have. The purchase of the Nautel FM5 for KACE was based on the good experience with the FM10 in use at KOST.

■■■

Marvin Collins started working in broadcasting in 1954 and has been with KFI since 1976. He has been chief engineer since 1980. He is certified Senior Broadcast Engineer with the Society of Broadcast Engineers.

For more information, contact Nautel in Maine at (207) 947-8200; fax (207) 947-3693 or circle ***Reader Service 51.***

USER REPORT

Z CD: No More Late-Night Pages

by George Nicholas
Director of Engineering
Central Star Communications

CEDAR RAPIDS, Iowa Ever since I began installing **Harris** Platinum Series Z CD FM transmitters in May of 1997, something strange happened to my phone and my pager.

They both stopped going off in the middle of the night.

In my technical consulting practice and now as director of engineering for Central Star Communications, I have installed several Platinum Series Z CD FM transmitters. I'm pleased to report they are excellent.

The Platinum Series Z CD is Harris' second generation of higher-power solid-state FM hardware. They are named after its patented Z-plane combiner technology. It is an excellent choice for any market size.

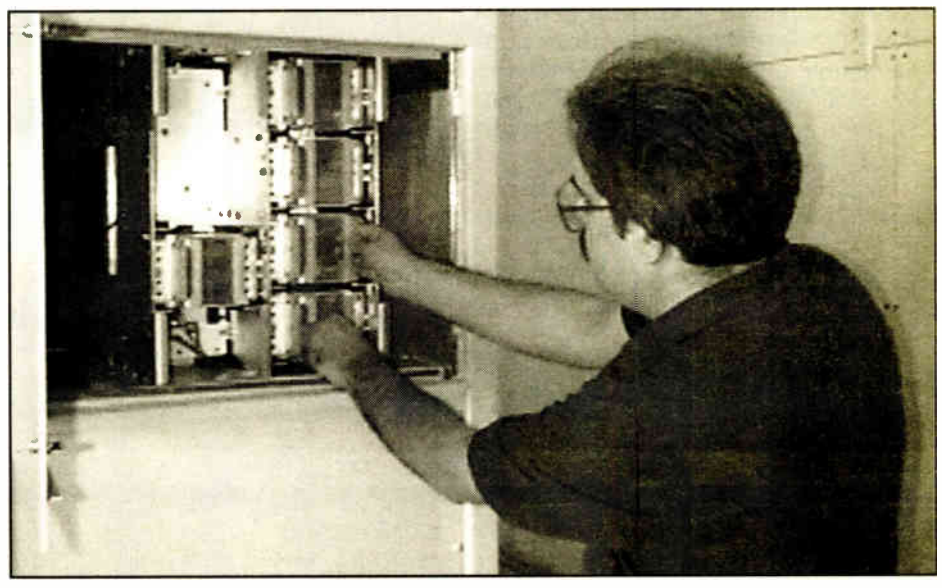
Z CD transmitters are available in both single-phase and three-phase models, with the single-phase Z-10 requiring an additional cabinet for the power supply. The transmitter is available in 2, 3.5, 5, 7.5, 10, 15 and 20 kW versions. Units 7.5 kW or higher require a two-cabinet design and single-phase power, with 38 inches of available rack space. The lower power single- and three-phase units are single cabinet design. All are self-contained and have no external RF filtering.

The bottom one-third of a Z CD transmitter is the linear step-regulated power supply, which is dual-redundant in 3.5 kW models and above, accessible via front-panel screws. The power supplies are beefy, mounted on sliding rails that allow them to slide together for easier repairs. The factory does a good job of tying back cables.

The back side of the lower portion of the transmitter contains the dual-speed cooling fan. The fan cage is bolted to the back of the transmitter with standard hardware. It would have been a nice touch to include hinges for the fan assembly, just like the back door above, in the rare case you would have to work on the power supply from the back side.

The center third of the transmitter contains the Z-plane combiner system and modules in both the front and back of the transmitter, along with the IPA. Access is by a hinged front panel with thumbscrews for convenience. The same type of RF amplifier modules (or pallets, as Harris calls them) are used for both the IPA position and RF amplifiers. Each hot-swappable RF pallet actually contains two amplifiers capable of 425 W each pallet (850 W total per module), and can be installed right-side up or upside down in any location.

The Z-5 CD includes eight modules total on the right side of the transmitter (as viewed from the front) Four modules are accessible from the back, and four, as well as the IPA module (same type as the RF) are accessible from the front. The Z-10 CD includes fully populated front and back, left and right sides. Since only one-half of the IPA module is used, there is built-in redundancy of using the unused half of the module, with automatic switching built in standard to the controller. Modules are removed by turning two knurled retaining screws, which hold each module in place, and sliding them out.



George Nicholas removes an RF module from the Harris Z-5 CD.

Few failures

Users of Z CD transmitters will appreciate the "soft-failure" mode of the transmitter. I have only seen two individual module failures to date, both failing at the time of installation, but because the transmitters in both situations were running at less than maximum rated TPO, the stations remained at nearly 100 percent power output by compensating for the module, albeit in the fault mode.

Fault mode is easily detected on the transmitter by the diagnostic display, as well as the speed of the fan. In the normal mode, the transmitter comes up with fan at full speed, then reduces the speed after one minute of operation. If the transmitter goes into fault mode, the fan automatically kicks into high-speed mode.

The top third of the transmitter includes the Harris Digit CD exciter and an opening for an optional, redundant Digit CD. The top also includes a tilt-down card cage that holds several larger multilayer digital control cards, all socketed, as well as the transmitter control surface. These cards include the firmware chips and are surface-mount design, so unless you are proficient with surface-mount repairs, the majority of repairs to the digital system will be by swapping boards with the factory. Fortunately, the transmitter virtually always has the ability to stay on at reduced power while retaining basic control functions.

Big foot

The transmitter cabinet footprint is somewhat larger than you might think a solid-state transmitter would be, with more depth than width. Cooling requirements might be somewhat less than a tube-type transmitter, but not by much. Closed-system air conditioning is recommended.

Admittedly, the first time you hit the transmitter ON button, it takes some getting used to the low voltage and high current readings of a solid-state transmitter compared to tube transmitters. Typical readings for a Z-5 CD operating at 3,500 W TPO might be around 48 VDC and 125 A. By comparison, our Z-10 CD, running at 9,000 W, clocks in with about the same voltage and around 250 A of DC current.

Remote-control connections are mounted on two barrier-type terminal strips at the rear left side, conveniently located at eye-level. There is full remote control of Z CD transmitters, including all of the control functions, metering and an array of status functions. There is a DB-style connector located on the controller board that could be used instead of the barrier strips for remote control.

There is a connection for a 2-inch copper ground strap at the bottom of the transmitter. It is critical to maintain a good RF and AC ground to the transmitter. Doing so will improve its reliability.

Good protection

Among all of the Z CD transmitters I've installed, the ones with the most trouble have had less-than-optimum grounding, lightning dissipation or surge protection. All three should be included in your new transmitter project list. At the sites I have constructed with optimum protection, I've had no problems.

At first glance, there are two obvious things missing from the front of the transmitter: tuning and loading controls. Since Z CD transmitters are totally broadband, the only frequency-dependent component is the Digit exciter.

Control is simple and straightforward. The High button is preset for any power level at 100 percent, and the Low button for any secondary power level desired, both easily calibrated in the field. The FWD and REF buttons display the output in percentage/VSWR or actual output in kW, by simply pushing in and holding the respective button for a couple of seconds.

The sound of all Z CD transmitters is outstanding, given its broadband design and great specs. If you have state-of-the-art audio, Z CD transmitters will take good care of you. They have for me.

■ ■ ■

George Nicholas is director of engineering for Central Star Communications in Cedar Rapids, Iowa. He can be reached at (319) 365-9431 or via e-mail at gnicholas@capstarbroadcasting.com

His English Springer Spaniel, Murphy, continues to page him in the middle of the night for laughs.

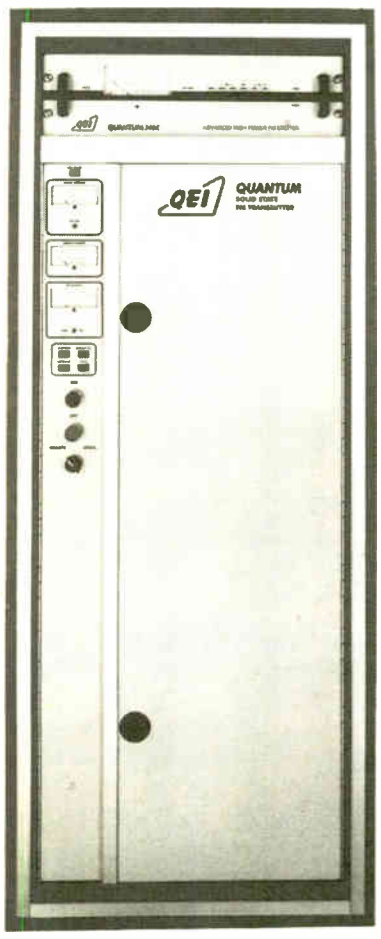
USER REPORT

QEI Takes the Cake At Desert West

by Ted Tucker
President
Desert West Air Ranchers

TUCSON, Ariz. Since the mid-1980s, I have been a broadcaster in Arizona and have used QEI transmitters exclusively because of their competitive price, high quality and great service.

From the early incarnation of its low-power 675T500 to the high-power FMQ-series single-tube transmitters, I have had virtually every model QEI makes. It's not that they never have a problem; like most pieces of equipment, they will occasionally slip up. But I can say that QEI has always been there to fix any problem and answer my questions The transmitters are well-built and not overly complex, and the on-air sound is competitive.



Desert West prefers QEI Transmitters.

For my last station, I installed QEI's most recent generation of transmitter: The QUANTUM-Series 4.2 kW solid-state FM transmitter, a surprisingly simple model for all its high-tech appearance. The transmitter is housed in a 58-inch-high cabinet comprised of a 300 W FM exciter/driver that feeds a splitter and drives the input of the modular 600 W FET PA amplifiers.

Precise power

The QUANTUM series is available in power increments between 1.2 and 9.6 kW in 600 W increments to the 6 kW level and 1.2 kW increments between 6 kW and 9.6 kW. This allowed me to buy precisely the amount of power required while keeping the price competitive and maintaining quality or features. The outputs of these modules are summed in a combiner integral to the back-plane of the amplifier frame.

The internal harmonic filter and output match network are attached directly to the combiner module and form a neat compact package. I was amazed at how much room there was in the cabinet. Everything was easily accessed and maintenance couldn't be easier.

Simple connection

The installation of the transmitter was easy since no special interface panels were required. It was literally a matter of connecting the transmission line and attaching the single-phase AC power input and remote control connections. We were on the air in a matter of hours rather than days, as has been the case with some transmitters.

When I had a failure of one of the seven PA modules, the transmitter simply dropped in power. The failed module took seconds to remove and the transmitter remained on the air while the module was repaired. QEI technical support is outstanding.

I have installed more than a half-dozen solid-state transmitters, all QEI. As with all solid-state devices, one thing I've learned is to keep them cool — especially here in Arizona, where the word "scorcher" was invented. On one of the installations, heat problems in the building combined with the thin air of a high-altitude site (over 9,000 feet) caused the over-temperature protections in the QEI transmitter to kick in and protect it from damage. Again, QEI came to the rescue and improved the cooling system. The improved system was easily installed in the field.

Looking ahead

The Quantum Series transmitter has delivered ease of installation and a great on-air signal. My next project already has a QEI Quantum on the drawing board (it's a big drawing board).

It's not just their state-of-the-art products or competitive price, but the people at QEI who make the difference for me.

