Radio World®

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FCC Would Let AMs "Barter"

by Charles Taylor

Washington DC The controversial concept of "negotiated interference" has been addressed in a Notice of Proposed Rule Making, but without its widely criticized identifying nickname.

An NPRM for MM Docket 89-46 was released near the end of February by the Commission and would modify rules that will allow stations to weaken power or go dark.

The FCC says it hopes to make strides in improving AM service with several amendments to its rules and policies that aim to encourage stations to reduce interference.

However, informal discussion about some of the ideas has previously brought a consensus of negative reaction.

"We are pleased the Commission has recognized the need to reduce interference and congestion on the AM band," said the NAB in a release following the notice. "However, to the extent that the Commission's proposal advances the buying and selling of spectrum between AM stations, we again express our concern as to the wisdom and legality of this proposal."

Quello's reservations

FCC Commissioner James Quello, though generally in support of the notice, worried that the amendments could lead to "negotiated interference"—where stations barter with neighboring stations for power increases or decreases.

"The procedural mechanisms contained in the proposal could lay the foundation for a system of negotiated interference rights," he said. Quello asked commenters to address the issue.

Alex Felker, chief of the Commission's Mass Media Bureau, discussed the concern at a press conference and downplayed the possibility of the bargaining between stations. The proposal, he stated, would allow stations to adjust their coverage, it would reduce interference and it would serve as a step in improving AM.

Also Felker said the ruling would build flexibility into the Commission's process. "The idea is that the quality/quantity trade-off is far too much toward quantity right now and what we might want to do is get a mechanism in place to pull it closer to the quality end of the range."

Specifics of the notice

Specifically, the first proposed amendment would allow AM licensees to reduce their protected contour areas, which the FCC said would reduce interference to neighboring stations. Reduction methods would include power cutbacks, antenna reconfiguration, reduction of tower height or changes in tower

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NRSC Plans FM Tests

by Alan Carter

Washington DC Plans are underway by the National Radio Systems Committee (NRSC) FM Technical Subgroup to conduct multipath field tests at WAEB-FM in Allentown, PA, that would give the industry some scientific data on the interference problem.

WAEB-AM/FM CE Harry Simons, Jim Gotshall of Delco Electronics' advanced development division and Radiotechniques Engineering President Ted Schober are coordinating the project.

The subgroup also is working on a second project investigating first adjacent channel interference on the FM band.

For the multipath study, Simons said WAEB's owner, CRB Broadcasting, volunteered the station for testing and that he is applying for a six-month experimental license from the FCC. Testing would occur between midnight and 4:30 AM on Mondays, if approved, starting in May or June.

Various experiments

Among tests to be conducted are effects of AM incidential noise on receivers, multipath versus stereo, multipath versus antenna tuning and matching, multipath effects on SCA and vice versa, and circular polarization reception.

Additional tests would be conducted on transmitter tuning to obtain minimum noise and examine the difference between tube-type and solid state IPA.

If the FCC grants the experimental license, Simons hopes to begin selecting sites for the field survey before the opening of the NAB convention 28 April.

Schober said the tests and results hopefully would make working with multipath a "science" rather than an "art" as it is now because little scientific data exists.

A station can transmit a perfect signal but still experience multipath because so many variables are involved, he said.

Radio design

At Delco Electronics, which will supply some resources toward the project,

(continued on page 13)

FMX Talk Is Halted

by John Gatski

Washington DC The NRSC FM Technical Subgroup declined to discuss the controversy over FMX's effectiveness during a recent meeting because only one party involved in the dispute was present.

The FMX controversy involves Broadcast Technology Partners (BTP), the inventors of FMX, and a Bose Corp./Massachusetts Institute of Technology (MIT) FM reception study, which was unflattering to the technology.

FMX was brought up under new business during a 15 February meeting, but discussion was halted after reservations were voiced about the fairness of debating the issue when BTP representatives were the only ones present.

"The representative from Bose was not there so it was kind of decided to table it," said NRSC member George Hanover,

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Room Shortage?

Will exhibitors be shut out of rooms at the NAB Convention in Las Vegas?

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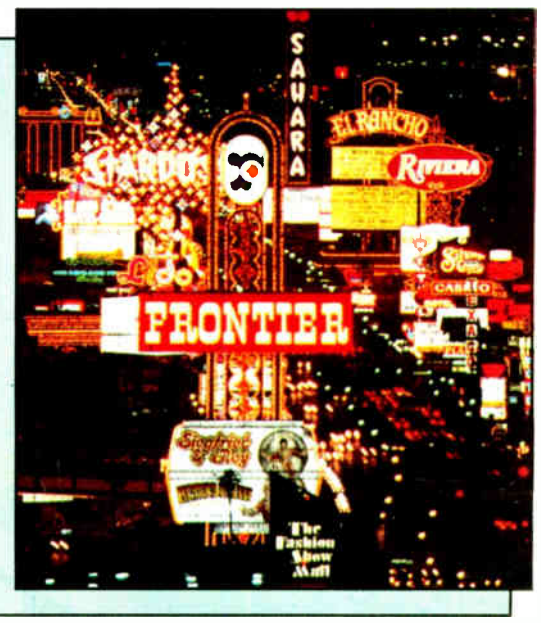

News Briefs

Japanese Meetings

Tokyo JAPAN NAB Science and Technology VP Michael Rau on a recent trip here asked the Japanese electronics community to institute the NRSC preemphasis standard.

The EIAJ, the Japanese version of the US Electronic Industries Association, said it would refer the standard to the technical and business committees for review.

"They seemed favorable," he said. Rau said EIA plans to hold further discussions with the Japanese here in April.

Rau said the only response Japanese officials gave him on questions surrounding FMX stereo extension was they are studying it.

AM Stereo Battle

New York NY A judge here has delayed action on Leonard Kahn's patent infringement suit for his AM stereo system against General Motors pending the outcome of a counter suit from Motorola in Chicago, according to a court official.

Kahn has appealed the New York stay. In Chicago, the case is pending with no court date set for a hearing but the parties continue filing various briefs.

Kahn filed suit last April against General Motors for allegedly marketing a radio incorporating his distortion reduction technology and infringing on a patent held by him.

Motorola, developer of a competing AM stereo system, filed suit in Chicago asking the court to resolve the patent dispute.

EEOC Compliance

Goldsboro NC The FCC has fined Eastern Carolina Broadcasting Co., licensee of WGBR-AM and WEQR-FM, $7000 and renewed its licenses for only three years, subject to periodic reporting on allegations of employment discrimination, according to a Commission report.

The stations were among a group that several local NAACP chapters and the National Black Media Coalition (NBMC) filed petitions to deny against. Ironically, the petitons to deny were withdrawn, but the FCC continued its review.

The FCC found no "intentional discrimination," but said the the group "did not engage in an on-going assessment" of an EEO program.

In filings, the FCC said the stations claimed they pursued an affirmative action program, but the Commission found those efforts "inadequate."

Rebuilding Tower

Bethesda MD WGMS-AM hopes to have its wind-damaged directional tower system operational by late spring, according to GM Michael Ferrel.

Ferrel said the station's insurance company is completing its estimate and he hopes to have the tower rebuilt by the end of May or early June.

WGMS lost its directional transmission 28 December when severe thunderstorm winds knocked down one of its four towers. The station was forced to convert its 5000 W daytime/1000 W nighttime directional signal to a weaker 1000 W daytime/250 W nighttime omni-directional signal.

According to Ferrel, the weaker signal did not have a significant effect on listenership because AM listeners make up a small portion of WGMS's audience.

New RAB President

New York NY Warren Potash, retired VP/GM, WBAP-AM/KSCS-FM, Fort Worth, has been named new president and CEO of the Radio Advertising Bureau.

Potash succeeds William Stakelin, who resigned last November.

NBC Radio Moves to Virginia

Arlington VA Westwood One is moving its NBC Radio news department to Westwood's facilities here.

NBC Radio will share facilities with Mutual Broadcasting, but maintain separate staffs.

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FCC Approves New IF Separation Rules

by John Gatski

Washington DC The FCC has approved IF minimum distance separation requirements for all classes of FM stations and the new distances will be same or less than those allowed under the old rules.

IF interference results when a susceptible receiver encounters two fairly strong IF-related signals and causes a distorted reception on one or both of the stations, hence the need for minimum distance requirements.

. . . there was no technical justification for maintaining a number of different protection levels . . .

The minimum distances were adjusted so all classes of stations would not overlap at their predicted 36 mV/m median field strength contours, according to Jay Jackson, of the FCC Mass Media Bureau.

Prior to the new rules adopted under MM 86-144, the FCC regulations stipulated different protection levels for the various classes of FMs.

The Commission concluded that there was no technical justification for maintaining a number of different protection levels all applying to the same potential interference phenomenon.

IF—intermediate frequency—refers to the middle frequency of a small range of frequencies that an FM receiver utilizes for amplification and filtering. Most FM receivers use 10.7 MHz as their first IF.

The new regulation also spells out minimum separation requirements between TV channel 6 and any FM stations operating at 98.5 MHz.

Jackson said there are approximately seven locations in the US where TV channel 6 and 98.5 MHz stations are close enough to require minimum distance requirements to prevent IF interference.

The Commission approved the measure 15 February with support from Chairman Dennis Patrick and Commissioner Patricia Dennis. Commissioner James Quello dissented.

For more information, contact Jay Jackson at the FCC, 202-632-9660.

NAB Scrambles for Lodging

by Alan Carter

Washington DC The NAB is trying to head off a room shortage at the spring convention in Las Vegas brought about by a drop in commitments from hotels.

At the peak, NAB was short about 2000 rooms, according to NAB Exhibit and Associate Membership Director Rick Dobson. By early March, the figure was down to approximately 1000.

Dobson said NAB is working through the Las Vegas Convention & Visitors Authority to obtain rooms from wholesalers who reserve large blocks of rooms year-round for tourist trade.

"Yes, there are exhibitors who do not have rooms yet," Dobson said. But with this latest effort, and by encouraging exhibitors to book through private travel agencies, he said exhibitors are obtaining lodging.

"People do not seem to be having much trouble getting rooms."

Request ignored

Although NAB requested more rooms than the 13,000 hotels blocked last year through the Convention & Visitors Authority, the housing bureau only received a commitment of 12,000 from hotels, according to Conventions and Meetings Senior VP Hank Roeder.

NAB, in a letter to exhibitors, suggested they go through travel agents to obtain rooms that are reserved by the wholesalers. Wholesalers are favored by Las Vegas hotels because they agree to pay for rooms contracted on a 52-weekend basis—regardless of whether they fill their block or not.

If attendees make reservations through travel agents, NAB warned them to indicate they are "tourists" traveling as an individual or group. "Use caution because these arrangements cannot be used specifically for convention travel," NAB stated in the letter.

Room with a view

Some exhibitors have complained about room assignments, and NAB admitted its priority point system combined with the hotel problems has not worked well "to say the least."

Roeder said the priority point system, patterned after the system used to assign exhibit space, does not work for hotel room assignments.

If the number one exhibitor requested 500 rooms, for example—and that is all the rooms set aside for exhibitors, the computer would show no rooms available for others, Roeder explained.

The system for assigning rooms will be revamped, he promised.

For information on the rooms from NAB, call 202-429-5353

Turning Thoughts Springward

by Judith Gross

Falls Church VA You know **spring has sprung** when . . . the engineer is taking more trips up to the transmitter shack "just to check things out" . . . those car wash promotions and car lot remotes **fill up the traffic log** . . . the state broadcasters associations begin their annual meetings **conveniently close** to golf courses . . . you start hearing rumors about new products at the **NAB show**.

Me? My thoughts turn to **baseball**. Maybe I'll be able to hear the Mets on 660 AM now that **WFAN** has switched slots on the dial with what used to be the old **WNBC** out of Noo Yawk. At least, that's what Emmis top exec Jeff Smulyan promised me just before the switch. Where would a die-hard fan be without **skywave**?

Thought it was a particularly good piece of re-positioning and general public relations the way the FCC deleted all references to **"negotiated interference"** in its recent NPRM to reduce AM interference.

The term was heavily criticized, but **MMB Chief Lex Felker** thinks the concept is sound and felt the negative association with the phrase was getting it a **bad rap**, especially in the press.

It still is a proposal to let stations barter with other stations for **interference rights**. The question is: does the listener stand to lose?

It calls into question the whole concept of the **public interest and free enterprise**. It's true that if two stations bargain to allow a small amount of interference in a certain area the fringe-area listener **might suffer**.

But would the whole community suffer even more if the weaker of the two stations **goes dark** because it can't afford to keep things going?

I guess it feels a little like a balancing act, doesn't it, Lex?

☆☆☆

OK, if it's no big deal how the **FMX controversy** got on the agenda of the NRSC's FM technical subgroup, then why is NAB Science & Technology **being so secretive** about it?

Doesn't anyone over there think it's a wee bit, well, irregular, that **BTP people showed up in force** for the meeting while the Bose-MIT folks didn't even *know* a meeting was taking place?

Update on the **room shortage** problem for the NAB convention: Looks as if the best way to go about getting a room now is to **travel incognito**.

That is, pretend you're a tourist, going to Vegas to dump all your money into a **one-armed bandit** or while away the day at a casino.

Don't mention the word **"convention"**; don't talk about traveling with a block of business colleagues; act as if the letters N-A-B stand for a **secret society** of grown-ups who have a mysterious handshake and wear funny-looking hats.

The NAB says if you act **touristy enough**, you might get one of the rooms travel agents have reserved which are apparently keeping **legitimate convention-goers and exhibitors** from getting all the rooms they need. Worth a try, anyway.

It was interesting to see what **FCC staffers** do when they aren't pouring over dockets or returning station applications under the Commission's **"hard luck" policy**, as one former staff member called it (meaning "hard look").

The occasion was a retirement luncheon for one of those fortunate souls taking advantage of the **early retirement out** at the Commission. The guest of honor was 28-year veteran **George Enuton**, former assistant chief for engineering in the FM branch.

The luncheon took on the overtone of a "roast," with one colleague reading from George's bio which he said claimed credit for everything from **80-90 to the Paperwork Reduction Act** (which George's bio apparently violated!).

What was really interesting, though, was the number of folks who **used to** be with the Commission who are now **private consultants**. Many of them voiced concern about the way things have got-

We've come a long way, Baby. (insert) Proud FCC papa

ten **pretty lean** over on "M" Street. One former employee noted how even in his day, workers had to bring their own staplers and such into work.

It stands to get even worse, now that many of the really hard workers are opting out under early retirement.

Not desiring to slow down in his retirement, George plans to rally for **more minority participation** in station ownership and applications. And his enthusiasm in this area seems to have rubbed off on **daughter Robin Rothchild**.

Robin is putting together new Class A FM station **WVAY in Mount Snow, VT**, with Radio Systems doing the turnkey installation. Should be on the air later this spring. Not bad for a young woman who, as you can see from the photo, was once crowned **"Miss FCC"** at a Commission picnic, at a more tender age.

☆☆☆

Kudos to **Gentner Electronics**, which must be doing well, business-wise, judging by the latest news from the **stock market**. At the beginning of March, the company got a listing on **NASDAQ**.

This means Gentner's stock is being **traded more**, and also you can get a **quote on its stock prices** by calling up NASDAQ, if you want to buy some shares. The company is listed as "GTNR." Cngrts!

Information is the latest word in station promotion . . . seems stations are taking advantage of the latest technology to set up info-lines **via telephone**.

You dial a number and get the latest **headlines, news, sports, weather**. You also get info on the station and hopefully get lured into listening.

Only thing that seems a bit **out of place** with the idea is the fact that such stations are encouraging listeners to get the info in a way that does not involve **listening to the station**.

I mean sports, weather, headlines . . . these are all reasons **why people listen** to the radio rather than, oh say, their favorite CD or cassette tape. If you give these to them by a mere touch of the Touchtone, why should they **bother tuning in** your station?

Metroplex radio, in Fort Worth, lost no time in recruiting a well-known radio personality who was, uh, shall we say, out of a job?

No sooner had **President Reagan** left office than their Dallas station **KOJO-FM** had made the former prez an offer for a weekly show. KOJO offered the president a yearly salary equal to what he made as chief exec: **$200,000**. Now, if they'd made the offer when he was running in 1980, *that* would have been a tough choice . . .

There is no end to the amount of **new technology** being utilized by stations these days. We already have request lines by fax. Now WCBS-AM news has set up a **cellular traffic network**, made up of "cellmates" who call the station for traffic updates from their car phones.

Then there's **Accu-Weather**, the leading private supplier of weather reports to radio stations everywhere. The service now uses **Megacom**, a **fiber-optic** cable system to offer improved reports to listeners.

That's in addition to its single and double line **Comrex** for those where fiber isn't practical.

Either way, it's a far cry from the **hiss and crackle** I used to record onto cart from Accu-Weather when I was just starting out as a news reporter at **WINR-AM** (where else but) in Binghamton, NY.

But new technology doesn't always have a **positive effect**. You want to drive listeners away? Do what someone at **WPLJ**, also in the Big Apple recently did.

Some humor-loving individual reprogrammed the station's **answering machine** to tell listeners on the request line "This is WPLJ-FM and **we don't care** what you think. And we're going heavy metal."

Well we got **computer viruses** and system hackers, so answering-machine kidnap artists can't be far behind.

Heard something interesting? Spill your guts to **Earwaves**. *Write PO Box 1214, Falls Church VA 22041, or call me at 703-998-7600. Best tidbit of the month wins a coveted 1989 edition* **Radio World** *mug.*

FM Class "A1" May Help AM Daytimers

by Peter Hunn

Fulton NY During the mid 1970s, I was the proud morning DJ at WNLC in New London, CT. With 10,000 watts and eight towers, the station's entire studio/transmitter site simply reeked of broadcast power!

Even the building's fluorescent lights glowed, involuntarily, with the praises of WNLC's RF strength. "All area radios," I reasoned, "are probably overwhelmed by the signal of the BIG 1510!"

A shopping trip taken not long after that assumption really surprised me. While some stores in the mall had

GUEST EDITORIAL

receivers absorbed in WNLC, more than one shop sported radios playing the Connecticut College station WCNI (FM).

For purely ego-oriented rationale, this pattern really bugged me. I mean WCNI was only 10 W and my WNLC blasted out a superior 10 kW. And WCNI didn't have any eight super-cool, professional looking transmitting towers either!

"Excuse me," I snootily interrogated a salesgirl, "but don't you know you're just listening to a 10 watt radio station?"

"Huh?" she shrugged, "I don't care about watts. It comes in OK, don't it?"

A different view

Many years have passed since calling WNLC my radio home. And, ownership of a few small-wattage stations has mellowed my ego in the Transmitter Power Output department.

In fact, as owner of a 1 kW standalone AM daytimer, my attention is frequently focused on rule changes and proposals aimed at giving daytime stations a chance to more evenly compete with larger facilities.

Although a few "post-sunset" watts, slight preferences in an FM comparative hearing or a possible slot in any newly allocated AM/FM bandspace may provide some consolation, the results and time-tables of these options are often frustrating.

A good remedy for the standalone daytimer should be inexpensive and quick, provide local coverage without rendering interference to proposed/existing authorizations and give the station something to promote—replenishing sales and morale.

With apologies to WNLC and that unidentified New London Mall salesgirl, I would like to propose that a key to the AM daytimers' revitalization is held by the spirit of the old 10 W school FM stations.

Pioneered in the late 1940s, by GE and Syracuse University's WAER (FM), the Class "D" 10 watters were meant to provide interested parties with a low cost path to get a clear signal into the community without using up much "regional" spectrum space.

Terrain shielding was taken into consideration (by the FCC) and it was not uncommon for states (even those as small as Vermont) to house a number of peacefully co-existing 10 W FMs on the same frequency.

Why not Class A1?

My suggestion is simple. There is enough existing FM bandspace, technology and interest to allow the owner of a standalone daytimer to build and operate a small adjunct FM station.

Such a facility, which I'll call a Class "A1" station, need only have an effective radiated power of 10-50 W, with an antenna at 50-100' HAAT.

Folks who are concerned about the ever-increasing number of new stations should take comfort in the A1 proposal, as these stations will serve to "plug holes" in the band for larger, "full-power" operations.

In addition, the Class A1 outlets will typically be used to "fill-out" a daytimer's status and hours of operation and will not create the impact of a new "full-power" station with another sales force/promotion department.

In order to set apart the A1 idea from low power FM proposals, Class A1 authorizations could be considered as a "minor change" to one's AM (daytime) license.

Equipment

An A1 FM could be put on the air quickly and inexpensively. If I had an A1 construction permit (and a $5000 budget), I'd look for a used exciter, Optimod 8000A, modulation monitor (the old watters didn't have mod monitors), some new foam transmission line and a single bay, educational-type FM antenna.

The antenna could be side mounted on the AM stick. If you have a remote studio site, a few sections of Rohn 25-G tower would get you going from your studio locale.

The A1s would simulcast their AM sis-

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Cut Ties To FMX

The NAB's work in coordinating the meetings and agenda of the National Radio Systems Committee over the past few years has provided a valuable service to the industry.

But the attempt to address FM issues in the last NRSC technical subgroup meeting, coupled with the controversy over FMX technology—in which NAB maintains a financial interest—has resulted in a conflict of interest.

