Radio World®

Vol 13, No 24 Radio's Best Read Newspaper December 27, 1989

FCC Letter OKs ModMinder

OET Says Pre-1983 Rules Are Adequate

by Judith Gross

Washington DC Confusion over new technology in measuring modulation—which has been voiced more in industry undercurrents than in open debate—should be cleared up as a result of a letter from the FCC's Office of Engineering & Technology.

The questions were sparked by the development of ModMinder™ by Modulation Sciences Inc. The new modulation monitor has found a home in a number of FM stations with engineers reporting that they have cut back on processing with no tradeoff in loudness.

ModMinder, according to Eric Small, VP of Engineering for MSI, provides more precise measuring of peaks based on the FCC's pre-1983 rules which required an FCC type-approved monitor. After 1983, modulation monitors were no longer required to be type-approved.

Ignores transient peaks

Small says ModMinder ignores the very brief peaks that last less than one millisecond and that as a result stations can generally increase modulation by as much as 1-4 dB over modulation measured on other monitors. ModMinder complies with the pre-1983 rules for type acceptance of monitors, according to Small.

Questions about ModMinder's use centered on whether the FCC considers it a valid way to monitor compliance with modulation rules.

In a letter to MSI, Dr. Thomas Stanley, the FCC's Chief Engineer stated that "If the equipment does indeed meet the pre-1983 technical requirements . . . I ex-

(continued on page 15)

The new KDHT on the air . . .

See Facilities Showcase page 23.

Bush Taps Duggan

by Charles Taylor

Washington DC The White House has nominated Washington communications consultant Ervin Duggan to fill the fifth and final vacancy on the FCC.

Duggan's nomination came as a surprise to most, because he is not well known in broadcasting circles. However, reaction to his nomination generally was favorable.

He is regarded as a Democrat with traditional family values, a plus to the Bush Administration's concern about indecency over the airwaves. And because of his experience in journalism, his views are seen as balanced with an appreciation for the First Amendment.

Duggan, since 1980, has been a communications consultant with Ervin S. Duggan Associates, a Washington firm that concentrates on speeches, articles, reports and congressional testimony, according to published descriptions.

He also has been a reporter at *The Washington Post* and national editor of *Washingtonian* magazine and a speech writer for President Johnson's Adminstration. Duggan served in the Carter Administration as special assistant to the secretary of Health, Education and Welfare.

Duggan would fill the commission seat vacated by Patricia Diaz Dennis, whose term expired 30 June. His term would run five years.

NEC Suspends Some US Equipment Sales

by Alan Carter

Melville NY NEC America suspended sales and marketing of TV transmitters and studio equipment effective 1 December, according to a company spokesperson.

To maintain and service existing transmitters and studio equipment in stations, NEC transferred the Broadcast Equipment Department to the Radio Group. It will remain in Richardson, TX. The department will focus on inventory control for equipment and parts, and customer service.

Termed a restructuring of the Broadcast Equipment division, the industrial camera line was transferred to the Professional Products group of NEC Technologies based in Wood Dale, IL, said NEC Corporate Communications Director Lourdes Cogswell.

Positions eliminated include sales director, held by Joe Engle, and sales positions, one in Virginia and another in New Jersey, Cogswell said. Industrial camera Sales Manager Jim Trumpp was transferred to NEC Technologies, according to Technologies spokesperson Lyn Corbett Fitzgerald.

The restructuring is a result of a change in the video marketplace and growth outside traditional broadcast toward corporate, industrial and production applications, Cogswell said. In early 1990, a new department will be established for application software development, with an aspect being video production houses, she said.

(continued on page 8)

News Briefs

Motorola Claim Rejected

Chicago IL A federal judge here has rejected Motorola's plea that the court settle the feud over AM stereo patent infringement between Leonard Kahn and Motorola.

Motorola filed a countersuit in Chicago to a patent infringement suit by Kahn in New York against General Motors. GM uses Motorola integrated circuits in AM stereo car radios.

The judge ruled that Motorola was not infringed by the New York suit, according to a Motorola attorney.

With the Chicago case settled, the New York suit by Kahn will continue. The New York case was put on hold until the Chicago suit was resolved.

US Marshals Seize Pirate Radio Station

Brooklyn NY As part of a continuing effort to shut down pirate radio broadcasters, US marshals and FCC staff seized equipment belonging to a pirate station here on 9 November.

The equipment, housed in Borough Park, was used to operate an unlicensed station on 91.9 MHz under the illegal call sign WJPL, according to the FCC. Another Brooklyn pirate station, WHOT, was shut down in July.

The FCC has closed in on several pirate high frequency radio stations this year operated on 7415 kHz: WNPR, Massapequa, NY, and WENJ, New Brunswick, NJ.

Penalties for unlicensed radio operations include seizure of the equipment, fines of up to $100,000 and/or one year in prison for the operators.

Radio Nets Ads Down

New York NY The steady decline of network radio listening since 1985 has caused network radio advertising to perform poorly in recent years, falling in 1987 and gaining only 1.7% in 1988, according to the seventh annual Communications Industry Report.

The report, released by the investment brokerage firm of Veronis, Suhler & Associates Inc., also stated that AM is rapidly losing ground to FM. "In 1988, FM constituted 75.7% of total radio listening, compared to 69.4% in 1984 . . . ," said John Suhler, president of the firm.

The report examines the historical, financial performance of 275 publicly reporting companies in 10 segments of the communications industry: radio and TV broadcasting, cable TV, filmed entertainment, recorded music, newspaper, book and magazine publishing, business information, advertising agencies and miscellaneous communications.

Revenues for publicly reporting broadcasting companies rose 9.3% in 1988, despite below average growth in other key areas and revenues for the three national network companies totaled 60.7% of total broadcasting segment revenue, according to the report.

For information from Vernois, Schuler & Assoc., contact Andrew Hornick at 212-935-4990.

One-To-A-Market Rule Waiver

Philadelphia PA The FCC granted a permanent waiver of its one-to-a-market rule in Philadelphia, allowing for the transfer of control of WMMR-FM from Sillerman-Magee Communications Management Corp. to Group W Radio Acquisition Co., a subsidiary of Westinghouse Broadcasting.

The waiver was necessary because Westinghouse already owns and operates KYW-TV through its Group W Television and KYW-AM through Group W Radio.

The Commission concluded that in multiple ownership proceedings, it would look favorably upon waiver requests involving radio and television station combinations in the top 25 television markets where there will be at least 30 separately owned, operated and controlled broadcast licensees after the proposed combination.

Index

NAB to Push Certification Mark

by John Gatski

Washington DC The NAB hopes to begin an aggressive promotion this year of the nearly completed NAB/Electronic Industries Association (EIA) AM receiver certification mark.

According to NAB AM Receiver Manufacturer Liaison Task Force Chairman Ted Snider, the NAB and EIA hope to reach agreement on certification mark parameters by early 1990 and begin promoting quality AM radio through member station spots.

The agreement on a certification mark has been a primary goal of the task force since it was formed in March 1989, Snider said.

The NAB and EIA met in July and officially decided to come up with an AM receiver certification mark with technical criteria recommended by the National Radio Systems Committee (NRSC). Discussions have been ongoing for several years on such a designation for improved AM radios.

Task force creation

EIA Executive Engineering Director George Hanover said the NRSC is not empowered to approve the certification mark, which led to the agreement by the NAB AM Receiver Liaison Task Force and EIA to develop the mark and promote its use.

The task force will lobby for support of the mark through broadcasters and manufacturers, Snider noted.

"We want to make the certification mark a household word as soon as we can," he said.

The certification mark's main criteria, based on NRSC meeting discussions, will include a minimum bandwidth of 50 Hz to 7.5 kHz, which Snider said would enhance sound quality significantly to listeners.

"We want to make the certification mark a household word as soon as we can . . ."

Nationwide promotion

Snider said promotion of the certification mark campaign will involve asking hundreds of stations to promote quality AM through as many as 30 to 50 spots a week and getting manufacturers to go along with it.

"Our first task is to get the radio stations to commit to it," Snider said.

NAB Science and Technology VP Michael Rau said the procedures for administration, eligibility and whether royalty fees will be charged for the certification mark have yet to be worked out by the NAB and EIA.

Snider said manufacturers have been receptive to the task force's efforts, but in some areas they do not agree, especially on AM stereo.

In initial NRSC deliberations of AM receiver specifications, inclusion of AM stereo was listed as an option for certification criteria, but later was dropped as was a suggestion to have automatic bandwidth control.

The NAB now is concentrating its AM stereo efforts on a congressional bill that would require AM stereo in receivers with FM stereo, a move which manufacturers and EIA vehemently oppose.

Manufacturers believe government should not legislate technical features in electronic products. The NAB has said requirement of AM stereo would enhance the technology's chances for survival.

Despite areas of disagreement, Snider said manufacturers at the NRSC meetings appear receptive to a certification mark for AM receivers.

Panasonic Audio Information Systems Division Assistant Director Robert Finger said the company generally supports the efforts of NAB and EIA to come up with a certification mark.

Studying costs

He said the company's engineering division is studying the cost estimates of the proposed specifications as they would apply to current and future models.

He said meeting the certification mark probably would not be cost effective for some models and the decision to designate products for certification will be made on a "product-by-product basis" for Panasonic.

Denon America, which has already produced a prototype NRSC radio, has also voiced support for the certification mark.

With plans to market a radio early in 1990, Denon has said it would adapt its design to meet the specifications of the mark once it is established.

For information about the AM certification mark, contact Ted Snider at 501-661-7510, NAB Science & Technology at 202-429-5346 or Robert Finger at Panasonic, 201-348-7768.

The (Yawn) '80s: It's a Wrap

by Judith Gross

Falls Church VA Yikes! It's not only the end of the year already, it's the end of the **entire decade**.

And, not to depress you or anything, but here we are plunging headlong into the very last ten years of the 20th century.

It will probably be, oh, along about April until I get used to writing **1990** on the checks and all. But wait until **2000**. All those zeros are gonna make me dizzy.

Remember back in grade school when **Mrs. Fernwhistle** started to predict what things would be like by the year 2000? We were supposed to have **monorails**, computers surgically implanted in our brains and men on **Jupiter**.

There's no predicting the march of technology, sometimes. 'Course, who'da guessed we'd have **digital satellite delivery, optical disks** and **super-conductors**? Not to mention talking car dashboards, aspartame sweeteners and caffeine-free cola?

By now you're all no doubt perusing these words of wisdom in between **holiday partying**, so kick back, take off those snow boots (sandals in California) and cozy up with a hot toddy while I clean out my IN box for the year.

We'll have plenty of time to get back down to the **serious issues** of the industry in January.

☆☆☆

I'm only going to say one thing about the whispers of controversy over **Modulation Sciences' ModMinder**. The FCC's OET letter should settle it, OK?

Special radio formats for AM were the hot fad at the start of the year, but they're fizzling of late. Seems it's a mite tougher to pull in the ad dollars than first thought.

So gone are **KPAL's kiddie format** out of Arkansas; it's a two-and-a-half-hour show each day instead, now. And gone is "all-motivation" radio from **WMMW**, Meriden, CT. Guess motivation is no substitute for entertainment.

But hope springs eternal. **All-business** seems to be doing OK in some markets. And here's a nifty one I was thinking about while driving through unfamiliar terrain recently.

How about "**Tourist Radio**?" You know, you're cruising along, away for the weekend and you get to your destination. So maybe it's not the hottest **resort spot** in the world. You'd still like to know where to go to eat, what to do when you have an hour or two before check-in and is there anything you shouldn't miss?

Ron Crider must have read my mind. He's already got it going on **KSPN** in Vail, CO, with plans to expand it to other spots around the country. I like it.

Was up in Baltimore again recently, guesting on **Tom Dantoni's** show on the

American Radio Network for an encore stint. Nice to know that folks not necessarily in the radio biz want to get the inside **technical scoop**; we had a number of callers.

And, best of all, I got to go back to the **Sip 'N Bite** down by the waterfront.

☆☆☆

I get lots of mail I don't get around to during the year. From **Jim Arcaro**, Director of Education for the Electronic Servicing Institute in Euclid, OH comes word of Cuba's **Radio Taino** blasting WWWE on 1100, in addition to stations on 830, 1040 and 1160.

The blasting is in apparent retaliation for our own **Radio Marti** and an article in the Cleveland *Plain Dealer* said Radio Taino's power is estimated at 300 kW.

My ole pal **Dave Solinske**, who

New look for the '90s: Boom Ball

preceded me at **WINR** in beautiful Binghamton, NY then went on to greener (but not necessarily more idyllic) pastures faxed me an unusual idea.

Drawing on the ingenuity of Gerry Turro, who got his Joisey county officials to declare a **state of emergency** so he could keep his translator going, Dave says why not a **state of emergency for AM**?

What he suggests are **Emergency Communications Acts** in each state which would mandate AM on radios with FM (similar to a bill currently before Congress) *and* mandate high fidelity. Basis for the emergency declaration? How 'bout AM's **public safety role** in Hurricane Hugo and the 'Frisco quake aftermaths? Also, the EBS.

Dave says the precedent has been set on a state level with **emissions standards acts** in California and New England, which got car manufacturers to include the standards in their designs. They didn't want to have to build cars differently for each region. What do you think, could it work?

Craig Gill, engineering student and SBE member out of Indianapolis (where it don't rain in the summertime if God didn't make little green apples) wanted me to consider him for most **eccentric engineer**.

Well, I think he's got some competition there, but Craig says he qualifies and as proof he offers the fact that sitting in his **living room** is an AM transmitter, a 3500 W. Hmmmm. Not only that, but transformers, carts and feed-line monitors are in the **dining room** with more transformers and broadcast boards in the **living room**.

And I didn't want to ask what was in the bedroom.

All right. You've had it with the boom box. That's last year's craze, yesterday's news, ancient history. Now, from **Fun Products** out of (where else?) Berkeley, CA, comes **Switch-It™**. It's a **boom ball**.

As you can see from the photo, it's a radio in a plastic shell, multicolored internal components, a headphone adapter and a necklace that doubles as an **antenna**.

Oh yes. It's been under development for three years, retails for about $40. Well, at least it's **AM and FM**. Quite attractive, huh? You'd wear one to that next SBE dinner, wouldn't you?

OK, so maybe you wouldn't. I just wanted an excuse to run the photo of it being modeled by **Mr. Muscles**, whose physique is typical of most radio engineers I've met. (All that heavy lifting of transmitters sure pays off.)

Not long ago **SBE Chapter 43** out of Sacramento reported on a new gimmick which will get you out of that **awkward encounter** with your mother-in-law, the blind date from hell and boring panels at the NAB convention.

Omega Contract Design in (also where else?) Sunset Beach, CA, is marketing a **pseudo-beeper** which you can set off at will, but secretly. Twenty seconds later the beeper beeps, you put on an apologetic face and bam! Yer outta there.

And I'm outta here. But before I sign off for **1989**, may **1990** bring you fewer trade shows, an end to all "wars" including AM stereo standards and loudness and nary a mention of **Scott Shannon**.

And may it be the year we (finally) don't have to beat the **receiver manufacturers** over the head to get better quality radios.

See ya next decade.

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

Praise for Ongoing Efforts of the NRSC

by Charles T. Morgan

York PA This is written in response to a previous editorial in **Radio World** and I speak not on behalf of the NRSC but as an individual who is concerned about our Radio Industry and its future.

I have served as Chairman of the National Radio Systems Committee since it was reinstated for the purpose of bringing broadcasters and receiver manufacturers together in an effort to reach an accord on joint improvement of our system of AM broadcasting.

The NRSC standard was the result of this committee's work. This standard has been adopted by the broadcast industry and we anticipate seeing NRSC receivers in the marketplace in the near future.

GUEST EDITORIAL

Yes, these receivers are slow in coming but we knew up front that the time lag between design concept and the marketplace was several years for any receiver manufacturer. For competitive reasons, manufacturers are generally tight-lipped concerning their plans and although some are proceeding in the development of these receivers, others have not yet begun the process. By focusing NRSC efforts on the development of a certification mark, it is hoped to attach additional value to the development of NRSC receivers.

More recently, the NRSC has directed its attention to FM. FM may not be broken, yet; but it can use improvement in certain areas and preventive maintenance in others. One of the main areas where improvement is needed is in the control or reduction of artifacts that are associated with multipath. Although a field study has been conducted by WAEB, Allentown, PA and a report on such tests is expected to be submitted to the NRSC, the committee decided to conduct its own test in a controlled laboratory type environment.

These tests, which are planned for January, will utilize a multiplex filter, transmission line, matching unit and a simulated multi-bay antenna connected to receiving equipment through a simulated and controlled environment.

These tests, which to the committee's knowledge have never been attempted before, will investigate the effect of multi-bay addition and bandwidth when connected directly to the receiver or through multipath conditions that can be varied in both phase and amplitude. In this controlled environment, it is hoped to learn the effects and limitations of everything between the transmitter output and the receiver input.

Questions that may be answered are the real effect of system bandwidth, group delay, incidental AM noise reduction, VSWR, etc. These tests can be conducted with normal stereo, SCAs, FMX or any form of composite modulation.

Another area of interest for the NRSC is its Composite Spectrum Working Group which is looking at composite bandwidth in both the transmitting and receiving systems and how they relate to adjacent channel interference. This committee's work is just beginning and two papers submitted to this subgroup have already developed some controversy.

One paper deals with the concern on the part of a receiver manufacturer that excessive occupied bandwidth is affecting receiver performance and may necessitate the narrowing of receiver IF.

The other paper is concerned with excessive bandwidth and distortion resulting from improper or excessive processing. Should these papers stand alone to provide our future direction? Of course not, but they do tell us that we should take a closer look at these potential problems. This reminds me of the problem in AM when we kept increasing the highs as the receiver manufacturers kept narrowing the bandwidth.

The NRSC is the proper forum to look at the state of the industry and try to evaluate where we are headed and I believe that now is the time to address these problems before FM takes the same path as AM. Some of the input we receive will be conflicting but it should all be put on the table and evaluated in an open forum and this is what the NRSC offers.

On the other hand, we could disband the NRSC and bury our heads in the sand only to look up in a few years to live in a world of narrowband FM.

■ ■ ■

Charles Morgan is VP/Engineering for Susquehanna Radio Corp. and chairman of the NRSC. He can be contacted at 717-848-5500.

Radio World
Vol 13, No 24 December 27, 1989

Editor, Judith Gross
Associate Editor, Alex Zavistovich
Buyers Guide Editor, Richard Farrell
News Editor, Alan Carter
Reporters, Charles Taylor, John Gatski
Benn Kobb, Frank Beacham/L.A.
Editorial Assistant, Robyn Rosenthal
Technical Advisor, Tom McGinley

Production Director, Judith Chamberlain
Production Manager, Jeanne Pearson
Kim Lowe, James Gillgam,
Bill Spencer

Publisher, Stevan B. Dana
Associate Publisher, Arthur Constantine

Ad Coordination Manager, Simone Leeser
Circulation Manager, Tiana Hickman
Accounts Receivable, Caroline Freeland

Advertising Sales Representatives:
East/Midwest, Art Constantine
800-336-3045, Fax: 703-998-2966
West Coast, Pat Macsata
415-786-2198, Fax: 415-786-2754

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

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

As 1990 approaches it's appropriate to assess not only the end of the year but also the end of a decade.

While the past ten years saw some dramatic swings in technology and business, 1989 was not a ground-breaking year.

Reflecting healthly radio broadcasters, 1989 saw increased sales of equipment and became one more year contributing to an overall picture of industry growth.

This year saw a new FCC take power and begin its first steps toward technical policy-making. But since one seat remains to be filled, the Sikes FCC has yet to set a tone for future action.

Ahead To The 1990s

In the past year, like the decade, both the benefits and pitfalls of deregulation were reflected in the economy.

While a relaxed regulatory climate helped spark more diversity in the area of equipment, it also contributed to making the radio station an investment commodity, an effect the industry is still trying to evaluate.

Radio's unique past and place in the growing telecommunications field has also managed to keep open opportunities that have disappeared in other fields.

While big corporations certainly play a role both in station ownership and equipment sales, radio is still an industry where an engineer with a good idea can make a go of it. Small vendors still have a chance for success.

As we move into the next decade, there are still important issues ahead.

The industry must find a way to attract a new generation of qualified engineers instead of allowing technical talent to be siphoned off into other fields.

The development of new technology must be encouraged by those willing to risk the time and resources.

And finally, management must become more sensitive to engineers' concerns even as engineers become better able to communicate those concerns.

In meeting those challenges the entire radio industry will be able to reap the benefits of its growth as it retains the uniqueness which has kept listeners tuned in for over six decades.

—RW

Solid State For FM Is Already Reality

Editor's note: This guest editorial is in reply to the **RW** *Buyers Guide overview of FM solid state transmitters which appeared in the 22 November issue.*

by Harold Rabinowitz

Louisville CO Do we really need solid-state FM transmitters? This question, being posed of late in broadcast engineering circles, had its origins in the '60s when the question was: Do we really need solid state audio amplifiers?

GUEST EDITORIAL

The same question sprang to life in the early '80s when solid state AM transmitters made their debut, then died the death it deserved when it became apparent that the answer was: yes!

Medium power is here now

Third time's a charm they say, or is it three strikes and you're out? Once more the same question has made a defiant claim in favor of antiquity, when the competition is already decided: solid state FM transmitters are here in a big way. They've established a beach head and are now setting about claiming all the territory they can.

Television Technology Corp.'s newly developed solid-state FMS series transmitters were introduced into the marketplace last September and are selling so strongly that TTC intends increasing its manufacturing rate from ten to 20 units per month, commencing in January 1990.

One reason for the surge in business is a recent FCC authorization allowing Class A FM stations to double their operating power. The new FMS units represent an ideal package for stations which operate between 1-8 kW of power.

Acceptance of the new units is not limited to the US alone. Transmitters have already been delivered to Canada, Ireland, Korea, Spain, Thailand and Venezuela. The Irish order for seven 8 kW transmitters and five smaller models is the largest single order to date.

What's the risk of buying now?

No one wants to be the beta test site guinea pig for an equipment manufacturer. Conversely, if a new product uses already-proven technology, who wants to buy yesterday's transmitter and be stuck using it for the next 20 years?

FM solid-state technology is well-proven, having cut its teeth on both low and high power VHF TV transmitters, which have been installed in record numbers worldwide.

Solid state TV transmitters were the first to appear, since TV stations are accustomed to spending significantly larger dollars for a transmitter and were

(continued on page 16)

Next Issue RW Jan. 10, 1990

FROM THE TRENCHES

by Alan Peterson

Hey, It's "Only" AM

Dear *JG*:

The past month has found me on the road on my days off, visiting radio stations all over New England just to "look the place over." You know how it is—"busman's holiday," right? Get a day off from the station, spend it at a station. I'll never learn.

Anyway, at one particularly nice operation, I'm hanging out in production with an up-and-coming superblade (who's been reading my letters to you in RW). He's flying on the edit block and we're talking a little shop when he stops me dead in my tracks, horrified.

His fully-produced spot—painstakingly mastered at 15 ips on a fresh reel of Ampex 456 and transferred to a crisp new Scotchcart—was dubbed cart-to-cart onto one of the old gray jobs with dead pads and rattle to spare. "That's the AM dub," he explained. Once I regained a little composure, I asked what the difficulty was in making a single generation dub from reel to another Scotchcart.

You'd think it would have been a case of the creeping lazies on his part (happens to all of us) . . . but noooo. He throws up his hands and says "What for? *It's only AM*!"

I almost bit the console in half.

Wouldn't you think this could have been a case of isolated thinking? I had hoped so myself, until I encountered the folks that just jazzed up the FM side with an Arrakis board, a phase-corrector for carts, a CD deck and a spatial enhancer (What? No MIDI? Guess I can't expect miracles *all* the time).

And right across the hall sat the poor schmo behind the Sparta Dittydesk with two vintage slamcrash cart machines, airing some forgettable format that couldn't catch flies, much less listeners. Why?

"Why not? It's only AM."

AAARRGGH!

Haven't you, in your travels Jude, been just a little disillusioned by the thrown-together sound of many AMs across the USA? We have a mere handful of days left before the '80s "are taillights." Where will the '90s take us?

We have just gotten a boost by some enlightening conferences as to the future of AM radio. Programming for talk, news and info and *yes*, music is becoming more refined and is offering more choices for the AM station manager and the listener.

Technologically superior radios have been designed and some beauties have been built (Bu-ry my heart in Moon-achie . . . our pals at Target Tuning and all that). It is genuinely exciting.

It is genuinely frustrating, too. All this progress going on and the folks in the stations are shooting themselves in the foot. The folks who just won't make it happen; the jock who's just going through the motions 'til the FM gig (*any* FM gig) comes along.

Everytime I've reported to you from the frontline I've always tried to enclose an idea or two, a suggestion that a clever broadcaster could use as a springboard. I find it awkward, but I can't offer anything for this one. All the answers are already out there.

1990 is so close now the glasses are in training to be "clinked." My New Year's resolution is to help my fellow broadcasters here in New England replace "aw, it's only AM" with "hey let's make it sound good—it's AM."

There's nothing so bad about that, is there? I mean, America starts with an "A" and an "M." That's good enough for me.

Have yourself a merry and a happy. And don't overdo the celebrating.

