Radio World®

Vol 14, No 6 | Radio's Best Read Newspaper | March 28, 1990

Three-Year Rule May Return

by John Gatski

Washington DC Concern about the radio station buying and selling frenzy may prompt legislation to restore the three-year ownership rule the FCC abolished in 1982, according to congressional sources.

Senator Al Gore (D-TN) could introduce a bill this spring reinstituting the three-year ownership rule for radio and television, according to Gore spokeswoman Laura Trivers.

But, she warned, the legislation "has been pushed back several times" and there is no guarantee it will be introduced.

If introduced and approved by Congress, the bill would overturn one of the hallmark decisions of the era of deregulation which many have blamed for the economic ills facing stations today, including speculative buying which has caused station prices to skyrocket.

The rule's repeal was based on the philosophy that if stations were doing a good job serving their communities, owners should not be forced to operate them for a minimum time period.

Original arguments against the rule's elimination centered on public interest concerns. At the time the deregulatory move was first proposed, those who wanted to hold onto it feared a loss of public affairs programming.

The NAB opposes the reinstitution of the three-year rule, according to NAB spokeswoman Susan Kraus. "There is no data that there has been a decrease in public affairs programming since the rule was eliminated," Kraus said.

But others, especially on the business side of the industry, support the return of the three-year rule for other reasons. The rule could have a stabilizing effect on the industry, according to Doug Sheer, co-director of Sheer and Chaskelson Research Inc., which monitors trends in the broadcasting equipment industry.

Sheer said the station buying and selling frenzy that occurred during the Reagan Administration and has continued even today contributed to the "disruption of the normal equipment replacement cycle."

The buying/selling frenzy has slowed down over the last year because buyers have learned

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Short EBS Tone Tested

by Charles Taylor

Washington DC If field tests by the Michigan Association of Broadcasters turn out as intended, broadcasters can look forward to a shortened version of the traditional Emergency Broadcast System attention tone.

A petition for rulemaking is before the Commission that would shorten the 20-second tone to a minimum of eight seconds.

According to a statement by broadcast consultant Grady Moates in the petition filed by the NAB, "Now that the public has become familiar with the tones, their length creates a boredom factor. Many listeners assume that the tones mean another test and will punch out of a station before hearing the message following the tones."

Currently, the Michigan Association of Broadcasters (MAB) is testing an eight-second version of the traditional test tone at two FMs and one AM in Lansing.

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Martin Convicted of Money Laundering

by Charles Taylor

Council Bluffs IA The former president of RF equipment manufacturer McMartin Industries has been convicted of laundering private funds in a local drug ring.

Jerry Martin was found guilty in February of accepting $15,000 in profits from a marijuana ring in exchange for private stock he owned in McMartin, according to local reports. The offense took place in the summer of 1987.

Sentencing by the Federal District Court in Omaha, NE, is scheduled in May. Martin could face a maximum penalty of 20 years in prison and a $500,000 fine for the laundering charge.

Martin was acquitted in a February trial of a second charge of money laundering and conspiracy to distribute marijuana. But he has yet to stand trial on another charge—on distribution of cocaine.

For the company, the conviction prompted a sense of relief—a hopeful end to some challenging times, said McMartin VP John Miller.

Lacked focus

"With the company president under federal indictment, it just didn't seem like we had the company focused on our customers or in the interest of where we wanted it to go," Miller said. "We were definitely affected by (the trial). I think there was a loss of direction during the last part of last year.

"When you've got a guy that's the final decision maker who's scared to death about going to jail or getting fined, there are problems. We kept hitting stumbling blocks with decisions on sales and decisions on marketing."

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Indecency Ban Panned

by Charles Taylor

Washington DC Amid a shower of comments, little support was expressed for a Congressional order that the FCC ban indecency over the airwaves 24 hours a day.

The comments came in response to a notice of inquiry issued by the Commission in the hope of developing a public stand supporting the 24-hour ban passed by Congress in 1988.

The FCC adopted the ban in December 1988, but its effective date was stayed by the US Court of Appeals in Washington in January 1989 after an outcry by broadcasters.

They still feel the same

Judging comments filed on the issue, contained in MM docket 89-494, the broadcasters' tenor has not changed.

"Indecency is constitutionally protected speech," said a group of 17 media leaders in a joint filing, including the NAB and NBC, CBS and ABC. The groups asserted that the law is unconstitutional because it reduced the adult population to seeing or hearing only what is fit for children.

The commenters said that so-called indecency encompasses a broad and diverse range of potentially socially valuable material, including news and informational programming, drama, motion pictures, modern dance and satirical material.

"Blanket bans on indecent speech in the cable, telephone, print and broadcast media have repeatedly been struck down in court," they said.

The groups added that the FCC failed to prove that it has a compelling reason for taking the place of parental decision-making and has chosen the least restrictive means of regulation: "This is accomplished by limiting the broadcast of indecent material to times of the day when parents can supervise their children and ensure that they don't have access to programs parents don't want them to see or hear."

They also presented documentation stating that no evidence exists that children suffer harm from exposure to indecent broadcasts.

Another strong statement came from Pacifica Foundation, which said that the FCC's support of the ban was born out of an attempt to improve relations with Congress. "This is not about children or the protection of children, but politics and the protection of the FCC from Congressional criticism," it said.

"The First Amendment forbids such a result," Pacifica reminded the Commission.

Preserve our moral fiber

One of those commenting in favor of the ban was a group of 21 religious organizations, with statements prepared by the American Family Association and Children's Legal Foundation.

According to the groups, the 24-hour ban would help preserve the moral fiber of the nation, maintain the integrity of the American family and show the public that the government respects the family unit.

"The implementation of the 24-hour prohibition will send a clear message to young people that America still has certain standards of acceptable behavior. There is still a right and a wrong," the comments said.

The groups added that indecent programming also impedes marriage stability: "The repeated and regular viewing of sexually oriented material interferes significantly with the marital relationship. It breeds discontentment with and unrealistic expectations of the spouse. To permit some indecent broadcasting will only serve to drive a wedge between a husband and wife."

Also heralding the ban was Bonneville International Corp., which offered that the best way to control indecent broadcasting would be a voluntary code of conduct within the industry. But because that is not likely, "the FCC must fulfill its statutory responsibility and prohibit indecency around the clock."

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Martin is Convicted

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The ordeal was all the more frustrating because the company already was in the midst of re-proving itself after original owner Ray McMartin was forced into a Chapter 7 bankruptcy four years ago. In November 1986, a group of investors purchased the defunct property, took it public and made a fresh start. Martin was hired as president at that time.

"Things were starting to look really good again and this thing hit us and brought us back down," Miller said.

Definite changes ahead

Martin was asked to resign in November and for the time being, the company is run by a three-member Board of Directors. A new president is pending election.

With that, Miller expects some definite changes in the company's philosophy and its reputation in the industry.

Already, McMartin has restructured its pricing policy: "We've substantially reduced the prices of a lot of our products that we believe were incorrectly increased by Martin to begin with," Miller said. "Secondly, we're looking into markets we want to penetrate and how we want to penetrate them.

"We want to change the image of the company to where people can say we're straight up, we're honest, we're credible people. Our backlog has tripled since January and we've started getting some good people on board and getting things moving again," he added.

"This company has already gone through two tough presidents," he said. "No more, no more."

For information on McMartin Industries, call John Miller at 712-366-1300.

3-Year Rule Considered

(continued from page 1)

that stations are not the type of investment that can be turned into quick profit, he added.

W.N. Cate, president of the Chapman Associates brokerage firm, said he would like to see a one-year or 18-month holding limit rather than three years.

Although a three-year rule would be targeted to stop the "quick-flip artists" from buying a station and then selling it immediately, the number of those transactions is exaggerated, Cate said.

"I would prefer not to see three years, but it would not be the end of the world if they did pass it," he added.

For more information, contact Sen. Al Gore's office at 202-224-4944, Susan Kraus at the NAB, 202-429-5480, Doug Sheer at Sheer and Chaskelson Research Inc. at 212-532-5511 or W.N. Cate at Chapman Associates, 404-998-1100.

AMs Asked to Air NRSC Radio Ads

by Alan Carter

Washington DC AM broadcasters are eager to give free air time to promote the improved NRSC AM radios with wider bandwidth which will carry an NAB/EIA yet-to-be announced certification mark.

Initial response to a late February mailing by NAB showed that 674 AMs have volunteered to air as few as ten or as many as 30 or more announcements per week publicizing the new radios and the mark. The announcements are not to endorse a specific manufacturer but radios in general which will have the mark.

"Your assistance in providing this necessary link to consumers will permit the industry to attain true and complete technical improvement of the AM broadcast band, from broadcaster to listener," NAB CEO Eddie Fritts told AM stations in a letter asking them to participate.

Out of 677 AM stations which sent in cards responding to the letter, 307 have said they would air 30 announcements per week for the improved receivers, according to NAB Science & Technology. Only three stations so far have said they could not participate.

Michael Rau, NAB VP of Science & Technology called the initial response "tremendous" and said his department would continue to track stations' responses.

"It certainly helps NAB's position when we sit down at the bargaining table with receiver manufacturers," Rau said. He estimated that "we'll be able to offer a value of $50 million worth of free publicity" for the improved and certified radios.

NAB will supply stations with the announcement, which can be customized for local promotions and tie into advertising from local retailers.

For information on the certification program, contact the NAB Science and Technology Department at 202-429-5346.

Sitting On Top of The World

by Judith Gross

Falls Church VA The world looks a lot different when you're suspended 180 feet **in the air**.

A lot of you know this already, I mean, some of you are old hands at this and all. But it was my **first** time.

All these years in radio and many hours at transmitters and not once did I ever actually get to **climb a tower**. They always looked pretty intimidating and to tell ya the truth, I'm a wee bit skittish about **heights**.

But there I was, at **WAEB's tower**, having been invited to observe the latest round of **multipath tests** (see story, this issue, page 13). Cliff and Ronnie, the guys from **D&R Communications Services** were making it look so easy sliding up and down on the motorized winch which Donny was carefully operating.

Then CE **Harry Simons** said, "Come on, it's a whole 'nother world up there." So I don't know, maybe the cold got to my brain, or maybe I knew I'd probably never get another chance like this. Up I went.

Gotta tell you how nice all those guys were. **ERI's Tom Silliman** loaned me a pair of quilted coveralls (it was January and had snowed). Don made sure I was strapped securely into the safety belt-sling and saw to it that I didn't get a **bumpy ride**.

Cliff preceded me and Ronnie was beneath to help me hang on. Harry took the pix. Was it fun?

As Harry said, there's the whole universe below you. **Breathtaking view**. The sound of the wind from 180 feet above the **Lehigh Valley**. The swaying of the pole where the antenna was mounted. Was I scared?

Well, Ronnie had to remind me to pry my fingers and toes from the pole when it was time for the smooth slide down. Now who says *JG* isn't on **top of the story**?

Speaking of being up on things, I knew it was going to happen. Late word keeps trickling in on new products at the **NAB show**, scheduled to start any day now in Atlanta.

How about a **digital audio cart machine**? We're talking a removable, low-cost medium in digital recording, which its designers are saying will be price competitive with analog. That's all I know for now, go see it at booth 7201. The company is **360 Systems**.

National Supervisory Network has a few other things up its sleeve besides transmitter control via satellite. Go take a look at a CD quality **audio recorder/player** as the company gets into desktop production. They're in booth 7022.

And along with a new owner, **ITC** has a new name for its cartridge. The cart, which previously sported the Scotch name owned by 3M, will now be the **ITC CART II**. It's made the same, looks the same, is the same, except for the name. See it, and the company's new **Series One** cart machine, at booth 3422.

Modulation Sciences has come up with an instrument that measures occupied bandwidth according to CCIR standards. The company will have it and a paper with data gathered on it at NAB, booth 4802.

And, OK, you say you're a **golf pro**? Want to get in a challenging game and take in the exhibit floor at the same time? **Bradley Broadcast** says it will have "the most challenging" game of golf at its booth, 6354. Check it out and let me know your handicap.

Always 'round about this time we hear of all kinds of activity with various and sundry industry players. Now comes word from **Howe Audio** that the company has closed its doors. Company officials are trying to find an interested party to manufacture and market the **Phase Chaser**, a popular item. Let you know more soon as we hear it.

It was pretty gratifying to see the response **NAB** got to its first mailing asking AM stations to air spots for improved **NRSC receivers** with the certification mark.

The mark itself is being held in the **utmost secrecy**, to protect a pending copyright. (Tried to have a sleuth pour through NAB's garbage to discover their choice, but they must have Ollie North'd it. Confetti, anyone?)

Anyway, in just the first month after the letter went out, **674 AM stations** said "Yeah, boy, we'll air those announcements, by golly gee whiz." That's what I call getting into the spirit. AMers want those radios (heck, we all do) **badly** enough to give away their most valuable commodity—air time—to get them.

Hope you receiver manufacturers are listening. It's **free advertising**. Where else could you get a deal like that?

And don't forget, by the way. The **deadline** for complying with NRSC is only three months away, **30 June**.

Loved a quip from FCC Commissioner **Jim Quello** during the NAB's State Leadership Conference in mid-March. The esteemed commissioner, who has been with the FCC for more than 15 years told the gathering, "I spent 27 years in radio, and I think I had a **little more fun** with that than at the Commission." Know exactly how you feel, Jim.

Oh yes, and my favorite industry gentleman, **John Battison**, asked me to let you know that he's soliciting papers for October's **SBE** national convention in St. Louis. Got a paper to present? Give him a call at 419-994-3849.

You mean we're already thinking about the **fall** shows? I'm just about to head out to the NAB spring convention.

Whoops—they call it a "safety" harness?

Up, up and away!

Got my Nikes and my Alka-Seltzer. Catch you when I get back from **Peachtree country**.

Heard a juicy tidbit? Spill your guts to **Earwaves** *by faxing JG at 703-998-2966, writing to PO Box 1214, Falls Church VA 22041, or calling 703-998-7600. Who knows, you could win a coveted* **RW** *mug.*

READERS FORUM

If you have comments for *Radio World*, call us at 800-336-3045 or send a letter to Readers' Forum (Radio World, Box 1214, Falls Church VA 22041 or MCI Mailbox #302-7776). All letters received become the property of Radio World, to be used at our discretion and as space permits.

Letting loose the RF genie

Dear **RW**:

Your recent article about problems resulting from the proliferation of RF lighting devices left me biting my tongue to resist saying "We told you so." While representing our clients before the FCC in commenting on the RF lighting docket, we stated on numerous occasions that the emission standards which RF lighting devices should be required to meet should be equal to other unintentional radiating devices like garage door opener receivers and home security consoles.

Those standards have proven to be effective in meeting the needs of AM broadcasters. Unfortunately, the FCC did not see it our way even upon reconsideration.

The persons and groups who spoke for the broadcasters did little to help on reconsideration. Engineering studies broadcasters put before the FCC were not convincing. End of life phenomenon and variance in production quality were practically ignored. Demonstration of need for the devices was speculative at best, particularly in view of the cost in residential electrical interference.

The result was an open door for large electronics manufacturers to begin production of millions of RF lighting devices, which could be expected to cause interference to AM radio reception.

When we met with the representatives of the RF lighting industry, they had not understood our client's objection to the proposed standards. Why did our client want parity in FCC required emission standards between RF lighting devices and other consumer electronic devices? We explained that our client wanted to protect the operations of its consumer devices, the same as the AM broadcasters wanted to protect their authorized use of the spectrum.

Despite our client's best efforts, and without a sustained, vehement objection from the broadcasters, the FCC let the RF lighting genie out of the bottle. The tricks it plays now in residences all over the country can be expected to increase rapidly as RF lighting devices continue to proliferate.

Because broadcasters did not succeed in limiting the impact of RF lighting devices, it is now incumbent on broadcasters to inform the public about the threat to their reception of their favorite AM programming.

Robert H. Schwaninger, Jr., Esq.
Brown and Schwaninger
Washington, DC

In support of long-wave

Dear **RW**:

Even though I am now involved in shortwave broadcasting I still like to keep up with current happenings in commercial AM/FM radio. I read with interest the "long-wave AM solution" letter from Donald M. Sites in your 24 January issue. I have also considered the long-wave radio idea. It might be the best place for true regional clear-channel stations.

I was particularly pleased to read of his mention of "FMing" the AM band. There was also mention of FMing the AM band in a recent installment of *JG's Earwaves*. A couple of years ago, George Yazell, a retired professional engineer in Florida, came up with not only the idea but the method for a complete FM signal, stereo and subcarriers included, on the AM band. The system—NFR, for Noise Free Radio—works, but does not have support of the NAB. I have noted with awe how fast the NAB has been able to work toward AM improvement.

Mr. Sites is right. "Other solutions already proposed are merely bandages on a wounded and dying public service." Perhaps a long-wave band would be a good way to implement the FM method.

Tim Coucke, Staff Engineer
Shortwave Station KNLS
Anchor Point, AK

Down with simulcasting

Dear **RW**:

I must agree with Keith Harris in his 7 February letter to **RW** in his comments on eliminating simulcasting.

I have noticed in my travels from coast to coast and border to border that more and more stations, even in the largest cities, are simulcasting.

Maybe in the largest cities where there are scores of radio stations there is no great loss of choices. But in the smaller, remote markets it gives listeners only one choice of music.

Whenever I had a combo I always programmed them separately and it proved financially rewarding.

I think the FCC should mandate that if a station simulcasts, one of its licenses should be up for grabs.

As far as AM is concerned, I often find myself listening to AM as I travel because it provides me the news and information I desire. If I am listening to FM and find no news in an hour, I'll switch to AM and then often stay there, if I find the programming interesting.

But even then, I often look for NPR, a form I once despised, because I get the news without a lot of "howdy dowdy." There are lots of so-called news-talk stations in this country, but I only find a few which really give you the news.

So many stations use so much comedy that you really don't get much news. If that is what it takes to attract listeners, I feel sorry for our country.

T.S. Storck
Stockton, CA

Recruit the youth

Dear **RW**:

I am writing this letter in response to a letter in the *Readers Forum* section of the 7 February **RW** concerning the shortage of broadcast engineers. This letter suggested that the solution to the shortage of engineers is to maintain the jobs of veteran broadcasters.

While this may or may not be the answer to our short term problems, it is obviously not a permanent solution. The only place from which you can form a lasting supply of technical help is our youth. The problem is that our youth have little or no contact with the broadcast industry.

While manufacturers send recruiters to technical schools, offer internships and higher pay, the broadcast industry waits for qualified help to knock its door down.

If we're going to receive our fair share of fresh techs we'll have to offer internships, station tours, be willing to speak at technical schools and, in general, generate an interest in the field of broadcasting.

Internships have long been offered by the programming department but have been put down by engineering managers as a waste of valuable time.

It is true that interns and neophyte technicians do require extra attention and guidance, but with a little time and training you'll find the free assistance to be quite helpful. In addition to getting free help you may even spark their interest enough that they'll pursue broadcasting as a career.

Even if the local colleges and tech schools don't offer credit hours for internships, many engineering students would jump at the chance to get some experience, even without pay.

If you've never had an intern on board, try one for a semester, five or ten hours a week. I think you'll find that it's a rewarding experience.

Jeff Littlejohn, CE
WYSY AM-FM
Chicago, IL

New Look At An Old Rule

The return of the three-year holding rule for stations is a possibility that is sure to spark heated debate in the months to come.

While the demise of the anti-trafficking regulation has been blamed for many industry ills, it is difficult to point to specific instances of harm.

Still, there probably have been situations where a get-rich-quick owner has avoided necessary equipment upgrades, jeopardizing the quality of the station's product.

And while the radio equipment industry's sales haven't suffered unduly as a result of it, the rule's elimination has in many cases altered the normal equipment replacement cycle.

The original intent of doing away with the rule was to allow for greater diversity in station ownership and service to the community.

But the speculative effects it has had on station prices have turned some of them into little more than a trading commodity—broadcasting in the public interest, or even the best interests of the staff—notwithstanding.

It has driven station prices beyond the reach of the "mom-and-pop" owner or the modest investor with a love for the business of radio.

It may be that some sort of compromise approach to anti-trafficking legislation would solve the problems the elimination of the three-year rule created.

Small, medium and large markets could be treated differently, or some sort of sliding one-to-three year program could be put into effect.

One novel approach might be to reinstate some form of the rule for FM stations, which have been the object of many transactions, but not for AM stations, which might increase in value as an investment if there was a limit on FM trafficking.

In this way reimposing the burden of regulation would go beyond the rhetoric and criticisms of the moment to aid the industry in a larger sense.

While it is difficult to reinstate a rule after a long period of deregulation, both Congress and broadcasters should be weighing benefits against cases of actual harm and seek a solution that is in both the long and short term interests of owners, staff and the public. —**RW**

Radio World®
Vol 14, No 6 March 28, 1990

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Radio World (ISSN: 0274-8541) is published semimonthly (except February, which has 3 issues) by Industrial Marketing Advisory Services, Inc., 5827 Columbia Pike, Suite 310, Falls Church, VA 22041. Phone: 703-998-7600, Fax: 703-998-2966. Second-class postage rates is paid at Falls Church VA 22041 and additional mailing offices. POSTMASTER: Send 3579 forms and address changes to Radio World, P.O. Box 1214, Falls Church VA 22041.

