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Radio World

Vol 13, No 4 | Radio's Best Read Newspaper | February 22, 1989

Bose-MIT Study Pans FMX

Supporters Defend System's Merits

by John Gatski

Cambridge MA The FMX noise reduction system has come under attack in a research project funded by the Massachusetts Institute of Technology (MIT) and the Bose Corp.

A report resulting from the project called the system, which was developed by CBS Technology and is marketed by Broadcast Technology Partners, a "step backward" from FM stereo when operating under multipath conditions.

In a scathing summary of FMX during a 25 January press briefing, Dr. Amar Bose, Bose Corp. chairman and professor of electrical engineering at MIT, said the MIT/Bose mathematical model and actual field testing experiments on noise and distortion in FM reception proved that FMX has not delivered what it promised.

"The FMX system was a creative idea to patch up FM stereo, but it introduced more artifacts," Bose told a packed auditorium of academicians, MIT students and reporters, many of whom had been flown in for the presentation by a public relations firm hired by the Bose Corp.

Emil Torick, a co-inventor of FMX, challenged the Bose report, calling it a case of "beautiful mathematics" but flawed and incorrect in its assertions. He said Bose's test equipment was substandard and field testing was not conducted under "real world" conditions.

FMX in the market

FMX was introduced by CBS Laboratories in 1985 and taken over by Broadcast Technology Partners. It has had its share of critics from the beginning. Recently, however, BTP officials maintained that most of the bugs with regard to multipath have been worked out.

The system uses companding to reduce noise introduced when FM goes from mono to stereo. Proponents claim the system will increase a station's noise-free stereo coverage area.

There are about 100 stations broadcasting in FMX, according to BTP. Inovonics currently manufactures FMX stereo generators and several other companies are considering production of FMX products including stereo generators and auto receivers.

(continued on page 3)

FCC Proposes Station Application Lottery

by Alan Carter

Washington DC The FCC has proposed granting applications for new AM, FM and television stations by a random lottery instead of the present, highly-debated comparative hearing process.

The commissioners voted unanimously 30 January to issue a proposed rule making seeking comment on the move, by which applications would be screened prior to the lottery.

After an application is selected, opponents could file petitions to deny, according to the proposal. Instead of using the comparative criteria currently in place, the lottery preferences would be limited to diversification and minority owners, those required by law.

Payoffs cited

In making its case, the FCC noted that a vast majority of cases are settled among applicants and relatively few licenses are granted based on comparative factors.

"Typically this involves one party making a cash payment to the competing applicants in exchange for withdrawal of the competing application," said Mass Media Deputy Chief Roderick Porter.

He said the comparative process can take up to five years for an application to be approved, delaying service to the public without providing substantial offsetting benefits in terms of selecting "better" applicants.

A lottery system would be better, Porter continued, by eliminating many comparative criteria, speeding up the process and by making it less expensive for applicants and the Commission.

Commissioner James Quello said the proposal is "worth considering," but he was concerned about the number of applications filed in a lottery.

The FCC has been bombarded with

(continued on page 15)

Ohio FM Goes All DAT-Gold

WMTR's DAT setup

by John Gatski

Toledo OH DAT is "golden"—golden hits, that is—for WMTR-FM 95.9, which went on the air 12 January declaring itself the first all Digital Audio Tape (DAT) radio station in the US.

How does it sound? "You can hear Karen Carpenter's lips touch when she sings," said station owner Max Smith, Sr.

Formerly adult contemporary WHFD, the Class A station spent about $200,000 in changing to a "pure DAT gold" hits format, according Smith. The new call letters stand for Metro Toledo Radio.

The station uses converted Sony DTC 1000 DAT machines adapted for professional use under the name RS-1000 by Radio Systems Inc. All the music is provided by First Comm., a California company that remasters old hits to DAT.

A customized project

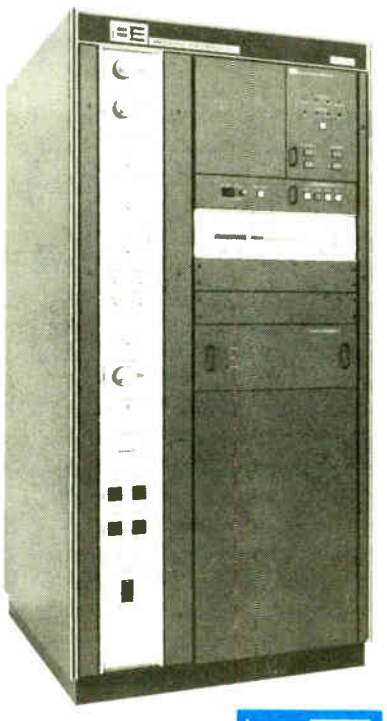
Radio Systems President Dan Braverman said WMTR was the company's first installation and it went very well.

Because it took some time to customize the machines, Radio Systems loaned WMTR four stock DTC 1000s to record its promos and spots until the others were completed.

Radio Systems modified the Sony machines by installing new microproces-

(continued on page 15)

So Many Ways Better...



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World Radio History

News Briefs

Fine Levied

Payson AZ The FCC said it has ordered High Country Broadcasting Corp., licensee of KRIM-FM, to pay $5000 for twice engaging in an unauthorized transfer of control, failing to file timely copies of a network affiliation agreement and an ownership report. The action upheld a Mass Media Bureau decision.

Seeking review of the bureau's decision, High Country denied liability for the two unauthorized transfers, according to the Commission. High Country claimed that although its files were devoid of an ownership report for 1984, the Commission had failed to prove that it did not file such a report for the station.

High Country also argued that the Commission gave no indication that it was enforcing its now abolished rule requiring radio stations to file network affiliation agreements with the FCC during the period in question.

High Country said that the fine was excessive and requested that it be reduced or rescinded by the Commission.

ERP Increase OK'd

Los Angeles The FCC has tentatively permitted KMPC-FM to increase its effective radiated power to exceed the maximum allowed so the station can extend coverage to Glendale, CA. Final approval is pending no objection from the Mexican government.

KMPC-FM, formerly KUTE-FM, was originally licensed in 1952 to operate with an ERP of 82 kW and an antenna height above average terrain of 189 meters. KMPC was grandfathered as a superpower Class B in 1962 when the limitations for Class B FMs were established. Grandfathered superpower status was subsequently relinquished when the station's facilities were modified to operate at the Class B maximum.

Par Broadcasting, licensee of first adjacent KGMG-FM, Oceanside, CA, filed a request for revocation of KMPC's special temporary authority and informal objection to permanent authority to operate with 2.4 kW. Par alleged that the temporary increase had created serious and substantial interference. The FCC rejected the claim.

NAB Names New Engineer

Washington DC Kelly T. Williams joined the NAB effective 1 February as a staff engineer in science and technology.

Williams was engineer for WHMM-TV in Washington. He joined the station as maintenance/operations technician in 1980 and was named broadcast engineer in 1983, a position he held until 1986 when he was named to his current post.

At NAB, Williams will be active in broadcast auxiliary and frequency coordination matters, in efforts to shorten the EBS tone, work on the AM antenna project and work on the spring engineering conference.

Hall of Fame

Scottsdale AZ Veteran sportscaster Red Barber and Nathan Safir, a pioneer of Spanish language broadcasting, have been named radio recipients for the NAB Broadcasting Hall of Fame.

NAB Radio Board Chairman Lowry Mays called Barber "a national treasure" and said Safir has contributed greatly to radio's ability to serve all communities.

Barber contributed such memorable expressions to sports broadcasting as "the catbird seat," for the broadcast booth, and "the rhubarb patch," where umpires and players argued.

Safir is VP and GM of KCOR, San Antonio, TX, the first full-time Spanish language station in the US. He also is VP of Tichnor Media, the largest group of Spanish-language radio stations in the US.

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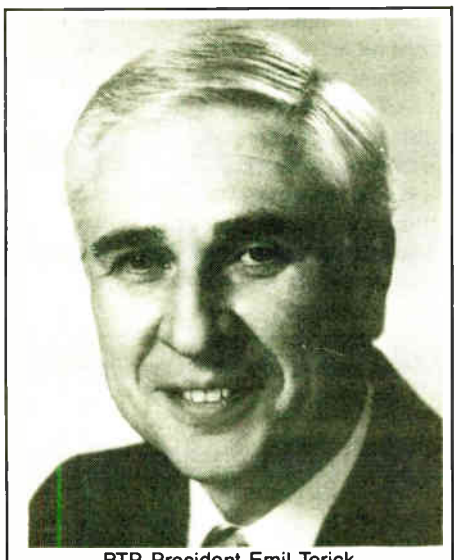
Study Criticizes FMX

(continued from page 1)

At the winter CES show, two audio manufacturers announced availability of FMX receivers.

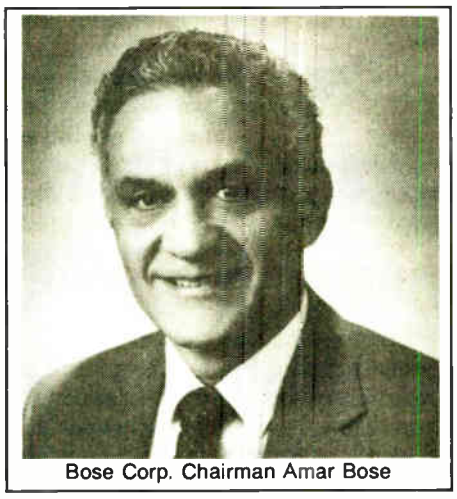
In the research analysis, Bose and Dr. William Short, a member of Bose Corp.'s research staff, concluded: FMX decreases station coverage, degrades reception on FM stereo receivers and FMX receivers are "inferior to existing FM stereo receivers for receiving FMX transmissions" under multipath conditions.



BTP President Emil Torick

In explaining the mathematics of noise and distortion in FM reception, Bose observed that FM stereo inherently causes more noise than FM mono.

The MIT/Bose research discovered, however, that introducing an additional component, such as FMX or SCA, into the 20-75 kHz region, where the existing FM stereo information is located, causes more noise and distortion in the audible frequencies.



Bose Corp. Chairman Amar Bose

FMX compounds multipath

Under normal FM stereo, the signal consists of three components, a mono channel (M) 0 to 15 kHz, the 19 kHz stereo pilot signal (P) and the 38 kHz double sideband suppressed subcarrier signal (S), which is the stereo channel. With the subcarriers above 20 kHz, according to the research, noise is proportional to the rise in frequency. Thus, there is audible noise increase in FM stereo over mono.

FMX further compounds the problem, Bose claimed, because of its compressed stereo channel (S'), in quadrature to the S channel, that is added to the high frequency region and further aggravates phase error during multipath conditions.

In an FM receiver, the report stated, FMX transmission produces more distortion than an FM stereo transmission, even on mono, under multipath conditions because the receiver tries to decode

(continued on page 12)

Firms Continue FMX Plans

Washington DC FMX equipment and receiver manufacturers will continue to manufacture FMX products despite the release of negative test results on the stereo extension system in an MIT/Bose Corp. research report.

The report was released 25 January by Dr. Amar Bose, professor of Electrical Engineering and Computer Science at MIT and chairman of the board at Bose (see related story).

"We're probably going to proceed with our line of FMX products," said Jim Wood, president of Inovonics, which is currently the only maker of FMX stereo generators for radio stations.

Wood said the products are working well, and stations on the air have "no complaints at all."

Inovonics plans to unveil its latest FMX stereo generator at the spring NAB show.

A spokesman for a second company considering manufacturing an FMX generator, Orban Associates, was not aware of the research report. Howard Mullinack, sales manager, said Orban is still studying the situation, but he acknowledged that no independent analysis of FMX had been conducted previously.

Other companies considering offering an FMX generator are CRL and Aphex Systems.

CRL Engineering Manager Chuck Adams, who observed that his company made the original prototype FMX generator used in tests of the system, said he wouldn't react to the negative research results until he reads the report.

Aphex president Marvin Caesar was unaware of the Bose-MIT research but said the company was "still waiting to see what the market reaction to the system is." Caesar said he wanted to see which consumer companies support FMX before making a final decision on offering a product.

He noted, however, "We still have reservations on its viability for typically processed stations."

A representative at Alpine Electronics of America, which showed an FMX stereo car receiver at the Winter Consumer Electronic Show, also was not aware of the MIT/Bose research.

Tony Hicks, technical services representative for Alpine, said his company is set to release its new line of FMX-equipped receivers and that FMX worked well in company testing.

JVC also introduced an FMX-equipped auto receiver at CES, slated for sale in the spring.

For more information, contact Jim Wood at 408-458-0552, Howard Mullinack at 415-957-1067, Marvin Caesar at 818-765-2212 and Tony Hicks at 213-326-8000.

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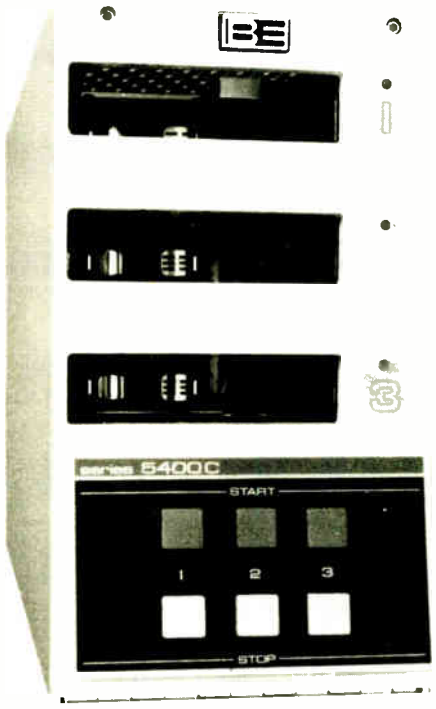

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World Radio History

In The Eye of the FMX Storm

by Judith Gross

Falls Church VA Even before word of the **Bose-MIT research** had made its way through the grapevine, FMX supporters and some neutral observers were scratching their heads and asking themselves the question **"why?"**

Implications ran the gamut from the **curious**—why would such an esteemed technical school and a well-known name bother, when there are **more pressing** and "sexy" technical topics like **HDTV** to ponder . . .

To the sinister—"was the esteemed professor **secretly involved** with a rival or incompatible system?"

Bose said, after exhaustive and repeated questioning of his motives, that the study was done solely for **purposes of research**, and it would be difficult to **prove** anything to the contrary without the use of a psychic.

But now that the research is out, maybe it's time to **stop arguing** about who did what for which unknown reasons and look at what we've got in the FMX arena.

We've got **several dozen stations**—proponents claim 100—that are using the system with **no complaints** and apparently with benefits. It's got the support of CBS FM stations. (OK, I know, CBS Technologies has a piece of it, but still . . .)

And we've got **Gannett stations** supporting it and many others.

On the other hand we've got this **new research**, some lingering doubts from past problems with FMX, the question of whether the system can really benefit stations with **heavily processed** formats.

What's needed now is some **independent research**. Not NAB, which also has a piece of FMX, not BTP, not even necessarily a receiver manufacturer who wants to make FMX radios.

An **independent technical group** which includes the processing manufacturers who would like to make FMX generators (**Orban, CRL, Aphex** and **Inovonics**, who already has FMX gear) and of course, station engineers would be the ticket. Now how about some **industry support** so we can get this thing cleared up?

By the way, one last little **interesting tidbit** from a very reliable source reports that Bose and his supporters were "all over the **FCC**" before the results of the research were made public. Reason? To get some Commission action to **stop FMX**.

The **reaction** from the Commission was predictable enough. "It's a **marketplace decision**." Well, it worked for AM stereo, didn't it?

☆☆☆

The **Continental Electronics** Division of Varian is breathing a sigh of relief now that the Navy has **lifted its suspension** against any further contracting with the company.

Continental **revamped its policies** concerning conducting such business, presumably also including dealing with paid consultants. This recent action by the Navy apparently **clears Continental** and means they won't be in trouble over this at a later date . . .

From the Toledo station which went **all DAT** mentioned in this issue comes the new term for on air talent: **DAT jockeys**, also abbreviated: DJ.

So we have the DJs who used to spin vinyl discs now playing compact discs, and now the DAT jockeys, giving us a little bit of **disc and DAT** . . .

In our long standing (about a year old) tradition of spoofing the locale of the **NAB Board meeting** held every January in a **semi-resort setting** we give you a photographic glimpse of CEO Eddie Fritts addressing the Board in sunny **Scottsdale, Arizona**, where the saguaro cactus grows as tall as a low-profile station antenna.

I hear the golfing was good, guys . . .

Allied Broadcast found out that there's still a lot of interest in radio engineering, according to the book, that is. Allied had a drawing and gave away two *NAB Engineering Handbooks*. The winners were **Sam Parker**, GM of **WSIP** in Murray, KY and **Andy Hanus**, CE of **WFSU**, Tallahassee, FL.

Well, it isn't Hawaii . . .

There have been many odd reasons why stations go **off the air**, but few so strange as what happened to **WKLV** in Bradenton, FL. There was no use paging the engineer, he couldn't help in this case.

Seems **thieves broke in** and stole enough transmitting cable and copper strap wire to put the station off the air and the **high cost** of the copper strap wire kept them that way for awhile. What next? The towers themselves?

The Big Apple's **WPLJ** tried valiantly to get listeners to adjust to the **new call letters** WWPR to reflect the station's revamped "power" image. But one year later, Noo Yawkers remained stubborn. So the **station gave in** and changed its calls back to the "legendary" (meaning everyone got used to them) WPLJ.

Don't feel bad, WPLJ, Old Gotham Town had to change Avenue of the Americas back to **Sixth Avenue** after several decades for the same reason . . .

On a more **somber note** comes news of the passing of a well-known name in the transmitter business. **Bernie Gelman**, first with CCA then CSI, and more recently on his own, died of lung cancer 1 February. Surviving family is encouraging gifts to the **American Cancer Society** in lieu of other commemorances. Contact Saul Gelman 813-688-5451.

And oh yes. It's off to **Hamburg** for the AES. Got my liederhosen all packed and my quart-capacity stein chilled and ready.

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 second edition* **Radio World** *mug.*

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Skills and manuals correlate

Aloha **RW**,

I have just finished reading Denise Kearns' article on engineers' skill and then Barry Mishkind's on *The Trouble with Manuals* (**RW** 15 November, 1989).

Oddly enough, there is a correlation between the two. I recently took a BVU 950 training class from our local Sony office and one of the books they provided us with was the theory of operation manual.

The engineer who was teaching the course was also the author of the theory manual and the combination of the two was very enlightening.

I asked if these manuals were available for all of their products and according to the engineer, they now do them for all the new products and some of the older but more popular machines.

Perhaps if enough people ask, maybe other manufacturers will see an advantage in publishing a theory of operation manual for their products.

With this information available, it's a lot easier to understand the circuits (digital or analog) and not only improve the speed with which an engineer can locate and repair a problem, but also increase the engineer's understanding of the technology that goes into the product.

William T. Hayes, DE
KHON-TV
Honolulu, HI

Another AM believer

Dear **RW**:

Congrats on a great new look! Your changes are excellent and I like the new size and ink.

I have been reading your publication for years as a GM and now as I start the new year as an owner. I am excited about the challenge of redeveloping a fulltime AM station in Waycross, GA. We are installing Motorola C-QUAM AM stereo with CRL processing including the NRSC standard.

I firmly believe that if all AM stations would upgrade to AM stereo with the NRSC gear and then promote it, we would see a major upswing in AM listenership. I also believe that AM owners need to band together for some type of lobbying effort in Washington on behalf of AM radio.

But as long as we sit around thinking that the sky is falling—it will! So let's get up and get the job done!!

Finally, I hope that the new administration and who they choose to run the FCC will look hard at the idea of adding more stations to the AM band.

Too many AMs are dark or being auctioned as it is. Maybe we need to concentrate on correcting what we have instead of throwing more chickens into the frying pan.

Charles P. Young, Pres & GM
WAYX-AM
Waycross, GA

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A Closer Look

The controversy over the FMX system points out an unfortunate by-product of an overemphasis on deregulation in the broadcast industry. That is, the absence of technical standard-making procedures.

Ever since the FCC's marketplace approach became known through unfortunate examples such as the AM stereo quagmire, industry organizations and the private sector have shied away from standard-setting.

With the NRSC standard a notable exception, this has left broadcasters at the mercy of the ups and downs of new technologies as they emerge.

Stations are forced to become laboratory specimens if they want to be on the "cutting edge"—experimenting with a new technology and providing data until the systems are perfected.

Often, the stations most eager to utilize innovations are the ones in the most competitive markets, which means they cannot be very forgiving of the minor "bugs" a new product may exhibit in its infancy.

The result is that an emerging technology which may, in its final form, truly benefit the industry loses credibility and others are discouraged from inventing new ones.

In the case of FMX, the Bose-MIT study was the first independent scrutiny of the system. And there are already subtle doubts being cast on the motivations of the researchers.

It would have been more productive if the system's proponents had opened FMX to industry examination at the very beginning.

A voluntary committee such as the one formed for the NRSC and TV's stereo system would have gone a long way toward erasing the doubts and encouraging both professional broadcast equipment and receiver manufacturers to design and market FMX products.

While FMX's promoters, BTP, have had some impressive successes with the system, broadcasters putting their signal "on the line" for it deserve to be reassured of its technical integrity with solid, independent data.

The only reasonable way out of the current controversy is for the industry to take a closer look.

—RW

Attracting New Blood to Radio

by Robert Orr

Branson MO As a small market radio owner/operator I have fought the endless battle of recruiting quality people for my station for eight years now.

Even recalling my days in the larger markets of Des Moines and Pittsburgh, the pool of well qualified and career oriented prospects was relatively much smaller for broadcasting than general business or other sales fields or even government.

Small and medium markets compete with larger markets for employees; larger markets compete with other industries.

To make matters worse, most young people seeking broadcasting as a career are ego driven and only interested in the glamour jobs—announcing or on camera.

Some "broadcast schools" take all comers who are interested in an "exciting, star-studded" broadcasting career.

They rarely do the tough duty of informing less talented young folks they aren't cut out for air work and counseling them to take up one of the other rewarding positions in broadcasting.

Many spend good money for a broadcast education and end up outside the industry all together.

Not in the running

Radio and television, the most powerful media conceived by man, have done a poor job of selling our industry to America's youth.

Look at the recruiting done in the business machine industry, medicine, insurance, the armed forces and even the CIA, to mention a few.

How does broadcasting stack up? Are we even contenders? We need not wonder any more why we have a hard time attracting good people, we only need do something about it.

GUEST EDITORIAL

NAB should create a series of announcements about broadcasting as a career to be aired on the networks and local broadcast outlets.

Their book "Careers In Radio/Television" should be made more substantive and directed at high school students making informed career decisions.

It's up to us

Every broadcaster in America should attend high school and college "Career Days" and sell our industry.

NAB, TVB and RAB might even consider a national recruiting campaign for sales, engineering and bookkeeping/traffic trainees.

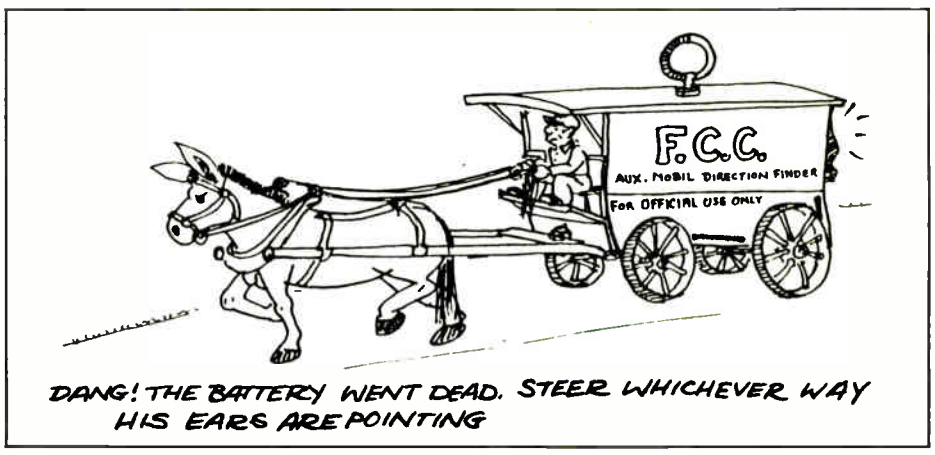
Finally, small and medium market broadcasters need to review their pay scales. It will always be hard to compete with Xerox or General Motors or even the federal government with current salaries.