—Al

■ ■ ■

Al Peterson splits his time at the frontlines between WSBS, Great Barrington and WHYN, Springfield, MA. Both stations are highly-rated AMs. Drop Al any leftover holiday food and spirits to **RW**. *Write P.O. Box 1214, Falls Church, VA 22041.*

Praise for Ongoing Efforts of the NRSC

by Charles T. Morgan

York PA This is written in response to a previous editorial in **Radio World** and I speak not on behalf of the NRSC but as an individual who is concerned about our Radio Industry and its future.

I have served as Chairman of the National Radio Systems Committee since it was reinstated for the purpose of bringing broadcasters and receiver manufacturers together in an effort to reach an accord on joint improvement of our system of AM broadcasting.

The NRSC standard was the result of this committee's work. This standard has been adopted by the broadcast industry and we anticipate seeing NRSC receivers in the marketplace in the near future.

GUEST EDITORIAL

Yes, these receivers are slow in coming but we knew up front that the time lag between design concept and the marketplace was several years for any receiver manufacturer. For competitive reasons, manufacturers are generally tight-lipped concerning their plans and although some are proceeding in the development of these receivers, others have not yet begun the process. By focusing NRSC efforts on the development of a certification mark, it is hoped to attach additional value to the development of NRSC receivers.

More recently, the NRSC has directed its attention to FM. FM may not be broken, yet; but it can use improvement in certain areas and preventive maintenance in others. One of the main areas where improvement is needed is in the control or reduction of artifacts that are associated with multipath. Although a field study has been conducted by WAEB, Allentown, PA and a report on such tests is expected to be submitted to the NRSC, the committee decided to conduct its own test in a controlled laboratory type environment.

These tests, which are planned for January, will utilize a multiplex filter, transmission line, matching unit and a simulated multi-bay antenna connected to receiving equipment through a simulated and controlled environment.

These tests, which to the committee's knowledge have never been attempted before, will investigate the effect of multi-bay addition and bandwidth when connected directly to the receiver or through multipath conditions that can be varied in both phase and amplitude. In this controlled environment, it is hoped to learn the effects and limitations of everything between the transmitter output and the receiver input.

Questions that may be answered are the real effect of system bandwidth, group delay, incidental AM noise reduction, VSWR, etc. These tests can be conducted with normal stereo, SCAs, FMX or any form of composite modulation.

Another area of interest for the NRSC is its Composite Spectrum Working Group which is looking at composite bandwidth in both the transmitting and receiving systems and how they relate to adjacent channel interference. This committee's work is just beginning and two papers submitted to this subgroup have already developed some controversy.

One paper deals with the concern on the part of a receiver manufacturer that excessive occupied bandwidth is affecting receiver performance and may necessitate the narrowing of receiver IF.

The other paper is concerned with excessive bandwidth and distortion resulting from improper or excessive processing. Should these papers stand alone to provide our future direction? Of course not, but they do tell us that we should take a closer look at these potential problems. This reminds me of the problem in AM when we kept increasing the highs as the receiver manufacturers kept narrowing the bandwidth.

The NRSC is the proper forum to look at the state of the industry and try to evaluate where we are headed and I believe that now is the time to address these problems before FM takes the same path as AM. Some of the input we receive will be conflicting but it should all be put on the table and evaluated in an open forum and this is what the NRSC offers.

On the other hand, we could disband the NRSC and bury our heads in the sand only to look up in a few years to live in a world of narrowband FM.

■ ■ ■

Charles Morgan is VP/Engineering for Susquehanna Radio Corp. and chairman of the NRSC. He can be contacted at 717-848-5500.

Radio World®
Vol 13, No 24 December 27, 1989

Editor, Judith Gross
Associate Editor, Alex Zavistovich
Buyers Guide Editor, Richard Farrell
News Editor, Alan Carter
Reporters, Charles Taylor, John Gatski
Benn Kobb, Frank Beacham/L.A.
Editorial Assistant, Robyn Rosenthal
Technical Advisor, Tom McGinley

Production Director, Judith Chamberlain
Production Manager, Jeanne Pearson
Kim Lowe, James Gillgam,
Bill Spencer

Publisher, Stevan B. Dana
Associate Publisher, Arthur Constantine

Ad Coordination Manager, Simone Leeser
Circulation Manager, Tiana Hickman
Accounts Receivable, Caroline Freeland

Advertising Sales Representatives:
East/Midwest, Art Constantine
800-336-3045, Fax: 703-998-2966
West Coast, Pat Macsata
415-786-2198, Fax: 415-786-2754

Radio World (ISSN: 0274-8541) is published semimonthly by Industriol Morketing Advisory Services, Inc., 5827 Columbio Pike, Suite 310, Folls Church, VA 22041. Phone: 703-998-7600, Fox: 703-998-2966. Second-closs postoge rotes is poid ot Folls Church VA 22041 ond odditionol moiling offices. POSTMASTER: Send 3579 forms ond oddress chonges to Rodio World, P.O. 8ox 1214, Folls Church VA 22041.

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

As 1990 approaches it's appropriate to assess not only the end of the year but also the end of a decade.

While the past ten years saw some dramatic swings in technology and business, 1989 was not a ground-breaking year.

Reflecting healthly radio broadcasters, 1989 saw increased sales of equipment and became one more year contributing to an overall picture of industry growth.

This year saw a new FCC take power and begin its first steps toward technical policy-making. But since one seat remains to be filled, the Sikes FCC has yet to set a tone for future action.

Ahead To The 1990s

In the past year, like the decade, both the benefits and pitfalls of deregulation were reflected in the economy.

While a relaxed regulatory climate helped spark more diversity in the area of equipment, it also contributed to making the radio station an investment commodity, an effect the industry is still trying to evaluate.

Radio's unique past and place in the growing telecommunications field has also managed to keep open opportunities that have disappeared in other fields.

While big corporations certainly play a role both in station ownership and equipment sales, radio is still an industry where an engineer with a good idea can make a go of it. Small vendors still have a chance for success.

As we move into the next decade, there are still important issues ahead.

The industry must find a way to attract a new generation of qualified engineers instead of allowing technical talent to be siphoned off into other fields.

The development of new technology must be encouraged by those willing to risk the time and resources.

And finally, management must become more sensitive to engineers' concerns even as engineers become better able to communicate those concerns.

In meeting those challenges the entire radio industry will be able to reap the benefits of its growth as it retains the uniqueness which has kept listeners tuned in for over six decades.

—RW

Solid State For FM Is Already Reality

Editor's note: This guest editorial is in reply to the **RW** *Buyers Guide overview of FM solid state transmitters which appeared in the 22 November issue.*

by Harold Rabinowitz

Louisville CO Do we really need solid-state FM transmitters? This question, being posed of late in broadcast engineering circles, had its origins in the '60s when the question was: Do we really need solid state audio amplifiers?

GUEST EDITORIAL

The same question sprang to life in the early '80s when solid state AM transmitters made their debut, then died the death it deserved when it became apparent that the answer was: yes!

Medium power is here now

Third time's a charm they say, or is it three strikes and you're out? Once more the same question has made a defiant claim in favor of antiquity, when the competition is already decided: solid state FM transmitters are here in a big way. They've established a beach head and are now setting about claiming all the territory they can.

Television Technology Corp.'s newly developed solid-state FMS series transmitters were introduced into the marketplace last September and are selling so strongly that TTC intends increasing its manufacturing rate from ten to 20 units per month, commencing in January 1990.

One reason for the surge in business is a recent FCC authorization allowing Class A FM stations to double their operating power. The new FMS units represent an ideal package for stations which operate between 1-8 kW of power.

Acceptance of the new units is not limited to the US alone. Transmitters have already been delivered to Canada, Ireland, Korea, Spain, Thailand and Venezuela. The Irish order for seven 8 kW transmitters and five smaller models is the largest single order to date.

What's the risk of buying now?

No one wants to be the beta test site guinea pig for an equipment manufacturer. Conversely, if a new product uses already-proven technology, who wants to buy yesterday's transmitter and be stuck using it for the next 20 years?

FM solid-state technology is well-proven, having cut its teeth on both low and high power VHF TV transmitters, which have been installed in record numbers worldwide.

Solid state TV transmitters were the first to appear, since TV stations are accustomed to spending significantly larger dollars for a transmitter and were

(continued on page 16)

Next Issue RW Jan. 10, 1990

FROM THE TRENCHES

by Alan Peterson

Hey, It's "Only" AM

Dear *JG*:

The past month has found me on the road on my days off, visiting radio stations all over New England just to "look the place over." You know how it is—"busman's holiday," right? Get a day off from the station, spend it at a station. I'll never learn.

Anyway, at one particularly nice operation, I'm hanging out in production with an up-and-coming superblade (who's been reading my letters to you in RW). He's flying on the edit block and we're talking a little shop when he stops me dead in my tracks, horrified.

His fully-produced spot—painstakingly mastered at 15 ips on a fresh reel of Ampex 456 and transferred to a crisp new Scotchcart—was dubbed cart-to-cart onto one of the old gray jobs with dead pads and rattle to spare. "That's the AM dub," he explained. Once I regained a little composure, I asked what the difficulty was in making a single generation dub from reel to another Scotchcart.

You'd think it would have been a case of the creeping lazies on his part (happens to all of us) . . . but noooo. He throws up his hands and says "What for? *It's only AM*!"

I almost bit the console in half.

Wouldn't you think this could have been a case of isolated thinking? I had hoped so myself, until I encountered the folks that just jazzed up the FM side with an Arrakis board, a phase-corrector for carts, a CD deck and a spatial enhancer (What? No MIDI? Guess I can't expect miracles *all* the time).

And right across the hall sat the poor schmo behind the Sparta Dittydesk with two vintage slamcrash cart machines, airing some forgettable format that couldn't catch flies, much less listeners. Why?

"Why not? It's only AM."

AAARRGGH!

Haven't you, in your travels Jude, been just a little disillusioned by the thrown-together sound of many AMs across the USA? We have a mere handful of days left before the '80s "are taillights." Where will the '90s take us?

We have just gotten a boost by some enlightening conferences as to the future of AM radio. Programming for talk, news and info and *yes*, music is becoming more refined and is offering more choices for the AM station manager and the listener.

Technologically superior radios have been designed and some beauties have been built (Bu-ry my heart in Moon-achie . . . our pals at Target Tuning and all that). It is genuinely exciting.

It is genuinely frustrating, too. All this progress going on and the folks in the stations are shooting themselves in the foot. The folks who just won't make it happen; the jock who's just going through the motions 'til the FM gig (*any* FM gig) comes along.

Everytime I've reported to you from the frontline I've always tried to enclose an idea or two, a suggestion that a clever broadcaster could use as a springboard. I find it awkward, but I can't offer anything for this one. All the answers are already out there.

1990 is so close now the glasses are in training to be "clinked." My New Year's resolution is to help my fellow broadcasters here in New England replace "aw, it's only AM" with "hey let's make it sound good—it's AM."

There's nothing so bad about that, is there? I mean, America starts with an "A" and an "M." That's good enough for me.

Have yourself a merry and a happy. And don't overdo the celebrating.

—Al

■ ■ ■

Al Peterson splits his time at the frontlines between WSBS, Great Barrington and WHYN, Springfield, MA. Both stations are highly-rated AMs. Drop Al any leftover holiday food and spirits to **RW**. *Write P.O. Box 1214, Falls Church, VA 22041.*

NAB Withholds Show Numbers

by Alan Carter

Washington DC The NAB Exhibitors Advisory Committee has made two official requests for demographics on exhibit attendance at the annual show, but the NAB refuses to turn over the information.

The committee first asked for the information at a 1 June meeting and most recently on 13 November when the group was in Atlanta for a site visit in preparation for the 1990 convention, said committee Chairman John Phelan, director of technical markets for Shure Brothers. The two official notices are in addition to private requests from individual exhibitors.

"We can't hold a gun to their head and force them to give it to us," Phelan said. "I certainly would like to know who I'm dealing with."

Several other members of the exhibitors committee expressed similar concern.

Why not NAB

"I know of no major show that doesn't give demographics," said Allied National Marketing Manager Dave Burns. "Are they afraid of the bad publicity?"

The breakdown on attendance that is available, as well as observations of badges on the exhibit floor, indicates there has been a sizeable increase in the number of non-broadcasters at the NAB show.

Burns maintained that NAB doesn't want its radio and television members to read and hear that they are a shrinking number at what was originally an over-the-air broadcaster trade show. But Burns said who the attendees are shouldn't matter because a larger attendance makes for a better show with a wider audience.

Midwest Marketing Communications Manager Pete Rightmire, another member of the exhibitors committee, also said he wanted to know who was who at the show.

Demographics would assist him in justifying the expense of the NAB show and help Midwest decide what products to display, Rightmire noted. If there are no news directors attending NAB, for example, he said the company would downplay newsroom equipment, and highlight products more in line with those in attendance.

The politics involved

Rightmire also said he suspected NAB is worried about the politics of the attendance. "The NAB is a political entity and as such, they are protective of and serving broadcasters," he said.

(continued on page 20)

Gearing Up for Atlanta's Show

by Alan Carter

Atlanta GA Except for haunting concerns about hotel reservations, exhibitors seem confident in preparation for the 1990 NAB annual convention running here 30 March-3 April.

The Exhibitors Advisory Committee was in town 13 November for a site visit before the show opens at the Georgia World Congress Center. Approximately 180 people attended representing more than 150 exhibitors.

Rooms available

NAB promises better handling of room assignments in Atlanta, after difficulties last year in Las Vegas when hotels did not release enough rooms for the convention and held the rooms for gambling trade. This, however, has not stopped some exhibitors from making rooming arrangements outside the NAB system.

"The hotels in Atlanta are far more cooperative," said NAB Exhibits and Associate Membership VP Rick Dobson. "Trade shows in Atlanta are critical to the hotels."

Hotels have guaranteed between 15,000 to 16,000 rooms, Dobson said. Based on the traditional use of rooms where some are doubles and also including turnover, the number should accommodate the expected 50,000 or more attendees.

Room forms are out, and as expected, NAB Executive VP & Chief Financial Officer Michael Harwood said some calls are coming in from people who are not pleased.

NAB will have an extensive shuttle service and recommends that people use the Atlanta monorail system that services many areas near hotels and the convention center.

The association stressed that people should not drive to the convention center because parking is very limited and not as plentiful as in Las Vegas. In fact, NAB is negotiating to obtain parking at the convention center and sell passes to exhibitors at cost.

Not in 14 years

This is the first time the convention has been in Atlanta and the first time it has been east of the Mississippi since 1976. Hesitations about an unfamiliar site seem to be under control, Dobson said, after exhibitors toured the city and facility.

This year's show covers 425,000 square feet and includes about 700 exhibitors.

Because the convention center is divided into separate halls, the space is anchored with Sony and Ampex in different areas and the remaining large companies spread around to disperse traffic.

Exhibitors Advisory Committee Chairman John Phelan, director of technical markets for Shure Brothers, said Atlanta offers several advantages.

Access to the city is easier by air and there is a significant population within driving distance. Exhibit hours have been expanded on Saturday and Sunday to 7 PM to accommodate the additional traffic.

Committee members Dave Burns of Allied and Pete Rightmire of Midwest praised the Atlanta facilities and the setup.

The committee noted that NAB has advised exhibitors that in addition to the usual security, if they are concerned about their booths, they should hire private guards for hours when the convention center is closed.

Committee members said added security has no relation to moving to Atlanta but does address a concern exhibitors have expressed for several years.

Simplified Renewal Supported

by Charles Taylor

Washington DC Comments on the FCC's third notice of inquiry regarding amendments to the comparative renewal process heartily supported a measure that will simplify efforts by licensees.

The path toward station renewal reform has been paved with numerous suggestions ultimately aimed at simplifying a drawn out process and helping the Commission eliminate abuses by parties which unethically compete for a station license for financial gain.

The Commission's third notice proposed that a station's expectancy for renewal might be based on the submission of quarterly issues-oriented program lists over the past license term. Currently, renewal expectancy is awarded by a broader determination of overall service to the community of license.

Broad support

Capital Cities/ABC supported the idea, claiming it would give needed structure and certainty to the comparative renewal process.

Also, ABC said, the importance placed on the issues lists would encourage licensees to devote time and resources to issue-responsive programming and take more seriously what type and amount of such programming is appropriate for a station's particular niche in the community.

CBS added that the procedure would "alleviate the subjectivity and uncertainty inherent in the Commission's current renewal expectancy standard."

NBC, which also applauded the move, recommended that licensees be allowed to add relevant program-related evidence within a hearing if they deemed it helpful in demonstrating their merit.

"(Owner's) promises are no more proven than those of the competing applicant."

"The procedural proposal should enhance licensees' confidence that their good faith program judgments and efforts, if duly recorded, will . . . have the effect of establishing a renewal expectancy," NBC wrote. "This is as it should be."

Program list not enough

NAB, however, maintained that a licensee's issues program list was not enough to show expectancy against a challenger. Total service to the community, including all programming and non-programming efforts, should be taken into account.

"Licensees serve their communities in many ways and participation in activities such as charity drives, community fundraisers and educational programs should be encouraged," NAB said. "The present wording of the proposal could (send) a signal that the agency is interested only in the issue-responsive programming listed in the public file as a guide to community service and a renewal expectancy."

Comments from Post-Newsweek Stations questioned a challenger's ability to show that a licensee did not broadcast programs included on the program lists or to suggest that the programs were not issue responsive.

"The most troublesome questions involve how the Commission and the courts will construe the second ground for rebutting the presumption that the listed programs were not reasonably responsive," Post-Newsweek wrote.

One suggestion the company offered was for the FCC to specify an amount or percentage of issue-responsive programming that would trigger the rebuttable presumption of meritorious service: "This measure would provide a standard that is directly tied to programming yet introduce a much needed element of predictability for all involved and provide a concrete standard that is not opaque to judicial review."

Mount Vernon Broadcasting and United Communications Corp. were concerned over how a licensee who recently purchased a station should be judged.

"Where the program/issues lists are not the work of the renewal applicant but of a prior owner, the applicant cannot claim the advantage of a record of actual service," the companies wrote. "His promises are no more proven than those of the competing applicant."

In such an instance, Mount Vernon and United said, the recent owner would have to meet any renewal challengers squarely on the standard comparative issues.

For information on the comparative renewal process, contained in MM docket 81-742, contact the FCC at 202-632-5050.

NEC Stops TV RF Sales

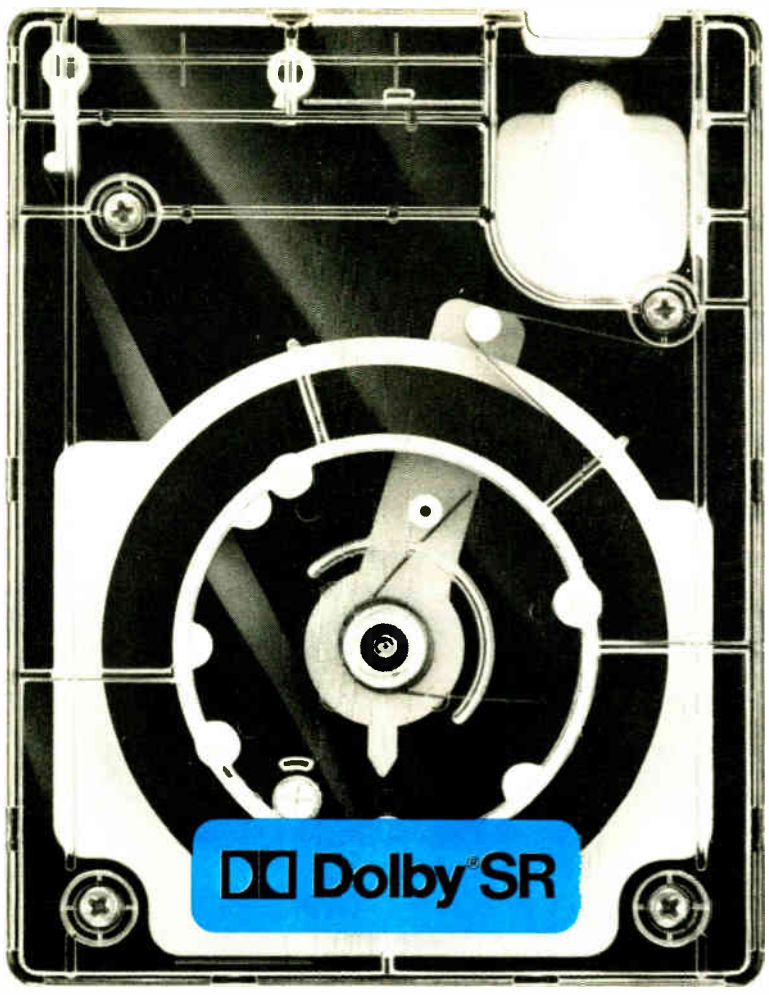
(continued from page 1)

Cogswell declined to define the restructuring as an elimination of over-the-air broadcast sales for NEC. She called it a "temporary" status.

While NEC transmitter sales had surged during the past several fiscal years, Cogswell said sales had flattened recently. "It (sales) wasn't significant enough," she said.

NEC also sells FM transmitters overseas and the domestic restructuring is not expected to affect that market.

For information from Broadcast Equipment call 214-907-4710 in Richardson, TX; for information from industrial sales, call 708-860-9500 in Wood Dale, IL.



Put Dolby SR before the cart

There's no doubt that compact discs and other digital audio sources have helped to raise broadcast audio quality to new heights. And to some degree, almost all broadcasters have embraced this new technology.

But you probably continue to use carts right along with these new formats. For on-air playback of your programming, as well as commercials, spots, and jingles, carts are still tough to beat for convenience, ruggedness, and familiarity.

Carts do have one limitation, though: sound quality that doesn't measure up to today's high expectations. Dolby SR (spectral recording) overcomes that limitation. With Dolby SR, your carts can capture the full range of dynamics present in all your source material, digital or analog. And using Dolby SR to produce spots and jingles ensures an outstanding finished product.

You've always had good reason to use carts. Now with Dolby SR there's a great one: sound quality updated for today's demanding broadcast environment.

The Dolby Model 363 provides two channels of Dolby SR in a compact, reliable package ideally suited for both production and on-air playback.*

Dolby®

Dolby Laboratories, Inc., 100 Potrero Avenue, San Francisco, CA 94103-4813, Telephone 415-558-0200, Telex 34409.

346 Clapham Road, London SW9 9AP, Telephone 01-720-1111, Telex 919109.

*Broadcast units incorporating up to 12 channels of Dolby SR for use with multiple cart machines or open-reel recorders are also manufactured by Pacific Recorders & Engineering Corp., Carlsbad, CA.

Circle 63 On Reader Service Card

Lone Crusader For Translators

by Charles Taylor

Washington DC John La Tour suggests the chicken salad.

"I had it here yesterday," he says, leaning over the table in the same restaurant where he has invited members of various groups to a one-on-one lunch for the past few days.

La Tour has come to Washington before to push his cause, but to little avail. He mentions a meeting the day before with an official of FCC Chairman Al Sikes' office and appears discouraged.

"I feel more hopeless than hopeful with the chairman's office. It was very disappointing," he says.

Strongest full-time advocate

La Tour is perhaps the nation's strongest full-time advocate of the use of FM translators, which provide a link from a station's transmitter, allowing it to extend its coverage area.

One reason for his frustration is that there exist as strong, if not stronger, forces against the use of translators than La Tour's one-man advocacy.

His major fear now is legislation introduced by Rep. Matthew Rinaldo (R-NJ), the Radio Improvements Act, that could severely limit the future of the technology by forbidding translator use outside of a station's locality unless a region is unserved by any radio station.

Another major foe is the NAB, which has fought hard against the technology's use, saying it leads to increased interference in an already crowded spectrum and creates a low-power FM service. Allowing widespread use of translators, NAB has said, would be like "opening a Pandora's box."

Deep freeze on the industry

NAB's influence was likely a factor in the March 1988 FCC rule making that put a freeze on new translators by commercial FMs, which surely doesn't make La Tour happy.

"The NAB is so powerful that it could suffocate our whole industry, sweep it neatly under the carpet and no one would be the wiser," he says.

La Tour's strongest battle forum to date has been through the co-incorporation of the American FM Translator Association, which he hopes will unite other supporters of translators into one voice.

"The congressional delegations, the House Telecommunications Subcommittee and the Federal Communications Commission are getting a strong voice from the NAB. We felt like we needed some sort of organization to represent our position as well."

Most of the 150 individuals La Tour has approached are, thus far, like him, owners of translators who view the freeze as a threat to free enterprise. La Tour is president of Dupree Power Broadcasting Inc., which operates 55

(continued on page 20)

Reaction Slight to Translator Act

by John Gatski

Washington DC A congressional radio bill that would limit FM translators to a station's service area has received slight to little reaction from the industry and radio stations, according to a House of Representatives subcommittee.

The provision is contained in the Broadcast Radio Quality Improvements Act of 1989 (HR 2714), a technical improvements bill designed to help the AM band. The provision would limit FM translators to local service, unless an area outside the primary station's service area has no other radio service.

The NAB helped initiate and continues to support HR 2714's proposed limit on FM translators.

House Telecommunications and Finance Subcommittee Senior Counsel Larry Irving said his office has received only five letters pertaining to the FM translator provision.

He said the few letters express opposition and support for the provision with perhaps a slight edge opposing translator limitation.

Controlled circumstances

In one letter, for example, KNLR-FM President Terry Cowan wrote to express his support for continued FM translator use under "controlled circumstances."