■ ■ ■

For more information, contact QEI in New Jersey at (609) 728-2020; fax (609) 629-1751 or circle ***Reader Service 90.***

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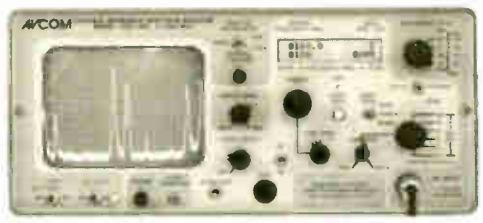

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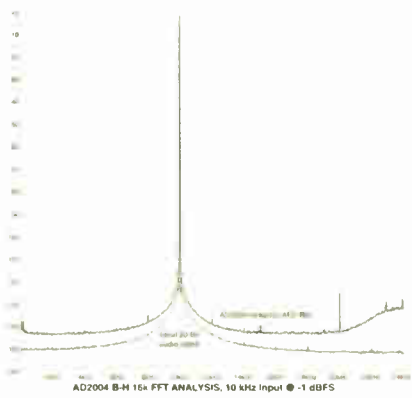

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USER REPORT

WKXK Operates From Sears Tower With BE FM30s

by Warren Shulz
Chief Engineer
WKXK(FM)

CHICAGO WKXK(FM) is an ABC Radio-owned station that uses **Broadcast Electronics** transmitters in an alternate-main configuration on the Sears Tower in Chicago.

This setup consists of two BE FM30s that have been in daily service for 15 years. While I did not have a hand in selecting or installing this equipment, it has given me outstanding performance.

Synchronous AM noise exceeds -45 dB. This is an important parameter when you are transmitting SCA packet data. PA grid VSWR match when adjusted, and when observed with a Narada 2030A directional coupler, is very stable.

The transmitters have had few repairs over the years. The only upgrade was a factory retrofit to replace blowers with a slower rotation speed to lower ambient noise level.

Solid-state IPA stages are as found and still meet power specification. Over the years, the exciters were upgraded from FX30s to the FX50.

Controlled environment

One contributing factor to the trouble-free operating life of the units is their controlled operating environment. AC mains voltage is regulated, and temperature is maintained at a constant 77 degrees with computer-room air conditioning equipment. We operate one transmitter at a time for long periods and avoid transmitter switching on the back-up transmitter just to see if it will work. This avoids thermal cycling and, I would expect, extends component life.

Another contribution to long life is that the 30 kW transmitter operates at reduced TPO and with a downsized plate supply. At the time these transmitters were purchased, a model with a nominal 10 kW range was not available.

Annual maintenance checks for hardware tightness are outstanding. Only during last year's maintenance check did I finally encounter a filament lead that had slightly overheated and that required hardware retermination — after 15 years of service.

This equipment was selected for specific intermodulation turnaround conversion loss. The Sears Tower site is shared with six other FM broadcasters. In the case of WKXK, we have a station on-site, 800 kHz below WKXK.

Each station's antenna system is co-located on a vertical tower section with little spacing. Antenna cross coupling ranges between -23 to -46 dB. The 56 dB isolation figure between any station's antenna input is obtained by the application of a bandpass filter. Unlike some FM transmitters, the FM30 is fully stable when operating into this narrow bandwidth termination.

The overall performance appears limited only by the ability to demodulate the FM signal. For audio performance, we can obtain SMPTE intermodulation distortion specifications in the 0.1 percent range routinely (studio to mod monitor).

The transmitter's turnaround loss conversion is a critical parameter to meeting FCC spurious emission specifications. Broadcast Electronics has published data to evaluate this important aspect. This assures the buyer that the spurious emission specification will be met. Knowing the turnaround conversion takes away the uncertainty from the site's RF output filtering requirements.

The critical performance parameter in a grounded cathode-power amplifier is the PA grid circuit bandwidth. In this application, BE took steps to ensure the bandwidth of the grid-matching circuits are sufficient and stable over long periods.

The FM30 From Broadcast Electronics

This model transmitter has a CMOS control system that provides the basic function with no frills. This has been more than adequate for the application.

The two FM30 transmitters have provided years of trouble-free service, and the design performs well, even in this very demanding installation. I recommend you take a good look at the Broadcast Electronics high-power FM transmitters. In this installation, they have provided years of trouble-free service.

■■■

For more information, contact Broadcast Electronics in Illinois at (217) 224-9600; fax (217) 224-9607; or circle ***Reader Service 129.***

815C FM Transmitter Has Uncluttered Feel

▶ CONTINENTAL, *continued from page 50*

the transmitter at the door and place it on the desired location of the second floor.

The solution to the stair problem was provided by Special Systems in Irvine. By using a "stair-climbing robot," they were able to get the transmitter up the stairs and on our raised floor system in about an hour with only two men. Wrapped in furniture pads and mounted to its pallet skid, the 815C made it through the entry door, up the stairs, and negotiated a cramped 90-degree turn at the head of the stairs with little difficulty.

Once in place, we performed an internal inspection. With the panels off, it was immediately obvious that the 815C is uncluttered and well laid out. The transmitter traveled well and all of the hardware and fasteners were snug and in place, except for a small plastic bag containing isolator mounts and hardware attached to L1 on the floor of the transmitter. Know that these "mystery mounts" replace the bolts holding L1 to the transmitter floor and significantly isolate vibration from L1 to the frame of the transmitter.

Minimal effort

Installation was an absolute pleasure. The access to the remote control strips is via the front. The "Euro-style" barrier strips don't require spade lugs, saving time and fatigue. Cable routing into the transmitter is effortless with the sides on or off. Connection to the mains is from the bottom, optionally from the top, and direct to the terminals. An opening is provided for a four-inch ground strap, again in the right place, allowing easy installation. The 1-5/8 EIA output flange is mounted in the top rear, making it simple to get to from the top and the bottom when the back panel is removed.

Power-up was effortless and without incident. Turn it on and it works.

If we had been hard-pressed to get the 815C on the air, we could have had the transmitter on the air in 45 minutes or less after it had been put into place without stress or cutting corners — or without wiring in the remote control, of course.

Installation of the 815C PC software is equally smooth. We did not install a PC at the transmitter site, but did install a modem for remote dial-up access. From my home, 70 miles away, I could look at each of the amplifiers, monitor output power, VSWR, efficiency and cabinet temperature. If a module needs to be reset, it can be done remotely from the PC while simultaneously viewing all of the modules

In the first couple of weeks we had some minor setup problems that were corrected, via modem, from tech support at the Continental factory in Dallas.

Few problems

Problems with the 815C have been minimal. Tech support for the few that we have had has been excellent.

Access in and around the 815C is generally good. There is one detail that would make working on the transmitter easier. The access panel for the rear amplifiers has two screws with washers that have to be removed before the panel can be slid up and off. It would be great if some kind of non-threaded captive fastener arrangement could be used to hold the panel.

Over time I can see losing one or both of the screws and washers or stripping the captive nut in the frame. A minute detail, but at 3:30 in the morning ...

Overall the Continental 815C has been a good investment and a stable performer. If upgrade plans for sister station KACD go through, I wouldn't hesitate to recommend another 815C for that installation.

■■■

John Paoli was the chief engineer at KACD/KBCD before going to Chancellor Media Corp.

For more information, contact Continental Electronics Corp. in Texas at (214) 381-7161; fax (214) 381-3250 or circle ***Reader Service 12.***

Looking at Tube and Transistor

▶ TRANSMITTERS, continued from page 50

Electronics, says buyers are looking for transmitters that are "more reliable, (and) easier to control, monitor and repair."

Greater freedom from maintenance requirements is an advantage of solid-state transmitter design. "Solid-state transmitters can be designed with sufficient redundancy that a backup transmitter may someday be a distant memory," said Steve Keating, manager, domestic broadcast marketing at manufacturer Continental Electronics.

The issues of cost, reliability, service and control have been around forever. Completely solid-state high-power FM transmitters, on the other hand, are quite new. What are the manufacturing tradeoffs between tube and transistor designs? Will tube transmitters disappear anytime soon?

Daryl Buechting, FM radio product manager for Harris Corp., said, "For high-power solid-state FM transmitters to supplant tube-type transmitters, we need an advance in technology, allowing twice the power for a given device size and price."

Bealor of BE pointed to a lack of low-cost, mass-produced 100 MHz MOSFET devices, and he sees no progress being made in that direction.

"Unlike AM, there are no advances of any significance being made in MOSFET device technology (at this frequency)," Bealor said.

What power level is considered the dividing line in a prudent solid-state vs. tube-purchasing decision? Most consider the area above 5 kW TPO to be the beginning of the gray area.

"From a cost/power viewpoint, the practical limit for solid-state is around 5 kW," said Jeff Detweiler, sales manager for QEI. "To state it another way, the cost of tube replacement is only offset at power levels below 5 kW."

Solid-state designs are quantum or modular in nature. According to Buechting, solid-state expenses are linear. "Twice the power in solid-state requires twice the number of components and power-supply capability," said Buechting. "Tubes achieve higher power levels more cost-efficiently."

"The break point on power vs. cost is 5 kW," said Jellison. "Above that level, you start ramping up cost. At 20 kW it is almost 3 to 1."

So it seems that, at least for now, solid-state designs are more cost-effective below 5 kW TPO. Above that point, tube designs remain more attractive based on capital cost considerations.

Substantial benefits

Although more expensive at higher powers, solid-state has important advantages. According to Crawford, "The 'pros' are no tubes, little or no tuning and less technical experience necessary to install, maintain and repair."

He added that these benefits bring their own drawbacks. Broadband (no-tuning) circuits are less efficient. More heat is expelled, less RF is transferred to the load.

With so many remote, unmanned sites in use, a more expensive solid-state transmitter may well be cost-effective for certain users. Any high-tech device that is separated from the nearest engineer by 500 miles of bad road must be low maintenance. By that argument, a few trips a year may quickly offset any capital advantages of a less-expensive tube unit.

See TRANSMITTERS, page 57 ▶

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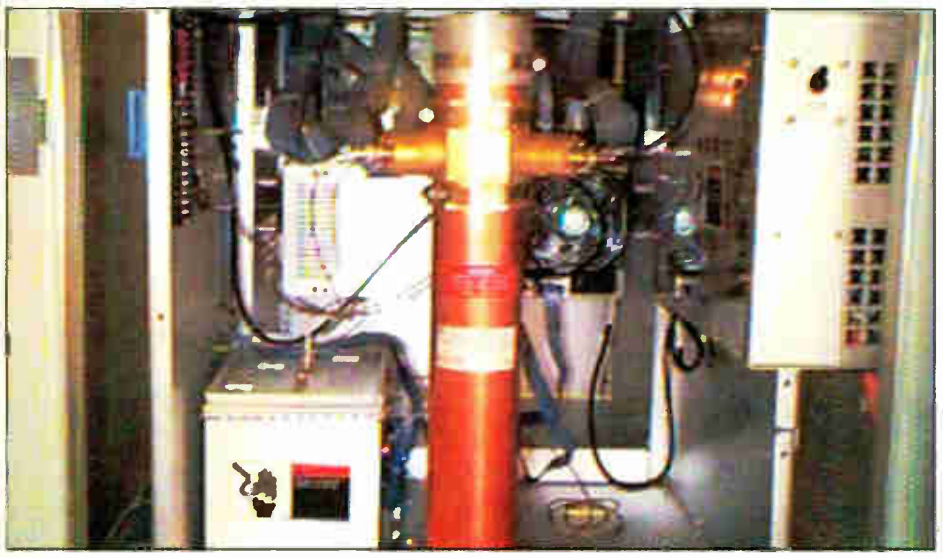
▶ TRANSMITTERS, continued from page 56

Detweiler of QEI makes an interesting point. Even though he agrees that solid-state designs are expected to be more reliable and to require less maintenance, he considers solid-state transmitters to be far more sensitive to their surrounding environment.

"They must move more air than their tube counterparts due to the lower temperature rise allowed on each solid-state device," Detweiler said. Unlike solid-state models, tube transmitters are environmentally vigorous. "The tube will withstand adverse temperature environments for longer periods of time than will their solid-state counterparts."



An Inside Rear View of the Z-5CD Transmitter From Harris

Advice and revelations

"Make sure the MOSFET device is standard, unselected, and that RF amplifiers are field serviceable to component level using components available from several suppliers," said Jorgen B. Jensen, manager, sales and marketing at Nautel.