Broadcasters must begin using their considerable selling power to make radio and television careers very desirable in the minds of our youth.

■ ■ ■

Rod Orr is President of Orr & Earls Broadcasting, Inc. which currently owns KOMC/KRZK, Branson, MO. Orr is a member of the board of directors of The Missouri Broadcasters Association and is a recent appointee to the NAB's Small Market Committee.

by Trenton Williams



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Now you can get the best of both worlds. With Denon's DN-950F CD Cart Player, playing a CD is as easy as popping in a cart. From its rugged computer-type disk drive to the 3-pin XLR outputs, the DN-950F is built for heavy-duty broadcast use. And it has broadcast-ready remote control, quick cue and review and end-of-message functions. It's even designed so a side-by-side pair fits in a standard 19" rack. No wonder thousands of these machines are at work in studios around the world.

The Denon **DN-950F**

The DN-950F uses Denon's easy–to-load CD Cartridge. The cartridge keeps expensive CDs in mint condition, because the DJ never touches the disc itself. And it plays as easily as any other cart. With the Denon-950F CD Cart Player, you get the competitive edge of direct-to-air CD sound, without giving up the convenience you're used to. And without the hassles of conventional CD players. So why waste time and lose audio quality by putting your CDs on tape carts?

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World Radio History

NAB Radio Board Meets

by Alan Carter

Scottsdale AZ The NAB said it will petition the FCC to reconsider a recent ruling that allows commercial short-spaced FM stations to broadcast with directional antennas.

The NAB Radio Board, meeting during the winter board of directors meeting here at the Scottsdale Princess Hotel 16-19 January, passed a resolution endorsing the petition for reconsideration.

The Radio Board also named radio license renewal as its "top priority" legislative effort in 1989 and will support a move to have radio-only legislation introduced in Congress this year. (See separate story this issue.)

In other action, the Radio Board decided to hold an "AM improvement retreat" to explore strategies "for continuing the fight to strengthen AM radio."

Localism and the spectrum

The board used the resolution on FM sport-spacing to champion localism and interference-free service.

According to NAB, the Commission's action last December allowing the use of directional antennas to broadcast in short-spaced situations will lead to increased FM interference and a decrease of service to listeners.

The board stated that NAB "shall do everything possible to establish localism and spectrum integrity as the foundation of the Federal Communications Commission's radio allocation policies."

The board pointed out that it believes listeners are best served by a high-quality, interference-free radio signal. It added that degraded radio service hurts competition, has a negative impact on the radio marketplace and deprives listeners of high-quality radio service.

Fritts voices concern

NAB President and CEO Eddie Fritts, in a speech to the board of directors, said NAB's biggest challenge remains the FCC's "continued abdication" of concern for spectrum integrity.

The petition for reconsideration has to be filed within 30 days after the report and order is published in the Federal Register. An FCC staff member said the short spacing report and order was to be finalized by the first of February.

AM game plan

On the AM improvement retreat, the proposal came from NAB's AM improvement committee chaired by Art Suberbielle, president and general manager of KANE-AM, New Iberia, LA.

The retreat will allow broadcasters to "brainstorm a plan of attack" for AM's future, Suberbielle said. The retreat is planned for March prior to the spring NAB convention.

On Suberbielle's list of concerns that he hoped the retreat would address was encouraging better quality receivers from manufacturers. Technological advances in AM stereo and the NRSC standard were among improvements he noted.

Suberbielle said he wanted AM broadcasters to come to the convention with "a plan of action."

In other board news, Joint Board Chairman Wally Jorgenson reported the budget review process has been revamped, and a financial advisory committee has replaced the old budget review committee.

The financial advisory committee has greater authority, Jorgenson said, and conducts an extensive review of financial matters, making recommendations to the executive committee.

The board approved a fiscal 1989-90 budget with a projected income of $15.9 million and projected expenditures of just more than $15.7 million, with a projected surplus of $180,000.

Technical and legislative issues were dominant themes at the NAB's board of directors meeting.

For information from the board meeting, contact NAB's public affairs and communications department at 202-429-5350.

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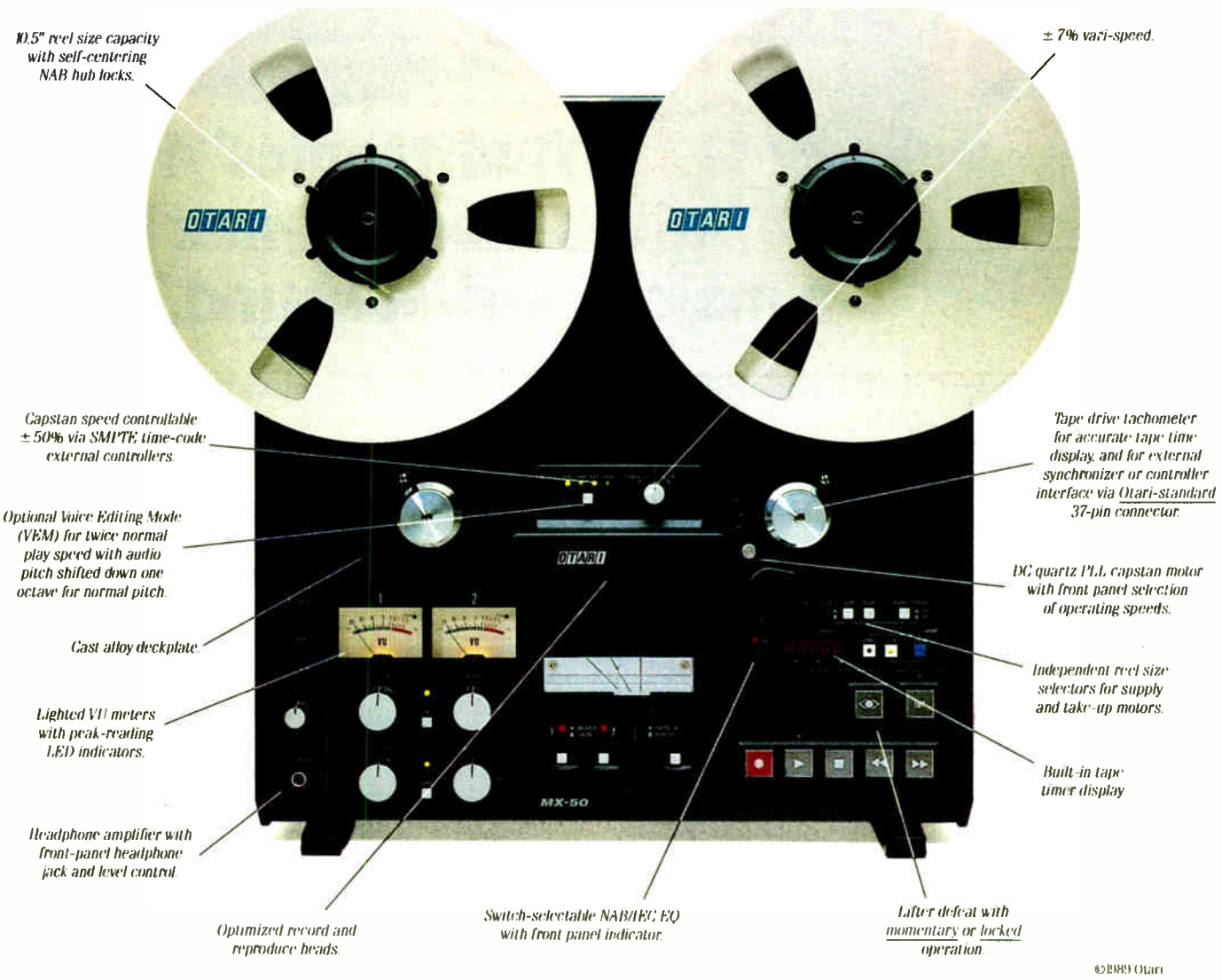

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World Radio History

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World Radio History

Venezuela Probes Monster AM

by John Gatski

Washington DC Station engineers—imagine this scenario. It's after sunset. You have just cut your 1240 kHz 5000 WAM station back to 1000 W.

But suddenly, for some reason, none of your listeners can hear the broadcast because a Spanish-speaking announcer is overpowering your signal. What is going on?

That type of interference could become reality in the future for some US stations if the Venezuelan government makes good on its intention to finally put its long-delayed, million-watt station on the air, according to the State Department and FCC.

If it ever gets on the air, the "Voice of Venezuela," the station's nickname, would broadcast an omni-directional signal that would reach as far north as Canada and as far south as Argentina.

(Voice of Venezuela) . . . would be the most powerful radio station in the Western Hemisphere . . .

It would be the most powerful AM radio station in the Western Hemisphere, according to the FCC.

On-air capability in doubt

Presently, US officials do not see the proposed station as an immediate concern because the Venezuelan government has been talking about such a project for nearly ten years, but has not been able to get it working, FCC and State Department sources said.

According to the State Department, the transmitter is rumored to be rather old and the Venezuelan government has not yet obtained parts to make it operational.

Venezuelan embassy officials, however, said plans are progressing to get "Voice of Venezuela" on the air although no details were available about the transmitter power and on-air date.

If it went on the air, "obviously, it would be an extremely powerful station," said William Jahn, a spokesman for the State Department's Office of Radio Spectrum Policy. "It could have a very negative effect on the southeastern US stations."

Interference to US AMs

He said the nighttime skywave of such a powerful signal could intermittently cover some US stations and generate adjacent channel interference through overmodulation.

"Because the propagation effect is over sea water, there could be a greater interference from the daytime groundwave as well," said Wilson LaFollette, assistant chief of the FCC Policy and Rules making Division and head of the FCC International Affairs branch.

He said WALO, the 1000 watt AM station located in Humacao, Puerto Rico, could be overwhelmed by the million-watt station in Venezuela. The Puerto Rico station is subject to FCC power regulations.

WALO CE Efrain Achilla-Diez said his station currently is struggling to be heard over Caribbean stations that are not governed by FCC regulations and a million-watt station would be as disastrous because Venezuela is only 500 miles from Puerto Rico.

"Should the Venezuelans come on the air with a million watt signal, we would have to ask the FCC for a remedy," he said, probably in the form of an enormous wattage increase request.

Similar to VOA

"Voice of Venezuela," according a Venezuelan Embassy spokesperson, will be similar to the "Voice of America" and broadcast several languages including English, Spanish and French.

(continued on page 10)

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World Radio History

NAB Pushes License Reform

Scottsdale AZ A radio license reform bill that would include elimination of the comparative renewal process is the number one legislative priority for the NAB Radio Board.

The Radio Board passed this resolution during the winter board of directors meeting here in January. The reform bill also would include codification of earlier FCC radio deregulations.

In the reform legislation, NAB said it wants to eliminate the payoffs in the petition-to-deny process and delete ascertainment, program logs, program type and format requirements and commercial time limitations.

The NAB says there is extensive abuse of the licensing process, especially by parties who file competing applications during new license and renewal applications only to make money through a payoff so they will drop their challenge.

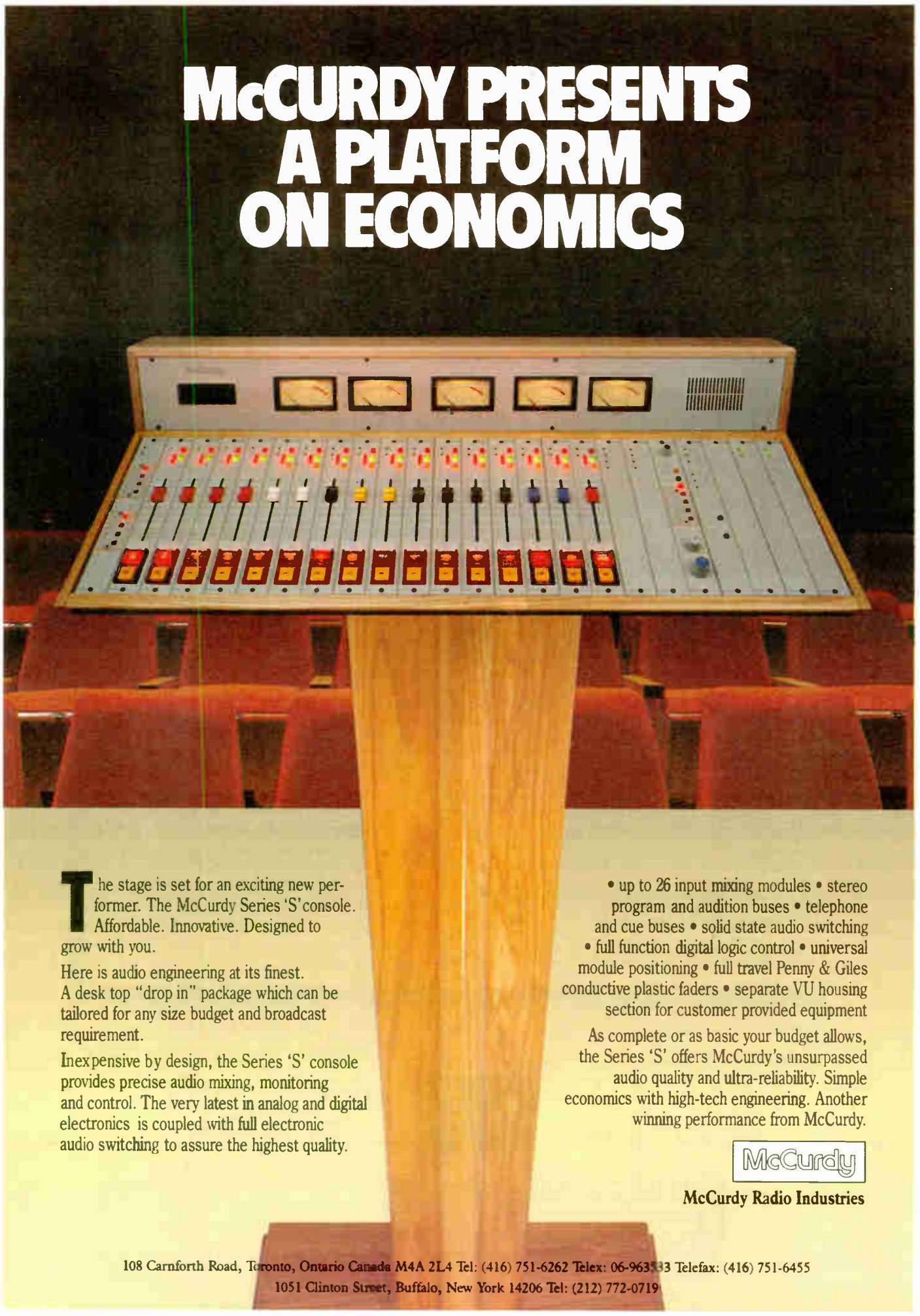
During legislative forums at the board meeting, members of Congress—Rep. Byron Dorgan (D-ND) and Rep. Hank Brown (R-CO)—also noted their opposition to spectrum fees.

"If we need more revenue let's go after it in a frontal way," not spectrum fees, Dorgan said.

Rep. Carlos Moorhead (R-CA) said the radio-only bill has merit. "You should consider separation of radio and TV" for licensing legislation, he said.

Moorhead suggested that he would view radio-only renewal legislation more favorably if it included strong Equal Employment Opportunity requirements.

A legislative forum was included in the NAB's recent Board meeting.



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Venezuela

(continued from page 9)

LaFollette said that the Venezuelan government presented the idea for its "Voice of Venezuelan" AM station at the 1981 Region II (North, South and Central America) Medium Frequency Broadcasting Conference of the International Telecommunications Union (ITU) held in Rio de Janeiro, Brazil.

Several agreements were made at what became known as the Rio Conference, LaFollette said, including an agreement to limit daytime AM power to 100 kW and 50 kW at night for new stations in the Americas.

Venezuelan officials signed the accords, he added.

He said Venezuela was not specific about the station's power at the Rio Conference, but when the US later found out that the country was contemplating a million watt transmitter, State Department and FCC officals reminded Venezuelan officials about the agreement.

"We have since indicated that they would not be in accordance" with the Rio agreement, LaFollette said.

There are several stations in the Western Hemisphere that exceed 100 kW, but were grandfathered under the Rio Agreemment including a clear channel Mexican station and a British station on Montserrat Island, both authorized for 500 kW, LaFollette said.

A State Department matter

If the Venezuelan government follows through with its one million watt station, it would become a State Department matter, Jahn said.

"We would have to express our concern to the Venezuela government," he said.

The amount of protest would depend, in part, on the number of complaints by US stations, he added.

For more information, contact Wilson LaFollette at 202-632-5414 or William Jahn at 202-647-2723, the Venezuelan Embassy at 202-797-3800 or Efrain Archilla-Diez at 809-852-1240.

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World Radio History

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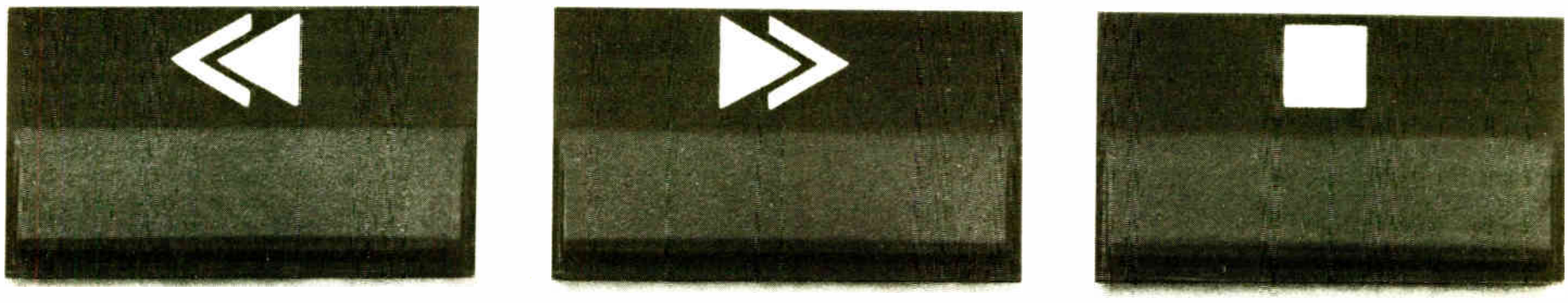

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World Radio History

FMX Fails in Study

(continued from page 3)
a combination of the FMX and the stereo information.

"With a mobile receiver, the momentary interchange of S and S' results in severe difference channel error, causing a barking effect where the level of the music momentarily jumps up as much as 14 dB, and then returns to normal as the receiver passes out of a region of multipath," the study stated.

Bose conceded that under ideal broadcast conditions, FMX does show significant noise reduction over FM stereo.

In field tests, measurements were calculated for about 15,000 locations along a driving route away from WMBR-FM, MIT's radio station in Cambridge.

Short noted that the FMX transmission produced more instances of distortion and noise than FM stereo under multipath conditions.

Field testing also showed that WOMD-FM in Boston, one of CBS's four FMX equipped stations, broadcasted a signal that increased the amount of "blending" in the FMX blend-equipped test receiver, according to the research.

BTP has claimed that "blending" can be lessened with FMX. Blending means an FM receiver is limiting its performance to a mono reception automatically, and it occurs when stereo separation reaches a low level.

In defense of FMX, Torick said WMBR broadcasts with substantial distortion in its signal, aggravating noise and distortion when making the tests.

Torick said he has heard the noise and distortion demonstrated by the Bose/MIT study during past BTP testing.

When the FMX compressor was not set properly and when synchronous AM crept into the signal because of "unsymmetrical tuning of the transmitter," the results were similar, he said.

"This kind of effect has been eliminated at our stations," Torick added.

Flawed equipment

In a written response, Torick said the FMX generator used in the FMX/Bose laboratory test "was a unit licensed for laboratory use only, without the program peak overload protection that is necessary in FMX broadcast generators."

And, according to his statement, the FMX radio used in the field tests "incorporated an unapproved prototype sample version ... of the Sanyo LA-3440 FMX decoder." Torick said the chip is "inadequate for vehicular use."

Short, however, said the equipment was adequate for testing, and BTP had told him the FMX chip was suitable for testing.

Although the test results did not report synchronous AM measurements, Short maintained it was not a problem in the WMBR broadcasts.

Stations satisfied with FMX

Torick asked that if FMX was as bad as the MIT/Bose research indicated, why there have been no complaints from FMX-equipped stations and from their listeners—a claim supported by the NAB.

Some stations have reported problems after FMX installation, although BTP said the cause was the older equipment.

WFMT-FM, a Chicago classical music station, conducted a two-day FMX on-air broadcast test in 1986, but dropped the system after significant noise and distortion showed up in the broadcasts, according to CE Al Antlitz.

"The (claimed) noise reduction effect was there" without multipath conditions, Antlitz said.

But he said the honeymoon soon ended with FMX when multipath became evident. "It was readily apparent that we had a crud level we never had before," Antlitz said.

Antlitz said FMX also caused an unstable stereo imaging problem.

BTP said the FMX generator was defective when WFMT notified the company, but Antlitz said he doubted that was the case and, at the time, speculated the technology was not going to work.

Antlitz noted that FMX caused more noise during multipath, complaints by listeners were minimal.

But he added, "Evaluating any broadcast system based on listener response is a hopeless task." He said most listeners simply switch stations if multipath problems become significant.

WNIB, another Chicago classical station, dropped FMX in December 1988, but station president William Florian said it was not because of any problems with multipath noise.

"I didn't have any problems with it, but there are no receivers out there," he said.

Antlitz, however, said he noticed more noise on WNIB after it had installed FMX equipment last year.

WPKT-FM in Middlefield, CT, was the first station to be tested with FMX. CE Stew Jaeger said the early FMX generators did have problems, but the latest equipment seems to be working well.

"So far, it seems to work, but there are not a lot of decoders out there. I can't see that we have a significant change in our multipath problems."

CBS plans proceed

At CBS Radio, FMX installation is on track. "Our plan is to continue with FMX," said Helene Blieberg, director of media relations for CBS Radio.

Of the 11 CBS FM stations, four have converted to FMX—WODS, Boston; WLTT, Washington, DC; WOGL, Philadelphia; and KLTR, Houston. The rest will be converted to FMX, Blieberg said.

When questioned about the impact of the MIT/Bose research on the future of

(continued on next page)

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World Radio History

MIT, Bose Claim FMX Flawed

(continued from previous page)

FMX, Blieberg said, "We are not going to comment on that because we have a financial interest."

The original FMX development started at the old CBS Technology Center, which closed in 1986. At that point, BTP was formed to continue the development and licensing of FMX. CBS remains as FMX development partner along with the NAB's for-profit division, NAB Technologies, among others.

NAB Science and Technology VP Michael Rau said he wants his department to study the Bose research before making any public comment on the findings.

He said NAB would forward the Bose report and BTP's rebuttal to the association's FM technical committee.

Rau noted said that "NAB's support for FMX is based on the premise that it's an improvement for FM broadcasting. The industry needs to evaluate the Bose research."

He added that "eventually the decision on FMX will be made in the marketplace, not in an MIT lab." Rau also said the NAB so far "has not received any letters of complaint" from stations operating with FMX, nor any letters of great praise for the noise reduction system.

Unstated motivations

One reporter at the briefing questioned Bose's motivation for undertaking the study, and in the BTP statement, company officials hinted at a deeper motivation for Bose's harsh criticism of FMX.

"He (Bose) certainly went to great lengths to show the system in a way that is not representative of what goes on in the real world," Torick said.

BTP questioned the shroud of secrecy that surrounded the study's results, which prevailed until the day of the briefing.