KNLR-FM is located in Bench, OR and also operates a translator in Burns, OR, to fill a signal void.

"The FM translator has been an important tool for broadcasters who need to fill a 'hole' in their coverage area. It has also been an important tool for smaller communities to enable the importation of signals to serve their populations much the same as cable has done with both television and radio signals," Cowan's letter said.

Cowan acknowledged a need to prevent "entrepreneurs" from using translators to solely make money without a concern for the local community or possible interference to other stations.

However, he favored liberalizing some aspects of legitimate translator use.

"There is a need to expand certain technical rules and retain programming rules," Cowan's letter said. "Liberal commercial origination should be prohibited unless local programming is also permitted. Power limitations should be removed or raised so that better service can occur."

Permission to exceed

Cowan suggested the FCC permit translators to exceed 10 W if the increased signal does not intrude on the 1 mV/m contour of another FM station licensed to a city different than the primary station.

Translators also should be allowed to serve areas that are not served by another station, and the FCC should continue to permit translators in the primary service area if 1 mV/m does not intrude into another station's 1 mV/m contour, Cowan noted.

Cowan even suggested allowing translators to intrude into another station's service area if the other station does not object.

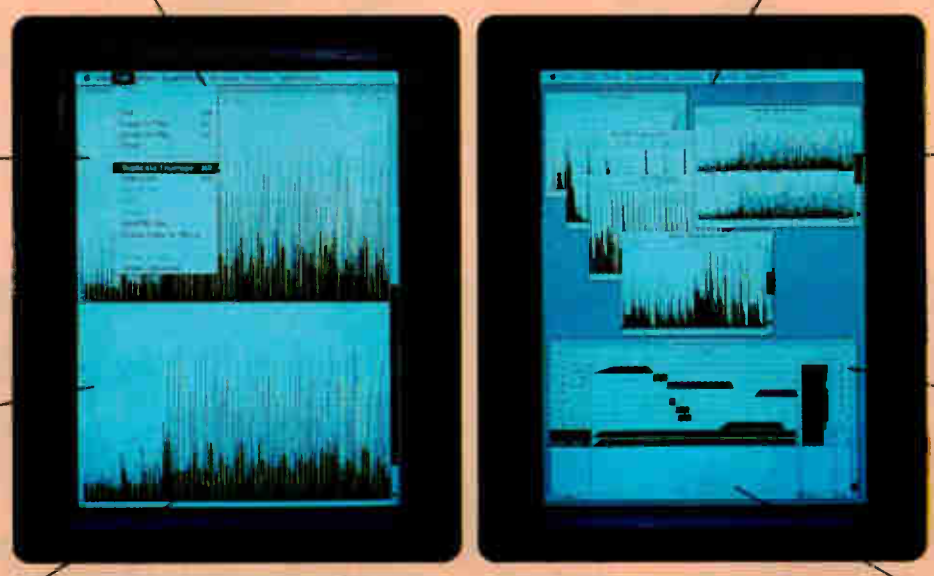
For information about the FM translator legislation, contact Terry Cowan at KNLR, 503-389-8873, or Larry Irving at the Telecommunications and Finance Subcommittee, 202-226-2424.

RADIO PRODUCTION 1990.

Total creative control, starting at less than $6,500.*

Interface easily to analog and to all major digital formats.

Fast learning curve to high creative output. Difficult editing tasks made quick and easy.



"Duck" a background track beneath a voice-over. Fade-out/fade-in, with complete accuracy.

Time expansion and compression—<u>without</u> pitch change

Storage capacity from 10 minutes to 6 hours of <u>stereo</u> digital audio.

Superlative audio quality. Multiple mixes and multiple generations—<u>without</u> degradation.

Easily expandable and upgradable—now and in the future.

STUDER DYAXIS. DIGITAL AUDIO HARD DISK FOR RADIO. YOUR LOW COST WAY TO BEAT UP ON THE COMPETITION.

Ratings wars—the push to get advertisers—the crunch on operating costs...You always need to move faster and be better than the competition.

The station offering quick turn-around and the ability to produce more complex, sophisticated and creative spots, jingles, promos and programs is likely to be the winner. With Dyaxis, you can *be* that winner. Your advertisers love you. Your listeners love you. And your competition hates you.

The Studer Dyaxis is the most powerful and cost effective hard disk digital recording/editing system available, starting under $6,500*—*proof* that digital audio for radio doesn't have to be expensive.

No ad can tell you all that Dyaxis will mean to production at your station. So call us at **800-366-4900** for our 12-page Dyaxis color brochure and read about your exciting future in digital audio editing with Dyaxis.

Now, *see* what you *hear*. On Dyaxis. From Studer, a name you can trust.

*Price not including Apple Macintosh computer.

STUDER REVOX

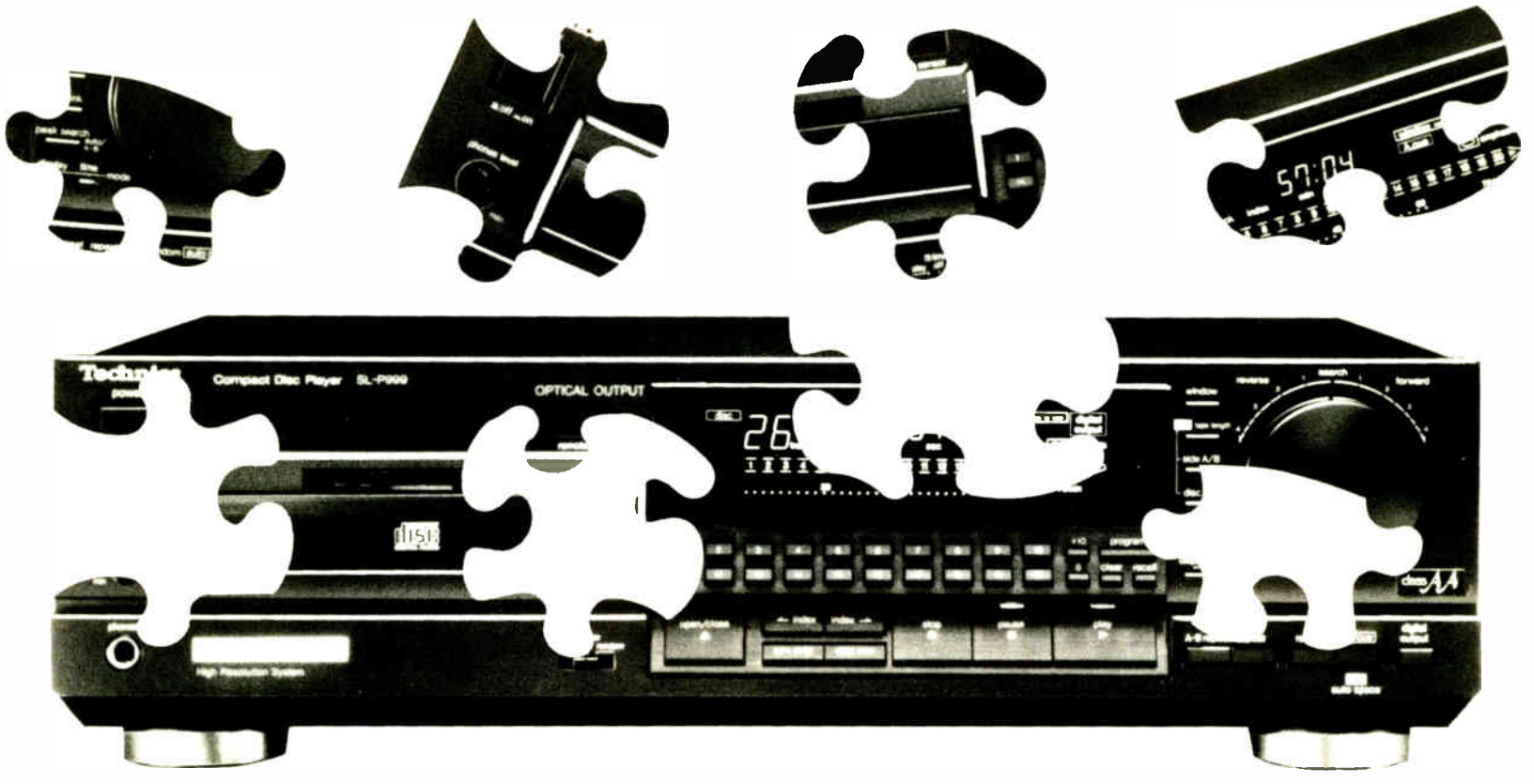
Studer Revox America, Inc
1425 Elm Hill Pike • Nashville, TN 37210 • (615) 254-5651
New York (212) 255-4462 • Los Angeles (818) 780-4234
Studer Revox Canada Ltd., Toronto (416) 423-2831

NOW AVAILABLE
MacMix™ version 2.3
and
Excellerator/DSP Card

Circle 89 On Reader Service Card

Technics

When this one was put together . . .



the plan was features, "broadcast-ability" and price.

THEY DID IT!

The SL-P999 with auto cue, indexing and digital as well as analog outputs, features two D-A converters per channel and 20-bit resolution. The price? Technics lists all of this at only $549.00. Allied's price is even better.

ATLANTA, GA CHICAGO, IL DALLAS, TX
LOS ANGELES, CA RICHMOND, IN

800-622-0022

ALLIED
BROADCAST EQUIPMENT
A HARRIS COMPANY

Circle 31 On Reader Service Card

AM Hearing Seen as Positive

by Charles Taylor

Washington DC It remains to be seen whether the FCC's comprehensive AM improvement meeting in November will prompt the "big bang" of improvement that many hope for, but sentiments following the hearing were optimistic.

Participants interviewed agreed that the five hours of testimony presented by 26 broadcasters and industry officials was educational and will help assure FCC rules that aid AM's ills.

"I think it made for a very healthy situation in that the attitude was, yeah, we do have a problem here, so let's sit down and see how we can solve it," said Group W Radio President Richard Harris.

Number of AM topics

The meeting covered a number of topics relevant to AM radio, including ways of alleviating interference, allocation of new channels within the expanded band, AM stereo from the broadcasters' and receiver manufacturers' viewpoint and numerous proposals to help popularize AM again.

The NAB, whose own interests in the band keep pages of comments consistently churning to the Commission, seemed assured that the FCC took the testimony of participants to heart, according to Science and Technology VP Michael Rau.

"I think Al Sikes is a results-oriented individual. I don't think he would do something just for perception," Rau said.

One result from the meeting, maintained NAB Executive VP John Abel, was the successful educating of a new Commission on issues that might be unfamiliar.

"From an educational standpoint, I think the opportunity to spend a whole day on AM radio is quite remarkable," Abel said. "Everyone was aware that there is a problem with AM radio but this gave us the opportunity to give the Commission a greater understanding of the magnitude of the problems facing AM broadcasters."

Rau noted that new Commissioners Andrew Barrett and Sherrie Marshall, who had not been exposed to the problems and issues of AM, received a full rundown. "It's priceless to have that kind of exposure."

Marshall said she got a clear message from AM broadcasters that interference is the number one problem facing them.

"I intend to see that the Commission goes forward to address the issues and to insure that the American public is provided the greatest possible benefits in respect to AM broadcasting," she said.

The forum also gave the NAB an opportunity to focus the Commission on some things it wants done: "That's admittedly a little inconsistent with some

(continued on page 18)

FCC Pressed on Expanded Band

by John Gatski and Charles Taylor

Washington DC The FCC is under pressure from a variety of interests including minorities, public stations and daytimers who would like to broadcast from additional channels slated to open on the expanded AM band 1 July 1990.

Several stations and group owners, testifying before the Commission at its 16 November AM *en banc* hearing, expressed their opinions on how to best select stations for the expanded band.

Receiver manufacturers also present at the hearing assured broadcasters that production of receivers which include the extended band are already underway.

Standalone daytimers urged the Commission to allocate space in the 1605 to 1705 kHz expanded band to them so they can better serve their communities for longer periods each day.

Daytimers favor "homesteading" on the band—broadcasting simultaneously on their original frequencies until expanded band radios fully penetrate the marketplace.

Jerry Smith, operations manager of WPDQ, Orange Park, FL, spoke of the value of nighttime service, citing the emergency coverage his station provided to nearby Charleston, SC, during Hurricane Hugo while that city's stations were knocked off the air.

Help daytimers

Bayard Walters, owner of the Cromwell Group, and former president of the Daytime Broadcasters Association, shared a common view that daytimers should be moved to make a near-exclusive 24-hour service within the expanded band, stressing that "daytimers should get everything they can."

Wayne Eddy, president of KYMN in Northfield, MN, said the FCC should either put daytimers in the expanded band or "buy them out. Rules that apply to daytimers are archaic. We need enough power to serve full time," he said.

Faraway forecast

John Quinn, president of WJDM, Elizabeth, NJ, also supported a preference to daytimers.

Quinn urged the Commission to allocate space to help stand alone daytimers who cannot serve their communities during the nighttime hours.

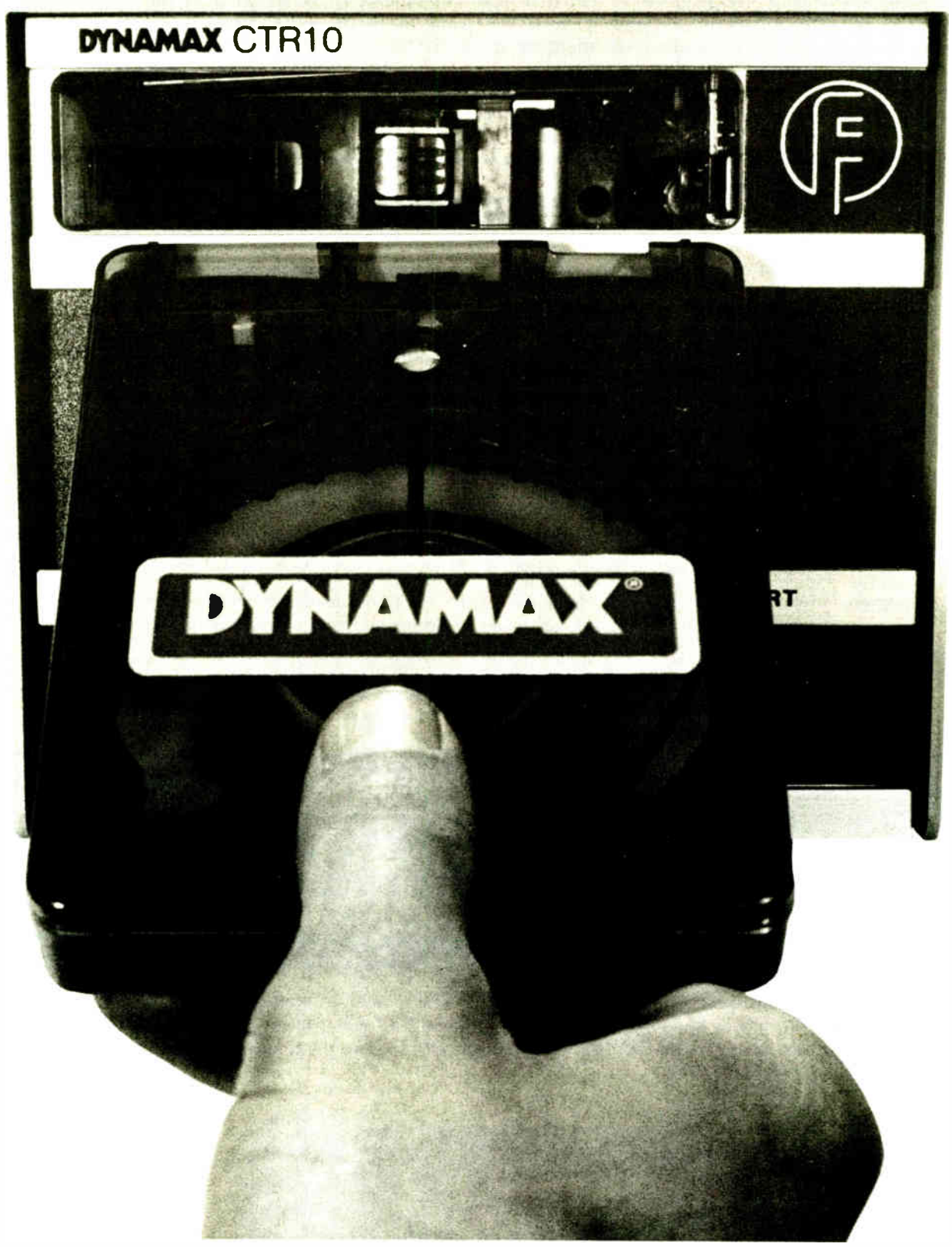
"WJDM is our only immediate source of local news, emergency conditions, weather and traffic reports, information

(continued on page 18)

MOMENT OF TRUTH

DYNAMAX®

COBALT TAPE CARTRIDGES BY FIDELIPAC®



It's Time to Test the Metal. . .

Every cartridge you play means air time won or lost. Fidelipac's cobalt-formula Dynamax removes the doubt—you can count on Dynamax for a stand-out performance every time.

Want proof? Let Allied send you three FREE Fidelipac cobalt-formula Dynamax cartridges for your own evaluation. To get your free 70-second, 2.5-minute and 3.5-minute Dynamax carts, just send your request on your station's letterhead to: Allied Dynamax Offer, Dept. db, P.O. Box 1487, Richmond, IN 47375. Offer subject to change without notice.

Test Dynamax off the air. Learn why they're the best on the air.

ATLANTA, GA CHICAGO, IL DALLAS, TX
LOS ANGELES, CA RICHMOND, IN

800-622-0022

ALLIED
BROADCAST EQUIPMENT
A HARRIS COMPANY

Circle 6 On Reader Service Card

Letter Clears Monitor Issues

(continued from page 1)
pect it would produce valid readings of FM modulation."

As to whether the FCC recognizes ModMinder as a valid way for a station to comply with modulation rules, Stanley wrote "Equipment meeting the pre-1983 requirements is satisfactory for determining compliance with the current FM modulation requirements."

The letter was written as a result of a meeting between the FCC's Office of Engineering & Technology, the Mass Media Bureau and the Field Operations Bureau after questions which arose at the FOB level, Stanley said.

He noted that the FCC had "stopped regulating this area" and said he was "surprised there was confusion." He said the letter was a way of trying to remove some of the confusion and added, "I hope this clears it up."

MMB deputy chief William Hassinger agreed with the view expressed by Stanley in the letter to MSI. "We're satisfied that compliance with the pre-1983 rules is satisfactory for our purposes," Hassinger said.

In the field

Richard Smith, Chief of the FCC's Field Operations Bureau said that the FOB will proceed as usual in monitoring stations' compliance with all the rules.

"We look for compliance with the rule that sets forth the modulation limits," said Smith. "Our procedures aren't changing, we have our own methods which we will continue to use," Smith added, noting that "the ultimate responsibility is left up to the broadcasters."

He said the FOB was interested in ModMinder and was considering "taking a look at it for our own internal curiosity."

Reaction from the marketplace was that the FCC's letter does serve to clear up any confusion or controversy a new technology is likely to cause.

"We believed MSI was on strong footing to begin with," noted Dave Burns, National Sales Manager for Allied Broadcast, which has been marketing ModMinder. "Some questions came from the industry; now they've been answered. For stations considering buying it, this letter lifts the veil and allows the user to take advantage of new technology," he added.

William Loveless, DE for Bonneville Stations has put ModMinders in all seven Bonneville-owned FMs. He said the letter from the FCC is clear. "This gives us a clear track to employ—or I guess deploy—them at our stations," he said.

He added that the questions about ModMinder were "political." "We didn't have any technical questions; there were 'political' questions—but we knew ultimately the technical would win," he said.

Anyone wishing to obtain a copy of the FCC's letter can contact Modulation Sciences Inc. at 800-826-2603.

WYHY-FM Assists in Solving Murder Case

by Alan Carter

Nashville TN The WYHY-FM production department helped police here understand a muddled 911 tape that resulted in the indictment of a man for the murder of the caller and her two teen-age sons.

DJ Tom Peace said he and others in the production department took the cassette tape, which had been enhanced by the FBI, and transferred it to reel-to-reel.

They then used a variable speed Otari MX-55 to slow the tape down between 20 to 25%. Leader tape then was placed between the voice of the caller and the operator, to isolate the conversation.

To further clean up the conversation, the station staff used an Orban 674A stereo equalizer to remove the highs and lows to reduce the hiss.

"It wasn't so much that we enhanced the tape but we just used some radio practices to separate the voices," Peace said. "Editing—that's what it was."

The caller was frantic and terrified, Peace said, but after he worked with the tape police could hear more clearly a section in which they were most interested. Police declined to specify exactly what they heard on the tape that led them to apprehend the suspect.

However, Detective Terry McElroy of the Nashville Police Department credited the work of the station with helping obtain the necessary evidence.

Police took the tape to WYHY at the urging of Mercury Records Regional Promotion Manager Ted Mellencamp, whose friend is a police detective assisting with the case.

"They were just grasping for straws," Mellencamp said. "They thought something was there."

McElroy said the man charged was the woman's estranged husband and stepfather of the children. The victims were shot and stabbed, McElroy said.

The man faces the death penalty if convicted.

For information, contact WYHY at 615-256-6556.

TTC Talks Solid State

(continued from page 5)

willing to pay a bit more for new and reliable technology; the reliability is self-evident.

Reliability and low maintenance

In a tube unit, when the final goes "pop" the transmitter goes "plop" and you're off the air or dangling at drastically reduced power.

In a solid state unit, due to redundant modular design, a lost power FET only means a slight reduction in output power—not a disaster with its accompanying stomach acid. Tube-type transmitters lose the reliability competition hands down and the chief engineer of almost any solid state operation will confirm that.

Many transmitter operating specifications actually improve in solid state transmitters and virtually no specifications deteriorate. The new self-monitoring technology provides for rock-solid operating parameters. Power is set and stays set. The days of chasing power settings all over the output meter comes to an abrupt halt.

In commencing design of its FMS series two years ago, TTC's approach was to create a transmitter that attacked all the significant problems that have plagued transmitters for years.

The most critical and promising new concept was "fail-on." Historically, most transmitters were designed "fail-off"; reliable in many cases, true, but when something failed, programmed to quit in order to protect circuitry.

Fail-on stipulated new design assumptions: 1) reliability of components must be increased—operate them well below their maximum ratings; 2) circuitry protection in the unlikely event of component failure by isolating and shutting down sections gone defective; and 3) prevention of damage to good sections by the malfunctioning ones, enabling good sections to remain on the air.

It was a new concept but it was achieved and fail-on became a reality.

A positive side effect of solid state, fail-on design is the fact that no maintenance is required, save for an occasional blower cleaning and even that can be done with the transmitter on air. Solid state units tolerate a lot of abuse.

The demand for efficiency

One of the loudest claims critics make against solid state transmitters is that they are not as efficient as tube models. This tends to be a hollow statement with its assumptions poorly defined.

At medium power levels (1-5 kW) a solid state FM transmitter final is as or more efficient than its tube counterpart. It is definitely true that at higher power levels final efficiency of FET amplifiers can achieve better performance at approximately 80%.

However, what counts is not final efficiency so much as overall efficiency: AC power in (which is what you pay for) vs. RF power out. What tube transmitters make up for in final efficiency they oftentimes lose in filament power, cooling and other peripheral requirements, which draw much more AC power than their solid state counterparts.

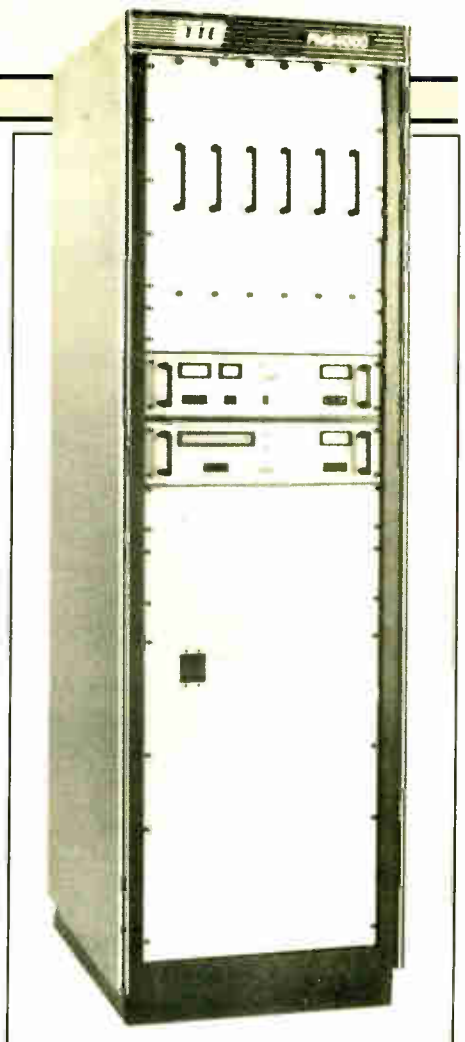
The TTC FMS4000 4 kW transmitter consumes typically 6800 W AC power and produces 4000 W RF power. This is comparable to tube transmitters. It is anticipated that improvements to FET devices will make FM transmitters in the 30 kW range a reality in the near future.

Price vs. long term economy

Another allegation concerning solid state transmitters is that they cost significantly more. TTC offers its FMS transmitters at prices comparable to tube transmitters.