Keating of Continental thinks the industry is still learning about the benefits of solid-state devices.

"As more experience with solid-state FM transmitters is gained, many stations will be able to justify the loss in efficiency of solid-state with the decreased cost of ownership in repair and maintenance," Keating said.

Reliability and support remain overriding considerations. Cost concerns are mitigated by consideration of the long-term usage expected.

In short, manufacturers and engineers say the cost crossover point between one-tube PA type and all-solid-state transmitters is at the 5 kW level. Below that, solid-state is the choice, while above that, the expected greater reliability and redundancy of solid-state must be weighed against its higher cost. What do you think?

■ ■ ■

Jeff Johnson is network engineer for WVXU in Cincinnati and the X-Star Radio Network. He recently wrote a multipart series in RW about servicing DAT machines. Reach him via e-mail at Jeff.Johnson@goodnews.net

What Next? DAB? Spread Spectrum?

The discussion in the accompanying article essentially presumes the use of the current standard, analog RF signal envelope or template in the FM band. What about digital audio broadcasting? Is that a factor today, as equipment companies plan new models and when buyers consider the timing of their purchases?

The consensus seems to be that a single IBOC DAB standard must be adopted prior to any serious commercial development or consumer demand in this country. With rapid progress being made in the areas of direct-to-home satellite delivery and Internet audio streaming, and with DAB systems on other bands spreading abroad, many observers say the U.S. industry had best settle on a standard soon.

Jay Crawford of WVXU/X-Star asks, "Will the listener pay for DAB, with all of the other choices?" No one wants a repeat of the AM stereo experience.

But to date, there is no clear consensus about the timing of a DAB solution. Perhaps the industry and regulators will agree on one within a year; then again, perhaps not. IBOC research has been ongoing for most of this decade.

Transmitter makers are watching with interest and caution. They seem confident they can handle whatever comes along.

"Existing transmitter designs are not directly capable of simultaneous amplitude and phase modulation necessary for digital transmission," said Jensen. "However, output from a digital generator may be applied to a linear amplifier and combined with output from a standard FM transmitter."

According to Keating and to several participants in IBOC research, no current FM transmitter can reproduce a true DAB waveform. But that's not a problem in the long term.

"Once the requirements of the DAB portion of the signal are known, we will be able to produce DAB equipment for our new and existing customers," said Keating. "Our FM transmitters are sufficiently flexible to allow any proposed DAB system to be employed."

"IBOC is a great idea for U.S. broadcasters," Buechting of Harris said. "It maintains the hierarchical system of station value based on power, location, frequency, prestige, etc., while allowing forward digital compatibility." Considering the large financial resources involved in the current round of mergers and acquisitions, this may be the most powerful argument for IBOC digital.

Many manufacturers have expressed critical awareness of, and an expectation to be able to meet, the demands of any standardized IBOC DAB system.

Another idea

But some forward-thinkers have other ideas for the FM band.

Ralph Evans III of Evans Associates in Thiensville, Wis., believes that "regulatory work should begin to deploy spread spectrum."

Evans envisions the use of the present FM band as a spread-spectrum environment. He thinks channelized digital broadcast is an inefficient usage of the band.

Spread spectrum is a modulation technique used successfully by personal communications service (PCS) companies to bring military-style, highly reliable digital services to the consumer. Through the frequency hopping technique employed in spread-spectrum systems, multipath fading is reduced greatly, and co-channel and adjacent channel interference disappear. The technology is used in a limited way already by radio stations for remote pickup applications, and several suppliers offer spread-spectrum systems for RPU.

Evans is thinking much more broadly. The only limitation to the number of radio facilities that could serve a market would be audience tolerance for bit retransmission (analogous to the well-demonstrated "pixelization" freeze effect we see on TV satellites).

Evans says his calculations show that, using digital spread-spectrum techniques, the total number of FM stations could increase by at least a factor of 10. Migration from the existing analog service could be accomplished by temporarily assigning a frequency hopping algorithm that respects local FM channels.

Whether the current political landscape would allow this, and whether existing broadcasters would find this appealing, remain unanswered.

USER REPORT

Crown Makes Impact in Georgia

by Glenn Finney
Chief Engineer
The Good News Network

AUGUSTA, Ga. I recently selected equipment for two, new 6 kW Class A stations in rural Georgia for our nonprofit Christian radio ministry, The Good News Network.

Selecting equipment and systems is something I enjoy and on which I spend a lot of research and effort. We ultimately settled on the new, FM2000A solid-state transmitter from **Crown Broadcast** for both stations.

Since both stations will be noncommercial, it was important that these projects be built and operated at a reasonable cost. However, it is my policy never to compromise quality to save a buck.

This required imagination and thinking outside of the mainstream. After some research, we determined that a 2,200 W transmitter could indeed work with a six-bay antenna, yielding 6 kW ERP — a bit unorthodox, but an interesting idea. There was no terrain to worry about so I gave it a go.

Good relationship

We have a good business relationship with Crown and use several of its low-powered transmitters, exciters and translators. The performance and personal service from Crown have been exceptional, so I had no apprehension to try this product. Crown also uses many of the same modules and subcomponents in every model for reliability and simplicity.

A close look at a FM2000A power module.

We received each transmitter, tested on frequency, in seven to 10 days. Each arrived in good condition. The transmitters were shipped in four separate boxes via UPS. Once unpacked, the DC power supply, exciter, power amplifier chassis and PA modules can fit in the trunk of a large car with room to spare.

Imagine, no more paying the truck driver $20 extra to help unload the pallet.

Installation is easy and straightforward. A heavy-duty rack is required to mount the transmitter. Even though the three basic pieces are designed to mount immediately on top of each other, I decided to leave one rack space between each chassis.

This made installation easier and gives some extra free air space. The cooling air is drawn through the PA chassis and out the back. The DC supply and PA chassis are deep — more than 20 inches. Therefore, we left some space behind the rack as well.

The AC power connection to the DC power supply chassis is unique. All that is required is a 20 A, 240 VAC circuit. The connection is made with a Hubbel twist-n-lock connector. (You RVers and campers know what this is.) Crown provides the Hubbel connector in the installation kit.

We also chose another unique option for broadcast equipment: a 7/16 DIN connector for the RF output. DIN connectors are widely used in cellular and PCS. They are larger than N-type connectors, have a higher power rating and are very easy to connect. Crown also offers a 7/8-inch EIA flange connection for the RF output.

The decision to get the DIN connector was ideal. I was able to locate a DIN-to-N adapter (TESSCO part number 31473) that allowed me to put the 100 W exciter on the air in less than a minute in the event of a catastrophic PA or power supply failure.

The DIN connector approach requires a short 7/8-inch pigtail and reducer to adapt to the main coaxial feedline.

The output of the exciter to the PA is with a standard N-type cable assembly, which also is provided. An interlock cable and DC power cables are connected between the PA chassis and the DC power supply. The exciter can be used with or without the optional internal stereo processor and generator.

Metering functions

Remote control and metering are provided on both the exciter and the PA chassis with a dreaded DB-25 connector. Although many in the industry are used to these by now, most of us still don't like DB-25s for non-computer field terminations.

I would rather see a removable Phoenix Contact connector. However, they do provide every needed metering function on both the front panel and the remote connections.

The initial power-up procedure also was simple. It requires about 70 W of exciter drive to yield the rated 2,200 W from the PA, and the PA ramps up smoothly and slowly. They also included an RF output limiter adjustment just under the front panel of the PA, which I also liked. However, there is no "local" raise/lower power adjustment directly on the front panel of the PA chassis. There is, however, a set of push buttons under the front cover. Automatic power control is always maintained and works well.

With the transmitter operating at a full 2,200 W, the exhaust air from the PA chassis was very cool — something I am not used to seeing. I also gave the "hot-pluggable" sales pitch a try at the 1.5 kW level. I removed an entire 500 W module while operating. The other three modules compensated, and the output never fell below 1,500 W.

At a higher power level, the loss of an entire module resulted in a slight loss of output power, which is what I expected. I plugged the module back in and the power ramped up smoothly again. Changing a power module only requires the use of a Phillips screwdriver for removal of the front PA panel.

We determined that a 2,200 W transmitter could indeed work with a six-bay antenna, yielding 6 kW ERP.

We purchased and used the optional built-in stereo processor and generator on these projects. The audio quality is clean, and there is a processing density adjustment to satisfy different tastes. The exciter needs no additional processing for a rich, loud sound.

It only required a few hours to install and test the FM2000A transmitter, and it was a pleasant experience. From what we have seen so far, the long-term savings in electricity costs will be excellent. The FM2000A also would make a great backup transmitter for larger stations and group owners.

For more information, contact Crown Broadcast in Indiana at (219) 294-8050; fax (219) 294-8222; or circle ***Reader Service 168.***

■ ■ ■

Glenn Finney is on the volunteer staff of the Good News Network and lives in Macon, Ga. He is active in amateur radio. Reach him via e-mail at gfinney@broadcast.net

USER REPORT

FM500: A Hot Standby Transmitter

by Jim Withers
VP of Engineering
Koplar Communications

ST. LOUIS I grew up in the radio business when a 500 W FM transmitter was about the size of your average Kelvinator, and weighed twice as much, so I guess I can be forgiven for being in love with the FM500, a 500 W FM linear amplifier made by **PTEK**, of San Jose, Calif.

I bought my first FM500 as a backup amplifier for my FM station in Laramie, Wyo. The transmitter site is high. In fact, it is so high, the only way to get closer to God is to die. For the six to seven months a year when the site is snowbound, I needed a cheap, absolutely reliable standby transmitter that required no tuning, no air conditioning, no anything, except AC power. That perfectly describes the FM500.

This little 500 W power pack is very neat. External connections? Two N connectors, an AC plug and a terminal strip for remote control. Plug in an antenna and a 10 W exciter (PTEK also makes one of those, but that's another article), turn on the juice, crank the front panel gain control for the RF out that you want and away you go.

The FM500 from PTEK is a good bet for a backup transmitter.

Fault logic

The front panel also has a multimeter, for reading forward and reflected power, as well as output stage voltage and current. Also, there are several fault lights: Underdrive, General Fault, and a remote off indicator. The fault logic cuts off the amplifier during a fault condition, so it would be hard to cook the output transistors.

The RF section is self-contained on a massive heat sink, which disconnects easily from the chassis, making for simple replacement if a failure occurs. As an engineer, I am embarrassed that I cannot recite from memory the component layout, but the truth is, in two years, the top has been off that unit exactly once, to install a factory mod.

The FM500 is built solidly, and I say this as someone who tried to lift it into the rack alone a couple of times (emphasis on *tried*). The power supply is beefy, and is well-regulated. No offense to the Wyoming Rural Electric Co-op, but their power wanders around like a lost dog. Even so, the supply voltage on the FM500 is rock-solid.

Slow roast

Airflow is provided through a front-panel muffin fan that I like because it is easy to check. How many times have you gone around to the back of a piece of equipment, noticed the muffin fan had quit and silently wondered exactly how long that piece of gear had been slowly roasting itself to death?

While I am not exactly Victor Kiam, (who liked his shave so much he bought the company), I liked my FM500 so much that I bought a second one. This one went to one of our stations in Corpus Christi, Texas. We had an old but serviceable 10 kW transmitter, but the driver stage was shot. I called PTEK. Two days later, I plugged in an FM500 and we were back in business.

My partners were delighted, because the FM500 cost a fraction of a new (or even used) 10 kW transmitter. As a side note to this purchase, the overnight carrier that delivered the FM500 absolutely, positively dropped it — hard enough to jar the front-panel meter out of its housing and bend the chassis mounted output connector. Still, we didn't have time to ship it back, so I took my chances and plugged it in. It came right up without a hiccup.

Wish list

I suppose all of us have our wish lists about equipment, and I am no exception, but on the FM500, it is fairly short. A 110/220V selector would be great. The 220 was immediately available in that old transmitter, but 110 had to be rigged up. As for the front-panel meter, it should be bracketed onto the panel instead of sticky-taped on. Finally, the general fault LED is a bit ambiguous. Adding two or three more LEDs and making the fault indications more specific would be nice. But, like I said, it's a short list.