Bose said secrecy was maintained because of a fear that BTP would disrupt the presentation if test results were released in advance.

Bose also denied that the project's motivation was for some future commercial venture to compete with FMX, claiming the MIT/Bose research on FM reception was nothing more than research.

Bose's company makes home loudspeakers and has a joint venture with Delco for high end auto stereo systems. Bose Corp. also has collaborated with Acura for a sound system for that auto line.

No commercial incentive

"Nobody can understand that you can do something without commercial incentive," Bose said. "My dearest wish is that they (BTP) would have found this out."

Bose said FMX is "an honest attempt" at improving FM, but will not work because of the inherent constraints on the FM spectrum.

Short said he was excited about FMX initially, recalling that the actual MIT and Bose test came together when he became interested in adding FMX to the Bose line of automotive stereos.

At the briefing, Bose said BTP had threatened "legal action," but would not elaborate on what kind of action the company had discussed.

Torick said he is not pursing any legal action at this time.

For more information, contact Drs. Bose and Short at 508-879-7330, Emil Torick at 203-622-2804, Al Antlitz at 312-565-5000, William Florian at 312-633-9900, and Stew Jaeger at 203-278-5310. NAB Science & Technology can be reached at 202-429-5346.

Varian Suspension Lifted

Palo Alto CA The Continental Electronics Division of Varian Associates can resume doing business with the federal government.

The US Navy has lifted the suspension imposed on the company in the midst of Pentagon scandal allegations last July.

At the time the suspension was placed while the the government conducted an investigation about conversations between a Continental VP and a paid consultant under suspicion regarding irregularities in government contracting.

Other Varian divisions and ongoing contracts were not affected by the suspension.

In demonstrating its fitness as a responsible government contractor, the company reviewed, updated and reissued its written policies and practices and initiated expanded training and internal audit programs to insure compliance with new rules of conduct.

The Department of Defense then lifted the suspension "with prejudice"—meaning that neither Varian nor its Continental Division will incur further suspension or be disbarred as a result of what has been learned from the investigation.

No fines or penalties have been assessed in connection with the investigation but the company has agreed to pay the Navy's investigative costs and has established a $250,000 escrow account to cover any claims that might arise.

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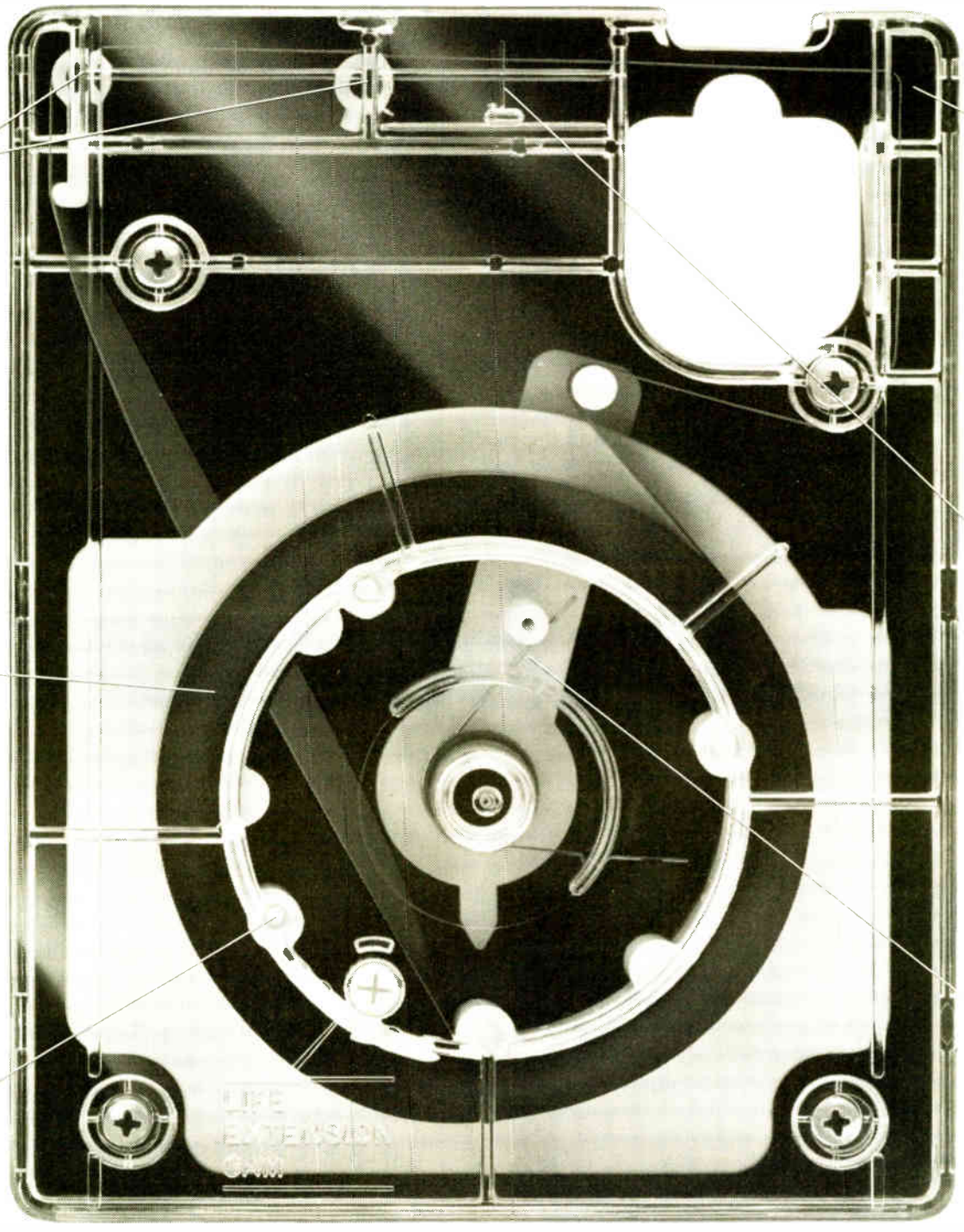

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World Radio History

WMTR Adopts DAT Format

(continued from page 1)

sors, more complete remote functions, new logic commands for the cue tones and larger buttons so the DJs—"DAT jockeys"—and technicians can operate the machines more easily.

In order to maintain improved signal-to-noise ratio and frequency response of DAT during signal processing, CE Jack Didier rewired an Auditronics Series 200 on-air console.

The station also added a new Harris HT 3.5 kW FM transmitter with a THE-1 exciter and a Moseley 6020 studio-to-transmitter link, Didier said.

Faith in product

Although the controversial DAT machines have not been around long enough for machines to have proven their reliability under professional use, Braverman said he believes the Sony/Radio Systems combination will provide years of trouble-free service to WMTR.

"We think that Sony machines are very reliable. That is why we chose to modify them," he said.

DAT's physical advantage over CD includes doubling the capacity (150 minutes versus 75 minutes for CD) and four times more durability than audio carts, which translates to about 2000 plays, according to Radio Systems.

Radio Systems Broadcast Sales Rep Gordon Conover praised WMTR management for going all DAT.

"It didn't happen in New York. It didn't happen in Chicago. It happened in Toledo. They (the others) were all too scared," Conover said.

Smith said listener and sponsor response to the change has been overwhelming.

"It has been excellent," he said. "I believe it (DAT) is the future of record and playback."

Smith said he likes DAT sound quality better than compact disc audio. "It's a fuller sound. It's such a pure sound," he said.

DAT vs. CD

Conover agreed that DAT may sound slightly better than CDs because of the higher sampling rate (48.1 MHz versus 44.1 MHz), but he said the opinion among audio purists is far from conclusive.

Sound quality debate aside, he noted that DAT provides tremendous promise for the future including the ability to digitally program a graphic with each song.

He said, for example, graphic storage capability with DAT can provide information about the artists, album, etc., to the DAT jockeys so they can relay it to listeners at the beginning or end of a song.

WMTR has promoted its switch to DAT with much fanfare and even presented a DAT recording of the station's first four hours of broadcast under the new format to the Rock'n'Roll Hall of Fame, Smith said.

For more information, contact Max Smith, Sr. and Jack Didier at 419-445-9050, and Dan Braverman and Gordon Conover at Radio Systems: 215-316-4700.

Station Application Lottery Proposed

(continued from page 1)

applications in previous lottery systems for low power television and cellular telephone.

The FCC staff noted that the lottery system has been revised and the experiences in those cases would provide good experience for radio and television.

The guidelines for making applications would be stricter, including a "zero-level interest" in applications filed for the same frequency, Porter said.

Trivial pursuit

Commissioner Patricia Dennis noted the importance of the goals in comparative hearings but said, "Up close, I'm told these comparative hearings don't work well." The hearings turn into "endless litigation over a lot of trivia, like whether someone is a leader of the Rotary Club or just a member."

Statistics show that 80% of the cases are settled, and the comparative process plays no role in those, Dennis said. "The applicant with the worst comparative qualifications can simply buy out the other applications and we will routinely approve the settlement."

Although the proposal addresses minority interests and diversification, Dennis said she is concerned that it does not address some gender concerns.

Mass Media Bureau Chief Alex Felker said the proposal asks for comment on whether credit should be given to those applicants seeking to operate AM daytimers and also if consideration should be given to the applicant that proposed the allotment and conducted the engineering work.

Chairman Dennis Patrick said the proposal asks "a very important" set of questions.

"To me it comes down to the observation that the comparative renewal process is slow and complex," Patrick said. "I would point to what, to me, is the most troublesome aspect, and that is it is not clear the criteria and the process provides for or allows us to discriminate between the applicants who are most likely to serve the public interest once they are awarded the property."

For more information on the proposal, contact Andrew Rhodes at the FCC, 202-632-7792.

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Circle 29 on Reader Service Card

World Radio History

Equalizing Telco Remote Lines

by Thomas Vernon

Harrisburg PA Although skyrocketing telephone costs have greatly reduced the frequency with which radio stations use remote lines, there are still times when it's cost-effective to use the services of Ma Bell.

This is especially true if you rent metallic pairs and do the equalization yourself. Let's take a look at "do-it-yourself" equalization, including some hard-to-find info on Western Electric repeat coils and equalizers.

STATION SKETCHES

Figure 1 illustrates the equivalent circuit of a mile of 24 ga telco pair. Note that all pairs have DC resistance, shunt capacitance, series inductance, and leakage.

The impedance of our mile of 24 ga pair is far from 600 ohms, and it is far from being a pure resistance.

While it will result in slightly higher losses, practicality dictates that we terminate the line with some standard value such as 600 or 150 ohms.

Terminating the line in 600 ohms and driving it from a 600 ohm source reduces some of the high frequency rolloff; terminating in 150 ohms extends the HF response even more.

Sometimes all that is required for good audio is to operate the line at 150 ohms. This is done with 4:1 repeat coils and is appropriately known as coil equalization.

When more is needed

If response problems remain however, an equalizer must be inserted in the line. A parallel-resonant equalizer is illustrated in Figure 2.

The resonant frequency of L and C is selected to be slightly higher than highest frequency being transmitted. Below the resonant frequency, the equalizer offers a low reactance to low frequencies and a high reactance to high frequencies.

This response is the exact opposite of the transmission line, which rolls off the higher frequencies.

Figure 1. Equivalent circuit of 1 mile of 24 ga telephone pair.

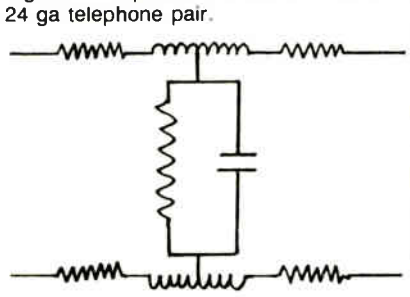

Table 1. Data for several Western Electric Repeat coils. Source: IBS Master Handbook

Western Electric Rep #	Pri:Sec	Pri	Sec	Response
94E	600:600	1-2/5-6	3-4/7-8	VOICE
94F	900:600	"	"	VOICE
94H	600:600	"	"	VOICE
94J	30:60	1-2	4-5-6	VOICE
94N	600:600	1-2/5-6	3-4/7-8	VOICE
94P	10:25	1-2	7-8	VOICE
94T	600:400	1-2/5-6	3-4/7-8	VOICE
94U	20:600	1-2/3-4	5-6	VOICE
94Y	600:600	1-2	3-4	VOICE
111C	600:600	1-2/5-6	3-4/7-8	BDCST
119C	600:600	"	"	BDCST
119E	600:600	"	"	BDCST
119F	600:1200	"	"	BDCST
120C	600:600	"	"	VOICE
120D	900:600	"	"	VOICE
120E	400:600	"	"	VOICE
120F	360:900	"	"	VOICE
120H	600:600	"	"	VOICE
120J	900:600	"	"	VOICE
120K	400:600	"	"	VOICE
120L	360:900	"	"	VOICE
120M	600:200	1-2/3-4	5-6	VOICE
146A	135:600	1-2/5-6	3-4/7-8	CARR
146U	600:600	"	"	CARR
173B*	600:2K/2K	1-2/5-6 and 9-10/11-12	3-4/7-8	VOICE
177C	600:600	1-3/4-5	7-9/10-11	BDCST
177D	600:150	"	"	VOICE
	600:600	1-2/3-4	6-8/9-11	
	600:1350	1-2/3-4	-8/9-12	
189F	170:340	1-2/3-4	5-6-7	VOICE
202A	600:600	1-2/5-6	3-4/7-8	VOICE

*Hybrid

Western Electric manufactures outstanding quality components, but often only stamps them with an ID number. You have to do some detective work to determine values, tolerances, etc. Table 1 is a partial listing of data on WE repeat coils.

Many of these transformers have been disposed of as surplus and others found their way into college stations via the Western Electric College Gifts Program. Note that there are some real oddballs along with the useful items.

Note that most repeat coils have four windings. Thus a 600:600 ohm coil is made up of four 300 ohm windings. In series the impedance is 600 ohms, in parallel it's 150 ohms. Left open, there are two 300 ohm outputs.

In some transformers, such as the 111C, the electrostatic shield and case ground are brought out to separate terminals. These are normally connected together and tied to a good ground point.

Line equalization

If coil equalization is inadequate, you'll have to add a line equalizer. This is usually placed at the receiving end, before the transformer. You might use a surplus WE equalizer, or one of your own making.

Figure 3 illustrates connections for the Western Electric 23A equalizer. A variable resistor is used when the circuit is being set up, then the closest combination of fixed resistors is trapped together.

The most frequently encountered WE equalizer is the KS-20159. This box is switch-selectable for 5, 8 and 15 kHz circuits. Connections are shown in Table 2.

If you can't find an equalizer around the station, it's easy to make your own. Figure 3 shows component values. To reduce noise and RFI, be sure to use a shielded metal enclosure.

Table 2. Terminal Information for Western Electric KS-20159 equalizer.

EQUALIZER CONDITION	TERMINATING IMPEDANCE	TERMINAL TB-3	STRAPPING TB-2
5 and 8 kHz	600	2 to 3	8-9-10-11
	150	1 to 2	12-13-14
15 kHz	600	2 to 3	7-8-9 10 to 11 12 to 13 14 to 15
	150	1 to 2	

EQUALIZER INPUT ON 1 AND 2 OF TB-1
EQUALIZER OUTPUT ON 5 AND 6 OF TB-2
LINE OUTPUT ON 17 AND 18 OF TB-2.
IF INTERNAL AMPLIFIER IS NOT USED JUMPER 5 AND 6 OF TB-2 WITH 19 AND 20.

Setting up equalizers is a simple procedure. You'll need two people and the equipment shown in Figure 4.

The setup

First, set the equalizer's resistor to maximum resistance. Then measure the line loss at the top frequency that you'll be using. To do this you must know the level being sent from the other end.

If you're fortunate enough to have a pink noise generator and audio spectrum analyzer, this procedure is reduced to simply viewing pink noise from the sending end on the analyzer's display

(continued on next page)

From The ALLIED Technical Notebook

The Denon Cart Player® is the most popular machine in all of radio. Many ingenious methods have evolved to interface it with consoles of all types. Henry put them all in one box.

1. The Denon CD player uses 5 volt logic. Many consoles use 12 volts. Connecting the CD player directly to the console could cause *lots* of damage. LogiConverter solves this problem by *isolating* the console logic voltage from that of the Denon CD player. *"LogiConverter provides double isolation. Opto-isolators on the inputs, and relays on the outputs."*
2. Connecting the remote-control circuits of the Denon directly to the console will probably cause a ground loop, because the audio and control grounds will tie together in the console. LogiConverter prevents this from happening, to preserve S/N performance. *"LogiConverter eliminates ground loops."*
3. Many consoles use logic outputs for remote control. In many cases, a circuit goes "HI" (+12 v) for START. The Denon CD requires a logic LO. *LogiConverter eliminates this problem.*
4. Some consoles provide only a maintained closure for remote Start. The Denon CD needs a momentary. *LogiConverter solves this problem, because it can convert maintained inputs to momentary outputs.*
5. Many installations will require both Start *and Stop* from the console. Most consoles provide *start-only* outputs. LogiConverter will *add* the *STOP* function even if the console doesn't have it. *"LogiConverter can be user programmed to add a STOP function even if the console has Start-only outputs."*
6. Up to *four* CD players can be controlled by one LogiConverter, if Start-only operation is desired. (CD stops at end of track automatically.) If Start and Stop is desired, then *two CD players can be controlled by one LogiConverter.*

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World Radio History

Getting the Most From Ma Bell

(continued from previous page)
and adjusting the resistor for the flattest response obtainable.

To borrow a quip from the computer world: "The great thing about industry standards is that there are so many to choose from." Such is the case with the 0 dB reference point.

While the current broadcast standard is 1 mW in 600 ohms, the previous standard was 6 mW in 600 ohms.

Some military dB meters set 0 at mW in 500 ohms. Other standards have also been used. The reference level is usually printed on the face of the meter in question.

Since a lot of military and telco surplus equipment has found its way into college radio and small market stations, it's worthwhile to check the meter's reference level. A lot of confusion, confrontations with telco personnel and embarrassment can be avoided in this manner.

Figure 2. Western Electric 23A equalizer for 8 kHz circuits.

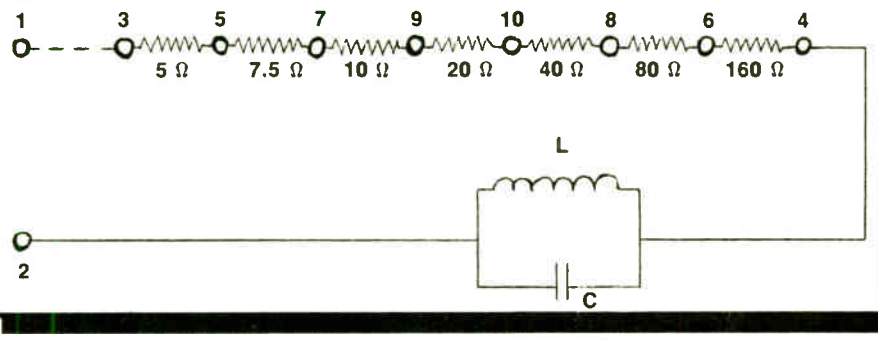
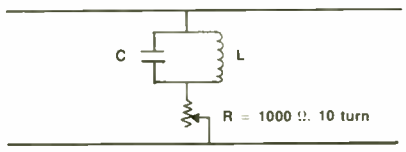


Figure 3. Line equalizer with component values. The resonant frequency of L and C is slightly higher than the highest frequency to be transmitted.

Top Frequency	Resonant Frequency	L MH	C μf
3.5 kHz	3.6 kHz	3.0	.75
5.0 kHz	5.5 kHz	4.0	.21
8.0 kHz	9.5 kHz	2.5	.11
15.0 kHz	17.8 kHz	4.0	.02



How high the levels?

Lines should be driven at +8 dBm peak. Putting out higher levels will cause crosstalk into adjacent cable pairs, and may result in an irate call from the phone company.

Putting out significantly less than +8 dBm will badly degrade your SNR. Under some circumstances however, telco may require you to operate at less than +8, depending on local conditions.

One of the problems with infrequently used remote lines is accidental disconnection by the phone company. If a linesman sees an open pair with his test meter, he may assume it is unused and wire it into another circuit.

You can avoid this trauma by making sure that your lines are terminated and by always leaving a tone or some other signal on them at all times.

An inexpensive, battery powered oscillator is often connected to the line at the remote site. In this manner, you can check the line yourself at any time from the studio.

Sometimes in spite of all precautions, a line gets disconnected. When this happens it's important to have the circuit number available.

This can usually be obtained from the salesperson when the line is ordered, or from the test board shortly thereafter.

Keep it handy

It's a good idea to have all telco circuit numbers posted in the control room, along with the radio test board number and instructions for announcers.

Lines that have been in use for a while may suddenly become noisy. This is usually because water has penetrated the cable jacket at some point and is causing an imbalance to ground. This is especially true if there's a DC voltage on one wire for simplex control or metering.

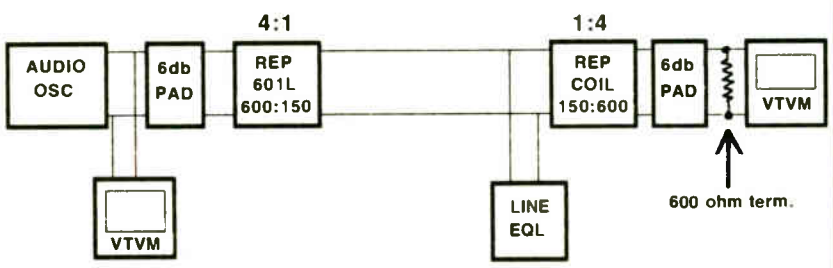
It's often possible to eliminate the noise by removing the simplex voltage. A pair with low voltage AC is less prone to problems than a pair with DC on one wire. This is only a temporary fix for the problem, but it can buy some time until more permanent repairs are made.

Since we don't have access to intermediate points in the program loop, station equalized lines are only feasible for relatively short hops, but they're a cost-effective alternative to response extenders and STL hops under certain circumstances.

■ ■ ■

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

Figure 4. Test setup for equalizing broadcast telco lines.



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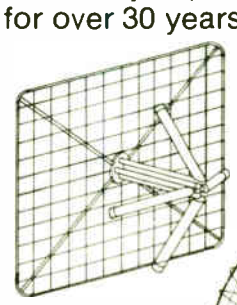
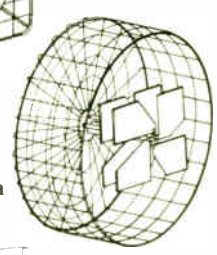
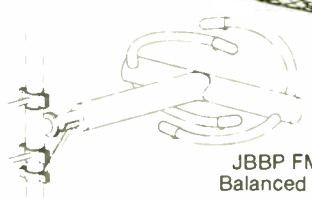


JAHD CP Arrowhead Screen Dipole



JSDP CP Spiral Broadband Antenna



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Circle 16 on Reader Service Card

World Radio History

Creative Engineering Saves Time, Dollars

by Bill Higgs

Louisville KY The old joke goes, "the food was terrible, and the portions were too small." So it often seems in our field. It is a sad fact of broadcast life that smaller stations operate on limited budgets.

Also, more frequent format changes or "tweaking" of the existing format calls for more frequent equipment rotation. Further, as management trends shift, it seems that the engineer often is asked to do more with less.

Belt tightening is never a pleasant process, whether it has to do with the engineering budget or the post-holiday flab. Traditional solutions often simply will not do, or are not within the budget. This month, we'll look at a case study in "creative engineering."

By "creative engineering," I mean taking a new look at the problem and its solution, with the emphasis on the final result. The aim of all radio broadcasting is a legal and salable signal, regardless of how it gets there.

This example is not necessarily intended to be duplicated, but will serve as a "thought starter" for your own particular needs.

Placing a dish

As I have commented several times, satellite delivery of programming is a mixed blessing in my current situation. Being in downtown Louisville has advantages and disadvantages, one of the latter being a great deal of TI from Ma Bell's horns only three blocks away.