The 4 kW version lists at $32,500 and the 1 kW at $21,500 (easily convertible to a 2 kW or 4 kW unit). A budget priced model will be offered in 1990, sometime around midyear.

The costs of future higher-powered FM transmitters should be competitive as well, given that manufacturers' costs for solid state RF devices continue to drop. The first 25 or 30 kW solid state FM transmitters will probably be priced higher than tube models, but think about it.



TTC's FMS 4000 4kW FM transmitter

Even if high-power solid state units are more expensive than tube units, won't the extra investment up front be far surpassed in the downstream savings achieved in greatly reduced maintenance, tube replacement and (perish the thought) downtime?

Granted there are cheaper FM transmitters available. However, remember the broadcast industry's hard lesson learned by everyone from producers to engineers: you get what you pay for.

Some have advised the industry not to hold its breath for FM solid state transmitters to appear. At TTC we're not holding our breaths—we're too busy meeting the delivery demand.

■ ■ ■

Harold Rabinowitz is VP of Engineering at TTC's facility in Louisville, CO. He can be reached at 303-665-8000.

Digital Course

Beginning in the 10 January 1990 issue, **RW** will run a 12-session course entitled *Introduction to Digital Electronics*. Northern Virginia Community College will offer 1.3 CEUs (continuing education units) to registered students who successfully complete the course and an examination mailed at its conclusion. Fill out the coupon to register.

NORTHERN VIRGINIA COMMUNITY COLLEGE
Director of Continuing Education, Annandale Campus
8333 Little River Turnpike, Annandale, Virginia 22003
(703) 323-3159

Social Security No. _____

Please enroll me in the Community Service Program listed below:

Name _____ (FIRST NAME / MIDDLE INITIAL / LAST NAME) Home Phone _____

Address _____ Business Phone _____

City _____ State _____ Zip Code _____

Course Title Introduction to Digital Electronics Fee $ 20.00

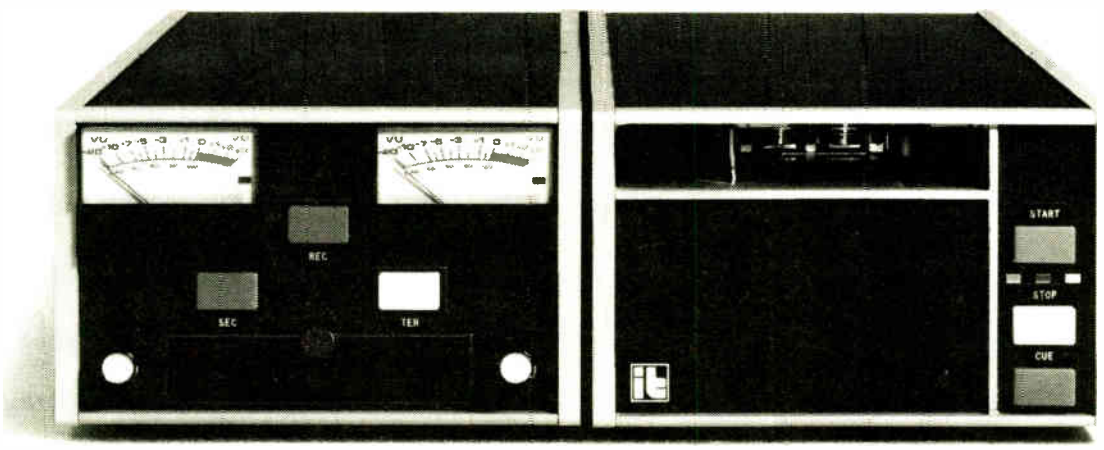
Course Code BCST91401N Course Date(s) and time _____

How did you learn about this course? ___ Received brochure in mail, ___ Newspaper advertisement, ___ Library, ___ Referral ___ Radio/TV announcement ___ Other

Enclosed is my check payable to Northern Virginia Community College. I understand that enrollment may be limited and if the course is cancelled for any reason, my check will be refunded in full.

For office use: ___ SA 91 ___ RU 97 ___ SD 91 ___ RU 98

This is one reason we sell more cart machines than anyone else.



The 99B series Master Recorder features a patented erase, splice-locate and azimuth-adjust system (ELSA).

And here are three more.

Our Authorized 3M Dealers

Allied Broadcast Equipment	Broadcast Services Company	Broadcast Supply West
800/622-0022	800/525-1037	800/426-8434

3M International Tapetronics — The World Leader In Cart Machines.

3M

Circle 74 On Reader Service Card

Expanded Band Uses Argued

(continued from page 13)

(that is) imperative to our citizens," Quinn said.

"Yet the station must go off the air at night and during some winter months does not sign on until 7:15 AM, a time when many listeners have already left for work or school."

According to Quinn, Elizabeth area listeners have awakened to a forecast of six inches of snow. The weather report, however, was coming from WCKY, a clear channel Cincinnati, OH, station on the same frequency, not WJDM.

Testimony from Dorothy Brunson, owner of AMs within Brunson Communications, cast a different light on daytimers' arguments. According to Brunson, she paid $500,000 to upgrade an AM from daytime to 24 hours a day and now regrets the decision.

"I used to be able to target sales based on the hours we were on the air," she said. "It wasn't worth the investment."

David Honig, attorney for the National Black Media Coalition, argued in favor of reserving portions of the expanded band for minorities.

Honig said it was wrong for daytimers to think they deserve the majority of the pie and that daytimer priorities would again shut out minority rights. "It's bad policy, it's unfair and it flies in the face of both of history and common sense."

He said that the Commission should allocate 50 kHz of the expanded band for minority stations.

Commissioner James Quello asked Honig about the possible unconstitutionality of such minority "set-asides" in light of a case currently before the Supreme Court dealing with an FCC action in the case of a particular broadcaster.

Honig answered that the case being appealed was unique and that minority set asides have held up constituionally in previous challenges.

Minnesota Public Radio VP Thomas Kigin offered another point of view in favor of reserving a number of stations for non-commercial use.

"Just as 20 percent of the FM band was reserved for non-commercial radio, so too should 20 percent of the expanded AM band be reserved for public interests," Kigin said.

Kigin also suggested the Commission adopt policies that help AMs broadcast in "full time interference free coverage areas" and seek rules to reduce interference from appliances and other sources.

One positive note was sounded when AM receiver manufacturers Delco and Panasonic said that they will be ready for consumers when the expanded band stations begin broadcasting.

Delco Radio Design Division Staff Engineer William Gilbert and Panasonic Assistant Audio Information Systems Division Robert Finger said they will have expanded band radios on the market in 1990.

Gilbert noted that all Delco receivers will have expanded band by 1992.

Gilbert also said that the FCC should utilize the expanded band by moving AM stations that cause significant interference on the current band.

En Banc Hearing Seen as Good Start

(continued from page 13)

of the interests of some of the others there, but from my perspective that was part of the accomplishment too," Rau said.

Other participants also were generally pleased with the FCC's reception to the hearing.

Pleased with openness

"I was really delighted with the openness of the FCC on the entire range of challenges that face AM," said Art Suberbielle, chairman of the NAB's AM Improvement Committee and president/GM of KANE-AM. "We feel like the Commission is definitely an ally in this mission that we have. The more we get on the bandwagon, the quicker we can accomplish our goals."

"The awareness that I saw grow during the day by those four Commissioners to the opportunities and the problems that presented themselves by many different constituencies was quite exciting," said Group W's Harris.

At the heart

"I felt that the more they got into the whole thing, the more they understood the feelings of AM people and what the radio industry in general was feeling," Harris said.

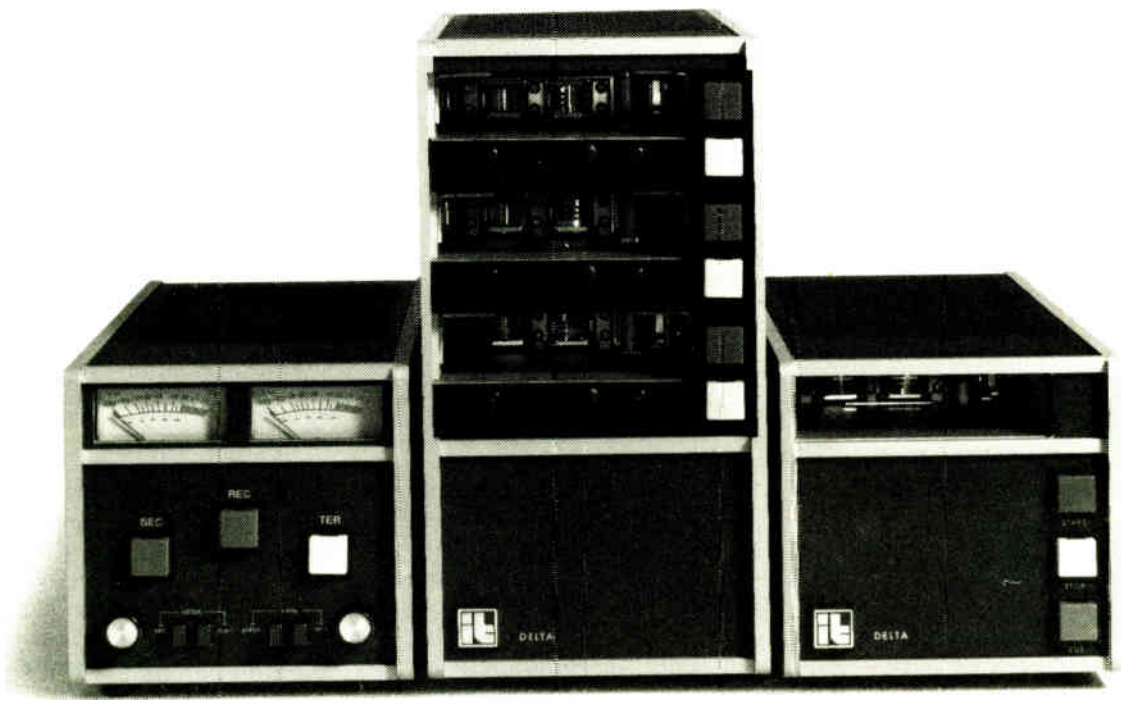
Added Bayard Walters, president of the Cromwell Group, "This doesn't mean that it's going to be easy or that AM will be perfect, but at least there's a chance.

"Now, I think there is a general awareness not only in the broadcasting industry, but on Capitol Hill and in the FCC that AM is something that's fast getting away from us," Walters said.

It's likely perception will become clearer as the comments period for the *en banc* hearing draws to a close in mid-December, and despite across-the-board optimism thus far, both Commission and broadcasters know only a first step has been taken.

Said Harris with Group W, "It was a great opportunity, but we now need some kind of overt message from the Commission saying that they've heard these problems and are ready to offer some real life solutions—maybe not total solutions, but some efforts going forward to getting these things solved."

Here's another reason we sell more cart machines than anyone else.



The Delta series. The world's most popular cart machine over the last five years.

And here are three more.

Our Authorized 3M Dealers

Allied Broadcast Equipment
800/622-0022

Broadcast Services Company
800/525-1037

Broadcast Supply West
800/426-8434

3M International Tapetronics — The World Leader In Cart Machines.

3M

Circle 66 On Reader Service Card

NAB Conceals Show Figures

(continued from page 7)

Phelan also said he needs demographics to justify the expense of NAB and noted that Shure has products directed at production and post production. He also said Shure is courted by video shows for its business.

"My gut feeling is that we see a lot of those people at NAB," Phelan said. "But I'd like to confirm that with demographics."

Pacific Recorders & Engineering President Jack Williams, past chairman of the exhibitors committee and a founding member, said he understands exhibitors' concern for the information but that he, personally, doesn't need the information. He maintained that traffic at his booth is substantial and the demographics of the attendees wouldn't affect how PR&E works the show.

Williams said NAB could get pressure from its broadcaster members if publicity about the increase in production attendance became widespread. He speculated broadcaster members might want to limit attendance.

On the other side, however, Williams suggested it "would be in the best interest (of NAB) to release (demographics) on a category basis" to exhibitors.

NAB Executive VP & Chief Financial Officer Michael Harwood said demographic information was priority information that NAB did not release. Questioned further about honoring the exhibitors' request, he responded, "We haven't decided."

He said that NAB wanted to get a better handle on demographic information. With a large number of people registering on-site, Harwood said the information about those people is not as accurate as he would like because attendees fill out the forms inaccurately or not completely.

Better statistics

NAB is working to improve the registration process for 1990 by sending out forms earlier for exhibitor guest passes—the main problem—and by encouraging exhibitors to invite guests earlier to get pre-registration forms mailed in before the show.

Harwood said NAB sells it attendance lists and needs a better breakdown on the numbers.

Current lists available for sale from the 1989 show include: commercial radio stations, 1547; commercial TV stations, 2498; commercial radio & TV, 368; commercial group radio, 358; commercial group TV, 271; commercial group radio & TV, 231; non-commercial radio, 170; non-commercial TV, 543; non-commercial radio & TV, 299; network radio, 126; network TV, 819; network radio & TV, 179; audio recording studio, 267, and teleproduction/post production, 5833.

The lists are available on about half of 1989's 50,000 attendees. Harwood said the remaining 25,000 include spouses, complimentary passes and exhibitor guest passes.

Harwood said comments that NAB didn't release demographics because of publicity about non-broadcast attendance was not a valid argument. Broadcasters can see on attendee badges at the show that there is a number of non-broadcasters, he said. "It's strictly a logistics thing."

Translator Advocate States His Case

(continued from page 10)

translators primarily in the southwestern United States. Because of the freeze, he has 150 more awaiting FCC approval.

He is asked how much money he has made from the venture, but shies from answering: "Not enough, but it's profitable." Judging from the figures La Tour furnished, each of the 50 translators could reap more than $20,000 a year for the company—totaling in excess of $100,000 annually.

Robbed of variety

But more important than the threat to free enterprise, La Tour assures, is the argument that the limiting of translators would rob many communities of programming variety.

"America needs to know that it can have its favorite programming," he says. "They can have classical, beautiful music, Christian, children's, ethnic, news talk and an infinite variety with translators."

La Tour has other arguments as well.

"Translators generate market knowledge for local broadcasters. Let's say an AOR station comes into a market from a translator and it's successful. It lets other radio stations know that there is a demand for AOR and that if they're not providing it, they should consider offering more or offering it exclusively.

"And if the translator was able to develop a strong listenership and was able to siphon off revenue, that means that local broadcasters weren't providing a service that listeners wanted. The name of the game in radio is to serve the public, not the broadcaster."

During his Washington visit, La Tour presented these same convictions to nearly 25 people who have some interest in translators, from FCC officials to NAB to congressmen.

"We're trying to lobby here in Congress, we're trying to stay in touch with the Commission as it changes its commissioners, and we're trying to educate our listenership, telling them that if they enjoy the programming being provided over a translator, then they need to contact their congressman."

Response, in many cases, has been lackluster, La Tour concedes, though there have been bright spots: "Most of the Congressional staff members I visited with agreed with our perspective. They said our arguments were compelling."

Arguments not enough

But, he realizes, for his arguments to hold weight and for his organization to hold power, he will need more than kind support.

"I'm concerned that good arguments may not be enough. I'm convinced that political pressure and influence is what gets things done in Washington. My task now is to go home and mount political pressure by getting people who listen to our radio stations to write and say, 'Don't let the FCC get rid of my favorite radio station.'

"Translators provide a service no one else is providing and we've got a lot more to say," he adds. "There's no reason why low power FM can't be to FM programming what cable television has meant to television programming."

Yet another reason we sell more cart machines than anyone else.

The OMEGA series. High quality performance at an affordable price.

And here are three more.

Our Authorized 3M Dealers

Allied Broadcast Equipment
800/622-0022

Broadcast Services Company
800/525-1037

Broadcast Supply West
800/426-8434

3M International Tapetronics — The World Leader In Cart Machines.

3M

Circle 11 On Reader Service Card

JOB DESCRIPTION:

1. Play...Hard
2. Record...Often
3. Rewind...Fast
4. Fast Forward...Quick
5. Stop...Seldom

Only qualified applicants need apply

I've found the perfect candidate (I understand the price has been reduced, also) K.D.

Revox PR99 MKIII...Highly Qualified!

ATLANTA, GA CHICAGO, IL DALLAS, TX
LOS ANGELES, CA RICHMOND, IN

800-622-0022

ALLIED
Broadcast Equipment
— A HARRIS COMPANY

HARRIS/ALLIED ©1989

Circle 77 On Reader Service Card

Newcomers Shake Up Denver

by Dee McVicker

Denver CO A move into major market Denver recently put KDHT-FM under construction by its new owner, All Pro Broadcasting. Licensed to Greeley, Colorado, with an antenna upgrade now extending its signal to Denver, the station needed to look the part of major market and sound like it as well.

Production "A" at KDHT

FACILITIES SHOWCASE

But KDHT isn't the only station making new waves in the Denver market. Soon to accompany the FM will be All Pro's new AM, KMVP. Although not on the air yet due to a pending zoning decision on its proposed antenna site, the AM has been stamped with FCC approval.

Onward and upward

With the venerable FCC's blessing, the group saw no reason to delay the construction of AM studios alongside its FM studios. Constructing both stations under one roof and one master construction plan would eliminate additional expense—and time.

In keeping with major market status, the group selected a contemporary high-rise complex in Thornton, a suburb of Denver, and set to work readying its radio stations for the Denver market.

What awaited the group was bare concrete real estate, notably absent of adequate ceiling-to-floor space. The group brought in an architect and Allied Systems' Chuck Rockhill to integrate cabling, equipment and the full height of radio into a confining 14' vertical space.

Rockhill enlisted the help of Allied's resident CAD system to make preliminary sketches of studios. Although the final design was done by the stations' architect, this cooperative effort between system designer and architect benefitted the project in many ways.

"In the broadcast portion of any radio station, cable chases, raised floors, soundproofing and anything of this nature are critical," noted Rockhill. These considerations, he claimed, should be part of the emphasis of facility design.

To contain the audio within studios and keep exterior noise out, a suspended ceiling was hung ten feet above the flooring. Raising the floor was an initial consideration, but, said Rockhill "largely due to the heating and air conditioning, we couldn't."

To spare the extra footage needed to raise the floor, the group settled on ducting and cable chasing above the studios instead. Flex ducting was used wherever possible and precautions were taken to isolate ducting so that vibrations generated by the main heating and cooling unit were absorbed.

To eliminate reflected sound within the studios, the cooperative efforts of Rockhill, the architect and a member of the group's board of directors produced studio designs with walls angled to one another. All studios are either five-sided or six-sided designs.

CE Dave Sawyer stands next to a rack of processing and monitoring gear.

Harris/Allied/Arrakis

When it came time to fill the studios' equipment needs, the group found nothing lacking in Allied's equipment catalog. With Allied's access to over 250 product lines, as well as finishing touches such as studio clocks, the group had an equipment preview that ran the full gamut. What they elected to go with is what Rockhill refers to as the "total Harris/Allied/Arrakis job."

Two master control rooms, one for AM and one for FM, are identically equipped with a 12-channel Arrakis 5000-MF console, five Fidelipac CTR12 cart playback decks, an Otari MX5050B II reel-to-reel recorder/playback, a Tascam 122 MKII cassette deck and a Technics SP25 turntable.

The studios' telephone interface to the outside world is done through Gentner SPH3A hybrids. Although KMVP-AM and KDHT-FM have one telephone line each into their master control rooms, the AM's talk format will, suspects Rockhill, require additional telephone lines.

Because programming for both stations is neither piped in via satellite nor delivered by syndicated service, the

(continued on page 34)

Road Testing the SV-3500 DAT

by Ty Ford

Baltimore MD As it regards DAT machines, I'm beginning to feel a little like Goldilocks. Remember how she tested the three beds and found one too hard, one too soft and one just right? So far I haven't found a DAT that's just right, but Panasonic's SV-3500 comes closer to it than others I've worked with.

Surely part of the comfort I'm feeling comes from the fact that all of the machines have certain operational similarities. Hence the more experience I have with the genre, the more accustomed I get to similar features.

PRODUCER'S FILE

The SV-3500 is a simpler machine. Among other things, it doesn't try to accommodate all of the possible digital I/O configurations. Analog inputs and outputs are standard XLRs. Input level is +4 dBu at 10 Kohm. The analog output is +4 dBm/−10 dBm switchable. Digital input and output (SPDIF) is 75 ohm coaxial. The reduced amount of circuitry hardware means a lighter net weight and smaller cabinet space.

Front panel input controls include analog input level and balance pot. Also on the front is a low impedance 30 mW headphone output jack and volume control.

Remote possibilities

The small hard-wired remote control which comes with the SV-3500 takes up very little counter space. It duplicates eight of the most often-used controls on the machine itself (record, pause, play, forward and backward skip, FF/cue, rew/rev and stop), but doesn't provide complete remote control.

If you're planning to rack-mount the unit in a machine room some distance from the console and need to get to all of the features, Panasonic's Chris Foreman recommends remote control via the serial port on the rear of the machine. Panasonic has hired a firm that has designed a computer interface consisting of a black box and some software that provides full remote control.

Keyed-in commands from a Macintosh computer feed the black box via the computer's modem port. The pulse output of the black box feeds the serial port of the SV-3500. There is also an ASCII software program written in hypercard for a Mac. It simulates the front panel of the SV-3500 on the screen of the Mac so that you can operate it with a mouse.

Incidentally, the operations manual includes pulse series data code information for all of the front panel functions. If you're handy with this kind of technology, you might consider coming up with your own interface design.

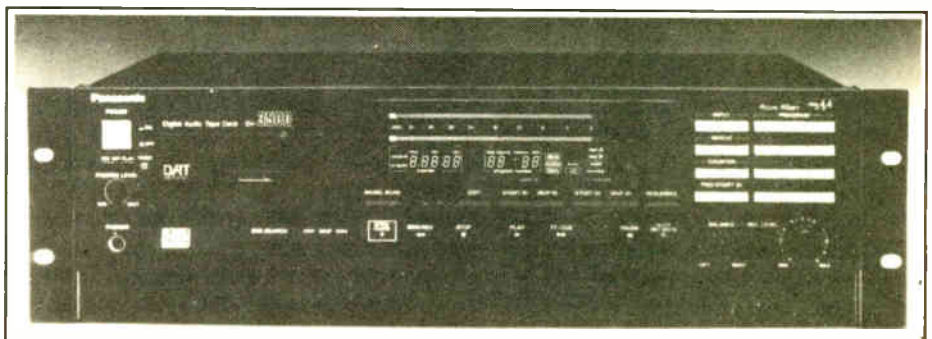
Professional recording

Out of the box, the SV-3500 records at 48 kHz, 44.1 kHz and 32 kHz. According to others I have spoken with, the 32 kHz recording feature is a "digital and data only configuration" and was originally designed for data recording. So far attempts at recording digital audio at this sample rate have not been effective.

Of greater interest to audio professionals is the small switch inside the chassis which allows digital recording at 44.1 kHz and 48 kHz. Apparently, when the switch is thrown, the SV-3500 will record even copy-protected digital audio at 44.1 kHz. This is no doubt because it was designed for professional, not consumer applications.

In addition to the standard transport functions, the SV-3500 records absolute time. This feature lets you know exactly where you are on the tape, and—by subtraction—how much time you have left.

In addition to absolute time, the unit also automatically records the length of each part number and has a less precise tape counter—the kind you'd find on most analog cassette machines—which can be reset at any point of play.


Panasonic's SV-3500 DAT recorder/player

Like many of the other DAT machines on the market it also will automatically number the cuts as you record them.

One problem I've run across with many DAT machines, this one included, is that the automatic start ID cue is sometimes too close to the beginning of the cut. When the same cut is cued up several times in a row, there is a variance that sometimes cuts off the first moment of audio.

Manually moving the start ID helps, but it takes time. They've solved this problem with CD players by engineering a cue wheel so you can walk up to or away from the start point.

While in the index mode you can record, erase or change the position of any program number or skip cue, without destroying the recorded audio. If you erase a program number—which breaks the logical numerical sequence—the SV-3500 will automatically resequence the program numbers.

Things to remember

Planning and forethought in the programming of your tape will help you get the most from this DAT. Consider the following "ifs":

If you erase the program number from the beginning of a cut, the audio becomes part of the preceding cut number and will no longer cue up for play.

If you've left enough space on the tape, you can record over an existing audio track with another audio source, or record over the track with no audio to leave a blank space.

If you "punch in" or record over the existing audio, you have to get out of record before the next program number or the machine will continue to record over it as well.

If you get out too quickly, you run the risk of leaving part of the original track on the tape.

If you're planning to do a lot of adding or subtracting of cuts, consider leaving a few seconds of blank tape after each cut ends to allow for safe "punch out."

Hot morning show producers looking to store lots of numbered bits and sound effects for easy access should know that the SV-3500 needs at least nine seconds from the beginning of each cut to lay the start code. Attempts to drop a start ID less than nine seconds apart are ignored.

DAT speedway

The most useful operational features of the SV-3500 are the program buttons on the front panel. To get the machine to cue up to any cut just punch in its number and hit the pause button.

Fast forward time trials using a sixty minute DAT cassette resulted in a brisk 20.8 second sprint from start to finish, 32 seconds on a 90 minute tape. Adjacent cut access time between start cues 30 seconds apart was less than five seconds. Access time for start cues several minutes apart took about six seconds.