All in all, this is a nice piece of gear, and at less than $3,500 list, almost any station can afford one as an emergency backup transmitter (coupled with an exciter, of course), or a replacement for a cantankerous IPA in an older main transmitter.

PTEK also sells a combiner; with this, two 500s can be paralleled to make 1 kW. The FM500 is small enough to be carted from site to site, for those stations that are part of a duopoly, and of course, it is broadbanded and needs no tuning.

Five hundred affordable, reliable watts in a very small box. As a standby, this transmitter is very hot.

For more information, contact PTEK in California at (888 411-5174; fax (408) 448-5951 or circle ***Reader Service 207.***

■■■

Jim Withers also is an engineering consultant. Reach him at (314) 454-6310 or e-mail jim@kplr.com

For the six to seven months a year when the site is snowbound, I needed a cheap, absolutely reliable standby transmitter.

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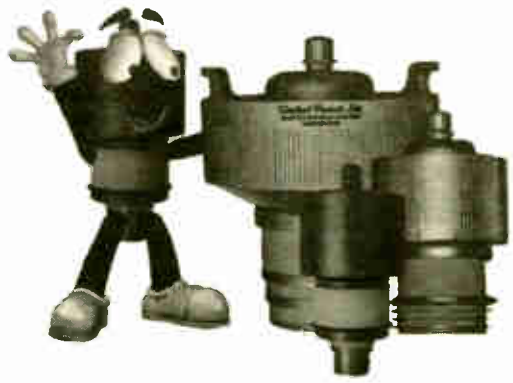

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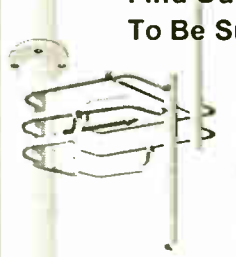

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USER REPORT

Amplifier Gets the Word Out at KHIM

by Fred R. Morton Jr.
Technical Director
Altus Educational
Broadcasting Foundation

ALTUS, Okla. I recently installed a **Broadcast Technology** FM power amplifier, the B-1.2K, for KHIM(FM), 97.7 MHz, in Mangum, Okla. This amplifier, as well as the station, were new, so I had the experience of building an FM facility from scratch with a piece of equipment from a manufacturer with which I had not worked.

We used some existing equipment to keep our construction costs down. We called an old QEI 675 exciter into service, as well as an Orban Optimod 8100 and ancillary equipment. The 675, with approximately 7 W, drives the B-1.2K to a TPO of 820 W, which in turn feeds a 7/8-inch Andrew foam transmission cable and an OMB four-bay circularly polarized antenna. The station ERP of 1.5 kW more than covers the city grade of Mangum, a small community in southwest Oklahoma.

Abnormal is normal

During the initial setup, all went smoothly until we went to apply power to the amplifier. Upon power-up, power was indicated — as well as what appeared to be abnormally high VSWR.

After checking everything we could think of, including antenna, coax and jumpers, we found the problem. On the B-1.2K, low VSWR indicates about half scale on the internal meter used for various functions. A call to the factory confirmed that what appears to be high is actually normal. Unfortunately, the manual doesn't mention this. A lot of time and effort was spent tracking down what turned out not to be a problem.

Once the B-1.2K is connected, the operation is a virtual set-and-forget situation.

Set and forget

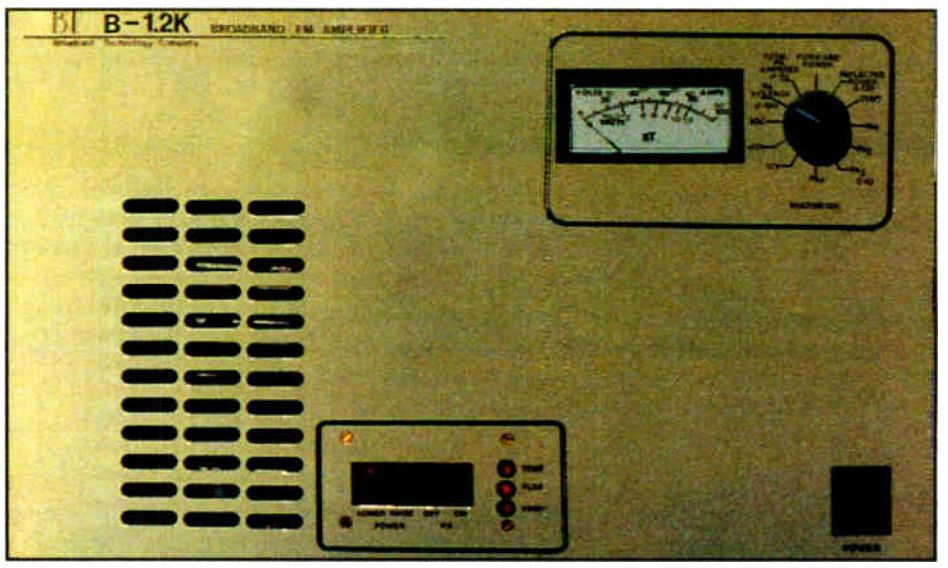
Once corrected, the operation of the amplifier has been a virtual "set-and-forget" situation. The only problem we encountered was the amplifier would shut off unexpectedly, usually in the afternoons. We found that with temperatures running more than 100 degrees during the summer of 1998, the city utility had such demand due to air conditioners running almost constantly, that the utility voltage (on our rig, 220 V single phase) would drop so low it would shut down the amplifier. Other than that, KHIM has had no problems with the unit.

I am in the process of preparing a backup transmitter site for one of my client stations in Houston. I will definitely consider another unit from this company. Once on the phone, they seemed eager to please and were helpful in solving our VSWR "problem."

■■■

Fred Morton also is chief engineer at KKTL(FM) in Cleveland, Texas, and KRTS(FM) in Seabrook, Texas, as well as director of engineering at KMGZ(FM) in Lawton, Okla.

For more information, contact Broadcast Technology in Colorado at (719) 336-3902; fax (719) 336-9473; or circle ***Reader Service 13.***



KHIM(FM) powers up with the B-1.2K Amplifier.

USER REPORT

Loyal to the BF-5K Workhorse

by Jesse Gilbert
Technical Director
CSRG, Inc.

SULPHER SPRINGS, Texas The **McMartin** BF-5K FM Transmitter has proven to be a reliable and rugged tube transmitter for our radio group.

We have installed about 10 McMartins over the years, the most recent being at KTGP(FM) in Pawhuska, Okla. When McMartin shut down, the designer of the transmitters, Charlie Goodrich, continued supplying parts, technical assistance and McMartin transmitters from his Omaha company, **Goodrich Enterprises**.

The BF-5K is a modified design of the BF-3.5K. The tube complement includes two 4CX250Bs and a 3CX3000. Its front panel contains a bank of tally lights for isolating problems. The exciter can be mounted in a space on the front right with slides. Coax to your antenna connects to the top of the transmitter from the self-contained filter.

When the back door is opened, on your right side are two cabinet doors. Behind the upper door is the final tube with its tuning and loading controls, and behind the lower door are the two IPAs or driver tubes along with grid tuning, and IPA loading and tuning air-variables. The control-ladder assembly is mounted on the upper left transmitter wall, with the screen voltage supply and its motor-driven rheostat located below. The remote-control terminal strips are on the floor by the back door, and two cleanable intake filters are mounted on the back door.

Keeping things cool

My favorite BF-5K installations isolate the transmitter's cooling from the room by connecting a flexible duct to the back door intake from the outside wall, and then pulling exhaust air from the top of the transmitter with a large blower in the wall through ductwork. This external blower may not be necessary, but it keeps everything cool.

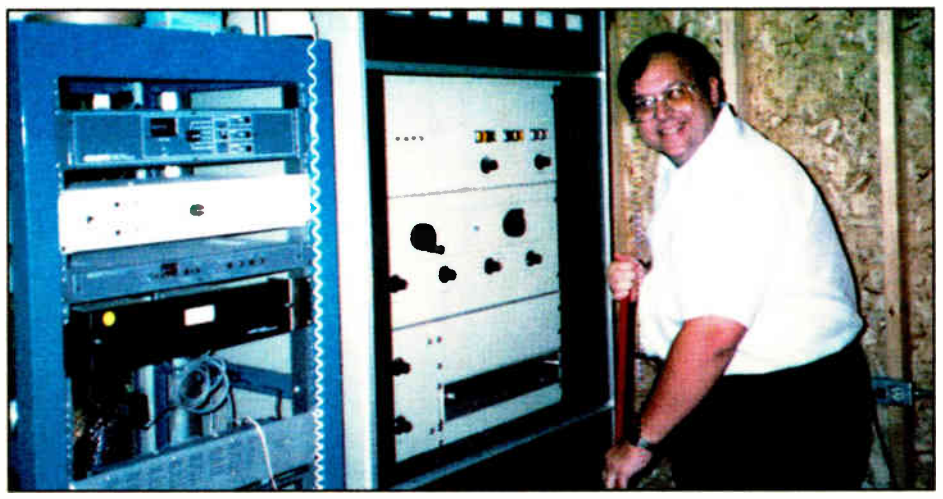
The transmitter stays happy at maximum power levels in outside temperatures of 100-plus degrees. If the blowers fail, a pressure switch on the tube compartments shuts the transmitter down, but a temperature sensor is there for backup. In a 15-year-old installation this summer in Texas, the air-conditioning failed, but the transmitter never missed a lick, although the STL receiver stopped working when the room neared 120 degrees.

Maintenance primarily involves cleaning and tube replacement. I start watching the power output after six months to a year. When I start getting IPA overloads, I replace the IPA tubes. The final installation has lasted up to two years.

I like to lubricate the 90-degree gear boxes used in the final installation's tuning and loading control mechanisms every year. These can get dry and stiff through time. The High Voltage supply is rugged; it took 15 years before I lost a high-voltage component in any of our McMartins. In one installation, rectifiers in the screen supply, which is used for power adjustment, have failed. With a good complement of tubes, power output is stable with typical line-voltage fluctuation. With the spring-loaded control on the front panel, power out can be adjusted continuously down to nearly nothing. I have had the output loading assembly get pitted and self-destruct, though nothing else in the transmitter was damaged.

After the first couple of McMartin Transmitters we bought (20 years ago?), a new control-ladder design came out which was a great improvement for reliability. There have been no failures with the newer control ladder. McMartin's older B910 exciter was a bit fussy. Its replacement has been solid as a rock.

When I've had problems troubleshooting, Goodrich has been helpful. It's pretty handy being able to talk to the designer of the transmitter. Mostly, though, the BF-5Ks just sit there and run, and only once have I dealt with lightning damage.



Art Morris in the Transmitter Room at KELE(FM) in Mt. Vernon, Mo.

These transmitters cost half of a new solid-state transmitter. If you have access to an engineer who can change the tubes and you need to economize, I wholeheartedly recommend the BF-5K. We bought another this summer and will continue to purchase them.

■■■

For more information, contact Goodrich Enterprises in Nebraska at (402) 493-1886; fax (402) 493-6821 or circle ***Reader Service 52.***

USER REPORT

FM-5000T: Worth the Price of Admission

by Jim Withers
Director of Engineering
Koplar Communications

ST. LOUIS Having acquired four FM stations in Corpus Christi earlier this year, all with older transmitters, my partners and I decided we needed standby transmitter capabilities.

Three of the four stations were at a common tower site, so we decided to buy one standby for all three stations. Our requirements were simple: We needed an affordable, 5 kW transmitter, preferably broadbanded (since it had to be remotely switchable and tunable to three different frequencies). It also had to have a small footprint, since we were putting it into a 10-by-24-foot building which already contained three other transmitters and a combiner. The search led us to **Armstrong Transmitter Co.**

In addition to manufacturing STLs and antennas, Armstrong builds a line of grounded-grid and solid-state FM transmitters. We settled on the FM-5000T, a grounded-grid, 5,000 W model. This is a very nice transmitter, coupling proven 3CX type triode technology with modern microprocessor control and monitoring logic.