Free subscriptions are available upon request to professional broadcasting and audiovisual equipment users. For address changes, send current and new address to RW a month in advance of the above address. Unsolicited manuscripts are welcomed for review; send to the attention of the appropriate editor.

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Radio World
April 11, 1990

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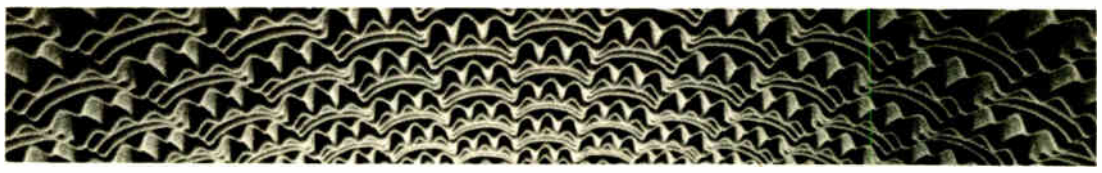

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Laser Turntable Now a Reality

by John Gatski

Sunnyvale CA Radio stations are among the potential buyers targeted for Finial Technology's laser turntable that finally is available in the US—for a mere $32,000.

After several years of prototypes, postponements and a company buyout of Finial (now owned by Carillon Technology, Inc.), the "off-again, on-again" Finial LT-1 laser turntable is here, according to the company.

The Finial laser turntable, which debuted at the Audio Engineering Society Convention in 1988, works like a compact disc player, but the laser reads the record grooves of 33 and 45 rpm records instead of digital "pits."

About two years ago, the company discontinued plans to produce the laser turntable because it was very expensive to manufacture and the company felt the suggested $3500 retail price would not offset those costs.

According to Finial PR spokeswoman Fran Dym, however, outcry from audiophiles and record collectors and a new marketing plan that included a $29,000 price hike, made conditions more palatable to enter the market again.

The laser turntable is now being marketed to radio stations, archivers, libraries and individual collectors (the ones who can afford it, of course), Dym said.

The technology is based on a microcomputer/tracking mechanism and laser servo that reacts to the record grooves like a CD reacts to the "pits" in a compact disc.

The microcomputer controls the speed of the turntable, monitors the time and memorizes cut boundaries. Just like a CD player, the display includes elapsed time, time remaining, time of cut and time for each side.

Unlike a CD player, which converts the source to digital information then back to analog for playback, the LT-1 converts the optical imprint reading of the record grooves directly to an acoustic analog signal.

Because traditional record playing involves a stylus touching a record and the grooves are vulnerable to dust and scratches, the laser turntable uses a noise blanker circuit to compensate for those physically induced sonic flaws, according to Finial.

The noise blanker "differentiates between valid musical signals, which have reverberation, and the ticks and pops that do not." Thus, it plays the music without the surface noise, the company claimed.

Also, according to Finial, severely scratched records that previously repeated a portion of the record over and over until you moved the tone arm will not be a problem for the LT-1.

The laser tracking mechanism compensates for the "stuck" groove in about 20 milliseconds, according to the original AES paper on the Finial laser turntable.

Unlike a regular turntable with a 500-hour stylus, the LT-1 laser has a 10,000 hour life and the low energy of its beam will not damage record grooves, the company said.

For more information about the Finial laser turntable, contact Fran Dym at DYM, SR and A, Inc., 212-661-5300 or write to Finial Technology: 707 East Evelyn Avenue, Sunnyvale, CA 94086.

The Finial laser turntable carries a price tag of $32,000.

Royalties Issue Snags DAT Bill

by John Gatski

Washington DC DAT bill proponents are garnering congressional support for the legislation, but the bill is being contested by some recording artists groups that are seeking royalties from the DAT industry.

A letter was sent from bill sponsors Reps. Henry Waxman (R-CA) and Al Swift (D-WA) to all House Energy and Finance Committee members urging support of the bill.

HR 4096, the Digital Tape Recorder Act of 1990, would require the Serial Copy Management System (SCMS) in every consumer DAT recorder imported or produced in the US. The bill is based upon a compromise between the Recording Industry Association of America (RIAA) and DAT manufacturers worked out last year.

With SCMS, a DAT recorder, for the first time, can digitally make an original tape recording of a CD, but that tape cannot be copied. The original DAT recording of an analog source can be copied once.

Artist groups voice opposition

The royalty question stems from some recording artist groups, such as ASCAP, Songwriter's Guild of America and National Music Publishers of America, who oppose the DAT bill because it does not address royalties.

RIAA, which agreed to SCMS-based DAT legislation, also believes the royalty question needs to be settled, but that it should not be linked to this bill.

In the letter, Swift and Waxman acknowledged the royalty question has not been worked out in the legislation, but maintained that the bill is very important to get the technology started.

"HR 4096 represents the first time after many years of debate that the recording and consumer electronics industries have found some common ground on intellectual property rights," the letter stated.

"Some are arguing that no action should be taken unless a royalty system is enacted. We think that course of action is unwise. This long-awaited compromise should be adopted as quickly as possible," the letter said.

In previous debate, royalty proponents have stated that artists should receive some compensation, perhaps a tax added to blank DAT tapes and/or on the recorders.

No counter proposal yet

So far, royalty proponents have not introduced any legislation that would enact a royalty system for DAT recorders or tapes, according to congressional sources.

In their letter, Waxman and Swift acknowledged that "the recording and electronics industries were unable to resolve their longstanding differences on these royalty questions during their efforts to enact negotiations and 'agreed to disagree' so they could continue their efforts to enact the compromise on serial copying into law.

"HR 4096 leaves the battle on these issues until another day," the letter concluded.

The bill was assigned to the Commerce, Consumer Protection and Competitiveness, and Telecommunications and Finance subcommittees, but no hearings were scheduled, according to the subcommittees.

Monitoring Dispute Continues

by Judith Gross

Washington DC The pre-1983 rules for FCC approval of modulation monitors—while no longer in effect—are continuing to stir controversy in light of a recent product introduction which takes a different approach to a station's modulation monitoring.

Last year Modulation Sciences introduced FM ModMinder™, a modulation peak indicator which ignores shorter bursts of overmodulation yet still—according to its designer—adheres to the pre-1983 type approval rules and allows the stations which are using it to remain within legal modulation limits set by the FCC.

In December Modulation Sciences requested and received a letter from Thomas Stanley from the FCC Office of Engineering & Technology which said that if ModMinder meets the pre-1983 requirements for type approval of monitors, then it would be adequate for use to monitor modulation today, when those rules no longer apply (see **RW** 27 December, 1989).

But a competing manufacturer of modulation monitors, Belar Electronics Laboratories, has questioned the publicity surrounding the Stanley letter and also questioned whether Modulation Sciences' assurances that ModMinder meets the pre-1983 rules are accurate.

In a letter to Stanley, Arno Meyer, president of Belar said Stanley's letter was being misused in news reports as "proof that you have, on behalf of the Commission, approved the ModMinder as a device that will 'produce valid readings of FM modulation.'"

Belar's letter also states that ModMinder is not a monitor and does not meet pre-1983 requirements.

In a letter to Meyer, Stanley replied that while the headline of an article which appeared in **RW** in December could, if taken by itself, be misconstrued, "the article itself accurately describes my letter to Mr. (Eric) Small of Modulation Sciences. Nothing in the article suggests that we have approved or in any way endorsed the ModMinder."

the Commission no longer regulates this type of equipment . . .

Stanley's letter went on to say that since the Commission no longer regulates this type of equipment, it is not necessary that the FCC make a finding of whether ModMinder meets pre-1983 rules.

Meyer and his attorney, Eugene Mullin, subsequently met with Stanley to further discuss the correspondence. Stanley, Meyer and Mullin all indicated after the meeting that Belar's concerns would not fall in the area regulated by OET.

"My recollection is that Mr. Meyer's concerns dealt more with enforcement of modulation limits," Stanley noted.

"Dr. Stanley said we should direct our concerns to the Field Operations Bureau and we are trying to set up an appointment with FOB," said Meyer.

Engineering report

Since the correspondence took place, Ted Schober, a professional engineer and president of Radiotechniques, a consulting firm, has completed an engineering report of the technical measurements of ModMinder which states that it does show compliance with type approval standards for FM modulation monitors.

Schober, who notes in the report that he visited FCC labs while FM modulation type approval rules were in effect, says "FM ModMinder meets all the standards for peak flashers for monophonic and stereophonic FM broadcast modulation monitors when measured according to the methods employed by the Federal Communications Laboratories in testing modulation monitors for type approval."

At the time the report was done, Schober noted that since ModMinder is not a complete modulation monitor, his measurements pertained only to the peak flasher function. They did, however, include measurements which included subcarriers.

Since the report, Modulation Sciences has developed a demodulator card for ModMinder, slated for introduction at the NAB show, which would provide more complete monitoring functions.

The debate over pre-1983 rules—rules which are no longer in effect—centers on requirements for stereo testing. Meyer contends that separate tone burst tests in left and right only channels are required to comply with the rules.

Schober maintained, however, that the pre-1983 methods for type approval never included such stereo tests. He said one reason was that at the time the rules were in effect, the Commission did not have an adequate way of generating separate stereo channels.

Rules not specific

Rule 73.332 (d)(2) states that no peak preset indicator is needed for the stereophonic subcarrier. Later on in subsection (d)(4) is the only indication that tone burst tests are required—but for the main channel, stereophonic subchannel, pilot subcarrier and all SCA subcarriers "simultaneously."

Two letters to Modulation Sciences back up the view that, while the rules at the time may have been vague, tone burst tests were required either only on the main channel or on the total composite signal.

In his letter, Charles Haubrich of QEI, another manufacturer of modulation monitoring gear, said "to the best of my recollection, the peak preset indicator required by 73.332 was intended to monitor total baseband modulation, i.e. main (L+R) channel, sub (L–R) channel, pilot and SCA injection added together."

And a letter from consulting engineers Hatfield & Dawson stated "the conclusion we draw from this analysis is that the tone burst test requirement was specifically intended to apply only to the main channel."

OET staffers currently at the Commission don't recall how the pre-1983 tests were performed. In addition, all records of how to perform such tests have apparently been lost or destroyed, according to John Reed.

But Reed, backing up Stanley's view in his letters to Modulation Sciences and Belar, says OET considers the debate a moot one. "We don't need to do these tests any more and we haven't since 1983," Reed pointed out.

For more information contact FCC OET at 202-632-7060; Belar Electronics at 215-687-5550; Modulation Sciences at 800-826-2603.

Dolby Squeezes Data

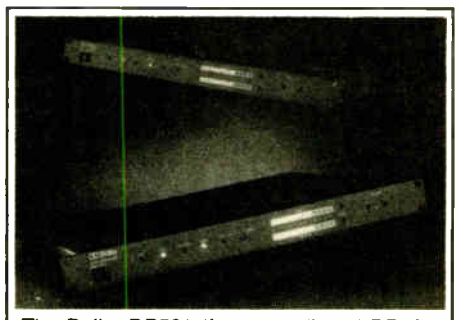
San Francisco CA Data compression seems to have come into its own with the emergence of several new technologies. One of the latest involves bit reduction in a product offering from Dolby.

Dolby Laboratories says its 500 Series digital audio encoding/decoding system that uses a priority bit reduction scheme with analog-in and digital-out is aimed toward satellite distribution with potential for STL use and maybe digital audio broadcasting (DAB).

Dolby showed the 500 Series with Adaptive Transform Coding (ATC) at the October Audio Electronics Show and planned to have product at NAB. Dolby has the basic modules; users need one encoder, the DP501, and one decoder, the DP502, that cost approximately $3000 each.

The company is marketing the 500 Series to satellite users initially according to Kevinn Tam, broadcast technology marketing manager. Transponder space is limited and expensive and the bit reduction could prove cost effective and more efficient for satellite distribution.

Dolby also sees possible uses for STLs, cable and fiber optics, but wants to let broadcasters decide about other potential applications for the new technolgy. The company also predicted possible applications for the audio portion of advanced television.



The Dolby DP501 (foreground) and DP502 (rear)

The units code two audio channels at a data rate of 128 kb/sec per channel, or about one-sixth that of 16-bit linear PCM. They have analog inputs and digital outputs.

Dolby Engineering VP Steven Forshay said ATC is specifically optimized for professional-quality music and speech transmission and storage. The system's dynamic range is not limited by the ATC process, he maintained, but rather by current A/D and D/A converter technology.

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NRSC Probes Clipping, Limiting

by John Gatski

Washington DC Composite clipping and removal of overshoot limiters, and their effect on occupied bandwidth during FM broadcasts, were among the topics discussed at the 20-21 February NRSC FM subgroup meetings.

Accounts of the meetings, which were permanently closed to the press in January after four years of open coverage, were provided by NAB Science and Technology Staff Engineer Stan Salek, who is staff coordinator.

During a report on the effects on SCAs of clipping, CRL's Chuck Adams who had submitted a previous report critical of clipping to the subgroup, noted that tests of composite clipping had no adverse effect on occupied bandwidth, according to Salek.

Different results

"Addition of composite clipping produces less occupied bandwidth increase than originally was thought," Salek said.

There has been a view held by some engineers that processing can cause interference to first adjacent stations, but based on Adams' research that apparently is not the case, Salek said.

Because there is less occupied bandwidth with composite clipping it is less likely that it will cause interference, he added.

Removal of overshoot limiters from processors yielded the same results, based on tests conducted by Cutting Edge Technology President Frank Foti, according to Salek.

In other action, the NRSC heard a proposal to test the effects of processing on radio receivers and whether processing degrades the audibility of an FM signal, according to Salek.

"Addition of composite clipping produces less occupied bandwidth increase than originally was thought," Salek said.

"Bob Orban, president of Orban Associates, is wrapping up the test plan," Salek said.

Group Chairman Ed Anthony also said that Orban would be designing a test to determine the effects of "relaxed modulation monitors" on FM signals. Modulation Sciences, a competitor of Orban's, recently introduced a modulation peak flasher which ignores shorter bursts of modulation.

Look at receivers

The NRSC also plans to monitor receiver manufacturers' policies to determine if they are reacting to the overcrowding of the FM band and making changes to receivers to compensate for the proliferation of stations.

During a meeting of the full FM subgroup on 21 February a test was proposed to study the effects of transmission elements on broadcast signals, including combiners, delay units and filters.

ERI will provide the equipment and the space to conduct the test, NRSC Chairman Charles Morgan is designing the test proposal, Salek said. The test was originally proposed by the working group on multipath studies but has been shifted to the full FM subgroup.

The NRSC's multipath studies working group will be "dormant" for awhile, according to Salek.

He said the group will hear updates on NRSC member Harry Simon's independent multipath study and possibly look into diversity reception as a means to reduce multipath in the future, but no major topics are scheduled for the group.

The next NRSC meeting is scheduled for 29 March before the NAB convention in Atlanta. Agenda items include review of returned NRSC member ballots for approval of AM receiver standards and discussion of industry implementation of NRSC standards.

The NRSC recommended an AM standard, which includes a minimum frequency response of 50 Hz to 7500 Hz, which will be used as criteria for a joint NAB/Electronic Industries Association voluntary certification mark for AM receivers.

According to accounts of the 9 January meeting in Las Vegas, some companies such as Delco, Philips and Denon demonstrated NRSC quality radios at the Winter Consumer Electronics Show, which signals a willingness by manufacturers to build quality AM receivers.

For information, contact Stan Salek at the NAB, 202-429-5391.

Short EBS Tone Tried

(continued from page 1)

According to Larry Estlack, CE at WSYM-TV in Lansing and state chairman for the EBS, the tests were initiated after an MAB survey revealed that broadcasters would be willing to increase usage of the EBS system if they didn't feel it was such a tune-out to listeners.

"We felt that reduction of the tone length to a third of its former length would still provide enough alert time to catch peoples' attention, but maybe not enough time for them to reach down and push the button and look for another station," Estlack said.

"And broadcasters felt that as competitive as the business is now, that we should do whatever we can to keep the public informed but not provide good reasons for people to search out another station," he added.

Results of the group's tests are expected to be presented to the FCC in mid-April. Estlack also intended to present a paper on the tests at the NAB show in April.

One EBS receiver manufacturer has already introduced equipment which could accommodate the shorter tones. TFT's models 886 and 887 receivers can be programmed for a tone duration of eight, 12 or 24 seconds.

Four changes to rules

The tests follow a petition by the NAB last September asking the FCC to consider four changes to EBS rules based on concerns expressed by NAB member stations and discussions of the issue at Commission EBS Advisory Committee meetings.

The NAB petition asks first for the shortened test tone, based on station managers' concerns—like MAB's—that "by transmitting the full 20 to 25 seconds of the attention signal and the current test script, many listeners and viewers become annoyed and may either tune to another station or turn the radio or TV off."

The recommended length of the tone, NAB said, should be a minimum of eight seconds and a maximum of 25 seconds.

NAB also recommended that stations be allowed to localize and individualize the EBS test script, provided certain minimum information is included; and that stations be permitted to monitor, activate and fully control EBS operations by remote control, instead of requiring that EBS equipment be present at a distant control point.

FCC action doubtful

According to NAB Staff Engineer Kelly Williams, it appears doubtful that the Commission will act on the latter requests.

"With the test message, they said they are basically allowing people to tailor their messages now," he said. "Even though that's not expressly written in the rules, they've been reasonably accommodating for people who want to do that."

Regarding remote control and monitoring, "the Commission has been very good in general about accommodating peoples' special needs," he added. "Their attitude seems to be that if you have some special need, they'd rather you be compliant and work with the Commission.

"We thought the tone length was the utmost issue," Williams said.

Action expected in spring

According to the Commission, action on the EBS rules is expected in the spring, following the results of the Michigan testing.

Said Frank Lucia, an FCC engineer with the EBS, "Chances are the Commission will put out a notice of proposed rule making when we formally ask for comments on shortening the tone this spring."

The change in EBS rules comes at a time when the emergency tone is showing more use than ever. According to FCC figures, last year 190 broadcast stations reported 1240 tone usages for day-to-day emergencies affecting their communities. The figure is a record.

Since implementation in 1976, a total of 10,493 reports have been filed.

For information on RM-7188, contact the FCC at 202-632-3906.

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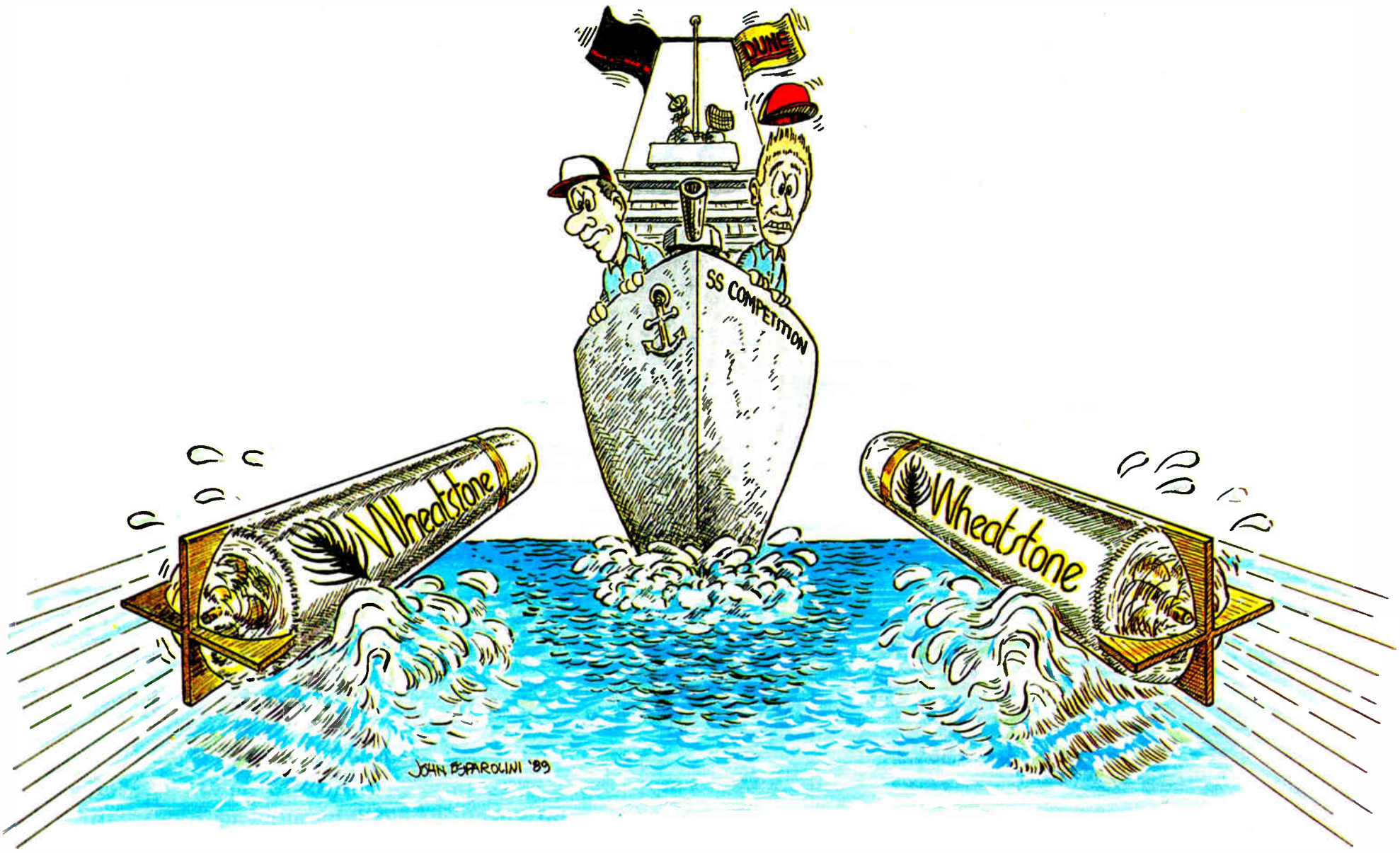

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Switching Antennas On Day Two of Tests

by Judith Gross
Part II of II

Allentown PA The sun is lending a spring-like quality to the day, yesterday's snow has melted and the winds have died down as I join the team assembled for the second day of multipath testing on a weekend in late January.