This threatens to undermine the committee's efforts and calls into question the ability of the group to act autonomously and in the best interest of the industry.

This meeting, in which FMX proponents—including former NAB Science & Technology VP Tom Keller—were present to discuss their side of the controversy over the Bose-MIT study of FMX while the researchers who conducted the study were not, casts doubt on the ability of the NRSC to address the subject impartially.

Both NAB and EIA, which co-convene the NRSC, should examine the way the meetings are being handled to insure the committee's independence and objectivity in the future.

But for NAB the problem is more serious. The desire to generate outside revenue has put the association in a position where its work on behalf of industry improvements can be compromised.

By keeping even its small financial interest in FMX, the NAB's efforts in the area of FM technical improvements are looked upon with suspicion.

Even if the association could maintain its impartiality under such circumstances, the appearance of conflict is damaging enough.

It's time for the NAB to sever its ties with BTP and relinquish its interest in FMX. Any revenue gain that could result from the partnership is not worth the cost to the association's reputation.

—RW

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.

On the film set

Dear **RW:**

You are correct about the technical authenticity of the radio set for *Talk Radio*. The only false note that I detected was the final shot of the "radio" tower with the blinking red lights . . . which was obviously a bat wing television tower. A small point in what is an engrossing film.

Here in Cleveland, our additional complaint is that the scene was moved from Cleveland (where the stage play takes place) to Dallas.

Robert Conrad
VP and Program Manager
WCLV
Cleveland, OH

Name correction

Dear **RW**:

As a consultant in the broadcast industry (dare I say consulting engineer?), I have been following with interest the articles and letters in **Radio World** of SPE vs. broadcast engineers and the role played by NARTE.

I am a NARTE certified Class I engineer with a double master endorsement and the first thing I learned is that NARTE is the acronym for "The National Association of Radio and Telecommunications Engineers."

In all your articles you refer to NARTE as "The National Association of Radio and Television Engineers." Please, Radio Globe . . . Oh, I'm sorry, **Radio World**, call us by our correct name!

One last comment. In the 1 January *Readers Forum* Mr. Ed Jurich of WWMX said, "The term 'engineer' refers to one who designs."

Almost all the broadcast engineers whom I know in Austin are very capable engineers who can design circuits and a couple of them can design directional arrays. That is more than I can say for some of the PEs whom I know.

Kenneth J Hollan
E1-03122 NARTE
Austin, TX

Disturbing story

Dear **RW:**

I really enjoy reading your excellent publication, **Radio World**. I did not, however, take much enjoyment from reading John Gatski's article, *Transmitter Meltdown KOs WPFW* (15 December, 1988).

If one of Mr. Gatski's purposes in writing the article was to generate reader feedback, then I betcha he gets it. His indictment of John Hofstetter, perhaps warranted, is no less than that. If what he writes about Hofstetter is true, then Europe's loss is America's gain, at least for a little while.

I am really uncertain as to why Mr. Gatski's article was published, unless it was for the purpose of exposing incompetent practices masquerading as broadcast engineering. Should that be the case, then congratulations are in order, for this is a horror story of the first order.

Even a fledgling broadcast engineer

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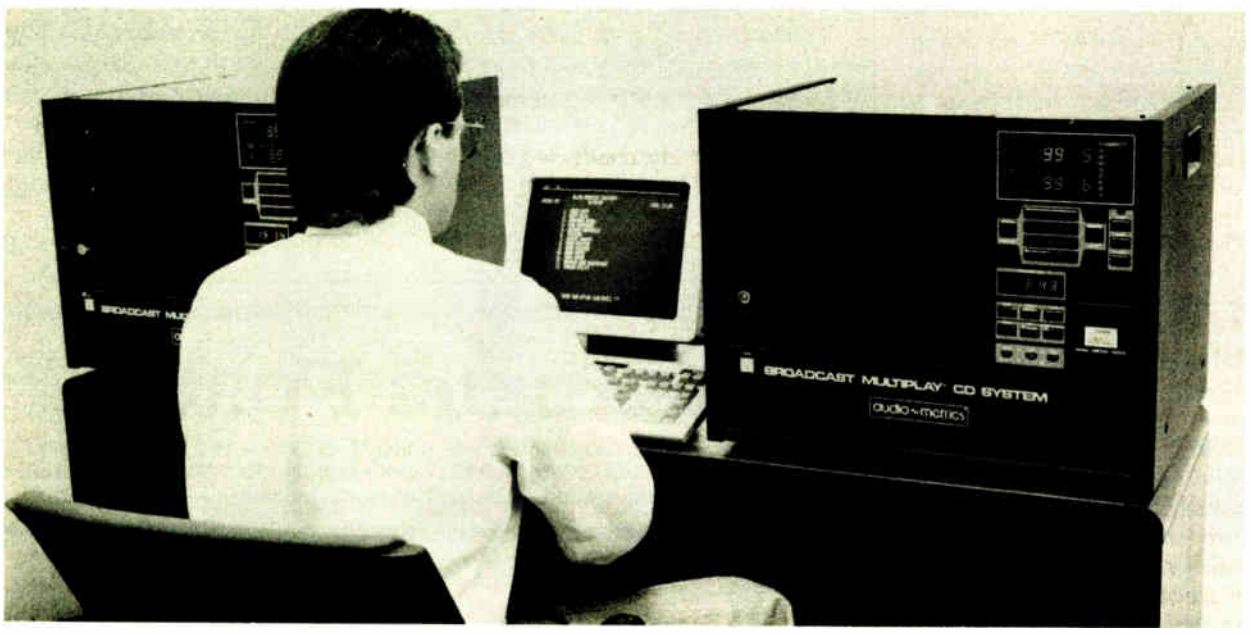
The CD Automation Solution

Audiometrics AMCDS-1000A Broadcast CD Multiplay

Whether you're running a live assist setup, part-time automation or total automation, the Audiometrics AMCDS-1000 is your CD answer. Its DB25 multipin connector interfaces directly with popular automation systems — there's also an RS 232 data port for control from a PC, if you want to "roll your own". The CD Multiplay's lockable cabinet holds 100 CDs: No more "missing" discs. You can cue up any cut on any CD in seconds from the front panel or either of the rear panel connectors.

Over 2000 CD Multiplays are proving their quality and reliability in 24-hour service. Here's how three of them are solving radio station problems right now:



→ **KVRP AM/FM, Haskell, TX** "We need to stay on the air 24 hours and put out a good clean sound to stay competitive," says Chief Ken Lane. "Our two stations are doing that with only two jocks, a part timer and two newsmen. We run live assist during the day and full-auto at night with three CD Audiometrics AMCDS-1000 Multiplays, Sonomag automation and a PC. I'm very pleased — in fact, I don't think I could go back to the way things used to run."

→ **KNXR, Rochester, MN** "After three years on conventional players," President/GM Tom Jones recalls, "we started seeing serious CD handling damage." Now KNXR delivers its Adult Traditional format on a pair of Audiometrics CD Multiplays. "They're very dependable, they sound great, and they've taken care of the damage problem," Tom says. "The CDs are only handled when we rotate them. At the top of the hour, our operators preprogram nine cuts in each machine's memory. Then they just press the console "on" button, and cued-up music is on the air — the AMCDS-1000's multipin connector mates with the console's logic connector. Soon, we'll run the whole system from a PC — we've already written the software."

→ **WZOK FM, Rockford, IL** is the city's #1 CHR "and fully determined to stay there," according to CE Jack Lambiotte. They play "97.5% CDs" on a quartet of Audiometrics Multiplays. "We run our AMCDS-1000s with a live-assisted Sonomag automation system," Jack reports, "connected to the DB25 multipin connectors on the rear of the machines. That's been flawless. There's just a keyboard and monitor in the control room — it's a real "hands-free" operation. I can hear real improvements on the air. Our Multiplays track much better than the so-called professional CD player we had been using, and the sound quality is far superior."

The CD Multiplay is the simple, sensible way to integrate CDs into any automation system. Call your Allied sales rep for all the details — including our free test CD offer.

P.S. Check the mid-February *Radio World* Buyers Guide for more about the Audiometrics AMCDS-1000 Multiplay.

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ALLIED Broadcast Equipment
— A HARRIS COMPANY

NRSC Puts FMX Talk on Hold

(continued from page 1)

who is the engineering director of the Electronic Industries Association (EIA) consumer group.

No Bose Corp. or MIT representative was in attendance and none had been invited, confirmed Dr. William Short, a Bose engineer and co-author of the study.

Bose not on list

According to Stan Salek, NAB staff engineer and NRSC coordinator, agendas are sent to industry people who are on a mailing list, but he was "not sure" if Bose is on the list.

The FM Technical Subgroup is convened by the EIA and the NAB and consists of receiver manufacturers, broadcasters and industry group representatives. The subgroup seeks out information and sometimes makes recommendations pertaining to broadcasting and transmission standards for radio.

Last minute addition?

Several committee members said they were not sure how FMX got on the NRSC agenda in the first place.

Salek said FMX was placed under new business and was brought up by him after a "a couple of people" made a request. He refused to name them, however.

Subgroup Chairman Wes Whiddon, engineering manager for Group W's FM stations, said he talked to Salek about FMX prior to the meeting, but was not sure if it would be brought up.

"I discussed with Salek about what we would do if it came up," he said.

He said he did not know how BTP found out FMX was placed on the agenda, but said that a representative of the company usually attends the meetings. BTP also is on the mailing list, according to the NAB.

BTP President Emil Torick said he did not initiate any action to get the subject on the agenda or know about it being placed on the agenda beforehand.

He said he decided to attend because he had an inclination it would be discussed because the Bose/MIT study has become a much-talked about subject within the radio industry.

BTP, however, apparently did have some advance knowledge of FMX's place on the subgroup's agenda.

Representatives from FMX proponent BTP (center) Tom Keller, Emil Torick and Aldo Cugnini attended an NRSC FM Technical Subgroup meeting.

On the morning of the meeting, BTP Engineering VP Tom Rucktenwald told Radio World that BTP would be discussing its rebuttal before the subgroup during the afternoon meeting.

Three BTP employees attended the meeting: Torick, co-inventor Tom Keller, former NAB Science and Technology VP, and Aldo Cugnini.

Salek said the Bose/MIT study and BTP's rebuttal were placed in the meeting record, but no lengthy discussion took place.

NAB Science and Technology VP Michael Rau said the Bose Corp. and MIT were not slighted at the meeting because there was virtually no discussion and their study was presented, along with BTP's rebuttal, into the meeting record.

"I would have been happier to see the Bose people there if they were going to discuss it," but they didn't, Rau said.

The limited FMX discussion at the subgroup meeting took place when Torick briefly addressed the controversy, challenging the Bose/MIT report mathematical calculations.

The Bose/MIT study, conducted by Dr. Amar Bose, an MIT professor and board chairman of the Bose Corp., and Short, was released 25 January, and said FMX causes noise and distortion problems under multipath conditions.

A few days after the Bose/MIT report was released, BTP countered with a rebuttal, claiming the math formula and field testing were flawed and the equipment was not approved for testing.

In elaborating on BTP's rebuttal at the subgroup meeting, Torick commented: "We graded the professor's math paper and it failed."

Unfair discussion

NRSC member Dick Kennedy, a design engineer for Delco Audio Systems, objected to the criticism of the Bose/MIT math because only one side was there to present an argument before the subgroup.

Kennedy also questioned the criticism of the math because of Bose and Short's widely respected reputations in the audio industry.

The Bose Corp. manufactures home audio speakers and is involved in several joint ventures with auto sound equipment manufacturers including Delco.

After Kennedy's comments, the group then decided to refrain from further discussion of the subject, according to subgroup members.

Not NRSC's responsibility

Because it does involve radio reception and transmission, Salek said "there are elements to bring out on both sides" of the FMX controversy, but NRSC will not take any action on the dispute.

He noted that the NRSC is not the group to resolve the FMX dispute because the technology has been privately developed.

"NRSC would not involve itself with a system that consists of proprietary technology," he said.

Whiddon agreed. "At this point, the NRSC is not ready to launch into this," he said. "At this point, we don't want to get into another 'AM stereo' controversy."

Whiddon was referring to the fact that the NRSC has carefully avoided addressing the AM stereo controversy in its work to encourage better quality AM receivers by reducing interference on the AM band.

Some radio industry insiders criticized the NRSC for its decision not to get involved in the AM stereo issue.

Conflict of interest?

Some NRSC members privately said they believe the NRSC should refrain from dealing with the FMX controversy because of the NAB's ties to FMX.

According to some members of the NRSC who declined to be identified, there is a potential conflict of in-

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State Licensing Still A Concern

by Charles Taylor

Washington DC Forces are growing to strike out against efforts by some states to require consulting telecommunications engineers to meet specific licensing criteria to practice their trade.

Federal legislation has been drafted by Rep. Matthew Rinaldo (R-NJ), a ranking Republican member of the House Telecommunications and Finance Committee, focusing on the argument that broad state engineering statutes are not applicable to telecommunications engineers.

The bill recommends requiring "the certification of telecommunications engineers and technicians through private sector organizations whose qualifications it annually approves," instead of allowing requirements that vary from state to state.

It also cautions that unless congressional action is taken, a "patchwork of state laws imposing varying requirements" of radio and telecommunications technicians and engineers could result.

State-by-state laws could "force additional costs on businesses and engineers and make it more difficult for those in the field to do business internationally," it added.

GAO study

Rinaldo also is sponsoring a study by the federal government's General Accounting Office (GAO) that intends to determine the degree to which states are injecting themselves in the licensing area and what impact it has, according to Paul Schlegel, a senior legislative aide with Rinaldo's office.

So far, the issue has been pressed by state boards in Washington, New Mexico, New Jersey and Michigan, where registrars challenged consulting engineers who had not met requirements.

It is hoped that the GAO study will be completed by spring, Schlegel said. A bill would not be presented before its results are known.

> ***"We're going to try to move the ball from where it is now across the goal line . . ."***

Meanwhile, an attorney representing the National Association of Radio and Telecommunications Engineers (NARTE) is hoping to build up support for the proposed bill by encouraging engineers to contact key legislative officials.

"A legislative call to arms is what we're about to launch," said Robert Thompson, an attorney with Wood, Lucksinger & Epstein in Washington, DC, and NARTE's legal representative. "We're going to try to move the ball from where it is now across the goal line."

In a letter dated 1 March titled "Open Letter to NARTE Legislation Supporters," the organization calls upon about 150 "key" individuals who have expressed an interest in lobbying Capitol Hill officials to contact those representatives and support the proposed bill.

"We want to demonstrate across the Congress the breadth of support that we've gotten. We want the Congress to be deluged with a couple hundred sincere approaches by engineers who feel their livelihood is being threatened," Thompson said.

Industry-wide controversy

The efforts are the latest in what has mushroomed into an industry-wide controversy regarding whether consulting telecommunications technicians should be required to meet various criteria for accrediting professional engineers—PEs.

These usually include a minimum term of experience, passage of an exam and a four-year accredited academic degree in order to legally practice or advertise under the term "engineer."

The primary supporter of the issue, the National Society of Professional Engineers (NSPE), maintains that the licensing standard will place broadcast engineers under the same scrutiny as their counterparts in other engineering disciplines.

It also will set a necessary and long overdue standard for minimum competence within the broadcasting industry, said Arthur Schwartz, general counsel for the NSPE.

Allies of state licensing also emphasize that it is not intended to affect engineers employed by a private firm. Only unregistered consultants who refer to themselves as "engineers" would be under state scrutiny.

Foes of the move toward licensing fear, however, that it could lead to 50 diverse state laws, thus creating chaos among those, for instance, that are consulting for a company that has stations located in a number of states.

And according to NARTE's attorney Thompson, state enforcement is an easy vehicle for manipulation by those who want to have the finger pointed at a particular engineer.

"It's not so much that the state boards are picking people at random," he said. "They're acting in most instances on a complaint that someone has filed, usually someone who's been defeated in a contract bid or someone who wants to limit competition."

Prices driven up

If state licensing indeed did become standard for consulting engineers, it's also possible that prices would be driven up across the board in the industry.

"The engineering costs to radio stations—particularly salaries of staff engineers or fees to contracting or consulting engineers—could increase significantly," wrote NAB's Michael Rau in the association's newsletter.

But, he continued, "There appears to be no immediate need for alarm."

The FCC has remained essentially noncommital about the issue. In a letter to NARTE President Ray Thrower last summer, FCC Chairman Dennis Patrick alluded to the Commission's 1984 support of federal deregulation of engineers, thus shying away from a strong view on the state regulation, according to Thompson.

He did, however, pledge the Commission's support if it becomes necessary to maintain the integrity of the industry before Congress, Thompson said.

For more information, contact Robert Thompson at 202-223-6611; and the FCC at 202-632-5050.

FCC Denies AM Renewal

by Charles Taylor

Washington DC The FCC said it has denied Catoctin Broadcasting Corp., owner of WBUZ-AM in Fredonia, NY, renewal of its broadcast license on the grounds of employment discrimination, misrepresentation and fraudulent contest operation.

In announcing its decision against the station's sole principal, Henry Serafin, the Commission said "Although we do not lightly decide to deny renewal of a license, we will nevertheless reach such a determination where the record demonstrates that renewal would not serve the public interest. An analysis of the record here leads us to conclude that this is such a case."

Serafin denied the charges placed against him and told **RW** that he had been singled out as "an undercapitalized small-town station. We're probably the easiest to go after."

Catoctin has 30 days to appeal with the US Court of Appeals for the District of Columbia, in which case the Commission's order does not become final until completion of judicial review. If it decided not to appeal, the station would be ordered off the air within 90 days.

Serafin said he will appeal the ruling.

"We have to. We have no choice," he said. "I'm 63 years old; I should be retiring. All I want to do is be able to sell the station. I'm being stripped of my livelihood and my years of labor. If they take my license away, I have nothing."

Serafin, who has owned 100% of the station since 1978, was found to have willfully violated the FCC's equal employment opportunity rules by discriminating against a black female job applicant and, "with intent to deceive," lying to the FCC about the matter, according to Diane Killory, general counsel for the Commission.

It also found that Catoctin placed documents into the station's public file years after they were due for filing, then again misrepresented information regarding the charge.

Also, the Commission concluded that the company violated FCC rules by failing to award a stereo receiver and cassette tape unit used in a contest, instead keeping it for use at the station. Serafin also lied to the FCC regarding this matter, Killory said.

The pattern of Serafin's misrepresentation was sufficient grounds for denying renewal, the FCC said. The additional findings of employment discrimination and contest violation only reinforced the conclusion.

The case against Cacoctin revolves around the company's 1981 license renewal. Killory said it has taken the years since to sort through an entanglement of legal details. The station has remained on the air during that time.

For more information, call the FCC at 202-632-5050.

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FM Short Spacing Draws Fire

by Alan Carter

Washington DC The FCC faces appeals from at least two fronts on a rule making allowing short-spaced FM stations by use of directional antennas.

In addition to the NAB, which promised to file a petition for reconsideration once the report and order was issued, the engineering consulting firm of du Treil, Lundin & Rackley will file a separate appeal on at least three technical points.

The FCC released the report and order, under docket MM 87-121, 22 February and also outlined how broadcasters can apply to operate short-spaced FMs effective 14 April.

The NAB opposed the action, claiming it will lead to increased FM interference and a decrease in service to listeners.

Technical objections

du Treil, Lundin & Rackley will address its concern at the docket's requirements for directional antenna performance and certification; for limiting the rate-of-gain change to 2 dB per 10 degrees, and for not allowing stations to accept additional interference, according to Steve Crowley.

Crowley said the firm believes concerns over antenna performance and certification can be addressed in the modeling process. The firm also sees "no engineering justification" for making the rate-of-gain policy a rule, he added.

As for accepted interference, he commented, "We think stations should be allowed to accept interference, especially in an area not already served (by the station.)"

Bob Surette, manager of RF engineering for Shively Labs, called the overall document a "conservative approach" to directional antennas. "They've really tried with this."

But Surette questioned the elimination of waivers, noting that there are some cases where they are needed because the directional patterns "are usable."

New procedures

Under procedures the Commission adopted in December, broadcasters no longer can apply for waivers for co-channel and adjacent channel short spacing.

Instead the FCC will require applications to protect facilities similar to contour protection criteria currently used in the non-commercial service.

The maximum amount of short spacing is limited by the amount of separation specified for the next smaller size station class, according to the report and order.

However, because of the Commission's limited FM application processing resources, the agency said, permissible short spacing "initially" will be limited to eight kilometers, or five miles.

Eventually, according to staff, the decision will permit an average—for all classes of stations—maximum co-channel short spacing of 26 kilometers (16 miles), or about a 14% reduction in the current spacing requirements.

Allotments unchanged

The FCC said no change is made in the current FM channel allotment process, under which proposals for new channel allotments must meet minimum distance separations with respect to other co-channel and adjacent channel stations.

Also, no change is made with respect to minimum distance separation requirements for IF-related stations.

The report and order noted that until the Commission acts on a proposal to increase power for Class A FMs from 3 kW to 6 kW, it will accept applications that

(continued on page 21)

FMX Tabled

(continued from page 7)

terest because NAB stands to profit from FMX equipment sales.

NAB legal counsel Valerie Schulte said the NAB is a limited partner within BTP and has the right to a percentage of net profits from the patent license royalties.