The big selling points for grounded-grid transmitters are simplicity and low cost. The lack of a screen grid means a much simpler power supply configuration, and tube technology beats the solid-state option hands down on a pure cost-per-watt basis. Simplicity and low cost are the essence of the FM-5000T. With one tube, one HV supply, some control logic and a solid-state driver, this rig is cost-effective and simple to own and operate.

The FM-5000T is small in size but large in durability.

Small but sturdy

At 22 inches wide by 26 inches deep, the transmitter is small, but well built — there is a lot of iron packed into that space. The plate transformer is rated at 10 KVA, so it is hard to see how it could ever run warm, let alone hot. The cavity is solid as well, with large angled gussets anchoring it to the cabinet frame. The input circuit is broadbanded, so there is no need for input tuning on the PA. The output tunes with motorized plate tuning and output loading controls.

Transmitter setup is easy. The microprocessor has lithium ion battery backup, and all control, monitoring and overload/timing memory are contained in one panel 2RU high. There are full-time meters for RF Power Out (both forward and reflected), plate current and grid current. The plate voltage

See ARMSTRONG, page 63 ▶

▶ ARMSTRONG, continued from page 62

meter is switchable between Ep. filament voltage and a CAL position (which does not seem to do much).

Status monitoring is extensive, and the panel has one particularly neat feature: A spring-loaded key switch allows the overload circuits to be bypassed for a minute or so to facilitate troubleshooting. There is no danger of leaving this in the bypass configuration, however; the microprocessor automatically brings the overload protection back on line.

The transmitter is a piece of cake to tune. Before turning on the plates, the motorized plate tuning is roughly set according to a frequency vs. length chart in the manual. The HV then is turned on and the plate tuning rocker switch is toggled back and forth to achieve maximum RF out. The output coupling rocker switch then is toggled for optimized grid current with maximum RF out, and the FM-5000 is on the air.

Looking for hinges

Any downsides to this transmitter? The front-panel cavity access door does not swing open past about 80 degrees because of the hinge design, and access is a bit awkward. Speaking of hinges, a hinged (but still removable) rear door, instead of the current lift-off version, would be a handy feature, and all door screws should be captive; they are not, and I am notorious for losing loose screws.

Valuable time

Also, the manual could be more extensive. There is little in the way of theory, so if a problem arises, it takes valuable time to decipher the schematic. Finally, a major complaint: There is no shorting stick inside the cabinet. This is a big one with me, since one of those $5 sticks actually saved my life once when I was neck deep inside a 50 kW RCA TV transmitter.

All in all, this transmitter is a quality product and an outstanding price performer. The company supports the product well (going so far as to ship me a critical part counter to counter on a Sunday) and is striving to gain market share. Armstrong is not well known, and to overcome that disadvantage, it has priced a well-built transmitter attractively. Definitely worth the price of admission.

■■■

Jim Withers is a 32-year veteran of broadcast engineering, 22 of which have been as an engineering manager. He owns six radio stations in Texas and Wyoming. Reach him at (314) 454-6310 or by e-mail at jim@kplr.com

For more information, contact Armstrong Transmitter Corp. in New York at (315) 673-1269; fax (315) 673-9972 or circle ***Reader Service 130.***

TECHNOLOGY UPDATE

JT Communications

The FMP-20 from **JT Communications** is a self-contained FM broadcast exciter for low-power, portable and emergency applications.

Using the company's PLFM-100 exciter module, the FMP-20 will operate at 88-108 MHz and is DIP switch programmable. Critical voltages and currents can be monitored through a panel-mounted connector; a portable digital multimeter is supplied for measurements and can be used as a diagnostic field service tool.

The output can be adjusted with an internal control, and the RF can be switched either remotely or locally. Both the IPA and PA stages are field-tuned for optimum matching at desired frequency. A seven-pole low-pass filter cleans up any harmonics, and a DC input line is filtered for noise spikes and alternator whine.

The FMP-20 will operate from any 12V DC power source. Standard audio inputs are an unbalanced 600 ohm composite, and an unbalanced 600 ohm 75 µS pre-emphasis.

For more information, contact JT Communications in Florida at (352) 236-0744; fax (352) 236-5130 or circle ***Reader Service 169.***

The big selling points for grounded-grid transmitters are simplicity and low cost.

USER REPORT

LeX 25: Exciting Small Market Gem

by Marion Bishop
General Manager
KHPU(FM), Howard Payne Univ.

BROWNWOOD, Texas Over the years I have seen quite a few FM exciters, and honestly can say that there weren't many that were, in fact, exciting.

However, that lack of excitement should never cloud the judgment of broadcasters who are making the important choice of which exciter to purchase. The exciter is, after all, the heart of an FM transmitter. If the exciter goes down, the transmitter is down.

With that thought in mind, let me share our experiences at KHPU(FM) with the LeX 25 from **Bext Inc.**

Small budget

Howard Payne University, a small denominational school in mid-Texas, owns KHPU. Being a small school, there was virtually no funding available for our station from sources outside of my own department. So in our quest for a transmitter system, the primary consideration was cost. The second major consideration was reliability.

Having built and maintained commercial stations in the past, the last thing that I wanted to do now that I am an educator was to spend all my nights and weekends keeping a radio station on the air. After all, what's the point of being a college professor if you can't enjoy all that "free time" that you have? Our search, based on the criteria of price and reliability, eventually led us to the Bext LeX 25.

The LeX 25 is a low-cost FM transmitter/exciter with an output that can range from 1 to 25 watts. In fact, we have been able to get nearly 30 watts out of it when necessary. KHPU is a low-power, noncommercial station and doesn't have a backup transmitter. On the occasions when it is necessary to pull the PA off-line, it only takes about two minutes to reroute the RF cables and boost the exciter output from our normal 2 watts to maximum power out. The result: We still can cover our city of license with an adequate signal while the PA is off-line. That may not mean much to those with redundant transmitter facilities, but it does to small-market broadcasters.

Simple design

The LeX 25 would make a nice translator station with the purchase of the optional built-in stereo generator and compressor/limiter. The only other addition would be an external wattmeter and the antenna system. The rest of the unit is set up nicely with a simple design. The front panel has an LED monitor board that gives an indication of power supply voltage, frequency lock, over- modulation, forward power and reflected power. There is even a 24V DC connector on the back of the unit so that it could be operated off battery power if the AC grid went down.

By purchasing a few additional items, you can turn the LeX 25 into a strong translator station.

The internal circuitry is simple, with all RF and audio circuits located on a single board mounted on the rear panel. The RF power output is regulated up to 20 watts and incorporates fold-back protection. Frequency is controlled by a set of programmable switches on the back panel, which make it easy to set up. Composite audio is fed in through BNC connectors on the rear panel. There are BNC connectors for two SCA inputs. A 600 ohm audio input is optional.

The LEX 25 is apparently pretty rugged in operating at extreme conditions. Shortly after we went on the air, our air- conditioning unit in the transmitter building failed. It was in the hottest part of the summer and the daytime highs were in the 105-to-107-degree range. The building temperature was nearly 120 degrees when I got there. Other systems were failing, but the LeX 25 was plugging along doing its job, even though the ambient temperature was 16 degrees hotter than the maximum rating for the unit.

Are there better exciters on the market? Yes, but they cost considerably more. Has the LeX 25 lived up to its billing? Definitely. We have been more than pleased with our purchase. The LEX 25 is a good bet for a station looking for a low-cost, reliable exciter/transmitter.

■ ■ ■

Marion Bishop is assistant professor of communications at Howard Payne University. He spent 17 years in radio and cablecast television programming. He has owned radio and television interests, and has served as an industry consultant.

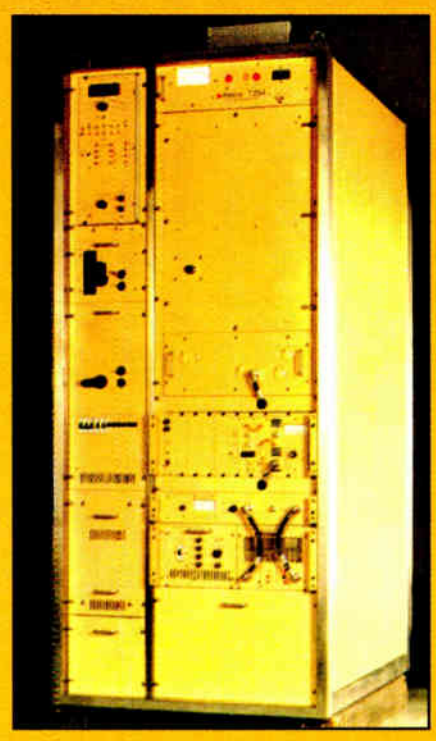
For more information, contact Bext in California at (619) 239-8462; fax (619) 238-8474 or circle ***Reader Service 14.***

TECHNOLOGY UPDATES

Itelco

The T254 from **Itelco** is a 30 kW FM transmitter for broadcast operations from 87.5 to 108 MHz.

The transmitter is in a single stainless-steel rack, which holds the exciter (model T241); the solid-state driver amplifier; the tetrode power amplifier



in coaxial cavity; the air-cooling system; the tube power supply units; the remote-control interface unit; the transmitter control unit; the check panel; the earthing switch and the mains distribution unit.

Each unit in the rack is designed in order to be removed and checked easily. The transmitter complies with requirements for safety personnel as specified in IEC 215 rules.

The T234 20kW FM transmitter has the same features as the T254, with the exception of the power supply unit.

For more information, contact Itelco in Colorado at (303) 431-1699; fax (303) 431-2868 or circle ***Reader Service 53.***

RFS Broadcast

RFS Broadcast offers broadband antennas, which are useful in the era of consolidation and DTV because they provide bandwidth for multiple channel operations. Vertical and horizontal pattern control helps maximize pattern efficiency, and possibly saves money by allowing a smaller transmitter.

The 904CP antenna panel is pressurized and can handle up to 20 kW. Four 7/8-inch EIA inputs allow maximum versatility. The 904CP antenna can be fed in either horizontal, vertical or circular polarization. It is a broadband antenna that can be designed to provide customized patterns with excellent VSWR across the band. Dipole radomes provide increased ice protection while maintaining minimum wind loading and trouble-free maintenance.

The company also offers the 828, a side-mounted antenna capable of 5 kW per bay. This is a pressurized, stainless steel antenna with very low windload. Like the 904CP, the 828 can be configured for circular or mixed polarization.

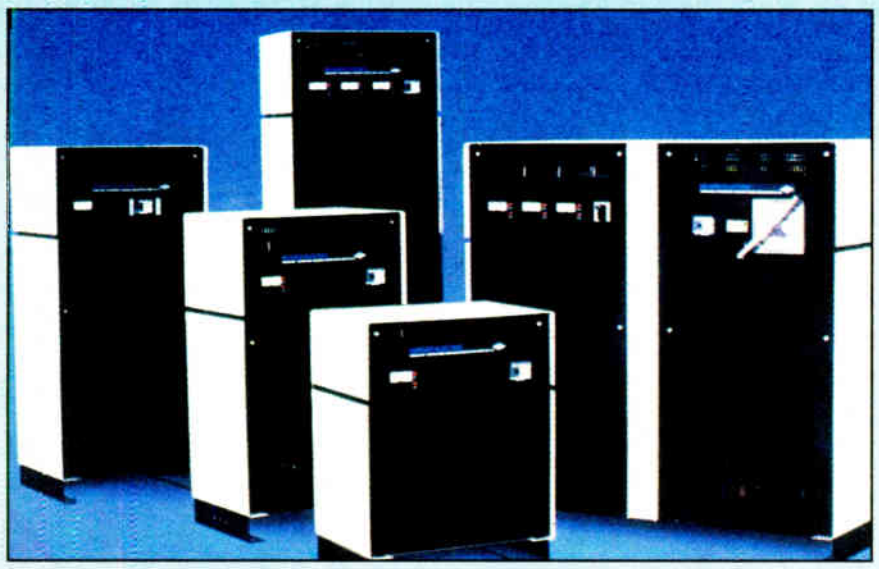
For more information, contact RFS Broadcast in Connecticut at (203) 239-3311; fax (203) 239-9260; or circle ***Reader Service 171.***

TECHNOLOGY UPDATES

Warner Electric

Warner Electric offers an extensive line of voltage regulators under the STABILINE trademark.