Be prepared to sharpen your short-term back timing skills if you plan to use the SV-3500 for high accuracy drop-in production on-the-fly. When a cut is cued up in the pause mode, actual audio occurred anywhere from 1.93 seconds to 2.28 seconds after the play button was pushed.

I would have gladly traded the Skip ID

(continued on page 29)

Get the carts you can count on... from a source you can count on!

Demanding broadcasters around the world count on Audiopak broadcast cartridges for consistent response, dependable quality and outstanding reliability. High-performance tape formulations, superior coating processes and rugged, "no-maintenance" casing designs have made Audiopak the international standard. Why settle for other broadcast cartridges? Getting "workhorse" A-2s, "stereo" AA-3s or "digital-ready" AA-4s is as easy as picking up your phone.

audiopak®
BROADCAST CARTRIDGES

Allied leases Audiopaks and the machines to play them in. Your old carts and machines may be worth $$$ in trade toward new Audiopak cartridge and machines.

We have the full Audiopak line of broadcast cartridges in stock for immediate delivery at competitive prices.

ALLIED
BROADCAST EQUIPMENT
A HARRIS COMPANY

800-622-0022

ATLANTA CHICAGO DALLAS
LOS ANGELES RICHMOND

Circle 33 On Reader Service Card

Getting Started in Consulting

by David Hebert

Pasco WA The only part of broadcasting that is changing faster than the number of stations eliminating their need for a chief engineer is the number of ex-chief engineers beginning a life in the contract engineering business.

When you decide it is time to commit fully to the life of an independent contractor the moonlighting that was once fun becomes your bread and butter. At this time, certain commitments are required for efficient execution of services and obtaining payment for those services.

Acquiring assets

A good first step is acquiring the assets of the company. This is probably the most difficult requirement due to the capital required. It's always wise to start small but attention should be given to equipment that is versatile, professional, accurate and easy to use.

Because part of the capabilities of the business will be defined by the resources available to meet those capabilities, success demands the acquisition of only the best quality equipment available. After all, your results are only as good as your tools.

CONTRACT ENGINEER

As the business grows, more equipment can be added. As more unusual, specialized and expensive test equipment is acquired, consideration then becomes directed to cash return. If item A will generate more return than item B, or if by acquiring item A other work can be generated that will create a more favorable cash flow than item B, the choice between the two items becomes clearer.

At this point, also, I would recommend the acquisition of a good computer system. Whatever make and model chosen, it will be quickly found that running a business is almost impossible without a versatile and workable computer system.

Administrative paperwork

Since the only things we can count on are death and taxes, it is important to secure the necessary legal tax numbers, state and county registration, business licenses and miscellaneous permits that may be required. Uncle Sam will expect a fond remembrance quarterly and his feelings may be hurt if he is forgotten.

Since technical work involves a level of exposure to legal hazards, a good general purpose liability insurance policy is a worthwhile investment. At the beginning of the business life a small policy can provide adequate protection. As the affairs grow, the policy should be modified accordingly.

While still on the subject of insurance, arrangements should be made to keep any health coverage in force. Perhaps a previous employer will allow continued health insurance coverage at group rates. This is going to require, however, another monthly "remembrance."

If the business is to be available to the most number of clients, then another avenue of concern is how their needs will be treated when the technician is unavailable.

Without a telephone answering machine that will allow message retrieval from another telephone, proper contact with the client is difficult and unreliable. Sometimes, a pager number is a better way to provide client access during emergencies.

Getting a return

As the business grows, its needs and capacities grow with it. One can clearly see that all this commitment involves expense.

Obviously the area of charges for services rendered is a delicate area as most clients may misunderstand when they only see what is perceived as unjustified. Generally, if a client believes the fees charged are justified by the quality of work provided, he will become more receptive to these so-called high rates.

Again, the quality of work provided will be a function of high-quality test equipment along with the technical competence of the provider. In previous articles, I have discussed ways of upgrading technical abilities in order to provide adequate financial return.

It is most helpful to begin a small technical business while still under the umbrella of a fulltime employer. With this plan, a reputation can be established, equipment secured, and skills increased to a point of insuring a proper return in the early days. The technical person must now become skilled in still another level—business.

And all this must be done without alarming your present employer that your current obligations will take a back seat. Nevertheless, if you're motivated, the rewards of self-employment can be worth it.

■ ■ ■

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

VOA Greenville: Beyond Relay

by Thomas Vernon

Harrisburg PA As our series on the Voice of America wrapped up last time, I mentioned the changing mission of the Greenville relay station since its creation in 1963. One of its newest roles is training, education, and research. This month we conclude this series on the VOA with a look at some of the more recent assignments for the North Carolina site.

One of the ongoing research projects at Greenville involves remote transmitter failure diagnostics with computers. Several of the GE 250 kW units have been equipped with remote sensors to monitor voltage, current, temperature and water flow parameters throughout the transmitter.

These transmitters are linked to a DEC Micro-VAX computer via data gathering units. All interconnections are made with fiber optics. Measured parameters are stored in memory for one month.

One of the long term objectives of this project is to estimate repair time for transmitter outages and automatically report this information to the Network Control Center in Washington, DC.

Research is also under way in adapting dummy loads for real-time computer displays of transmitter output power.

The loads currently in use are older water cooled units that require power output calculations by calorimetric method. Operators must read water temperature rise on a mercury thermometer and water flow rate to calculate power output.

Because of the many variables and the age of the system, accuracies of ±10 percent are optimistic. Computer displays will facilitate more rapid tuning and accurate power output calculations.

Educational programs

Several educational programs are administered at the VOA training center. By far the most extensive is the 12 month technical training program for field engineers. The curriculum has two phases.

Phase I consists of four months of classroom instruction and laboratory exercises. Classes meet from four to six hours daily.

Fourteen modules are taught, including lessons on propagation and monitoring, transmitters, satellites, microwave links, automation and modulation. Recently there has been an added emphasis on management skills, as applicants with more technical skills are recruited from the job market.

Phase II consists of eight months of structured hands-on experience, where applicants rotate through the different job functions at the relay station. This includes working with tower riggers, transmitter technicians, shift supervisors and warehouse personnel. At the conclusion of the program, most graduates are sent to VOA relay stations overseas as foreign service officers.

Commercial refugees

Many of the new recruits for this program are refugees from commercial broadcasting, who are attracted by the first rate training and opportunities for worldwide travel. Most also find a technical challenge, professionalism and stress on excellence at the VOA that often seems to be lacking in contemporary radio.

The training center is also a repository for videotape instructional materials. Currently there are about 50 hours of instruction on such topics as soldering, AC-DC curcuits, software and microprocessor techniques.

Additional courses are taught under a contract basis at Greenville. These include 80 hours on satellite interconnections, 80 hours on microwave techniques and 40 hours on the General Electric 250 kW shortwave transmitters used at the relay station.

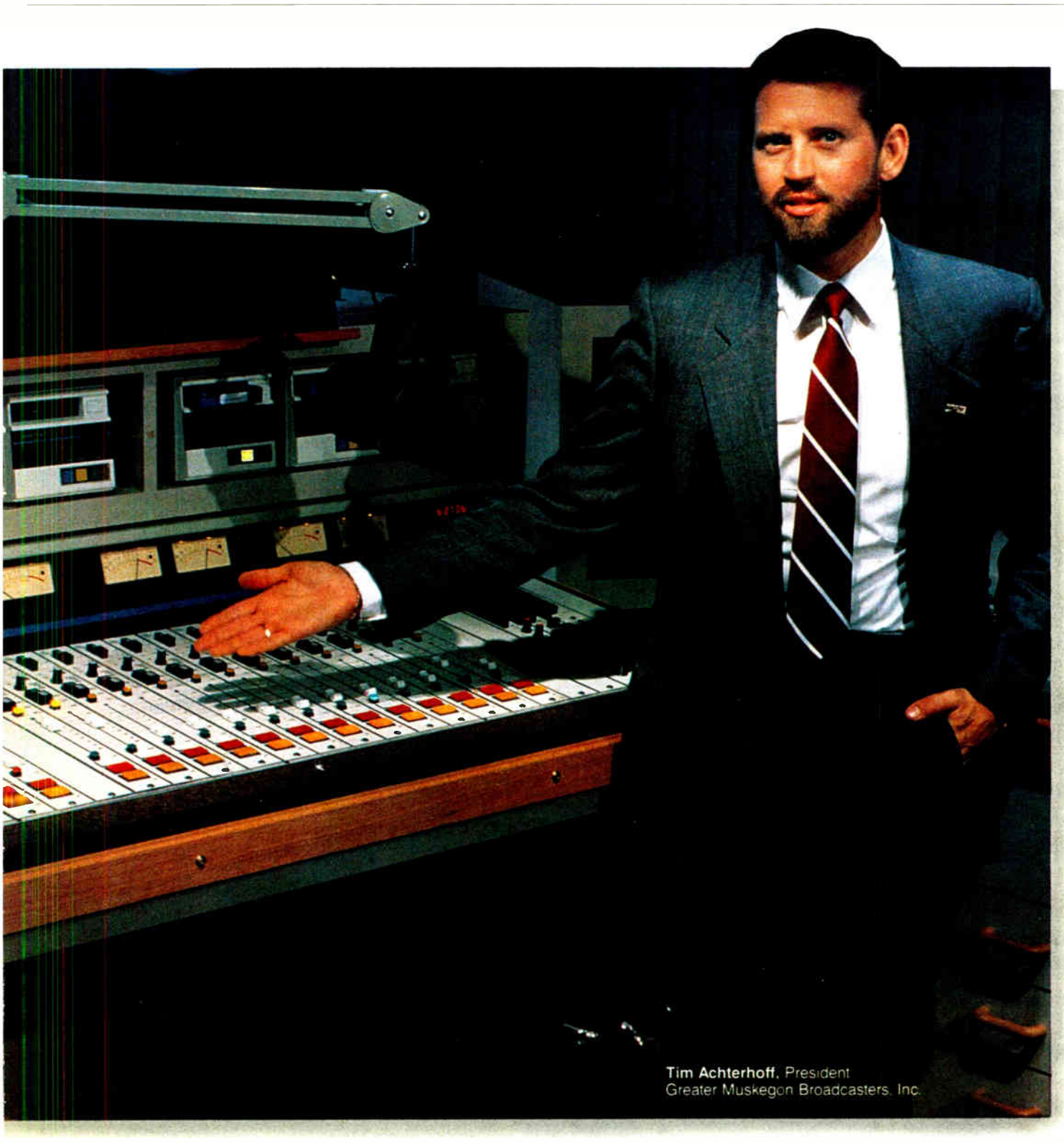
The training programs at VOA are in a continuous state of change. Existing instruction is updated and refined each time it is taught, and new programs are being added regularly.

Although I've tried to present some of the more interesting highlights of the Greenville relay station in this series, it really has to be seen to be appreciated. Visitors are always welcome, although it's best to make arrangements before you arrive. For more information, or to arrange a tour, call 919-752-7181.

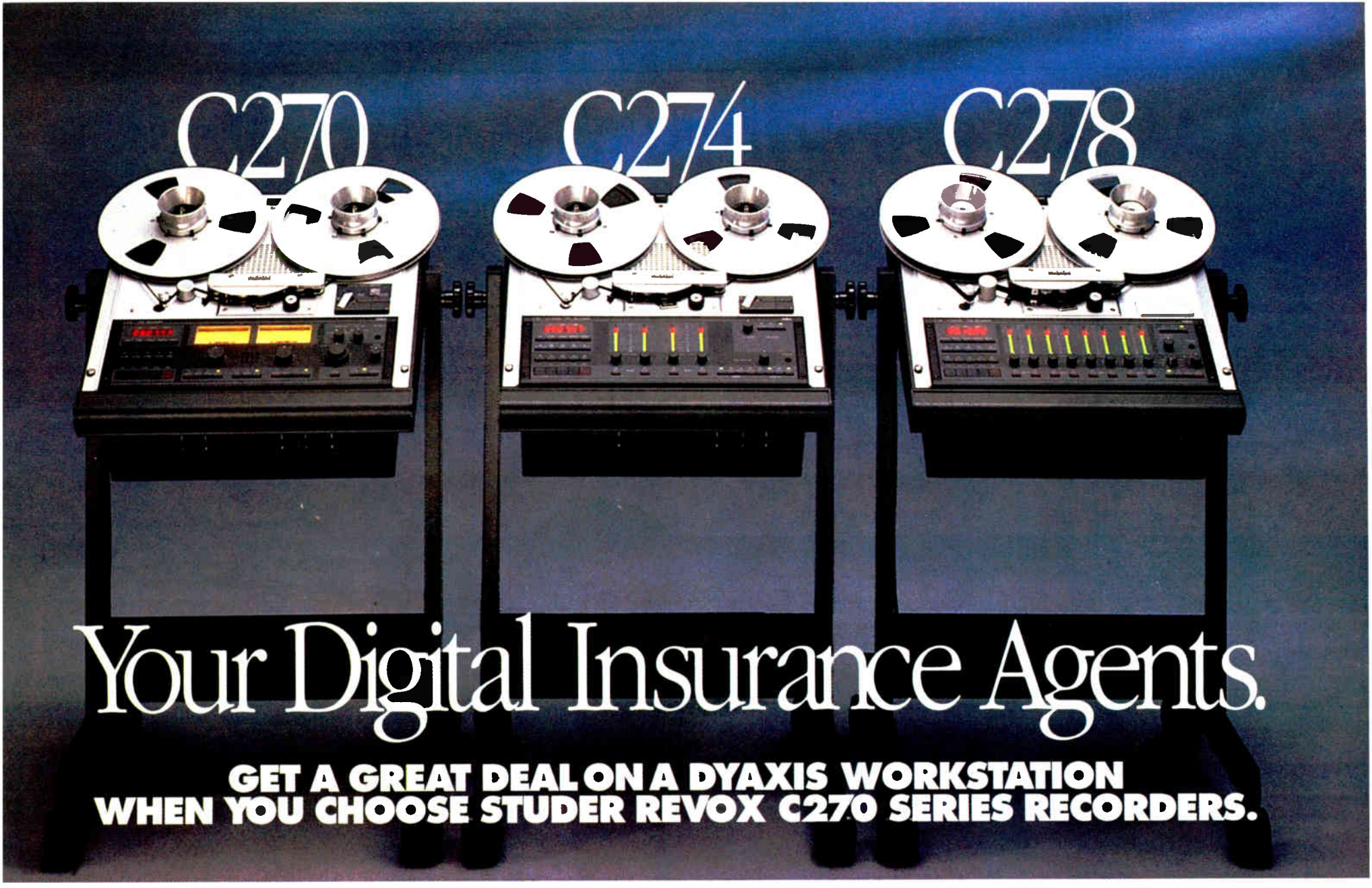
Special thanks to the following VOA staff members for their assistance in the preparation of this series: Bruce Hunter, deputy station manager, Greenville Relay Station; Dell Carson, technical training officer; and Judy Jamison, Office of Public Affairs.

■ ■ ■

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



Tim Achterhoff, President
Greater Muskegon Broadcasters, Inc.



DIGITAL INSURANCE A C270 Series reel-to-reel with a hard disk option? Yes, Studer has just acquired Dyaxis, the most price competitive and capable digital audio workstation available. Now when you buy a Revox C270 (or a Studer A807) Series reel-to-reel, we'll give you a discount certificate worth up to $2,500 on your future Dyaxis purchase. That's your hard disk option!

THE C270 SERIES This exciting new line of recorders provides you with all the traditional Studer Revox benefits—mechanical precision, electronic sophistication, supreme sound quality and superior support—adding up to state-of-the-art analog recording technology. The C270 is available in 2, 4, and 8-track versions with or without remote/autolocator.

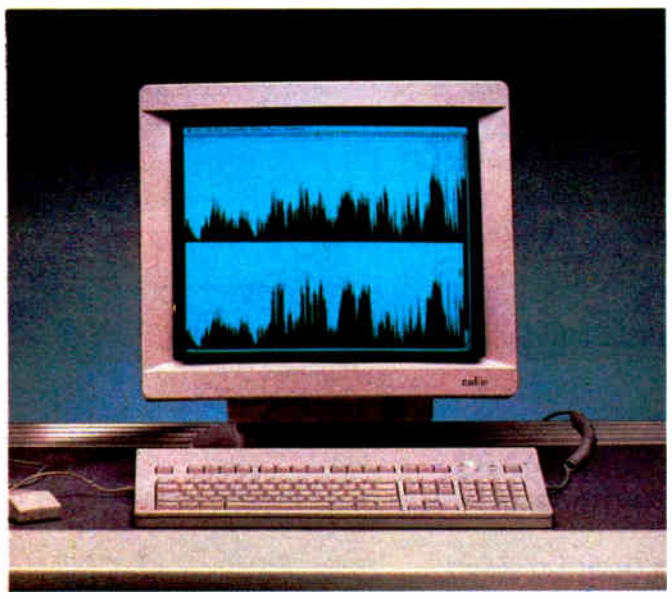
BEST BUY Compare the "street" price and performance of any C270 Series machine with the competition, and you'll find there *is* no competition. The die-cast deck plate and head block, the precision mechanics and a host of powerful features tell you any C270 Series machine will last as long as you need a reel-to-reel in this emerging era of digital workstations. And in the digital future, you'll need analog recorders that will sound good—for a long time. That's why your last reel-to-reel should be a Studer Revox.

TIME CODE...OR NOT The C270 2-track version offers optional center track time code for effortless synchronization to picture or sound. The C274 4-track and C278 8-track are both equally adaptable to production or post. The optional remote/autolocator stores 18 start/stop addresses and provides full transport and channel remote control to fit into any professional studio environment.

LOGGING TOO For station logging applications, special super low speed versions of the C274 and C278 are available with built-in time/date code generator and reader with search capabilities, providing up to 25 hours of continuous audio on one reel of tape.

STUDER DYAXIS With over 200 Dyaxis systems delivered worldwide, Studer has become *the* leading supplier of Digital Audio Hard Disk Systems, and the *only* major reel-to-reel supplier currently delivering such digital workstations. Buy either, and you choose a leader. Studer Revox.

Call your Studer Revox Professional Products Dealer—your Digital Insurance Agent—or Studer Revox direct to receive all the details. And remember, your purchase of any C270 insures that your future will be digital—with Dyaxis.



STUDER REVOX

Studer Revox America, Inc.
1425 Elm Hill Pike • Nashville, TN 37210 • (615) 254-5651
New York (212) 255-4462 • Los Angeles (818) 780-4234
Studer Revox Canada Ltd., Toronto (416) 423-2831

Circle 54 On Reader Service Card

SV-3500 Edges Out Higher Priced DATs

(continued from page 24)

function for a stop cue that cued up the tape to the beginning of each next cut, like a cart machine. I'd be willing to pay almost 500 bucks more for the machine if it would cue to start after each play. Well, maybe not $500, but $350 for sure.

According to Foreman, one SV-3500 user has programmed a 20 kHz tone with no other audio as one of the cuts on the tape. He then programs playback to play the cuts he wants to hear, followed by the 20 kHz tone section.

Even though he can see the 20 kHz on the meters, it gives him a "pad" of inaudible audio and keeps the DAT playback from playing the next cut. So far, the dogs in the neighborhood haven't complained.

There are DAT machines that cost a lot more than the SV-3500. . . that can't outperform it.

Another good protection feature would keep any additional recordings you want to add from over-recording segments you want to keep. If you're not keeping a very precise track sheet with absolute time to show you where and how long each piece is, you can easily screw up by trying to over-record an old 30 second segment with a new 45 second segment.

While in record, the machine doesn't know to stop before it hits the next recorded cut on the tape. You end up accidentally blowing off the first 10 or 15 seconds of the next cut. Simply put, *this machine is not idiot proof!*

Additional features

The skip buttons on the front panel allow you to skip forward or backward to other cuts. Press the button once, you move to the next cut. Press it twice, you go two cuts down the tape.

The end search button quickly advances the transport to the end of the recorded portion of the tape. If you've been recording absolute time, this feature allows you to continue recording from the last recorded position or find the total number of programs or total time recorded on the tape.

The timer selector allows automatic playback or record when the unit is connected to an optional AC line timer.

The memory section allows you to program a number of cuts, in order or randomly. The repeat button causes the machine to continuously repeat any number of cuts you have programmed into the memory. Pressing the recall button gives you a front panel readout of the cut number series currently programmed.

Panasonic borrowed the A-B repeat technology found on most CD players. During play, pressing the A-B repeat button at the point at which you wish the repeating section to begin, and again where you want the section to end, creates a play loop that will repeat sixteen times before stopping.

The music scan feature lets you hear about the first nine seconds of each numbered cut on the tape. It then fast forwards to the next cut, plays nine seconds of it, and moves on to do the same with all the cuts on the tape.

The auto record mute button lays down a four-second unrecorded section on the tape before each cut. This is particularly helpful when you're recording over old tracks. It cleans off the track to insure a good clean entry and exit point for the new cut.

And in the end . . .

As I said earlier, the machine is not idiot proof. I doubt that being so was in the original design parameters. Used intelligently this machine can be more than just a great archiving master recorder. There are DAT machines that cost a lot more than the SV-3500's current list of $2500 that can't outperform it.

Incidentally, in a previous DAT article I referred to dropout inconsistencies using a variety of machines and DIC tape. I was unable to pin down the cause. Since then I've spoken with Russ Brown and Kevin Kennedy of DIC, who verified that in early production runs there was a problem with the cassette shells.

According to Brown, extra tape drag caused by poor specs on shell manufacture caused the problems which have now been corrected. All of the tests performed on the SV-3500 were made with DIC tape. There were no dropouts.

■ ■ ■

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

Survival Manual for Class A's

by Steve Crowley

Washington DC Class A power increases are underway ... for some. Last month, the FCC issued a list of 668 Class A stations that meet newly increased separation requirements. They can now increase power to equivalent maximum facilities (6 kW, 100 meters) by simply doing so and filing FCC Form 302 within 10 days. RFR guidelines must also be met—no problem for most.

Since there are about 2000 Class A stations, chances are yours didn't make the list, and now you are looking for the fastest, most economical route to an upgrade.

If you haven't already done so, have a separation study performed to see why you were omitted. It's unlikely, but there may have been an error in the Commission's database.

Even though you didn't make the list, if your antenna height above average terrain is less than 100 meters, you may now increase power to above 3 kW to meet the old equivalent maximum facilities (3 kW, 100 meters). For example, a Class A station operating with 3 kW at 50 meters may increase to 4.8 kW. Again, FCC Form 302 must follow the increase.

That's it for the quick and easy increases. The upgrade routes I'll now discuss require the filing of an application for construction permit using FCC Form 301. Processing time for these is uncertain; they are considered minor change applications by the Commission.

(As of this writing, the FM Branch has been processing 50% of these in about five months. The added burden of Class A power increase applications will undoubtedly increase processing time. Twelve months, 18 months—no one knows.)

CONSULTANTS CORNER

Though you don't meet the new separation requirements, you probably met the old ones and are therefore considered a newly grandfathered short-spaced station. Here's how you can increase beyond the old 3 kW, 100 meter maximum. (Incidentally, if you don't increase power, you can always relocate in accordance with the old separation requirements.)

Agreement between stations

If your only short-spacing is to another Class A station, an agreement may be reached between stations to increase the power of either one or both stations. In addition to this agreement, a public interest showing must be prepared which indicates the extent of any interference as well as other services provided to the interference area.

If the short-spacing is to a facility other than Class A, you have the added requirement of demonstrating that no fully-spaced or lesser short-spaced site is available.

Can't get an agreement? Consider filing under the short-spacing rules of Section 73.215 which took effect last spring. You might find that terrain works such that you don't even need a directional antenna. Remember that these are "non-overlap of contour" rules. This includes existing overlap, which means some stations may be put in the peculiar position of having to reduce existing coverage in some directions to get an overall power increase.

That covers newly grandfathered short-spaced stations. Perhaps you were short-spaced under the old rules as well. If so, and if you have been short-spaced since 16 November, 1964, you are still subject to the provision that your 1 mV/m contour may not extend toward the 1 mV/m contour of the short-spaced station. Relocation or a directional antenna may be required in order to increase power.

The down side

Remaining categories of stations are the biggest losers in this proceeding. They include Class A stations short-spaced to, and within the protected contour of, second- and third-adjacent Class B or C facilities. Under the new rules, they have practically no opportunity to increase to maximum facilities.

Stations within 199 miles of Canada or Mexico must meet greatly increased separation requirements until international coordination procedures are complete. This will happen sooner with Canada than Mexico. With Canada, a provision now exists for specially negotiated short-spacing agreements.

The last to increase power will receive less interference and get the best coverage.

Several petitions for reconsideration of the new rules have been filed. Among the pleas are that Class A stations with existing overlap filing under Section 73.215 not be forced to sacrifice existing coverage in order to improve overall service.

It has also been requested that the public interest showing requirement be eliminated as a routine matter. In many cases in which these new rules will be invoked, two Class A stations will be doubling power with no change in site or antenna height. Desired-to-undesired field strength ratios remain the same, so there will be no service loss—only service gains.

It is axiomatic that the public interest is served. Eliminating this requirement would free the Commission from the burden of redundant showings that can only increase application processing time. Furthermore, application preparation costs would be reduced.

Other reconsideration

Reconsideration is being sought of the requirement for demonstrating that no fully-spaced or lesser short-spaced sites are available. While these sites may exist, many Class A stations will not be able to afford a move. Even if such a site is not available, the alternative site showing is complex and increases application expenses for the station.