At WAEB's transmitter site, Don Spevak is at the controls of the motorized pulley system while Ron Spevak and Cliff Nensteil, all of D&R Communication Services, are riding easily up and down the cables suspended from the 210' tower.

Yesterday they removed the four-bay ERI circularly-polarized antenna under the watchful eye of ERI President Tom Silliman and WAEB CE Harry Simons.

They replaced it with an ERI vertical-only radiator and called it a day while Air

Hoisting the special ERI antenna

System Technologies took real-time pattern readings from a Piper Warrior, with Tom Becker at the computer and Ralph Chambers in the pilot seat.

Harry reported that the signal was phenomenal, clearly reaching as far away as Philadelphia on the 17 kW of power being used for the tests.

Today, the agenda is a 180° flip, literally, as the vertical-only radiator becomes a horizontal-only. Air System will fly its one-mile loops and collect more data.

Then the special ERI antenna will come down and the four-bay Shively antenna, which has been sitting farther down on the tower leg, will be moved up to the pole where the four-bay ERI once stood.

The aim of this weekend's operations will be to determine how different antenna patterns can affect the presence of multipath.

Inside the transmitter shack, the coffee is going toward tepid, the donuts are getting sparse and we need more Coke.

That, and the fact that the tiny shack, like most transmitter sites, sports no sanitary facilities, necessitates a trip five miles down a rural road into Egypt, PA to the Texaco station.

We head out in Harry's Blazer and decide to conduct our own listening tests of the horizontal-only pattern. Ralph and Tom are replacing a part on the Piper Warrior and it will be awhile before the tiny plane emerges on the horizon for the more official data gathering.

After six years at WAEB, Harry can pinpoint the worst of the multipath lo-

(continued on page 14)

Donny is steady at the controls.

Multipath Tests Move Forward

(continued from page 13)

cations "by ear." We ride through the gently rolling hills of the Lehigh Valley, back towards Bethlehem, a town named by an Austrian Baron and looking very much like a European city.

Every now and then Harry stops, turns up the volume and cocks one ear toward the speakers. Then he turns back down to comfortable listening level and seeks out another location. "Very interesting," he says.

While the vertical-only pattern produced an extremely strong signal that seemed to worsen the most severe areas of multipath, the horizontal-only pattern is noticeably different, Harry reports.

It seems to have improved the multipath, but the tradeoff is in coverage. The figure-eight or cardioid pattern produced by a horizontal-only pattern doesn't penetrate the station's desired coverage area as well. It also becomes a problem for car radios.

One question these multipath tests are seeking to answer becomes clear: is there an antenna that would give the best compromise between the multipath-reducing effects of a horizontal-only pattern and the signal enhancement of a vertical-only pattern? And would that likely be circularly-polarized, or some slight leaning toward a horizontal pattern?

We double back towards Egypt with a "pit" stop at the Texaco station. From high on the remote hill that is WAEB's transmitter site a white spec on the horizon approaches. The Piper Warrior, airborne once more, is getting in position to take readings.

A long afternoon of tower scaling follows. Ronnie and Cliff make uncountable trips up and down, carefully removing the horizontal-only radiator and then concentrating on the Shively bays. One by one they will be plucked from their positions and hoisted up to the 50' tower pole.

These are, in fact, still only the second round of the Phase I tests. There is talk of further testing from the GM multipath-measurement van which began the tests last July. And there are hopes of characterizing multipath's effects on SCAs, among other possible tests.

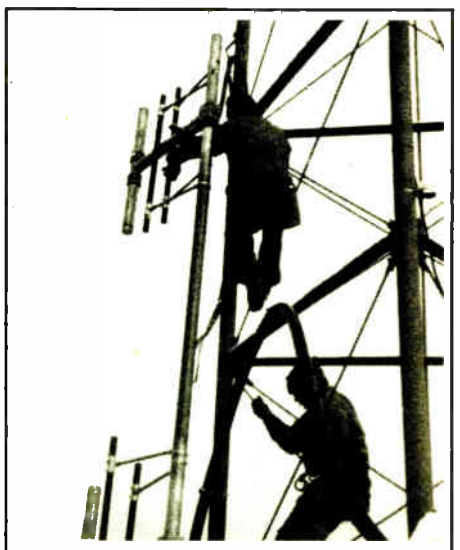
A lot of the future agenda will depend on the continued cooperation and voluntary efforts of the companies and individuals who have worked so tirelessly

The careful climbing of D&R communications

on the project for the past six months. But one exhausting weekend's worth of tests is nearly over.

Air System is waiting for word at the airport, ready to fly one-mile radius loops around the antenna to take readings of the Shively which will then be coordinated with all of the extensive other data they have collected.

Bay by bay, the squarish radomes of the Shively take the place of the pretzel-



The vertical/horizontal-only radiator makes its descent.

curls of the ERI, now sitting on the ground 200' below.

After an endless afternoon they are in place, and the laborious process of tuning begins, with Ronnie and Cliff up on the tower "tweaking" the bays and Donny on the ground calling out directions being relayed to him by Harry, who is inside the shack watching the meters.

Finally they are done and ready to slide back down the tower on the steel cables.

As we crane our necks to watch, the only sound is the motorized winch manned by Donny and an afternoon wind that has picked up.

"Would you like to try that?" Harry asks me, pointing 200' up the tower. I look over at Donny's confident manner at the controls.

"Will they be gentle with me?"

Donny laughs and nods, "Nothing to it."

"Well, sure," I tell him, "why not?"

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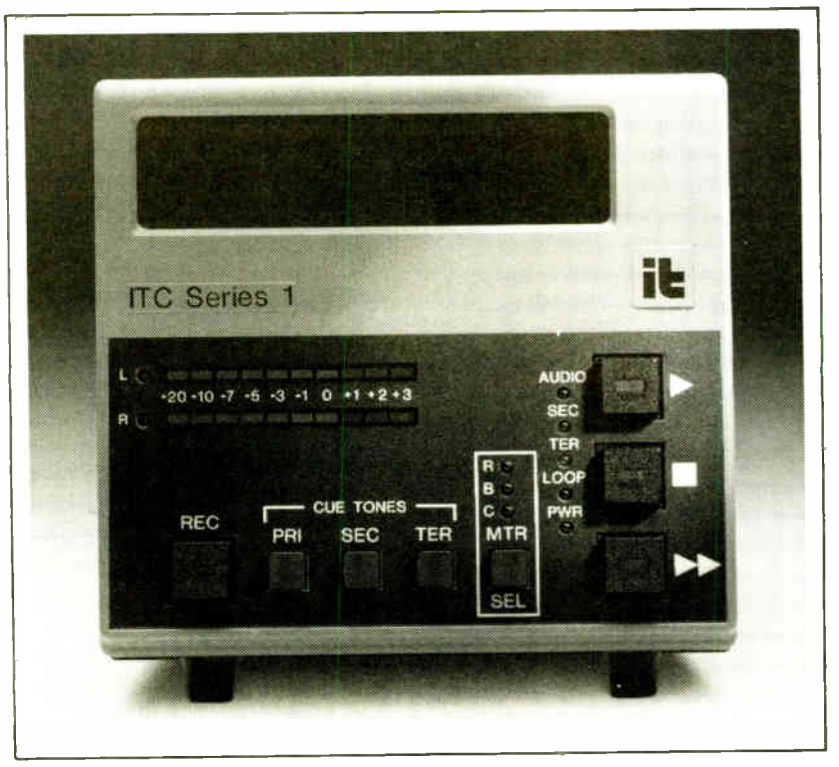

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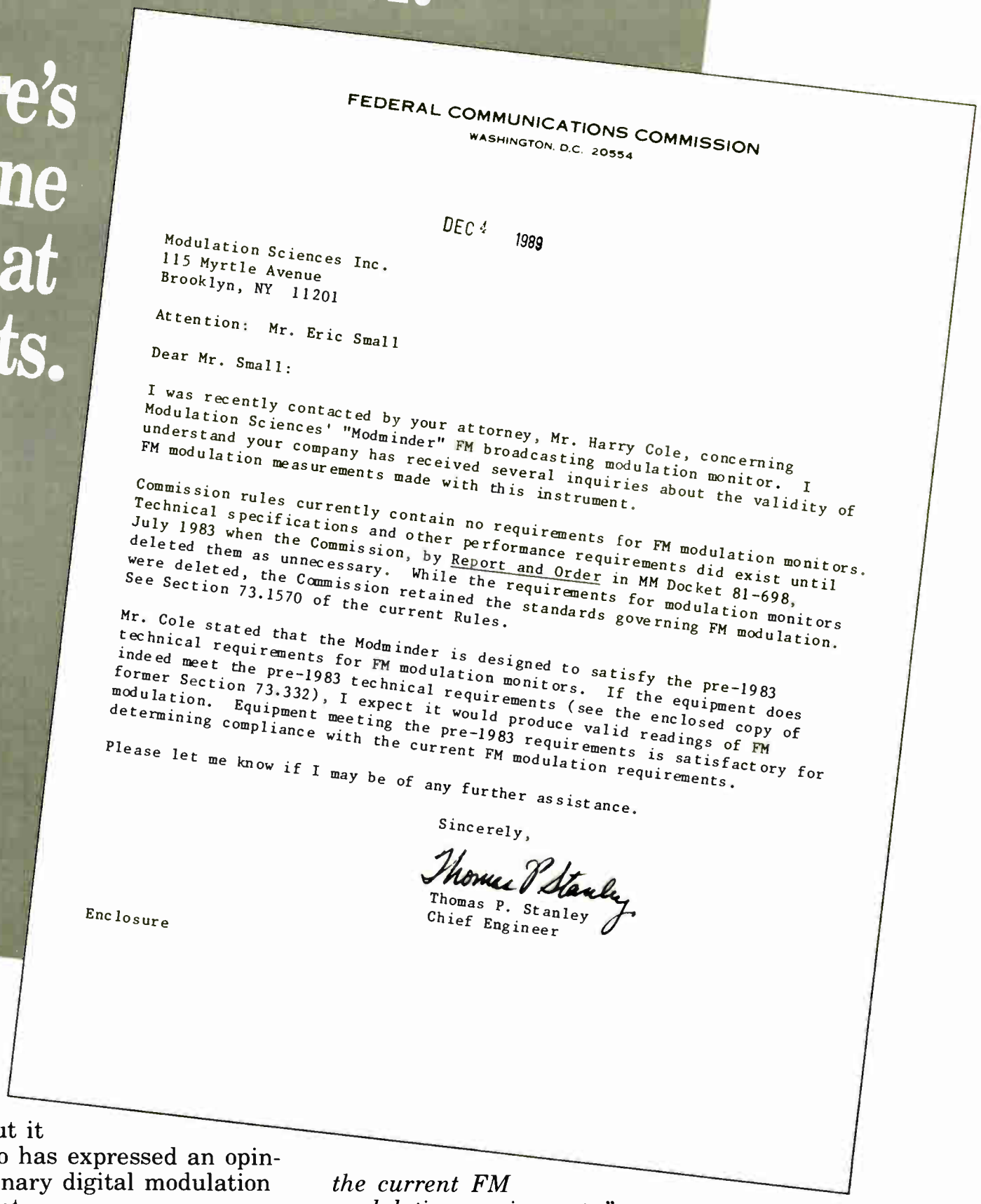

FEDERAL COMMUNICATIONS COMMISSION
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DEC 4 1989

Modulation Sciences Inc.
115 Myrtle Avenue
Brooklyn, NY 11201

Attention: Mr. Eric Small

Dear Mr. Small:

I was recently contacted by your attorney, Mr. Harry Cole, concerning Modulation Sciences' "Modminder" FM broadcasting modulation monitor. I understand your company has received several inquiries about the validity of FM modulation measurements made with this instrument.

Commission rules currently contain no requirements for FM modulation monitors. Technical specifications and other performance requirements did exist until July 1983 when the Commission, by Report and Order in MM Docket 81-698, deleted them as unnecessary. While the requirements for modulation monitors were deleted, the Commission retained the standards governing FM modulation. See Section 73.1570 of the current Rules.

Mr. Cole stated that the Modminder is designed to satisfy the pre-1983 technical requirements for FM modulation monitors. If the equipment does indeed meet the pre-1983 technical requirements (see the enclosed copy of former Section 73.332), I expect it would produce valid readings of FM modulation. Equipment meeting the pre-1983 requirements is satisfactory for determining compliance with the current FM modulation requirements.

Please let me know if I may be of any further assistance.

Sincerely,

Thomas P. Stanley

Thomas P. Stanley
Chief Engineer

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Circle 26 On Reader Service Card

VOA Founder's Well-Kept Secret

by Frank Beacham

Washington DC By today's standards, it would probably be a political scandal: a Rumanian-born enemy alien, forbidden by law from even operating a shortwave radio, heading America's broadcast propaganda arm, the Voice of America (VOA). But it happened.

And not only was there never a scandal, the federal government recently dedicated a state-of-the-art new broadcast studio to the man whose little deception allowed him to become the first director of VOA.

The late John Houseman, known to most Americans as the crusty Professor Kingsfield from *Paper Chase* film and television series, is a legendary figure for his pioneering work in theater, radio, television and film.

But little known is the fact that he was one of the founding fathers of the Voice of America when it began operation during the early days of World War II.

Studio trubute

The recently renovated Studio 4 at VOA's Washington headquarters is now called "The John Houseman Studio" and a commemorative metal plaque is secured to the studio wall. Current and retired agency officials turned out for the February dedication ceremony.

The plaque, featuring the famed Houseman side profile, is inscribed, "As he organized the Voice of America's earliest broadcasts, he set a standard for accuracy and the telling of truth. May all who speak into VOA microphones follow his example."

Houseman, who died at age 86 about a year ago, would have probably gotten a kick out of those words and the ceremony held in his honor.

"As I received my civil service appointment in the name of Jacques Haussmann, no one—least of all myself—seemed to question the propriety of placing the Voice of America under the direction of an enemy alien of Rumanian birth who, as such, was expressly forbidden by the Department of Justice to go near a shortwave radio set," wrote Houseman with amusement in his memoir, *Front and Center*.

A brilliant theater career

Houseman was 40 at the time and already had completed a brilliant theater career in the 1930s. He also worked on the film classic, *Citizen Kane*. His collaboration with the young genius Orson Welles resulted in one of the most famous programs in the history of radio, *War of the Worlds*. It was John Houseman who used his body to block the CBS studio door and prevented network officials from entering to stop the controversial 1938 Halloween broadcast in which Martians landed at Grovers Mill, NJ.

In the early days of World War II, Houseman left the employ of producer David O. Selznick in Hollywood to join Robert Sherwood, the four-time Pulitzer Prize-winning playwright who oversaw foreign information services for President Roosevelt.

He was joined by an extraordinary collection of luminaries from various fields—journalists, publishers, executives, actors, musicians, educators and financiers.

"They were of such celebrity in their past and future lives that it is almost impossible to believe they were all ever assembled under one roof," Houseman wrote later.

Houseman, the showman, was assigned to create the war-time propaganda programs that would become the Voice of America. He oversaw a tough group of newspapermen who would write the stories.

Professional necessity

"I learned a lot about the drinking habits of newspapermen," Houseman recalled. "I discovered that their alcoholism was not a vice or weakness but a professional necessity.

"There were sensitive areas of the news and significant situations that could not be approached in a formal atmosphere of sobriety; under the relaxing influence of alcohol they could be discussed frankly and clarified by knowledgeable, civilized men without indiscretion or treason."

But the distinction between journalism and show business went totally unappreciated, Houseman remembered, by a third important group involved in the creation of the VOA.

The engineers, Houseman said, were "a highly expert, specialized group whose task it was to beam our voices along the complicated atmospheric routes that would eventually lead them to their appointed targets.

"Without their occult knowledge we were helpless and they knew it, and this lent them an aura of superhuman authority that we resented but dared not question."

By the end of Houseman's first year at the VOA, the service had gone from no equipment or programming to a New York staff of nearly 3000 persons turning out close to 1000 shows a day in 27 languages.

Simple-minded American hosts

About one-fifth of the staff were aliens, most of whom worked in the VOA foreign language sections. Houseman especially remembered the French and German sections.

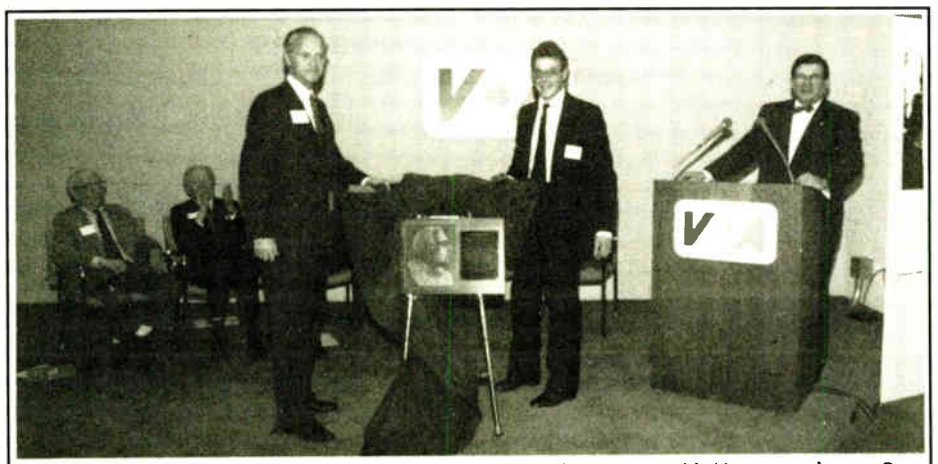
The French section, under famed French newspaperman Pierre Lazareff, had a staff of 100, which Houseman described as "quick, erudite, elegant, logical, contentious but tractable and always slightly condescending toward their well-meaning but simple-minded American hosts.

"Their broadcasts were lively, well spoken and clear, with as much Gallic savor as they could get past the vigilant, puritanical eyes and ears of the hated Control Desk.

"They did not distort the news (as the Italians did); they colored and flavored it, adding zest to the factual and often self-righteous style of the News Desk's master scripts."

But the Germans, who shared the fourth floor with the French, had a collective behavior which "was utterly different," Houseman remembered.

"On the surface, they presented a model of discipline and efficiency; when I passed by, the entire section rose to its feet and bowed. Their newscasts were punctual, precise, clearly delivered and in rigid accord with the dictates of the Control Desk."



USIA Director Bruce Gelb (left) unveils the commemorative plaque with Houseman's son Sebastian Houseman (center) and VOA Director Richard W. Carlson (right).

Fell apart in a crisis

However, Houseman said, with the first crisis they fell apart. "At the slightest hitch—a change in schedule, an imagined personal affront or some minor disagreement over interpretation of a new directive—they would flare into sudden violence. Voices would rise an octave, shrill and guttural with misery and hate; scripts flew, chairs fell, screams of rage set the needles of the studio dials peaking; and shows failed to get on the air while the rest of us looked on in uncomprehending amazement."

The beginning of the end of Houseman's tenure at the VOA came when Sherwood asked him to travel to London and then to North Africa to start a new subsidiary VOA program. It was then that Houseman revealed his immigration secret to his superiors.

No problem, he was told, the naturalization process could be accelerated by a little political pressure in the right places. And so it was. On 1 March, 1943, Houseman took an oath of allegiance as a US Citizen.

Now, all he needed was a passport. As the passport application was being processed, Houseman was appointed a US Infantry colonel to facilitate his dealings with the military overseas.

He visited Brooks Brothers on Madison Avenue and ordered "the costume" of a colonel: the jacket, fatigues, khaki shirts and a belt of khaki webbing.

Six days later the uniform was delivered. The passport was not. Houseman had been caught in a continuing struggle between the Army and State Department on one side and his propaganda agency on the other.

The State Department was withholding passport privileges from Houseman and others in a powerplay designed to stop what it considered dangerous meddling in foreign affairs by the VOA's supervisors.