Identified as the WHR Series, they are designed for AC power systems up to 660 VAC and ideal for any broadcast application requiring protection, including transmission. Constant voltage is maintained to sensitive electronic and electrical systems even when the input voltage and system load vary.



Various models are available with power ratings ranging from 2 to 1,680 kVA that hold output voltage to plus or minus 1 percent. The units have typical efficiency of 99 percent, no waveform distortion and no power restrictions. Other features include all-buck or all-boost capacity, availability of two voltage ratings and shifted input ranges for greater low-voltage protection.

A more recent model is the low-profile, single-phase unit designed for mobile broadcast vehicle or studio use. This regulator is a rapidly responding 6.6 kVA narrow range unit rated for 120 V, 50/60 Hz, single phase duty which can be used in standalone or 19-inch rack-mount installations.

For more information, contact Warner Electric in Connecticut at (860) 585-4500; fax (860) 584-1483 or circle ***Reader Service 131.***

Elenos

Elenos offers several new FM products.

One is the ETG 100, a 100 W exciter with microprocessor control. It shows its operating parameters on a large front-panel display.

Also new from the company are ultra-compact tube transmitters. Offered are the E4TX10000, a 10 kW W FM transmitter, and the E4TX5000, a 5 kW FM transmitter. Neutralizing the tetrode or adapting input impedance (wide-band input) is not necessary with these transmitters.

Tube replacement is simple thanks to a special extractor. The tube is protected against thermal shocks and overload currents, and the filament voltage is stabilized.

For more information, contact Elenos in Italy at +39-532-829-965; fax +39-532-829-177; visit their Web site at www.elenos.com *or circle* ***Reader Service 54.***

Superior Broadcast Products

Superior Broadcast Products offers the KAFM 5500 and KAFM 10000 FM transmitters.

Both models are single-tube grounded grid for low-cost operation and come with a solid-state exciter and IPA driver. The 5500 has an output power of 500 to 5,500 W, while the output power of model 10000 ranges from 1,000 to 10,500 W.

Both transmitters have an optional stereo generator, compressor/limiter, remote interface and FSK ID for automatic station identification. They are frequency agile and easily can be set in the field. Signal to noise stereo is 68 dB, and signal to noise mono is 66 dB. The operating temperature for these transmitters ranges from -15 to 40 degrees Celsius.

For more information, contact Superior Broadcast Products in Texas at (800) 279-3326; fax (972) 473-2578 or circle ***Reader Service 209.***

CTE International

The DEX30 from **CTE International** is a digital exciter, the basic building block for the company's solid-state FM transmitters.

The base version is provided with one MPX input and two wide-band AUX inputs (30 Hz to 100 kHz) with modulation sensitivity suitable for RDS and SCA uses.

The digital low-pass filters on the MPX signal can be set at 15, 53, 60, 75 and 100 kHz. Input level adjustments are analog with a digital control.

Dynamic mode is used to suppress overmodulation due to interference between adjacent channels. Functions are managed by a microprocessor and are controllable by keys and an LCD alphanumeric display.

For more information, contact CTE International in Italy at +39-522-509450; visit the Web site at www.cte.it *or circle* ***Reader Service 15.***

Silicon Valley Power Amplifiers

The B-2000 from **Silicon Valley Power Amplifiers** is a rugged, lightweight FM Broadcast amplifier designed for continuous use in remote locations where access is limited.

The unit has the ability to deliver up to 2.4 kW with only 10 W of drive from the exciter. The power amplifier chassis uses four of the company's 0101-700CH 700-watt modules driven by an enhanced form of the 0101-150CP. The only component designed specifically for the B-2000 is the low-loss combiner.

No tuning is ever required for the B-2000, and installation is simple, requiring only a screwdriver. Access to the main RF amplifier modules requires the removal of the front panel (four bolts) and the fan mounting assembly (six bolts). The modules are on rollers and slide out easily.

The RF power amplifier modules have built-in protection against DC surges, as well as an over-temperature trip. The LCD display shows Forward Power, Reverse Power, Drive Power, Final Current, and Final Voltage. Comprehensive fault warning indicators are included, and remote monitoring and gain control are accessible.

For more information, contact Silicon Valley Power Amplifiers in California at (408) 986-9700; fax (408) 986-1438 or circle ***Reader Service 170.***

Radio World

Broadcast Equipment Exchange

"Broadcast Equipment Exchange" accepts no responsibility for the condition of the equipment listed or for the specifics of transactions made between buyers and sellers.

ACOUSTICS

Want to Sell

AMPLIFIERS

Want to Sell

Marantz 2440 vintage quadradial amp, vgc, manuals, $125/BO; Fender twin reverb, 1972 guitar amp, mint cond, $450/BO. J Thornton, 320-634-3213.

McIntosh Mac 1900 stereo rcvr, $300; Heath W5M (pair) mono tube amps w/preamps, $400/all; Harmon-Kardon Citation 12 stereo power amp, $150. C Collins, 414-363-9205.

Datatek 9 input, mono, each input w/4 outputs, rack mount in working order, $100/BO. D Nuechterlein, 517-652-6863.

Want to Buy

Audio dist amp suitable for stereo, each chnl must have level adjustments, needs to be in gd cond. H Kneller, 941-494-4111.

ANTENNAS/ TOWERS/CABLES

Want to Sell

ERI 2 bay FML CP antenna, tuned to 105.5 MHz, mint cond, unity gain, on ground ready to go in Ohio, $1200/BO. D Palmer, 740-593-6651.

Jampro JHCP-4 4-bay circ pol FM antenna, BO. S Perez, 323-882-8000.

ERI FML 3E 3 bay rototiller antenna w/DC stub & heaters, vgc on 104.1 MHz, $3500; Shively 6810 2 bay on 99.1, like new, $1000. C Gennaro, 906-932-2411.

AUDIO PRODUCTION

Want to Sell

Koss LV-20 stereo headphones, new in box, will trade for older pair of working AKG K-144 or K-240 headphones; Fostex 3180 stereo reverb w/24 mS pre-delay, rack mountable, vgc, will swap for UREI Cooper Time Cube (920-16); Sennheiser HD 414 light weight, open-ear design headphones, new pair, $50, used pair $30; AKG RR-25 remote control w/33' cable & connector for AKG BX-25 reverb unit, will trade for Teac RC-71, RC-170 or RC-190 remote; Burwen TNE 7000A stereo transient noise eliminator, gd cond, will trade for working UREI Cooper Time Cube (920-16). J Roper, 812-877-2663.

Altec 1607A powered Solid State mixer/amp in Altec table top rack, excel cond, $75; dbx 2 chnl compressor/limiter, $175; McMartin LX-10C single chnl mic-pre, $25. J Borden, 414-482-8954.

Dielectric DC 485-431 RF 3-pole 4" patch panel. Mr Fair, 773-784-1558.

Roland SRV330 reverb unit, spacial reverb 32 bit digital, over 300 effects barely used, looks new, manuals, $395/BO; Lexicon LXP1 effects unit, reverb/delay & chorus unit, barely used, manuals, $195/BO; Tascam 2400 dbx unit for Tascam 38 & 32, like new. J Thornton, 320-634-3213.

Sony PCM-501ES PCM digital rcdr processor, $500. B Meuse, 650-969-2433.

Valley People 2x2 interface box, XLR to RCA levels, $100. D Kocher, 610-776-1455.

dbx 3BXIII 3 band dynamic range expander w/impact restoration, $75; Furman LC-3A limiter/compressor, $75. 561-832-0171.

ANTEX AUDIO CARDS, will not be undersold. A.S.C. (619) 523-1575.

Patchbays, (12) ADC PPA3-18MKIINO, 48pt to Punchblock @ $499 ea, B Stock. Call Redco Audio, 800-572-7280.

Want to Buy

Neve, Api, Gates, Longevin, Collins, Lexicon & other mic preamps, Eqs, reverbs, delays. T Coffman, 619-571-1645.

Sony MU-R201 dedicated rever processor. B Meuse, 650-969-2433.

AUTOMATION EQUIPMENT

Want to Sell

Sono Mag ARS-1000, (3) Carousels, (4) PB cart machines, (5) Otari PB r-r, use as full or simi automation, $1000. D Brabandt, 812-738-9622.

ABC Netcue II, gd cond, $100. P Wolf, 941-458-3777.

Format Sentry FS12C w/CD interfaces for up to 16 CD players, w/3 FS data latch cards, vgc, $1000. C Gennaro, 906-932-2411.

Schafer 800-T controller for use w/r-r equipment, $500 +shpg. J Bahr, 340-719-9336.

Want to Buy

SMC MSP-12 controller & switcher, power supply & keyboard. Rick, 505-762-6200.

BUSINESS OPPORTUNITIES

CART MACHINES

Want to Sell

Sparta 800C R/P cart machine, $75. M Fitzner, 706-291-9766.

Tapecaster 700 mono cart PB, fair cond, $100. M Fitzner, 706-291-9766.

Audicord mono play decks (3), gd cond, $100 ea. P Wolf, 941-458-3777.

Dynamax CTR100 R/P, splice finder, stereo cart machine, excel cond, $700; (2) BE 2100 Series cart R/P mono, $300 ea; BE Phase Trak 90 player, $225. Danny, 318-445-4843.

ITC 3D triple deck stereo cart player, vgc, $500; Audicord A Series reproducers (2), fair cond; Audicord DL Series mono recorder, great cond, BO . C Gennaro, 906-932-2411.

ITC SP recorder/reproducer in working order, mono w/service manual, $125. D Nuechterlein, 517-652-6863.

CD PLAYERS

Want to Sell

Pioneer PD TM 3 triple six pack CD players, like new (14 avail), $125 ea. C Gennaro, 906-932-2411.

CONSOLES

Want to Sell

McMartin B-802 stereo console, gd cond, $800; Harris mono-5 console, gd cond, $350; Peavey CS-X2 crossover, $75. M Fitzner, 706-291-9766.

Soundcraft 400B 16x4x2 mixer, British, EQ, $2000. J Borden, 414-482-8954.

Tascam 1508 8 chnl stereo mixer, like new, manuals, $395/BO. J Thornton, 320-634-3213.

Yamaha Pro Mix-01 in gd cond w/digital out, $750. Mr Fair, 773-784-1558.

Ampex AM10 6x2 mixer, $295; Altec tube mixer 4 mic, 1 line, $695. J Price, 214-321-6576.

Ampex MR70 tape recorder console. J Price, 214-321-6576.

Quantum AM-168 & QM-120 16x8 audio board w/patch bay & console, $2500; Gately 16x8 audio board w/quad monitoring, XLR connectors on all inputs & outputs, in custom console, 4 effects returns, $800. A Baker, 317-925-7371.

UREI 1653, missing one fader knob, vgc; Sparta AS-15B in fair cond. H Kneller, 941-494-4111.

MCI/Sony 618, 24x24, $6.5K; Quantum 24x24, $4.5K; Soundcraft 600, 32x16, $5.5K, like new; Model 30, $295; 512, $950; 520, $1450. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

CONSOLES continued...

Want to Buy

Altec 1567A; Gates or RCA "The Yard" or BC6 in stereo or dual mono. M Schackow, 605-374-3424.

Arrakis 500SC console power supply. S Gray, 501-332-6981.

Gates Producer, stereo or similar, like Sparta stereo mixer w/pwr supply. D Sites, VOA, PSC 74 Box 25, APO, AE 09718.

DISCO-PRO SOUND EQUIP

Want to Buy

Yamaha BP-2 bass pedals. B Meuse, 650-969-2433.