Another concern is an opportunity for an interesting ploy that may forestall many power increases. Here's how it works: Station X and Station Y, both Class A facilities, are newly short-spaced. Station X wants to increase power but Station Y won't agree. Station X then increases to maximum Class A facilities using the provisions of the short-spacing rules of Section 73.215.

Under those rules, Station X must protect Station Y assuming that Station Y is a maximum Class A facility (6 kW, 100 meters). It does so by suppressing its newly expanded coverage in the direction of Station Y with a directional antenna.

Once Station X is licensed, Station Y may then increase to maximum non-directional facilities because it is now required to protect only the licensed facility of Station X. Since Station X has suppressed coverage toward Station Y, Station Y will obtain greater coverage than if it originally increased power to maximum equivalent facilities mutually with Station X and received interference.

Last to increase, wins

The incentive is to not make agreements in those cases where there will be a large area of contour overlap. The last to increase power will receive less interference and get the best coverage. This will likely create stand-off situations where neither facility will improve.

This problem wouldn't occur if Class A stations were allowed to increase power without the consent of other Class A facilities. Even if only one station increases, service gains will typically outweigh service losses.

These rules are complex. You have to look at the new power increase rules together with other FM rules and Commission policies to determine the best route to an upgrade. Your situation should be examined by your own legal counsel and technical consultants.

■ ■ ■

Steve Crowley is a registered professional engineer with the consulting firm of du Treil, Lundin & Rackley, Inc., 1019 19th Street, NW, Suite 300, Washington, DC 20036. Phone: 202-223-6700 (FAX: 202-466-2042).

Dealing with Hum in the Chain

by Bill Higgs

Louisville KY Question: "Why does it hum?" Answer: "Because it doesn't know the words."

Forgive me for opening with an old joke, because hum in the broadcast chain is no laughing matter.

Hum is potentially present anytime AC is present. We are most familiar with audible 60 Hz hum, originating from the power mains. The electrical and magnetic fields created by the power lines cross paths with our electronics and an unwanted element is introduced. Knowing this, it should be a simple matter to shield our equipment properly and eliminate the problem, right?

Wrong. Most engineers have gone through at least one episode of hair pulling trying to eliminate a persistent hum problem. Shielding and grounding alone is not the answer.

One major way in which hum is introduced into equipment is from the magnetic fields of transformers. Most modern broadcast equipment has shielded power transformers with mu-metal casings or toroidial windings, so the external magnetic field surrounding the unit is greatly limited.

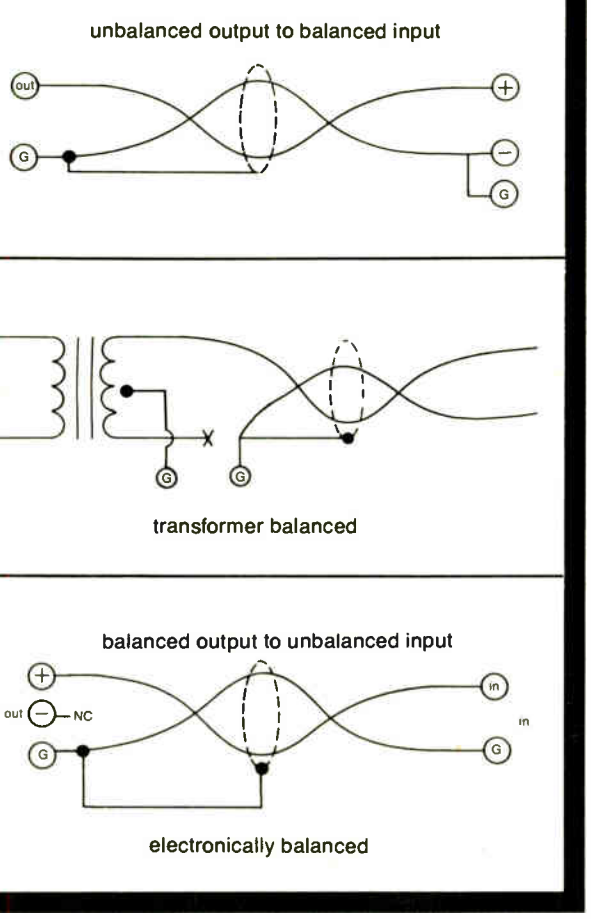
The same goes for any signal transformers. Tape heads and microphones are also magnetic in nature and susceptible to magnetic interference.

The solution here is to separate transformers and magnetic pickup devices as far as possible. I remember once trying for an hour to find a hum problem in a rack-mounted cart machine, only to find it directly beneath the power transformer of the power amplifier mounted directly above it. The lesson here is to first try moving the offending equipment. Live and learn.

The second most common problem I have found is single-ended (unbalanced) equipment improperly connected with balanced devices. Contrary to popular myth, unbalanced equipment does not by nature create more hum than balanced equipment.

The idea of balanced lines in the first place is that any interfering signal (read hum) is induced equally in both wires. As a balanced line is a push-pull arrangement, the interference is effectively balanced out.

Figure 1.



BOTTOMLINE BROADCASTER

If the line is not balanced, the hum component will be greater in one side than the other and the interference will not cancel. If one side of a balanced line is grounded, this is exactly what will happen. Hum will be amplified, and drive the engineer nuts.

What's the answer?

The solution is to let the unbalanced equipment dictate the hookup. Unbalanced inputs should be driven by one side only of a balanced output and the center tap should be grounded on transformer isolated outputs.

Balanced inputs, on the other hand, can usually be unbalanced by simply tying one side to ground. Use one of the internal wires of the audio cable as signal ground and let the cable shield float so that it carries no signal.

Never ground one side of an actively balanced output, unless the manufacturer specifically indicates that this should be done. In most cases, doing so will both blow the output chip and induce hum into the entire system. (See Figure 1.)

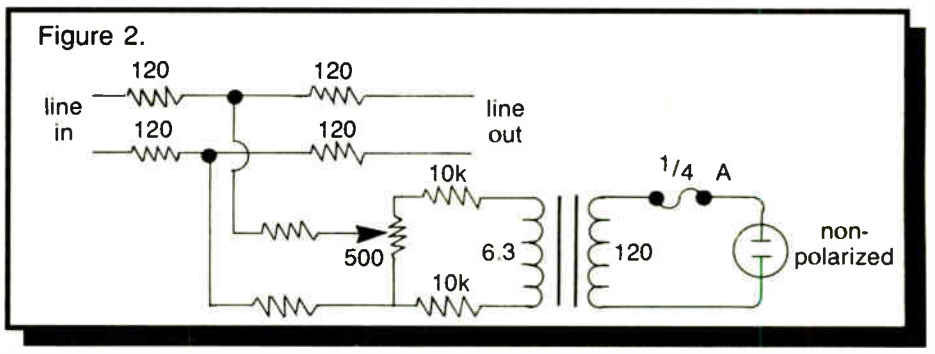
Ground loops are another source of trouble, particularly with unbalanced or actively balanced circuitry. This problem occurs when AC currents flow through a shared circuit with the audio. Use of a common grounding buss of extremely low impedance (such as copper strap or copper tubing) helps with this problem.

Other insidious inroads

Assuming we can clean up our own houses, there are other sources of hum. Most stations do various remotes from around the area, many of which have a significant level of hum. The reasons vary from ground loops at the source to a mic near a fan.

There is also the guy who connects his radio loop across the speaker of his PA amplifier. Can anything be done about these situations?

Figure 2.



Amazingly, yes. The solution is called a humbucker, which induces an equal amount of hum into the audio amplifier 180 degrees out-of-phase.

If the remote is local, you have access to the same source of hum as the remote. Figure 2 is a circuit that introduces a small source of 60 Hz AC into the same input as the remote line. Losses in the mixing pad are about 8 dB. If you prefer, the adjustable hum may be inserted into an unused board input, although this limits operational flexibility.

Build the unit however you like. As the transformer will have 115 VAC on the primary, make sure that it is well insulated. If you really want to go cheap, you may be able to use a pilot light winding on the board's existing transformer. The idea is to have raw AC of between 6 and 12 V.

Operation is simple. Increase the output via the potentiometer until the hum nulls out. If the hum increases steadily, unplug the AC cord and turn it over. Adjust for a null.

This is not intended as a solution to an inherent hum problem, and it will not stop 120 Hz hum caused by bad filter capacitors. It may, however, bail you out of a jam. If so, you can "hum" something a bit more pleasant.

■ ■ ■

Bill Higgs is on the engineering staff of WHAS-TV, was CE for WXLN/WFIA 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 c/o WHAS-TV, 520 W. Chestnut St., Louisville, KY 40202.

Editor's note: Are you a small-market engineer with projects, tips and ideas to share? Fax a brief note to **RW** *at 703-998-2966 or call JG at 703-998-7600.* **RW** *pays for articles published.*

Solve Problems by Networking

Don't Just Leave It at The Office! Exchange Ideas with Your Peers

by John Cummuta

Downers Grove IL Radio stations are basically "small" businesses, which means that the size of an engineering staff can run anywhere from a few to a handful. In many cases it's down to one or none.

ENGINEERING MANAGER

But a serious problem that these small department situations cause is that there is limited opportunity for cross-pollination of ideas, knowledge and experience. This may not only cost your station time and money, but you as an individual can be penalized with a stunted professional growth curve.

The problem becomes even more pronounced if you're the department manager, because you now have even fewer peers to bounce ideas off of and learn from.

One stop-gap help is reading publications like this one. In these pages you receive the shared wisdom and experience of a host of your colleagues.

But, if they only half answer your immediate need, you're stuck. And if they don't pass along any relevant knowledge to your situation, you can only store what they do give you away, just in case it becomes germane somewhere down the line.

Networking

A few engineers I know have begun networking with others in their areas. It gives them an opportunity to share all the things they were never taught in technical school, like how to deal with the FCC, who are the best suppliers for various parts—and what is the average compensation for your position, as well as the positions under your charge.

This is a great idea, because broadcasting, perhaps more than most other industries, is a series of little islands. You rarely get to see what the people on the other islands in your area are doing, because they are the trade secrets of competition. But engineers can get away with what talent and programming people would never consider—fraternizing with the "enemy."

On our own little island, we tend to have experience that's limited to whatever has actually happened on that island. It's possible that we've lived on one or two other islands in our career, but engineers are a lot less transient than those in other departments in the stations, so it's much more likely that we've mostly been exposed to what's happened at our place and what we read in the trades.

In other industries, where the technical staffs tend to be larger, there is a wide breadth of experience to draw on. If a certain problem hasn't previously cropped up on your assembly line or in your computer, chances are that it has happened to one of the other guys and they can be a big help in getting you directly to the solution.

Mentors

Another element that began dissolving the minute the ink dried on the FCC's deregulation actions a half decade ago was the ability for new engineers to mature under the tutelage of older, more experienced pros. You remember—the ones who knew just where to tap the transformer to stop the buzzing.

Since few schools really teach broadcast engineering, it was this patriarchal system of handing down knowledge from one generation to another that supplied radio with some of the finest engineers to ever fill a shirt pocket with tweakers. Now that the mentor system is pretty much gone, another source of good old savvy is missing.

Networking can help meet this need as well. While the Chief Operator of one station in a given market may just be beginning to shave, another may be approaching retirement.

"There is wisdom in a multitude of counselors." Thousands of years after it was written, it still makes sense.

When this seasoned veteran leaves the industry, a valuable source of knowledge and experience will be lost to those new technicians who might like to learn a few things, without having to live through them themselves.

Talking with fellow engineers is one way of dealing with operational headaches.

How to start

The ways of building a networking group are as varied as the engineers in a major market, but there are a few simple ways to get started.

One that immediately jumps to mind involves food. I've never met a broadcast engineer (including myself) who didn't love food. So, why not just call (or write) the other engineers in your area and ask if they'd be interested in getting together for pizza once a month.

From that beginning you could formalize a structure, if you wish. You could even create a club, elect officers, conduct social functions and the works. But the important thing that you want to make sure happens is that you *do* talk shop.

You frequently hear people say things like, "Leave it at the office."

Hogwash! You're in this business because you love it and there's no rational reason why you can't discuss something you love around the clock if you want to.

This is your big opportunity find out if anyone else has experienced that crazy problem you have on your modulation monitor, or if they've located the right drug to calm your nighttime jock down to normal human levels of communication.

Whatever you feel are the nulls or weaknesses in your knowledge or experience, a network get-together is your chance to bask in the glow of the group's collective intelligence.

Academic network

Another possible place to initiate a network might be at a technical school or community college in your area. They might even be interested in your creating some kind of broadcast engineer's club. They've probably all got ham radio clubs, so why not something on a professional level?

A side benefit of the school environment is that they might even let you use the labs for some actual hands-on demonstrations or training. There's no reason why the more seasoned engineers in your area couldn't even charge a nominal fee to conduct training on important areas of your craft.

Local SBE organizations may also be a good catalyst for this kind of activity, but whatever form you use to get it started, the important point is to start.

No one can know all there is to know about your profession, and certainly, no one could possibly have experienced all the disasters, large and small, that can befall you.

A quote from the *Bible* says that "There is wisdom in a multitude of counselors," and thousands of years after it was written, it still makes sense.

■ ■ ■

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

Get More Bang from Your Computer Buck

by Barry Mishkind

Tucson AZ If the late 1970s and 1980s brought nothing else, they made computers a vital part of our lives.

Perhaps you remember 17 or 18 years ago, when the first pocket calculators came out. For $400 or so, you could get the power available today for $3.95 plus tax!

However, it took less than ten years to get from that to computers for the masses at your local Radio Shack. The TRS-80 Model 1 was indeed a blessing and a challenge for users.

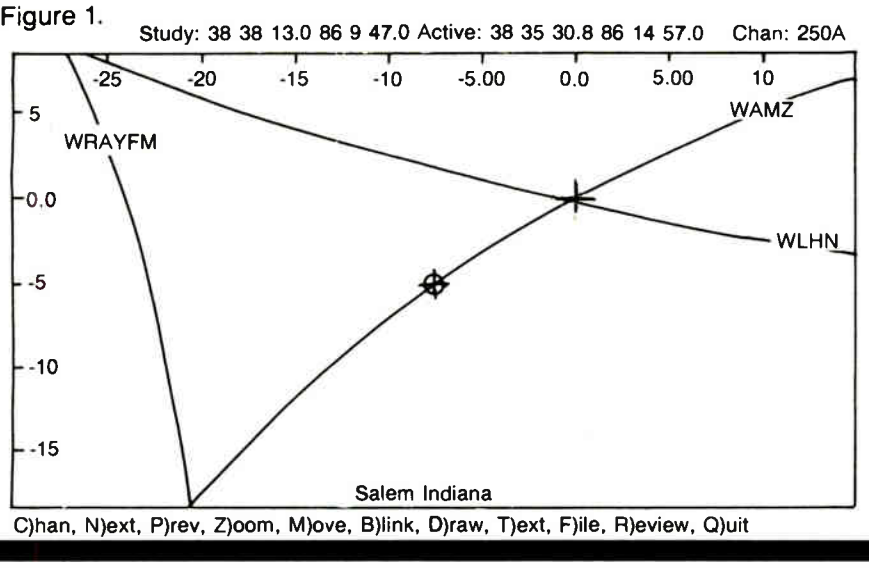
Some manufacturers developed job-specific computers, such as for program automation. As time passed, more and more equipment was designed to take advantage of computer control. Business uses were found for the computers, payroll, billing, inventory and word processing, for example.

ECLECTIC ENGINEER

At the fall broadcast conventions in New Orleans and Kansas City, there were demonstrations of some of the programs available. Many were offered free, some are even on various electronic BBS systems.

It is my hope to acquaint you with some of the resources that are available.

Figure 1.



The engineer's lot

Yet, in many stations, the only time that the engineer got to use the computer was when he installed or repaired it. One of the reasons was that there were few programs of use to the engineer, especially at a cost the stations were willing to bear.

So, many of us bought our own micro computers and learned to program a little in BASIC, writing some programs to do simple math such as that needed for DA base current reading, indirect power charts for FM, pads, etc.

Then with the IBM PC and clones, costs came down dramatically.

Now, poised at the threshold of 1990, all around us are databases of RPU and STL frequencies, and programs to to calculate STL paths or design a T-net, as well as higher level programs to analyze directional antennas or assist in FM site selection.

Checking them out

In addition to the free packages offered by such companies as RF Specialties and Continental Electronics, is a nice one given out by Broadcast Data Services. The BDS toolkit is TSR, so it loads into memory and pops up when you need it.

BDS, which offers on-line database and other services has also authored a program for use in the field by stations wanting to know what opportunities are available for FM facilities.

FMPC is a relatively low cost program that allows the user to play "what if?" by graphing protection contours of all stations in a given area. (See Figure 1.)

After downloading the necessary data, you can have an up-to-date look at

(continued on page 35)

Making a Splash in Denver

(continued from page 23)

production studios are critical to operation. Two stereo production rooms are equipped with Arrakis 10,000 consoles set up for 16 channel production, Fidelipac CTR112 playback and CTR124 record/playback cart decks, Otari MX5050B II reel-to-reels, Orban 674-A graphic parametric equalizers, Crown D-75 monitor amplifiers and 4406 JBL studio monitors.

KDHT Program Director Ira Gordon mans the station's master control.

Equally important to the stations' programming is the newsroom. Also equipped with an Arrakis board, the 1500SC 8-channel with two inputs per channel, Fidelipac stereo CTR12 and mono CTR13 cart decks and a Tascam cassette deck, the newsroom serves both AM master control and FM master control from its central location.

In the stations' music library, the group rack-mounted an Arrakis 250SC six-channel console to give them more room and flexibility. Said Rockhill, "We rack-mounted (the console) in a pod that goes on top of the desk, so the music librarian cannot only use it for auditioning music, but also as a dubbing center."

A Technics SP25 turntable, Tascam CD501 CD player, and Fidelipac CTR12 cart deck are used to audition and/or dub music. "They haven't got a record deck at this time," commented Rockhill, "but it's just a simple matter of rolling one in."

What the stations aren't lacking, however, is plenty of library storage space. Handy Arrakis Modulux storage racks line the music library's walls for a 250 LP library, as well as 100 seven-inch reels, 100 tape cartridges and 160 CDs.

Termination for all six studios is done with punch block connectors in the engineering room. An Eventide BD9321 digital delay also resides in engineering, along with new diagnostic equipment such as the Potomac AT-51 audio test set and the Tektronix 2225 oscilloscope.

. . .The equipment was brought into Allied's lab for testing and proof of performance. . .

Proof of performance

The equipment, sourced by Allied along with Arrakis' top of the line furniture, was brought into Allied's lab for testing and proof of performance prior to permanent residence at the new location. After an initial proof of performance, matched against manufacturers' published specifications, equipment was placed in surge controlled burn-in racks for 96 hours.

The station's morning man, Rick Lofgren, sits behind the production "B" console.

Although this might seem like overkill to some, according to Rockhill, "The mortality rate of ICs is typically going to show up in the first 100 hours of operation and the mortality curve drops off considerably after that."

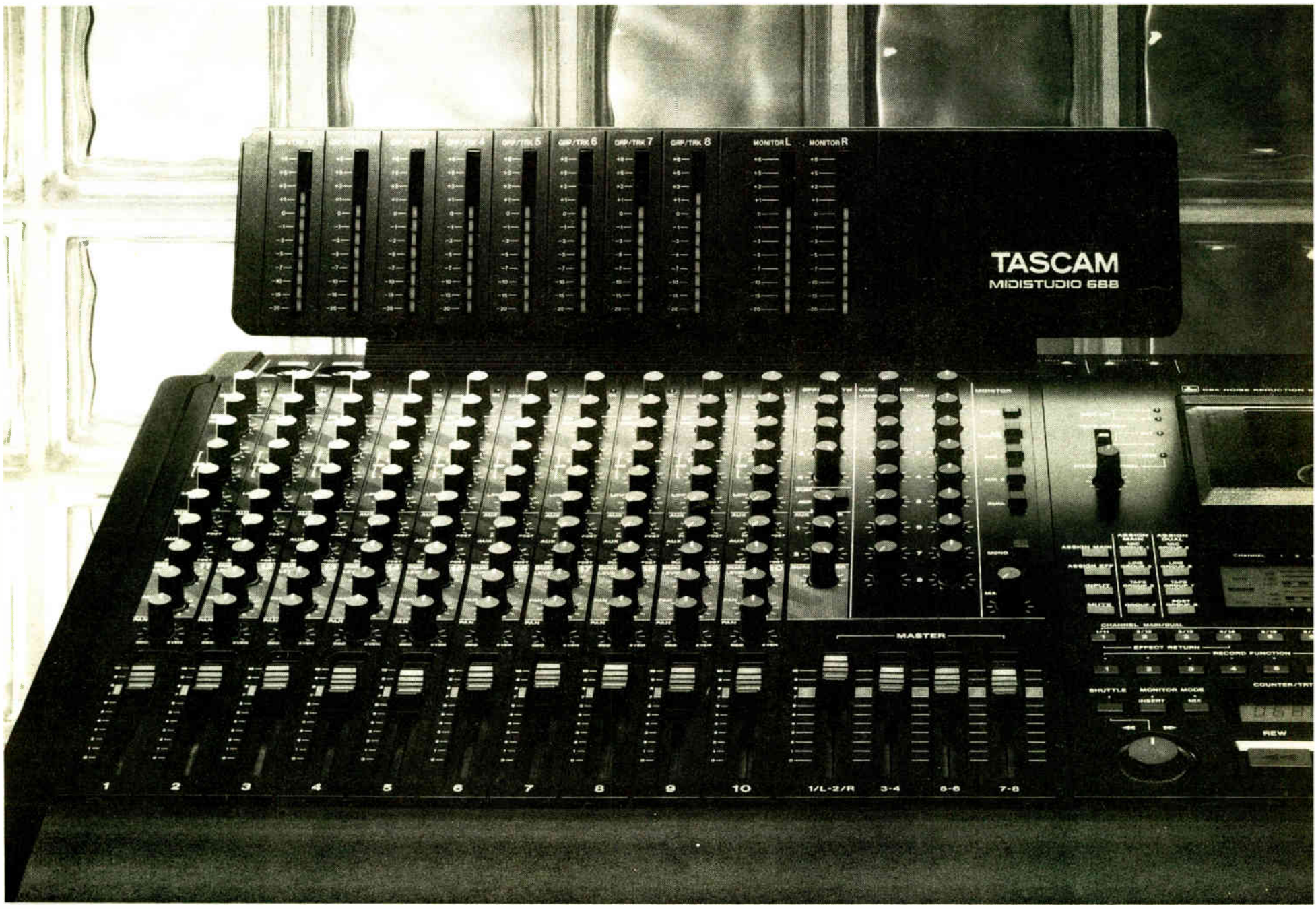
After burn-in, KDHT's and KMVP's equipment was again given another proof of performance test, and then assembled into a system package for yet another proof.

After being broken down into system modules for transportation, another Allied proof was done. This last proof, said Rockhill, is done primarily for the customer's benefit as well as to detect problems that might have occurred during transportation.

Needless to say, the assembly on-site, done by an Allied installation crew, went without a hitch. The only responsibility remaining for the Denver newcomers was to turn the key and create a few new waves in Colorado's top rated market.

■ ■ ■

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



Computer Use for Engineers

(continued from page 33)

where stations can fit in your area. The great thing about this program is that it allows you to move the prospective transmitter site and then redraws the protection contours.

Advantages

Here's the benefit of not being locked into one site: you can move around and try many different sites, which might give you a higher class and resultant coverage than you might have thought.

For instance, your site might have you limited to your current facility. But moving a couple of miles away, you can upgrade. Yet, using the interactive program, it might be possible to "leap" over a shortspaced area and find another opening that permits a bigger upgrade.

Yes, you can have your consultant do this for you. But at just $200 or so for FMPC, you can present much more direct instructions to your consultant, saving a lot of time and money.

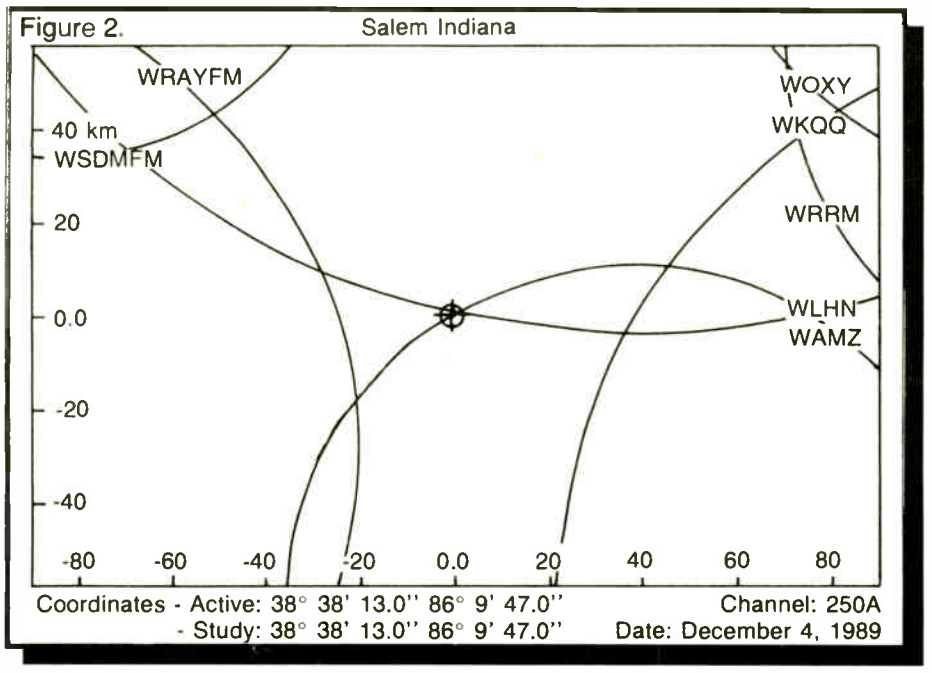
An example of this is where you have to search for usable land. Before spending a lot of money "what if"ing with the consultant, FMPC will direct you to the possible site areas, so you can determine which ones are the most financially feasible to use.