As a traditional religious format station, WFIA receives several hours per day of its programming via satellite, on several different channels.

The problem was twofold. Our location made suppression of TI difficult without shielding of the dish, and the landlord wanted $10,000 for a structural engineering study to erect the antenna on the roof of the seven-story studio building!

This amount was approximately equal to the yearly engineering budget for a station of this size.

The logical solution would be to install the dish (which we already had) at the transmitter site, approximately three miles away. Interference would not be a problem, due to some natural terrain shielding, but linking audio back to the studio would be.

Equalized lines on this path were quoted at a figure in excess of $350 per month and I have never been impressed with their reliability. Considering that several channels of audio would be required, this solution became quickly impractical.

ICR would be a possibility, but no frequencies were available—plus it would require several channels of audio.

BOTTOMLINE BROADCASTER

Again, expensive, even if we could do it. The final link option–23 GHz—meant, once again, several kilobucks.

Looking beyond the obvious

Time for creative engineering. Several off-the-wall options (laser, cable television, etc.) were seriously considered only to be discarded as impractical. Another solution would have to be found.

A check with other satellite users in town revealed that a station with a studio only a block away was using a music service on the same bird, and the same transponder. Furthermore, the dish was on the studio roof!

They were fortunate enough to have a low wall shielding them from the telco tower and had experienced good results from their system. In a final stroke of luck, their engineer was cooperative.

The wheels were turning by now. An inquiry revealed that they would furnish us baseband service for our demodulator for $40 per month. This was approaching a figure that management was happy with. Basic loop service, however, was over $90 per month, so expenses were still higher than hoped.

A little investigation revealed that the only property between our two studios was a multi-level parking garage. Negotiation with their property management produced an easement through the garage for $35 per month. Things were at last looking practical.

Making a long story short, I elected to

(continued on page 22)

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World Radio History

Manuals: Good, Bad & Ugly

by Barry Mishkind

Tucson AZ Over the past several months it has been gratifying to receive comments from a number of engineers and manufacturers on just what is "good enough" when it comes to instruction manuals.

At the same time, the questions of how to set standards for the actual equipment have figured in several discussions.

One thing that has clearly emerged from this is that while there is, in fact, a good deal of frustration in the field, there are manufacturers that have heard and are attempting to respond.

First, a couple of fine examples of "manualese" that might cause you to break out in either a heavy sigh or a smile.

Zooming in

Don Hulick, of New York's State University College in Oneonta, NY sent me a copy of a service manual for a color camera that advised the technician:

"1. The zoom speed don t relate when do the ZOOM POT SET adjustment. 2. Push the POWER SERVO ZOOM CONTROL unit is stops and quick."

This service manual also states that the first step in the electrical adjustment procedure was to "make sure that the camera operate normally." I'm sure this does cut down on any adjustments you might be tempted to make!

Don was also kind enough to prove that instruction manualese also afflicts non-broadcast gear as well.

For example, he recalls a motorcycle he owned whose manual contained the following " . . . please cause an oil change to happen every 1,000 miles . . . " This was presumably because " . . . the machine has a strong, elegant crankcase . . . " Well, you get the idea.

Bruce Anderson of KIQX Radio in Durango, CO took the time to nominate the ATI P100 manual as very user friendly. Indeed, any manual that eschews the omnipresent legalese and not only presents the basic information but includes suggestions to cover most operating conditions has to be a favorite.

If something is still not 100% clear, there is a phone number and an invitation.

And what can I say but "thanks!" to Lloyd Mintzmyer and Terry Cutler of KOOD-TV, Bunker Hill, KS for the wonderful schematic of a picture manual in Figure 1. It is pretty self-explanatory!

ECLECTIC ENGINEER

More attention to RF needed

Meanwhile, I'm happy to relate that several manufacturers called and/or sent samples of their manuals to exhibit the handiwork of their technical writers.

And while they are becoming much more sensitive to what they send out, in some cases it is obvious that they expect you will be fixing their equipment only on a bench with no time pressure.

One area that seems to cry out for attention is RF equipment operating parameters.

With the increase in licensed power levels added to the variety of antenna systems, it *is* hard to anticipate the exact operating levels of a transmitter.

Still, with all the computers and programs available, it should not be so hard to provide more meaningful guides to expected operating parameters under differing conditions.

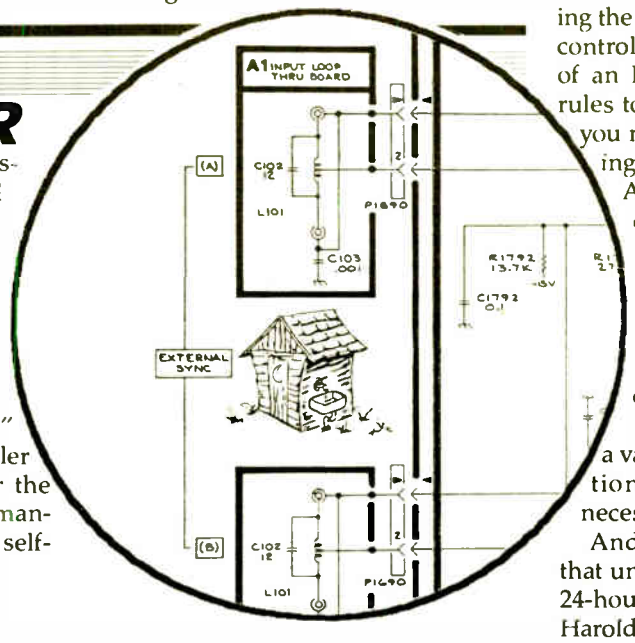

Figure 1

Another problem that seems to be increasing as companies take more and more advantage of computer assisted drawings and diagramming is the difficulty of accurate reproduction.

All too often a CAD picture becomes indistinct by the time it get to the manual. Those of us with poorer eyesight, or who end up in a dimly lit transmitter shack often become frustrated at numerical designations that became fuzzy in the process of getting from computer to paper.

As I continue to leaf through some of the manuals that have arrived, some do stand out. Harold Hallikainen's manual for his Hallikainen & Friends' DRC190 remote control system has sections on nearly everything you might want to know about remote control in general, as well as operating the DRC190.

For instance, there is a section covering the basic FCC rules relating to remote control. Another section is a transcript of an NAB session on remote control rules to clear up some of the questions you might have. It is interesting reading.

Also, there is a section on how to deal with TSL applications. For those using computer interfaces to the unit an introduction to programming is included. Additionally, it's not a bad tutorial for those wishing to become more conversant with BASIC.

Very few pieces of gear exist in a vaccuum, and the DRC190 in structions seem helpful in making necesary interfaces.

And the recognition of the difficulty that unit failure can cause is seen in the 24-hour technical support provided. Harold has listened and anticipated nearly every need a user might have.

There are more manuals to consider than space available here, so we will continue on a bit further next time.

By the way, for those wishing to share strange or great examples of instruction manual writing with everyone, just drop me a sample or photocopy, at 2033 S. Augusta Pl., Tucson, AZ 85710. Thanks.

■ ■ ■

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

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Circle 5 on Reader Service Card

World Radio History

AM Antenna Monitor Interface

Gary Wachter has come up with a handy interface for AM antenna monitor remote control systems. He is this month's **Great Idea** *contest winner and gets to have dinner on* **RW**. *He also becomes eligible for the grand prize at year's end.*

If you have a great idea, send it to **Radio World,** *PO Box 1214, Falls Church VA 22041 and you could win an American Express "Be Our Guest" certificate worth $50.*

by Gary Wachter

Phoenix AZ Antenna monitors such as the popular Potomac AM-19(204) display phase and current readings one tower at a time. When operating by remote control, a method must be used to obtain readings from all the towers.

One technique is by direct control. The buttons on the remote control select the tower directly. Phase and current is read with the raise/lower function of the command channel associated with each tower. If there are just a few towers or many control functions to spare, this route is the simplest.

Another is with sample/hold. An external device steps through each of the towers, storing the resultant phase and current data into a memory device (a low loss capacitor for analog, Random Access Memory (RAM) for digital).

GREAT IDEA

The stored data for all tower parameters is made available simultaneously, in near real time. Many metering channels will be used, but all of the parameters can be displayed at once. The "freshness" of data will depend on the cycle rate of the readings taken from the antenna monitor.

There is also individual selection. The phase and current of a single tower is displayed individually. Any other tower may be monitored by calling it up in sequence.

When updating the transmitter control facilities at KFYI last year, we wanted to make available as much information on the operation of the transmitter site to the input of the Gentner VRC-2000 remote control system as possible.

The sixteen metering channels can be filled up rather quickly. The most data/least channels used criteria was best served by calling each tower up separately.

Interface description

To construct a sequential selection system, a command pulse is used to select towers 1 to 4 in order. The respective Phase and Loop DC sample voltages from the antenna monitor go directly to the remote control metering inputs.

If the array is normal, it will be easy to associate the remote values obtained with the tower selected. But what if the array suddenly goes out or there are two towers with similar readings? A method is needed to indicate which tower is selected.

Identification is handled by providing a unique DC voltage for each tower selected and sending it to a metering channel. For instance, 1 V is output when tower #1 is selected, 2 V for tower #2, etc.

To provide more versatility, another command channel is used to switch between Day and Night modes on the monitor to provide current readings from the Loop output. On a four-tower array, 12 seperate indications can be made using three metering channels and three control outputs.

Circut description

The tower-select advance pulse (closure to ground) is sent to the 74LS74 edge-triggered "D" flip-flop to be divided. The output of this counter is a simple 2-bit binary code which is sequenced through each of its four states with each input closure and then starts over.

This BCD code goes to the A and B inputs of the 74LS155 dual 2-to-4 line decoder which provides a continuous low output on the selected output of each section.

The low output on the first section of the 74LS155 illuminates the LED status indicator on the board as well as pulling low a 7407 open collector hex buffer.

The buffer selects one of the four trimmer potentiometers which form a voltage divider to provide the feedback to the metering system to indicate which tower is selected.

The second section controls the antenna monitor tower select buttons through 4N33 optical isolators. The Day and Night select buttons are controlled directly by the remote control through a pair of 4N33s. You may elect to skip this feature and have the antenna phasor or switcher control the mode of the monitor.

The interface board can be checked out and set up on the bench prior to installation at the transmitter site. Apply 5 VDC to the Vcc.

One of the tower LEDs should be illuminated and the corresponding optical isolator turned on. Momentarily bring the tower advance input to ground. The select status LEDs will illuminate in sequence to indicate the tower selected.

If the LEDs fire erratically, contact bounce exists from a mechanical switch which is generating a burst of activity. If you are connecting to a mechanical relay output remote control, this could cause a problem which can be fixed by a simple contact debouncer.

Calibrate the tower selected voltage by setting the trimmer pot to the desired reference voltage. Be sure that the sample output is loaded by the remote control or equivalent resistance, otherwise the calibration may have to be repeated.

Use just a little over 1 V per tower and set the calibration on the remote control to display only the most significant digit. This way, a sample voltage of 2.108 V will read simply as 2 or 0002. Setting the voltage just a little high will take care of any drift induced errors which may create a false indication.

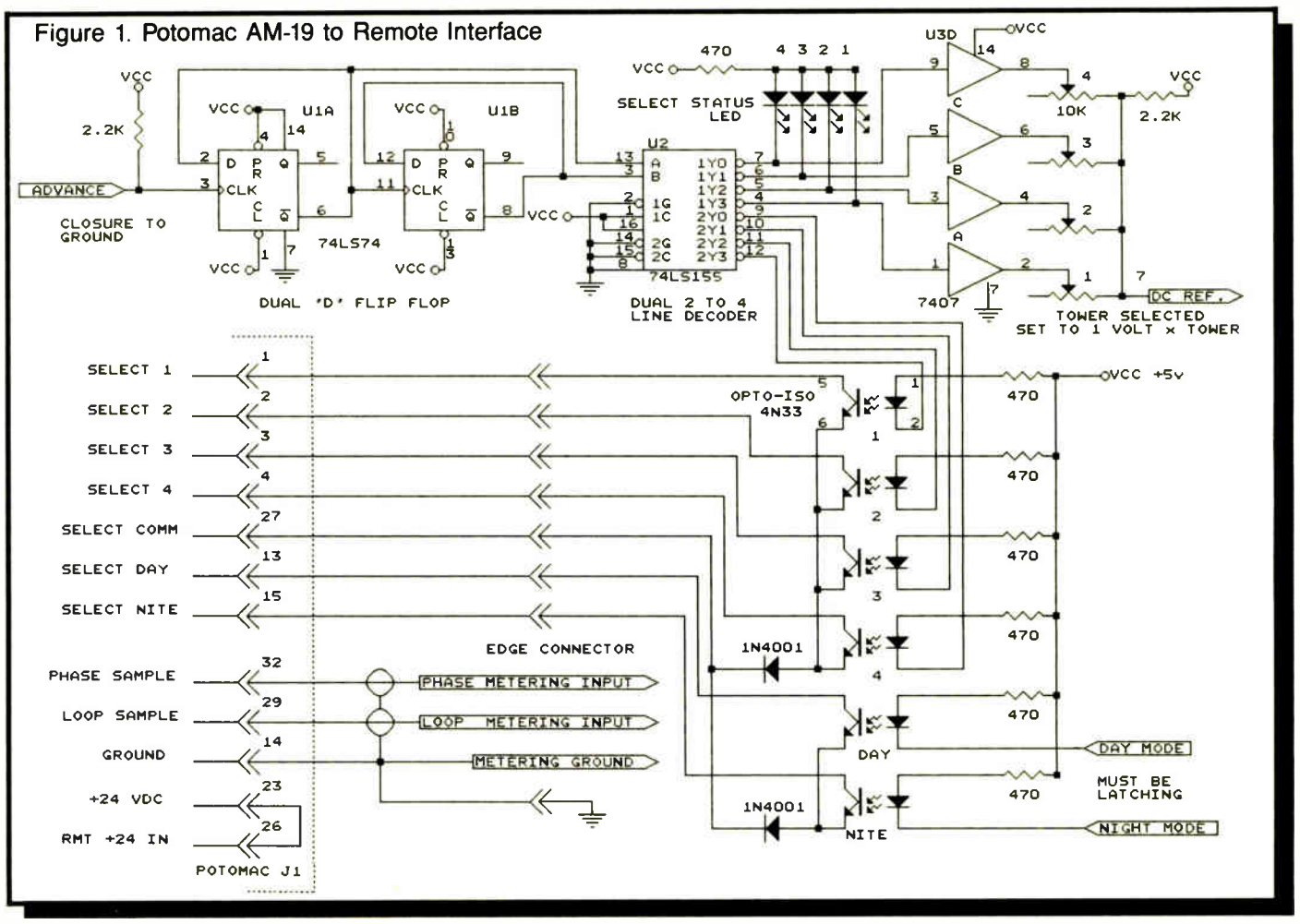
The Potomac monitor has to be in RMT for external control. Using the remote control, step though each of the towers to verify that the sequencing is correct. Calibrate the remote control phase and loop outputs of the remote control.

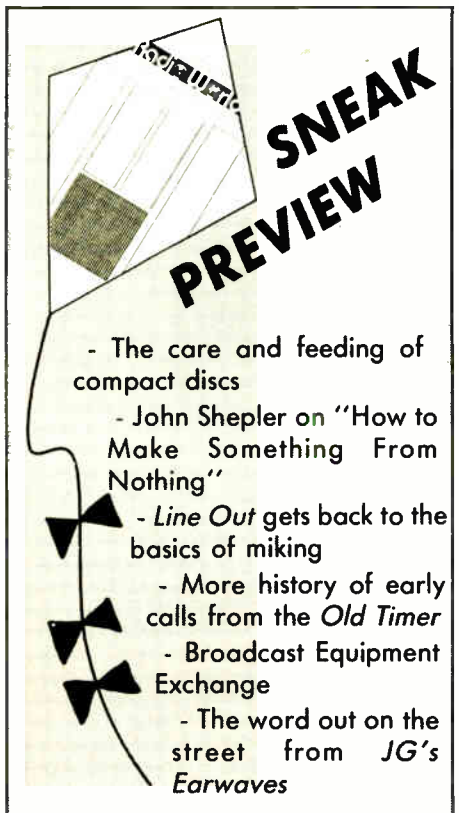
For arrays with more than four towers, the interface can be expanded with a greater resolution counter and decoder with, of course, more optical isolators and the like.

■ ■ ■

Gary Wachter is Technical Manager at KFYI-AM; 631 N 1st Avenue; Phoenix AZ 85003. He can be reached at 602-258-6161.

Figure 1. Potomac AM-19 to Remote Interface





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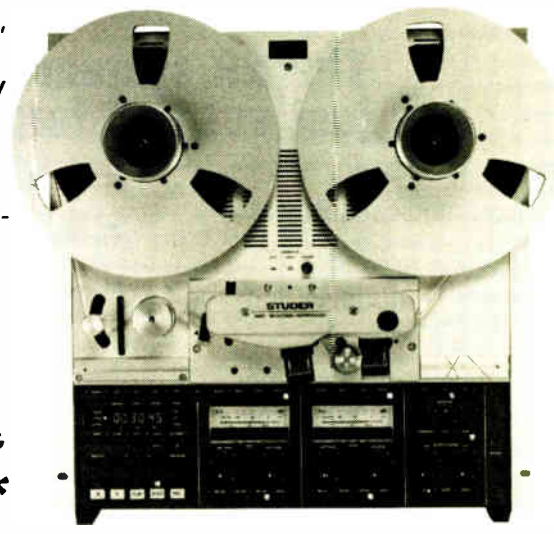

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Circle 47 On Reader Service Card

World Radio History

Create a Productive Workplace

by John Cummuta

Downers Grove IL In the old "sweat shop" days workers weren't considered assets, they were often looked on as mules. Controls on managers' exercise of authority were practically non-existent.

It was a loose system, where abuse was all too frequent and relations between workers and management were strained.

That kind of environment wouldn't work today. There are laws forbidding unfair labor practices, for sure, but it's more because business owners and managers are just more enlightened.

They know that good management/employee relations means a healthier bottom line and that it's counterproductive to take advantage of workers.

It decreases the output of the business, and therefore shrinks profits.

Maximum productivity

A challenge for any business, but particularly for a mature one, is to keep the initial excitement alive.

If your station has been a market leader for years, your greatest challenge may be to make your employees believe that it makes any difference at all to get enthusiastic about their jobs. After all, how can you go up from number one?

Two keys to keeping that sense of momentum alive are open communications and a creative environment. When a business is new or meeting a vigorous outside challenge, communications are brisk—among employees and between employees and management.

A startup or competitive situation also breeds ideas. Everybody has them. Everybody contributes them. But when the situation gets fat and happy, everyone dries up and just chats in their little cliques.

ENGINEERING MANAGER

To maintain a flow of energy and ideas, management must foster an atmosphere of openness and acceptance. Some of the best and most profitable ideas will come from the bottom of the organization up, so savvy managers will encourage their employees to contribute ideas that the station might be able to capitalize on.

More than that, ideas chosen for action should be tangibly rewarded. That way you'll get more good ideas, probably more than you could act on in a lifetime, and you'll be able to cherry pick the best ones.

If you are in a position that is growing and you find yourself looking for one or more managers to take some of the load in running day-to-day activities, look for people who complement you.

Getting more from employees

It's tempting to look for a clone of yourself, thinking that you'll have less conflict, but what you do is stifle the natural development of your organization and the people in it.

The one thing you cannot compromise on, however, is a profit perspective. Whether you develop managers from within your organization or hire them from the outside, they must be continually sensitive to the impact of their decisions and performance on the bottom line.

You also want people with enthusiasm and energy. To do a good job, a manager will have to work extra hours, a few weekends, whatever it takes. If you find a person with a clock-watching attitude—that's not successful manager material.

When you do find good managers, give them authority and loosen the reins. Decide ahead of time, together, where you will exercise ultimate decision-making power. Otherwise let your managers do the job their way.

While you may coach them to improve their management skills, avoid reversing their decisions. It damages their morale and the confidence of their people.

Managing technical people

Technology is advancing so rapidly these days that it is not uncommon, as a senior engineer, to have youngsters on your staff who know more about a recent development than you do. Don't sweat it.

While it's important for you to maintain a basic understanding of what is possible in today's engineering environment, I don't believe it's necessary to know everything there is to know technically.

Today is the age of the specialist. A mark of the successful manager is determining what you absolutely must know and leaving the rest to specialists on your staff or with your consultant.

If you have a staff to manage, being a good manager is a profession of its own.

If you do have specialists on your staff, make sure you consult them when making any long-term decisions that impact their area of expertise.

That doesn't mean that you relinquish

(continued on page 33)

Cost Effective Cleverness

(continued from page 18)

bring the entire baseband into WFIA's studios. I purchased 1000 feet of RG59, and routed it through the third floor of the garage.

Tending to the details

At each end, I installed CATV-type grounding blocks as a protective measure, and used open spans of about 30' each across the alleys on either side. The total run is about 850'.

Wanting to isolate the feed and include a bit of gain, I built a small broadband video amplifier (inexpensive video DAs are now available from several consumer suppliers) and installed it at the front of the line.

I have good levels at the demodulator, and can now decode as many channels of audio as I need (currently five). Since the coax is grounded at each end and twice in the middle, I have confidence in its ability to resist lightning induction. Total cost was approximately $125, plus the monthly expenses noted above.

The moral is: don't be afraid to explore non-traditional ways of getting things done. Sometimes Murphy's law does work in your favor, and, of course, sometimes it doesn't. But it is always worth a try.

Next month, we'll begin another cost-cutting project: a tunable satellite demodulator based on an FM radio. Necessity, once again, was the mother of invention.

Well now, I need a cheap G1 subcarrier feed from the hotel across the street. Let's see, wireless microphone? 49 MHz? Infrared? I wonder . . .

■ ■ ■

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.