FINANCIAL/LEASING SERVICES

LIMITERS

Want to Sell

Urei LA-10 1 chnl comp-limiter, like new, $500. M Schackow, 605-374-3424.

Orban Optimod 8000, recently recapped, gd cond. H Kneller, 941-494-4111.

Teletronics or Urei (LA 2, 3, 4, 1176), Gates, RCA, dbx (160-165), Altec, Collins. T Coffman, 619-571-1645.

Teletronix LA-2A's, UREI LA-3A's & LA-4's, Fairchild 660's & 670's, any Pultec EQ's & any other old tube compressor/limiters, call after 3PM CST, 972-271-7625.

Symetrix 528E mic processors, new cond, $225; CRL SEP800, SMP-800, SG-800 FM processors, excel cond, $350 ea or $850/complete; Orban Optimod 8100A/ST studio chassis, gd cond, $300. P Wolf, 941-458-3777.

Want to Buy

Altec 436C or 438C; Gates SA-39B. M Schackow, 605-374-3424.

MICROPHONES

Want to Sell

RCA 77DX in excel cond, $1200 or will trade for Urei 1176 or 1178. M Schackow, 605-374-3424.

OC White mic arms w/risers, gd cond, also one Luxe arm, gd cond. H Kneller, 941-494-4111.

Neumann U47, $3900; U67, $3300; U87, $1800; KM83 or 84 pairs, $1400; KM88s, $950 ea; RCA 77DX, $1200; BK5, $700; BK1A, $300. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

Want to Buy

Neumann U-89 in gd cond, will pay up to $1300. Mr Fair, 773-784-1558.

RCA 77 & 44 or other ribbon mics, dynamics & tube mics. T Coffman, 619-571-1645.

EV 666, also need desk stand, mic holder & connector for 666. D Sites, VOA, PSC 74 Box 25, APO, AE 09718.

RCA 77-DX's, 44-BX's, WE KU-3A's On-Air lights, recording lights. Top price paid. Fast response. Bill Bryant Mgmt, 2601 Hillsboro Rd, G12, Nashville TN 37212. 615-269-6131, FAX: 615-292-3434.

RCA 77-DX's & 44-BX's, any other RCA ribbon mics, on-air lights, call after 3PM CST, 972-271-7625.

MISCELLANEOUS

Want to Sell

Blank recording disks, 94 metal base, 6.5" & 50 fiber base 8" blanks, $125/all; McIntosh ML10C speakers, $200/pr; DOD R831 2-31 band mono EQ's, $150/both. C Collins, 414-363-9205.

Hosa 16 chnl multitrack snake, barely used, 10' long, $95/BO. J Thornton, 320-634-3213.

Motorola consolette 2-way base station w/T1600BM base station controller, gd cond, $300; RCA stereo/dual channel consolette BC-7A, gd cond, $600. M Fitzner, 706-291-9766.

RCA Stereophonic pre-amp Eqs (2) BA-36A, $60/ea; RCA 216160 stepper switch, new, $100. M Fitzner, 706-291-9766.

Magellan 2000XL, brand new, $100. P Wolf, 941-458-3777.

Numerous 2 & 3 pole circuit breakers for Challenger electrical panel. H Kneller, 941-494-4111.

Simpson 260 Series 5P AC/DC voltage & ohm multimeter, complete w/manual, test wires & carry case, mint cond, $160; Philips 22RH567 electronic crossover, 3 way speaker system w/built in pwr amps, motion feedback system, 22"h, 13"w, 11"d, matched pair, $400/pr. S Barker, 707-528-4055.

ADC TT (Bantam) Patchbays, $149; TT or 1/4" cords, $10; new short MRL test tapes, $229 for 2", 1/4", $79; Gates dual stereo tube limiter, $1200; Gates top level, $595; Allen & Heath GL2 rack mixer, mint, 14x4, $795; CBS Labs Audimax, $400 ea; tube preamps, $300-400; MX10 mixers, $795. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

Gentner G2500 Super Hybrid, $950. Gentner TeleSwitch $350, both items like new. S Kirsch, 516-763-1776.

Want to Buy

Capitol 16" music library transcriptions. J Hartt, 206-282-0720.

Harris 2.5K plate transformer, single phase for 3 kW plus rotron blower & overload relay board. J Bahr, 340-719-9336.

Jazz record collections, 10" LP/12" LP be-bop, swing, dixie, highest prices paid. B Rose, Program Recdgs, 228 East 10th, NYNY 10003. 212-674-3060.

Tuners: Sequerra, R.E.L. Precedent, Fisher FM1000, Scott 4310, Marantz 10B. Mike 619-271-8294.

MONITORS

Want to Sell

Used Mod Monitors, McMartin & Belar. Many to choose from, tuned & calibrated on your frequency, full guaranteed. Goodrich Ent. 402-493-1886.

Want to Buy

Belar/TFT FMM2 stereo FM monitor, AM mod monitor. J Black, 406-434-5241.

CONSULTANTS

RECEIVERS & TRANSCEIVERS

Want to Sell

McMartin AM receiver, $35. M Fitzner, 706-291-9766.

Telos Zephyr 9200 codecs, manual, rarely used, $3700/BO. J Din, 714-775-2340.

Comrex 2-line freq extender, xmtr & rcvr, $1995 for both ends. Steve Kirsch, 90 S Long Beach Rd, Rockville Centre NY 11570. 516-763-1776.

Want to Buy

McKay Dymek DA5, 6 or 9 rcvr directional antenna. J Hartt, 206-282-0720.

Marti 15/C composite STL receiver. J Bahr, 340-719-9336.

RECORDERS

Want to Sell

Ampex 350 & 351 tube audio electr/mic pre's, excel cond, BO. J Borden, 414-482-8954.

Ampex AG-600B r-r, fair cond, $300; Ampex AG-600B electronics only, no transport, $75; Ampex AG-600 tube type r-r, fair cond, $200; (2) ITC 750 Series r-r PB units, $100 ea. M Fitzner, 706-291-9766.

Pioneer PDR-05 CD rcdr w/box, manual, $450. D Kocher, 610-776-1455.

Revox A-77 1/4 trk in cabinet w/speakers, gd cond, $400. Mr Fair, 773-784-1558.

Revox A77 r-r tape rcdrs (2), fair cond, $175/ea; (3) Viking model S r-r PB decks, $26/ea. M Fitzner, 706-291-9766.

Tascam 32, excel cond, $600. M Schackow, 605-374-3424.

Tascam 38 8 trk rcdr, 50 actual hrs, new pinch roller, like new, manuals, r-r, $1275/BO; Tascam 32 2 trk rcdr, 50 actual hrs, new pinch roller, like new, manuals, $550/BO. J Thornton, 320-634-3213.

Ampex 350 r-r, mono w/Inovonics solid state electr rack mount, 7.5 & 15 ips, $300; Ampex AG-440B 1/2" 4 trk r-r in custom console, 7/5 & 15 ips, $1100; Scully 280-B mono r-r in custom console, 7.5 & 15 ips, $500; Ampex AG-440 mono r-r in custom console, 7/5 & 15 ips, $500. A Baker, 317-925-7371.

Dokorder 1140 4 trk 1/4" r-r, 10", 7 & 15 ips, excel cond, $150. J Mindy, 716-377-1880.

ITC Premium Series stereo cart recorder in new cond, $500. C Gennaro, 906-932-2411.

MCI JH110C 1" 8 trk rcdr AL-3, $2500; MCI JH1 4 trk 10B E/C, $1250; Ampex 440 stereo w/Ampex mixer, excel cond in console, $750; Ampex 440C, in console, servo motor 4-speed E/C, $995; Ampex tube rcdr 1/2" stereo 440 transport, $3500; MCI JH110A stereo E/C in console, $495; MCI JH110B stereo E/C in big console, $795; (2) Ampex AG350 R/P electronics, $75 ea; Ampex mic preamps tube transistor, $75; set of Ampex 8 trk ERP heads, $750. J Price, 214-321-6576.

Otari ARS-1000-C (3) automation stereo PB decks w/25 Hz tones, $500 ea/BO. J Bahr, 340-719-9336.

Revox B-77 fair cond; Ampex 350/440, capstan motor 3-3/4 & 7-1/2 ips, cond unknown. H Kneller, 941-494-4111.

Teac A-3300SX stereo 2 trk r-r deck, 15 & 7.5 ips, gd cond, $300; Tascam 44 4 trk r-r deck, 15 & 7.5 ips w/vari-pitch, gd cond, $750. J Roper, 812-877-2663.

Telex 6120, 1-3 stereo cassette duplicator, gd but needs heads, $1200. C Juranis, 610-374-6832.

Ampex 4 trk tube deck, $2500; stereo 351 (recond), $1800; Akai Adam, new, digital 12 trk, $3500; MM1000-16 w/new heads, $4500; Otari MTR10-4, $3500; Ampex ATR102s, search to cue, $495; Ampex locator for ATR or 1200, $895; MCI 110C-8, $3.5K; Tascam 85-16 recond w/dbx, rc & loc, $3K. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

Want to Buy

MCI JH-110 A, B, C parts, whole machines. J Borden, 414-482-8954.

Stellavox rcdrs & parts. C King, 860-665-2881.

Studer A-80 1/2" MK I, II or III rcdr. Mr Fair, 773-784-1558.

Ampex 351-354 electronics. J Price, 214-321-6576.

King Audio 685 semi-auto cassette loader. C Juranis, 610-374-6832.

Ampex ATR100 tape-recorders for parts. Circuit cards, heads, motors, machine parts, or electronic parts. Call 818-907-5161.

Ampex PR10 tape recorders. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

REMOTE & MICROWAVE

Want to Sell

Andrew GP5 F890A 8' grid microwave dish, new; Andrew 33682 male flange adaptor to 1/2" cablewave; Scala CA5-150 S/X yagi antennas, new; Andrew 015870003 (6) grounding kits, 1/2" cablewave. J Black, 406-434-5241.

Comrex 2Xp encoder, $1000. Tom, 1-800-860-9771.

Comrex Nexus ISDN Codec, 2 yrs old, used one hr weekly, mint cond, $1500. T Byrd, 423-899-6417 x254.

Gates M-5864 remote control studio unit & Harris AM-80 remote panel, $250. M Fitzner, 706-291-9766.

Gentner T6100 telephone hybrid, $150; Gentner SPH4 telephone hybrid, $175. M Williams, 417-781-1313.

MCI xmtr remote control phoneline touchtone, $250. D Brabandt, 812-738-9622.

Harris nitrogen pressure regulator, tested, works OK. H Kneller, 941-494-4111.

Gentner Microtel telephone line mic coupler, gd cond, $85. P Wolf, 941-458-3777.

Marti AE2 filter in 19" rack mount; Marti CR10 RPU rcvr, 161.7 & 161.64, excel cond, beige & recently retuned at Marti factory; Marti MR30/150-170 tube rcvr for parts only. H Kneller, 941-494-4111.

TFT 7610-C studio remote wireless unit, $850/BO; TFT 7601 studio remote control wireless unit, $850/BO. J Bahr, 340-719-9336.

Want to Buy

Gentner SPH-5 telephone hybrid. T Wortmann, 402-371-0780.

SATELLITE EQUIPMENT

Want to Sell

Want to Buy

Harris nitrogen pressure regulator, tested, works OK. H Kneller, 941-494-4111.

SOFTWARE/ DATABASES

Want to Sell

STATIONS

Want to Sell

Two AM radio stations in Tennessee near Nashville, one daytime, one 24 hr, both new Solid State xmtrs, heart problems, must retire. 615-797-9785.

Want to Buy

We buy CP's for new stations and/or upgrades. Call: 888-697-6630, fax 843-881-4436 or email: ams@pdn.net.

Network looking for stations! dark, brokered, AM & FM, fax details to programming: 954-735-0370.

STEREO GENERATORS

Want to Sell

Moseley SCG3T totally refurbished, works great, $700/BO. J Thornton, 320-634-3213.