FMPC is screen driven with options listed at the bottom of each screen.

In addition to the graphics screen, there is a text screen and a review screen. On the text screen you'll find calculated for a given channel the distance and bearing from your chosen site to the other stations of concern. If you move the site, it recalculates and even shows how far you've moved.

The review screen covers all channels in the study with the number of conflicts and most restrictive conflict listed on screen for a quick determination of where to go next.

Figure 2. Salem Indiana



Returning to the graphics screen, which can drive a plotter directly, you can even adjust the scale, by zooming in or out to include more stations or inspect closely the edges of possible areas. (See Figure 2.)

By zooming in real tight, you can visually manipulate your site down to distances under one kilometer, then read out the coordinates for use by the consultant.

What don't I like about FMPC? Its data file loading is a bit difficult if you don't recall the filename. You can get a directory listing, but you then must remember the filename as you go to the loading screen. BDS is working on a better loading sequence.

The compatibility issue

The real meaning of "PC compatible" becomes clear if you have non-standard video drivers in your computer. FMPC checks your driver, but if you are running mono EGA, for example, it sometimes gets faked out. However, software switches can compensate for this, once you realize what you need.

Also, it is not designed for use on the educational channels. BDS explains that this is due to the complexity of many situations involving TV channel six. I guess that's life.

On the other hand, FMPC is right up to date with the new protection contours, handling the 6 kW class A contours, as well as those for the new class C3.

All in all, FMPC is a very cost effective program that allows you to discover your station's possibilities.

For further info contact Mark Steinwinter or Mike Degitz at BDS: 1-800-523-3117.

■ ■ ■

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

Before we changed the rules of the processing wars, we made sure we were following the FCC's.

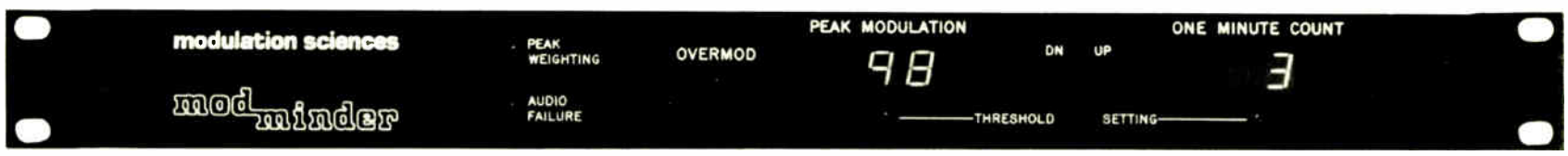
ModMinder's revolutionary digital modulation measurement technology has caused plenty of excitement and considerable comment. Not to mention the occasional unfounded rumor.

This excerpt from an Opinion of Counsel prepared for Modulation Sciences by the respected FCC law firm of Bechtel, Borsari, Cole & Paxson in Washington D.C. should clarify the picture. The Opinion is based on consultation with a Professional Engineer, and on exhaustive research covering FCC Rules and Reports and Orders as well as case law. After all of that, attorney Harry Cole's Opinion is this:

"I understand that... [the ModMinder™] has been designed and manufactured to satisfy the FCC-defined standards for type approval in effect prior to the 1983 deregulation. It is my opinion that, assuming that [the ModMinder] does in fact meet these standards, and thus permits monitoring of a station's modulation consistently with the last rules in effect for such equipment prior to the elimination of the modulation monitor requirement in 1983, then *correct installation, regular maintenance, and proper operation of [the ModMinder] should be sufficient to assure compliance with the Commission's modulation requirements.*"

Harry F. Cole, Esq.

We invite you to review the full text of this document. For a copy, please call Modulation Sciences toll free at 800-826-2603.



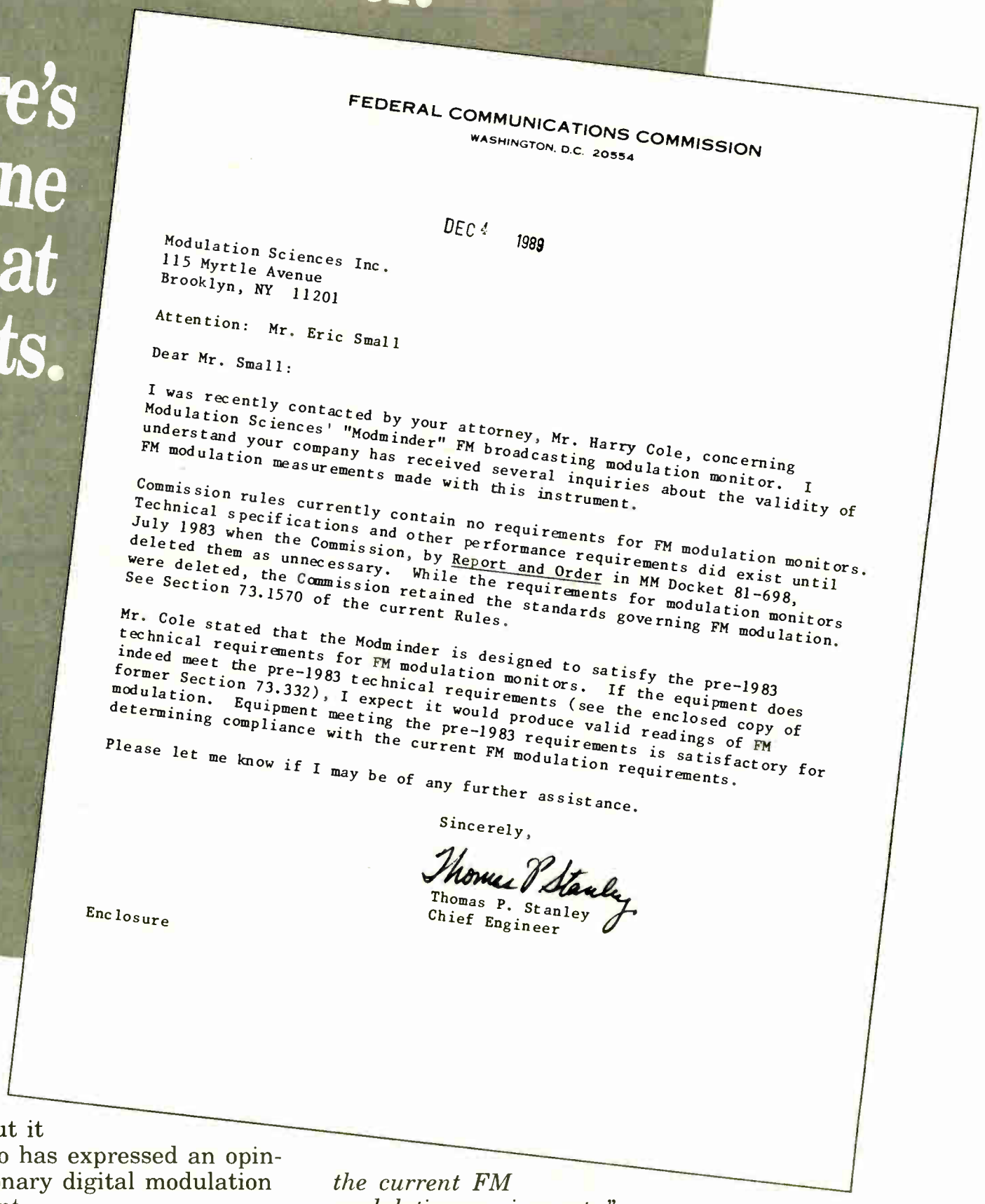
modulation sciences, inc.

115 Myrtle Avenue • Brooklyn, NY 11201 • Tel 718-625-7333 • Toll Free 800-826-2603 • Fax 718-260-8286

Circle 16 On Reader Service Card

Everyone has an opinion about ModMinder.

Here's the one that counts.



FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

DEC 4 1989

Modulation Sciences Inc.
115 Myrtle Avenue
Brooklyn, NY 11201

Attention: Mr. Eric Small

Dear Mr. Small:

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

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

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

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

Sincerely,

Thomas P. Stanley

Thomas P. Stanley
Chief Engineer

Enclosure

It's only been a short while since we introduced ModMinder™and changed the rules of the processing wars. But it seems everyone in radio has expressed an opinion about this revolutionary digital modulation measurement instrument.

Here's the one that really matters. This letter from Dr. Thomas Stanley, Chief of the FCC's Office of Engineering and Technology, confirms that the ModMinder takes *"...valid readings of FM modulation. Equipment meeting the pre-1983 requirements is satisfactory for determining compliance with the current FM modulation requirements."*

We designed ModMinder to meet the pre-1983 requirements. And to measure FM modulation like nothing else, pre- or post-1983. For more information on how ModMinder can help you be louder and cleaner—and legal—call Modulation Sciences at 800-826-2603, toll free.

modulation sciences, inc.

115 Myrtle Avenue • Brooklyn, NY 11201 • Tel 718-625-7333 • Toll Free 800-826-2603 • Fax 718-260-8286

Circle 78 On Reader Service Card

An RPU Can Back Up Your STL

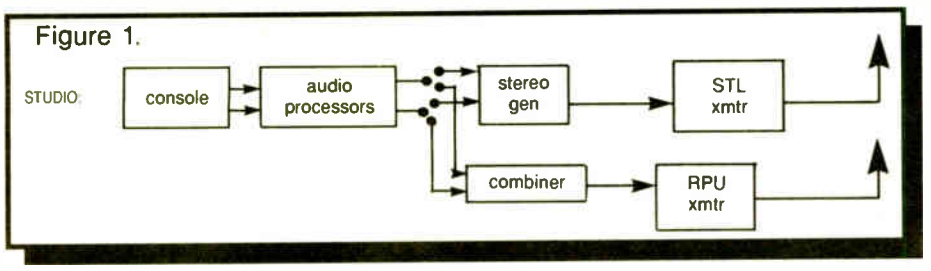
by Tim McCartney

Bemidji MN If your STL fails with no hope for immediate repair, your RPU can be used temporarily. FCC regulation 74.24 allows broadcasters to use the RPU band for a total of 720 hours (generally 30 days) per licensed frequency for "emergency" STL purposes.

However, in the face of the 1 July, 1990 FCC requirement for STL narrowband emission, unexpected questions are emerging. Among them is whether a station with a non-compliant STL can temporarily substitute its RPU while the STL equipment is rebuilt and recertified.

Non-emergency applications are specifically precluded—such as RPU substitution as an STL while waiting for an STL license to be granted. The FCC states clearly that it does not consider this to be an applicable emergency.

Figure 1.



RPU is last resort

In general, the 450 MHz RPU band is reserved for live coverage from remote scenes of events. The lone exceptions are Alaska and Hawaii, where the band may be used for regular STL applications.

For most stations, such an RPU substitution comes complete with enough problems to render it as the last resort, when no other options exist. In a temporary switchover, engineers face difficulties with reception, location, monaural signal, preemphasis, frequency sharing, audio quality and fail-safe.

The RPU transmitter obviously must be able to reach its mated receiver at the main transmitter site. RPU antennas need to be in place or easily located for the temporary setup. Figure 1 is a block diagram of a simplified configuration of RPU as backup STL.

If the RPU receiver is located at the main transmitter site, setup is simplified. The receiver output feeds the FM exciter monaural audio input, which is capable of adding or not adding preemphasis. An available stereo generator at the main transmitter site maintains the audience's stereo receiver indicators, but may pose additional problems since the generator itself seldom adds preemphasis.

The studio setup is usually fairly simple, with a combined mono output from the final audio processor (which usually has preemphasis) feeding the RPU transmitter.

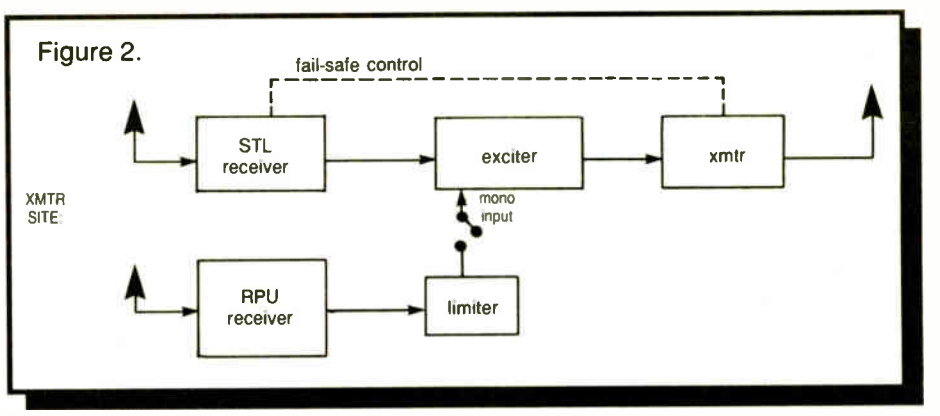
Naturally, in the end, the need is for one preemphasis circuit only. This may sound much simpler than it actually is under these circumstances.

Frequency coordination

There's also the matter of frequency coordination. Since the FCC will allow multiple users on the same frequency in a given market, local broadcasters are left on their own to argue it out.

While a community with effective local coordination plans may be able to handle this type of emergency for a few days, most users' patience levels will be stretched if the full 30 days are utilized.

Figure 2.



Audio quality is also a concern. Only two wideband, 15 kHz audio frequencies are granted for RPU use (450.925 and 455.925 MHz). The other narrowband channels, intended primarily for voice-only remote broadcasts, lack significantly in the full-fidelity requirements of STL use.

Care must also be exercised not to overdrive the RPU transmitter's required limiting circuitry. And, full modulation is impossible if a limiter is not employed after the RPU receiver audio output.

A further complication is fail-safe, since the FCC requires that such systems remain operational. An indication of the Commission's feelings in this regard (74.432) is contained in the exemption of Alaska and Hawaii stations to permit use of the RPU band for permanent STL assignments. Described are specific fail-safe requirements.

Despite various potential problems, the RPU system may emerge as a realistic choice under proper circumstances. So, it may be worth the time and investment to prepare for a less complicated switchover.

Stretch STL "emergency"

Curiously enough, the definition of "emergencies" for RPUs may soon be stretched considerably. With the FCC narrowband STL requirement ahead in 1990, questions remain about how non-compliant stations will meet the requirements.

If an existing, non-compliant STL is out of service while being rebuilt and recertified, it seems safe to assume that most broadcasters will view this as a true "emergency" and act accordingly, unless the FCC advises otherwise.

But before stations undertake to "define" the idea of such an emergency on their own, it would be wise to check with the FCC, or have the SBE, which has voiced concern about the approaching deadline, clarify the issue for the radio industry.

■ ■ ■

Tim McCartney is a contract engineer in Bemidji, MN. He is an SBE Senior AM/FM Broadcast Engineer, a former radio station engineering director and general manager, and has a masters degree in human resources management. He can be reached at 218-751-1680.

DT-90 Is WBAL's Workhorse

by Andy Butler, Dir Eng
WBAL-AM/WIYY-FM

Baltimore MD WBAL is a 50 kW news-talk station serving the Baltimore and Washington, DC markets. Station Manager Jeff Beauchamp likes to point out that news comes first in that format description and we expend a good deal of effort making that commitment a reality. A staff of 15 professional news people works the streets seven days a week.

The staff files reports using an extensive network of two-way, 450 MHz RPUs, cellular telephones, dial telephones and dedicated loops. Capturing, cataloging and airing this local material as well as material from our four networks is a formidable task.

Managing this task effectively was a major goal as we planned a recent newsroom renovation. A 50 input × 20 output Utah Scientific audio switcher was the core of the old newsroom.

Unfortunately it took a series of four or five switcher moves to access a source, capture it on tape, check its quality, edit it to length and commit it to cart for airing.

Simplification the goal

News Director Bob Shilling wanted to simplify this process. We were attracted to digital workstations such as the Dyaxis used in our production department. These systems deliver a lot of power and flexibility but their capacity is limited and joining six or more of them into a network is virtually impossible.

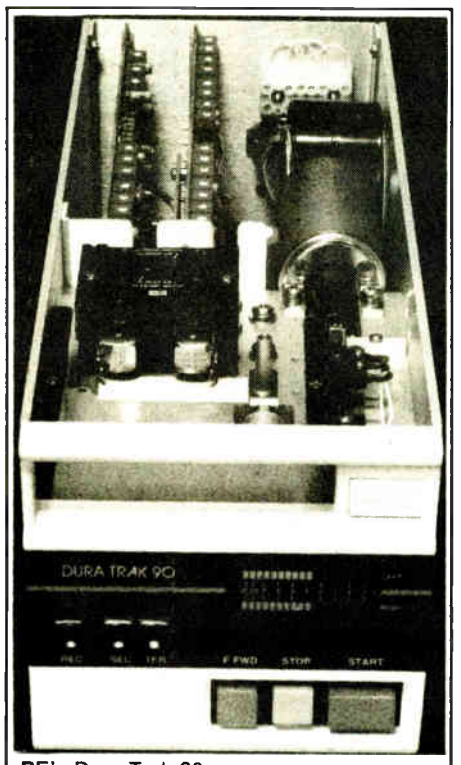
We eventually decided to stick with traditional analog workstations based on a pro audio grade mixer, broadcast quality reel-to-reel, professional cassette deck, record/play cart machine, a dedicated digital telephone hybrid, two inputs from the switcher and a microphone chain that feeds the mixer, a house intercom system and the two-way radio.

USER REPORT

Picking most of the equipment was straightforward. A Rane SM 26 splitter/mixer is a reliable hub for the edit station. The Otari MX 5050B reel-to-reel is a standard and the Tascam 122 cassette deck has also given us good service.

The sticking point was the cart record-play. We were seeking a well-constructed, simple to operate workhorse that would include some key convenience features but avoid the complex confusion of a top-of-the-line production machine.

The answer came when Broadcast Electronics' Vice President of Engineering, Geoff Mendenhall, made a comment during a presentation to our SBE chapter. He was demonstrating the Phase Trak 90 from Broadcast Electronics (one of the full blown production machines that we had declined) when he mentioned that BE was planning another machine with the same mechanical deck and simplified electronics.



BE's Dura Trak 90

The Dura Trak 90 (DT-90) that resulted has been perfect for our use. It is compact (a record-play, a splice finder-eraser and a playback machine will all fit across a 19" rack) and easy to operate.

Features include a reliable high speed cue, top notch audio quality and easy front panel control of all functions. The news people are particularly fond of the soft-edit. With soft-edit, rather than dig behind the front panel for a push button you simply push the record button twice to suppress the start tone and then edit multiple cuts together.

Easy setup

The machine sets up easily. Included is a sturdy machined head mount that locks tightly in place. The bias and EQ controls are of good quality and easily accessible. The audio circuits are straightforward and perform well.

The remote control functions are brought to a single DB-25 connector on the rear panel. These include a full complement of functions that make it equally easy to interface the machines to the Pacific Recorders & Engineering console in our news studio or the other devices in the edit station.

The DT-90s are performing well and the price that Broadcasters General Store negotiated for us made them fit our budget perfectly. Even on the brink of the digital age there is still a need to process and air a wide variety of audio cuts with analog simplicity. These machines definitely fill this need.

■ ■ ■

Editor's note: Andy Butler may be reached at: 301-467-3000.

For more information on the Dura Trak 90, contact Bob Arnold at BE: 217-224-9600, or circle Reader Service 56.

BUYERS GUIDE INDEX

Analyzing the Future of Carts

by Richard Farrell

Falls Church VA The analog cart machine is and will continue to be an important hub in the workings of today's radio station. But how does it continue to exist with the compact disc? And is there a digital cart machine in the wings to replace the analogs?

Cart machines and CDs seem to have achieved a peaceful coexistence. ITC/3M Product Supervisor Bill Parfitt says cost is a factor. With the buying and selling of radio stations today, management is more aware than ever of budgetary concerns where they relate to new equipment purchases.

And too, says Parfitt, there are stations that are dubious about the CD's direct-to-air sound. "Some stations say it doesn't matter because you can't hear (CD quality) after processing anyway and these stations opt for a cartridge-based format."

Wes Whiddon, director of engineering for Group W's FM stations, says he certainly does not see the cart machine disappearing anytime soon, but says also that "98% of what we do is on CD, but not for airplay. We use carts for airplay. And I don't know of any stations not using carts for spots.

"Some stations play straight off CDs into their air chain and some transfer CDs to cart," says Whiddon.

NewCity Communications Vice President of Engineering John Marino says both CDs and carts play large roles in the operations of his group's 13 stations. "At our stations," Marino says, "all music comes in on CDs. The programmers buy everything on CD and dub it to cart. That's how we do music.

"We feel that CDs in the control room confuse most operators," continues Marino, explaining in part his group's philosophy. "It is another medium they would have to deal with."

Marino says none of his stations play CDs direct-to-air. "Equipment in CDs is still in its infancy," he says. "Essentially, CD players are not quite there yet for day-to-day studio operations. We are trying to see where the multiple-play CD technology is going."

CD role dependent

Studer Revox America's Director of Professional Dealer Products, David Bowman, says CDs will become an increasingly viable broadcast tool, although he observes that "it's hard to say what stations are doing with their CDs. Everybody wants to be on the top of the heap where ad dollars are concerned,

INDUSTRY ROUNDUP

but it is hard to go to CDs after you've invested in cart machines."

Anders Madsen is skeptical for the moment where CDs are concerned. The Pacific Recorders & Engineering sales and marketing manager links the amount of CD use to the formats in which they are played.

"CDs direct-to-air probably peaked about two years ago when it was the thing to do," Madsen offers. "Since then, there has been a retreat from that large number due to unreliability of software and equipment. Stations these days are into no-error programming and are more likely to dub to cart than to put up with skips," he says.

When do we do digital?

As always, the questions of whether there is, can, or ever will be an adequate digital replacement for the analog cart machine crop up. No one seems to expect a digital product to take the analog's place anytime soon.

But this is not to say it is not expected ... eventually. The oft-held view of a future all-digital station plays perfectly into the hands of expectations that such a replacement will at some time come to pass.

"It's probably realistic to say that present carts will be replaced by a digital cart machine. It is probably inevitable. In nearly all phases of a studio, digital is the future," says Larry Lamoray, director of marketing for cart-maker Fidelipac. "But it is not yet a truly affordable and reliable medium for broadcast," he says.

A voice of experience

"I don't see anything out there that is going to be the next digital cart machine," Bill Parfitt says. Parfitt harkens back to ITC's 1987 introduction in prototype form of the HCDA 3000, an intended digital cart replacement that never shipped. Parfitt says that while "technologically speaking the product was quite a breakthrough," its cost, for that time, appeared prohibitive to broadcasters.

"It did what it was designed to do," says Parfitt, "but it was in cassette format. I think stations may have been anticipating another cartridge-based or endless loop-type format."

"The technology is there," says John Marino of digital possibilities. "The problem is reliability. That has to improve for it to be suitable to broadcasters. And if its use became widespread, then manufacturers could probably make it cost effective," he says.

(continued on page 47)

TRY **$6495** NOT **$6495** TO **$6495** FOCUS **$6495** ON **$6495** JUST **$6495** THE **$6495** PRICE **$6495**.

RS Series Consoles from Radio Systems are in place in 200 radio and TV stations around the world, and the reviews are unanimous: RS Consoles are a sweeping success because they do so much for so little.

Look at the features you get: ☐ Three output busses ☐ Full remote control ☐ The ability to accept mic, line or consumer sources on ANY input ☐ Two inputs per channel ☐ VCA control ☐ Penny & Giles faders ☐ Digital timer ☐ All-metal wraparound chassis ☐ Excellent RFI rejection ☐ Full stereo and mono metering ☐ Superior audio specs ☐ Studio talkback ☐ Beefy cue and headphone amps ☐ Jumper-programmable muting, timer start, pulse/holding start ☐ Semi-modular design with connectorized parts for easy replacement ☐ Two-year warranty ☐ Toll-free service.

After only one year, Radio Systems consoles have spawned a host of imitators, by manufacturers from "A" to "W". But take a closer look at the RS Series, and you'll see the difference. Look at our ingenious circuit board design that prevents cross-talk. Study the input architecture that accepts any input level. Ask for a loaner copy of our user's manual, the best in radio.

Because after all, you shouldn't focus on JUST the price.

THE PRICE:
☐ RS-6: **$3,995.**
☐ RS-12: **$6,495.**
☐ RS-18: **$8,995.**

For DAT machines, custom studio furniture, and the industry's best consoles, contact Radio Systems toll-free at 800-523-2133.

TRY NOT TO FOCUS ON JUST THE PRICE, BECAUSE THE RS SERIES CONSOLES DO SO MUCH.