The association became involved in 1985 when then-NAB Science & Technology VP Tom Keller became a co-inventor of FMX and involved the NAB through the for-profit division that invests in ventures to help develop broadcasting technologies.

According to Schulte, NAB has not yet made any money from FMX, because there are only a few patent licenses that have been sold.

Rau said NAB's internal technical committee is evaluating the Bose/MIT study, and he emphasized that limited ownership of FMX will not "influence our study of the technology."

"I've gone on record a hundred times, I guess, saying that if FMX is an improvement, we (NAB) will support it," he said.

For information, contact Stan Salek at 202-429-5391, Michael Rau at 202-429-5339, George Hanover at 202-457-4975, Emil Torick at 203-622-2804, Dr. William Short at 508-879-7330, Dick Kennedy at 317-451-1866 and Wes Whiddon at 713-622-1010.

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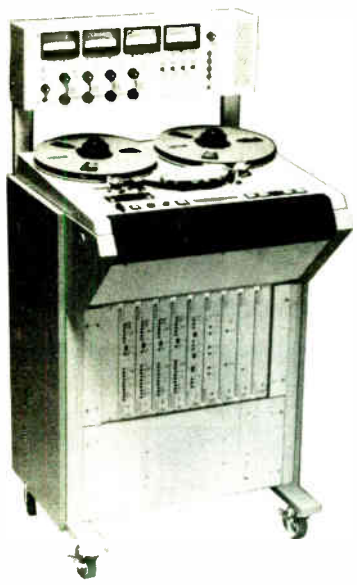

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AMs to Negotiate Interference?

(continued from page 1)
location.

Also, a station, under certain circumstances, could surrender its license, which the Commission said would reduce interference "in the congested AM band (and) lead to improved reception and better overall AM service to the public."

Stations currently are allowed to surrender licenses, according to the Commission, but radiation and protection rights of those stations are grandfathered and maintained for one year while the FCC accepts applications for replacement stations.

With the proposal, the Commission suggested discontinuing the practice of grandfathering such stations. Further, applications filed after a station deletion would not be permitted to propose facilities that will cause either prohibited overlap of daytime contours at remaining stations or create unacceptable levels of nighttime interference.

FCC Commissioner Patricia Diaz Dennis added, "By deleting radiation and protection rights for stations that go dark, we would finally be able to end our counterproductive practice of licensing replacement stations that do not meet our current interference criteria."

But Quello cautioned that "the proposal has significant implications for our localism policies as established by Section 307(b) of the Act." He added "We must make sure that service by local communities is not reduced to the point where a community is underserved."

Accept contingent applications

The second amendment within the Notice proposed to accept contingent applications from AM licensees seeking to implement interference reduction arrangements.

Generally, such applications are not accepted in broadcast services, but the Commission said it might serve the public interest to accept them when the proposed changes would result in interference reduction.

It also was proposed that if two or more licensees submit contingent applications that will bring about interference reduction, they will not be subject to competing applications from third parties with respect to any opportunities created by the contingent arrangements.

This change, the FCC said, would encourage licensees to engage in interference reduction efforts because they can be assured of the benefits of their efforts.

Finally, the Commission also proposed establishment of a "service floor," to be used when analyzing AM modification proposals, which would denote a level of service that must be maintained subsequent to any facilities changes.

The FCC has requested comments on appropriate parameters of such a service floor, and whether other services such as commercial FM should be taken into account when determining whether the services meet the service floor.

For more information on Docket 89-46, contact Diane Hofbauer at at the FCC, 202-254-3394.

More Readers Forum

(continued from page 5)
could manage to put an FM exciter on the air without " . . . consulting with several engineers . . . ." Even a novice amateur radio operator knows that power amplifier stages require neutralization and that any un-neutralized PA is subject to disastrous oscillation.

It should not be up to manufacturers' technical reps to teach basic electronics to station engineers. Further, transmitters don't usually "lose neutralization." Something is done to them to make that occur. After any transmitter tuning, for whatever purpose, neutralization is always the last thing checked.

When operated properly, the RCA BTF20E is a stable and trouble-free transmitter. Judging from the picture and by Mary Drayton's words, the transmitter probably could have been returned to the air quicker and much more inexpensively than the solution which was chosen.

Finally, in my opinion, the new transmitter should have hit the air the day it was received. Mary Drayton states, "It was very frustrating *in a way*." That's not all that she should be frustrated about.

Philip B. Witt, CE
WCOV-TV
Montgomery, AL

NRSC to Test Multipath

(continued from page 1)
Gotshall said the company is interested in evaluating receivers "under worst-case scenarios" to obtain information that may be beneficial in designs of future radios.

"We want to know exactly what is happening," he said.

Simons said he is looking for industrywide participation from broadcasters and manufacturers with a specific interest in multipath.

The multipath project stemmed from a February meeting of the FM subgroup, when an "FM Occupied Bandwidth Working Group" was organized.

Ed Anthony, working group chairman and an audio design engineer at Broadcast Electronics, said the group will examine if FM transmission methods are affecting interference.

Three areas under evaluation are the FCC rules, composite clipping and "aggressive processing."

Making a comparison to interference on the AM band, Anthony said, "We're trying to catch it before it gets too far along."

Other areas include typical modulation levels and what the market is using for actual occupied bandwidth.

For information on the multipath project, contact Harry Simons at 215-434-4424. For information on the working group, contact chairman Ed Anthony at 217-224-9600. For information on the FM Technical group, contact Wes Whiddon at 713-622-1010.

Help for AM Daytimers

(continued from page 5)
ters and allow daytimers to add the marketable "AM and FM" to their identifications.

The new FMs could be stereo too, giving a new dimension to a satellite music format.

At 10-50 W, with relatively low antenna height, there must be enough space (perhaps as little as 25 miles co-channel) for every standalone daytimer to get an A1 authorization.

Although the Class A1 stations would be very low power, their clean, stereo signal, within about a five-mile radius of the transmitter site, would undoubtedly boost the daytimers' image, without discounting the importance of the AM station's function.

Picture the owner of a daytimer telling his staff and advertisers that he has just received FCC permission to build a small FM to augment his AM outlet. And that it, along with its low cost and fast timetable, will be on the air in a couple of months.

Now that's an announcement I'd be proud to make.

■ ■ ■

Peter Hunn is owner-operator of WZZZ-AM in Fulton and former owner-operator of WHRC-FM in Port Henry NY. He is also the author of Starting and Operating Your Own FM Radio Station *available from Tab Books.*

NAB Asks Freeze on Buyouts

by John Gatski

Washington DC Until the FCC thoroughly evaluates its procedure allowing "non-applicant buyouts," the NAB has asked the Commission to freeze any third-party attempts to buy out new TV or radio station license applicants during the comparative licensing process.

As part of a petition for rule making, the NAB has asked the FCC to freeze all pending and future non-applicant buy-outs until the Commission can make a judgment on whether such transactions serve the public interest.

The FCC can approve non-applicant buy-outs under a precedent set by a recent Marco, FL, case.

The NAB believes privately negotiated buyouts violate the "public interest" intent of the Communications Act of 1934.

In the Marco case, the FCC allowed an outside party to come into a comparative licensing process after the application and public comment deadlines. The party was able to secure a construction permit by buying out each applicant until it was the only one left.

Process of elimination

According to NAB Deputy Counsel Barry Umansky, this precedent allows an outside company partnership or individual to buy out applicants for a new TV or radio station license and, through this process of elimination, be the only party left to be granted a construction permit.

The NAB believes privately negotiated buyouts violate the "public interest" intent of the Communications Act of 1934, because interested parties such as the NAB do not have the opportunity to comment on the buyout.

"The commission should enact a freeze until this thing gets resolved," Umansky said. "Let's not let people swoop out of the sky and . . . negate the (comparative licensing) process."

Allow comments

In a related matter, the NAB also requested the FCC to allow comments regarding the non-applicant buy-outs during the comment period for the proposed rule making to change the comparative licensing system to a lottery form of selection.

Umansky said the non-applicant buyout is a part of the comparative process and comments would be appropriate under the lottery proposal.

A congressional remedy also may be forthcoming to reform the FCC licensing process, Umansky noted.

A bill soon-to-be introduced in Congress, according to Umansky, would ban pay offs during renewal periods and set up a two-step evaluation process during comparative licensing evaluations.

For more information contact Barry Umansky at the NAB, 202-429-5456.

Active Device Course To Be Offered in RW

Annandale VA We live in an era when the best tools a broadcast technician has are often a telephone with an equipment manufacturer's "800" assistance number taped to it, and a file of "air express" mailers.

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Introduction to Active Devices is a course offering a brief overview of how the basic active devices in electronics operate. A brief review of vacuum tubes will also be presented.

The course is excellent for the individual who plans to study further in a technical school or community college. It's also a good refresher program for individuals who have studied the basic material in the past.

The course will begin in the 12 April issue of **Radio World** and continue for 12 consecutive issues.

Northern Virginia Community College (NOVA) will offer 1.3 CEUs (continuing education units) for those who complete the class. An examination will be mailed to those who register for the program (see coupon, below).

The fee for this class is $20. To register, fill out the registration form and mail it *directly to the college* (please do not mail to **Radio World**.)

The course has been prepared by Ed Montgomery, currently an electronics teacher at Thomas A. Edison High School in Fairfax County, VA. He has previously taught broadcast engineering at NOVA and worked as a broadcast engineer for several radio stations.

His last course for **RW** on fundamentals of AM broadcasting was a success. While not mandatory, Montgomery has suggested two possible reference sources for those who take this course.

One is the *Radio Amateur's Handbook*-published by the American Radio Relay League and the other is *Electronic Principles and Applications* by Charles A. Shuler, published by McGraw-Hill.

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Manuals: Things are Looking Up

by Barry Mishkind

Tucson AZ Next to the 3 AM phone call rousing the sleeping engineer to an emergency, one of the most vexing problems we face is the equipment manual that stubbornly refuses to provide useful information.

When both situations occur together the engineer becomes just slightly motivated to throw things around!

Preliminary manuals, poorly photocopied pages, missing parts locators are some of the obstacles that impede troubleshooting and repair. If the station is off the air, the pressure is just that much greater.

So how can we cope? As we have seen over the past few months, a number of manuals are little more than package stuffers, requiring calls to the manufacturer for information.

Other manuals have all the information, but it's hidden somewhere in a manual with enough pages to endanger some forests.

And then there are the manuals that seem to go out of their way to be informative. A good number of manufacturers are starting to listen.

They hear us

For example, David Oren called from Tascam to talk about his company's philosophy. In response to the needs of the industry, Tascam not only tests every machine it imports, but the company has a technical writing team to produce informative, useable manuals.

Thumbing through a sample manual, I was first impressed by the high quality of the print job. This manual was created with care. The pictures and diagrams are sharp and well marked. In the schematic section, there are cross reference notes that get you to the information you need.

The section on operation is suitable for copying and distribution to the entire staff. Not only does it explain how to operate the equipment, it tells why following the instructions is important. Using carefully chosen words, Tascam gives us what we need to train new staff members.

Again, in the maintenance section, well-marked pictures are used that make it easy to locate components or the proper test points to follow the text in checking out the unit.

David told me that Tascam welcomes user feedback and suggestions for improvements in its manual.

Full-time manual preparation

Similarly, I received a letter from Lawrence Cervon of Broadcast Electronics. He relates, with pride, that BE maintains an independent manual department with three fulltime individuals.

BE's manual is detailed and generally of high quality, even including a troubleshooting tree to speed the way through repairs.

Ron Durbin from Pacific Recorders & Engineering has sent me a couple of letters on this subject. His point is quite direct. He wants input from guys in the field so that the manuals he produces are more complete and easier to use.

Like the others, Ron's employment at PR&E is a specific attempt by a manufacturer to react to our needs. Our responsibility, then, is to make those needs known clearly and not just mumble in our beer about "those darn manufacturers and their rotten manuals."

ECLECTIC ENGINEER

But what of the future? Are there better ways to connect the mind of the design engineer with the field engineer?

To the brave new world

While this series of articles was being prepared, I kept asking myself where it was headed. What was it that I *really* wanted to say . . . to stimulate?

It may be the reality of our industry that most of us are in one-person shops without the time to read every page of every manual in the station. It's also true that we usually read many manuals only under the pressure and haste of downtime.

Certainly the increased complexity of equipment over the past decades has made routine operations easier for many of us.

But the price is the inbuilt tendency of stations to operate with minimal personnel and that leads to engineers caring for several stations, each with a different complement of equipment.

One solution may be a cross between the 24-hour technical service offered by some transmitter manufacturers and the ever more present computer. Will we soon see the on-line manual?

Just think. We might soon be able to dial into the local network and be connected to a menu that provides us with a lot more than just a data-base.

The latest updates and corrections to the manual would be right there. The manual could then be downloaded to your local hard disk for inspection or for printing sections of special interest.

Cost and time savings

The advantages are varied and important. The manufacturer would not be faced with an expensive set of mailings to update each manual, nor would he

(continued on page 21)

A Low-Cost Tunable Demodulator

by Bill Higgs

Louisville KY As I have stated before, satellite program delivery is both a blessing and a curse. It has fulfilled its promise of inexpensive audio delivery but it also means that the engineer has more stuff to work on.

Instead of a simple twisted pair terminated at the telephone block, there is now a stack of shiny boxes in the rack. These boxes are called demodulators and other less acceptable things by those who must repair them.

The trend in radio audio delivery is toward single channel per carrier, or SCPC service, rather than subcarrier technique. Several birds now carry these services, including Spacenet 3R, Satcom F4 and Galaxy 1.

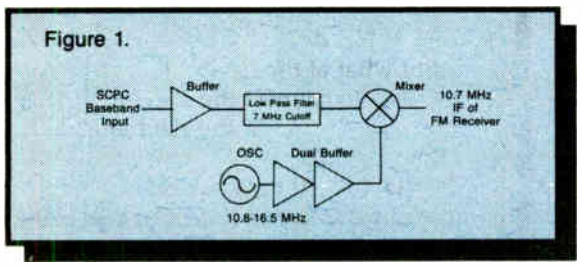
BOTTOMLINE BROADCASTER

Program suppliers tend to be rather secretive, so I can't tell you who's where. As the saying goes, you know who and where you are.

Earlier radio delivery services rode piggyback on a video subcarrier, much like normal television broadcasting (with the exception of FM modulation of both audio and video).

The SCPC services use an entire transponder of several MHz bandwidth for audio services alone. Each channel of audio is on its own carrier, without the dominant video signal.

Figure 1.



Not tunable

The result of this technique is that the nice audio tuning knob on the front of the satellite receiver doesn't cut it for SCPC services.

It was designed for video subcarriers in the 6-7 MHz range. Padding these circuits down below 5 MHz doesn't really work either (I have tried), because they usually do not have the sensitivity necessary for decent quality audio.

The usual solution is to purchase a demodulator from one of several suppliers specializing in satellite equipment.

These are excellent devices, usually featuring audio expansion and other perks. The drawback is that they are usually fixed-tuned (a tunable unit is made by Avcom).

This month we will begin a two-part look at a tunable demodulator intended for casual "browsing" or occasional use.

The prime design criteria were "cheapness" (see the column title!) and easy. The entire thing can be built in a lazy afternoon. Therefore, to meet these criteria, it is based on an inexpensive FM radio as a foundation.

Up converter

The basic block diagram is shown in Figure 1. It is a simple up-converter, translating the SCPC frequencies to the 10.7 MHz IF frequency of the FM radio.

High-side injection is used, so the tunable oscillator covers approximately 10.8 to 16.5 MHz. This month we will build the oscillator and get it running.

Figure 2 is the oscillator circuit itself. You hams will recognize the circuit as an adaptation of a widely published Colpitts VFO.

The tuning capacitor is a standard broadcast variable swiped from an old tube-type AC-DC table radio, with both sections connected in parallel.

The coil is also a junk box item, from a television receiver IF, I think. It measures 5/16" in diameter, has ten close spaced turns of about #22 wire and a tuning slug.

Any combination of capacitor and coil that will give the desired frequency coverage with reliable oscillation will do fine.

Putting it together

Construction is not especially critical, but try to lay the circuit out in a straight line. This will help to avoid possible feedback and parasitic problems.

I used "ugly" construction for my version, building it on the copper of an unetched circuit board. The components connected to ground act as standoffs. A perfboard would probably do just as well.

Purists among you may wish to design a circuit board, but frankly I find such things to be a nuisance and a strain on my sanity.

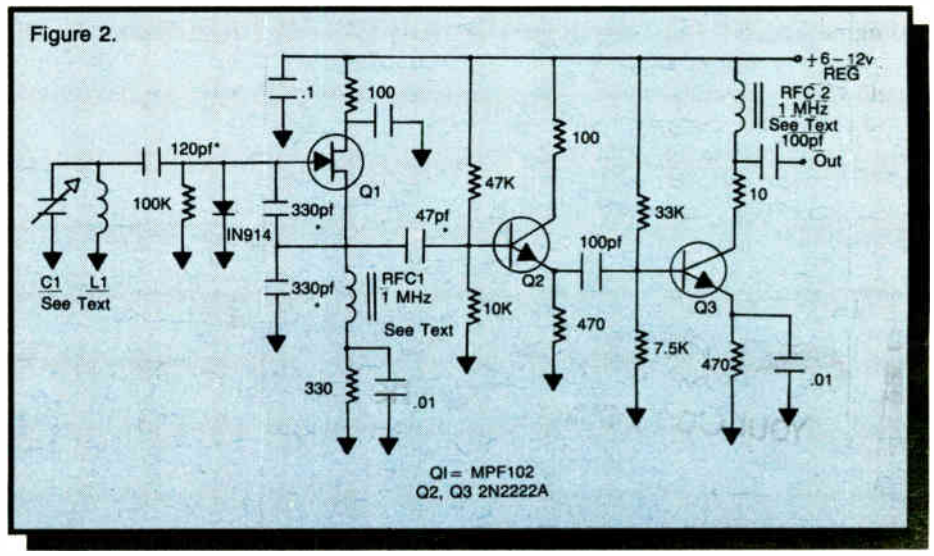
Stability should not be a problem; after all, we are dealing with FM here. Just the same, all capacitors marked with an asterisk should be polystyrene or silvermica.

RF chokes are not particularly critical values; I suspect my source was the same junk TV set.

A word about scrounging here. I am an inveterate pack rat, and the shop has several old circuit boards lying in a pile in the corner.

They have, however, provided almost all of the parts for this project and have bailed me out on several occasions. So far, the total cost of this project is 79 cents, as I had to purchase the FET.

Figure 2.



Room to be creative

Since your parts will be different from mine, don't be afraid to substitute parts or to play with the circuit.

Almost any N channel FET will work in the circuit and almost any NPN transistor that will hit 15 MHz will work fine in the buffer portion.

I chose to use a metal can version for Q3, as it will run a bit warmer than the others in the circuit. Play with the bias values if you want; you might get better results.

Some tweaking is necessary to get the thing on frequency. The idea is to oscillate from just above 10.7 MHz to about 16 MHz, so don't worry if coverage is broader.

The demodulator receive frequency is

(continued on page 30)

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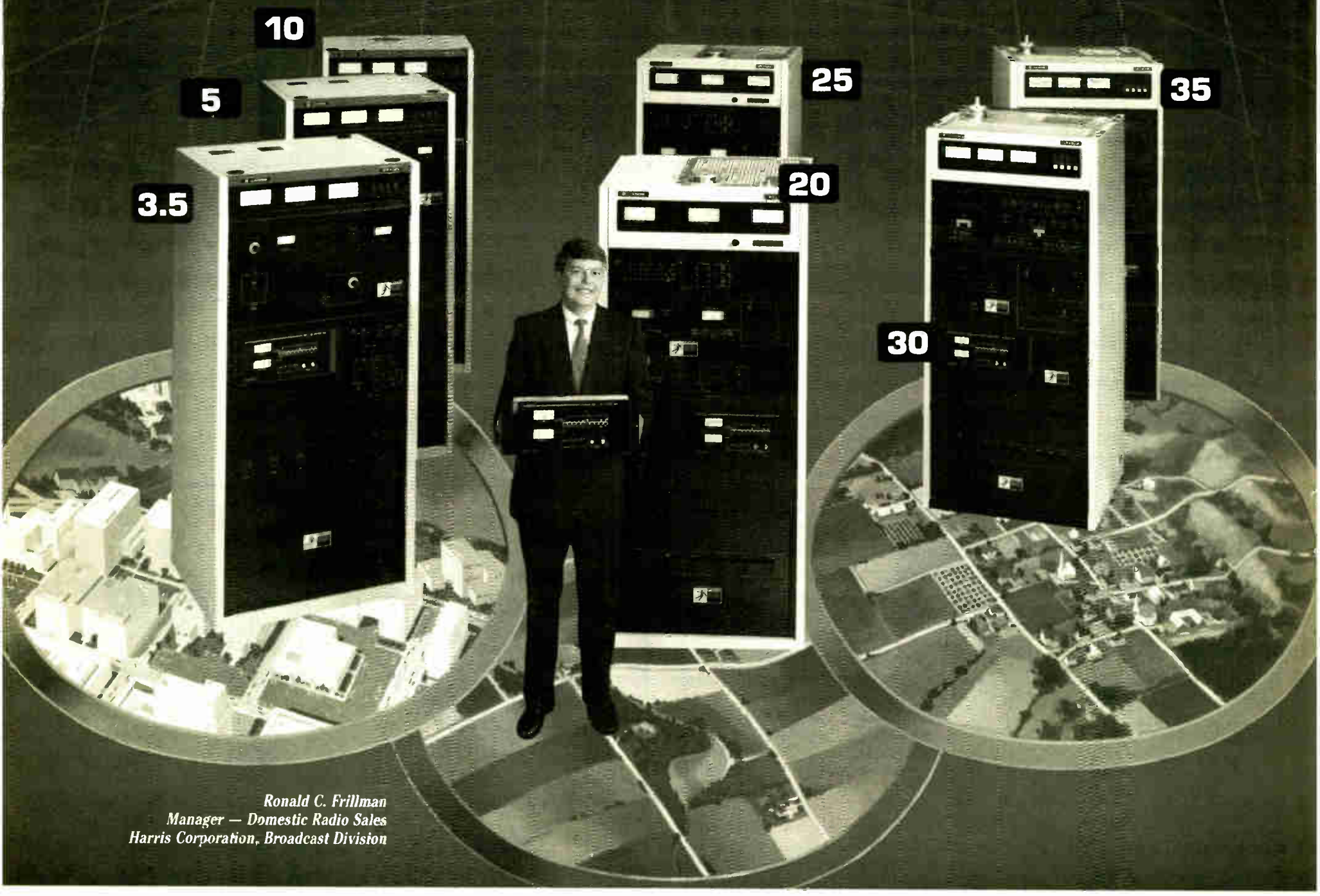

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Hypermedia for Broadcasters

by Thomas Vernon

Harrisburg PA Computers have been integrated into radio for so long that they're pretty much taken for granted. Even in small market stations, there's usually a PC clone in the office for traffic, logs, billing, and other business applications.