Growing restless

By the spring of 1943, Houseman, still in his director's job, was growing restless as more and more of the VOA's equipment and personnel were being shipped overseas "for operations in which I was not permitted to participate."

In July, 1943, Houseman resigned to return to Hollywood and what was about to become another successful new career as a motion picture producer. (Later, he would begin an acting career at 70 that would win him an Academy Award).

At the VOA today, public affairs spokeswoman Devorah Goldburg laughed when it was pointed out that the agency was dedicating a new studio to a man who ran the VOA as an enemy alien.

"He just didn't happen to mention he was a Rumanian citizen at the time. That's all, " she laughed. "It's kind of interesting ... and unusual."

But that was a different time, without the glaring media scrutiny, without the ethical fervor rampant in today's government.

But then no one would disagree that John Houseman earned his plaque at the VOA. You can almost hear him say it now: "I got it the old fashioned way. I *earned* it."

C3s Opt Not to Hike

by Charles Taylor

Washington DC Forty-six of the 149 Class A stations granted a power boost under the new C3 licensee classification have decided not to go for the upgrade, according to the FCC.

The C3 licensee classification, adopted last March, authorized the Class A stations to hike power up to 25,000 W with an antenna height above average terrain of 328'.

The majority of stations eligible for the increase are located in the Midwest or in sparsely populated areas, a factor that may have led many of the 46 to pass on the hike, according to FCC Allocations Chief Karl Kensinger.

"We don't know for sure because most of them didn't file any comments, but I think looking at who is on that list, a lot of the stations are in areas where I think any additional power would just increase the power bill and wouldn't result in any better coverage," Kensinger said. "They're just located in areas where a power increase is meaningless."

When the new class was established, the 149 designated stations were asked to note in writing their intention to institute the upgrade. Those stations that did not respond would be deleted from the C3 designation.

For information, contact FCC Allocations at 202-634-6530.

The Components of Productivity

by John M. Cummuta

Downers Grove IL Have you ever reached the end of a day feeling like you didn't get a thing done? You were there for eight hours, yet nothing of note was accomplished. Or, have you ever felt the same way about the people who work in your department?

ENGINEERING MANAGER

Well, the measure of how much gets done—per unit of time—is called "productivity" and increasing productivity is a good thing for managers to do. It causes your boss to smile, which causes you to continue getting paid—and that causes your creditors to smile. It can even get you a raise or promotion.

In fact, productivity is even more important than that. It's what the Japanese have been beating us at and it's what we had better improve at, or we'll need to start learning Japanese.

Easy for engineers to grasp

Increasing productivity should be a natural concept for engineers to grasp, because it's logical. It's a "systems" kind of problem. Let's start at the top.

Productivity (amount of work per unit of time) has four principle components: time, activity, knowledge and process. The relationships of these elements are shown as a formula in Figure 1.

You'll notice that, in general, productivity is directly proportional to time, activity and knowledge; it is inversely proportional to the process you use to accomplish whatever it is you're doing. That means that to increase productivity, we must either increase something above the division line or decrease what's below the line.

Let me use the example of baking a cake to demonstrate this relationship more clearly. You use a certain amount of time to prepare and bake a cake, you have the activities involved, you have the knowledge necessary to either read and follow the directions or to do it from memory and you execute the process step by step.

Figure 1.

$$\frac{\text{Time} \times \text{Activity} \times \text{Knowledge}}{\text{Process}}$$

Let's look at what's involved. First of all, there's *time*. Time is a constant. We can neither expand or compress it, so we might as well not worry about it. Let's concentrate on the things we can affect.

Activity and knowldege

Activity is how hard you work, how fast you work and how efficiently you work. In the example of baking a cake it's how fast you mix the ingredients and put the mixture into a pan.

Obviously, if you mix twice as fast, that will increase productivity. If you doubled the muscle you put into whipping the batter, you'd increase, by some percentage, the number of cakes you could put out per day. That's why we show activity as directly proportional to productivity: more activity—more productivity.

Now, while everyone could generally be more effective in their use of time and could work a bit harder, it's usually difficult to get anyone to maintain a substantially higher level of energy. But, for short spurts, working harder is a straight-line way to get more productivity.

Productivity is also directly proportional to your *knowledge*. The more you know about what it is you're doing, the faster and more efficiently you should be able to do it.

To go back to the cake baking example again, this would equate to your knowledge of how to put the ingredients together and in what amounts. If you know everything by heart, you'll waste less time reading directions—and you'll just get more done. Productivity goes up.

In the reality of a high-tech world, however, a good deal of your knowledge capacity is used for just keeping up with the newest concepts. And it's usually not a great idea to do most technical tasks by heart. Using the manuals, the procedures and the specifications is the safer route to success.

But the principle still holds: the more you know, the better you are at a job. The better you are, the faster you'll get it done. The faster you get it done, the higher the productivity.

Process

That brings us to the *process*. The process is the way you do whatever you're doing and it's usually the place where you will find the greatest opportunity for productivity gains.

You'll notice that process is inversely proportional to productivity, and that simply means that the shorter the process the greater the productivity. So, anything you can do to reduce the process (speed it up) will increase productivity.

In order to better understand what factors control the size or time-span of the process, we'll break the term down to its two principle component parts: steps and tools.

The steps in a process are usually fixed. In other words, if in baking our cake we first have to pour the mix in a bowl, then add two eggs, then add milk, then mix and so on, those steps cannot be eliminated without serious consequences to the outcome.

So like time, which cannot be altered, the steps in most processes cannot be removed—but they may be rearranged or sped up.

Tools are usually a technician's greatest levers. You understand the concept of leverage: using minimal force to effect maximum change in the outcome. Well, the right tools give tremendous leverage in the execution of any process and therefore usually offer the greatest opportunities for dramatic productivity gains.

Let's use our cake baking example again. We acknowledged that we can't affect time, but we can work harder, meaning that we can increase our activity level.

Looking at the entire cake baking process, the mixing of the ingredients and placing them in the pan are relatively small parts of the overall time-span. We'll say that a third of the total cake production time is actual human activity.

That means then that even if you mix twice as fast, you'll only have a one-sixth improvement in the process time. But what happens if we give you an electric mixer (a tool)? That could more than halve the mixing time—while actually requiring *less* work on your part.

Let's say that we gain the same one-sixth in overall process time. Now, what happens if we replace the conventional oven with a microwave? The oven is just another tool in the process, but look what it can do to overall productivity. The microwave could cut the process time in half or more.

That means that the addition of one tool could reduce process time by fifty percent. Another way to say that is that the introduction of the new tool could *double* productivity—again with no requirement for us to work harder.

We've seen the same results when computers are introduced into the bookkeeping or billing processes at the station; or when new, computerized test equipment is implemented. A task as simple as cutting a piece of wood can be dramatically affected by the choice of a power saw over a handsaw.

Productivity (amount of work per unit of time) has four principle components: time, activity, knowledge and process.

Putting it to work

What does all this mean for you? If you're a manager, you manage people executing processes. In most cases, the productivity of those processes has a direct-line relationship with station profit. So, to increase profit you'll want to make your processes as productive as possible.

In doing so, just keep in mind the equation in Figure 1; and remember that, with few exceptions, the tools you use in the process will have more effect on overall productivity than any other element.

So, saving money by not buying the most effective tools for each process in the business is like saving gas money by not driving to work each day. The losses outweigh the gains.

For the record, this article was written on a word processor. Every process has its tools.

■ ■ ■

John Cummuta is president of Advanced Marketing Concepts, Inc. a broadcast management and marketing consulting firm, and a regular **RW** *columnist. He can be reached at 312-969-4400.*

Glimpsing the Future of Radio

by Ty Ford

Baltimore MD Production Rat the Third (PR3) punched a few new variations into the voice-patch program of the on-air computer just as the memo from the research department specified.

The latest Presence and Performance ratings had just been issued, indicating a dip in the 0600-1000 program sector. Life was simpler, but less human than it had been in his grandfather's days.

Back in the end of the 20th century, (when there were real live people on the air) a program director would have had to blow out the morning show. Now, almost a century later, there were no program directors, no airstaff, no promotions department, no account executives and almost no management at all.

PRODUCER'S FILE

Computers did most of the planning now. The "human element" seemed too damned unreliable and costly.

PR3 was one of a handful of real people who remained in the radio industry. He was a third generation production rat, following in his father's father's footsteps.

Life in the 21st century

The First Technology Evolution (FTE) had hit radio people the hardest. In the early 21st century, at the peak of PR1's career, nearly half the workforce had been wiped out. Spiralling debt services had caused operating costs to be cut to the bone.

The air staff was the first to go at most stations. Unlike account executives who "did the deals" and brought in the money, the airstaff was seen as a very expensive luxury.

Local talent and programming was first replaced by satellite-fed networks. Networks were hot for a while, but changes in the layers of the atmosphere due to environmental problems had made microwave transmissions less than reliable.

Cross-atmospheric plasma arcing was the main problem. It was like cloud-to-cloud lightning, only much worse. Entire layers of the outer atmosphere hundreds of miles thick would become highly charged by incoming radiation from space.

At the same time, lower levels of the atmosphere were being charged by the massive amounts of man-made RF. Concentration levels of RF on earth were the highest they'd ever been. The frequency spectrum was jammed.

This hadn't been a problem in back PR1's days because the middle layers of atmosphere were still conductive. This conductivity had kept charges from building up between the atmosphere's layers.

It was determined that the arcing was caused by pollution from a combination of incinerated plastics and toxic waste.

Although no one could have predicted it at the time, certain oxidized plastic molecules had fused in the middle layers of the atmosphere which resulted in decreased cross-atmospheric conductivity.

This highly unpredictable middle layer created a continuously changing and unstable dielectric constant between the inner and outer atmospheric layers.

Leaky capacitor

The earth's atmosphere had become a giant leaky capacitor. When the discharges occurred, the entire sky would light up and flicker like a huge fluorescent light fixture with a bad ballast. Continuous electromagnetic communication was simply impossible.

The Space Administration launched telemetry probes into the various atmospheric levels so they could predict the discharges. The data was downlinked by laser to earth stations, which were tied into the AC power grids in each continent.

Sub-frequency tones were transmitted on the grids, automatically taking sensitive circuits off-line just before each discharge and returning them to service afterwards. During periods of sunspots, the discharges happened ten or twelve times a day.

The challenge to PR2's generation was to reduce RF congestion so that commercial broadcasts could continue.

Elaborate fiber-optic distribution systems were developed that relieved some of the congestion. Fiber-optics were also less sensitive to the atmospheric discharges, which continued.

Digital pulse code modulation replaced analog modulation and required much less space on the frequency spectrum. Lower RF levels on the earth's surface almost eliminated the atmospheric discharges.

Cross-atmospheric plasma arcing was the main problem. It was like cloud-to-cloud lightning, only much worse.

FCC replaced

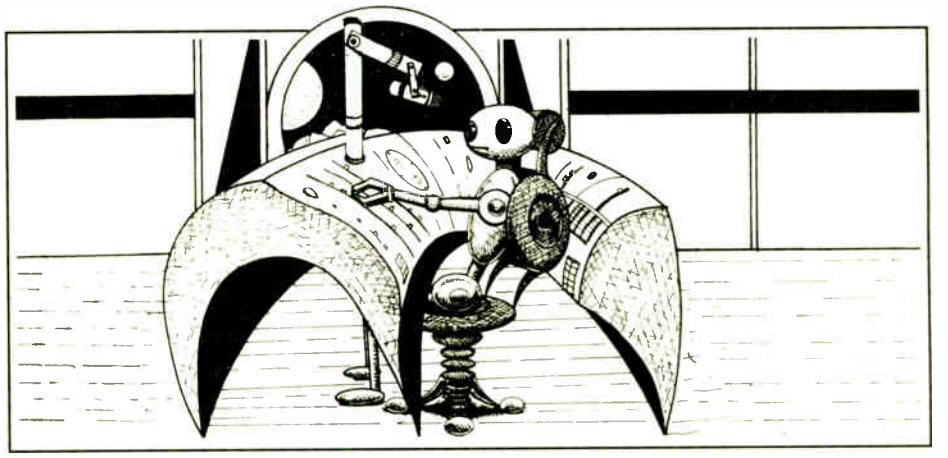
However, it wasn't until the replacement of the Federal Communications Commission by the Corporate Communications Committee that broadcasting saw a turnaround.

By the end of the 21st century, the federal government was so burdened with its own debt problems that it could no longer afford to fund the FCC.

Seizing the opportunity, an *ad hoc* cartel of multi-national business executives, whose companies depended heavily on advertising, convinced the federal government to let them carry the ball.

With sheer profit motive as its prime directive and without the inefficiencies of political intervention, the CCC soon became the most powerful force in the world.

It was also during this period that sales departments became extinct. Audience measurement data was made directly available to the buyers, who were by then small subsidiaries of the multi-national corporations.



The numbers were automatically crunched and "buy orders" were sent out over the new optical data cables. Everything was done "by the numbers."

There were Salesops at most of the better stations. Their job was to keep the machines on line and verify the error correction circuits. Client courting, long lunches and even account executives were luxuries no station could afford.

Enter PR3

PR2 was ready to retire. It was just prior to the Second Technology Evolution (STE). His son, PR3, carried on in the tradition of the family. Radio and production had come a long way in 90 years.

PR3's job classifications were Broadcast Sysop and Voice Reference Standard.

Voice-pattern technology, developed in the now-historic 20th century, had advanced to the degree that human voices were no longer needed or used for radio broadcasting.

There were only a handful of people like PR3 whose voices were still used as reference standards and from which all other broadcast voice patterns were derived.

These synthetically augmented voice patterns were called voice-patches.

While it was true that computers could replicate the human voice all by themselves, voice-patches were superior. There was no getting around it, even though the computer originated voices sounded good—and many of the broadcast facilities had started using them because they were cheaper—well designed voice-patches always tested better.

(continued on page 23)

FROM THE TRENCHES

by Alan Peterson

CE True Confessions

Dear *JG*,

I wish you could've been here tonight.

The legendary single night of the year in Massachusetts when the wind blows cold, the moon is ringed and killer bees hold Tupperware parties in ATUs. The one night of the year here when you can silently make a wish to the stars . . . and it is granted. Tax-free.

Big bonus in *this* state, believe you me.

Tonight I wished for a visit from some very colorful CEs to swap "horror stories" with; stories of events which now they can talk about, but couldn't when it was happening. Stories of flaming equipment, calls at 3 AM, dirty tricks . . . stories CEs would only tell other CEs.

When I came back inside, thanks to the power of fantasy, five outstanding representatives of our industry were seated in my living room, all around the fieldstone fireplace (which was running at 100% mod with white oak). Each had a great story to tell, and Ritchie Z was first.

Ritchie (a pseudonym to protect his reputation) worked with me in the mid '80s and asked me, "Al, remember when we were trying to get our STL and get off the landlines for our FM?"

"Yeah, sure do. Every time it rained, those old lines would hum up a storm. The phone company went nuts trying to isolate the hum. Did they ever find it before we went STL?"

"They would've never found it. Each time it rained I just headed up to the tower site and lifted the shields from the phone connections! Hummed like a hornet's nest! Two or three episodes like this and we had Corporate's OK for an STL in three weeks!"

"Nice trick."

It was Warren Small's turn, from New Hampshire's WGIR. "Ever get those middle of the night calls that make you long for the days of testing for the Class 3 ticket? Our FM guy calls once: FM's down, won't go back up, what to do? I ask him to check the remote control for me. Know what he asks me? 'What's the remote control?'"

Five amazed expressions, followed by lotsa laughs.

"This guy's been taking readings every two hours every day for three years! And he asks me what the remote control is? Come on!"

"Boy, I know that feeling," said WPRO Providence's Duffy Egan. "This one call was something. Phone rings at 4:07 AM . . . I'll never forget the time . . . and it's the overnight guy. Guess what he had to call me about?"

"Off air?" "Distortion?" "Fire Alarm?" "Tower lights?"

"This guy's been taking readings every two hours every day for three years! And he asks me what the remote control is? Come on!"

"Not even close. He was calling to find out where I kept the attachments for the vacuum cleaner."

I was starting to hurt from laughing.

"You guys get pen marks on consoles?" A loud "Yes!" went up in response to Bob Shotwell's (WACE-AM Chicopee, MA) time-honored question. "Bored jocks just love to draw doodles, circles and borders around pots, meters . . . you name it. This evening guy I knew in Springfield decided he wanted to 'clean up the act' as it were, so he grabbed a can of cleaner from the shop and sprayed the surface of the old Rockwell-Collins board."

"Sounds like a decent, conscientious guy, Bob."

"He was. I only wish he'd used Fantastik instead of graffiti solvent (uh oh). The stuff began melting anything made of plastic—knobs, input keys, meter faces . . . each fader knob began looking like a Hostess cupcake left in the sun. And the meters melted and stuck at the last peak the music hit! I had a job repairing the console and I was pretty furious!"

His fury, our funny. By then I was doubled over and eager to hear more. If there was anybody left in the room that could've topped that story, it would've been Andy Hudak with a tall Texas tale from KIKK radio. Surely he would have a horror story not to be believed. Unfortunately, he did.

With a voice that belied the great depth of pain he felt, he said simply, "I was there to videotape the tower collapse that killed five men nine years ago."

Not a sound followed his words. Even the fireplace stopped making noise. When I began to speak I noticed my face and fingers got very cold.

"Andy, that was your tape we saw on the network news, wasn't it? The new tower was going up, the men were up there . . . " I couldn't finish and had to leave the living room.

Well, it was my fault, I did ask for "horror stories." I sure didn't expect this one. Most of what I had garnered for this note were funny stories.

Andy's tale was a kick in the gut which made me feel very fragile, very mortal and extremely alone. In fact, the living room was entirely empty once I returned.

Show me anybody who's in radio for the duration who doesn't passionately love what they do for a living. I've been here since 1977 and it's still fun, challenging, aggravating, endearing and still very confusing. These are the stories—good and bad—that keep us talking about it with the same wonderment and love we've always had and always will.

Whether these tales are excruciatingly funny or deeply soul-stirring, they tell us more about who and what we are in ways that are just too fleeting to write about. But I'll keep trying.

I hope to get this wish again next year. May the next twelve months bring more great tales to tell. And fewer heartaches for all of us.

Reaching for the Stars,

—Al

■ ■ ■

Al deeply thanks the aforementioned CEs for their true anecdotes, with sincere gratitude for allowing him to relate them in a flight of fantasy.

Built to Survive The Morning Zoo

Don't let its stylish chassis fool you: Micromax® is engineered from the inside out to handle everything your crew can throw at it. The way DJs in a hurry sometimes "slam-start" carts, for example. Ordinary cart machines can't always keep up with that kind of treatment. But Micromax's belt drive flywheel/capstan and DC servo pinch roller motor roll with the punches—they deliver smooth, wow-free starts in as little as 60 milliseconds.

PR&E engineers designed Micromax to the same high standards of dependability and efficiency as a Pacific Recorders console. In fact, it actually runs so efficiently that cooling vents are unnecessary. Cooler components are longer-lived components— and this is the coolest cart machine made.

It's loaded with standard features, too: Replay Inhibit, three cue tones, cue erase, auto fast recue and many more. Including Pacific Recorders' Maxtrax® tape heads* with matched electronics for outstanding audio quality.

On performance, features and reliability, Micromax will go head-to-head with any cart machine you can name (except, of course, our own Tomcat®). Yet its manufacturer-direct price will make extremely efficient use of your equipment budget. So if things sometimes get a little wild in your studio, your next step should be clear. Call PR&E for more detailed information on the cart machine that's engineered to hang tough and stay cool—Micromax.

PACIFIC RECORDERS
& ENGINEERING CORPORATION

2070 Las Palmas Drive ▪ Carlsbad, California 92009
Tel: 619-438-3911 ▪ Fax: 619-438-9277

* NAB-format heads are available at no extra cost.

Tapping into a Computer BBS

by Barry Mishkind

Tucson AZ As we continue to explore the use of computers in your station, one of the areas we can't ignore is that of computer BBS, or bulletin board services.

These electronic information boards provide resources that can make a positive difference in productivity all over your facility.

For example, without leaving the station, your sales staff can connect up to an on-line listing of co-op sources that can lead to increased sales to local advertisers.

The station manager can check the latest FCC news and filings, world business news, or the value of his stock portfolio. Your bookkeeper can access a number of financial services, including credit checks.

The wide world of telecom

There are many engineering services, ranging from calculated average terrain elevations to protection and service contours to databases to utiltity programs to assistance and advice.

Sound interesting?

Just by hooking up a modem between your computer and the telephone line and running a simple program, you can dial out and connect up to anything from a printout of tire dealers to a real time "conversation" with others like yourself.

You may connect to a large network or a private computer; each has its own advantages.

One network is CompuServe. Others include the Source, MCI Mail and Prodigy. Originally large mainframes selling excess or unused nighttime capacity, these networks have turned into highly popular sources of information, games, E-Mail service and more.

Yes, there is the matter of costs. Calling distant services can generate long distance charges. And when using the services of some vendors, you incur charges for the time used.