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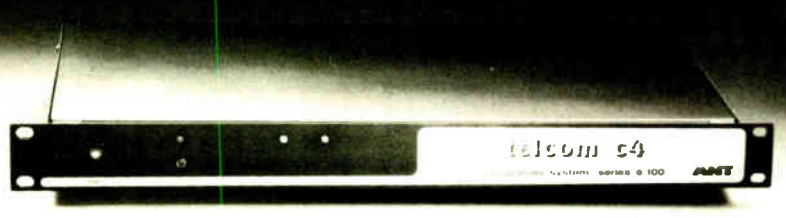

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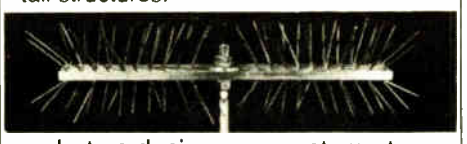

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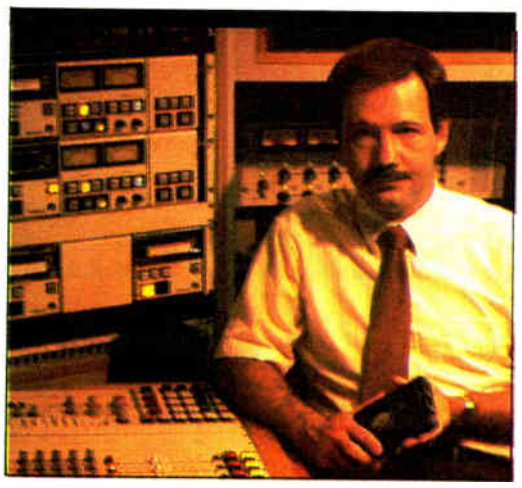

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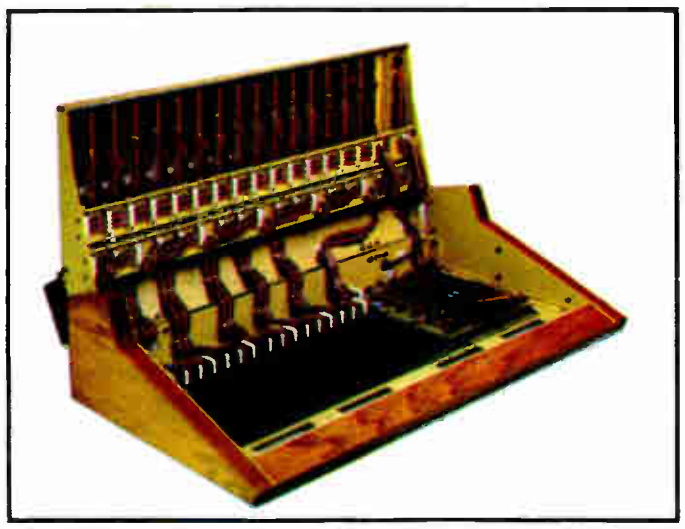

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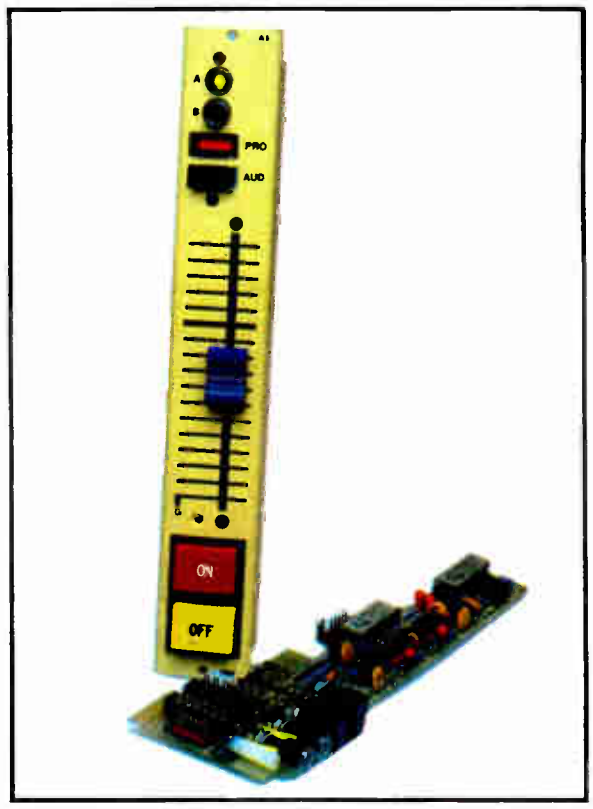

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World Radio History

Basics of Audio Equalization

by Ty Ford

Baltimore MD This edition of *Producer's File* takes us back to the basics of equalization. If you're already well-versed with the ups and downs of EQ, consider passing this article along to someone less experienced than yourself.

A few years back, when I was working at a major market radio station, we got a new production console. To my delight there were four banks of assignable parametric EQ. My delight was not shared by the other members of the airstaff.

Their previous equalization experiences had been limited to the bass, treble and loudness controls on the stereo receiver we used as an air monitor. Typical of their responses was, "It's too complicated, besides the only production I do is read copy over a music bed."

PRODUCER'S FILE

For the most part they were right. EQ changes should only be made by those who can hear the difference. Listening and judgement must first happen before any EQ changes are made or you're liable to end up with some bad sounding audio.

To make judgements you need points of reference . . . what sounds good, better or best. If your car stereo sounds better than the monitor system in the production studio, you're in real trouble.

Big agency work

One good source of reference audio I used were spots produced by the big agencies.

I chose spots that sounded great on the air and listened to them in the production studio to get a sense of how they were equalized and what they sounded like on the production monitors. I then set about to equalize my spots to sound like the "reference" spots.

If you can't get your tape machines to sound as hot as the big-time stuff, don't blame your engineer's failure to keep the tape machines tweaked.

Although worn heads, wrong tape and tape recorder circuits in need of adjustment can compromise your sound, it's also possible that the agency production house is compressing, limiting and EQing the dubs to way beyond flat response.

If your production studio does have a good monitoring system and you have the desire to improve the sound of your work, EQ is a good place to start. Learning the frequency spectrum by ear is the all-important first step. Learning how to get the most out of the equalizers you have is the second step.

Tracking the highs

The first area of sound to concentrate on is the high frequencies, those between 8,000 and 16,000 cycles per second, or 8-16 kHz. The lack of these frequencies cause the source to sound muffled or muddy. Too many of these frequencies cause the source to sound piercing and thin.

Keep in mind that that "muddy" sound can be caused by a lack of highs *or* too many lows. Be aware that most tape hiss and a lot of circuit noise live around 8 kHz. Boosting frequencies in this area will make your spots sound brighter. Add too much and you'll start hearing a lot of hiss and sibilance—splattering "S" sounds.

Achieving a "hot" production sound requires more than making your spots sound brighter. Getting a good voice track is the most important part of a spot. The novice producer often makes the mistake of adding low frequencies to make a voice sound more massive. While a little "warmth" on the bottom is good, too much makes the voice just sound muddy.

Pride and the desire for a "ballsy" sounding voice have messed up a lot of production. True resonance and deep tones are the result of a relaxed set of vocal chords. Drinking warm or room-temperature liquids keeps your vocal chords from getting stiff. Cold liquids cause your vocal chords to tighten, reducing your resonance.

If you're mixing voice and music, the overall EQ of both should be similar. While mixing sources with different EQ curves can be used for effect, most of the time the idea is to get as coherent a mix as possible.

Having a boomy bass voice track and a squeaky thinned out music track sounds as unnatural as a full frequency symphony with a telephone voice EQ.

The low-down on EQ

First, look around the studio to see what kind of EQ devices are available. Check the equipment racks, the console and the mics.

(continued on page 31)

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World Radio History

Renovating the Radio Ranch

by Dee McVicker

Pace FL Operations Manager Luke McCoy calls WXBM-FM's building a facade. It is the kind of building found in an Old West movie set, a backdrop perhaps to a John Wayne film.

When McCoy first saw it, he playfully named it Radio Ranch, an endearment that would fare better over the years than the station itself.

Radio Ranch had become as outdated on the inside as what it had proudly displayed on the outside. It was about as state-of-the-art as a ghost town.

McCoy doesn't even go into the details of the equipment they replaced. He recalls only that it was "junk" and that WXBM was in no position to compete for listeners.

But as badly as the station needed a face lift, it was also in desperate need of

FACILITIES SHOWCASE

circulating its money wisely. "If you have money," says McCoy, "you can buy gear. The hard thing is if you don't have money."

Everything but money

WXBM, an individually owned station, was competing against money backed, group owned stations that had everything and then some. WXBM's only edge, as McCoy saw it, was to be selective about what it bought, how and when it bought.

McCoy started to pull the tumbleweeds out from under consoles and cart machines. His plan was simple. They would commit to an ongoing upgrade that would take just a few years to complete. They needed to go slowly and plan carefully.

Part time engineer Dan Wester, who also works full time for a nearby college station, was commissioned with the challenge. McCoy laughs when he considers what awaited Wester.

Says McCoy, "His (Wester's) life is divided between working at the University of West Florida, where they have two of everything and here, with one of every other thing!"

The long and short term plan

There were three long overdue upgrades—or steps—to the ultimate new WXBM. The target date for completion was penciled in for three years later.

"Two to three years from when you start is not that long, as long as you buy good quality to begin with," comments Wester. He also reasons that an on-going upgrade requires very careful planning to eliminate the possibility of backtracking and spending money needlessly.

The first upgrade on the list was a project the FCC had long ago decided for the station. As a Class C with a 500' antenna co-located with the studio, WXBM needed to bring antenna height up to new regulations.

That meant moving the existing antenna site. Wester and McCoy saw this as not so much an FCC requirement, but as an entirely new market of listeners.

"What's happening in this market," informs Wester, "is that we're seeing a unification of two cities because of the tower locations."

Fortunate location

WXBM, licensed to Milton, Florida, and originally covering Pensacola, Florida and Mobile, Alabama; is now radiating radio from 1400' in Alabama, covering a good portion of northwest Al-

A long way from the old Radio Ranch . . .

abama and the Mississippi coast, as well as its original Florida market.

Thanks to the FCC and the FAA's need for airspace clearance, WXBM's antenna is on a tower farm located between two fairly large markets.

If there was a question before that the future upgrades at WXBM were not justified, this new listening audience all but eliminated that consideration. Now was an excellent time; WXBM's market could very well develop into a Top 50.

Before WXBM moved up to a new studio, an interim upgrade was needed to solve some audio problems. Wester calls this stage an "absolute necessity upgrade," where the station spot purchased items that would benefit it the most until funding was more favorable for a new studio.

Most of the spot purchases were done for the master control room. They decided on ITC cart machines and began utilizing dbx noise reduction to cart the oldies that the format required.

Although WXBM still had its antique Collins AC10 console, it was at least able to beef up audio quality considerably.

The final upgrade

With the antenna no longer gracing Radio Ranch, the transmitter room became vacant. Although it did not fit acceptable studio needs, it at least had a panoramic view of what would become two production rooms.

With a little strategy and reconstruction, it was agreed that the transmitter room would serve as the new master control room.

McCoy had an estimated budget of $40,000 earmarked for this upgrade. By transforming the old transmitter room instead of completely restructuring the interior, more money could go toward the new equipment which was desperately needed.

They weighed compromises and benefits and built onto the existing structure to get the space they needed. The result is a control room likened in the shape of a triangle with the top lopped off.

To the left of its panoramic view, the operator looks out to a production room still under construction. In center view, the operator looks out at the second production room and to the right, the lobby.

The odd shape of the new control room required cabinetry that was equally odd-shaped. The station hired a local carpenter to custom fit cabinetry into the new studio.

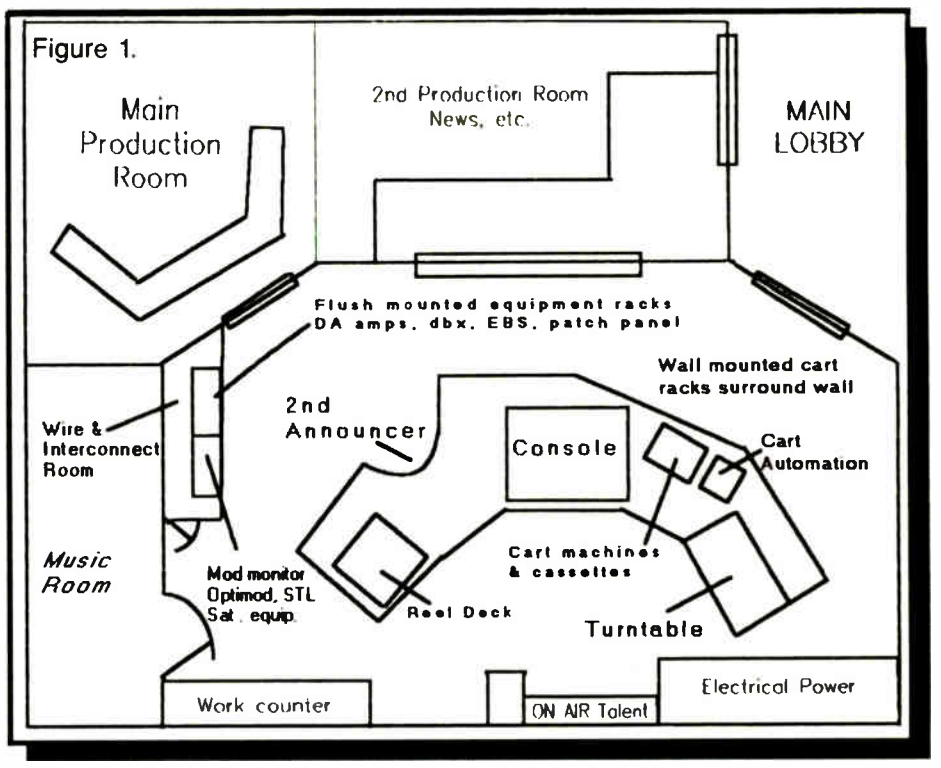
Although the transmitter-room-turned-studio was an excellent compromise that left the studio in the hub of station activity, and saved thousands of dollars besides, it was a compromise that cost $10,000 of the $40,000 budget. This left very little for budding equipment needs.

WXBM needed to stretch dollars, loosen cash flow and still get the majority of what was on the "need" list.

To stretch dollars, Wester decided that

(continued on page 28)

Figure 1.



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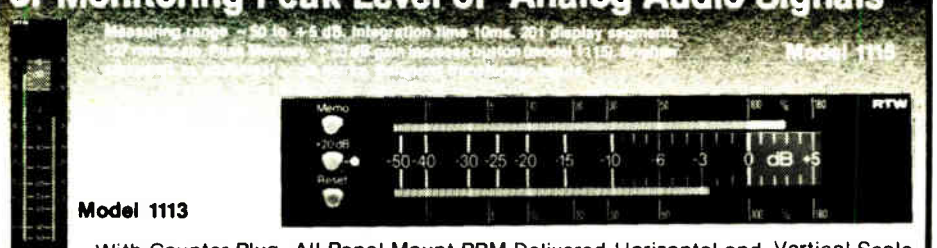

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World Radio History

New Station on a Budget

(continued from page 27)

a package purchase was the best way to go. To loosen cash flow, the station decided that the package purchase would be in the form of a lease.

"By getting a package there are some things you can take advantage of," says Wester. "And by getting a lease we could get a package."

Revamping the old

Wester says he had considered used equipment for the master control room, but quickly eliminated this possibility when he realized that very little was available in what they needed.

The equipment needed had to be critically picked due to money restrictions and the scope of the project.

It started in the master control room. The 10-year old Collins AC10 console was finally retired and replaced with an Arrakis 10,000.

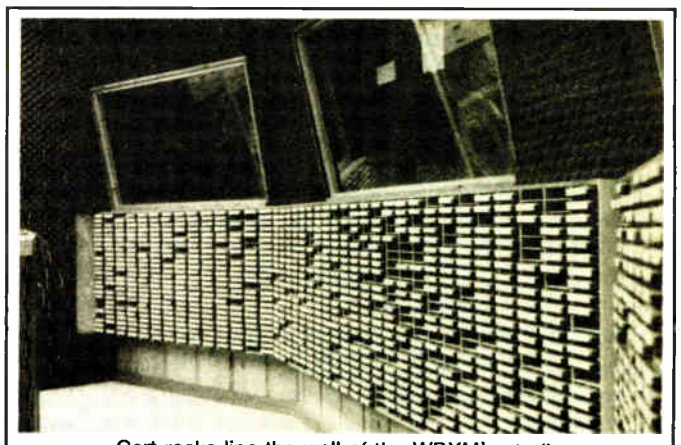
"It had the features that we wanted," says Wester, "features and specifications that people are looking at today. And it had a slightly better price."

The Arrakis 10,000 that Wester chose is an 18-input module mainframe, of which 12 modules are currently in use.

For module options on the Arrakis, Wester elected to go with 1x7 switchers. By utilizing this option as well as built-in console equalization, the station was able to better the quality of remote signals coming in from seven different sources on two console modules.

The alternative to the network, telephone, RPU and control room-to-control room feeds, says Wester, was to add more modules or an expensive audio switcher. Both of which would add considerably to the cost of the upgrade.

Next, they brought in Dynamax cart machines to go alongside the ITC cart machines purchased during the "absolute necessity" upgrade a year previous. "The Dynamax's were primarily to run the music off of," says Wester, "generally because they are the newer machines."



Cart racks line the wall of the WBXM's studio.

To their new cart machines they added the same dbx capability that was so successful with the ITC machines. For the new cuts that McCoy had programmed into the format, Wester chose the Studer A727 CD player. He liked the instant cue.

Some luxury, too

With a lease, the station was also able to afford what Wester considers to be a necessary luxury: a new QEI modulation monitor.

He felt that if they were going to compete, they needed "something to depend on" that would give them compression readings and that of the competition.

The previous master control room, meanwhile, became one of two production rooms. It was upgraded with a Dynamax cart machine, dbx noise reduction and new turntable and turntable preamp.

Wester felt that the few dollars spent here were well worth the quality they got in return while converting disc to cart.

The second production room is still under construction, and here the station plans to pick up an existing lease on used equipment. This upgrade, assures McCoy, will be on an equally tight budget and will be done with as much thought as the last.

The new "Radio Ranch" is still riding along.

■ ■ ■

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.

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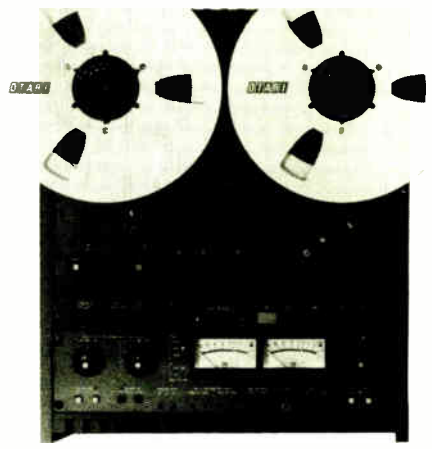

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World Radio History

The Fundamentals of Audio EQ

(continued from page 26)

Equalizers are circuits that allow modification of the frequency response of a signal. In their simplest form they may be designed to block a certain band of frequencies from passing through a circuit.

An equalizer which blocks the passage of low frequencies is a high-pass or low-cut filter. An equalizer designed to block all frequencies above a desired point is a low-pass or high-cut filter. These filter switches are normally found on both mixers and mics.

The typical application of a high-pass filter would be to block, cut or "roll off" undesirable lower frequencies such as 60 Hz and 120 Hz hum from poorly grounded circuits or extraneous acoustic or mechanical noises such as wind and noise from nearby machinery.

Low-pass filters are normally used to block high-frequency noises such as circuit noise and tape hiss.

Since the filters are either "in" or "out," there are no in-between settings. To get those in-between settings you need adjustable "shelving" EQ which usually comes in either of two configurations: step-switched or continuously variable.

Choosing your roll-off

Step-switched EQ lets you choose several frequencies at which a pre-set amount of "roll-off" will begin. Typically your choices will be between 50 Hz, 100 Hz or 200 Hz on the low end and 5 kHz or 10 kHz on the top.

Both low-pass and high-pass filters are commonly used in ENG (electronic news gathering). Since most of the audio is voice only and since most voices have little if any energy below 100 Hz or above 12 kHz, the frequencies above and below are often "rolled off." This usually makes the voice easier to understand.

Continuous EQ allows you to vary the volume of a chosen frequency or range of frequencies with the turn of a knob. The tone controls on a typical stereo preamp function this way.

The graphic equalizer provides even more control by dividing the audible frequency spectrum into a number of bands usually measured in octaves or fractions of octaves.

The more bands, the more precise the control. The musical concept of octaves becomes apparent when you look at the face of a graphic octave equalizer. The bands—25 Hz, 50 Hz, 100 Hz, 200 Hz, 400 Hz, 800 Hz, 1600 Hz, 3200 Hz, 6400 Hz and 12,800 Hz—are each one octave apart. To calculate the octaves of any frequency simply divide or multiply by two.

A parametric equalizer provides even greater control of the parameters of the frequency spectrum by allowing you to choose a band of frequencies, the width (or Q) of that band of frequencies and how much or little of that band of frequencies passes through the equalizer.

Most parametric equalizers offer control of the entire audio spectrum using three or four bands which overlap slightly.

Zero in on the problem

One unique application of the parametric equalizer is its ability to find problem frequencies.

If, for example, you hear a frequency or range of frequencies that seems to "ring out" louder than the other frequencies start by deciding in which band the sound occurs.

. . . "muddy" sound can be caused by a lack of highs or too many lows.

First turn the frequency boost control of that band all the way up, then sweep the band of frequencies until the sound you're listening for jumps out.

Experiment with the bandwidth or "Q" control to determine how wide the bandwidth of the objectionable sound is. Once you have determined its parameters, reduce the gain until those frequencies sound proper in the mix.

The operation just described is an example of "subtractive EQ." Frequencies that stood out too much were reduced.

Additive EQ works the opposite way. In the above example, the producer might have chosen to boost some of the other frequencies to balance the frequency response.

Consider that turning down the bass or turning up the treble can have similar, but different effects on the overall EQ balance.

In most cases it is better to take a little off "the bottom" and add a little on "the top" than it is to simply boost the higher frequencies or cut the lows.

The idea is to get as consistent and linear an envelope as possible. Boosting any frequencies too much will cause those frequencies to distort.

The more you listen, the more familiar you will become with the audio spectrum. Soon you'll be able to identify frequency ranges by ear. This knowledge will improve your judgement, helping you to work faster and better.

Be aware that running the monitors too loud "burns" your ears.

If you often mix with the monitors way up, try listening to your completed mix the next day after your ears have had a chance to recover to make sure you haven't over-EQed the high end.

One final thing. If you're just starting to work with EQ (or any other effects that need to be switched or patched into the console) remember to remove them from the line at the end of the session so you don't screw up the next person.

The people who know what's going on can figure it out. They'll straighten out your mess . . . think you're a jerk . . . and go on with their work. Those who don't have a clue will go through all kinds of unnecessary anguish in trying to get their work done. They'll hate your guts!

■ ■ ■

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

Splatter matters.

Splatter is a form of radio interference that can drive listeners away from AM radio. It creates distortion in your signal, wastes transmitter power on undesired sidebands and interferes with other stations. Even with an NRSC audio filter, misadjustment of the transmitter or audio processing equipment can still produce an RF spectrum that can exceed NRSC or FCC limitations.

That's why routine monitoring of your station's RF spectrum is a must. But it doesn't mean you'll have to bust your budget on a spectrum analyzer. It just means you need the rugged SM-1 AM Splatter Monitor from Delta Electronics.

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World Radio History

Optimizing STL Performance

by David P. Hebert

Pasco WA Someone once said that there are basically two kinds of people: those who divide everyone into two different groups, and those who don't.

The same might be said for aural studio-transmitter-links (STLs) in modern use these days. These systems allow broadcasters to convey high-quality audio programming between two different geographical locations, usually from a studio to a remote transmitter.

They allow the broadcaster greater control of the audio signal than if this signal path was provided by a telephone company circuit. Generally, a modern link will offer almost transparent audio quality, and, in most cases, improved reliability.

Don't overlook the obvious

A typical STL installation can be deceptively simple. Since relatively little actual wiring is involved, the process can be done quickly.

We tend to make a quick system checkout and then walk away. Some items may get overlooked that can take the fun from the project at a later date.

It may seem funny, but a common oversight can be proper alignment of the transmit and receive antennas. Antennas used in this service are very directional and have narrow beam widths.

One of my clients suffered through years of STL problems, only to later find that the transmit antenna at the studio was pointed down to a bowling alley instead of up to the transmitter.

In fact, the bowling alley was almost 20° in azimuth to the side of the desired path as well. A proper reorientation of both antennas in the system resulted in a happier STL.

Looking deeper

Another problem we encountered was a low signal level. This situation was inexplicable because the transmitter and studio locations were directly line-of-sight with a perfectly clear view of each other.

CONTRACT ENGINEER

After all other solutions had been ruled out, we took the STL transmitter to the broadcast transmitter and checked the VSWR of the receive antenna. With this test, we found a defective connector on the receive antenna.

The moral of the story is to not only check the transmit antenna for VSWR but check the receive antenna as well when the system is installed or when problems develop.

An STL receiver will sometimes receive noise during the most unusual times. Sometimes this noise will only happen during episodes of wind.

If looking over the premises for scraping metal contacts (guy lines, loose antenna hardware, rusty joints, etc.) doesn't provide the needed information, one then considers installation of a cavity.

The proper choice of cavity won't compromise system performance, but will still filter most noise out of receiver circuits.

If the problem noise occurs only when the transmitter is on the air, sometimes one only needs to find a different location for the receive antenna to get it further from the main transmit antenna.

This noise can also be coming from the main transmitter itself and could also be improved with the use of a cavity. Poor receiver sensitivity can also be due to a defective first RF amplifier in the receiver.

Mono STLs

Early in our discussion, I described two types of STL systems. Basically, they are monophonic and composite systems.