Larger stations subscribe to Arbitrend, a computer service that breaks down demographics by daypart, age, income level, etc. There are programs that handle music rotation, callout research and promotional idea banks.

STATION SKETCHES

The engineering department may have a PC to automate audio testing, performing a number of sophisticated measurements that would not be time effective if done manually. There may also be a spreadsheet program to take care of parts inventory as well.

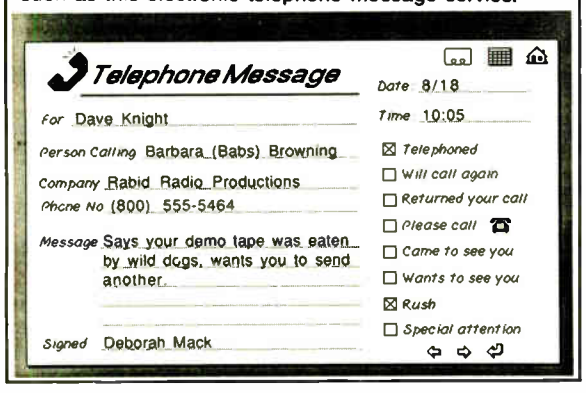
All of these programs have one thing in common: they were developed by commercial software vendors. Perhaps they have some options that the station can customize, but that's about it.

No in-house job

This isn't to say that there isn't a frequent need to create specialized computer applications in-house, because there is. The problem is that the CE (or contract engineer) often has neither the time, skills, or patience to create such materials.

Sure, outside software houses could be contracted to do the job, but they don't usually understand broadcasters' needs and the cost is prohibitive for all but large stations with large programs.

Figure 1. Hypercard comes with several office applications such as this electronic telephone message service.



Sophisticated rule-based programs with conditional branching often must be developed in LISP, engineering programs in Turbo, Pascal or BASIC, business programs in RPG or COBOL (ugh). How many broadcast engineers out there also happen to have a degree in computer science?

Enter hypermedia, with applications in radio. Let's also take a look at HyperCard, the "un-programming" environment for the Macintosh, that allows non-programmers to develop fairly sophisticated applications.

For those of you straddled with an IBM PC or clone, take heart. Big Blue is slowly coming around and a PC based hypertext development environment is due soon.

By definition, hypermedia is a method of information management where data is held in a network of nodes connected by links.

Text, graphics, audio, video or source code can be contained in the nodes. Links between nodes may be made by the user through associative, rather than hierarchical means.

HyperCard is an implementation of hypertext on the Macintosh. It is a three-disk set that is included with all Macs purchased after 1987.

Included with the package are useful office utilities such as an electronic rolodex, appointment book, and phone message system.

The real value of HyperCard however, lies in the ability of non-programmers to use it to create customized applications for vertical markets too small to be considered profitable by software developers.

HyperCard's basic unit of information is the card. Groups of related cards are grouped in stacks. You browse through stacks by clicking on buttons with the browse tool.

Applications are written in HyperTalk, an object-oriented language used to develop and manipulate cards, fields, backgrounds and buttons—the basic building blocks of a HyperCard stack.

The English-like nature of the language makes it easy for new users to come up to speed quickly.

Level to level

HyperCard is unique in that it gives users access at several levels. At the browsing level, use is passive. Moving up, the user can enter and edit text on existing cards at the typing level.

Users at the painting level have access to HyperCard's graphics and painting facilities. Data can be organized and linked at the authoring level.

The highest level, scripting, allows advanced users to create applications in HyperCard's programming language, HyperTalk. Developers can lock their completed stacks at the browse level to prevent accidental or deliberate tampering.

Perhaps the most exciting applications for HyperCard lie in its ability to control equipment, or other programs through external commands (or XCMDs, to use the HyperCard vernacular).

XCMDs are really subroutines written in Pascal, C or Assembler, and attached to a HyperCard stack as a resource.

Perhaps you have an automation system or ATS whose display and human interface isn't too user friendly. HyperCard to the rescue.

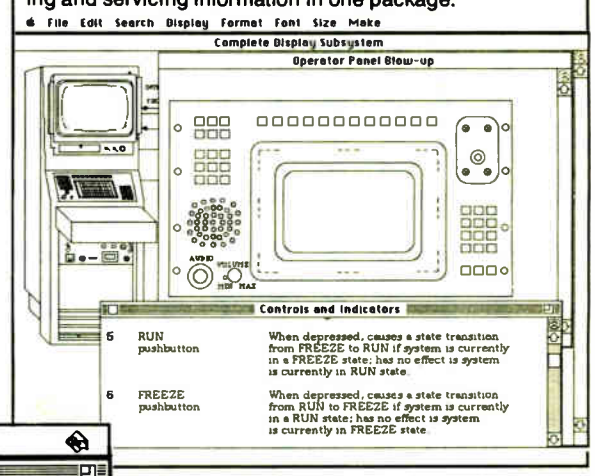
You can create a HyperCard stack with XCMDs to link with the original program. The operator can control the equipment via a mouse in a friendly Macintosh environment with windows, pull-down menus and icons.

It's also possible to write XCMDs to directly operate equipment with remote control capability. Such commands have already been created to control several brands of videodisc players for computer based training applications. The possibilities are limited only by your imagination.

Part of the fallout of deregulation and the elimination of FCC licenses is the requirement for licensees to assess the technical competence of the operators they hire. Too often, training of new operators is neglected and haphazard.

HyperCard, with its capacity for digitized sound and images, is an excellent training tool. With a rudimentary knowledge of HyperTalk, useful training tools can be developed.

Figure 3. Hypertext instruction manuals can combine training and servicing information in one package.



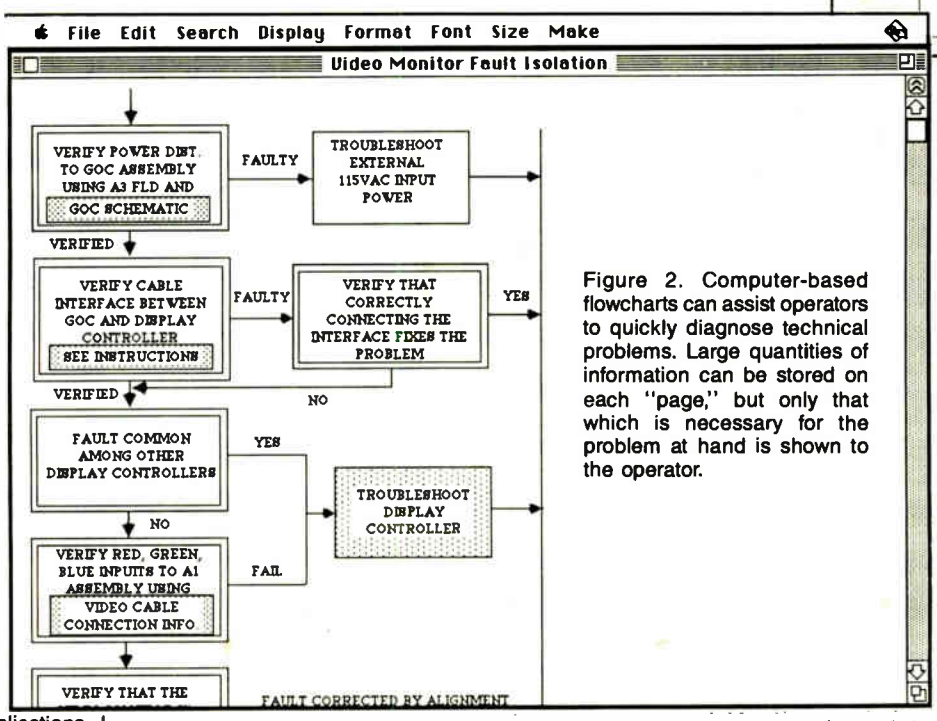


Figure 2. Computer-based flowcharts can assist operators to quickly diagnose technical problems. Large quantities of information can be stored on each "page," but only that which is necessary for the problem at hand is shown to the operator.

For totally inexperienced operators, (there seem to be a lot of them these days) drill and practice sessions can be easily devised with true/false, multiple choice or fill-in-the-blank questions.

With a few more lines of HyperTalk code, you can keep a running tab of operators' right and wrong answers.

You can import photographs of studios or equipment to the screen, with hidden buttons linking to pop-ups describing their functions.

Interactive flowcharts, like that in Figure 2 can be designed to walk operators through off-air situations. While much information can be stored on the "page," only relevant material is displayed to the operator, reducing confusion.

More sophisticated training systems may involve different views of the same information. Topics are selected with levels of detail to suit individual needs. This structure mimics the way people normally access information, allowing

(continued on page 30)

Alaska's Pipeline for News Gets a Facelift

by Dee McVicker

Anchorage AK One hundred and twenty-two public stations don't know it yet but they have recently acquired a new production studio.

The telltale signs of new construction can be found not in their facilities, but in their satellite feeds from Alaska Public Radio Network.

Such are the wonders of the nation's largest broadcasting group known as "the government."

Alaska Public Radio Network, a news and information arm for public radio, is a satellite newsroom to 22 Alaska public stations.

For some of these stations, APRN is more than just a satellite feed, it is their only source for state and local newscasts.

One hundred national public stations also tap into an APRN service. They pick up the network's five minute newscast known as *National Native News*.

It is no wonder then that APRN made plans to expand. In addition to its regular services, a new morning service was being introduced that would require six satellite feeds in an hour and a half's time, and as much news and equipment as the network could collect.

The master studio had, up until the new service, handled all of the traffic with very little difficulty. But the new service would quickly create a production bottleneck.

The old "Ampro" studio was the first place APRN looked to ease the network out of traffic congestion. The second place was the federal government.

The federal OK

APRN doesn't consult the market ratings when it decides to make a major expense change. Like its member public

FACILITIES SHOWCASE

stations, the network usually consults the federal government.

Although corporate underwriters have been known to pick up the financing of various projects for the network, the bulk of APRN's major expense money comes from two federal agencies.

The NTIA (National Telecommunications and Information Administration) and PTFP (Public Telecommunications Facilities Program) allocate grant money to public radio facilities on a for-need basis. All APRN had to do was convince them of the need.

Operations Director Chris Bydalek didn't write the grant application for this project but he has a pretty good idea of how it went.

"The NTIA and PTFP already know what it takes to build a radio station," says Bydalek. They could easily disapprove of any item on the network's list, or, as often happens, the whole application.

"We've been turned down for many grants," relates Bydalek. "This one we happened to get."

Bydalek was also glad to discover that the same funding sweep that got the new studio also doled out grant money to several of the state-wide member stations.

Checking the list twice

The list of equipment sent for federal grant approval was based primarily on the existing master production studio.

In fact, Bydalek said APRN's previous technical director could have very well copied off the equipment list drawn up for the master studio years ago.

Alaska Public Radio Network built redundancy into its new studio which serves 122 stations.

This made sense. The network wanted twin studios that could easily interchange equipment, parts and operators.

It wasn't the first time APRN had specified equipment based on existing equipment. Redundancy is a resident plan, a strategy that is evident throughout the facility.

Reporter workstations, of which there are four, have Otari recorders where actualities are reproduced from cassette tape. Each workstation also has a computer to script newscasts.

The Otari logo shows up again in a small edit booth, where news material is transferred from phone line to reel-to-reel tape. In the master production studio, Otari recorders are found yet again as well as an Auditronics board.

The new twin studio

As planned, the new studio became a small twin to the master studio, with one contrast. Two new Fidelipac Dynamax CTR10s were the only exception to the network's redundancy rule.

Vendors offered the Dynamax alternative when APRN's de facto standard cart machine became difficult to obtain under a blanket purchase.

Bydalek says that so far the network has been comfortable with the brand switch. He doesn't hesitate to say, though, that the brand switch would not have been pulled off so easily had it been the de facto standard console or recorder that was not obtainable.

Bydalek considers the Otari recorders and the Auditronics board to be the foundation of the studio clone concept.

Without recorder and console redundancy, both of which rank high on the list of usability, the twin studio would become, at best, a distant cousin to the master studio.

"If a board, for instance, should go out in one of the consoles," explains Bydalek, "we'd need to replace it quickly."

Being able to interchange console modules made it practical for APRN to stay with the Auditronics 212 mainframe. And, being able to interchange recorders during an emergency made it equally practical to stay with the Otari recorders.

In addition to the Auditronics 212 mainframe, the four Otari MX5050-Mark IIIs and the two Dynamax CTR10s, the network also added the dbx 900 mainframe, the Pro-Verb reverb, the Orban 674A equalizer and a Urei 565 filter set.

Playing cat and mouse with noise

APRN plays the same cat and mouse game with noise that is a radio favorite. Even without the transmitter, STL and call signs, APRN has its share of pursuits with this pest.

Although it may not always win, the network does know that the chase begins at the phone lines more times than not. Says Bydalek, "The phone lines do tend to be very poor quality out here in Alaska."

The state's poor quality phone service is likely to remain APRN's noise culprit for some time. Although the network doesn't transport its services via phone line, it still relies on telephone circuits to bring in a good many of the in-field reports.

APRN can't very well eliminate this noise source, so it does what radio stations have been doing for some time. It sets a trap with filters, equalizers and a few other handy devices.

The pre-renovated studio already had the Symetrix noise reduction system and the Comrex frequency extender on line. "The Comrex extends the phone feeds to 5 kHz," says Bydalek, adding, "it doesn't seem like all that much, but it makes a big difference."

(continued on next page)

Alaska

(continued from previous page)

The new equipment that APRN added to the studio made an equally impressive difference. The Urei 565 filter set gave the network the capability to filter out those frequencies most likely to piggyback noise.

"Low frequency cut off is at 240 Hz and high frequency roll off is from 2.5 kHz to 24 kHz," says Bydalek of the Urei 565. He also uses the filter set to notch-filter a persistent 60 cycle hum.

Among other duties, the Orban 674A stereo equalizer was brought in to re-equalize material coming from phone line feeds. With this unit APRN was able to overshadow the noise that couldn't be filtered without filtering program material as well.

The dbx mainframe, which was equipped with the 903 compressor module and the 902 de-esser module, is employed to take the edge off of noise by attenuating a portion of the high frequency range and by boosting the SNR.

The combined result, says Bydalek, brings the new studio up to par with its larger twin. The only thing left, he adds, is to equip the new studio with satellite uplink capability.

■ ■ ■

Dee McVicker is a free-lance writer with a long record in equipment sales. Comments on articles and inquiries about her writing service can be taken at 602-899-8916.

Manuals

(continued from page 16)

have to keep a user list and track used equipment sales.

The user who buys something used wouldn't have to worry about getting a manual to use. The latest one would be available at all times. And, with the large scale storage available, older versions of manuals might be held on line for comparison.

There might be a series of files relating common maintenance procedures and service tricks discovered by users. There could even be a list of troubles that have come up, and how to deal with them.

For some of us, it will be an important sales point. One great advantage of such an on-line manual system is that when a designer retires or moves on to something else, the expertise would not be lost.

Will we see such a system soon? The technology is here now. Many of us already have access to computers with high resolution graphics capability. A number of manufacturers already have their manuals on computers.

Of course, not everyone has a computer on the shop desk. So, for the time being, it would require two parallel systems of providing information to users. And some manufacturers are swamped now in trying to meet the needs of their customers.

Yet it should not be a suprise if, in the near future, we see a few manufacturers set up their own bulletin board systems, or rent space on a larger network.

So get ready and watch for that future, coming to a computer screen near you soon!

■ ■ ■

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

FM DAs

(continued from page 10)

involve contour protection based on the presumed use of a 6 kW ERP and an antenna HAAT of 100 meters.

"Our purpose in doing this is not to prejudge the outcome of the ... (Class A) proceeding, but merely to preserve our options and the potential benefits intended by that proceeding," the Commission noted.

The FCC said that applications submitted prior to 14 April that include a request for a waiver will be processed under the current minimum spacing rules and not under the new contour protection rules.

Applications submitted on or after 14 April must specify whether they are to be processed under the new contour protection rules.

Along with these filing procedures, the FCC said it will require an engineering study to establish the lack of prohibited overlap of the protected and interfering contours of facilities separated by less than the minimum distance separation requirements.

But because the necessary documents, Forms 301 and 340, will not be revised by the effective date, applicants must file the information as a supplement. Incomplete filings, according to the new guidelines, will be cause for rejection under "hard look" processing.

For information on the technical aspects of 87-121 from the FCC, contact Bernard Gorden at 202-632-9660; for procedural information, contact Lilo Cunningham at 202-632-6485.

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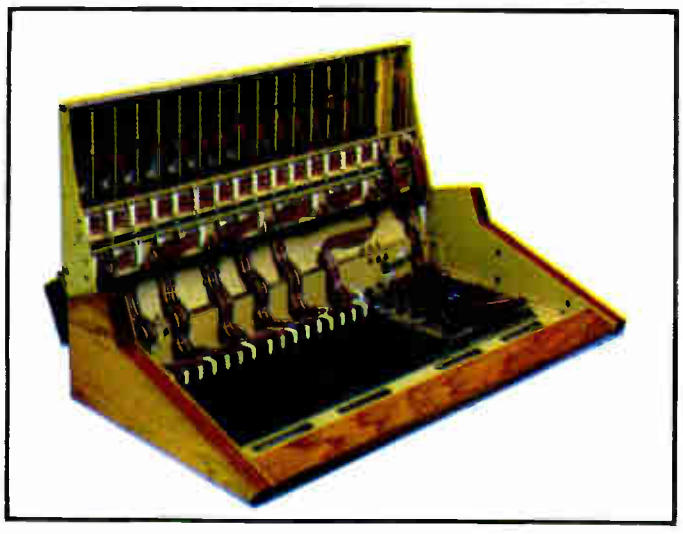

Interior View of the 5000 Series Console

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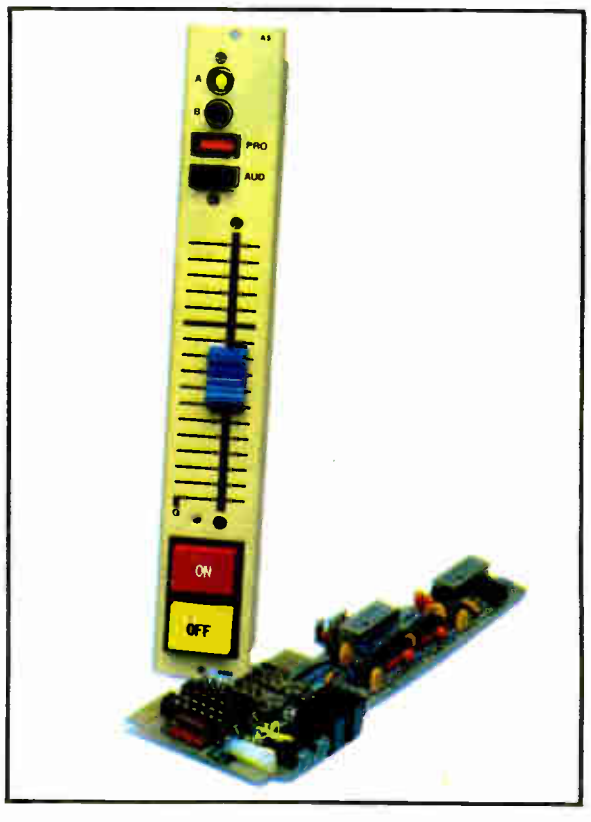

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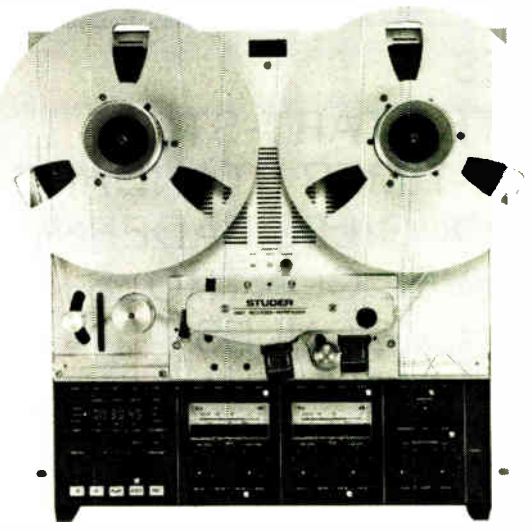

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Mental Disentrenchment

by Ty Ford

Baltimore MD While preparing for a talk I've been invited to give at the West Virginia State Broadcasters Convention this month, I found myself sorting out some of my favorite theoretical approaches to production; ways of *thinking* about things, rather than ways of *doing* things.