Some networks moderate this with local access numbers. (Also, there is one long distance data service that features significantly reduced cost access.)

Without a large long distance bill, a user can send E-Mail to a whole list of stations or individuals, who can retrieve it directly into their computers instantly or at their convenience.

Dialing in

Again, in order to reach these on-line services, all you need is a modem and a telecommunications program. That is actually easier than it sounds.

ECLECTIC ENGINEER

Common 1200 to 2400 baud internal modems are easily obtainable at $100 to $200 and can usually be installed in under five minutes (most of which is for removing all the "things" piled on top of your computer).

There are many good telecommunications programs around. Some are expensive, some very inexpensive shareware. And, as I said, some services (MCI Mail for one) even provide a custom program for access.

What's out there?

CompuServe, the Source and others like them are commercial general purpose networks. You can access everything from daily news and stock prices to airline schedules to E-Mail.

CompuServe also has a well-supported broadcast section, known as BPFORUM. Administered by a number of individuals including an FCC staffer and a programming support fellow (I don't want to say joke service), it covers the gamut of the broadcast field.

For example, one section lists FCC activity. Another has a number of local SBE chapter newsletters. Yet another is a discussion area.

In addition to engineers, a number of air personnel and management, as well as manufacturers check in to these areas for exchange of information.

Your sales department may be interested in RABCOOP, a BBS run by the Radio Advertising Bureau. RAB provides promotional ideas and coop advertising material.

While more expensive per minute than some other services, one new sale can pay for its use very quickly.

Broadcast Data Services, Communications Data Services, Dataworld and others provide on-line services such as a current FCC database.

They can list all stations on a specific frequency, or within a certain radius of your facility. The GM might want a list of all recent applications affecting the area.

A channel search can be performed, to see if a planned upgrade is possible. Or, it can be used to check on the HAAT (height above average terrain) of your site.

More exotic services, such as shadowing studies, coverage maps, directional antenna design and more are available.

Private BBSs

Another area that holds a great deal of interest are the private BBSs that exist around the country.

In some cases, SBE chapters have put

(continued on page 24)

Exploring Radio's Outer Limits

(continued from page 19)

Voice-patch technology had evolved much in the same way drum machines had in the 20th century. The first drum machines used artificial replications of waveforms that were very similar to the waveforms produced by real drums.

Although the A/D/S/R (attack/duration/sustain/release) parameters of real drum sounds could be easily reconstructed, the lack of accuracy in the fragile harmonic structure caused the first synthetic drum sounds to be noticeably different than their real counterparts.

Just as these "man-made" drum sounds were accepted by the culture as something "new and trendy" during the polyester-disco era in the late 1970s, so were the first computer-generated voices.

"These distinctive ear-catching life-like voices give your radio station the powerful and unique sound it needs . . ."

They sounded . . . well . . . unusual. Which is exactly how they were positioned by the companies who sold them.

"These distinctive ear-catching life-like voices give your radio station the powerful and unique sound it needs to cut through the clutter."

The money a station would save on production-voice steroids alone would more than pay for the new technology. Besides, steroid-pumped jocks had a short life expectancy.

First used as voices on station IDs, drop-ins and promos, their use was soon expanded to cover entire airshifts. In the central processing unit (CPU) were Rhetoric Files in which were stored all the "'right" things to say.

It was all there: all of the positioning lines; time, temperature and weather variations; intros and outros; applicable humor updates.

Broadcast sysop

As a Broadcast Sysop, PR3 also kept track of a high-speed relational data base with mega-storage archives which kept track of people and events, incoming "buy order" data and all other station functions.

Sysops controlled the degree of program integration based on the positioning data and specific syntax data from the research department.

Even the music the stations played was "delivered" via optical data streams. During PR2's era, it was found that the key a song was played in was very important. The researchers in PR3's generation had taken it a step further.

They found it was the changes in key from song to song that that had an effect on the listener. As a result, the appropriate key changes were programmed into the music computer.

Because the music was in the form of optical data, it could be changed by the Sysop's software to conform with the key changes.

This meant that the same song might be heard in a different key, depending on the time of day or where it was in the music rotation.

PR3 smiled when remembered how his grandfather had talked about the radio business of long ago. The Rad Biz of today made radio in the 1990s seem prehistoric.

■ ■ ■

Ty Ford had a series of bad chromium pizzas for lunch for several weeks before beginning to write this article. After finding that they obviously affected his writing style, he suggests that everyone pay more attention to what they eat!

An Overview of Digital Devices

This is the sixth in a 12-part series called An Introduction to Digital Electronics. *Northern Virginia Community College will offer 1.3 CEUs (continuing education units) to registered students who successfully complete the course and an examination mailed at its conclusion.*

Successful completion of the course and the final exam will also earn 1.3 professional credits toward recertification under the maintenance of certification provisions of the SBE Certification Program. To register, contact the Director of Continuing Education, Annandale Campus, 8333 Little River Turnpike, Annandale, VA 22003, or call 703-323-3159. The fee for the course is $20.

by Ed Montgomery

Part VI of XII

Annadale VA Digital devices consist of numerous gates combined in a capsule known as a chip. A specific amount of power is required to operate the devices; they also have output limitations that cannot be exceeded.

A digital integrated circuit's "fan-out" is the number of inputs a single output of a chip can drive. The load represented by a single input is known as "fan-in." These characteristics vary for each family of chips.

A very simple device that can supply a chain of digital pulses is the 555 timer. It is a small chip consisting of 23 transistors, 16 resistors and two diodes. All of these components are installed in an eight-pin DIP (dual in-line package).

The 555 consists of two comparators, a flip-flop and an output stage. The comparator examines two numbers and decides whether they are equal. Figure 1 is an example of a four-bit comparator. (An illustration of what actually is in a 555 timer is found in Figure 2.)

An exclusive OR (XOR) gate is used in the Figure 1 circuit. In this example the number 00 and 10 are compared. If any corresponding bit is unequal, a "1" is fed to the NOR gate. If the corresponding bits are equal, a "0" is produced. (Note the output of gates A and B. The output is low-level if the numbers are unequal and high if they are the same.)

A flip-flop circuit has two outputs. When one output is 1, the other must be 0. One side of the flip-flop is considered to be set. If the outputs change, then the circuit is considered to be reset or cleared. This is the function of the trigger input on the 555. A block diagram of the 555 is illustrated in Figure 3.

The 555 timer is a very simple device that can be used to understand how a chain of digital pulses can be used to perform specific electronic tasks. Figure 4 is an example of how a 555 can divide an incoming frequency to a lower frequency.

The 555 is wired to external components to make it a monostable multivibrator. The device is also known as a one-shot because each positive impulse will produce a positive output pulse. R_1 and C_1 create a time constant that controls the frequency of the output.

Once an input pulse activates the time constant circuit, subsequent pulses of the input chain have no effect on the output. The frequency can then be changed. Feeding the pulses to a resonant circuit can change them into sine waves.

Another examnple of how a 555 timer can be used is illustrated in Figure 5. Here the device can change digital information into an analog signal. A pulse chain is introduced to one of the comparators and its output is measured across meter M. R_5 is used to calibrate the signal to correspond to markings on the meter face.

Another circuit that is important in digital electronics is the trigger. A trigger can respond to either positive or negative edges of a pulse. Figure 3 illustrates this.

The 555 timer has a trigger input connected to one side of the flip-flop. In the frequency divider circuit, it handles the input frequency to be divided.

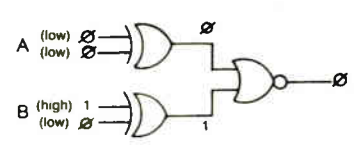
A Schmitt Trigger is a unique circuit used to take an analog waveform and "square" it up for digital purposes. The Schmitt trigger can be set or adjusted to where it should turn on or off.

The Schmitt Trigger operates on upper and lower threshold levels. Figure 6 illustrates a sine wave chain of puses with the upper threshold at level 1 and the lower at level 2. When the upper threshold voltage level is reached, a pulse is generated. The pulse voltage level is maintained until the lower threshold is achieved. Thus a digital pulse chain is produced from a sine wave input.

■ ■ ■

Ed Montgomery currently is an electronics teacher at Thomas A. Edison High School in Fairfax County. He has taught broadcast engineering at Northern Virginia Community College and worked as broadcast engineer for several radio stations.

Figure 1.



C = comparator
1 = ground
2 = trigger
3 = output
4 = reset
5 = control voltage
6 = threshold
7 = discharge
8 = supply voltage

Figure 3.

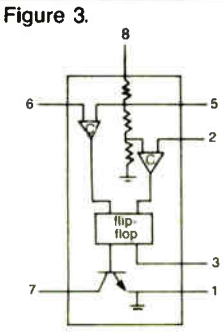


Figure 4.

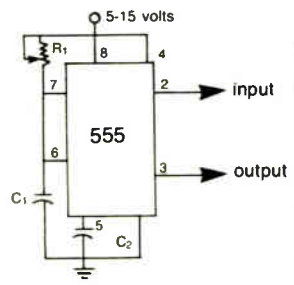


Figure 2.

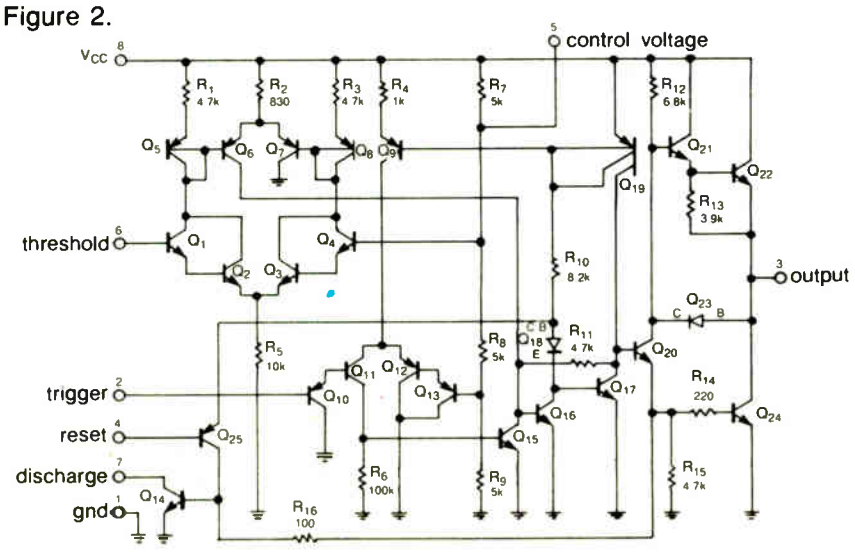


Figure 5.

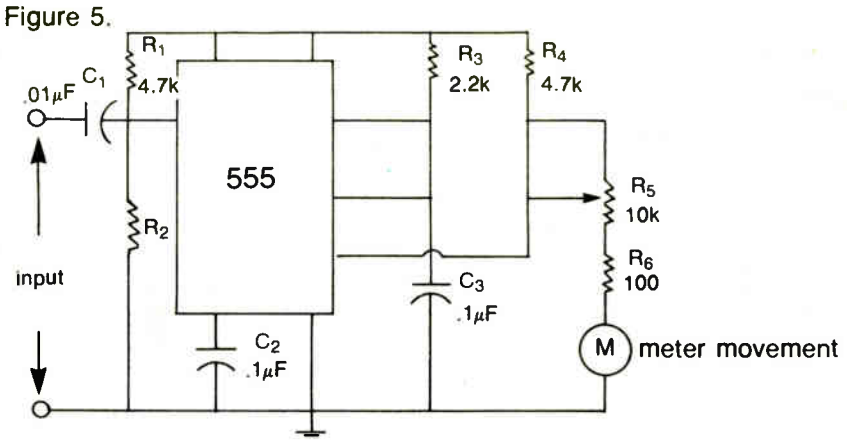
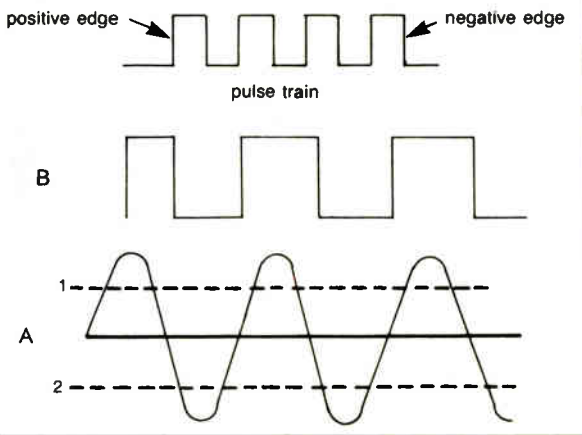


Figure 6.



Bulletin Board Use

(continued from page 22)

local RPU assignments into a database that can be accessed. This can save a lot of time in planning a new STL, or a remote broadcast in these days of overcrowded airwaves.

Others are more of a "chat" type BBS, where local engineers (and those that call in from around the country) can exchange views, find out "what's new," or just track down some needed information.

A few are devoted to developing and sharing utility programs of interest to others.

There seem to be a lot of BBS numbers listed in various locations, including a fine article and listing put out by the NAB last May. (NAB members: Check your packet.)

However, as some come on line and others disappear, it is hard to know accurately what is out there.

Due to the rising interest, **RW** will be printing a periodic update of BBSs of interest to the broadcast community.

If you know of a BBS that should be on this list, please drop me a line with as much information as possible: phone number, location, who runs the BBS, fees (if any), special features, etc. Conversely, if you know of any problems or defunct BBS, we'd appreciate that info, too.

Please send information, suggestions or comments to me at 2033 S. Augusta Place, Tucson, AZ, 85710. Your input will make a difference. Thanks.

■ ■ ■

Barry Mishkind, aka **RW***'s "Eclectic Engineer," is a consultant and contract engineer in Tucson. He can be reached at 602-296-3797.*

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Circle 40 On Reader Service Card

Starting Fresh in Fayetteville

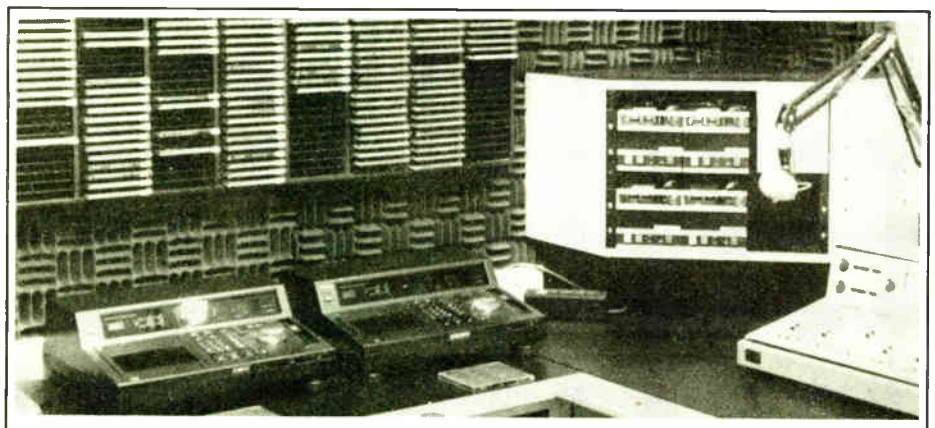
by Dee McVicker

Fayetteville NC They used to dub it as the station on the edge of town. But those that used to listen to WRCQ-FM know that it was really a station on the edge of *sound*. A 3 kW station licensed and located in Dunn, NC, WRCQ-FM had gone dark on 13 October, 1989.

FACILITIES SHOWCASE

In November 1989, Metropolitan Broadcasting of North Carolina acquired the station, complete with a hand-made console and a nest of wharf rats, which had made their home in the station's trailer just outside of Dunn.

The owners had no choice but to park their new station temporarily, until they could move from a facility on the edge of Dunn to the tallest building in Fayetteville, NC.



The air studio at WRCQ features Technics SL-P1200 CD players (left).

It was an enduring few months. GM Ron Walton, who had arrived in Dunn to turn the station around, hired an exterminator and contracted an engineer.

The exterminator reported that the rats had won and the engineering consultant jibed that the only thing holding up the roof of the transmitter building was the transmitter itself.

Walton gritted his teeth and rolled up his sleeves; he wanted the station out of Dunn as fast as possible. "We made a bee-line," he said, to Fayetteville.

Along with the new studios in Fayetteville, WRCQ-FM also took on a new persona and power. Formerly a 3 kW with an urban contemporary format, which didn't favor with listeners against a more entrenched urban station in the market, the station moved up in power to a gigantic 50 kW and changed its format to classic rock.

In a meeting that took all of two hours, Walton roughed out a drawing of what would become a new on-air studio and two production studios in the Wachovia building.

From paper to glass

Only two weeks in Dunn, enough time to find rats even more repugnant, and Walton already had a building for the station and studios laid out on paper. All that remained was to transfer the new station from paper to a glass building in Fayetteville.

Broadcast Support Group, Inc. out of Chapel Hill, North Carolina, was hired for the project. A new up-and-coming engineering firm, Broadcast Support put to task its unique engineering approach to studio design.

"We try to spend time with the programming people," explained Broadcast Support President Jerry Brown. "That's our strong point."

To open up the lines of communications between those engineering a new studio and those who would use it, the firm enlisted the help of a 20-page survey. From this document, an equipment list was drawn up which was then matched against the station's budget.

The engineering firm went one step further into programming turf. Burkhart Douglas and Associates, the group's programming consultant, was called in by Broadcast Support to provide an even more encompassing picture of the sound and equipment WRCQ would require.

Upgrading to disc

The most important audio upgrade, all agreed, was to change the on-air library to compact disc. GM Walton brought in a Century 21 CD library as the station's programming base.

Meanwhile, Broadcast Supply did its part by recommending the new Technics SL-P1200 CD players and bringing in a personal computer and a Radio Computing Services selector software program to rotate music. The station's RCS program selector ties into Burkhart Douglas' RCS system for on-line programming changes to the format.

The group outfitted its studios with Graphic Express furniture, a decision Walton wouldn't hesitate to make again. Not only did the furniture meet a tight deadline, it more than met the aesthetic appeal the group was trying to accomplish.

The building was likewise amiable to a tight deadline. Two television stations, a radio station and the FBI also reside in the Wachovia building, making the introduction of communication equipment less of a problem.

The only difficulty, said Walton, is that satellite downlink is virtually impossible for the station, due to antenna and dish congestion on the roof. Currently, Walton is considering tapping off of a satellite feed which already exists in the building.

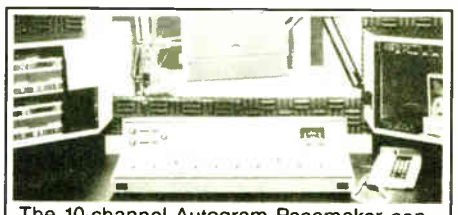
Delivering the news

Without a satellite feed the station relies on its staff to deliver local news. Newscasts, however, are not the primary emphasis of WRCQ's classic format. For this reason, as well as space restraints, one of the two production studios doubles as a news room.

Production A includes Otari MX5050B-II reel-to-reels.

The secondary production studio faces the control room for interactive news and on-air programming. "The newsperson also doubles as a sidekick for the morning show, so it's very important that the two have the ability to interact with each other between the two rooms," said Walton.

Walton also felt it imperative that the station be able to interact with the public, which is why the secondary production studio is visible through a window from the reception area.



The 10-channel Autogram Pacemaker console PM-1032 (center) was WRCQ's choice for its air studio.

"This certainly gives you the feel for a radio station," commented Walton, who had decided against putting the on-air studio off to the reception area because this would distract on-air personalities.

Salvaging equipment

The only salvageable source equipment from the old facility in Dunn were two Otari MX5050B-II recorders. These reminders of WRCQ's past now reside in the on-air studio and several more Otari MX5050's were brought in to out-

(continued on page 27)

Discovering Digital Broadcasting

Editor's note: This is the first of two Consultant's Corner *columns examining the Eureka 147 digital audio broadcasting (DAB) system.*

by Steve Crowley

Washington DC Digital program sources are proliferating in the studio—and even more so at home. Through compact discs, the consumer is increasingly conscious of digital quality. Broadcasters, however, remain unable to deliver that digital quality audio to the listener because of inherent limitations in our analog broadcasting system.

The idea of digital audio broadcasting (DAB)—transmitting a digital representation of audio—has been around for some time. Experiments have produced outstanding audio quality, but at the price of bandwidth so wide it hasn't been practical for general use.

The bandwidth obstacle has apparently been overcome by a consortium of European research institutes and consumer electronics companies in the Eureka 147 digital audio broadcasting project.

Originally created for satellite audio transmission, the developers also see it operating terrestrially in the VHF or UHF band to offer CD quality sound and make possible a complete digital program chain.