Mono systems can be used to provide two discrete audio paths for stereo use. In any system, performance is affected by modulation, and frequently overmodulation is found in mono systems, while undermodulation is common to composite links.

Mono systems commonly utilize a preemphasis boost in the transmitter, with a companion deemphasis at the receiver.

If a link is fed audio peaking at the manufacturer's specified level (commonly +10 dBm), you can bet that overmodulation is quite serious and high frequencies are being seriously clipped.

The same preemphasis we enjoy for noise reduction is causing this overmodulation and clipping is taking place in the receiver IF circuits.

If a frequency-conscious limiter is not used ahead of the STL transmitter, then the overall audio must be lowered to prevent the overmodulation.

Considering the amount of high frequency energy in the audio band above 10 kHz, a good level would seem to be 11 dB below manufacturer's specifications.

Some STL manufacturers incorporate a modulation meter (as opposed to an audio input level meter) which shows modulation in the presence of preemphasis, and this meter can be used to keep system performance optimum.

Composite systems

Composite STL systems require an absolute proper audio level to reach the best compromise between SNR and distortion.

To insure the optimum modulation level for this type of system a 400 Hz tone is fed into the composite STL transmitter and is adjusted to a level which indicates 100% on the modulation meter.

Subsequently, with the same level, the audio into the main transmitter/exciter is also adjusted to 100% modulation of the baseband. With the 400 Hz method it is important that no 19 kHz pilot be present.

With some FM exciters, no composite level adjustment is provided, so one must build an attenuator within the exciter.

Some older STL composite transmitters don't have modulation percentage meters built-in. In this case, the 400 Hz signal must be supplied at a level the manufacturer specifies as 100% modulation.

Proper construction of the composite adjust attenuator is very important. Any errors in construction or design can result in a loss of stereo separation and the entire purpose of the exercise is lost.

A trick in cabling audio around a composite system is using coaxial cable with a low capacitance value. For this purpose, I would recommend a high-quality RG-59 type cable.

Once the system is up and running, it should not be forgotten. All heat sink fins should be kept clear of dust and dirt. If the link uses a blower fan in the transmitter unit, the blades should be kept clean and turning freely.

Most modern STL systems are reliable and work well. Just a little attention now and then will keep them working properly and keep the engineer from completely forgetting about them.

■ ■ ■

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

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World Radio History

Keeping Employees' Enthusiasm Levels Up

(continued from page 22)
the decisions to them—it just means that you shouldn't make your decision without hearing their expert testimony.

Also work closely with your specialists in setting their performance goals as well as your mutual goals for their area of expertise. Sit down with them individually and discuss what they believe they can achieve in the next month, quarter, year.

Motivating performance

Your employees have varying degrees of intelligence, ability and drive to improve. It's your challenge to interpret each person's motivators and establish an individual motivational program for them.

Just keep in mind that people do things because they perceive that their actions will somehow improve their conditions or circumstances.

So you need to understand how each individual wants to improve his or her condition and use that as your motivational leverage.

The top ten factors influencing employee morale have been prioritized, after years of research.

They are, from most important to least: job security; interest in the work; opportunity for advancement; appreciation and recognition; feelings about the company and its management; intrinsic aspects of the job assignment; salaries; supervision; social aspects of the job and working conditions, including benefits.

This list shows clearly that money is not the main motivator. What it also makes clear is that the strongest motivational condition is for employees to feel like an integral part of the organization and that their future growth and well-being can be entrusted to the company.

As long as they do a good job, they should be able to feel secure that they will be rewarded, promoted and included in the company's growth and success.

Building a winning team

According to Japanese management principles, workers get the greatest pleasure from being praised in the company of their peers.

Recognition, as the above list indicates, is a strong motivator. When used properly, it can insure the repetition of good performance.

You should try to build a program of incentives for both individual and group performance. Then, when these goals are reached, you have an opportunity to recognize good performance.

Whether the rewards are monetary, symbolic or both, instituting such a program will have measurable results in performance.

Listening to your employees is another tool for building a winning team. Hear what they're saying, feel what they mean, react intelligently and in good faith.

You won't always be able to work problems out the way an employee might wish, but if they perceive you as concerned and fair, you will maintain their loyalty.

The other half of the communication loop is keeping your employees informed. Don't make them have to find out what's going on around the station through the grapevine.

Letting the facts filter down to your troops through the gossip pipeline can have a serious negative impact on their performance. They will likely be reacting to incorrect information most of the time. Keep them in the know.

Employee ownership

While you're probably not in a position to give your employees actual shares in the ownership of the station, you can foster a sense of ownership through enlightened management.

Let them participate, as much as practical, in the decision-making process. Encourage them to suggest ways of improving departmental or station performance. Reward and act on good ideas.

In short, make them feel like they have some influence on the success of the station and that they stand to gain from that success.

When you have the members of your team feeling that it is "their" station, you'll have a high-performance crew and great employee relations.

■ ■ ■

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.*

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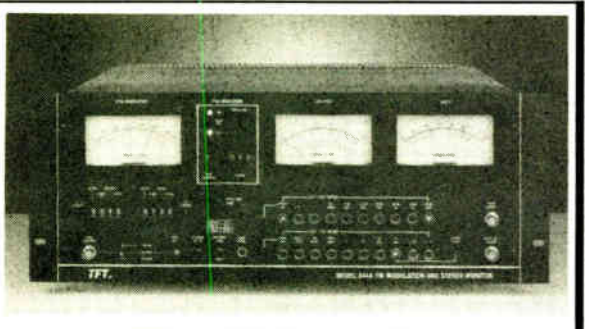


FM modulation monitor

TFT, Inc. has announced the availability of its Model 844A FM aural modulation monitor. Like its predecessor the Model 844, the 844A contains a frequency agile two-channel preselector and high level input, baseband and stereo monitors in a seven-inch chassis.

The 844A also features a frequency agile high level input, built-in absence of carrier and modulation alarms, and a front panel headphone jack.

For information, contact **Jesse Maxenchs at TFT: 408-727-7272,** or circle **Reader Service 84.**

Stereo signal test set

New from Dorrough Electronics is the Model 1200 stereo signal test set. The product is a modern version of the "Gain Set," allowing measurement down to −75 dB.

The Model 1200 also has the capability of measuring the stereo program signal in both the Left and Right or Sum and Difference formats.

The test unit incorporates two Dorrough loudness meters, indicating the peak and average amplitude on a single display.

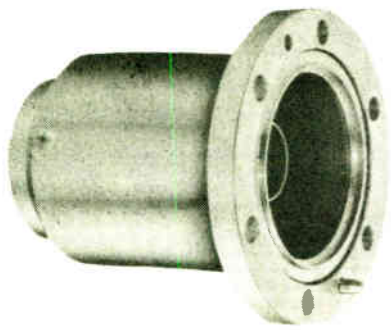
Applications for the test set include level set in newly converted stereo facilities and checking crosstalk and balance for achieving maximum stereo separation.

For information, contact **Kay Dorrough at Dorrough Electronics: 818-999-1132,** or circle **Reader Service 92.**

Block polymer contact treatment

Stabilant 22 is a new product recently introduced by D.W. Electrochemicals. The chemical is a block polymer which, when applied to electromechanical contacts, provides the connection reliability of a soldered joint without bonding the contact surfaces together.

For information, contact **Betty Gordon at D.W. Electrochemicals: 416-889-1522,** or circle **Reader Service 87.**



Coaxial cable connectors

Andrew Corporation has introduced two EIA flange connectors for its HELIAX® air dielectric coaxial cable. The 82RF is a gas pass connector; the 82RG includes a gas barrier to allow connection of the cable to non-pressurized components.

For information, contact **Don McSherry at Andrew Corporation: 312-349-3300,** or circle **Reader Service 94.**

Audio distribution amp

A recently-introduced product from Tec Pro Technology, Inc. is the company's audio distribution amplifier. The unit features a frequency response of ±.1 dB from 10 Hz-22 kHz and SNR of 95 dB. Other specifications include separation greater than 90 dB, input of −10 to +10 dBm, and output of +20 dBm.

The Tec Pro distribution amp has LED peak indicators, a mono/stereo bridge switch, headphone monitor jacks, individual output controls and RF input protection.

Two unbalanced high level outputs are also available via RCA jacks.

For information, contact **David L. Humes at Tec Pro Technology, Inc.: 606-623-7094,** or circle **Reader Service 98.**

AM audio processor

New from Orban Associates is the Optimod-AM audio processor Model 9100B.

Available in mono and stereo versions, the processor incorporates the high frequency preemphasis and 10 kHz low-pass filtering recommended by the National Radio Systems Committee. Three alternative preemphasis curves are also offered.

For information, contact **Howard Mullinack at Orban Associates: 415-957-1067,** or circle **Reader Service 89.**

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World Radio History

BUYERS GUIDE

Digital Workstations & Automation Equipment

CAPS Reigns at Crown FM

Tom Kenny, Op Mgr
& Joe Talbot, CE
KZXY AM-FM

Apple Valley CA On 15 August, 1988, Crown Broadcasting's KZXY-FM abandoned its "scratchy record" country format for a high-tech, adult contemporary sound that overwhelmed the listeners of the high desert with its clarity.

To the best of our knowledge, we became the first radio station in the country to play its music exclusively from digital audio tape—DAT controlled by a computer-assisted system.

When Crown's president Ron Strother looked for a system that combined state-of-the-art technology with a simple, practical music delivery, he turned to Concept Productions CAPS I system for walkaway automation.

USER REPORT

The heart of the system

The CAPS I system includes ten Sony DAT decks for music, commercials and custom voice tracks. However, we chose an alternate application of the system, for use on a live-assist basis, that features up to six DAT decks used exclusively for music.

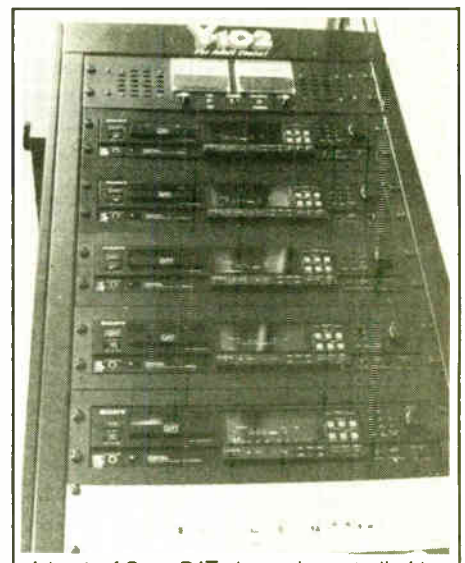
The DAT decks are controlled by a PC/XT-compatible computer, and an audio monitor panel, all mounted in a 78"×22"×22" high steel cabinet. The computer is outfitted with special cards made by Concept that duplicate the deck's normal infrared remote control. An audio switcher selects which deck feeds the console and keeps others off-line while they're cueing.

While the jock plays commercials and jingles from carts, the output of the switcher feeds a pot on the studio console. The PC monitor sits on the board in front of the DJ and displays "talk-up" time as well as intro time, the song's title and artist and a "scroll-ahead" feature to view upcoming music.

Concept also has an option that allows us to build our own daily music schedules from their music lists and integrate them with our hour and day patterns.

Every system has its virtues. With the CAPS I, our on-air talent enjoys the luxury of the system's pre-programmed music and automatic DAT cueing function.

The CAPS control system



A bank of Sony DAT players is controlled by the CAPS unit.

Time is not wasted choosing and cueing up individual songs.

Also, the system segues songs automatically. Jocks are free to change the order of the songs to accommodate tempo and artist separation.

Engineers will find that the audio quality is great and requires virtually no maintenance except for very infrequent head cleaning. No azimuth adjustment is necessary, and listening in mono shows no "phase funnies." We wish carts were as good.

The decks themselves are very reliable and a quick look inside will surprise you. Everything is "connectorized" and shielded. Simply put, these are not "consumer-looking" tape decks.

So far, we have determined only a few disadvantages to the CAPS I system. First, a DAT deck infrequently will refuse to respond to a command from the PC. But this is usually the result of loose or dirty contacts.

Occasionally the system may "freeze up" entirely (i.e., the system clock will stop and keyboard commands will refuse to function). The only way to get it up and running again is to reboot the computer and reload the program. A frequent massage of ICs, however, make this "freeze-up" problem rare.

A problem with DAT

Another disadvantage to the system has less to do with the CAPS I program and more to do with a problem apparently inherent in digital audio tapes: as they become older, they tend to oxidize and resist cueing cuts at random.

Thus, as an older tape finishes cut three at the beginning of the tape and receives the signal to cue to cut twenty-three at the tape's end, the tape, in the process of cueing, will either slow down and cue a second at a time or, in some cases, stop completely.

But since we usually play songs sequentially from tapes, and since Concept supplies us with only the newest DATs and updates tapes regularly, this has not been much of a problem for us.

The CAPS I system, in our live-assist application, is reliable and the Concept people are responsive and smart. We feel very confident about DAT and plan to use it at other stations in place of carts or open reel.

■ ■ ■

Editor's note: Joe Talbot is an expert at interfacing telephone networks to broadcast applications and has been a contract engineer for numerous radio stations in Los Angeles and San Bernardino for ten years. He has been with Crown Broadcasting since July 1988.

Tom Kenny has been in radio for ten years, working for Multimedia and New South Broadcasting in Louisiana before joining Crown as operations manager of KZXY AM-FM in April 1988. Either may be reached at: 619-241-1313.

For more information on the CAPS I system, contact Dick Wagner at Concept Productions: 916-782-7754, or circle Reader Service 96.

BUYERS GUIDE INDEX

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Circle 61 on Reader Service Card

World Radio History

Micro Di-Trol: Low Cost Control

by Don Prentice, President
Innovative Automation

Rio Rancho NM Micro Di-Trol is the newest version of the Di-Trol automation system available from Innovative Automation. Like Di-Trol, this scaled down version is comprehensive, easy to use and install.

Micro Di-Trol is designed for the primarily satellite-fed radio station requiring few audio sources, but desiring the versatility of larger automation systems. This cost-effective radio automation system includes the software, interface and manuals for under $5,000.

The Micro Di-Trol automation system can automate the most progressive station. Up to four audio sources, including reel-to-reel decks, cassette machines, single-play cart machines, "carousel"-type systems with 24 carts each (maximum of three), satellite audio feeds, DAT machines and studios, in any combination, can be automated using the Micro Di-Trol system.

TECHNOLOGY UPDATE

Program log capacity

The Micro Di-Trol is easy to use, and can automate any radio station except one formatted for totally live talk. The program handles a program log of up to 1440 events per day for a maximum of seven individually programmed days—or a total of 10,080 events per week. A maximum of 1344 exact time events per week are programmable to the exact second.

The program log allows the station complete flexibility in program format and entry into the system. The log is entered through a typewriter-like keyboard. A screen display leads the operator through each entry.

As each device or source number is entered, the system will display the device type on the screen for visual verification. As each code number is entered the corresponding code description is displayed on the screen.

Once program log entries are in the system, the operator can randomly edit any future or current log entry.

With the use of the computerized system to automate the radio station, the program log is always backed up on disk for safekeeping. This means that memory cannot be dumped should a loss of power ever occur.

Included in the Micro Di-Trol system is an interface controller designed by Innovative Automation. The interface is a digitally-controlled module that directs action from the computer program of Micro Di-Trol to various program devices.

Through this interface controller the system can select which device to air. Once the device is selected, the interface module will monitor and control the device.

Features available from the Micro Di-Trol Interface Controller include: audio control (automatically turns on/off the audio in any combination); random selection (random selection of carts to be played by the system) and device control (starting, stopping and rewinding of devices).

Source status monitoring (monitoring of the on-the-air source and the next-to-run device); silence sensing (detection of silence and automatic stepping to the next program event) and satellite tones (permits satellite tones to give the computer end-of-message tones, programmable by the exact time clock) are also featured.

Silence sensors

Multiple sensors on the computer processor continually listen for silence from the source on the air, satellite, exact timetable or any combination of these.

Silence sensors can be turned on or disabled for any duration by the exact time table.

Error messages will display on the screen and trip an error alarm without interrupting normal operation. Micro Di-Trol compares the real timetable to the exact timetable for a match and initiates appropriate action.

Although not expandable, Micro Di-Trol is perfect for stations using heavy satellite programming and for those requiring few audio sources.

■ ■ ■

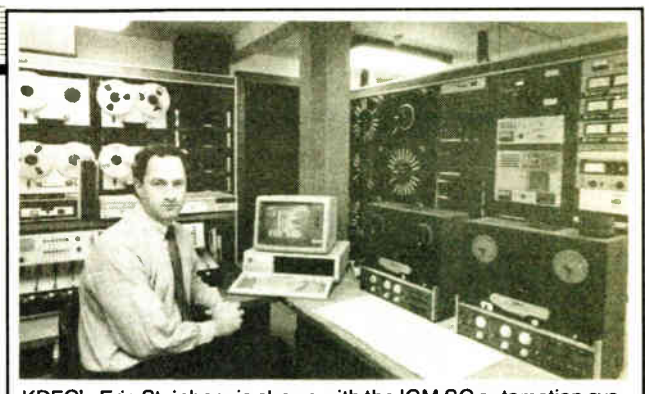
Editor's note: For more information, contact Don Prentice at Innovative Automation: 505-891-0501, or circle Reader Service 81.

IGM Automates KDFC

by Eric Steinberg
Chief Operations Officer
KDFC-FM

San Francisco CA KDFC is one of the leading classical music broadcasters in the nation. This success story is due, in part, to the adaptation of the classical format for use with automation equipment.

USER REPORT



KDFC's Eric Steinberg is shown with the IGM SC automation system

The new generation of PC-based automation systems appealed to us because of their ease of servicing and their potential for easy interface with our PC-based traffic and billing system. After talking to several manufacturers, we decided to purchase the IGM SC system.

KDFC's IGM SC system consists of an IBM PC (or clone), used for programming and operating the system. The PC communicates with the system via a normal serial port to a rack-mounted SW chassis.

The SW contains its own microprocessor, which controls each piece of source equipment, controls audio fading and switching and communicates spot announcement selection to the Go-Cart players.

Control of the source equipment is handled through individual plug-in source cards. The SW chassis has room for 16 sources. Since KDFC uses 29 different sources, we purchased the optional SWx expansion chassis, which holds an additional 16 source cards.

System contents

The complete KDFC system consists of eight Otari ARS-1000 reel-to-reel players, two ITC 3M cart decks, four Sony DTC-1000 DAT players, eight 24-tray Go-Carts, a live studio source, a BE Digitalk for time shifting Dow Jones financial reports and a relay source card.

The large number of sources is to allow for long periods of walk-away time during which the operators can perform other station functions such as traffic or program tape preparation.

Audio levels are easily set on the IGM SW by selecting the desired source on the bank of cue buttons on the front panel and selecting cue on the LED VU meter switch. Each source card in the SW is equipped with level trim pots.

(continued on page 46)

EXTEND YOUR LEVEL OF SUCCESS

The ATS-100 Stereo (dual channel) Extended Range Audio Meter is a self-contained audio measuring system. Dual "VU" meters provide precision visual monitoring. Peak Program Meters offer simultaneous level and peak monitoring.

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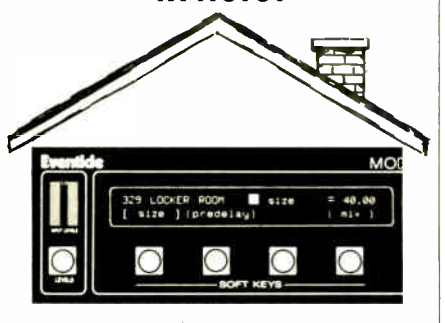

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World Radio History

RS-1000 Offers the DAT Edge

by Dan Braverman, Pres
Radio Systems, Inc.

Edgemont PA Imagine the ideal machine for automation. One with digital audio quality, random cut selection and compact two-hour cassettes. DAT is perfect. Well, almost.

On the surface, DAT is an automation engineer's dream format. The compact DAT cassette holds up to two hours of stereo program material—a familiar and convenient length for syndicated formats.

DAT's inherent digital quality offers consistent low noise and in-phase performance for quality-conscious automated stations.

Subcode data, available in all DAT players today, automatically and accurately allows automation controllers to cue the cuts to the program start IDs. Most importantly, DAT machines digitally number these cuts so that for the first time, automation systems have complete random access to any cut on any tape.

Therefore, songs need not be played in the order they are supplied on the syndicated tape, thus radically expanding the broadcaster's programming flexibility.

DAT . . . offers consistent low noise and in-phase performance for quality-conscious automated stations.

Current drawbacks

Today's crop of DAT machines, primarily developed for consumer use, lack some very basic interface utilities critical for use in automation systems. Most units do not provide broadcast-standard remote control terminals for automated control of start, stop and search functions.

However, several systems integrators currently utilizing DAT in automated environments have overcome this control problem by emulating the infrared remote control data stream with an external processor.

This data is then input to the DAT machine via the infrared detector port provided by the manufacturer for a consumer-type hand held remote control. This allows dependable remote function control.

Status readback to provide function confirmation such as run status and end-of-message information is a more difficult problem, since no port for this data is provided by the DAT machines.

Operating mode confirmation

Most current automation systems fly without confirmation of operational modes and just assume that the DAT machine has responded correctly to the commands.

To calculate when a program cut has finished and then cycle to the next event, some systems use external computers to keep track of program cut time. Other systems record FSK data at the beginning of a cut to tell the control computer the length of the cut prior to airing.

Either of these approaches requires external logic and/or careful pre-timing of cuts and recording of tapes.

TECHNOLOGY UPDATE

Radio Systems, Inc. has just released its model RS-1000, which goes a long way toward solving these drawbacks. Complete broadcast standard, hardwired remote control is provided so that simple control interfacing is possible without the use of external serial data encoders.

Extensive modifications to the Sony DTC-1000, including the installation of an internal microprocessor, have also enhanced the machine's interface ability so that it provides complete hardwired, available status information including end-of-message closures.

Remote control connectors and microprocessor-initiated protocols have been installed in the RS-1000 to emulate popular cart carousel and multi-slot units. Slot numbers are simply replaced by cut numbers and the DAT machine looks just like a cart "carousel" to any existing automation system.

Radio Systems will unveil at this year's NAB a PC-based sequencer for the RS-1000. While not a full-blown automation system, it is designed as a user-friendly operator assist for a multi-DAT player on-air system.

The sequencer will integrate a database to store and retrieve cut names and numbers, using a mouse with menus and icons to facilitate automatic cueing and tape loading.

Look for DAT hardware to rejuvenate automated and syndicated formats.

■ ■ ■

For more information, contact the author at: 215-356-4700, or circle Reader Service 91.

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World Radio History

Live Assist is the Next Frontier

by Richard Farrell

Falls Church VA "God tells us not to be live, because live spelled backward is evil," jokes Steve Bellinger, president of satellite automation system maker Systemation. If Bellinger's burning bush is correct, then there are a lot of evil-doers running amok in broadcast radio.

If manufacturers seem to agree on one thing it is that the future of station automation holds a live-assist combination; live talent working in concert with equipment that automates much of a studio's remaining workload. They also make a convincing case for the sound economics of live-assist type automation.

"A lot of people are using automation not as a 24-hour answer to broadcasting, but in their weak hours," notes IGM sales spokesman Carl Peterson. IGM markets its Instacart, Go-Cart, EC and the PC-based SC system.

Keeping the human touch

Duke McLane, senior vice president of marketing at Media Touch, agrees that live-assist is the inclination of the industry. "There is no question that live-assist automation, where the ultimate programming decisions are still in the hands and minds of the on-air talent, will be maintained," he says.

"I do not think you are going to see as much of the total walkaway capability as you have in the past," says Gentner Electronics Sales and Marketing Director Gary Crowder. "People use their automation systems with the live talent, but everything else is automated," he says.

Steve Bellinger sees wasted money in much of radio that is not in some way automated. "A babysitter, adding nothing to the product, at minimum wage, costs—if he or she is around the clock—better than fifty-thousand dollars a year. That is not money effectively spent," he says.