PRODUCERS FILE

For most of us theoretical approaches are easily overlooked because there simply isn't enough time to sit around and think about new and different ways to do things.

Copy has to be written. Spots have to be cut. The promos all need to be updated. The work piles up and back we go into the trenches.

At some point, our actions become so automatic that inspiration never has a chance. We shut down, failing to realize the amazing similarities between a trench and a rut.

There are no manuals for mental disentrenchment. Besides, providing hard and fast rules would be the equivalent of jumping out of one rut and into another. The idea is to develop ways of thinking which are not systematic.

If you have become a slave to certain ways of mental processing, your first attempts at "the road less traveled" may make you feel very uncomfortable.

Ignoring or choosing not to accept the status quo probably runs against your every instinct. But the truth is, there are an infinite number of ways to get out of a rut.

Shifting gears

Changing *how* you think is as important as changing *what* you think. If you're mind has been programmed to process information in a limited, predictable and consistent way, it can be compared to a meat grinder.

Regardless of the quality of the meat you feed into it, your end-product is still hamburger.

Putting turkey into the grinder results in turkey burgers, which are destined for neither fame nor fortune. If they were, you'd see them appearing up on the menus of better restaurants.

Turkey burgers are the answer to what to do with the odd pieces of turkey that can't be sold as bona fide turkey parts.

Although it can be argued that a certain amount of creativity had to exist in order to conceive of turkey burgers, the downfall of the concept is that the turkey ended up in the grinder, instead of being packaged in a more palatable and interesting form.

Hopefully, the next production project to which you apply your ingenuity will have more going for it than what to do with the left-over parts of your client or station.

Finding the key

Although these concepts have global applications, for the purposes of this article, let's channel them into the production studio/producer interface.

Simply put, the more varied and accomplished your skills, the more valuable you become and the more money you can make. "One trick ponies" are expendable.

Believe it or not, reading or rereading the operation manuals of the equipment in the studio can provide the key to hidden applications.

You may find yourself in a new studio with unfamiliar equipment. If you can't get your hands on the manuals, give the manufacturer a call on company time. If you can't find out how to get in touch with the manufacturer, call me. I have a fairly complete list of companies who make production gear.

Creative thinking can help a production expert get more from a Symetrix preamp.

Once you get in touch with them, try to get to the person who knows most about the device. Marketing people with a good technical bent can be helpful. Sometimes you can even talk to the person who designed the circuit and find out what kind of documentation is available.

If you don't come off as a total jerk, some companies will send you manuals at no charge. Don't expect "freebies." You may have to pay. If the Boss isn't into subsidizing your education, buy it for yourself. In the long run you'll be ahead.

You may find that what you thought was an audio "meat grinder" is actually a Cuisinart, with applications and capabilities far beyond your initial expectations.

A "what-happens-if?" attitude when experimenting with electronic circuits must be tempered by caution and knowledge. The idea is to find new ways to get more out of the studio, not how to blow it up.

Not in Kansas anymore

If you hit a dead-end on the documentation search, join the ranks of "The Observers of The Obvious" (also known as TOTO).

This little-known cult group has a subchapter consisting of audio production professionals. The major personality trait which distinguishes TOTO folks from normal people is their amazing and unbridled curiosity.

In the audio professionals subchapter, this behavior is exhibited by the uncontrollable urge to know every intimate detail about any piece of audio gear in sight.

If documentation is not available, TOTO members first perform a "skin check" of all external surfaces of a particular box.

Knowing the number of inputs, outputs and interfaces of a device is the first step in mastering its possibilities. From there the normal procedure is to explore every aspect of the unit's operational limits.

(Note: your boss will probably appreciate it if your "play periods" don't interfere with your regular schedule.)

As with most organizations of people, there are different experience levels. Entry-level TOTO members may be satisfied by complete knowledge within the expected parameters of operation of a piece of equipment.

More evolved members regularly experiment with exotic interfaces of several pieces of equipment with which they are intimately familiar.

"Masters Of The Obvious"—the highest level TOTOs—live to push existing circuitry and interfaces into the unknown. They often sacrifice personal safety for the glory of finding unimagined applications.

Applying the concept

Using these thought processes, lets take a look at the Symetrix SX202 dual microphone preamplifier. To the unenlightened it's a two-mic preamp with a +48V phantom power supply in a small box.

In the hands of even an entry level TOTO-an, however, the SX202 is much more. The back panel reveals two balanced (XLR) inputs and six outputs which include unbalanced line output 1+2; balanced line output 1+2; unbalanced line output 1; balanced line output 1; unbalanced line output 2 and balanced line output 2.

What we have here is a very flexible two channel mixer, all six outputs of which can be used at the same time.

The SX202 can do a lot more for you than get that extra mic into the console. If you use the balanced lines for the program buss, you can use the unbalanced lines for effects sends or as isolated feeds for headphones, logger tapes or talk show/teleconferencing hybrids.

The front panel offers a phase reversal switch for one of the inputs, which allows the unit to operate as a "differencing amplifier." As such, it can be handy for getting a good sound when two mics are placed at acoustically improper distances from each other.

You can also turn it into a pretty effective "vocal scraper" by feeding stereo phono or CD to the inputs, reversing the phase on channel one and taking either the 1+2 balanced or unbalanced output.

"But wait a minute," you say "the SX202 is a *mic* preamp. My phono outputs are line level."

Right, well there's a 15 dB switchable pad in front of the amp stage that'll knock the signal down to a workable level. Those same 15 dB pads allow the SX202 to function very nicely as a two channel −10 to +4 converter.

Versatile chip

According to Doug Shauer, director of marketing at Symetrix, the SSM chips used in the SX202 are the same ones

(continued on page 30)

Selling Your Skills for a Profit

by John Cummuta

Downers Grove IL Broadcast engineers live in interesting times today. Like almost every other profession, broadcast engineering is in a state of flux.

Even the name "broadcast engineer" is being called into question. And, as time goes by, fewer and fewer stations feel the need for on-staff engineering personnel. It's a period of uncomfortable change, for sure.

But under every uncomfortable change is an opportunity, and a growing number of engineers are taking the step to independence: selling their services to a number of stations for a fee, rather than one station for a paycheck.

Over the next few columns I'll provide some information aimed mainly at those who have made the move to become an outside, "contract" engineer; as well as those considering the change.

This information will be designed to help you make money as an independent consultant, which is presumably one of your major concerns. Hopefully, it will also help you manage your business better.

The big change

Moving from inside to outside engineer involves a lot more than just who signs your paycheck. As many consulting engineers have discovered, taking their talents on the road requires additional skills and knowledge that were rarely required when they were on someone else's staff.

This change should really be characterized less as one of moving out from under your boss—and more as one of growing from technician to business owner.

When you were simply trading your services for a paycheck all you had to remember was what card connector pin had the B+ and what "bad boys" did that helped you figure out a resistor's value.

Now that you're out there on your own, you have to understand what the bad boys at your creditors will do to you if you don't pay your bills. And you can't pay your bills if you don't bring money in.

And you can't bring money in if you don't get hired and don't operate at a profit. So let's concentrate on one aspect of running your consulting business: marketing.

This should be interpreted as the skills necessary to get, keep and profit from a number of clients. Sound interesting? Then let's get started.

The first business success key

The first key to succeeding as an engineering consultant is to remember that every word you speak, every tip you pass along has value—and if you want a guaranteed formula for going out of business—regularly give that information away for nothing.

ENGINEERING MANAGER

I called you an engineering consultant. Whether or not you prefer that designation is not important. I just wanted to make the point that what you are selling is your *knowledge* and whenever you are delivering that knowledge you are transferring value. That value should be compensated in some tangible way.

There's a story of a computer consultant who was called into a large business. The computer had gone down and the company was losing dollars by the second.

This consultant walked in and in a few short minutes ducked behind one of those intimidating panels and adjusted something that got the big machine crunching according to the game plan again.

Ten minutes later he was gone and a week after that the business owner got the consultant's bill for a hundred dollars.

Enraged, the business owner called the consultant. "This is ridiculous. A

(continued on next page)

Contracting

(continued from previous page)

hundred dollars for ten minutes. I demand an itemized bill," he said.

"OK," the consultant said, hanging up the phone.

The next day the business owner got a revised bill: "One dollar for turning a screw. Ninety-nine dollars for knowing which screw to turn. Total amount due—one hundred dollars."

Never settle for less

When people hire you, it will be because you know which screw to turn. Not just for turning the screw. So, lesson number one is that you should never undervalue your services.

That's true even if those services are delivered via a phone call. If you provide information that improves the immediate or long term performance of the station, you should be compensated.

Now, that compensation may come in the form of referrals, future business with other group stations or some other future value. But never, never, never just give your knowledge and skills away. That's the surest way to go out of business that I know.

You may choose to perform some quick service, just to show what you can do. In that case, you're using your knowledge value as an advertising investment. That's OK. Just don't ever give it away for nothing.

How do you figure out prices?

The basic formula is costs+return on investment+profit percentage=price.

This may be considerably different from the way you established your present fee structure. Most failing consultants set their prices based on what they think the marketplace will pay them.

While it's true that you can't charge a starting rate equal to what more well-known consultants are charging in their tenth or twentieth year in the business, you must charge enough to cover the above three price components, or there is no reason to start your business in the first place.

Is all this a part of marketing? You bet! Why in the world should I give you tips and methods to sell your skills, if you're selling them at a loss? All I would accomplish is to help you go bankrupt faster. So we start with the most important numbers: those that determine whether you're in business or on a suicide mission.

So let's take a brief look at costs. There are two kinds: direct and indirect. Direct costs are those you incur in actually performing your work.

In other words, if you have to buy some tubes for resale to the client, your cost for those tubes is a direct cost.

Indirect costs are those necessary expenses that are not directly attributable to any particular job or client, such as your rent, telephone bill, insurance and so on.

Determine or estimate the number of hours you actually work a month. Decide how much you feel you should earn in monthly salary and divide that amount by the number of hours you normally work. That's your hourly wage portion of your hourly rate.

Then divide your monthly indirect costs by the number of actual or estimated working hours per month. That's your hourly overhead portion of your hourly rate.

If you invested any money into starting your business, calculate what a bank would pay in interest on that amount, over an average month. divide that amount by the number of hours you work in a month, and you have the Return On Investment portion of hourly rate.

Then decide what percentage of profit you want your business to provide. Add up all the above portions of your hourly rate, then add the profit percentage to the total. The resulting number is your hourly rate.

Even if you quote prices by the job, base your quotes on this hourly rate. If it seems high that's too bad. This is the real number that will allow your business to be successful. If you charge less, you are perpetrating a cruel hoax on yourself and your business is simply dying a slow death.

. . . never, never, never just give your knowledge and skills away. That's the surest way to go out of business that I know.

You may not go bankrupt if you cut your prices short from the above formula, but if you are honest with yourself, you'll admit that you would be just as well off (maybe better) to be working for someone else.

If you really intend to build a successful consulting business, be fair to yourself and plan to make money, not just handle it on the way to your creditors.

Next month, we'll concentrate on helping you bring in more business—now that you know what to charge.

■ ■ ■

John Cummuta is president of Marketline, a broadcast management and marketing consulting firm, and a regular **RW** *columnist. He can be reached at 312-960-5999.*

Springtime's Flights of Fancy

by David Hebert

Pasco WA Spring is the time of year when a young man's (or woman's) fancy turns to things like getting his radio station back in top form.

It's hard to resist thinking about happy things like sprucing up the air sound when the weather is taking such a positive change for the better.

A few relatively simple steps can satisfy this most basic need so we can concentrate on other, less important, concepts of springtime.

Here are some easy suggestions that can make our endeavors most productive and at the same time not result in adding significantly to the bottom line.

The simplest contribution that can make the most improvement is, in my opinion, to realign all the tape heads in the various machines.

Of course, there are several methods for accomplishing this improvement, but a few suggestions may be in order.

Back to the source

If the decks you are aligning play syndicated music from an outside supplier, why not ask the supplier to provide you with an azimuth alignment tape recorded on the company's own duplicating equipment?

I have found small variations in even precision alignment tapes, so it is sometimes difficult to be sure the tape heads are set for maximum effectiveness.

If your supplier uses alignment tones at the beginning of each tape, they can be a valuable source for an alignment reference.

In this case, I usually use the freshest tape in the library to adjust the tape heads. If an oscilloscope is not available to help you, try making a patch cord to plug into the audio outputs of the machine with the polarity reversed on one channel.

CONTRACT ENGINEER

Simply hook an AC voltmeter to this cable and adjust the azimuth for minimum indication on your meter. If the outputs are unbalanced, try reversing the polarity on just one channel of the head.

If you are using this L-R method, be sure to check several different frequencies to be sure that you are not just cancelling one particular frequency (which is easy to do) to the detriment of all the other frequencies.

When aligning cartridge machine tape heads, it is important to use a cartridge longer than 3 1/2 minutes to sufficiently reduce the tape wobble across the head, which is usually greater in much shorter cartridges.

Sometimes, with older cartridges, one must check the alignment using several different cartridges and setting the record head for the best possible compromise on all the carts.

Mind those capstan rollers

While you're working on the tape machines, take a few extra moments to inspect the capstan pressure rollers. They should turn freely and also be soft and porous.

Studios routinely use isopropyl alcohol to clean heads and rollers. If this chemical is not of absolute purity, the rollers can become glazed and shiny.

This kind of damage greatly reduces the roller's ability to properly pull the tape across the head. Replacement is indicated for a hardened roller when damage has progressed to this point.

Frequently, plate modulated transmitters can suffer defective filter capacitors in their modulator bias supplies without too much outward indication.

When you are looking for a clue to this problem, you'll usually find an inability to totally 'cut off' the modulator static current by using the bias adjust controls.

With warmer weather on the way . . . check the transmitter blowers to be sure they are turning properly.

The AC noise that is generated when these filter capacitors lose their value will not be audible on the air because it is cancelled in the modulation transformer.

Easy upgrades

While we're on the subject of AM transmitters, its a good time to install the new NRSC equipment, if that has not already been done. Besides making the station considerably easier to tune in on most radios, this step can dramatically improve the audio across the entire spectrum.

Quite frequently, I'm finding that a soft final in an FM transmitter can degrade audio (and stereo) performance. It could be argued that the tube is just an RF amplifier, and this is true.

However, an old tube can develop on-carrier spurious emissions with modulation that won't show on a spectrum analyzer. The change to a new tube and subsequent retuning can sometimes make such a difference that the station's audio processing requires readjustment.

Many FM stations use the Orban Optimod 8000A stereo generator. While this is a fine unit, it may suffer from electrolytic capacitors that dry up with age.

This problem can be easy to detect. To check for this condition, rotate the meter selector through the 19 kHz and 38 kHz positions and compare the meter indications with the factory checkout readings.

If your unit has readings much lower than original, a session on the workbench is in order. A replacement kit is available from Orban; the entire procedure takes about 90 minutes to install. The cost is minimal.

Forgotten phone lines

Often, the only time telephone audio lines are checked is either during audio proofs or after they have been repaired. It is wise to check them from time to time to be sure that they are at maximum performance.

An inexpensive audio oscillator plugged into the station console and adjusted to provide a constant audio level will be sufficient for this purpose.

Someone else at the transmitter to monitor the receive response will be required for this project. Especially if repairs have been made to these circuits, this check is helpful.

With the warmer weather on the way, now is a good time to check the transmitter blowers to be sure they are turning properly.

It may seem funny, but be careful to check if they are turning in the proper direction. Sometimes, when two blowers are used together, a non-working blower will still turn backwards but appear to be satisfactory; it is being turned by the one motor that is functioning properly.

A way to check on whether a motor is suffering this condition is to look at the rotating blades as they slow down when the transmitter is turned off. I have seen this condition several times over the last few years.

Since the major winds are behind us (we hope!), it's a good idea to be sure that the STL antennas are still properly pointed to their target. Sometimes the wind can turn them far enough to produce a marginal signal in the STL receiver.

With these projects behind us, our thinking can return to the less interesting aspects of springtime for awhile—you know, things like baseball and spending lots of time outdoors.

■ ■ ■

Dave Hebert is president of Dave Hebert & Associates. He is an occasional contributor to **RW** *and can be reached at 509-545-9672.*

Preamp Alternative to a Second STL Site

by Sandra Woodruff

San Jose CA The nightmares of community FM radio are not always financial, but lack of money always makes life more difficult.

KKUP in Cupertino (San Jose), CA, decided to install a 950 MHz STL to eliminate a $200 monthly telco bill. Typical of community radio, the equipment was purchased before the path was checked out.

The path length is 20 miles from the studio on the valley floor to the transmitter at 3800' in the mountains south of San Jose—an easy shot for 10 W with a pair of Scala Paraflectors.

An easy shot, that is, except for the pesky 3200' mountain stuck right in our path.

A check of the system with the actual STL and a spectrum analyzer showed a path loss of 23 dB below the line-of-sight predictions.

We could find the transmitter on the analyzer, but the audio was useless. The equipment was already paid for, so we were low on options.

Recovering dB

The obvious choice was a dogleg and a second STL system. But in the tradition of public radio, the additional equipment would cost the equivalent of six months of the station's income.

Because of the crowded San Francisco radio spectrum and land use restrictions, we were not prepared for the paperwork required for a second STL site even if we could afford it.

Tackling the problem from the other direction, we decided to find a way to recover the 33 dB sucked up by the intervening mountain.

Larger antennas were quickly ruled out because of wind loading problems. Increasing transmitter gain to 2 kW was also not a feasible option.

An ad in a consumer electronics publication led to contact with DX Tele Labs in Scottsdale, AZ. DX is a manufacturer of high performance UHF amplifiers for consumer television reception.

The high gain and low noise specs on the DX TV amps looked good, so we challenged DX Design Engineer Richard Motzer to create a 950 MHz amp especially for broadcast STL use.

Prototype preamp

Motzer designed the amp on his CAD with special attention to off band rejection.

The DX Strip Line 950 Preamp has a nominal 26 dB gain at 950 MHz with a noise figure of 1.5 dB. The two stage impedence matched amplifier is built around a pair of Motorola MRF0211 surface mount transistors.

The KKUP prototype is built in a small weathertight multibox for mounting indoors or outdoors. The RF ports are 50 ohm type N connectors, while a type F connector handles outboard DC power.

We initially chose to mount our amp indoors, behind a bandpass filter. As it turned out, the filter was totally unnecessary.

The DX amp was totally unaffected by the 5 MW channel 65 transmitter about 300 yards from our site. The preamp will probably be moved up to the antenna end of the coax during an upcoming tower climb to grab an additional 3 dB of gain.

The DX amp performed as specified right out of the box. The 26 dB amp adds approximately 1.5 dB additional noise to the STL audio, which is not a problem in the −62 dBm range.

No stereo tests were made because KKUP has not yet chosen to broadcast in stereo. DX assures me that the amp is flat across 200 MHz.

The DX Strip Line 950 Preamp is an inexpensive, simply designed UHF LNA for broadcast STL use over long or unusual paths. The $200 investment saved KKUP thousands of dollars and months of site location for a second STL installation.

■ ■ ■

Sandra Woodruff was a contract broadcast engineer in the San Francisco Bay area until she took a job as a Senior Technical Writer with Sony Communications Products Co. four years ago. At the end of October, 1988, she gave up the soft life and returned to the real world of radio as Chief Engineer at KSEI AM/FM in Pocatello, Idaho.

Modulation Muting Relays

This month's **Great Idea** *is a modulation muting relay, a great help in the real world of today's radio. Send your projects and great ideas to* **Radio World** *PO Box 1214, Falls Church VA 22041 and win a free dinner (worth $50) on us.*

Each month's winner also becomes eligible for the grand prize at the end of the year.

by Phillip Ramsey

Billings MT One of the most interesting things I have found about small and medium market radio is how people will find all kinds of ways to skirt around the rules of common sense and FCC Rules and Regulations at the same time.

One of the most common errors is taking antenna current and transmitter readings with modulation. This seems to be especially true in stations with directional arrays.

It used to be a simple thing to take readings during a newscast, waiting for the newscaster to take a breath.

GREAT IDEA

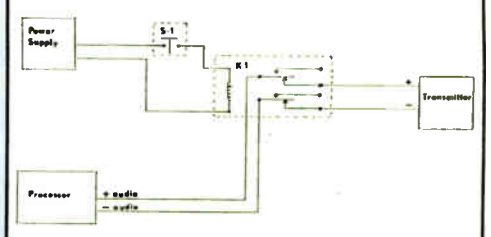
Times have changed quite a bit. Now we have network newscasts that are time-compressed and we are running lots of processing and much higher modulation levels.