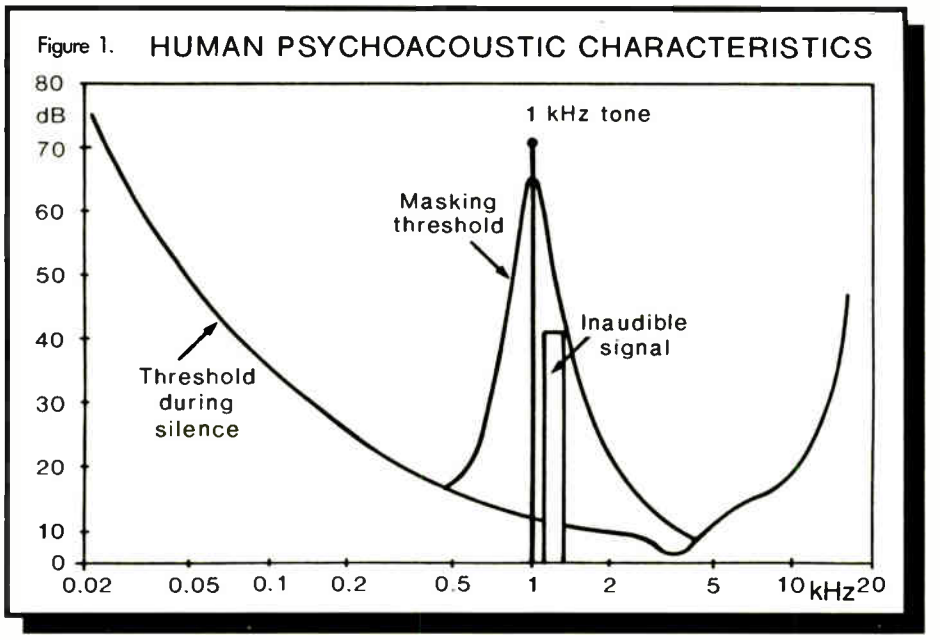
CONSULTANTS CORNER

Among the system's features are frequency response to 22 kHz, low transmitter power, no multipath distortion and more efficient spectrum utilization than FM—16 stereo channels can be placed within a single 4 MHz block.

The developers see it as a replacement for FM broadcasting; it's incompatible with existing receivers.

With claims like those, we ought to take a closer look. A key to the reduced bandwidth requirement is digital processing of the program material before transmission. This begins with analog to digital conversion of the left and right audio channels.

Figure 1. HUMAN PSYCHOACOUSTIC CHARACTERISTICS



Using a 16 bit word and sampling at a 48 kHz rate, a combined data stream of 2×16×48,000=1,536,000 bits per second is generated. A data reduction process then cuts this rate by a factor of six to 256,000 bits per second.

Losing information?

The lower bit rate allows for narrower bandwidth, but isn't audio information lost? Yes, but remember: the Eureka 147 system is said to produce CD quality sound; it cannot physically reproduce the CD waveform because of the lost data.

In digital audio systems, (this one included) fewer bits mean more noise. The idea here, however, is to keep the noise imperceptible to the listener.

This system relies heavily on psychoacoustics. The accompanying figure is a response curve of the ear's sensitivity as a function of frequency, with the highest sensitivity at mid-range. Let's assume a 1 kHz tone is being heard. That tone tends to "mask" other frequencies closest to it.

Given equal audio levels, a second tone at 2 kHz will be more apparent than one at 1.1 kHz. Audio or noise within the masking threshold will be less apparent.

The Eureka 147 system performs an instantaneous spectral analysis of the audio to compute an instantaneous masking pattern.

Then, the number of bits needed to represent each spectral value is determined with reference to the masking pattern. The number of bits is reduced (and noise increased) as much as possible, keeping the noise below the masking or hearing threshold.

Improving performance

Additional coding takes place to reduce redundancy and improve performance in the presence of errors. Even with a six-fold reduction in the bit rate, there is claimed to be no discernible difference under critical listening conditions.

Now that the audio data rate has been reduced to a practical level, it's ready for transmission.

In my next column, we'll see how the Eureka 147 system uses frequency and time interleaving of the data to produce a signal that is immune to multipath. Some real-world concerns such as spectrum availability and receiver design will be looked at as well.

■ ■ ■

Steve Crowley is a registered professional engineer with the consulting firm of du Treil, Lundin & Rackley, Inc. He can be reached at 202-223-6700.

WRCQ-FM Moves Up

(continued from page 26)

fit the secondary and the primary production studios.

Other source gear include Fidelipac CTR10 series cart machines, Technics SP-15 turntables and Nakamichi MR1 cassette recorders.

The old on-air console was replaced by a new 10-channel Autogram Pacemaker, the PM-1032. Another Autogram Pacemaker, the 8-channel PM-828, can also be found in each production studio.

For audio effects equipment in the primary production studio, the group elected to purchase an Orban 674A parametric equalizer, and an Eventide H3000B Harmonizer.

Walton is particularly impressed with the Eventide, stating, "I was amazed at all the things this equipment can do."

In terms of termination

With only 2200 square feet for studios and offices, Broadcast Support Group gave serious consideration to termination. Instead of a termination room, which would have eked out valuable space, the firm engineered cut-over panels in each studio.

Explained Brown, "We mounted punch blocks (in each studio) for cut-overs. Then we brought the various sources from each room into that area and cut them over to the different studios they needed to go to."

Space limitations or not, an EBS system was one item on the equipment list that was not up for debate.

Recent tornados and hurricanes on the Eastern seaboard in general, and North Carolina in particular, demanded an EBS system that was reliable and functional at all times. Broadcast Support recommended the new TFT 887 encode/decode system.

On 2 February, the station went on the air in Fayetteville. It was almost two months to the day that the group began renovation of WRCQ-FM and Walton had encountered his first wharf rat scurrying across the floors of the old trailer facility.

■ ■ ■

Dee McVicker is a free-lance writer and regular contributor to **RW**. *To inquire about her writing service, call 602-899-8916.*

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It removes resistive oxides and forms a protective molecular layer. It maintains maximum electrical conductivity and prevents contamination.

For information, call **Lisa Duce at Caig Laboratories: 619-743-7143** or circle **Reader Service 27.**

Bench multimeter

The Fluke 45 is a multimeter with a multifunction dual display. It is a 5 digit, 100,000 counts meter which includes a built-in RS-232 interface for PC instrument applications.

The unit carries a standard one-year warranty. An optional two-year warranty extension is available.

For information, call **Sue Whitcomb at Fluke: 206-356-6433,** or circle **Reader Service 03.**

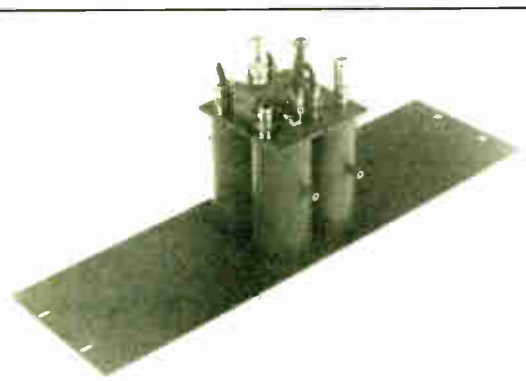
Portable DAT

The Panasonic SV-255 portable DAT recorder is equipped with microphone preamps which offer a low 128 dB (EIN) signal-to-noise ratio.

A true gain control attenuator ensures optimal dynamic headroom. A dual-channel mono recording mode can incorporate normal-level channels into clipping.

It has 18 dB per octave filters which provide enhanced phase and frequency response.

For information, call **Gene Juall at Panasonic: 714-373-7278** or circle **Reader Service 42.**



Mutual trap diplexer

The Model 6511 diplexer combines an STL studio receiver and transmitter, or the two corresponding tower antennas. It allows both re-ceive and transmit to operate on one tower coax cable.

It uses a mutual trap method of diplexing which prevents transmit signal interference.

For information, call **Elizabeth Buck at Microwave Filter: 315-437-3953** or circle **Reader Service 15.**

Pushbutton attenuator

Trilithic Incorporated of Indianapolis has announced a new series of modular pushbutton attenuators, which is well suited to high volume production applications.

The modular design allows the user to specify total dynamic range to 102 dB and resolution as low as 0.25 dB. The quantity of cells can range from 3 to 9. The frequency range is up to 750 MHz and has an impedance of 50-75 ohms. Return loss is specified at 20 dB.

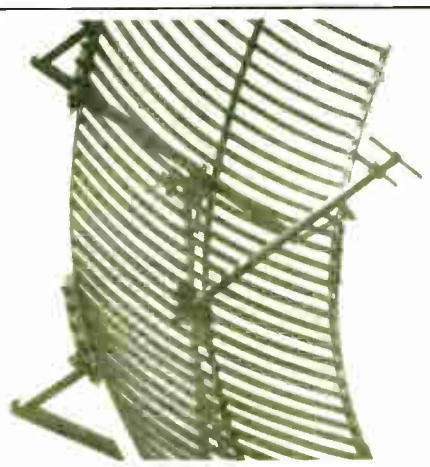
For information, call **Dave Distler at Trilithic: 317-545-4196** or circle **Reader Service 73.**

Active studio monitor

Studer has developed a powered 3-way speaker with a maximum sound pressure level of over 106 dB.

Each crossover has a dedicated output amplifier (100 W each) with negative output impedance.

For information, call **Dave Bowman at Studer Revox: 615-254-5651** or circle **Reader Service 30.**



Short haul antenna

Radiation Systems Inc., Mark Antennas Division, has developed a super short haul antenna, complete with a welded aluminum grid, to provide point-to-point communication in the 940-960 MHz frequency range.

For information, call **Sharon Krause at Radiation Systems, Inc.: 708-298-9420** or circle **Reader Service 23.**

EBS monitor

Multi-Technical Services has devised the System 1000 EBS Monitor. The System 1000 incorporates the EBS encoder, the decoder, and an FM receiver into a single rack space enclosure.

The System 1000 features a continuous automatic self test, alarm relay, an independent encoder output, and full program audio loop through.

This EBS Monitor weighs only 5.8 lbs., and can operate in temperatures ranging from 0 to +50°C.

For information, call **Lyn Williams at Multi-Technical Services: 919-553-2995** or circle **Reader Service 94.**

200 kW dummy load

Altronic Research Inc., recently added a 200kW dummy load to the Omegaline 5700 series.

The 57200B model is a water cooled load with the capability to maintain service at 200,000 watts of RF power. The 57200B is equipped with a VSWR of less than 1.10 to 1 through 450 MHz.

The 57200B single resistor design allows for a 45°C inlet water flow of only 19 gpm.

For information, call **Doug Starkey at Altronic Research Inc.: 800-482-LOAD** or circle **Reader Service 75.**

Radio World®

BUYERS GUIDE

Monitors, Microphones, Turntables & Preamps

ATM25 Packs Punch at KQEU

by Brian Walker
KQEU-AM

Olympia WA Studio microphones have always been a sore spot for me as far as broadcast equipment goes. All too often, they're much larger than they need to be and too fragile for an active format. What's more, they have very strange colorations when the announcer gets a little off axis and for the most part are too expensive.

USER REPORT

I've been interested for a long time in finding a reasonably priced studio quality microphone that is compact, low in off-axis coloration, has a tight cardioid pattern and good back-side noise rejection.

Stroke of luck

A few weeks ago, Pat Medved at Broadcast Supply West and I were talking on an unrelated subject when he asked if I would be interested in trying out a new microphone from Audio-Technica.

The ATM25 from Audio-Technica adds punch to voices with low-end boost.

He didn't know my opinion on microphones, but when he started mentioning things like fairly small size, hypercardioid pattern and a list price of $235 my interest was piqued.

Pat sent the mic and when I opened the box, my first thought was that the ATM25 was too small. Measuring only four and a half inches long it prompted my reaction: "The air staff is going to eat this microphone for lunch!"

I figured the best person to try out this microphone was our Production Director, Carl Cook. Carl has a long background in recording studios and the most finicky ears on the staff.

He has worked with the best studio mics around and I knew that if the ATM25 had a chance, it would be Carl who would make that decision.

I took the ATM25 into the studio, removed the microphone that was already in service, put the ATM25 on the air and explained to Carl that I wanted him to put this mic through its paces.

At this point, I got a fresh cup of coffee, returned to my office and prepared for the worst.

An hour later, I returned to the studio to see how Carl was doing with the mic. Phrases that I had not expected to hear came forth from his mouth.

Statements like: "This is great! It has a very natural, yet warm low-end to it. The highs are crisp and amazingly clean. The feedback problem that I've always had from my open-ear headphones is gone!

"I can see the copy-board without the microphone getting in the way and the best part is that you can't hear the tape decks start when you're on the air!"

More of the same

Of course I was quite happily surprised. Since then, I have loaned the Audio-Technica ATM25 to anybody willing to give it a try. Without fail, the response has been the same from everybody.

"What a great little microphone! I want one!" The only negative comments that I heard concerned its relatively small size and the fact that it took a little while to get used to it.

Because of the hypercardioid pattern and the ATM25's relatively high sensitivity, a little care in equipment placement must be exercised.

If your tape decks are directly in the ATM25's pattern, there is a good chance tape deck mechanical noise will be picked up. Fortunately, the ATM25's pattern is fairly tight and mechanical noises that approach the microphone off-axis are rejected.

The ATM25 has turned out to be far more of a microphone than its small package would make you think. It has an extremely warm, fat low end that lends a richness without any muddiness and a high end that is very crisp and clean without being harsh.

The biggest surprise came when we tried out the ATM25 on female voices. Quite commonly, female voices that are very high with little resonance come out sounding real thin.

With the ATM25, the female voices come across clean and crisp with just enough low end warmth to create a most pleasant sound on the air.

The ATM25 has turned out to be far more of a microphone than its small package would make you think.

On the technical side, the ATM25 packs a great number of features in a very small case.

Good things in a small package

Originally designed as an instrument mic for use on tympani, piano, string bass, cello, harp and drums, (it works great on congas!) the ATM25 is particu-

(continued on page 39)

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Gentner 6X Affords Flexibility

by Jeffrey Breitner, CE
WDFX-FM

Detroit MI If you had to sum up flexibility with one product, the Gentner 6X headset/speaker amplifier is a good candidate. The 6X provides the capability to drive multiple headphones, cue speakers, long cable runs and even background music/paging monitors. The uses for this equipment are limited only by the imagination of the user.

The 6X was purchased by WDFX to drive headphones in a new production studio. While most consoles have the ability to drive headphones, adequate headroom is not always a reality. A common method of rectifying this is to use a high quality medium powered speaker amplifier.

USER REPORT

By feeding the amplifier audio from the console headphone control output, the console operator has local control of headphone volume. Additional headset feeds necessitate having yet another amplifier and the associated parts for independent control of each feed.

This scenario can easily cost well over $1000! Try to justify that expense with an owner or general manager.

The 6X provides the ability to drive multiple headsets with one or as many as six different feeds. Each has independent control.

Versatility

The most versatile feature of the 6X is the ability to insert an audio feed into any of the six independent amplifiers with or without mixing in the master input. This provides an enormous amount of options for studio use.

For example, the master input can be a straight feed from any one of the program busses in the studio. Each output is independently controlled, therefore each headset user is free to adjust the volume to his or her preference.

For the producer or air talent who normally controls headphone volume at the console, the headphone feed is taken from the console control and inserted into a single amplifier.

The 6X is an attractive piece of gear; there is no problem putting it in a conspicuous place. Input and output connections to the 6X are made in back of the unit by three-conductor quarter-inch phone plugs (tip-ring-sleeve). An additional set of output jacks are located on the front panel for headphones.

Control of each output amplifier as well as the master input gain is accomplished at the front panel. Green LEDs signal the presence of audio and serve as a good indicator of which feeds are active.

All of the 6X options are set by internal jumpers. The jumpers allow each input and output to meet the needs of the situation—whether stereo, mono, balanced or unbalanced, or having the master input mixed with a direct input. Jumpers also set the power of each output to 500 mW or 2 W. The 500 mW setting is for protecting the ears of headset users and in most cases is more than adequate.

Use caution with jumpers

One word of caution about the jumpers: don't try to set them without the manual in hand. While setting a 6X to meet the needs of your station is far from brain surgery, trying to do it without a manual will result in far more stress than necessary. Before purchasing equipment, it's always nice to know what servicing entails. The 6X is designed for easy field service. The double-sided printed circuit board unscrews from the chassis and can be removed with the front panel attached in a quick five minute operation.

All of the ICs are soldered directly to the circuit board. This is a minor inconvenience because in order to avoid injury to the thin copper traces, offending components must be cut away from the board and their leads individually desoldered.

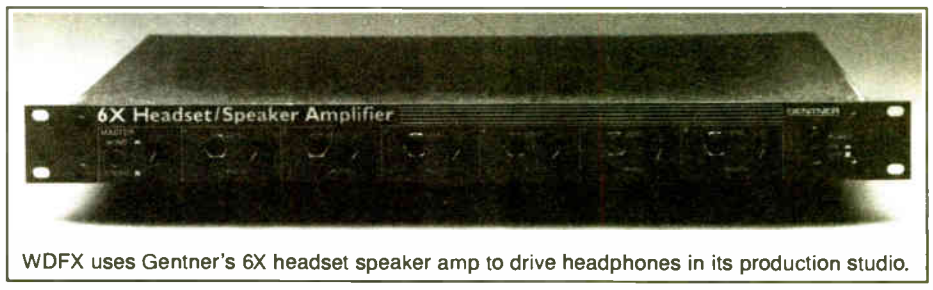
Aside from one failure, the 6X has performed perfectly. There have been no complaints of not enough volume, no audio clipping in high impedance headphones and no other anomalies associated with marginal amplifier design.

The 6X fills all needs for a flexible and quality headset amplifier that meets serious budget considerations.

■ ■ ■

Editor's note: Jeff Breitner is a licensed ham operator and a hopeless computer addict. He is also completing his BSEE at Lawrence Technological University. He can be reached at 313-398-1100 or on CompuServe 76276,2772.

For more information on the 6X headset speaker amp, contact Gary Crowder at Gentner Electronics: 801-975-7200, or circle Reader Service 6.



WDFX uses Gentner's 6X headset speaker amp to drive headphones in its production studio.

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Digital Output	▼	▼	
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Cue Memories		3	

FEATURE	A727	A730	"Brand X" Player
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Varispeed Built-in		▼	
End of Modulation Sense		▼	
Monitor Speaker		▼	
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Circle 65 On Reader Service Card

UPI Circles Globe with Tannoy

by Sam Brown, CE
UPI Radio Network

Washington DC When shopping for monitor speakers, you'll generally have just a few choices. Big expensive high-quality monitors aren't hard to find. Smaller high-end speakers may sound good but the prices generally don't.

The sound and appearance of "blue-light special," single driver, "just $29.95 a pair" units is downright embarrassing; consumer speakers, while relatively cheap, will not withstand the rigors of remotes or the onslaught of wattage when your slightly deranged weekend overnight jock takes the controls.

In steps Tannoy with the PBM 6.5.

Here at UPI Radio, our product is news. What we need on the road and in the field is a good, reliable, no-nonsense monitor at a reasonable price. The overall audio quality must be good enough for us to tell what our reports will sound like.

USER REPORT

With satellite, telephone, leased-line and tape as potential input sources, we need to produce a product that will satisfy listeners of the stations and networks where UPI is heard.

Speakers heard 'round the world

On the other hand, while we demand a lot from our speakers, we don't promise them tame living conditions. UPI's equipment may be set up as a temporary studio anywhere in the world.

Our Tannoy monitors have already traversed the globe, seeing two political conventions, the Olympics, an election and an outdoor presidential inauguration in January.

With all of this, however, they are still in good condition and functioning as spare monitor/cue speakers here in Washington.

Seek and ye shall find

When UPI was looking for the just-right speaker, we followed the usual procedure—first looking in the trade publications, next asking around among other Washington/Baltimore area engineers. Then we called Neil Glassman at Bradley Broadcast Sales, who recommended the Tannoys.

My first tendency was to be skeptical, since Tannoy has not made small broadcast speakers before. I've been buying from Neil for almost 10 years, however and his recommendations have made me a tech-hero on at least several occasions.

What we got was exactly what we wanted: a reasonably priced, durable small speaker. They are sold and shipped in pairs at manufacturer's suggested list price of $338 (actual prices will be lower, however).

You can generally expect to pay under $300. Even if you don't need two, an extra general-purpose speaker never hurt any broadcast operation.

Facts and figures

Tannoy, a British company, has been making speakers since 1926. Perhaps its best known innovation is the co-axial speaker which was introduced in 1947.

Tannoy's PBM 6.5 monitors stand up to tough use by UPI.

Currently, Tannoy's main market is the recording industry which uses the company's high-end products as reference monitors. In addition, Tannoy manufactures some consumer speakers and in the last few years have entered the broadcast arena with the PBM series, which is made in Canada.

The PBM 6.5 is a two-way unit with a 6.5″ woofer and 0.75″ tweeter. Maximum power handling capability is lOO W, but they shouldn't require too much power with a respectable 90 dB SPL/watt/meter efficiency rating.

Tannoy PBM 6.5s will run quite adequately from the internal monitor or cue amps on most boards, yielding infinitely better quality than the 3″ built-in speaker.

The frequency response is sufficient for most purposes with a ±3 dB range of 57 Hz to 20kHz. In this same series Tannoy also makes the PBM 8 which has an 8″ woofer and extends its ±3 dB response from 47 Hz to 20k.