Mistaken identity

"Automation has had a bad name over the last twenty years as a means of economizing at a station at the expense of listenership," says McLane, who cites two main factors for broadcasters' interest in automation systems: record keeping and production values.

INDUSTRY ROUNDUP

"Record keeping," he says. "is being able to positively verify that commercials ran as scheduled, that the commercials met the criteria and that they ran in the particular time in which they were guaranteed to run.

"It is quite common that stations not benefitting from any type of automation check off commercials as running on schedule when it is found, running air checks, that the commercials *did not* run or ran significantly later," says McLane.

With respect to production values, McLane says that automation systems can streamline studio operations because they can eliminate duplication of effort and "look after all of the materials handling; loading carts in machines, cueing up compact discs and allowing talent to select cuts by title, artist or duration rather than the CD #156, cut 5 type of thing."

McLane says his company, which markets the well-known Touchstone touchscreen automation system, is interested in systems that integrate not only the control of source equipment that goes on the air, but also "systems that are interactive with the business traffic system, electronic newsroom and the new wave of computer-based music playlist generators."

Satellites take hold

One area where automation systems have gained a foothold is in their growing use among stations of satellite-fed programming. Services such as Satellite Music Network (SMN) and Transtar are picking up affiliates who carry their formats either in some part or totally. Many of these affiliates are automated.

"Perhaps more than half of SMN's approximately 960 affiliates are in some part automated," affirms Art Reiser, CE for the Chicago studios of SMN. Reiser claims that a station's typical overhead saved from switching to satellite programming is somewhere on the order of 35%.

"I think satellite is where digital audio storage is going to have broad applications," says Gary Crowder. Crowder says that many of the Digisound systems his company has sold are operating with stations using satellite programming. "They are using the Digisound to program local commercials, news, PSAs and IDs."

Affiliates must care

But automation isn't the entire solution for most stations.

"Interfacing automation to satellite is not an excuse to forget your brains," Reiser says. "SMN only supplies half the battle. Our affiliates have to supply the other half by choosing a good jingle package and by thoroughly thinking out the liners that are sent to us."

For satellite use, "automation is really the best way to go," says Reiser. "But the word we try to impress upon every affiliate—many listen, many do not—is execution. You have to be careful of what you are running. We have stations using

(continued on page 42)

Acquired ... **LPB Incorporated**, makers of audio consoles, studio furniture and low power AM transmitters, announced recently that it has been purchased by Edward Devecka, an MBA graduate of Harvard Business School with an extensive background in general management, manufacturing and marketing.

On his acquisition of the Frazer, PA company, Devecka says he is planning "to manage LPB for growth in the current location. I bought the business because I was impressed by the technical skills of the people at LPB ... and by the international reputation for reliability and value of LPB audio consoles and AM transmission equipment."

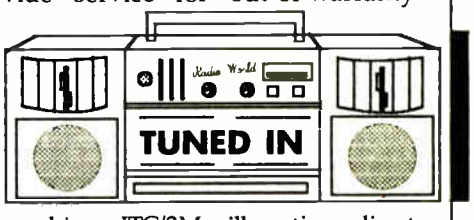
Former owner and founder of LPB Richard Crompton "will remain active long-term in the application of Highway Radio Systems (TIS), Carrier Current Systems and other uses of LPB low power transmission equipment," Mr. Devecka said.

Leaves manufacturing ... **CompuSonics Corporation**, according to company chairman David Schwartz, "took a good look at our capital structure, capabilities and business operations to date and realized that we could be profitable by limiting our activities to licensing and doing engineering work for other companies."

CompuSonics intends to forsake manufacturing operations and concentrate on licensing foreign and domestic firms to manufacture and service its existing line of digital audio recorder products, including its floppy-disk based systems. The company also intends to sell licenses on its audio data compression technology.

ITC/3M names dealer ... **Broadcast Services Co.**, a member company of the Davis Communications Group, headquartered in Four Oaks, NC, has been named a nationally authorized dealer for the products of International Tapetronics Corporation/3M.

Effective 1 January, Broadcast Services the ITC/3M product line throughout the United States. Broadcast Services, which provides equipment and services to widely diversified segments of the communications industry, will also stock major replacement parts for ITC/3M products and provide service for out-of-warranty



machines. ITC/3M will continue direct warranty service from its factory.

Movers and shakers ... **University Sound, Inc.**, a Mark IV company, has moved its headquarters to Sylmar, California, former facility of a group of products purchased by Mark IV. University Sound's new address is: 13278 Ralston Ave, Sylmar, CA 91342-7607.Phone: 818-362-9516. Fax: 818-367-5292.

WaveFrame Corporation has also packed its bags as of 9 January and moved about two miles from its previous location. Its new mailing address is 2511 55th Street, Boulder, CO 80301.

Telephone and fax numbers will remain the same.

Correction ... in **RW's** 15 January issue, a Marketplace item concerning a patch bay system from **Connectronics** included an incorrect contact phone number. The correct number to reach the company is 203-324-2889. **RW** regrets the error.

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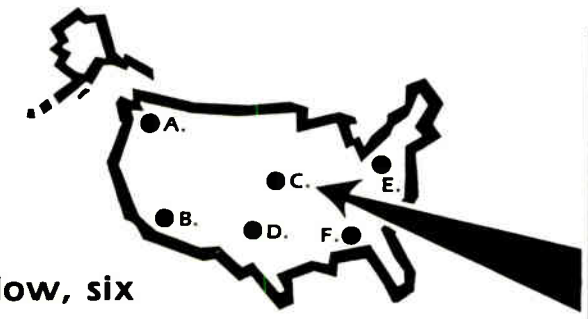

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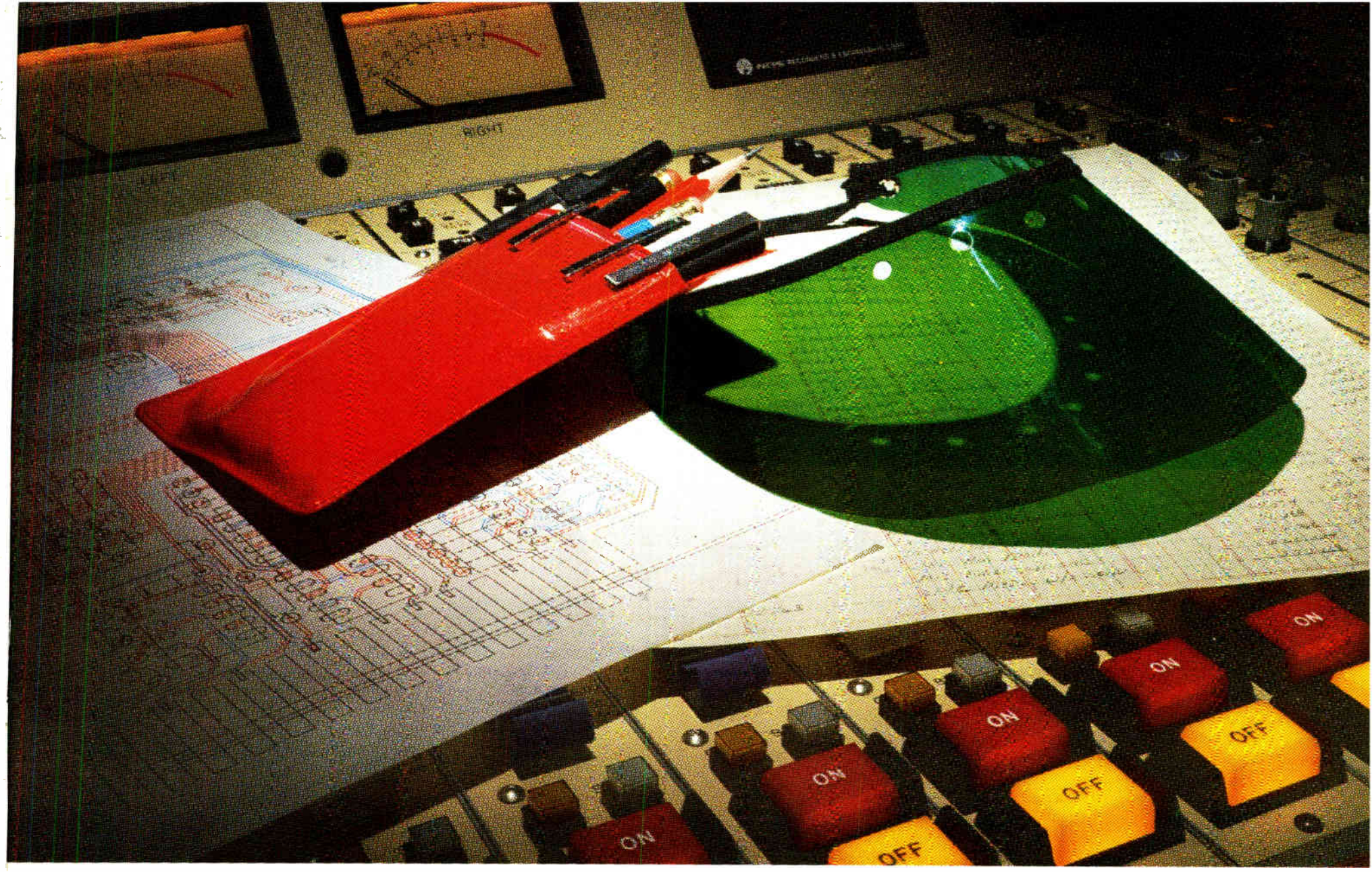
Circle 67 on Reader Service Card

World Radio History



Designed. Then priced.

Not vice-versa.

Other manufacturers set price goals, then commit their designers to create products to fit the price. Worse still, their prices must leave room for dealer profits.

Your station works as well as your consoles let it. How do you know whether your consoles have been built to a price, or designed to perform? If they're from Pacific Recorders, you have the assurance that a very real difference in priorities is at work.

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So the next time you have the chance to order new consoles, maybe you'd be better off to look beyond the price tag and see the value of our approach. Excellence first. All else second.

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World Radio History

Not for amateur radio.

You're no amateur at this game, so why play around with amateur CD players in the studio? You've tried consumer models in the past, just to see if they'll work long enough to make sense. We can understand that. But in the long run, they *don't* make sense. And you know it. Even modified or beefed up versions have given you headaches. . . wrong levels, hifi connectors, too many buttons or the wrong ones. Not to mention skips, mutes and breakdowns. Why take chances playing around with an amateur deck in a pro application? Leave that home player at home where it belongs. Check out the Studer A727 and A730—pro players for radio pros.

A727 Thousands of A727's prove their reliability in radio stations all over the world—*everyday*. The A727 provides full 16-bit resolution with 4x's oversampling—plus powerful error correction circuits to protect against on-air problems from damaged or dirty discs.

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FEATURE	A727	A730	"Brand X" Player	FEATURE	A727	A730	"Brand X" Player
Fader Start	▼	▼		Disc Recognition		100 discs	
Parallel Remote w/Tallies	▼	▼		Varispeed Built-in		▼	
Start & End Review	▼	▼		End of Modulation Sense		▼	
End of Track Alarm	▼	▼		Monitor Speaker		▼	
RS422 Serial Control	▼	▼		Separate PGM & Monitor Outputs		▼	
System Clock in/out	▼	▼		Remote Monitor Speaker Mute		▼	
Digital Output	▼	▼		Audio Channel Reset		▼	
Die-cast CD Drive	▼	▼		Rack Mounts Standard	▼		
Cue Memories		3		Flush Mounting		▼	

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Circle 65 On Reader Service Card

World Radio History

KIML's Informer Spreads News

by Ray Mapel, GM
KIML-AM/KAML-FM

USER REPORT

Gillette WY Recently, KIML-KAML radio discovered a way to solidify its relationship with listeners and advertisers alike, using new technology.

The new technology is called The Informer, an interactive telephone system designed specifically for radio by the Systemation Corporation.

The Informer looks like a regular computer, but that is where the similarity ends. Special circuitry transforms the computer into a sophisticated yet simple telephone device which gives callers access to a wide range of information.

The Informer can juggle up to sixteen incoming phone lines (for now, KIML is running it with three, but as demand grows we will be adding more lines).

Setting up the Informer was a breeze: we had it running the same day we received it. The software menus and documentation were clear and simple, and the people at Systemation were helpful in adding the finishing touches on our system.

System debuts

For a number of years, KIML has provided listeners with a recorded weather forecast/conditions service using a telephone answering machine on a single "Weather Phone" line.

The day after setting up the Informer, we moved our weather report over to the system. We also began building the "menu tree" that directs callers to the service of their choice.

After a few days of testing, we unveiled "The KIML Informer" to the public . . . and life for us (and our listeners) has never been the same.

A caller to the main KIML Informer number is presented with an audio menu of choices.

"Thanks for calling the KIML Informer, an exclusive service of AM-1270, K-I-M-L. Use your touch-tone phone to gain access to all the KIML Informer has to offer. If you don't have a touch-tone phone, please hold for the latest weather. For entertainment, press 2-2-2. For community events, press 3-3-3. For the world of sports, press 8-8-8 . . . "

Sub-menu directs callers

When the caller makes a choice, an audio sub-menu begins. For example, if the caller pressed "333," he or she would get:

"This is the community events area. For the latest school menus, press 2-2-2. For this week's KIML Country Auction items, press 3-3-3. Press the star key to return to the main menu, or the pound sign to repeat the previous menu."

The audio menu system is designed so that new callers will always be presented with clear directions leading them to the information they want, while veteran callers can interrupt the menu at any time and press the combination of numbers which will take them directly to the sub-section of their choice.

And, as you can see from the menu script above, callers can always get back to the main menu from anywhere in The Informer by pressing the star key at any time, or going back one menu step (from the school lunches to the community events menu, for example) by pressing the pound key.

Maintaining the system

Programming the Systemation Informer—building the menu system and inserting sections into it—is easy and fast, using a telephone and following the directions presented on the Informer computer's screen.

Updating individual items—weather or sports scores, for example—is simply a matter of calling the main Informer number and entering a special confidential access code which activates the recording process in the section you have selected.

The system is so easy to maintain that I keep the Informer computer in my office and take care of it myself.

Since each section can be updated independently from any touch-tone telephone by anyone who has been given the appropriate access code, we can

(continued on page 42)

Cablewave Systems delivers everything you need and expect from Rigid Coaxial Transmission Line performance...superior quality, plus optimum mechanical and electrical specifications.

To achieve this, Cablewave Systems fabricates high conductivity, hard-drawn copper tubing with precision machined, pin-type Teflon dielectric insulators. Standard 50 ohm transmission line is offered in sizes from 7/8" thru 9 3/16"; 75 ohm in 6 1/8" and 9 3/16". All utilize EIA bolt type flanges and inner connectors compatible with EIA standards, MIL specs and international IEC recommendations. Aluminum outer conductor 50 and 75 ohm transmission lines are available on special order.

To complement our full line of Rigid Coaxial Transmission Lines and accessories, Cablewave Systems also manufactures a complete line of semi-flexible air and foam dielectric coaxial cables and connectors.

For a copy of our 48 page Rigid Coaxial Transmission Line catalog and information on other broadcast and RF communication products, contact Cablewave Systems.

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Circle 73 on Reader Service Card

World Radio History

Informer Takes Calls

(continued from page 41)
have advertisers and civic leaders updating their own sections, without station personnel having to worry about it.

We have been using the Systemation Informer for about three months now, and we have just begun to scratch the surface of its potential.

Wide-ranging benefits

In addition to our weather line, we also feature complete national and local sports updates, school lunch menus, senior citizen lunch menus, the KIML Top 10 Country Singles, a home-video update and the radio auction.

And whenever we run a contest or promotion of any kind, we add a section to the Informer which contains complete rules and information about that promotion. To our on-air promos, we add the line, "For more information about (the contest), call the KIML Informer at 682-4444."

There are a couple of things we have done with The Informer to make it easy to promote. First, we run liner cards on the air, saying things like, "For up-to-date sports information, call the KIML Informer at 682-4444."

Second, all of our Informer advertisers feature a tag-line in their commercials about the service, and many of them include the Informer in their in-store and print advertising.

Third, we refer to the Informer when we are giving information on the air: "Here's one of the stories in the sports section of the Informer right now . . . ."

Convenient for talent

Our air personalities often run spur-of-the-moment Trivia contests using information to be found in the Informer.

An on-air person might say something like, "I'm looking for the name of the Number Seven-ranked video on the Video Excitement Top 10 Videos, as found in the KIML Informer." (As you might imagine, the lines really light up when they do this.)

From the sales standpoint, we find that the Informer practically sells itself. (We project that the system will more than pay for itself within the first year.)

One of the biggest selling points is its call-counting feature. The Informer's computer prints out a tally of the calls made into each section of the system each day, letting advertisers know precisely how many people they are reaching.

In addition to its sales and community-service strengths, the Informer helps our station operation. It is an effective management tool, allowing us to monitor exactly when our staff and others update their Informer messages. And our secretaries no longer have to scramble for miscellaneous information requested by a caller. They just give out the Informer number.

And we were delighted to find that, since Informer income is non-broadcast revenue, it does not affect our music-licensing fees.

In short, the Systemation Informer is giving KIML radio a new way to offer our community more service than ever before . . . making us more popular with our listeners, a better investment for our advertisers and a more efficient operation in general.

■ ■ ■

KIML's sister station, KAML-FM just went on the air on 26 December, 1988 offering an Oldies format that is being well received in its area. Ray Mapel may be reached at: 307-682-4747.

For more information on the Systemation Informer, contact Jay Mitchell at: 515-472-4087, or circle Reader Service 83.

Live Assist

(continued from page 38)
station using us who make us sound wonderful and stations out there who make us wonder why we are here."

"The choice of an automation system is important, perhaps 30-35% of the battle," Reiser believes. "But it is ultimately how a programer, operations or general manager chooses to make himself sound when we push the button to put him into a commercial break."

The real thing

It is clear that purchasing an automation system does not mean a station is abandoning its live broadcasting. Chances are the station is using the automated equipment for its slower hours while remaining live for the "drive time" and other peak hours.

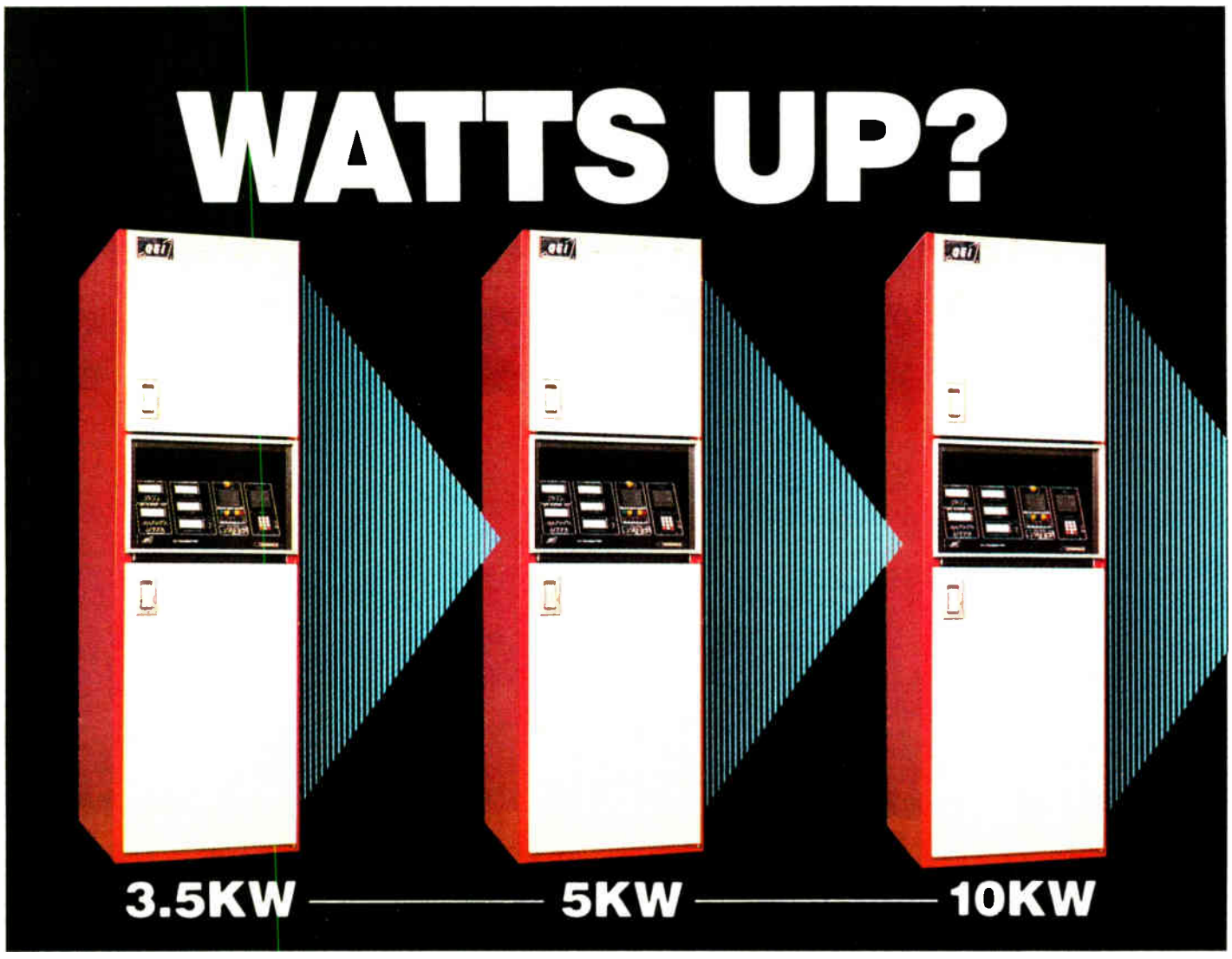
"To service its community or area, stations are finding that they are going to *have to* do some live," says Peterson.

Crowder agrees. "Stations have to be local," he says. "They have to serve their area. The danger in any type of automation is that of a radio station becoming a jukebox. You have to be careful that automation does not control you. It is a tool. The stations that are going to survive are those that have found a niche, a way to serve their community."

Whatever lies ahead, automation systems are going to remain in today's radio station, albeit in new ways, accommodating new applications and formats that prolong for survival.

They exist alongside seemingly squelched earlier notions of a station that has packed up, barred the door and "Gone Fishing," all the while casting its signal out across the lake.

"Walkaway" automation has indeed taken on an entirely different connotation, with stations walking away from inconvenience and inefficiency, but not their local identities and on-air sound.



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15000 HOUR TUBE WARRANTY

If you're shopping for a 10KW unit in the first place, the QEI FMQ-10000 has lots to recommend it. No other FM transmitter packs this much power, reliability and performance into a single 24" wide rack cabinet. And the FMQ-10000 is designed to operate on single-phase power, so there's no need to pay for installing new three-phase electric service.

What's more, for upgrades to power levels beyond 10KW, each of these FMQ series transmitters can serve as the driver section for QEI's 20, 30 or 60KW transmitters, again resulting in major cost savings.

Every QEI "New Reliables" FM transmitter is built to deliver ultra-dependability and performance. So—whether your station is thinking of upping its power down the road, or if the power you start with is the power you stay with—you'll be glad you chose QEI. Call us toll-free at (800) 334-9154 for the full story.

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Circle 75 on Reader Service Card

World Radio History

Audiometrics Rotates CDs

Paul Shulins, CE
WMJX-FM

USER REPORT

Boston MA Over the past few years more and more radio stations have decided to use compact discs for carting music and for direct-to-air use.

While it is true that compact discs provide superior noise performance and extended dynamic range to the user, the past few years have taught broadcasters much about the reliability, durability and overall suitability of CDs for demanding broadcast applications.

With most CD hardware geared toward the consumer, many radio stations jumped on the bandwagon early, purchasing consumer-type players for use on-air and for carting up music. Some of the players were better than others, both mechanically and electronically.

Short life of older players

However, the mechanical stability of the player came to be the most suspect factor. Just like consumer cassette decks, consumer CD players would start to break down.