The easiest and simplest way I have found around this situation is to simply put a relay in-line between the processor and the transmitter.

The following drawing was designed for a local control situation but with proper adaptation and use of your telemetry control lines could also be used in a remote-controlled station.

Here at KBLG we use CRL processors. I just took the processor output, ran it through a normally closed relay and then on to the transmitter. Our in-house control voltages are all 24 VDC, so I used a 24 V relay.

Figure 1. Modulation muting relay



It really doesn't matter what control voltage you use . . . at one station I used a 6 V relay and a plug-in power supply from Radio Shack. All that counts is that you have a way to temporarily interrupt the audio just before it gets to the transmitter.

As I said, the power supply can be any available size. Just match the relay to what you have available.

The end result is a proper (legal) reading, one that is stable and more likely to be within your nominal operating parameters.

One word of caution: be sure to train your operators not to abuse your "Modulation Muting Relay" PDs and GMs tend to come apart at the seams when they hear "dead air" when an operator leans on the button too long.

The parts list is as follows: S-1 N/O momentary contact push-button switch; K-1 N/C relay (control voltage dependent upon what you have available).

■ ■ ■

Phillip Ramsey is CE of KBLG in Billings, MT. He can be reached at 4140 King Avenue East, Billings MT 59101, 406-245-5000.

Software For Radio

(continued from page 19)
for browsing capability.

Broadcasters probably won't be the only ones embracing hypertext over the next five to ten years. As equipment grows more complex, manufacturers may include hypertext documentation in place of, or as a supplement to manuals in hefty three-ring binders.

Such electronic manuals are now in use for some types of military equipment.

Such documentation has several advantages for both the manufacturer and end user of the equipment. One of the most significant is reduced access time. The rapid linking capability of hypertext makes searching through a lengthy table of contents a thing of the past.

Since printing on paper is eliminated, the time for manual updates, maintenance, and distribution is greatly reduced. Just imagine, no more "preliminary" instruction manuals!

Because hypertext allows information to be accessed in different ways, electronic instruction manuals may be equipment training documents as well.

Figure 3 shows a page from such a document. Clicking on any item on the control panel reveals a pop-up describing its function.

Even editing audio?

HyperCard may be useful in the production room as well. Products such as the STAX sound effects library provide a wealth of digital sounds, all of which can be edited for speed and pitch.

Figure 4. Digital sound effects libraries permit editing of sounds to change pitch, duration, and tempo. Looping sounds for a set number of repeats is also possible. *Courtesy of S*T*A*X.*

A "page" from the Sound Effects Studio is shown in Figure 4. If you have a digitizer, such as the Farallon MacRecorder with SoundEdit and HyperSound, you can record your own sounds and add them to the library.

If you're contemplating such an application, it's best to purchase a hard disk along with your Macintosh. While it will take a big bite out of your pocketbook, it's the only satisfactory approach to digital sound.

None of the HyperCard sound products have the bells and whistles or editing capability of intelligent hard disk editing systems, but they're affordable enough to be contemplated by small market stations.

While HyperCard isn't the solution to all of a station's computing problems, it does allow users with minimal programming experience to create friendly, sophisticated applications with a minimal investment of time and money.

■ ■ ■

Tom Vernon, a regular RW *columnist, divides his time among broadcast consulting, computers and instructional technology. He can be reached at 717-249-1230.*

Low-Cost Demodulation

(continued from page 17)
determined by Local Oscillator Frequency–10.7 MHz, so use a counter to be sure you are within the range. If you do not have a counter, listen to the output on a general coverage receiver.

In this case, the *lowest* frequency heard will be the actual output frequency. Watch out for harmonics—this little oscillator has no output filtering. This should also get you close enough.

Troubleshooting is simple, as there is little to go wrong. Look carefully for any wiring errors. I have found that certain combinations of coil and capacitor will not oscillate reliably.

If this happens, try a series tuned circuit instead of the parallel circuit shown. Also, make sure that the coil is in the clear.

Shielding is nice, but I did not find it necessary. The complete unit should be in a metal box or cabinet to cut down on interference.

Next time, we'll look at the filter and mixer sections and finish the unit. In the meantime, be on the lookout for a decent FM radio to convert!

■ ■ ■

Bill Higgs has been CE for WXLN/WFIA for six years and has also done station consulting work. He has a PhD. in Theology which helps explain his patience with small market radio. He can be reached at 502-583-4811.

Production

(continued from page 25)
used in the 528 mic processor and preamp stages of Amek recording consoles.

The circuit built around the chip is gain-controlled, which means it uses only as much signal as it needs. Differential input circuitry and four inductive "beads" per channel make RF interference highly unlikely.

Inputs are Low-Z balanced transformerless with an input impedance of less than 3 K ohm and a +14 dBm maximum input level (pad in).

Red LED clip indicators fire at 4 dB below clipping. Frequency response varies 1 dB from 20 Hz to 20 kHz and THD is .01% or below.

Outputs are ¼" TRS (stereo) or ¼" TS (mono). Output impedances are 50 ohm balanced and 100 ohm balanced, with maximum output (into 600 ohms) at +24 dBm balanced and +18 dBm unbalanced.

At a list price of only $219 the SX202 delivers a lot for the money. Accessories for the SX202 include the RM-2, a two-unit standard 19" rack mount for $39; the SR-4, a stack-rack for four units for $39; and the SC-2, a security cover to keep tweakers at bay for $29.

For more information call Doug Shauer or Lavina Speer at Symetrix at 206-282-2555.

■ ■ ■

Ty Ford, audio production consultant and voice talent can be reached at 301-889-6201 or by MCI Mail #347-6635.

Hypermedia

by Thomas Vernon

Although the concept of hypermedia is new to many, it had its origins in 1945. It was then that Dr. Vannevar Bush, director of the government's Office of Research and Development published "As We May Think" in the *Atlantic Monthly*.

In this article, Bush lamented the inefficiency of data gathering in a library with information filed alphabetically and sequentially, and went on to describe a system for information storage and retrieval based on human associative thought:

"(The human mind) operates by association. With one item in its grasp, it spins instantly to the next that is suggested by the association of thoughts, in accordance with some intricate web of trails carried by the cells of the brain.

"Selection by association, rather than by indexing, may yet be mechanized. One cannot hope ... to equal the speed and flexibility with which the mind follows an associative trail, but it should be possible to beat the mind decisively in regard to the permanence and clarity of items resurrected from storage."

Bush went on to describe memex, a mechanical device based on microfilm and optics that would allow users access to vast quantities of information in an associative fashion.

Memex wasn't a practical device and it was never built. Bush's concept of information retrieval by associative links remained, however.

In the mid 60s, computer philosopher Ted Nelson used the term "hypertext" to describe an electronic library of infinitely cross-referenceable materials, instantly accessible to the user through a terminal.

Again, the ideas were ahead of the technology and only recently has Nelson's Project Xanadu begun to release software that realizes the earlier visions.

The first attempt to build a device based on Bush's vision wasn't until 1968, when Doug Englebart demonstrated his Augment system. During the presentation, Englebart worked on a hypertext document in tandem with a colleague 500 miles away.

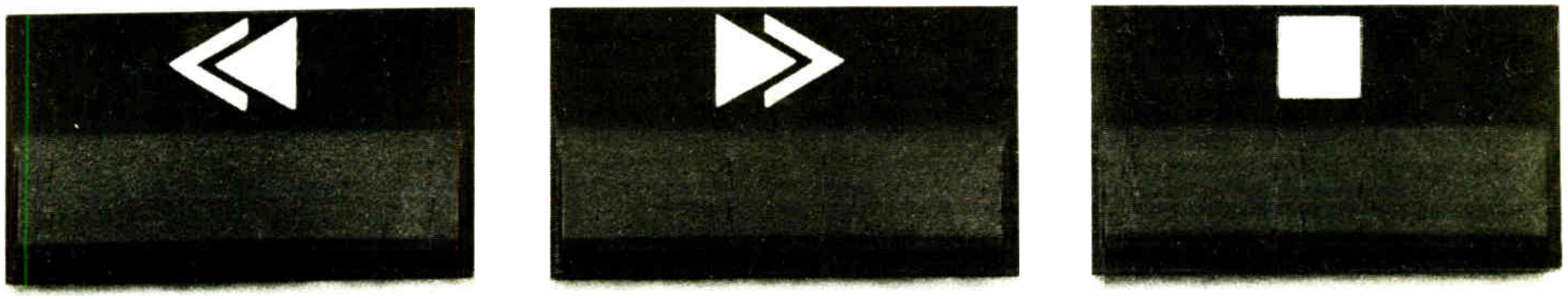
As technology advanced, audio, graphics and video have been integrated into the computer world, spawning the term "hypermedia."

Within the last year, interest and awareness of hypermedia have mushroomed. This is due in large part to Hypertext '87, the first international conference on the subject, as well as Apple's extensive promotion of HyperCard as an information management tool.

The reduced cost of mass storage devices, more powerful workstations and high-resolution graphic displays have also contributed to the acceptance of this new medium.

The technology of hypertext, once an oddity found only in computer research labs, is now in the hands of personal computer users everywhere, thanks to Bill Atkinson's HyperCard for Macintosh owners and Owl International's Guide for MS-DOS users.

THE BROADCAST DECK FOR PUSHY PEOPLE.



No tape deck gets pushed around more than a professional broadcast deck.

Round-the-clock fast forwarding and rewinding can burn out motors fast, while relentless play takes its toll on the tape heads. That's why the standard for broadcast decks is the 122MKII from Tascam.

Its FG-servo direct-drive capstan motor was designed to prevent tape damage and deliver perfect performance under heavy workloads. The unique Hysteresis Tension Servo Control actually lets you adjust take-up, back tension, torque and azimuth with open-reel precision. All without ever taking the machine off the rack.

At the same time Tascam's three Cobalt Amorphous heads deliver crisp, clean sound that's enhanced even more by a choice of Dolby® B, C and HX-Pro.

With 4-track, 2-channel stereo, Cue and Review, and easy serviceability, the rack-mountable 122MKII lives up to its reputation as *the* professional broadcast deck.

Call or write for more information about the 122MKII. Or ask other broadcast professionals. They're the people who really push our buttons.

TASCAM

Circle 50 On Reader Service Card

MARKETPLACE

Send us your new product info. Be sure to include a black and white photo. Send all submissions to Radio World Marketplace, P.O. Box 1214, Falls Church, VA 22041

Telco accessories

Telos Systems has introduced the Telos 100 switch console and the Telos 100 1A2 interface module, to be used with the company's digital hybrid telephone interface.

The switch console connects to the 1A2 via a modular cable. The 1A2 connects to the key system by a cable and bridging block. Each 1A2 supports 10 lines, two hybrids, two switch consoles and a desk phone.

For information, contact **Trisha Ristagno at Telos Systems: 216-241-7225,** or circle **Reader Service 70.**

Aural exciter

New from Aphex Systems is the Aphex Aural Exciter Type III. The unit features two modes of noise reduction and Aphex's SPR™ Spectral Phase Refractor.

The Type III incorporates the Aphex VCA 1001. It is a single-ended processor that can be applied at any point in the audio chain, and requires no decoding.

Two modes of noise reduction are employed. Mode A functions as a linear sidechain expander with variable threshold. Mode B reduces source audio noise while the Type III enhances the signal.

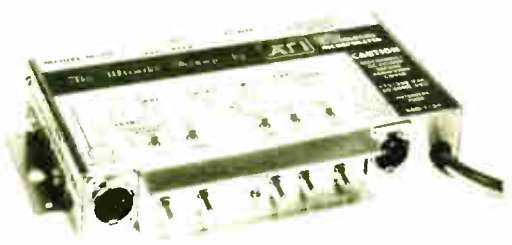
For information, contact **Arnie Christensen at Aphex: 818-765-2212,** or circle **Reader Service 77.**

AF power meter

Marconi Instruments has introduced the 893C AF power meter, an updated version of the 893B, offering wide power range, improved accuracy at low frequencies and improved impedance accuracy.

Two versions are available, one of which can be fitted with a 1 kHz notch filter.

For information, contact **William Bean at Marconi Instruments: 201-934-9050,** or circle **Reader Service 68.**



Mic amplifier

Audio Technologies, Inc. is in production on its new Ultimike™ M100 Microphone Amplifier. The direct balanced instrumentation amplifier input accepts +20 dBm maximum input.

The unit features switchable and adjustable gain, limiter, low cut filter, 48 V phantom power and a phase reversing switch.

The ATI M100 has XLR in and out, and is rack mountable.

For information, contact **Sam Wenzel or Ed Mullin at ATI: 215-443-0330,** or circle **Reader Service 71.**

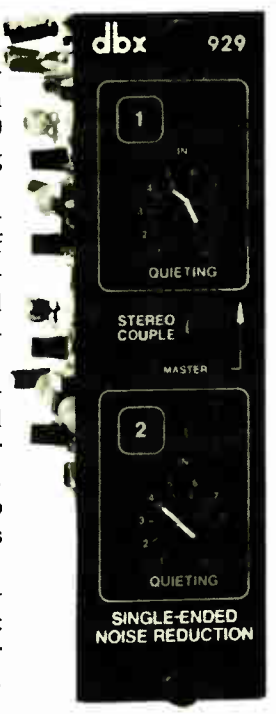
Hiss reduction

The 929 hiss reduction module has been added by dbx to its 900 series signal processing system.

The 929 module provides two channels of one-step hiss reduction, and individual channel filter adjustment control.

Features include balanced inputs and switchable balanced or unbalanced outputs. Each module has two independent channels of processing.

For information, contact **Dana Atwood at dbx: 617-964-3210,** or circle **Reader Service 67.**



Monitor loudspeaker

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

The NS10MC is a two-way acoustic-suspension bookshelf-sized system, with frequency range of 50 Hz to 20 kHz.

For information, contact **Robert Davis at Yamaha: 714-522-9312,** or circle **Reader Service 76.**

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March 22, 1989 Issue Use until June 22, 1989

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RadioWorld

BUYERS GUIDE

Monitors, Microphones, Turntables & Pre-Amps

SDA8-A Is KPBS's "Ideal" DA

by Chris Durso, CE
KPBS-FM

San Diego CA The ideal distribution amplifier would have unmeasurable distortion and impeccable bandwidth specifications. Noise or other artifacts would be nonexistent. It would be compact and easy to install and maintain. Input and output headroom would meet or exceed that of the peripheral equipment to which it is connected.

USER REPORT

The SDA8-A stereo distribution amplifier from Pacific Recorders & Engineering incorporates all of the above criteria and boasts a list of other features.

Any audio chain is only as good as its weakest link. All too often this weak link is the distribution amplifier, whether it is the first piece of equipment an incoming remote line sees or the last device before the audio processor. Any compromise at this point would cause irreparable damage to the overall audio quality of the radio station.

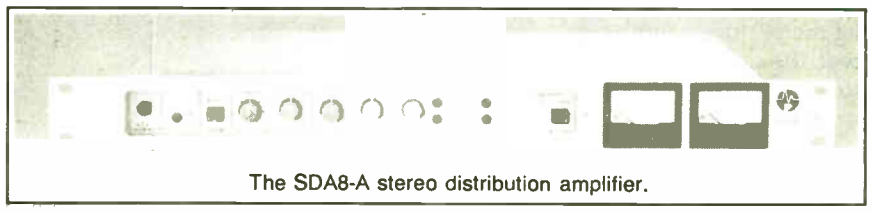
Uncompromised audio path

In recent facility upgrades at KPBS, close attention was paid to the audio signal path after the console, en route to the tape machines and outside world.

After careful evaluation a number of SDA8-As were purchased for both in-house and remote recording use. With a major emphasis on digital recording at the station we could not afford to compromise any part of the audio path.

The SDA8-A is a one-in eight-out stereo DA and it is packaged in a standard 1¾" rack unit. On the rear panel is an HP-style AC connector and fuse. All of the DA inputs and outputs including the balanced patch points are via Molex connectors.

Considering the density required to provide sixteen balanced outputs—as well as the input and patch points—the barrier strip is no match for the Molex connector. This configuration makes installation of the SDA8-A a pleasure.



The SDA8-A stereo distribution amplifier.

Panel controls

All of the front panel controls are recessed behind a removeable, transparent security cover. These controls include a step gain and fine adjust for each of the two channels. The step gain control changes the gain of the amplifier in 10 dB steps.

The gain of the input amplifier can be varied by nearly 40 dB by using the step gain and fine trim adjustments on the front panel.

Since the gain control is in the feedback loop of the input amplifier, input headroom is maintained at 20 dB above the input sensitivity, regardless of the gain setting.

One of the outstanding features of the SDA8-A is its common mode rejection ratio (CMRR). The input CMRR is greater than 60 dB across the audio range and typically greater than 80 dB at one kHz. The transformerless input attenuator uses 0.1% resistors to maintain circuit balance.

A variable capacitor and resistor, which are part of the balanced pad, are factory adjusted to assure the high CMRR from 20 Hz to 20 kHz. In addition, the components in the input circuit are also temperature gradient balanced.

Ideal for telco

With the CMRR specifications the SDA8-A boasts, it is clear that this is the first thing every telco program line entering the facility should see. The DA can

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BUYERS GUIDE INDEX

PR&E SDA8-A stereo distribution amplifier
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Also, Technology Updates from Shure Brothers and Beyer Dynamics.

Turntables, Vinyl on the Decline

by Richard Farrell

Falls Church VA "Compact disc has effectively done to turntables what cartridge machines did to reel-to-reel machines thirty years ago. It is the same kind of revolution. It has been a little slower in coming, but the use of CDs is very quickly eclipsing the use of black vinyl."

These remarks, from Allied Equipment Corporation's National Marketing Director Dave Burns, illustrate the general attitude displayed by those in the industry toward turntables.

"As a broad, general statement, turntables have really lost a considerable amount of popularity and their only real use today in a majority of stations in medium to large markets is for specialty programs—the sort of things that are not

INDUSTRY ROUNDUP

available on CD or tape," says Bill Wohl, custom projects manager for Radio Systems.

Wohl says that as a turnkey supplier building radio stations his company is "involved with a lot of facilities that have extremely limited turntable complements. We have actually built facilities that do not have turntables or there are none actually planned into the cabinetry."

"We have seen a dramatic decrease in replacement purchases of turntables," notes Bradley Broadcast's Sales Manager Neil Glassman, who adds that "when a turntable choice is made, more often than not stations are purchasing more economical models rather than the high end."

"Keep in mind that a large segment of the broadcast community were not playing their records direct-to-air, but were using carts as an intermediary," says Glassman. "So the vinyl record, in a

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Fostex, JBL Scale Down Monitors

by Mike Rabey, CE
WFBQ-FM/WNDE-AM

Indianapolis IN Choosing monitor speakers is one of the most important decisions to make whenever a broadcast studio is built or upgraded. In the past, the "industry standard" monitors shared three characteristics: they were big, heavy and expensive.

This was largely due to the belief that good sound requires large, heavy and expensive drivers and therefore large, heavy and expensive speakers.

But just as new technology is reducing the size and augmenting the performance of active broadcast gear, the same is true of broadcast monitors.

Two small monitors in particular offer performance you might not expect from such diminutive, inexpensive units: the JBL 4406 studio monitor and the Fostex 6301 powered monitor speaker.

Little big monitors

The 4406 incorporates a 6½" polypropylene woofer and a 1" titanium dome tweeter in a ported enclosure with cast aluminum frame. Crossover frequency is 3 kHz.

The 4406 shares many characteristics with the larger JBL monitors: high efficiency (87 dB SPL/watt/meter), low distortion, wide dynamic range and a crisp, forward sound. Tweeter level is adjustable via a pot hidden behind the speaker grill.

You may be thinking: "6½" woofers? In the doors of my car, maybe, but not in a studio monitor!" Well, believe it or not, these little speakers are capable of creating uncomfortable sound levels in small or medium size studios.

USER REPORT

No, they will not shatter the studio windows, but drive them with a moderately beefy amp (75 watts/channel max) and the jocks on your staff should be happy. Here at WFBQ our control room is larger than most, but we have heard only positive comments on our pair of 4406s.

The sound quality is also on a par with much larger speakers. The major sonic difference between these speakers and their bigger JBL brothers is in their deep bass (from about 60 Hz on down).

Beyond this point the 4406's output drops off quickly. Depending on the format and the size of the studio, your operators may not be able to hear the difference.

Of course, there are advantages to using a small monitor speaker. For one thing, if your studio is cramped for space, a 15"×9"×8" monitor speaker could create some new placement options. And a lightweight speaker (the 4406 weighs only 8 lbs.) might also enable you to try a mounting technique you perhaps had to rule out with much heavier speakers.

JBL 4406 studio monitors

The 4406's $225 list price is easy on the budget as well. If you can afford to give up a few dBs of ultimate loudness and don't require earth-rumbling bass response from your monitor system, the JBL 4406 may be for you.

The Fostex 6301B is unique in a number of respects. First, it is a *tiny* speaker—7½"×5"×5"—about half the size of a shoebox.