Motorola 1300 C-Quam AM stereo gen w/model 1310 stereo monitor, $1950. M Williams, 417-781-1313.

Want to Buy

Harris stereo generator modules for MS or MX15 exciter or an MS-15R stereo generator. H Kneller, 941-494-4111.

TAPES/CARTS/ REELS/CD'S

Want to Sell

Maxell KCA 60 3/4" u-matic video cassettes, like new, (50) 60 min length, $25. D Nuechterlein, 517-652-6863.

Scotchcart II, 300 3.5 min, in almost new cond, $1 ea +shpg. B Lord, 206-932-4839.

DISTRIBUTOR DIRECTORY

The following distributors serving the broadcast industry would be glad to help you with any of your requirements.

Want to Buy

Old Tamburitza recordings, especially on Balkan label. M Stosich, 630-960-9137.

TELEPHONE EQUIPMENT

WE BUY AND SELL BUSINESS TELEPHONE EQUIPMENT. DOMINION TELECOM. 800-998-3281.

TEST EQUIPMENT

Want to Sell

Potomac FIM-71 field strength meter, excel cond, seller will pay shpg C.O.D., $7400/firm; IFR 1100-S RF spectrum analyzer, goes to 1.2 Ghz, w/built in RF & AF sig-gen, multimeter accessory & manual, excel cond, $4200. D Kidwell, 512-258-0933.

Powerstat variable transformer type 1266-D, 240 V In/0-280 Out, $250; Powerstate variable transformer type 1156-D 115 V In/0-135 Out, $200. M Fitzner, 706-291-9766.

RCA WO-91B oscilloscope, $50; HP 332A distortion analyzer, $400. M Fitzner, 706-291-9766.

HP 8444A tracking generators, $750 +shpg; HP 214A pulse gen, $165 +shpg; Tektronix 508 1 GHz counter, $175 +shpg; HP H383A variable attenuator, $160 +shpg. J Baltar, 207-623-1941.

TUBES

Want to Sell

AMPEREX, EIMAC, RCA, SVETLANA 4CX250B, 4CX250R/7580W, 4-400C, 3-500ZG, 3CX3000A7, 807, 811, 833C. Westgate 800-213-4563.

TURNTABLES

Want to Sell

Dual 1228 & 1229, also Garrard A2, $50 ea. C Collins, 414-363-9205.

Protec SA270 (3) nearly new pro tone arms, $75 ea. M Fitzner, 706-291-9766.

Shure M232 tonearms (5), 12", 2/head shells, $35/ea; (2) Russco Studio Pro model B TT's, gd cond, $60/ea; (4) Russco Cuemaster TTs, $35/ea. M Fitzner, 706-291-9766.

Shure M64 T-T pre-amp, $25. M Fitzner, 706-291-9766.

Sony PSX-800 Biotracer T-T. J Hartt, 206-282-0720.

Transcriptor Skeleton, vintage audiophils TT, all glass, 10lb platter, made in Ireland, low hrs, $500/BO. J Thornton, 320-634-3213.

Stanton 310 TT preamp, gd cond; Technics SP-25 w/arm & ATI P-1000 preamp, gd cond; Harris IC preamps, complete, cond unknown. H Kneller, 941-494-4111.

Technics SL-1200MK-2, OK cond, $100 ea or $150/both. P Wolf, 941-458-3777.

Want to Buy

Shure 3012R 16" tonearm. J Hartt, 206-282-0720.

SERVICES

TRANSMITTERS

Want to Sell

Collins 830-D 1 kW FM w/2 exciters, one is original Collins, the other is McMartin B-910, both working, currently used as backup on 104.9, have spare (new) PA tube (4CX1000A) & manuals, u-haul, BO. D Land, 618-842-2159.

Gates BCP5P2, circa 1962, on 1320 kHz until 8/98, spares, manuals, etc, $2700. C Cook, 931-728-1320.

Harris Gates 1000/250 W tuned to 1550, not working, gd for parts, $500. D Brabandt, 812-738-9622.

Harris MW50-C AM xmtr, excel working cond when removed, $35,000. J Weitzman, 202-682-3536.

Marti M-30BT VHF remote xmtr, $350. M Fitzner, 706-291-9766.

QEI FM1-5000 1991 xmtr w/QEI 695 exciter & spare kit, great cond, BO. G Marshall, 732-224-2470.

RCA BTF-1E 1 kW complete w/original BTE-10C exciter & BTS-1A stereo gen, BO. M Fitzner, 706-291-9766.

Transmitter harmonic filers (2), 40 KW rating ea, super clean, $900/ea or $1500/both. D Kidwell, 512-258-0933.

Collins 310Z2 exciter for parts, no manual. H Kneller, 941-494-4111.

Collins 820D-2 1 kW AM on 1310, gd cond. S Gray, 501-777-8423.

Harris 2.5K, less exciter, needs plate transformer, blower & overload relay card, BO. J Bahr, 340-719-9336.

Harris FM-5CD, less exciter, like new, $16,500. P Wolf, 941-458-3777.

QEI Quantum 300E 300 W solid state xmtr w/synthesized exciter, excel cond, $4800; 100' Cablewave 1/2" foam line w/Type N fittings, excel cond, $200. C Gennaro, 906-932-2411.

Ricks College (KRIC), Rexburg, ID will sell radio xmtr/site including Continental 816R4 FM xmtr, 300' Pi-Rod guyed tower, Orban Optimod, QEI-691 mod mon, STL xmtr & rcvr, Moseley remote control, 12'x20' steel bldg, racks, cables, etc (all or part). B Wilson, 208-356-2309.

Want to Buy

Low pwr FM stereo tube xmtr, cond not important. C King, 860-665-2881.

LPB older tube-type model, AM low pwr xmtr w/power line coupler & instruction manual, 5 W or so. D Sites, VOA, PSC 74 Box 25, APO, AE 09718.

McMartin AM/FM xmtr, any model, exciter or stereo modules. Goodrich Ent., 11435 Manderson, Omaha NE 68164. 402-493-1886.

EMPLOYMENT

HELP WANTED

Radio is changing. Will you join in or watch from the sidelines?

Do you know your stuff?

Prophet Systems, the leader in digital audio broadcast systems, might be the place for you. Opportunities for tech support, programmers, engineers and sales. Great salary and benefits.

Check out listings on the web: www.prophetsys.com or call (308)284-3007.

PSI Prophet Systems IN. AudioWizard™ for Windows

'nuff said!!

CHIEF ENGINEER needed for 2 FM, 1 AM radio group in Norfolk, VA. AM is NDA, FM's are Class B and C. Two transmitter sites, one studio location. We need a dedicated professional with experience in RF and studio maintenance, troubleshooting, repair, and projects. The group has a part-time assistant engineer. No phone calls. Letter and resume to

Dave Paulus, General Manager, Tidewater Communications, Inc., 870 Greenbrier Circle, Suite 399, Chesapeake, VA 23320. Fax to (757) 366-0022.

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Engineering Director, (970) 949-0266. All applications held in confidence. E.O.E

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Seasoned, dependable AT, production, news anchor like ne, attracts loyal listeners & sponsors. Salary above poverty level appreciated. A McKuen, 513-777-8423.

Baby broadcaster seeking a shot to show off, trained with the basics, just need a chance, prefer Oklahoma. John, 405-630-5091.

Hard working, friendly, outgoing CE seeks employment, FT, PT, contract work, NE, TV/FM/AM/cable station, exper CET & FCC licensed, avail immed. M Rakoff, 718-969-5224.

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ACTION-GRAM

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Title _____

Company/Station _____

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Are you currently a subscriber to Radio World?
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I. Type of Firm

- ☐ D. Combination AM/FM station
- ☐ A. Commercial AM station
- ☐ F. Recording Studio
- ☐ K. Syndicators/Station Providers
- ☐ B. Commercial FM station
- ☐ C. Educational FM station
- ☐ E. Network/group owner
- ☐ G. Audio for Video/TV Station
- ☐ 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) _____

WTS ❑ WTB ❑ Category: _____
Make: _____ Model: _____
Brief Description: _____
Price: _____

WTS ❑ WTB ❑ Category: _____
Make: _____ Model: _____
Brief Description: _____
Price: _____

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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.

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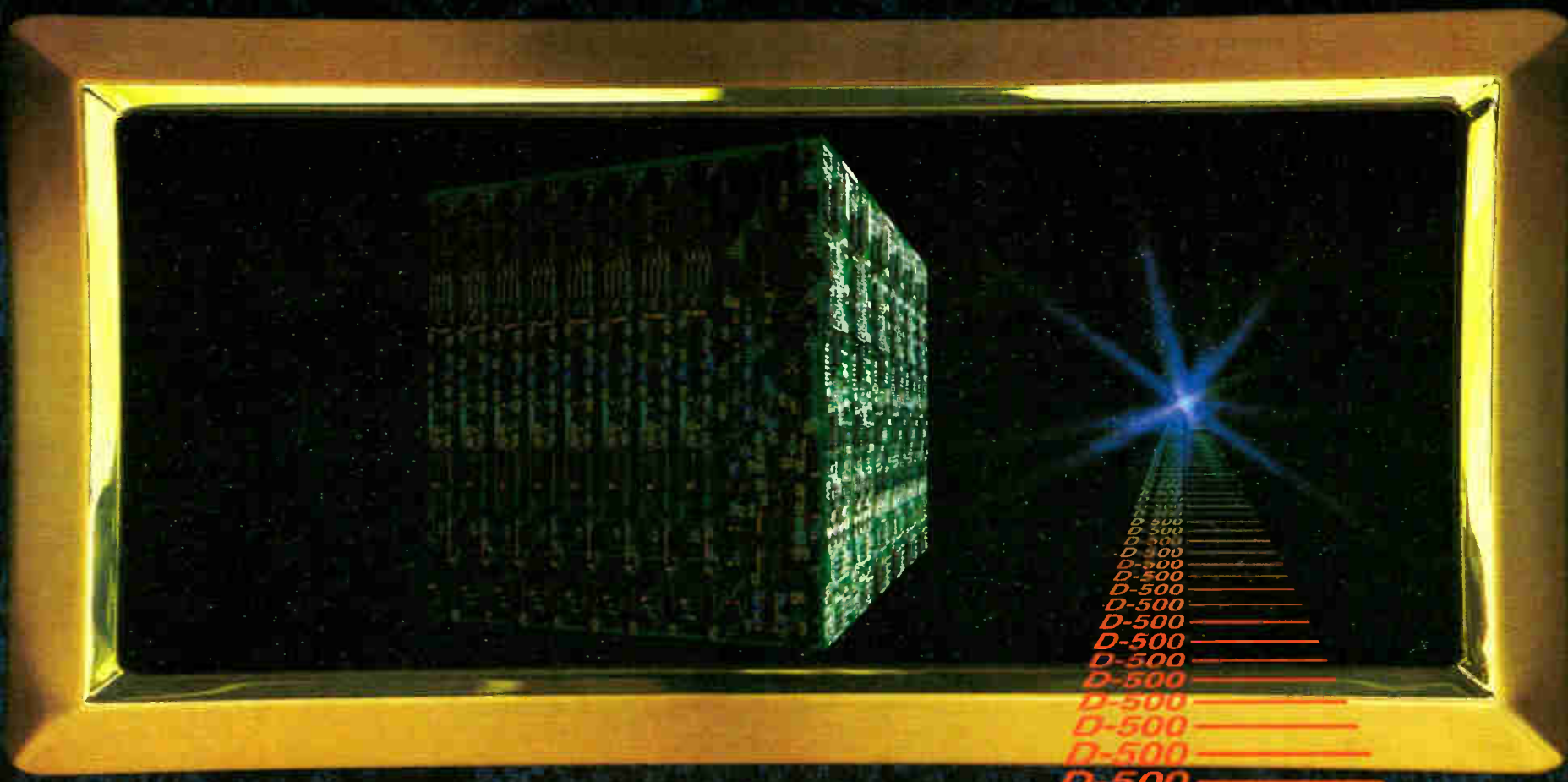

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