With an 8 Ohm impedance rating, the Tannoys are compatible with all standard amplifiers and monitor outputs. Connection is accomplished via red and black binding posts/banana jacks, spaced at ¾″, which matches most plugs.

Binding posts offer a more permanent connection to a greater variety of wire gauges than spring loaded push-on terminals.

A vinyl matte grey exterior with black grillcloth front gives the PBMs a neutral appearance that will make it seem equally at home in 1990's most modern digital studio or next to the battleship gray Gates console with the Tapecasters on top.

I could not recommend PBM 6.5s as primary monitor speakers in a production studio or in the air studio of an FM music station. While their sound is good, they don't have the booming bass or piercing treble one would get from the types of speakers made for serious music listening.

But with a reasonable price tag, and durable design for voice production or cuing, they're just what the doctor ordered.

■ ■ ■

Editor's note: Sam Brown, chief engineer of UPI Radio Network, is involved in many aspects of the radio and telephone industries. He can be reached at 202-898-8115.

For more information on Tannoy monitor speakers, contact Neil Glassman at Bradley Broadcast Sales: 301-948-0650, or circle Reader Service 62.

SMI-5A Offers Intercom Solution

by Chris Ostrander, CE
KUDL/WHB

Kansas City MO Each year, our engineering staff gets together with the air staff to discuss projects that would make their on-air and production jobs easier. An overwhelming number of them named a studio intercom system as their highest priority. The existing telephone intercom was cumbersome for communication between studios.

We wanted this intercom to exceed the talent's expectations and looked at several possibilities. On the low end was the FM wireless intercom and the more sophisticated "talk-a-phone" style intercoms.

The SMI-5, from Broadcast Tools, exceeded the expectations of KUDL for a studio intercom.

USER REPORT

On the other end of the scale was the type of intercom used in TV studios, but these were not cost effective. None of these systems was suitable for use in a radio station environment such as ours.

To make them work properly would have required extensive modifications. That's when we learned of the Broadcast Tools SMI-5A. For us, it was a dream come true.

One of the strongest features of the SMI-5A is that it is inserted into both the monitor and headphone paths in each studio. The monitors don't cut out with each call, but dim to a preset level. The on-air program can be monitored while having a conversation.

Each SMI-5A intercom can handle up to four other studios (five total). But if you want to separate some systems such as production rooms and voice booths, by selectively interfacing certain ones with each other, you could have a larger combination of studios.

. . . the SMI-5A has bass and treble controls for the headphones.

The best way to describe it is that each SMI-5A is like a 1A2 5 button phone set. You can have certain lines in all rooms and selective lines in one or two places, making the system very versatile.

The SMI-5As are connected with 25-pair phone cable like the 1A2 systems use. This cable is relatively easy to find at distributors like Graybar.

All you do is plug each unit in. There are no messy terminal strips on the back of these units and the 19" rackmount chassis at 1¾" makes them easy to install.

Each SMI-5A has a connector on the back which brings out all the switches and indicators for remote control. You can use either the internal electret condenser mic or feed it with a DA output from your console mic or any other line level source.

It uses a nice limiter circuit to squeeze up the voice when talking off mic. Because of the way the SMI-5A is designed, you have full Duplex talk paths. One person does not have to wait for the other to finish before pressing his talk-back button.

Other nice features include an All Call button that helps in those "panic" situations and a mono switch that easily sums L and R channels together in the monitor speakers and headphones for checking phase.

It also includes a Privacy feature. When Privacy is set to *on*, the SMI-5A does not allow talkback into the headphone circuit while the mic is on. This prevents someone doing an "All Call" or flustering someone on the air.

When Privacy is *off*, communication is not interrupted, which could be useful

(continued on page 39)

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Circle 16 On Reader Service Card

Beyer Mics Improve Field Audio

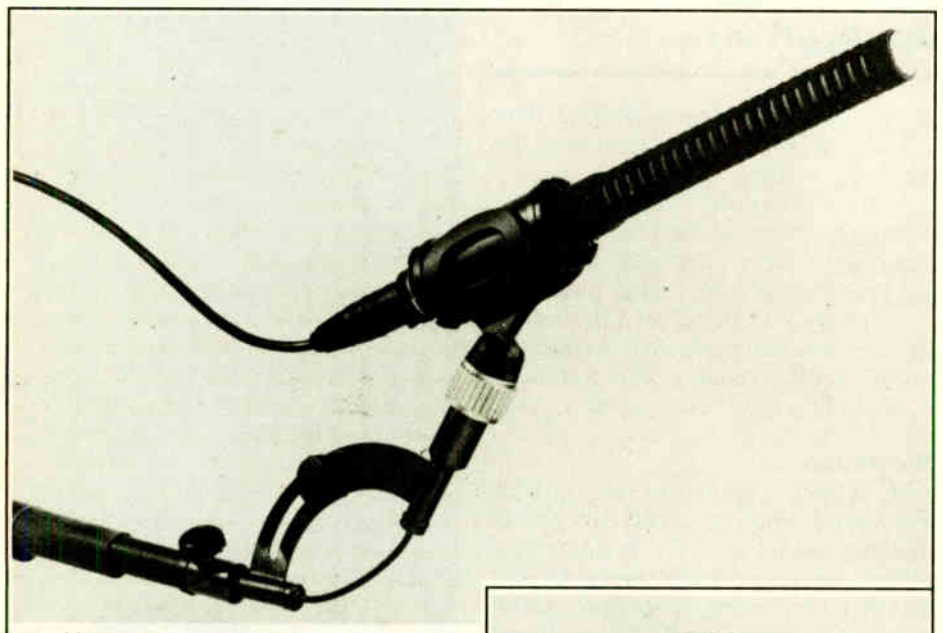
Sonic Accuracy, Rugged Durability of M 58 and MCE 86 Suit These Mics to ENG/EFP

by Mike Solomon, Mkt Dev Mgr
Beyer Dynamic, Inc.

Hicksville NY Broadcast stations continually reassess their equipment requirements in an effort to improve the quality of the station's signal. One of the first and perhaps the most cost-effective ways to do so is to examine microphone selection for remote applications.

Many stations send their news and sports people out into the field to gather and report news by either conducting interviews, recording a statement at a press conference, or by having the reporter conduct "live" commentary.

The microphones typically employed for these assignments may have been designed originally for vocal, as opposed to speech, therefore sacrificing maximum speech clarity. Also, an older field unit may indeed be rugged, but does not produce optimum speech intelligibility.



The MCE 86 is one of the lightest shotgun mics available.

TECHNOLOGY UPDATE

Two recent microphones developed and introduced specifically for news and sports remote interview applications are the Beyer M 58 dynamic and Beyer MCE 86 condenser microphones. Both models provide broadcasters with superb sonic accuracy.

Rugged M 58

The M 58 is an omnidirectional dynamic microphone of an extremely rugged design, created to meet the physical and environmental demands of electronic news gathering (ENG) and electronic field production (EFP) applications.

Its sophisticated internal shockmount system dramatically reduces undesirable handling noise, while the microphone's frequency response has been specifically tailored to provide the station with a very accurate and intelligible signal.

The M 58's weight-balanced design provides reporters with a high degree of comfort during lengthy interviews.

The microphone's handle length has been designed to accommodate a station's mic flags without sacrificing space for the reporter holding the mic. Each microphone is supplied with an external foam wind screen.

Being omnidirectional, the M 58 is ideal for stations looking for their reporters to produce a "live, on-location" sound.

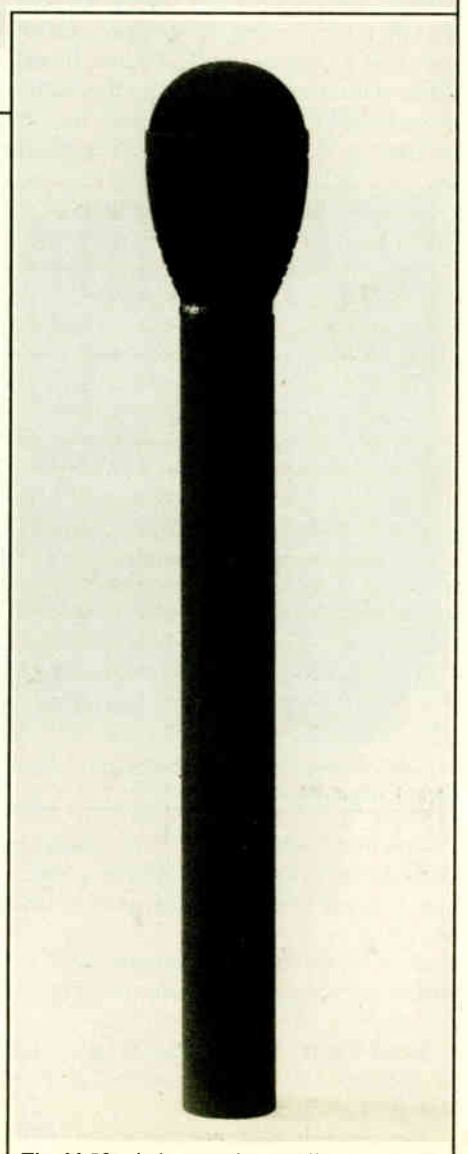
The MCE 86 is a hypercardioid short shotgun condenser microphone that can be powered by one AA battery or via phantom powering from any field recorder, mic mixer, or power supply producing from 9 through 48 volts DC.

This microphone's condenser transducer, hypercardioid/lobe polar pattern and high sensitivity produces excellent off-axis rejection of undesirable signals while producing accurate speech response, even at a distance of three to eight feet from your source.

At a weight of 92 grams, the MCE 86 is one of the lightest shotgun microphones available, yet due to its aircraft-grade aluminum construction it is made to meet the rigors of all handheld or stand mount on-location assignments.

Each MCE 86 is provided with a choice of elastic shockmount: the EA 86 for mounting onto the optional MZP 86 pistol grip or the EA 1925 for fishpole/boom/stand or gooseneck mounting.

Due to its lighter polar pattern, the MCE 86 would be applicable to stations looking to eliminate most off-axis sound while sonically focusing upon the voice of the reporter or the interview subject.



The M 58 mic is good for that "on-location" sound.

Improve field audio

The M 58 and the MCE 86 are two cost-effective ways to quickly improve the quality of your station's field audio. The M 58 lists for $199 and the MCE 86 lists for $495 with shock mount.

Each of these contemporary designs represent a phenomenal value and each microphone is backed up with a two-year unlimited warranty.

The two mics each provide recording studio quality transducers in very field rugged packages . . .

The two mics each provide recording studio quality transducers in very field rugged packages that are within the budget ranges of most broadcast facilities.

■ ■ ■

Mike Solomon is the market development manager for broadcast and pro audio at Beyer Dynamic. For information on the M 58 and the MCE 86, contact him at 516-935-8000, or circle Reader Service 24.

WMUS Opts for EV Sentry 100A

by Michael Maciejewski, CE
WMUS-AM/FM

Grand Rapids MI When Electro-Voice claims the Sentry 100A is the direct result of "human engineering" with the broadcast/recording studio engineer in mind, it's a serious claim.

The Sentry 100A's size makes the loudspeaker a great choice for near field monitoring applications. The dimensions of the enclosure are 17.25" high, 12" wide and 11.125" deep.

The exterior of the enclosure is covered with a sharp looking matte black vinyl, which is also scratch resistant.

Electrically, the speakers are a two-way design with a crossover frequency of 2000 Hz, 12 dB/octave. Handling the low frequencies is an 8" woofer, with a dome type tweeter for the high frequencies.

USER REPORT

Long-term average power handling capability of the system is 30 W (10 milliseconds). The tweeters alone handle 25 W of input power, which ought to eliminate the problem of burning them up when accidentally (or perhaps intentionally!) high input power is driven to the speaker.

I've witnessed several times the abuse dealt to the 100As in our production studios and have had yet to replace a tweeter.

Evaluating response

Evaluating the frequency response of any speaker system is very subjective. The placement of the speakers and the

The Sentry 100A's size makes the loudspeaker a great choice for near field monitoring applications.

environment of the room in which they are located both play a role in how the speakers perform.

We have the Sentry 100As suspended from the ceiling using Omni-mounts. The Omni-mount is a speaker mounting bracket—basically an angled pipe with a neoprene ball fitted on the end. A speaker mounted clamp that fits over the ball allows the speaker to be aimed in virtually any direction desired.

The sound

My subjective opinion of how the Sentrys sound when mounted this way is that they seem to lack low frequency response. This is probably due to the fact that they are floating in free space about two feet from the wall. I have heard them in another studio where they were mounted directly to the wall and the low frequency was much more acceptable.

The EV Sentry 100A is capable of 30 W long-term power handling.

However, mounting the speakers directly on a wall may present a problem if the studio has inadequate sound proofing.

Overall, the Sentry 100A speakers are a fine choice for studio monitoring.

■ ■ ■

Editor's note: Michael Maciejewski is CE at WMUS. He can be reached at 616-733-1671.

For more information on the Sentry 100A, contact Ivan Schwartz at Electro-Voice: 616-695-6831, or circle Reader Service 29.

Enter the HD25

Sennheiser Presents Headphone Monitor

by Tony Tudisco, VP Mktg.
Sennheiser Electronic Corp.

Old Lyme CT For years, the broadcast professional has been looking for sealed-type headphones to monitor digital or analog material in the studio or in the field. With the HD25 monitor headphones, that search is over.

TECHNOLOGY UPDATE

One must consider many factors when purchasing headphones. Not to be overlooked are such parameters as faithful reproduction of digital material and a dependable seal to block out extraneous sound while providing long-term comfort.

Also of importance is high gain to insure compatibility with low output preamps found in many portable tape machines and mixing consoles, as well as the ability to use the headphone in either a single or dual muff system, depending on the application.

The HD25 is a low impedance headphone (70 ohms) with high sensitivity (105 dB at 1mW, and a maximum of 124 dB). Total harmonic distortion is 0.5%. Frequency response

The HD25 headphones are suitable for analog or digital monitoring.

of the unit is 30-16,000 Hz.

Physically, the HD25 has been well thought out; its headband is fully adjustable with a split design for a custom fit. One ear cup can be swung back to allow the user single muff operation. The headphone is lightweight (five ounces) and uses a single-sided cable which is steel stranded for increased durability.

The cable ends in a right angle stereo mini with a ¼" adapter, a configuration useful for portable recorders. The cable as well as the cushions, driver elements and headband are all field replaceable.

■ ■ ■

Editor's note: Since this writing, Tony Tudisco is no longer with Sennheiser. For more information on the HD25 monitor headphone, contact Joe Ciaudelli, Sennheiser applications engineer, at 203-434-9190, or circle Reader Service 81.

Radix HE-20: Easy on the Ears

by Tim Schweiger, VP Mktg
Broadcast Supply West

Tacoma WA Years ago when I was an announcer, I was always disappointed with the sound of my headphones. Regardless of the brand of headphones I chose, they always sounded flat and distorted.

After doing a four hour board shift, I always had an extreme case of ear fatigue. We had an on air console with an internal headphone amplifier that exhibited excessive distortion, especially with 600 Ohm phones.

Today, at Broadcast Supply West, we have customers who are experiencing the same headphone dilemma. We set about to solve this problem and came up with a terrific product . . . the Radix HE-20 headphone amplifier/equalizer.

The HE-20 addresses several key problems experienced by most announcers. The amplifier has enough power to please all who request ear-splitting volume.

TECHNOLOGY UPDATE

Up to ten 600 Ohm phones can be powered with adequate headroom for audio peaks. Frequency response is 20 Hz to 20 kHz ±1 dB with distortion just over 0.1% over the audio range.

The HE-20 has a three-band graphic equalizer so each announcer can adjust the headphone mix without affecting the on air sound. Over a long board shift, the announcer can change settings to reduce ear fatigue.

Several stations have remarked that their announcers feel better when they can add more low end to the mix and sound boomier. The engineers love it because they don't have to mess with the on air processing.

The HE-20 addresses several key problems experienced by most announcers. The amplifier has enough power to please all who request ear-splitting volume.

Housed in a compact package, the HE-20 was designed for grueling, 24 hour broadcast use. Balanced line inputs are provided allowing direct connection to the console output.

The HE-20 also accepts an unbalanced input for connecting directly to a tuner or other source. A front panel headphone jack is provided. A back-panel removable connector is also included, for cabling the audio output to a remote location.

A blend switch allows for monitoring in normal stereo, narrow stereo and mono. Front panel lamps flash to indicate the presence of audio signal.

Lastly, a versatile mounting bracket allows the HE-20 to be mounted underneath or on top of the counter.

If your announcers have expressed the need for cleaner audio and equalization in the headphones, the Radix HE-20 is the quality solution.

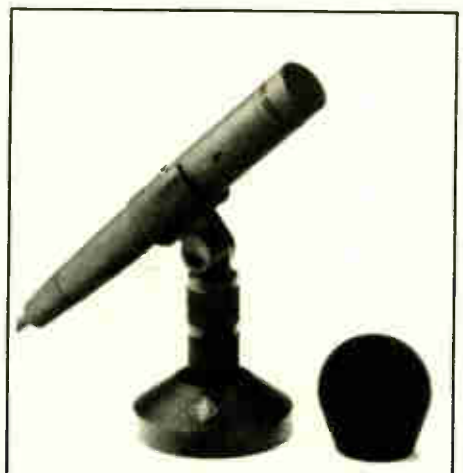
■ ■ ■

Editor's note: Tim Schwieger is VP of marketing for Broadcast Supply West. For more information on the Radix HE-20, contact him at 800-426-8434, or circle Reader Service 34.

Ear fatigue is a thing of the past with the Radix HE-20 headphone amp/equalizer.

BUYERS BRIEFS

The **Neumann** microphone series KM 100 is a modular condenser microphone system with a small diameter (21mm) capsule.



Neumann's KM 140 cardioid mic

The system consists of an active capsule that connects directly to the output stage forming an axially addressed microphone 3 2/3" long. The active capsule can also be connected to the output stage via a thin cable up to 150' long.

The mic's electronic circuitry is similar to the Neumann TLM 170. The electronics results in a mic with 4 dB less self-noise and 3 dB higher output level that the KM 83/84/85 series.

The initial offering includes four interchangeable capsules: AK 30 omni, AK 40 cardioid, AK 45 cardioid with low frequency roll-off and AK 50 hypercardioid. A variety of accessories, including stands, extension tubes, goosenecks and cable hangers for mounting the mics and capsules are available.

For more information, contact Jerry Graham at GOTHAM Audio Corporation: 212-765-3410, or circle Reader Service 87.

Yamaha Corporation of America has recently introduced the NS10MC commercial monitor loudspeaker system. The monitor utilizes technology developed for the NS10M studio close-field monitors.

The NS10MC is a two-way system incorporating a Yamaha 18cm (7") cone woofer and a 3.5cm (1 3/8") soft-dome tweeter. The enclosure is real wood with black finish and a removeable black front grille. The cabinet size is 15"×8 1/2"×7 7/8"; the system weighs 15 lbs.

Yamaha's new monitor loudspeaker has a frequency range of 50 Hz to 20 kHz, and has a rated power capacity of 120 W of program material. Its sensitivity is 90 dB SPL at 1 W, 1 m, on axis. The crossover frequency is 2 kHz (12 dB/octave).

For more information, contact Robert Davis at Yamaha Corporation of America: 714-522-9312, or circle Reader Service 9.

BUYERS GUIDE CALENDAR

Jan	Feb
Test & Monitoring Equipment	Digital Workstations & Automation Equipment
March	**April**
Monitors, Microphones, Turntables & Preamps	AM Transmitters & Exciters
May	**June**
Antennas Towers & Cables	Program Audio Processing
July	**Aug**
Studio Audio Equipment & Furniture	Consoles
Sept	**Oct**
Reel-Reel Recorders & DAT	STL, Remote & Telco Equipment
Nov	**Dec**
FM Transmitters, Exciters & SCAs	Cart Machines & CDs

B&K Mics Stand Up to MPR Use

The 4000 Series Proves Durable, Versatile for St. Paul Morning Show

by Tom Mudge
Minnesota Public Radio

Minneapolis MN For the past nine years, I have been studio manager for Studio M, which is located in St. Paul, MN and owned by Minnesota Public Radio. During that time, I've been responsible for recording *St. Paul Sunday Morning*, a radio show airing on MPR.

Part of the Bruel & Kjaer 4000 mic series (inset), the 4011 lends versatility to recording at Minnesota Public Radio.

USER REPORT

In November of 1984, I purchased our first three pairs of B&K studio microphones. What follows will not necessarily be new information, but rather additional thoughts about these very high-quality and versatile microphones.

The 4006 studio microphone

Our version of the 4006 microphone has a transformer, although a transformerless version is now available. I prefer matched pairs, which I purchased from the dealer.

The microphone's black anodized finish is very durable. In fact, part of a demonstration I saw included submersion of three-quarters of the mic into a glass of sparkling water with the microphone on and active through a pair of monitors.

The 4006 is omnidirectional and comes with two exchangeable screw-on "grids," one black in color, the other silver. These grids affect the frequency response of the microphone's pattern. The black one gives the off-axis high frequency response a rise; the silver one leaves the pattern standard.