Second, it is a *powered* monitor—the cast-aluminum cabinet contains a 10 W amplifier and requires 110 VAC to operate. Input is unbalanced line level via a ¼" phone jack on the rear panel. Another ¼" jack allows you to connect the integral amplifier to an external speaker.

Third, it puts out a phenomenal amount of sound for a speaker its size—enough clean audio to fill a large room with ease. The 6301B was designed specifically for location mixdown applications, where the ability to cut through high ambient noise levels is paramount.

That this little speaker packs a wallop was evident from the amazed expressions of the staff who heard it playing in our operations room . . . and down the hall . . . and into the break room. This micro-monitor is *loud*.

Good for several uses

Of course, there's only so much a 4½" long-throw driver in a sealed enclosure can do. Bass response drops off quickly below 80 Hz (the driver will blow out a match held in front of it, but the small size of the enclosure's front panel makes bass coupling minimal).

Placement of this speaker can have a profound effect on bass response in far-field applications. High-frequency response appears to have a slight bump in the 6-8 kHz region, giving the Fostex a

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UREI Features Time Alignment

by Douglas W. Fearn, CE
WKSZ-FM

Media PA When WKSZ decided to build a new first class 8-track production studio, we felt it was essential to install a better monitoring system than the basic speakers we were using in our air and 2-track production rooms.

The UREI 809A best met our needs. This is the smallest speaker in the UREI

The UREI 809
Time Align Monitor System

Time Align® series. The larger monitors use one or more 15 inch woofers, with one coaxially mounted horn for the high frequencies.

The 809A uses the same coaxial horn as the bigger monitors, but employs a 12" woofer in a 23×16½×15" deep box that weighs 60 lbs.

The Time Align feature refers to the way the drivers and crossover are designed. The advantage of Time Align is that all frequencies reproduced by the speaker arrive at the listening position at the same time.

Why time-alignment matters

For an extreme example of a non time-aligned speaker, imagine a woofer in a box and the associated tweeter in another box placed several feet in back of the woofer.

When both drivers are producing sound, as they would be most of the time with program material, an extreme amount of phase shift would occur between the signals arriving from the two drivers, due to the difference in time the sound would take to reach the listener from the two sources.

At frequencies near the crossover point, this causes cancellations to occur at various positions within the speaker coverage area. This is an exaggerated example, but even in otherwise well designed conventional speakers, phase differences can "smear" the sound.

The audible advantage of the Time Align system is a clarity and distinctness that I do not hear in other speakers. In fact, these speakers are so precise that some users may find them initially uncomfortable.

It is like the difference between the mushy but smooth suspension found in some cars, and the precise, responsive feel of a sports car suspension. Some people just don't like the way the sports car feels and likewise some people may not appreciate the clarity of these speakers.

I must admit it took me a while to become comfortable with them. But once you get used to them, you will be able to hear farther "into" your audio.

The frequency response is very flat (see Figure 1), so listening is far less fatiguing than with speakers that exaggerate bass or treble. You are also less likely to get unpleasant surprises when you hear your production on the air.

Also, because of their linearity, you will detect distortion with the 809As that originates in the source, but is not generated in the speaker.

Sound at close range

We intended to mount the 809As on ceiling brackets that would place them about eight feet from the mixer's position, but as a temporary measure we set them on the console overbridge, which is only about four feet from the mixer's ears.

This is within the range normally thought of as "near field" and because of their coaxial design, the 809As still sound great even this close. So we have left them there. (See photograph.)

The 809As come as a left and right mirror-image pair. However, both of ours

USER REPORT

arrived in the "right" configuration. But a call to the manufacturer assured us that the only difference was in the positions of the crossover and bass port.

Simply removing the crossover assembly (mounted on the front panel), reinstalling it in the bass port opening, which is the same size and turning the whole cabinet over changes a left to a right.

We just turned over the cabinet and left it that way. Measurements show no appreciable difference between left and right and the speakers sound fine, so we never bothered to finish the process.

UREI recommends at least 150 W per channel to drive the 809As. We use a 115 W per channel amplifier and the system works well at the monitoring level we employ. The 809A is efficient and needs very little power to drive (the high power is only necessary to ensure that the amp does not clip on peaks when monitoring at high levels.

After the speakers were installed, I checked the frequence response with a

(continued on page 42)

Orban 787A Tailors Mic Sound

by Chip Morgan, President
Chip Morgan Bdcst Engineering

Sacramento CA If there is one thing that sets a radio station apart from its competitors, it is the sound of its microphones. Almost every other audio source is pre-processed before it gets to the studio.

We all know how important live voice is, so we carefully purchase quality microphones, tune our rooms for "good acoustics," ensure low ambient noise levels and hire talent with "great pipes."

Historically, outboard mic processing systems have been created from old processing gear that had been removed from the main air chain. After all, not too many stations had the money for state-of-the-art mic processing, much less a separate chain for each air talent.

Now there is a relatively inexpensive answer to the need for custom mic processing—the Orban 787A programmable mic processor, including almost everything you need for great mic audio.

USER REPORT

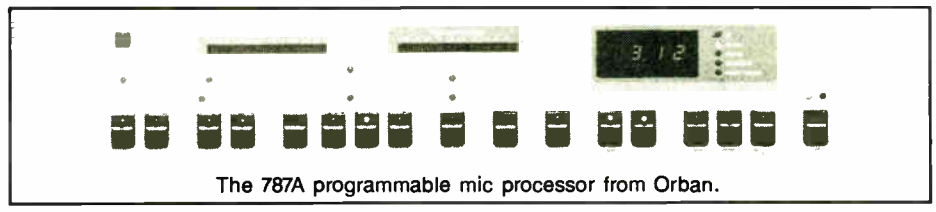
When you think of Orban products, you naturally think of the Optimod (AM, FM and TV). You think of quality audio, attention to detail and good ideas. The 787A is no exception.

I first saw the 787A at its introduction at NAB in 1988. I had already ordered two units based on preliminary specs. The system was impressive with its three-band parametric equalizer, compressor, de-esser, noise and compressor gate including effects send and return ports—all in one 3.5" rack mount unit.

With the 787A, you just play with the controls until you get the sound you want, then store the control settings so you can recreate exactly the same sound tomorrow, next week or next year with just the push of a button.

The 787A will store up to 99 complete setups, eliminating the laborious "tweaking" of a rack full of processing units before each airshift or production session.

The unit consists of the following blocks: a balanced input buffer amplifier, an input attenuator, three peak/dip "constant-Q" parametric equalizer sections connected in series, a gated compressor with selectable noise-gating capability, a de-esser and a single-ended effects-send and balanced return loop with level adjustment.



The 787A programmable mic processor from Orban.

The final section consists of a line-level balanced output and a separate mic-level output. Every function is completely adjustable on the front panel and all settings are stored in memory. You can even A/B your current setting with a stored one.

The unit provides two types of gating to maximize flexibility and utility. If attenuation of background noise (e.g., cart machine motors or other studio noise) is required, use the noise gate. If the ambient noise level is relatively low, use the compressor gate alone.

Both gating stages can be used simultaneously. The frequency can be adjusted in 10 step per octave increments in the coarse tuning mode. The fine tuning mode provides increments of 2.5 Hz in the low band, 30 Hz in the mid band and 60 Hz in the high band.

De-esser controls sibilance

Sibilance is controlled with the 787A's built-in de-esser. It reduces sibilance without adversely affecting high frequency brightness. The de-esser follows the compressor and equalizer and corrects any sibilance caused by the prior processing. A threshold control determines the amount of de-essing required for each voice.

Finally, effects-send and effects-return loops allow external processing to be easily inserted, even if your console does not have send-and-return capability.

The 787A comes with standard line-level inputs, and an optional low-noise, low-distortion Jensen transformer mic preamp with 48 V phantom power provides a mic-level input through a rear panel XLR connector.

Other 787A options include MIDI and RS-232 interfaces, which enable programming and controlling of presets from an external source or downloading presets.

Early setup

At KQPT we installed a 787A in the main production room and another in the main FM control room. The units are installed in the mic send and return circuit of Pacific Recorders & Engineering consoles, and they control the sound from AKG Acoustics 414 condenser mics.

Our units were some of the first out

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PR&E DA Suits KPBS's Needs

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handle up to 100 V of common mode voltage across the balanced line.

Input mode

In addition to the gain control, the front panel also contains an input mode selector, meter I/O switch (yes, there are two real VU meters on the front panel!), a 600 ohm termination selector and a headphone jack. LEDs signify that power is applied and indicate what the input mode configuration is.

The input mode selector can configure the DA in a variety of ways. In the stereo mode the left and right inputs are fed respectively to the eight stereo outputs. In the sum mode the left and right are added and fed to all outputs of the DA.

In the left or right configuration the appropriate signal is fed to all DA outputs. In this configuration the DA is a one-in 16-out. All audio switching is done with gold plated miniature relays. LEDs indicate the selected mode. The stereo LED is green to indicate the normal mode of operation.

Useful headphone jack

If you wish, the nominal 40 kilohm input impedance can be switched to 600 ohms with the push of a button and the headphone jack provides an isolated output signal suitable for driving most headphones.

This is a useful feature for checking remote lines or monitoring satellite signals. The jack would be more convenient, however, if it were not located behind the security panel.

The only other user adjustments that might be necessary are the output level adjust and the VU meter adjust, and although these controls are on the main circuit board they are easily accessible via well-labeled holes on the top cover.

Take the cover off after the DA has been running for awhile and the first thing you will notice is that little or no heat is generated in the enclosure. This is in large part due to the efficient toroidal power transformer. So stacking the SDA8-As in the rack has not resulted in any heat buildup problems at KPBS-FM.

The next thing to catch your eye will be the electrolytic capacitors with a grounded copper shield around them. These capacitors are in the input amplifier circuit and are shielded to minimize crosstalk of the audio signal to adjacent components in the amplifier. Now, there is attention to detail!

Now for the specs. As mentioned earlier the input impedance is 40 kilohm balanced bridging or 600 ohm terminating, depending on the front panel selector switch. Input gain is adjustable from −30 dBu to +9 dBu. The nominal level at the balanced patch input is −10 dBu.

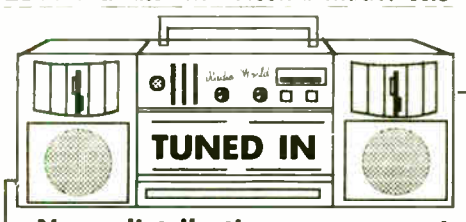
The output source impedance is 80 ohms. If a source output of 600 ohms is needed, the series buildout resistors can be changed. Maximum output level is +26 dBm into 600 ohms. Frequency response is within 0.6 dB from 20 Hz to 20 kHz. Distortion is less than 0.008% at full rated output. Crosstalk is greater than −80 dB at 1 kHz.

The SDA8-A sells for $990. I cannot imagine an audio chain in which the SDA8-A distribution amplifier is anything but one of the strongest links. It is indeed the ideal distribution amplifier.

■ ■ ■

Chris Durso may be reached at: 619-265-6431.

For more information on the SDA8-A distribution amplifier, contact Anders Madsen at Pacific Recorders: 619-438-3911, or circle Reader Service 79.



New distribution agreement . . . ITC/3M as of 1 January appointed three broadcast dealers—**Allied Broadcast Equipment, Broadcast Supply West and Broadcast Services Company** (reported in last month's *Tuned In*)—to sell its ITC NAB cartridge machine product line on a nationwide basis.

ITC/3M National Sales Manager Jim Milne said that "many broadcasters are looking for turnkey operations with systems made up from several different brands of equipment," and hopes that "these well known dealers who have systems integration capabilities will help us meet the needs of our customers."

All ITC service parts orders, equipment repair orders, telephone technical consultation and customer service inquiries will still be handled from the company's Bloomington IL headquarters at 800-447-0414.

Systemation names National Rep . . . The Systemation Company announced the appointment of Barry Homel to the post of National Systemation Representative. Homel is a former Vice President of Texar, and was associated with that company's fast climb in the processing segment of the broadcast equipment industry.

Homel said that "after months of investigating the equipment marketplace—and passing up several offers—I have found that Systemation has all of the qualities I am looking for." Homel also commented that "to survive and grow, radio needs to be open to new ways of doing things ... Systemation has proved it can do things in a new and better way."

Other **People news** has Kinsley D. Jones leaving his post as Vice President and CEO at Omega International to become Western District Sales Manager for Townsend Product Sales Group.

Jones will be responsible for sales of the company's line of VHF and UHF CST (computer supervised transmitter) products throughout the western states. He will work from Townsend's Mission Viejo, CA office—714-768-1228. Jones has worked in the past with such companies as Harris, McMartin, Moseley, Larcan and TTC.

Orban Associates recently appointed former Otari Sales Manager David Roudebush to the post of Marketing and Sales Manager of the company's Professional Products (its "Blue Panel") line.

Roudebush will handle the worldwide marketing and distribution of Orban's existing and upcoming products, except for the Optimod and broadcast transmission products, which will continue to be managed by Howard Mullinack.

International Sales . . . Broadcast Electronics, within the last two months, has delivered 16 transmitters to Venezuela, the contract orders totalling over $850,000. This brisk new activity is the result of the opening up of FM broadcasting service in Venezuela.

A year ago, Venezuela granted licenses for some 40 new FM stations. The first to go on the air was Exitos 107, which began operation in July using a BE 5 kW transmitter.

Government approves acquisition . . . Varian Associates announced plans to move ahead with its acquisition of the assets of Stamford, CT-based Machlett Laboratories, Inc. following the move's approval by the Federal Trade Commission.

With annual sales of approximately $35 million, Machlett, a Raytheon subsidiary, manufactures X-ray and power grid tubes. The agreement has Machlett continuing operations in its Stamford facility while most of its equipment is moved to Varian's Eimac Division plants in Salt Lake City and San Carlos, CA. The land and buildings in Stamford were not a part of the purchase.

Turntables Give Way to CDs, DAT

(continued from page 33)

number of facilities, had always been an archival medium anyway."

To get an idea of the numbers involved, Dave Burns offers: "If I had to estimate, I would have to say that our turntable sales are 50% of what they were two years ago."

The sheer weight alone of an extensive vinyl record library is of concern to turnkey suppliers. "Any time a customer says they will be storing albums in a unit, we have to change completely the way we build it because of the weight that is involved," says Bill Wohl.

"Now," says Wohl, "you can take a small DAT tape, and put two hours of programming on it, in digital quality. It is easy to see why the record goes away."

"We still, however, strongly recommend to stations that they include turntables for the reason that you just never know when you are going to need them," Wohl points out.

This is a telling point. Few in the industry would deny that the turntable is still a necessity to a station, even if a severely limited one. Stations may not be buying new turntables, but they will not throw out the ones they already have. For some, they are still an integral station component.

"There are a number of small market stations still playing records on the air, and for them, turntables are still a major source of programming," says Wohl. "These are the stations that still have not put music on cart," he adds. "And then there are an awful lot of stations that have music on carts that still use turntables for production."

Upkeep of existing turntables seems to be the norm, though, for most. "We have noticed an increase in our turntable bases that isolate the turntable better. What stations are finding is that a lot of the noise associated with records is coming from the environment in which the turntable and tone arm are found," says Tim Schwieger, vice president of marketing for Broadcast Supply West.

The base is "not 100% foolproof," says Schwieger, "but it does effect a marked improvement in the sound quality of the record. And these have sold extremely well. But this is just to upgrade their existing turntables. They are not buying new ones," he says.

Technics is undoubtedly the industry's turntable standard. A spokesperson for Technics noted that "the rise of the compact disc has certainly brought about some adjustments on the part of turntable manufacturers. Many suppliers . . . for all intents and purposes, left the turntable business altogether and have not returned."

For its part, Technics has attempted to adjust to the changing marketplace by addressing the pro CD market, offering players that feature a search dial for precise cueing and even two models that have pitch controls.

One area, however, in which turntables are still enjoying a relatively healthy life is in the nightclub. Pete Bidwell, national sales manager of professional products at Stanton Magnetics, who works closely with sound and light contractors, says "I have not seen a deterioration in my sales activity. In fact, I am ahead of last year, even with CDs out there."

Tim Schwieger agrees. "The disco market remains very strong with records," he says. "Sales on the SL-1200 Technics turntable, which has been known as the disco model, have been fairly strong and remain strong in that market."

"The problem is there are thirty billion LPs that will never become CDs," says Dave Burns, explaining why stations may still need turntables. "There has to be a way to at least dub them onto another medium, such as a cart now and perhaps even a recordable CD in the near future," says Burns.

But taking the example of archiving vinyl to DAT cassettes, with the savings in storage space and the fact that there is no degradation in quality on a digital medium, those records may be coming out of storage—even for dubbing to an "airable" medium—less and less frequently.

Another factor in the mix is Finial Technology's recent announcement not to proceed with its plans to produce a laser turntable. This move says that vinyl records lost a potential advocate, at least for the time being. Reaction was mixed.

"I truly hope that technology comes around," says Neil Glassman. "If not for broadcast, then for American culture. There is just so much of it that is only available on vinyl."

Tim Scwhieger is less enthusiastic—or nostalgic. "You would still have the storage problem and cleaning problem and all of the other things associated with vinyl. All of the things we have been mostly able to avoid with compact disc," he says of laser turntables.

Summing up the overall position of turntables in the broadcast market however, Burns says, "The fortunate thing is that we have not lost a market, the market has simply changed gears."

"Turntables sales have slowed down and CD player sales have picked way up. So we have had something to replace turntables, which has given that segment of the industry a shot in the arm."

And besides, as Bill Wohl puts it, "almost everyone making turntables is involved in a lot of other things. If turntables went away it would clearly not be a disaster to them."

by Trenton Williams

Shure Beta 58 Goes From Stage to Studio

by Tim Schneckloth, Advtg Mgr
Shure Brothers Inc.

Evanston IL Although the recently-introduced Shure Beta 58 dynamic microphone is intended primarily for on-stage vocal sound reinforcement, its technological advances make it a good choice for several radio applications as well.

The Beta 58's most important feature is a "true" supercardioid pattern that isolates and rejects background noise. Many dynamic microphones on the market claim to provide supercardioid polar patterns, but a lot of these maintain tight patterns over a very limited range of frequencies, often resulting in leakage and peaky off-axis response.

The "null" points of the Beta 58's polar pattern converge at a point very close to the theoretically ideal true supercardioid pattern of 125°. Both the 90° and 180° response levels agree with the theoretical ideal levels (approximately −9 dB and −12 dB respectively).

Design considerations

Developing a microphone with this kind of true supercardioid pattern presented an extremely difficult problem for Shure engineers, since dynamic microphone design often involves tradeoffs (microphone frequency response, sensitivity and directionality are all interdependent).

For instance, making a mic that is very sensitive is not difficult. But making a mic that is very sensitive *and* displays a true supercardioid pattern that is uniform at all frequencies is very difficult.

The Beta 58's final design took several years of experimentation and solution-finding to accomplish. Shure achieved its goal by developing new dynamic transducer technology and using specially-designed three-stage tuning networks.

For radio applications, a true supercardioid pattern that stays uniform throughout its frequency range has several benefits. One is its rejection of the ambient noise that plagues many cardioid microphones used in radio applications.

A true supercardioid pattern will also minimize off-axis sound coloration, which can have a detrimental effect on program audio. For these reasons, the Beta 58 is highly suitable for handheld interviewing, panel discussion situations and other multiple-mic applications requiring maximum isolation.

TECHNOLOGY UPDATE

High output sought

Shure engineers also attempted to optimize the Beta 58's output level performance. While designing the transducer element, they combined a powerful neodymium magnet structure with a narrow-tolerance voice coil gap.

The result is a cartridge with very high output. Even when the cartridge is tuned for optimum directional control, the output is several dB hotter than that of most popular dynamic microphones.

For radio applications, this extra sensitivity has one primary advantage—improved SNR, particularly useful when miking weak or distant sound sources.

Another Beta 58 design feature that makes it desirable for radio applications is a newly-designed two-stage pneumatic shock mount system.

In the first stage, the cartridge is supported in an elastomer, which isolates it from most external mechanical vibrations. The second stage of the system is a pneumatic damping device that rapidly dissipates any remaining energy. The result is low mechanical sensitivity and critical damping of any low-frequency resonance.

The Shure Beta 58 Microphone

To address other potential noise difficulties, particularly hum and RFI, the Beta 58 employs an integral humbucking coil, further minimizing sensitivity to AC interference.

The coil comes in addition to the normal precautions taken against these noise problems: all-metal casing, balanced output and proper grounding, all of which greatly enhance the Beta 58's usefulness in radio environments where electromagnetic fields often cause trouble.

Every new Shure microphone has to be able to withstand extended exposure to extremes in temperature (165°F to −20°F), humidity (100% at room temperature and 93% at 100°F), ultraviolet rays, salt sprays, alcohol, sand, water, violent vibrations, shipping tests and "drop tests."

The microphones are also subjected to ten days of repeated cycling between simulated arctic and tropical environments. The microphone must meet its original specifications after testing.

The Shure Brothers Beta 58's primary application is for music-related sound-reinforcement (it is, in fact, being distributed on a limited basis through music and sound dealers). But there is great deal of interest in discovering its potential broadcast applications, and for radio technicians, it is certainly worth a try.