With little available in the way of technical support, the players were destined for the storage shelves, but not before causing lost time in the production studio or lost ratings in the control room.

Presently, machines of much higher quality are available for professional broadcast use. These machines are easier to cue up, much more reliable and have better audio specifications. These machines are well suited for the production studio, but still have several major shortcomings for use on-air.

For one thing, they are more difficult and less convenient for the air talent to use than cart machines. The compact discs themselves are awkward to store and handle, and are much more vulnerable to damage from normal day to day handling than was previously thought.

Additional problems

It is also easy to make a mistake and play the wrong cut. And most professional CD single play units are not end-user serviceable. They require test gear far too sophisticated for most stations to have on hand, so they must go back to the factory to be fixed. Because of their high price tags, stocking spare units is generally not practical.

Three years ago, I decided that since I was able to hear such a marked improvement on the air in both noise and stereo separation from playing CDs direct-to-air, it was the way I wanted to go.

However, the problems associated with direct-to-air CD playing bothered me enough to make the idea unusable at my station.

I wanted to come up with something better. Six months later, my new system was put on the air, and I am proud to say that this system solves all the abovementioned problems and more.

The heart of our system is a set of two Audiometrics AMCDS 1000A CD multiplay units. Each unit holds 100 compact discs, and is able to automatically cue up and play any cut on any disc by microcomputer control.

The rest of the system is the microcomputer controller, the key to its ease of use and reliability.

The entire system is located in the music library. There, the CDs stay locked in a clean, untouched area (this has proven to be very important).

The micro-computer and keyboard for making changes to the system are also located in the music library.

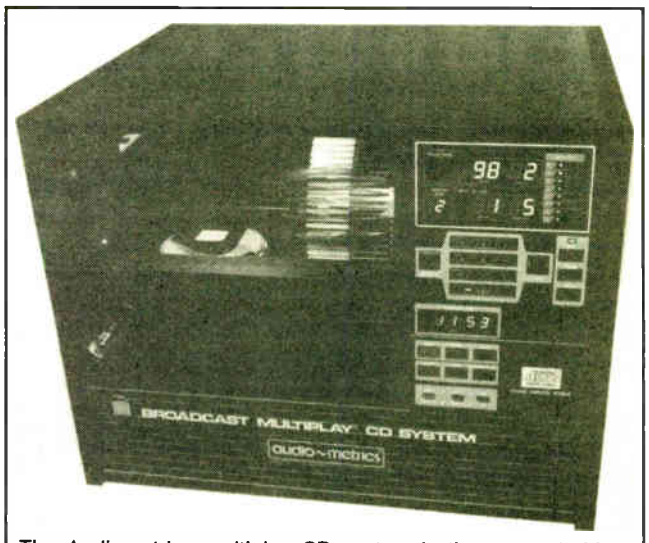
The only two devices needed in the control room are the color video monitor, which shows the status of the CD player, and the bar code reader, which "talks" to the system.

Having these two devices in the control room helps keep maintenance easy, since it is not even necessary to go into the control room to maintain the system.

Ease of operation

The system is easy to use. All the talent needs to do is tell the system what songs are entered, and then merely start the song from the button on the console, exactly

(continued on page 46)



The Audiometrics multiplay CD system is the secret behind WMJX's on-air operation.

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So why settle for marginal performance when you can have a performance margin today and in tomorrow's 2° spacing environment.

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Circle 64 on Reader Service Card

World Radio History

SAT 16 Makes SMN Switch Easy

by Corydon L. Thurston, Exec VP, Berkshire Broadcasting Co WNAW-AM

Great Barrington MA A radio station is as good as the creativity of its staff. Accepting that premise, an obvious goal of management would be to enhance that creativity wherever possible. But how does one balance that noble objective with one's budget?

USER REPORT

Creativity can be enhanced by providing more time to be creative and better tools with which to work.

Although program automation is not new, isn't it time to rethink its application as a necessary tool for today's radio station? For some reason, many broadcasters still perceive automation negatively. Maybe it is because they do not think of it as a tool.

I would bet that very few broadcasters view CD players negatively, yet its technology incorporates a number of automated features such as instant random access to song cuts, programmable play memory and a data storage capacity that can include an artist profile, song length and ramp time, etc.

I know it is stretching it somewhat, but think of those features: switching many input sources, random access capabilities, large storage capacity for preprogramming thousands of events. Then think about the time spent by your valuable people manually executing these routine functions many times each hour of each day of each year.

Signing up for satellite

WNAW decided to affiliate with the Satellite Music Network beginning in early 1989 and the system choice we made to maximize our operational efficiency in delivering the format was Broadcast Electronics' SAT 16 program automation system.

Keeping current with today's music takes extra talent and dollars. But satellite delivered formats can alleviate those concerns and give consistent quality 24 hours a day, with music that is well researched and fits your target market.

Another of today's technological developments that has become an entrenched tool of the trade, the satellite is the super station concept brought to radio. And for hundreds of small and medium market stations it has proven to be a great success.

An advantage we had going in was that BE had an econo version of its Control 16 automation system, expressly designed for satellite delivered formats. Its exclusive satellite interface panel allows customized switching of events (sources) triggered by the satellite disc jockey from his studio.

This feature, coupled with an optional relay panel that enables automatic time control to start and stop tape decks, makes the SAT 16 ideal for this format.

Leaves time for creativity

The basic system uses two Go-Carts and a three-deck cart machine to allow the system random access memory to create spot clusters, including the appropriate promos and liners, without having to pre-produce all stop sets.

The same principles I discussed earlier have applied here as well. The system has been a tool to enhance the creativity and productivity of the staff. With the satellite delivered format, the precise timing and execution of all stop sets is essential. Thus time spent on quality production, news updates and the like is made possible by program automation.

The BE program automation system is flexible, with vast memory and source capacity available. The equipment has been reliable, and technical support is always there if I need it. (As a matter of fact, BE sent a field service engineer to our station to install the system and train our staff in its operation).

But do not misunderstand; the system requires the attention of creative people to keep them fresh and fine tuned to your programming objectives, but I have found that this time is less than a quarter of the time previously spent in the studio pushing buttons.

Program automation, I am convinced, is the right *tool* for today's broadcast needs. Expandable for tomorrow's innovations, it has given creative time back to our people and allowed them to be more productive—the kind of productivity that improves the bottom line.

■ ■ ■

Editor's note: Corydon Thurston has been involved in radio broadcasting all of his life and learned what he knows from a great teacher—his father. He may be reached at 413-663-6567.

For more information on the BE SAT 16 satellite program automation system, contact Dave Evers at Broadcast Electronics: 217-224-9607, or circle Reader Service 93.

System 100 "Localizes" Sound

by Peter E. Clark, GM WLQM AM-FM

Franklin VA I recently applied for and was granted a new FM radio station to serve the community of Franklin. My biggest concern after obtaining the frequency was the overhead required to operate the FM during its early stages when there was little new income and a large debt to service.

Since we are only 45 miles from the Norfolk market and face competition from the large city stations for listeners, we felt that satellite programming, along with local news and programming, would give us a competitive edge.

Our decision to use satellite programming put us in the market for some kind of automation that would play our commercials and air the network.

We looked at many different systems and finally decided on Absolute Broadcast Automation's Satellite System 100, based on analog cassette technology.

We purchased the basic system including six cassette decks for playback and one for recording, and bought an additional deck for music fill and as a spare.

We also bought the optional complete business system package, which permitted us to maintain all of the station business and scheduling of commercials from the same computer, using the same integrated software.

USER REPORT

It took a week to install the system and get it running. There were no problems with the initial operation because the system had been "burned-in" during operations at the NAB's Radio '88 exhibit.

Location code aids scheduling

The system is powerful, with many features not found in other systems. Its operation includes two main areas: input of commercials into the computer traffic and scheduling system, and recording of the commercials onto cassette tapes for airing by the system.

The commercials are entered in a manner similar to other computer traffic systems, the only difference being the addition of a location code which identifies the location of the commercial in the automation system.

This location code is found automatically by "asking" the automation computer where the commercial should be recorded. The automation computer will then reserve space for the commercial and generate a location code to be used by the scheduling software.

After the orders are entered, the operator runs the next day's schedule. This is easily done by pressing one key on the computer—the software then prepares the next day's schedule.

After the next day's schedule is completed, all commercials are scheduled. Commercial clusters are filled or ignored if no spots are indicated.

The schedule is simply copied to the automation system computer by carrying the schedule diskette over to the au-

(continued on page 46)

CRL SPOTLIGHT

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Circle 70 on Reader Service Card

World Radio History

KONY Puts Auto-Jock On Air

by Carl Lamar, GM
KONY-AM

St. George UT KONY began using the Auto-Jock unit when we switched to the Satellite Music Network (SMN) Country Coast to Coast format in March of 1988.

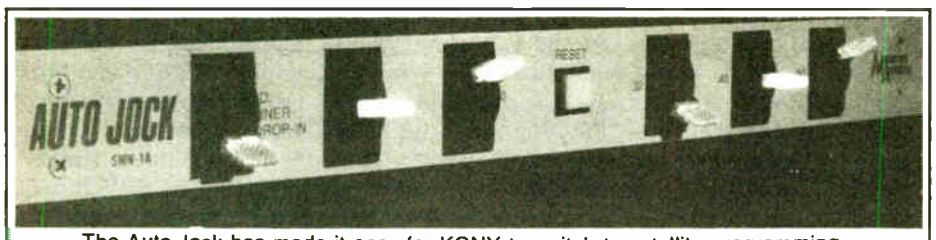
The unit, manufactured by Carl Watkins' Mountain America Satellite Radio (Blackfoot, ID), is an inexpensive means of automating a station onto SMN.

It's a breeze to install, fits a standard rack and has input and output connectors that are easy to solder and don't require a magnifying glass and a microscopic pair of long-nosed pliers to reach.

Unit backs its claims

The company's claim that Auto-Jock allows the user to "leave the station unattended indefinitely under its command" certainly holds true. Naturally, you have to conform your programming to SMN's format and the unit's capability.

The Auto-Jock interfaces directly to the six commands associated with the SMN format via the outputs of the satellite receiver demodulating and decoding equipment.



The Auto-Jock has made it easy for KONY to switch to satellite programming.

When the operator at SMN pushes a button to command a break, the receiver's relays respond accordingly and let the Auto-Jock unit interpret the command and either "take the break" or ignore it and continue with the formatted music/news from SMN.

Responding to selected breaks only, Auto-Jock plays recorded spots while muting SMN audio.

However, the unit is programmed by a set of switches on the front, which make the unit respond the *same way* every hour until switches are changed. This means that if during the 3-4 PM hour you want to take two breaks for local spots and then from 4-5 PM you need four breaks, someone will have to change the switches every hour.

Unattended operation

At KONY, we take the same number of breaks during the daytime, checking the unit hourly to change news sponsors during the :02 spot break.

Then, in the evening hours, we run only one local break per hour. That way we do not have to touch the unit at all until we want to add more spot breaks per hour.

Auto-Jock will restore SMN audio automatically at the exact time every time without additional signaling from a tape machine. This is accomplished through a command to fire a liner from SMN. So if your tape machine breaks down, SMN audio will return whether or not your machine has played its spots.

Override and break features

Auto-Jock also provides a spot liner override feature, which allows liners following spot breaks to be tripped by the spot cart or tape machine after spots are finished, if desired. This will allow spot breaks to last a few seconds longer without the liner playing over the end of the last spot.

Separating :02 breaks from :32 breaks, Auto-Jock allows independent control of these breaks. SMN uses a "command #2 tone" to signal both breaks, but Auto-Jock separates them and, if desired, will start two completely separate sources.

Auto-Jock separates the top of the hour IDs from other liners associated with SMN command #1, allowing them to be played on a separate machine. You could even have the time announced along with your ID on one cart.

A :00 break is provided at the top of each hour to program news from another network, spots and/or music. Again, the unit will mute SMN audio if desired after the legal ID plays and allow you to use an outside audio source to fill. The unit restores SMN audio after the liner command at :05 after the hour.

Separate control of all breaks is possible with simple multi-colored lighted toggle switches. It's so easy to understand, a child can operate it.

Auto-Jock has separate contact closures for each break and element, allowing for operations of as many or as few cart and/or tape machines as desired.

One nice feature is Auto-Jock's constantly re-chargeable battery, which keeps circuitry active for extended periods during power outages. Since the ID is interpreted by Auto-Jock through a series of timers, it is necessary to power the unit during a power failure so that a liner does not play instead of an ID at the top of the hour.

Auto-Jock brochure offers tongue-in-cheek advice to its users.

USER REPORT

Importantly, if SMN does not give you a liner command tone, you will be looking at several minutes of dead air. But, in all fairness to SMN, this is certainly more the exception than the rule.

We have been on SMN for almost a year now and I could probably count on my fingers the number of times liner commands were not done correctly. And these have not been Auto-Jock failures, but the results of human error at the network level.

We let the unit run by itself for 13 hours unattended. If you run the same number of spot breaks every hour and can put on a tape long enough to cover all your spot breaks you do take, the Auto-Jock will run indefinitely.

I have found the Auto-Jock unit to be exactly what it claims to be. It takes care of your station's audio switching needs and provides fine execution of the SMN format. The unit has paid for itself many times over in man-hour savings.

Carl Watkins has been super to work with and is very open to any suggestions on how the unit could be improved. Whenever SMN has come up with slight modifications to its clock, Mr. Watkins has always come up with the modifications necessary to keep his unit working as it was designed.

■ ■ ■

Carl Lamar has been in broadcasting since 1972. He has worked at KAFF AM/FM, KROS and KCLS in Flagstaff, AZ, and at the 50,000 watt KTNN-AM in Window Rock, AZ. Carl is now GM, morning show announcer and imminent part owner at KONY. He may be reached at 801-628-3643.

For more information on the Auto-Jock, contact Carl Watkins at 308-785-5940, or circle Reader Service 82.

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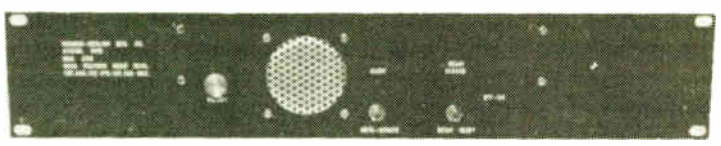

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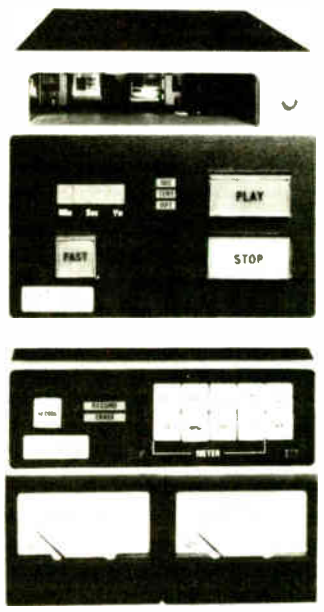

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World Radio History

System 100 Gets OK

(continued from page 44)

tomation computer for automatic copying to the system. The next day's schedule is then ready to go, the entire operation taking about 30 minutes.

Commercials are usually recorded (first generation) on reel-to-reel tape. To record the spot to the system, the operator need only input the location code of the commercial and instruct the system to prepare for recording the commercial assigned to that location code.

The computer, which is controlling what is on the air, is instructed to cue up the location on the correct tape for recording. The computer instructs the operator to put the spot tape in the record deck and the correct location is then cued.

The actual recording is handled by the System 100 production processor, which features one-touch recording of commercials and music.

For example, to record a spot to a location already prepared for recording by the computer-assisted recording system, the operator cues up the original recording on the reel-to-reel and activates the source start switch (found on the production processor) for the reel-to-reel tape machine. The next step is to check the levels and press the production processor start button.

Production processor records

The processor starts the record deck, places the cue tone on the cassette tape and automatically starts the reel-to-reel source to transfer the recording to cassette tape.

At the end of the recording, the operator presses the stop button on the production processor and the operation is completed. The system then asks if there are more spots to be recorded to this tape and the process can begin again.

I highly recommend this system to any satellite user. I would also recommend that you make heavy use of the localized satellite liners if you decide to use this system. The System 100 does an excellent job of handling these liners and sure gives you a local sound.

The price of this computer system was very low, and its reliability has been top notch. The people at Absolute Broadcast Automation have been great to work with and gave us 90 days of free phone consultation, in case we had any questions. And we did have quite a few.

I would say, however, that the biggest endorsement of this new system comes from our advertisers.

Our business has more than doubled in just three months and for the first time in many years we are getting repeat advertising buys and a lot more satisfied customers. The system will save you money and give you a competitive sound at the same time.

■ ■ ■

Editor's note: Peter E. Clark is the owner of WLQM-AM/FM. He may be reached at: 804-562-3135.

For more information on Absolute Broadcast Automation's Satellite System 100, contact Jack Mullen at: 301-786-4661, or circle Reader Service 90.

KDFC Chooses IGM SC

(continued from page 36)

After a final check of the wiring, the system was ready for air. The serial data cable was connected to the IBM PC and the software was booted. After about two minutes to load the daily playlist from the floppy disk, the system sprang to life and the Go-Carts began to search for the upcoming spots.

Flawless performance

Since that first turn-on nearly a year ago, the IGM system has operated without a single failure.

The operating software for the IGM SC is very simple to use while providing plenty of features for versatile programming. The skeleton of the program is an event file which consists of a sequential list of 2601 steps that can be saved on floppy disk.

By using special commands, it is possible to set up subroutines for typical station breaks or music rotation files. The subroutines can be called up from within the event file or by real time commands. Programming and operating commands are listed in an on-screen menu.

Other uses

Once the basic event file is created, it is only necessary to change those entries, such as the spot schedule, that differ from one broadcast day to the next.

The success of automating classical music at KDFC has encouraged us to expand our operation into other markets. We recently constructed the first commercial classical music station, KLEF, in Anchorage, Alaska.

We also installed an IGM SC system at KLEF, but with an interesting twist. Instead of having a separate programming staff in Anchorage, we duplicate the KDFC music programming in real time and send it to KLEF on 8mm digital tapes. A single 8mm tape costs less than ten dollars and will contain a full day's programming.

The task of producing the 8mm tapes with only the music portion and not the local spots and IDs is accomplished by the KDFC IGM system simultaneously with the on-air operation. The relay source card in the IGM-SW chassis is used to control the Start and Stop functions of the 8mm recorder.

Modified Sony 8mm VCRs are used as record decks. This procedure is far more efficient and cost effective than duplicating reel-to-reel tapes and the digital decks have excellent sound quality. Using this system, KLEF began operating in the black in its second month on the air.

■ ■ ■

Editor's note: Eric Steinberg may be reached at: 415-441-5332.

For more information, contact Rick Sawyer at IGM: 206-733-4567, or circle Reader Service 97.

Audiometrics at WMJX

(continued from page 43)

as he or she would start a cart.

The system can store up to 50 songs to be played and while one multi-play unit is on the air, the other unit is getting the next song cued up without the user having to even think about it. CDs can be played back-to-back on-air without having to worry about cue-up time.

The color monitor in the control room is color keyed to indicate which pot on the console the song will appear. It also gives a positive indication that the song is cued up and ready to go. All the information normally found on a cart label is on the screen before and during the time the cut is playing on the air.

Easier for talent

In addition, a visual indication of how much of the cut is left is continuously displayed in the form of a bar graph on the screen. This is handy for at a glance viewing from a distance to quickly see how much time remains in the song.

The talent is able to re-program the system, skip a song or re-play a song—all with a wave of the bar code reader wand over a simple menu that is laminated in plastic in the control room. The bar code reader was chosen because it is easy, quick and 100% accurate.

The potential also exists to program the system days in advance by directly downloading the data from the existing music library computer to the CD system's micro-computer. This would require the talent to do nothing but push the start button!

It has been two years since this CD system was installed, and I can say that both the programming department and the engineering department are happy with its success.

The system is easy to install, operate and maintain. It offers a solution to the skipping of CDs, and relieves some of the workload of the studio talent.

It also prevents the wrong songs from being played, and the right ones from getting lost. And most importantly, it works reliably and increases the station's technical quality.

■ ■ ■

Paul Shulins is a 14-year broadcasting veteran, having worked at WBOS in Boston as well as at WPXY in Rochester, NY. He may be reached at 617-542-0241.

For more information on the AMCDS 1000A, contact Dave Burns at Allied Broadcast Equipment: 317-962-8596, or circle Reader Service 88.

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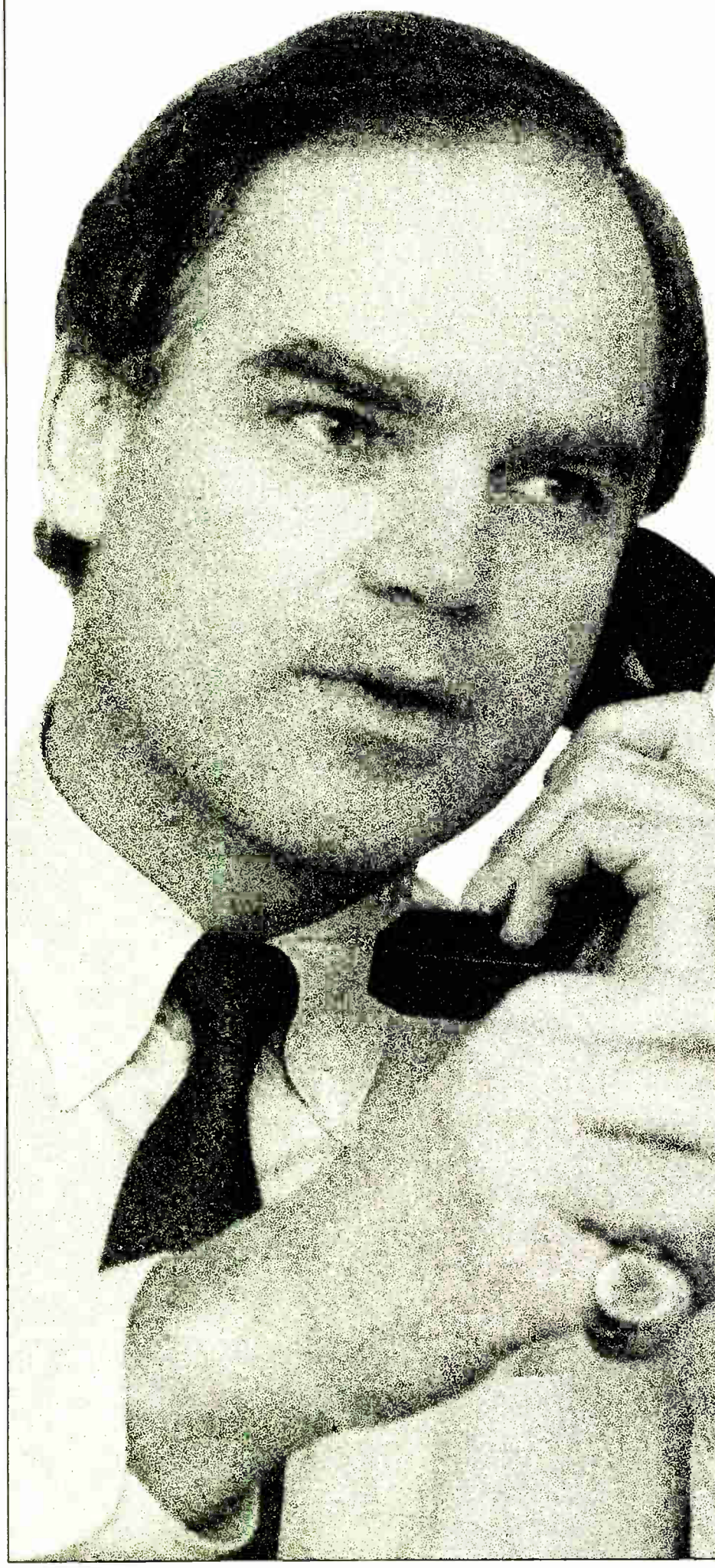

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