Another grid, called "the bullet," is also available. This grid causes the pattern's response to become still more diffuse and even. My experience with this grid is limited.

I use the 4006s with the silver grid, as I like the high frequency point source it gives me. I prefer using the mics in a group of three when recording smaller ensembles such as string quartets. I add more as the need arises with octets and other larger chamber music groups.

I also own and use a matched pair of B&K 4007s. Like the 4006, the 4007s are also omnidirectional and have a very flat and extended frequency response of 20 Hz to 40 kHz. They also have transformers.

I use the 4007s on piano in trios. They handle the transients of the piano with ease. I have also used the pair on acoustic guitar with very good results. The mics can handle lots of SPL, so they are well suited for use on brass also.

The 4006 is also a very versatile studio microphone. I've used it on guitar, percussion, piano and vocals, all with great success.

The 4011 studio microphone

The 4011 microphone is the newest addition to B&K's line of studio mics. It has a cardioid pattern and comes with a switchable –20 dB pad built into the cannon connectors base.

This feature could be called a pain if you were on a remote and you needed to quickly flip on the pad. You would need to unplug the microphone to do it.

The 4011 studio mic is also available in a transformerless version. Our pair, however, has transformers.

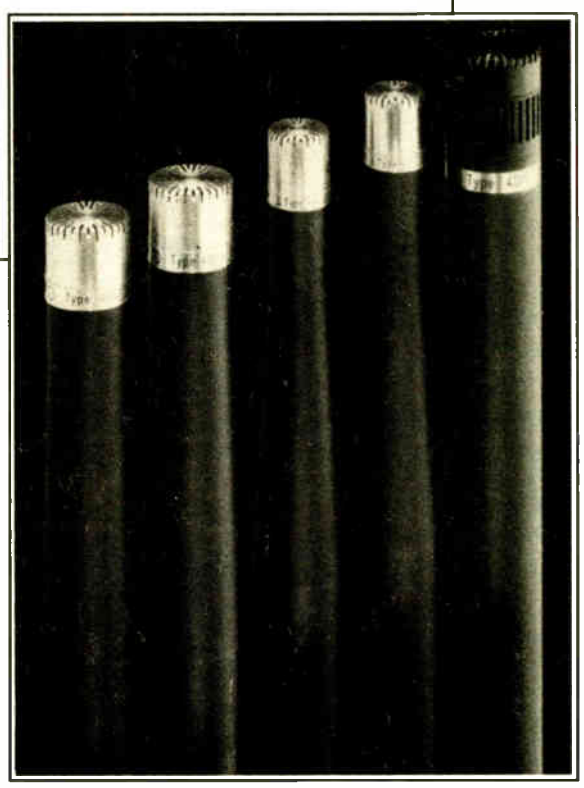
I use this pair of mics consistently in an XY configuration as it gives me an excellent sounding room pick-up, which in turn gives my overall signal excellent stereo/mono compatibility.

The 4011 is also a very versatile mic. I used it on the solo vocal of a digital multitrack project that included a 30 voice choir, string quartet, piano and four spoken word parts. I found it unnecessary to EQ the vocal. It cut right through the texture of the music and chorus.

I just recently finished recording the Guarneri String Quartet at BMG (formerly RCA) Studios. I employed a custom array of three 4006s and a pair of 4011s in an XY configuration.

The 4006s give the space and clarity necessary for a beautifully detailed stereo sound field. And the 4011s give the signal its great stereo/mono compatibility.

The 4006 is a very versatile studio microphone. I've used it on guitar, percussion, piano and vocals, all with great success.



MPR's morning show uses B&K 4006, 4007, and 4011 mics for recording.

SAINT PAUL SUNDAY MORNING™

I feel all of the B&K microphones are consistent, reliable performers in and out of the studio. I can highly recommend them as a great addition to any facilities mic kit.

■ ■ ■

Editor's nore: Tom Mudge is the technical director for Saint Paul Sunday Morning. *He can be reached at 612-290-1403.*

For more information on B&K microphones, contact Adrian Weidmann at 508-481-7000, or circle Reader Service 57.

ATM25: Good Thing In a Small Package

(continued from page 29)

larly well suited to applications involving high sound-pressure levels at short ranges.

The response is tailored to provide a very natural sound in reproduction. Audio-Technica designed in a low-end boost (as opposed to a high-end rolloff) to help pick up some of the gentle nuances produced in low frequency instruments such as a string bass or a cello.

This gentle, yet significant low-end boost works to a big advantage with voices. Every announcer I have met has always expressed the desire to have a voice that comes across warm, rich and with more punch.

In the past few years, attempts have been made to equalize that sound into their voices. The ATM25 does that without the cost or hassle of outboard processing.

The hyper-cardioid pattern of the ATM25 does a beautiful job of rejecting off-axis and background noises.

In our tests of off-axis response, the ATM25 had no discernable coloration. The "sweet spot" in front of the microphone is fairly large, so the announcer can move his/her head around without a change in the sound on the air.

The ATM25's relatively high sensitivity assures an excellent match to most mixers and consoles. The mic is capable of undistorted output even at very high levels. Chances are that the mic preamp in your console will max out before the ATM25 distorts.

Another feature of the ATM25 is the integral microphone clamp that mounts to standard microphone booms and stands. Once the clamp is attached to the mic stand, the ATM25 is very easily adjusted for positioning via a wing nut on the clamp itself.

This eliminates having to buy a separate mic clip or having to replace the ones that break.

In the studio or on the road

The ATM25 is by far one of the best dynamic microphones that I have seen or used. It has a rich warm sound and with its internal shock mount, the capsule in the ATM25 picks up very little handling or cable noise even when used in a hand-held situation.

The ATM25 is right at home in the studio or on the road where travelling conditions can be very demanding. This microphone has few equals in the industry.

The challenges that are commonly asked of a microphone are met head-on in the ATM25 and it performs as well if not better than microphones in the $500 to $700 price range. With a list price of $235, you can't miss with this mic!

■ ■ ■

Brian Walker is CE at KQEU-AM in Olympia, WA. Carl Cook is the production director, and has extensive experience in recording and producing both jazz and rock musicians. He and Brian can be reached at 206-491-9200.

For more information on the ATM25, contact Ken Reichel at Audio-Technica: 216-686-2600, Pat Medved at BSW: 800-426-8434, or circle Reader Service 8.

KUDL Selects SMI-5A

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for voice cueing on the fly.

The SMI-5A has two headphone amps, one for Host and the other Guest. Both have ample gain to drive any low impedance headphones or feed an external amp.

One welcome addition is that the SMI-5A has bass and treble controls for the headphones. Jocks love to adjust these to their preference and particular set of headphones.

Another feature is the Telco Interface input. This takes any output from an external telephone hybrid and inserts it into the headphone circuit. If you are currently using a speakerphone for hands-free communication, this would be a great improvement.

You have the choice of setting up the Host headphones "split," with Talkback in one ear and Program in the other, or Talkback in both ears.

Both Host and Guest headphone circuits receive the Telco input when selected. This enables two people to take off-air calls easily.

Our installation

Here at KUDL-FM and WHB-AM we had five studios that needed intercoms. Two on-air, two news and a traffic studio are used by both stations. In the Air Studios, we mounted the SMI-5As out of the way in a rack and outboarded the controls into our PR&E BMX consoles.

The lighted switches we used indicate which studio is calling them as well as to initiate talkback. In the other studios we mounted the SMI-5As into countertop racks at eye level.

In each of the studios we feed the audio input from the existing microphone by use of a DA output. By using our own mics, we hear a full, warm voice through the monitor speakers and headphones on the other end.

This is something we could never have accomplished with other intercom systems. There are trim pots for all inputs and outputs, as well as a nice setup sheet for logging settings for future reference.

As a result of our decision to purchase the Broadcast Tools SMI-5A system, our air staff was overjoyed. They use it all the time and because it's so easy to use we have had few problems.

If you are looking for an intercom that is designed to integrate with broadcast equipment and has all the bells and whistles you'll ever need, you should consider the SMI-5A system.

■ ■ ■

Chris Ostrander is the Chief Engineer at KUDL/WHB. He can be reached at 913-722-2866.

For more information on the SMI-5A intercom, contact Don Winget at Broadcast Tools: 206-937-9543, or circle Reader Service 74.

JBL 4410 Built for Performance

by Mark Gander, VP Mktg
JBL Incorporated

Northridge CA JBL has been building monitor loudspeakers for the recording and broadcast industries since 1946. The solid reputation of the company has been built on quality, integrity, performance, and value. Most of the innovations users take for granted in monitor loudspeakers today were first embodied in JBL products, and the company's position of leadership is maintained by addressing its product development to the specific job at hand.

TECHNOLOGY UPDATE

The general requirements for broadcast monitoring are essentially the same as in recording. They include high output capability with low distortion, ruggedness, accurate (flat) response and accurate stereophonic imaging.

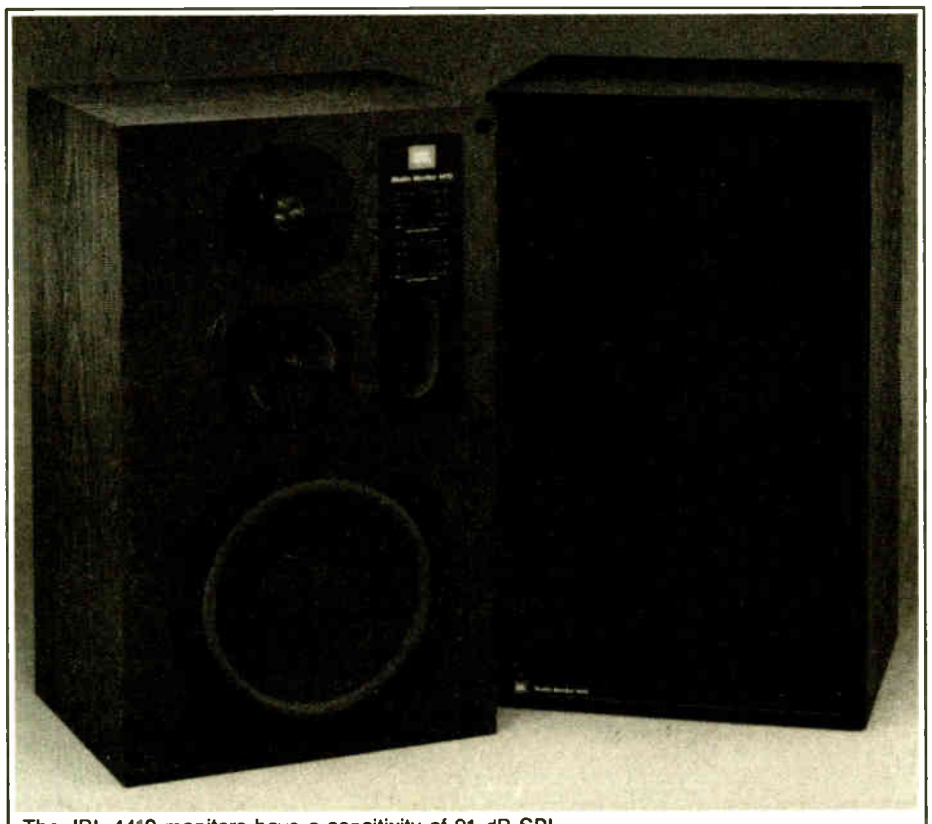
We will discuss these characteristics as they relate to JBL's best known broadcast monitor, the model 4410.

High output, low distortion

The 4410 has a sensitivity of 91 dB SPL, measured at one meter with a power input of 1 W. The power rating of the system is 125 watts, and this indicates that maximum output capability of the system is 112 dB at a distance of one meter.

Granted, the monitor will rarely, if ever, be driven to such output levels in normal operation. Still, the fact that it can sustain such operation indefinitely tells us a great deal about the speaker's ability to "coast along" with moderate power input.

Distortion in the system is quite low; at normal operating levels of 10 W input, second and third harmonic distortion components are about 40 dB below fundamental output. JBL's Symmetrical Field Geometry (SFG) low-frequency magnet structure contributes largely to this performance.



The JBL 4410 monitors have a sensitivity of 91 dB SPL.

Ruggedness and response

In professional application, there is always the chance of system abuse, and ruggedness is essential for maintaining on-line operation. JBL's professional monitors are both electrically and physically robust.

The use of diecast aluminum frames ensures precise alignment of voice coils. JBL's low-frequency drivers make use of flat, edge- wound voice coils for extra rigidity and higher packing density in the magnetic gap. The enclosures are made of highest grade particle board and are quite resistant to cracking.

As for accurate (flat) response, the 4410 is one of JBL's smoothest monitor loudspeakers. The dividing network shapes the signals to the three drivers so that overlap between them is virtually seamless. This is extremely important when critical judgements of program quality are made.

Consistent dispersion

Horizontal dispersion of the system is consistent over most of the frequency range, providing a larger listening area than that offered by systems exhibiting flat response only on axis. The use of polypropylene and polystyrene bypass capacitors in the dividing network contribute to the remarkable time domain

(continued on page 42)

Saluting the Classic Studio Pro

by Geoff Freeman
WDON-FM

Geneva OH I can remember using Russco Studio Pro turntables for as long as I've been in the radio business. The first time I saw one 15 years ago I thought, "So that's what a radio station turntable looks like." I still feel that way.

I don't speak of Russco Studio Pro turntables as a broadcast engineer. My opinion of them comes from knowing the basics—from using the equipment everyday, knowing what works and knowing what gets the job done. That's important to me.

There are three words that come to mind about Russco Studio Pro turntables: rugged, simple and dependable. This has remained constant since I've known them.

The beauty of simplicity

I've used turntables other than Russco Studio Pros in similar applications for both on-air studio and production room. I always felt that some other turntables seemed kind of "flimsy," like they would break unless I was extra careful with them.

Not that I abuse equipment, but I always see Russco Studio Pro turntables as a solid piece of equipment that I don't have to worry about.

Studio Pros are simple and easy to use—something I appreciate. Other

USER REPORT

turntables have levers, dials, lights and switches. In some cases they can be helpful but I see all that as just more things that can break and cause problems and equipment downtime.

As far as dependability is concerned, I can't remember ever having a major problem with a Russco Studio Pro turntable. I know it will work. The unit is also easy to maintain because it is a simple, basic turntable.

A production necessity

At WDON-FM, we have three Russco Studio Pro turntables—two in our main on-air studio and one in our production room.

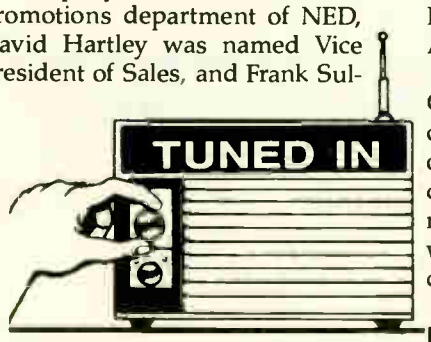
Our production room turntable gets used everyday for basic production

(continued on page 42)

WDON uses the Russco Studio Pro turntable heavily, for airing syndicated and specialty programming.

People . . . **Alpha Audio®** has named Richard Foate as national sales manager. His responsibilities will include the launching of the Dr-2™, Alpha Audio's new user-expandable digital disk-based recorder. Foate's primary focus will be to expand the national and international markets of Alpha's Automation Systems Division.

New England Digital has significantly realligned its sales and marketing departments to meet the growing needs of its present and anticipated customer base. The previous three years resulted in an overall company increase of 140%. In the promotions department of NED, David Hartley was named Vice President of Sales, and Frank Sullivan was elected to the position of Vice President of Marketing and Product Development.



New offices and relocations . . .

Studer Revox America, Inc. (SRA) recently relocated its Western regional sales office to the San Fernando Valley, in order to accommodate the demand for its professional audio products. This move will enable Studer Revox to expand its presence throughout the Western states. The new Los Angeles office will serve as the headquarters for direct sales to recording studios, post-production facilities, radio and TV stations located within these western states, in addition to offering sales and technical support for their existing dealer network.

Transmission Structures Limited (TSL) announced the opening of two international sales and service offices, located in London ENG and Arecibo PR. Both offices are scheduled to open 1 April, 1990. The main objective of these offices is to provide faster and more compete service to international markets. The Puerto Rican office is bilingual (English/Spanish), and will serve the Caribbean, South and Central America. The London office will concentrate on serving the European, Middle Eastern, and African markets.

Resource, a new Northern California-based market research consulting firm, has recently opened. The company is run by industry marketing and recording veterans Ron Nielson and Richard Ellen, with business partners Angela Langdon and Leona Aroha.

Increased sales, revenues . . .

Gentner Electronics Corporation (NASDAQ:GTNR) reported an increase in revenues to nearly $1.4 million for the second quarter ending 31 December, 1989. This growth represents a 26% increase over last year's second quarter results of $1.1 million. Gentner's intensive R&D efforts resulted in the introduction of five new products this year.

Service listing . . . **From National Supervisory Network** comes word that the service company is now listed with Harris/Allied Broadcast Equipment. This marks the first time the broadcast equipment distributor has ever listed an operations service company.

Russco's Turntable Stands Test of Time

(continued from page 41)

needs. We depend on it. We installed it into our custom-made production room furniture countertops.

Our two Russco Studio Pro turntables in our main on-air studio are also installed into custom-made furniture. These are mounted into a recessed area to the side of the console for easy access, with a removable lid to cover them when not in use and to give our air people extra work space.

The turntables in our main studio don't get as much use as the one in our production room, but when they do get used, I'm glad we have the Russco Studio Pro turntables to use on air.

Heavy weekend rotation

As at many other stations, the turntables get very heavy weekend use. We play syndicated shows on vinyl discs, as well as our Saturday night oldies show—which consists mostly of records—and our Friday "class reunion" program, which is mostly programmed with records.

Our Russco Studio Pro turntables haven't let us down yet. It's a comfort for me to know they are working for us. I would choose Russco studio turntables again. There are a lot of them out there working and there must be a good reason for that. For the basic broadcast application of studio turntables, you can't beat Russco Studio Pros.

You can use them heavily and not have to worry about them. We all have enough to do, without worrying about a down turntable.

One last thing about the turntables. Several years ago, I was working on a piece of production for a commercial for a night of boxing that was coming to town. The copy called for a "fight bell" sound effect. We had none.

I discovered that tapping a screwdriver, or even a metal pen, on the side of the metal turntable platter, at just the right angle, makes a great fight bell sound effect in a pinch.

The commercial was finished and aired and the hall that hosted the boxing was a sellout!

■ ■ ■

Editor's note: Geoff Freeman is CE at WDON. He can be reached at 216-466-1049.

For more information on Studio Pro turntables, contact Russell Friend at Russco: 209-291-5591, or circle Reader Service 35.

JBL Monitor Built to Last

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response of the system.

Stereo should never be taken for granted in broadcasting, and it should be constantly monitored along with program quality and program level.

The vertical in-line array of the three drivers in the 4410 produces stereo imaging accuracy in the following way. An engineer positioned midway between the two loudspeakers will be equidistant from all six drivers, and the signals from the three pairs of drivers will, over the coverage range of each driver pair, arrive at the listener's ears in step.

This ensures that there will be no timing errors in any part of the frequency range, and it will let the broadcast engineer perceive details of stereo imaging with no ambiguity.

■ ■ ■

Editor's note: For additional information on the 4410 professional monitors, contact Mark Gander at JBL Professional: 818-893-8411, or circle Reader Service 21.

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THE WHEATSTONE SP-6 AUDIO CONSOLE lets production people quickly accomplish 8 and 16-track work, yet easily handle routine transfers and dubbing operations. With its unique track monitor section it can facilitate simultaneous stereo mixdown during the multitrack bed session – almost halving typical production time cycles. Input channels are laid out just like an air console, with machine starts below the channel fader, so staff familiar with on-air consoles can quickly become comfortable in the production environment.

For those interested in more advanced techniques, the SP-6 employs a powerful talent monitor section designed to rapidly call up live mic and track combinations, making difficult punch-ins a breeze. Standard SP-6 input channel equalizers are more comprehensive than those supplied as optional items on competing products, allowing much greater creative freedom. Input channel auxiliary send sections are designed to be the most versatile in the industry, providing 4 different auxiliary buses to allow digital delay, reverb, talent foldback, and mix-minus feeds. Stereo input channels can provide either mono or stereo effects sends. Even more, the SP-6 has 4 auxiliary effects return inputs that allow effects to be recorded onto the multitrack or sent to the monitor buses.

The SP-6 provides independent headphone, control room and studio monitor feeds, as well as stereo cue/solo. Control room and studio mute and tally functions are independently dipswitch selectable on individual input channels. Additional studio modules may be ordered to accommodate larger, multi-studio installations. The SP-6 may be configured with any combination of mono and stereo input modules, in mainframe sizes ranging from 16 to 32 or more inputs. The console is available in either an 8-track production format or a 4 stereo subgroup TV master control configuration. So why not profit from Wheatstone's experience and reputation? Call us today and learn more.

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John Soller, chief engineer at WAZU

Radio is Starting to Experience a Shortage:

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