■ ■ ■

For more information on the Shure Brothers Beta 58 microphone, contact the author at: 312-866-2532, or circle Reader Service 75.

Beyer Mics Succeed for WNCN

by Vito Colonna, Prod Supervisor WNCN-FM, GAF Broadcasting

New York NY Five years ago, when I first came to WNCN, the station was using AKG 454s for production, broadcast and music recording. They used Sennheiser 421s for reporting and were not really interested in trying anything different.

In 1978, GAF purchased the station. As a result, a big infusion of cash was used to build new studios and install state-of-the-art equipment.

The final product was a station that was more than adequately equipped for the task before it: broadcasting high quality audio for perhaps the most demanding classical audience in the country, the New York City market.

New mics ordered

I was faced with fighting a management that had already spent a great deal of money upgrading equipment. But, to my ears, the need for a greater variety of microphones that matched the various requirements of the station was obvious.

It took a while, but the CE agreed that new microphones would be a worthwhile investment. I ordered the Beyer M 160 and M 130 M-S Ribbon system. Having been an engineer and musician for over two decades, I had been using miking techniques that were different from what was previously available to me at WNCN.

One that interested me was M-S. M-S (M for middle, or center, mic and S for sides) uses a cardioid pointing forward and a figure-eight with the lobes pointing to the sides.

While originally developed in the early 1930s, this technique has recently found favor among engineers. In essence, the matrix mixing box intrinsic to M-S miking delivers fully-controllable stereo effects without the problems inherent in summing up other stereo miking configurations to mono.

TECHNOLOGY UPDATE

M-S system aids engineer

The engineer has the added advantage, using this technique, of making a stereo blend and adjusting for soloists on site while recording directly to two-track. Another advantage allows the engineer to simply record the middle mic on one track and the sides on another, matrixing and signal processing as needed later.

With the quick turnover between taping and broadcast at WNCN, this flexibility is invaluable. Some weeks I have to turn over five remote concert tapings within three days for broadcast. The occasional addition of a spot mic or a house-mix feed can be blended in with no problems.

The Beyer Dynamic mics are built for M-S miking and fit my plans perfectly, whether recording the Brooklyn Philharmonic at the Brooklyn Academy of Music or recording at the Caramoor and Waterloo festivals under a hot, steamy tent.

In fact, despite these different environments, their performance never varied. As ribbon mics, they had a smooth overall response and just the right level of sensitivity. The Beyers were so good that listeners immediately began remarking on the improved quality of the broadcasts.

The Beyers are small and compact and work well with the Shure AZ7M stereo microphone adaptor, a personal favorite of mine. As a result, the quick setup and breakdown made those fast turnovers a whole lot easier.

New York's WNCN uses Beyer Dynamic microphones.

What would make them even easier is if the two mics were contained in one housing with a truer coincident point source. I understand that Beyer is working on such a model and I cannot wait to get my hands on it.

For live broadcasts, I set up an M-S system with the Beyer Dynamics mics after I found the sweetspot in our studio (no mean feat—the studio is on the fifth floor of an office building. We rented space on the sixth floor and then took out the ceiling to create a mini concert hall seating 80 people).

The system works extremely well for broadcasts ranging from solo guitarists to string quartets to 30-voice choral groups.

Other needs filled

While our M-S system evolved, other needs demanded other mics. WNCN was trying to make classical music accessible to a broader spectrum of listeners. As a result, programming came up with more promotions, increasing our live coverage of such classical music events as press conferences and interviews.

I was soon swamped with piles of cassettes that could not be broadcast without a great deal of time-consuming processing. Quick turnover was again a priority that demanded other mic alternatives.

Fortunately, Beyer Dynamic had just introduced its M 58 reporting mic, one of the advantages of which is that it simply feels good to hold.

From a production engineer's standpoint, the pattern response and mic sensitivity result in a tape that simply needs some editing and dubbing before broadcast.

Our success with these mics has led to the purchase of additional Beyer mics. We now use an M 740 on-air daily and M 260s for daily ad/news reports (over an 8 kHz dedicated phone line) and production voice-overs. We use an M 88 and M 69 as our workhorse production mics.

What first attracted me to the Beyer name was a beloved pair of DT 48 headphones updated with softer cushions and a coil cord. That quality I first encountered so many years ago stuck with me and, apparently, with the company. In general, the Beyer Dynamic mics offer attention to detail that you do not often get from larger companies.

It is frustrating that companies like Beyer are overlooked by engineers who get stuck following trends and refuse to try new products.

For example, it amazes me to see the cult-like attraction to certain mics and the blind allegiance to some large manufacturers. Doesn't anyone listen to these products?

■ ■ ■

Vito Colonna began his audio recording career in 1963 on a Wollensak full track mono machine, while rehearsing the first rock band ever formed in a Franciscan monastery. His search for truth through engineering continues in the genres of jazz and classical music.

For more information on Beyer microphones, contact Mike Solomon at: 516-935-8000, or circle Reader Service 72.

Neumann Cures the Stereo Miking Blues

by Douglas W. Fearn, CE
WKSZ-FM

Media PA True stereo pickup is not commonly required in radio stations. But it might be desirable in some situations, since live music is enhanced in stereo (particularly classical or other acoustic music).

A station might choose to use a stereo miking technique for the main announce microphone and/or production purposes. Other possible applications in production could be for sound effects recording or background crowd effects.

Monaural compatibility is a constant problem in stereo recording. If a significant phase difference exists between the left and right channels, serious cancellations at various frequencies are likely. The result is usually a dull and lifeless recording.

Placement important

Stereo mic placement can be critical. The goal should be a realistic reproduction of the stereo image along with mono compatibility.

A variety of microphone placement techniques have evolved over the years, but the one approach that always ensures mono compatibility uses coincident mics.

The classic coincident microphone technique uses cardioid elements at 90° angles to one another.

In a coincident mic system, the left and right microphone diaphragms are placed as close together as possible so that sound arriving from any direction is sensed at the same time by both microphones.

Another basic stereo technique uses spaced mics that are often omnidirectional types. In this method, stereo is conveyed by intensity, time and phase differences.

Spaced mic recordings are frequently very impressive if listened to in a good stereo reproduction environment, but they can be very poor when left and right are combined for the mono listener (which still includes about half of the radio audience).

Neumann has a full line of condenser microphones designed for a variety of purposes. Best known to broadcasters is the U-87, which is often used as a station announce mic. Neumann also makes microphones for recording, film sound and other applications.

Stereo condenser mic

However, another mic from Neumann, the SM-69, is a special purpose stereo mic with two condenser microphone elements in one housing, one mounted directly above the other and separated by only fractions of an inch.

The elements are large, like those in the U-87. One element is fixed in position and the other can be rotated to place the two diaphragms at an angle anywhere from 0-180° in azimuth.

The classic coincident microphone technique uses cardioid elements at 90° angles to one another.

In some applications, however, a greater or lesser angle may be desirable. Wider might be used to exaggerate the "width" of a source far from the microphone, while a more narrow angle would be desirable when the microphone is close to a single sound source.

An engineer must use his judgement when adjusting the angle, but the basic 90° setting is frequently optimum.

The Neumann SM69 stereo microphone.

The SM-69 also has provisions for several polar patterns of each microphone element, varying from omni-directional to bi-directional ("figure 8"), to cardioid (uni-directional), with intermediate settings available. The patterns can be set independently for each element, as is necessary in the M-S (mid-side) stereo technique.

USER REPORT

Pattern adjustments are made with rotary switches on a separate control box which is connected to the SM-69 by a multiconductor cable. The cable supplied with the mic is about 30' long, but longer cables are available.

The left and right outputs are standard male XLR-3 connectors. The SM-69 utilizes "phantom powering" which means that +48 VDC for the microphone electronics must be applied equally to both sides of the balanced microphone line and the negative connected to the shield.

This voltage is commonly supplied through precision resistors, or via a center tap on the microphone transformer. This permits standard microphone cables to carry both audio and the DC power for the microphone electronics.

Using phantom powering

A problem can arise, however, if phantom powering is attempted on transformerless microphone inputs not designed for condenser mics.

Transformerless inputs are frequently directly coupled (no capacitors) and consequently the high DC voltage is applied directly to the input preamplifier. If this is the case, a modification of the input will be necessary.

The phantom power can be obtained from either a built-in supply in the console, if so equipped, or from a separate supply. Neumann sells several different

(continued on page 42)

787A Sets Mic Levels

(continued from page 36)

of the factory and were initially determined to be excessively noisy. We left the production room unit installed and bypassed the control room unit, awaiting help from Orban.

A quick response from the factory indicated that we needed to install some caps in the EQ section. During the time the processor was bypassed, the jocks thought it was still in line and continued to use their code numbers. At one point I removed the unit and they clamored for its return.

Each on-air person is assigned a permanent preset number for his or her voice, to be recalled just before air time. This works much better than the usual non-programmable units, which are "compromised" to sound acceptable on all voices but cannot be personalized to each.

Stored settings for talent

Installing and setting up the equipment was no problem. We took each person into the production room and stored basic settings. Then final tweaking was made on the air to account for the main processing's effect on the mic sound. After each jock's settings had been recorded, we duplicated them in the production room for recording straight spots.

We set up the stored parameters in the order of the shifts so that the morning person is 01, midday is 02, etc. That way each person just advances the presets by one when he/she comes on.

KQPT uses the production room unit to set up and recall settings for outside voices as well as specific character voices. Each jock and production person has his/her standard setting as well as several alternates for effects.

The Orban 787A mic processor integrates a unique combination of quality processing functions in a fully programmable package. In one compact unit, the 787A combines all the functions you need to precisely define the sound of your mics.

■ ■ ■

Chip Morgan built his first pirate AM station "somewhere in upstate New York" at the age of ten. Over the years he has held almost every position at a radio station from morning personality to GM. He now designs and manages radio station projects nationwide. He may be reached at: 916-973-9734.

For more information on the Orban 787A programmable mic processor, contact David Roudebush at Orban: 415-957-1067, or circle Reader Service 66.

Neumann

(continued from page 41)

outboard supplies.

Assuming that you want to go to all this expense and bother to use a stereo condenser microphone, what can you expect the results to be?

If the acoustic environment is satisfactory, and the mic placement is good, the SM-69 is an almost foolproof way to obtain superior stereo sound without any mono compatibility problems.

If you have not experienced the sound of good condenser microphones, you will be amazed at the clarity, the smoothness of response and the extended high frequency reproduction.

These benefits do not come inexpensively, however. The basic SM-69 list price is $3840. The shock mount suspension, which I consider a necessity, is another $225. But for the ultimate in stereo pickup, the SM-69 is a solution.

■ ■ ■

Doug Fearn contributes frequently to **RW**.

For more information on the Neumann SM-69, contact Jerry Graham at Gotham Audio: 212-765-3410, or circle Reader Service 64.

JBL Intros Mini Monitors

(continued from page 34)

sound with enhanced "presence." Response extends to 15 kHz, where it drops off quickly.

While you obviously would not use the 6301B as the reference monitor in your main production studio, it is admirably suited to a number of less stringent applications. Any small studio needing a near-field monitor—newsroom, news dubbing booth, music dubbing booth—would be a good home for these little monitors.

Or perhaps a mono-sum monitor for the production studio. Remember, you do not need a monitor amp; it is in there!

Need a test monitor for the bench? The 20 kilohm input impedance and 0.5 V input sensitivity make for easy connection to test gear.

As you might expect, the little 6301B really excels at that which it was designed for: remote site monitoring. Its small size, light weight (6 lbs.) and integral amplifier make it a natural to throw into the equipment case and take to the basketball game, the shopping mall or wherever.

This stout-hearted little monitor can even double as a PA system for a small crowd!

At $350 list per pair, the Fostex 6301B is a versatile performer that would be a useful addition to any station.

■ ■ ■

Mike Rabey, in addition to his position at WFBQ/WNDE, is founder and president of Indy Audio. He holds a Bachelor's Degree in Music Composition from Ohio State University. He enjoys classical music, Skyline Chili and dog racing. He may be reached at: 317-253-7565.

For more information on JBL's 4406 studio monitor, contact Bill Threlkeld at JBL: 818-893-8411, or circle Reader Service 69.

For more information on the Fostex 6301B, contact Mark Cohen at: 213-921-1112, or circle Reader Service 62.

WKSZ-FM Applauds UREI

(continued from page 35)

⅓ octave spectrum analyzer and pink noise. The resulting response, measured at the operator's monitoring position, is shown in Figure 1.

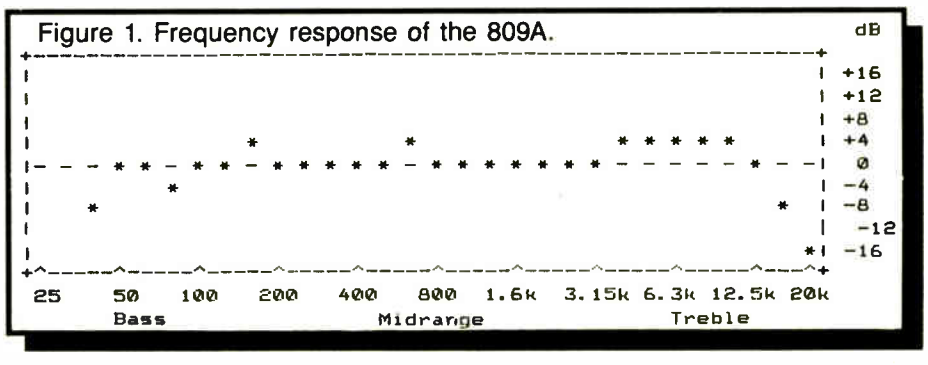
How do they sound? According to WKSZ's Production Director Bill Purdom, who uses them for eight or more hours daily, "they have good, flat response and anything I add or take away is immediately apparent. They are inobtrusive." Isn't this what you expect from a monitor speaker?

■ ■ ■

Doug Fearn contributes frequently to **RW**. *He may be reached at: 215-565-8900.*

For more information on UREI's 809A speaker, contact Bill Threlkeld at JBL Professional Products: 818-893-8411, or circle Reader Service 80.

Figure 1. Frequency response of the 809A.

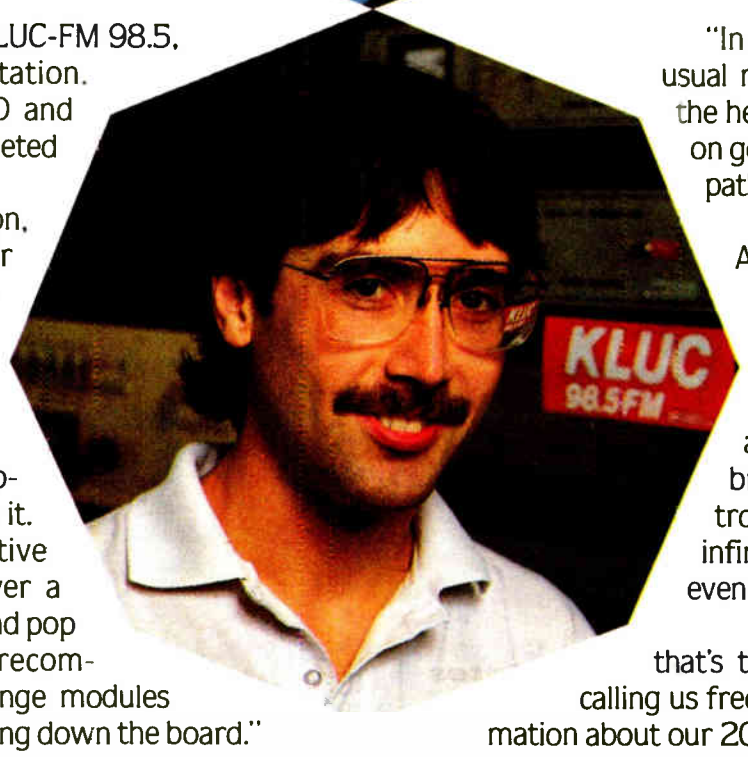


"Auditronics' transparency helps us stay number one in Las Vegas"

says Jay Pierce, Chief Engineer of KLUC-FM 98.5, Las Vegas' number 1 hit music station. "Now that we're almost 100% CD and Bernoulli disks, we've virtually obsoleted vinyl."

"As the heart of the station, the Auditronics 200 lets our superior program come through to the listener. We only have one console left that isn't Auditronics, and when it goes on the air you can definitely hear the degradation."

"Our 200 is my first exposure to Auditronics and I really like it. It's easy to access and all the active devices are socketed. If there's ever a problem you just pop a module out and pop another one in. Though it's not recommended practice, you can even change modules while you're on the air without shutting down the board."



"In three years I've had no problems, just the usual meter lamp replacements. I've changed the headphone pot once (our jocks are tough on gear!), but other than additions the signal path remains untouched to this day."

"Incidentally, our jocks love the Auditronics 200 because everything's laid out well for them. What you need is at your fingertips. The meters are easy to see and easy to read. The monitoring system's easy to use. Multiple inputs are at the top and out of your way. The calibration system's easy to get to. If Auditronics could just supply meter lamps with infinite lifetime, I could forget the consoles even exist."

You can have a trouble-free console that's transparent to digital programming by calling us free at 800-638-0977 for complete information about our 200 Series.

Photo: Jay Pierce, Chief Engineer, KLUC/FM, KRSR/AM, Nationwide Communications, Inc.

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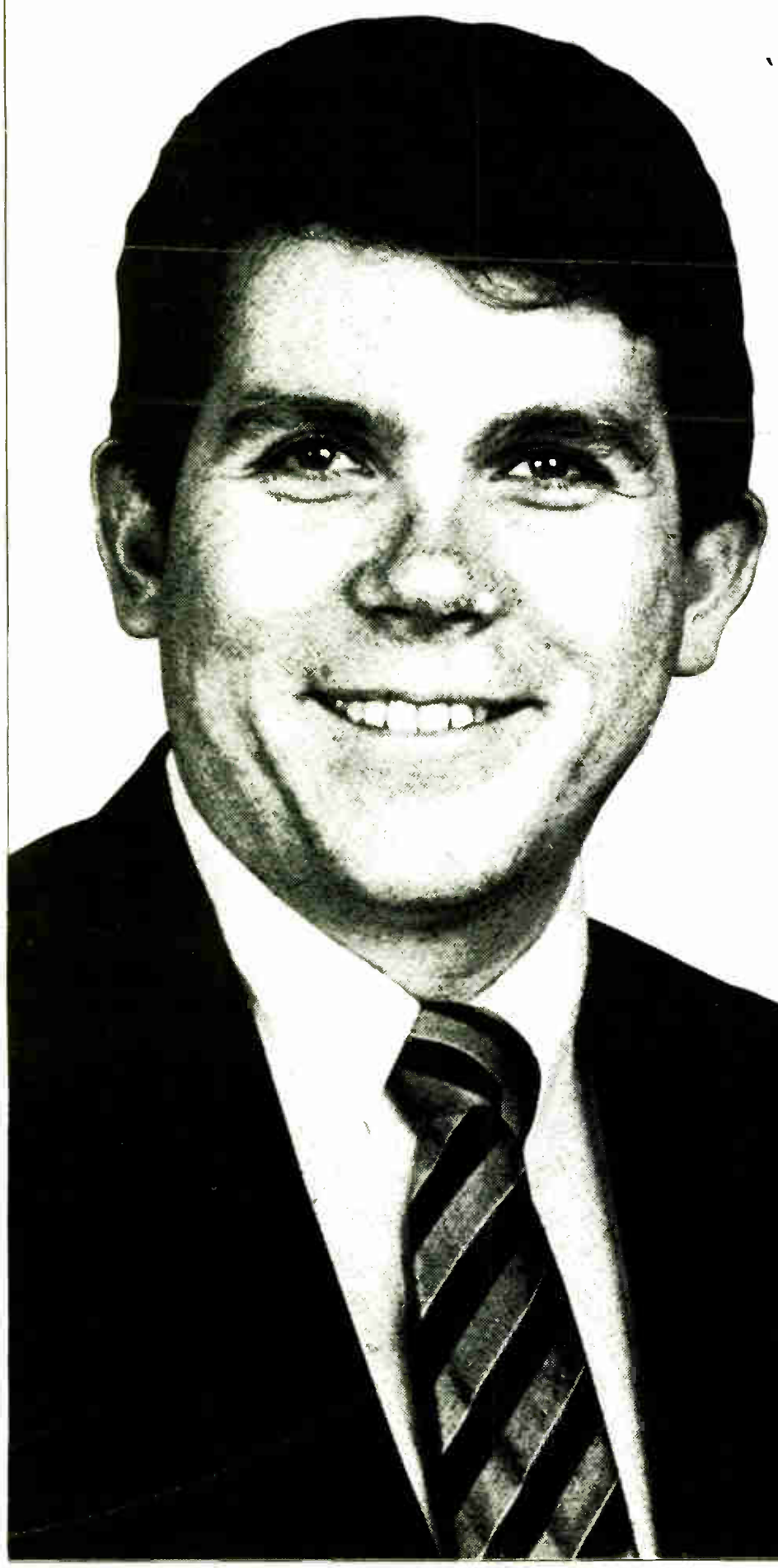

"The Chiefs at 14 of 16 Gannett Stations switched to DYNAMAX cartridge machines. Each Chief wants the best in performance reliability, and versatility."

Paul Donahue
Vice President of Engineering
Gannett Radio

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