RADIO SYSTEMS INC.

110 High Hill Road ☐ P.O. Box 458 ☐ Bridgeport, New Jersey 08014-0458
609/467-8000 ☐ 800/523-2133 ☐ Fax 609/467-3044

Circle 7 On Reader Service Card

WHAT MAKES AUDIOPAK THE CART YOU CAN COUNT ON?

"DURABILITY. We've used AA-4s exclusively since 1978. I've tried other carts, but AA-4s are generally more stable. They hold their phase, and they can really take the abuse. We love 'em."

Mike Sprysenski, C.E.
WOCL, Orlando FL

"PERFORMANCE. We conducted rigorous evaluations of all the leading carts, both in our fully equipped testing facility and in several different cart machines. The results? We've standardized on AA-4s."

Sonny Reschka, Dir. of Eng.
WNIC, Detroit, MI

"SUPPORT. The AA-4 is a very good cart, period. And Audiopak stands behind their product better than any other company in the business. They really are a customer-oriented organization."

Tom Cox, Technical Director
KKLQ, San Diego CA

"STABILITY. The phase scope doesn't lie: We've found consistent phase stability with AA-4s. Their overall performance on commercial production, vinyl record and compact disc playback is outstanding."

Chuck Waltman, Eng. Mgr.
KSAN, San Francisco, CA

"CONSISTENCY. We've used about 7,000 AA-4s over the past five years, with *very* few problems. In fact, we just carted our entire easy-listening music library in stereo on AA-4s. They're tops in my book, and the only cart I use."

Dwight Weller, Dir. of Eng.
WLIF, Baltimore MD

Audiopak's advanced neutral-design casing and high performance lubricated tape give top stations the reliability and the unsurpassed quality they need. Shouldn't you have as much confidence in your carts as these radio pros do? You can: just call (800) 522-CART for the name of an Audiopak dealer near you.

CART AFTER CART AFTER CART...

Circle 76 On Reader Service Card

"RELIABILITY. I've tested just about every cart on the market, and for reliability, quality and ruggedness, the AA-4 is the best buy I have found. That's why we have been using them for the last four years."

Jerry Bowers, C.E.
KSO/KGGO, Des Moines, IA

audiopak®

P.O. Box 3100
Winchester, VA 22601
Tel: (800) 522-CART or (703) 667-8125 Fax: (703) 667-6379

Dynamax Gets Braiker Rolling

by Ernie Hopseker, VP Eng
Braiker Radio Services Co.

Bellvue WA A new satellite radio network, founded by Ivan Braiker, began operation in the fall of 1989. His Braiker Radio Services Company differs from other satellite networks in that it provides programming only, with no network commercials.

While the technical operation of most satellite radio networks is conceptually similar, Braiker Radio has added a new twist. As often happens in an engineering environment, we discovered a new use for an existing function, a use outside that originally intended by the equipment's designers.

USER REPORT

Braiker originally envisioned an operation whereby the network air personality could maintain simple yet total control of all affiliate programming. The programming would include local commercial spots, jingles, IDs, liners and other format functions. This would provide continuity and a "feel" that all material was originating from the local affiliate's studios.

Needed remote control of events

The network studios had to be functional, simple to operate, foolproof and yet capable of network sophistication. In the early stages it was determined that we needed to be able to remote control up to 15 different cartridge-based affiliate events.

Some of the first ideas included our air personalities "playing a row of switches like a synthesizer" in addition to performing the traditional duties required. But, having considerable experience behind the microphone myself, I shuddered to imagine several different DJs pushing 15 different buttons while trying to produce results acceptable for network consumption.

The first part of the solution to this problem involved our decision to install a Wegener Tone Encoding System. Wegener utilizes a series of inaudible 25 Hz and 35 Hz tones encoded on each audio channel that can be distributed via satellite to each affiliate as part of our programming and used to remotely trigger a series of relays at affiliate sites designated by the network.

The system provides two encoded tones per channel, on each of two audio channels. Therefore we have four tones available, which form the basis of a BCD (Binary Coded Decimal) code, permitting control of up to 16 functions in theory (15 in reality; in our case the "0 0 0 0" function was discarded as being prone to triggering by loss of input).

Cartscan function

Later, while at the NAB convention last spring, I was walking the show floor prospecting for a solution that was easier than using a bank of control switches. At the Fidelipac booth I noticed that its Dynamax CTR100 Series cartridge machine includes a "Cartscan" function.

Cartscan uses adhesive labels, with four optional reflective areas that are applied to the right side of each cartridge and corresponding optical sensors within the machine. Normally these sensors are used to control internal selection of Standard or Elevated operating levels, Stereo or Mono, Matrix or Auxiliary switching functions.

Four functions form the basis of a BCD encoding system. Fidelipac informed me that the Cartscan logic was available at an existing 50-pin "D" connector on the rear of the machine and that the machines could be easily modified to deactivate the normal internal Cartscan functions. We could then use the standard Cartscan labels, but for our own logic.

We immediately purchased our first Dynamax CTR100 Series machine and devised a truth table for the functions that we required. (See Figure 1.)

The puzzle was far from complete at this point. The Cartscan matrix in the CTR100 provides a BCD code output whenever a cartridge is loaded. The problem now was how to mix up to eight loaded cartridge sources, identify the correct one upon its initiation and route its BCD output to the input of the encoder.

We designed an interface box which uses the remote start tally output of the cartridge machine and permits only that machine's code to be passed through to the Wegener.

We currently have between six and eight Dynamax cartridge machines on-air in each network studio. Additional units are used in the production studio, dubbing and music library.

Modus operandi

Operationally, our network air personalities load blank cartridges, with the appropriate Cartscan labels for the events that they wish to initiate, into any of our machines. The Cartscan matrix within each machine informs the Wegener system, via our interface, which function code is present on the cartridge currently initiated.

That BCD code is then transmitted over the satellite to each affiliate. Upon receipt of code at the local site, the appropriate relay, corresponding to functions 1 through 15, is closed and used to initiate designated equipment or events. We require that five cartridge machines be dedicated for this use at each affiliate studio.

The beauty of the system is that any cartridge can be loaded into any of our Dynamax machines. As implemented, the system merely supplies BCD codes for function initiations. This frees our network air personalities from undue concentration on cartridge loading and permits individual machines to be removed for maintenance without affecting the overall system.

Early troubles

There were a few initial glitches in setting up the system. For instance, we found that if our network personalities auditioned a cartridge, it initiated corresponding events at the affiliate end. So we now have a dedicated cartridge machine off-line from the Wegener system for audition purposes only.

We found too that the Cartscan labels are subject to wear and lose some reflectivity with use and handling. Therefore they need to be replaced occasionally. We also had the usual installation wiring errors, etc. But now everything works well, just as originally envisioned. Due to our volume of use, Fidelipac has made the unusual offer to provide machines factory-modified to our standards for our use.

Ingenuity has prevailed. Dynamax CTR100 units with Cartscan have given us a very simple and cost effective solution to what originally seemed to be an awkward and expensive task.

■ ■ ■

Editor's note: Ernie Hopseker may be reached at 206-562-3000.

For more information, contact Larry Lamoray at Fidelipac: 609-235-3900, or circle Reader Service 48.

Figure 1. Cartscan Function to Braiker Function Conversion Table

Normal Cartscan Function	Function Number	BCD Equivalent 2^3 2^2 2^1 2^0	Braiker Logic Function
Not Used	0	0 0 0 0	Not Used
Matrix	1	0 0 0 1	Legal ID
Elev. Level	2	0 0 1 0	Matched Call
Matrix & Elev. Level	3	0 0 1 1	Station Jingle
Aux	4	0 1 0 0	Image Liner
Matrix & Aux	5	0 1 0 1	Station Jingle
Elev. Level & Aux	6	0 1 1 0	Currently Unused *
Matrix, Elev. Level & Aux	7	0 1 1 1	Currently Unused *
Mono	8	1 0 0 0	Currently Unused *
Custom	9	1 0 0 1	Currently Unused *
Elev. Level & Mono	10	1 0 1 0	Commercial Cutaway—3:00 Minutes
Custom	11	1 0 1 1	Currently Unused *
Aux & Mono	12	1 1 0 0	Commercial Cutaway—3:30 Minutes
Custom	13	1 1 0 1	Currently Unused *
Elev. Level, Aux & Mono	14	1 1 1 0	Currently Unused *
Custom	15	1 1 1 1	Network Return

* Unused Codes permit later expansion

Care and Feeding of CD Players

by Laura Tyson, Sales Engineer
Denon Professional Products

Parsippany NJ By this time, most radio stations in the US probably have at least one CD player in use. Those of you who don't have one, don't worry—you will soon.

CD players, just like all living, breathing machines, require periodic maintenance for their well being. If you have not yet had the opportunity to become intimately familiar with the the internal workings of a CD player, then it's time to begin.

Player sections

Most CD players can be divided into three main sections: the servo section, the CPU section and the audio section. The audio section contains most of the processing, amplifying and filtering of the audio signal. The alignment and testing of this section will only improve audio quality and will not affect reliability or playback performance.

The CPU section of the player acts as the main controller and master clock for the rest of the player. Usually, no alignment is required here.

The servo section contains the optical pickup circuitry, most of the digital signal processing, the HF signal and the tracking and focusing servos that contribute to the performance of the player. Servo section alignment, when done correctly, will improve playback performance.

To better understand your CD player, keep in mind a few things:

1) *Don't let the jocks smoke in the air studio!*

And:

2) *Don' t let the jocks smoke in the air studio!*

Almost nothing will shorten the life span of the optical pickup in the player faster than being in a constant bath of smoke. Playing a "less than perfect" disc becomes a much more difficult task under such circumstances and skipping prevails.

Another thing:

3) *Clean the lens of the optical pickup about once a month.*

The length of time between cleanings depends on the environmental conditions in the studio. Is your station in a dry, dusty building? Do the jocks smoke in the air studio (I hope not)? Is the studio located in smog-filled Los Angeles?

The lens should be cleaned with a cotton swab lightly moistened with lens cleaning fluid. Check with the manufacturer of your CD player as to what type of fluid to use. Most glass lenses can be cleaned with isopropyl alcohol or camera lens cleaner. Do not use water.

A fluid cleaner is required to remove all of the sticky nicotine, pollution and other wonderful things floating around in our environment that adhere to the lens. If not cleaned regularly, the lens acts like fly paper—any particles of dust happening to float by will stick to it. It gets very messy.

Using compressed air to blow dust off the lens once a week doesn't hurt but continue to clean the lens with fluid on a monthly basis. Cleaning the lens will help minimize intermittent skipping and cueing problems.

The servo alignment

The next major maintenance requirement for CD players is the alignment of the servo section. Because a CD player is an opto-mechanical instrument, it will require an electro-mechanical alignment on a regular basis. Here's the next rule:

4) *Do a full servo alignment once every six months.*

Imagine the optical pickup assembly as a tiny lens, suspended around two sets of magnets on a horizontal and vertical plane. The lens of the pickup can be moved closer or farther away or from side to side with respect to the disc via electronic adjustments.

TECHNOLOGY TIP

As the pickup ages, it will physically shift. Some CD players have strictly mechanical adjustments to bring the pickup back to the correct position with respect to the disc and others have electrical adjustments which will move the relative position of the lens. The electrical adjustment should always be done after any mechanical adjustments and any time the pickup has been replaced.

Adjustment points

The servo alignment should be described in the service manual for your CD player. Following are some of the more typical points of adjustment.

PLL frequency adjustment. This is the adjustment of the fundamental clock frequency to which the entire player refers. The most typical frequency would be 4.3218 MHz, the rate at which information comes from of the CD (the bit rate). In real practice however, your CD player may need to be set anywhere from 4.20 MHz on up.

The setting of the PLL frequency does not affect the playback speed or pitch of the music. The only way to change the playback speed of the disc is to change the crystal to which the servo section listens.

Focus offset, or vertical positioning of the pickup lens. The focus offset adjustment is the fine tuning of the vertical placement of the lens with respect to the disc. This adjustment controls how clearly information is read by the optical pickup. Performing a focus offset adjustment is much easier and less time consuming than mechanically moving the turntable platter closer or farther away from the lens.

Tracking offset, or radial offset. Similar to the focus offset adjustment, this adjustment is the fine tuning of the horizontal placement of the lens, with respect to the "fixed" position of the disc.

Focus and tracking gain. These are the adjustments of the focus error (FE) and tracking error (TE) signal gain. They typically involve a phase/gain adjustment between the FEO or TEO (focus or tracking error out) signal and a reference input signal from an external signal generator.

On most CD players, the major test points are labeled on the circuit board for easy measuring. During all of the adjustments, watch for unusual distortions of the waveforms.

Assuming you are using a known good disc for the alignment, distortions of the waveforms can indicate problems with the player. The accuracy of each of these adjustments will affect the playback performance of the CD player.

Incidentally, items that do not affect playback performance include oversampling, digital filters, extended bit architecture and noise shaping. These features will improve audio quality, but will have no effect on reliability.

Record keeping

Finally, remember rule number five:

5) *Keep a thorough log of all maintenance and discrepancies for each CD player in the studio.*

Have the jocks record any discrepancies. Don't rely on them to scribble down something on the back of a soggy napkin. If they don't write it down, you *might* find out about the problem ... two weeks later. Make it easy for them. Have a form already prepared for them to fill out.

Having this information for every discrepancy will help you determine whether the problem is with the disc or with the player. If it is the player, the log will help pinpoint what is wrong with it.

Also keep a maintenance log for each CD player. Indicate when the lens was last cleaned, when the servo alignment was done and any other service.

Obviously, I cannot tell you how to fix your CD player in this short space. But hopefully these guidelines will help point you in the right direction.

■ ■ ■

Laura Tyson will respond to all faxes sent to 201-808-1608.

Understanding Microprocessors

by Bruce Helling
Advanced Product Support Coord
ITC/3M

Bloomington IL This is a short refresher on microprocessors, those little multi-legged chips inhabiting just about anything electronic these days. Yes, *them*.

The purpose here is not to rehash everything that has been written about microprocessor technology, but rather to remind you of why there are so darn many of these things in what is sold in today's broadcast marketplace.

TECHNOLOGY TIP

What is it? A microprocessor is basically a series of miniature electronic switches or gates, which, when presented with an open or closed electrical condition, will cause a preprogrammed response. Microprocessors make possible the packaging or bundling of numerous operating features into products while at the same time allowing product size to decrease, thereby meeting the needs of today's space sensitive studio designs.

A case in point

What does it do? A prime example of utilizing microprocessor capability in the broadcast equipment arena would be the ITC 99B Series audio tape cartridge machine.

Unlike earlier cartridge machines, the 99B provides multi-function operating buttons, an integral test tone generator and the patented ELSA function, which allows operators to automatically Erase a cartridge, Locate the Splice and Azimuth adjust the record head.

The point is that, without microprocessors, which allow us to design the features required by the radio market without an attendant increase in product size, the 99B would take up the rack space required by most microwave ovens.

But doesn't servicing a machine with microprocessors require a degree in electrical engineering? No, although that obviously isn't going to hurt. Microprocessors are controlled by the aforementioned pre-programming, commonly known as software.

A software program may be tremendously complicated, but all the troubleshooter needs to know is what is supposed to happen and when for a given input to the device. The software program will create different operational conditions depending on the physical electrical characteristics of the microprocessor pins.

For example, the program may call for an electrical "low" condition on pin #1 to cause a similar condition on pin #5, which in turn causes the motor to go into a high-speed re-cue condition.

From a basic troubleshooting perspective, this establishes a set of parameters which can be easily read with test probes. A series of readings will determine if the problem is occurring before, at, or after the microprocessor within the circuit.

One aspect of servicing that has become increasingly important to users is electrical protection of microprocessors. Just as switches and other moving parts needed (and still need) protection from outside elements such as dust and contaminants, microprocessors need to be protected from outside intruders such as voltage surges and sags, static charges and, in some cases, light.

Nothing has really changed in terms of servicing "older" equipment vs. microprocessor-based equipment. Care must be exercised in both cases.

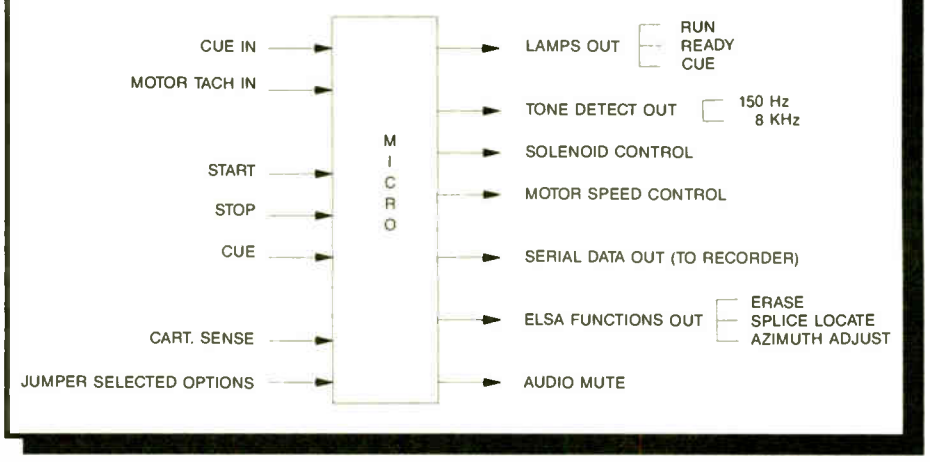
Fear not

The microprocessor is a little daunting to some because it does so many different things and because it appears to be so sensitive. However, with the same quality of care given normally to other electronics, microprocessors provide a tremendous amount of performance for their size and cost.

In addition, when troubleshooting proves that a microprocessor has become a problem, replacement of socketed microprocessors is a quick and easy task. An increasing number of manufacturers provide telephone service and advice lines.

Many times a manufacturer's technical representative can provide troubleshooting advice that will lead to a solution with one quick call. If you have questions or comments on ITC equipment, please contact ITC toll-free at 800-447-0414. From Alaska or Illinois, call collect 309-828-1381.

Simplified Diagram of Microprocessor Multi-function Control in ITC 99B Playback



WNCN Tests Technics SL-P1300 On the Air

by Sid Feldman, Eng Spvsr
WNCN-FM

New York NY WNCN is a classical music station. We program about 75% of our broadcast day from CDs direct to air; the remaining 25% is from 12" LPs. Carts are used only for playback of commercials and similar material.

USER REPORT

When Bruce Adams at Technics asked me whether WNCN would be willing to evaluate, on the air, three pre-production models of the Technics SL-P1300 CD player, I gladly accepted. We had been using three of the earlier version of this machine—the Technics SL-P1200X—and were basically happy with them.

Meets requirements

We have been using the Technics SL-P1300s for about 18 months now, and are quite pleased with their performance. The SL-P1300 utilizes 18-bit, 8-times oversampling with four D-to-A converters and balanced XLR outputs.

Basically, a CD player should be as reliable and trouble-free as a conventional turntable and easy to use. The machine should also be fast in loading and cueing. Additionally, we need to be able to program a group of several selections from a CD and have the player indicate to the announcer that he has properly programmed the desired selections.

Further, while the CD is on-air the announcer should be able to see at a glance what band is playing and time remaining to the end of the selection. The CD player should be fairly robust—resistant to normal shock and human traffic in the control room environment and capable of playing through some of the common defects occasionally found on CDs.

The announcers like the SL-P1300 because they can program additional tracks into the play memory, even while the machine is on the air—very handy when you realize that you are going to be short of music and would like to continue on the same CD.

The 1300 is the fastest machine I have seen in loading a new disc and can access Band 99 from Band 1 on the Denon Test CD in about one second!

The instruction manual supplied with the 1300 is well organized and well presented. However, operation of the 1300 is almost intuitive; our announcers learned how to program and cue without even having to refer to the instruction manual.

The cue search knob (2¼" diameter) permits you to cue up to the start of

(continued on page 50)

Furniture Can Help Your Sound

by Dennis Murphy, President
Murphy Studio Furniture

Spring Valley CA "Will it make me sound better?" In any discussion of elegant studio furniture this question seems to come up. The answer, although harder to quantify than field strength or modulation measurements, is yes!

A refined, classy, well chosen style of studio furniture projects a positive visual everyday expression of your facility's commitment to a quality product. Station personnel "feel better" about their jobs and that will translate into more productivity and a better sound. Potential clients visiting your facility pick up this feeling of quality as well.

Construction features

The Murphy Studio Furniture Elite Series attempts to address some of the more practical needs in a studio environment.

Sloped rack faces below the overhanging return countertops allow the best view angle to equipment or media located in these areas. The corner tower racks that sit on top of the console supports are at a 20° angle to the operator. This allows an easy three-quarter's arm reach to the rack face and a full view of a guest position shelf located on the back side of the console.

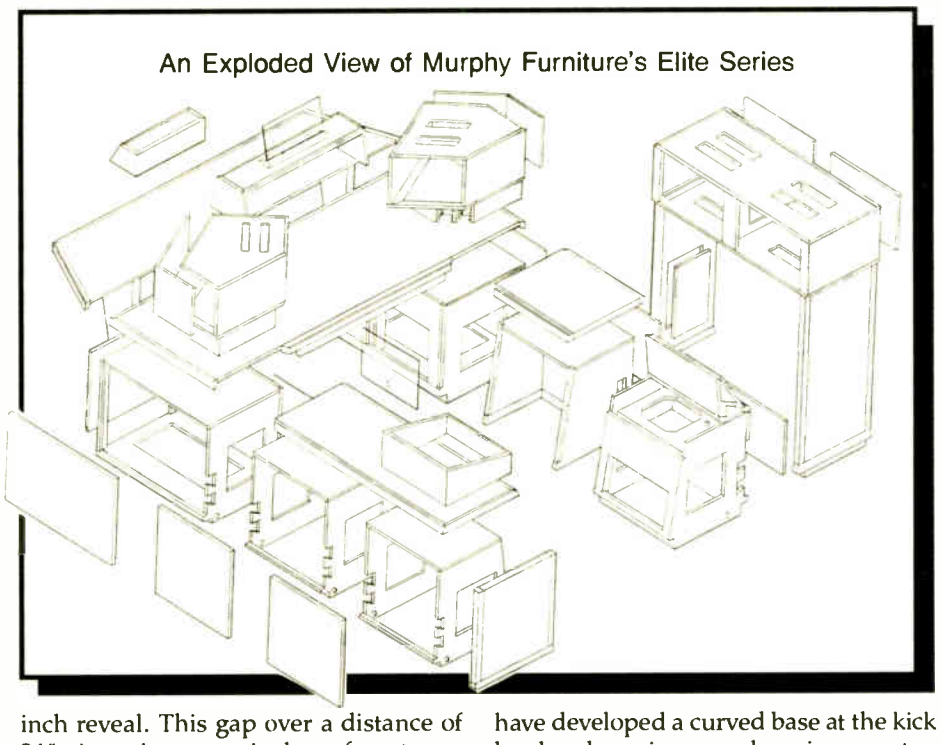
SPECIAL REPORT

Located above all knee spaces are aprons, which give strength to the counter and provide areas for mounting headphone jacks. Sit-down height is 30". Stand-up operation is 38".

There are three parallel wire passes in all returns. The bottom opening is for the AC and ground. The middle is for control and the top is for audio. There are 12" of separation between the top and bottom wire pass.

Wire can be laid into the passes eliminating the need for stringing wires through "D" rings. There is a wire management area located in the dead space of the corner tower racks and a wire trough under the console between the console supports.

We left the bottoms of all modules open to ensure maximum ventilation. Designed into the furniture just below the main counter wood trim is a quarter-inch reveal. This gap over a distance of 24" gives six square inches of vent area at the top of the module.



Passive ventilation eliminates the need for cooling fans, thereby reducing ambient noise and reducing the amount of dust blown into equipment.

Access and durability

Our design goal is to provide the most access possible while maintaining a sleek outer appearance. Removing the access panels leaves the entire perimeter open, allowing cables to be laid into the built-in wire ways. The jointed design of the panel on the back of the corner tower rack permits access to equipment even if placed in a corner.

The studio environment is often a 24-hour operation requiring furniture that must hold up to industrial use. No matter how high the quality of a product might be when built, if it has exposed laminate-to-laminate edges, it will show wear and tear immediately.

To solve this durability problem we have developed a curved base at the kick level and a unique overhanging counter. These act as "bumpers" to keep the backs and bases of chairs off valuable equipment mounted in the return rack faces. There is wood trim on all exposed corners in the base furniture and a 1½" thick smooth wood molding all around the counter level.

System components

Murphy furniture comes with console supports and wire troughs. Each console support has a field relocatable, hidden 14" rack, covered with a removable smoked plexiglass panel. The panel protects the rack-mounted equipment from the operator's feet while allowing a view to the panel lights. Drawers can be added to supports. The center counter and wire trough can be expanded to accommodate larger consoles.

Sitting on top of the console support is the corner tower rack (CTR), which positions equipment such as cart machines at a 20° angle to the operator. The standard rack opening is 14".

A tower storage base raises up the CTR to provide storage for 10 hot carts or 15 CDs. This also allows the CTR to cantilever over the control console, thereby saving the addition of width to center when using an 18-input console.

A sloped rack return comes standard with a 21" rack. This space can be easily converted to media storage or pencil and file drawers.

More components

Also provided is a single turntable return. Featuring an easy-to-see-over bi-fold dust cover, this return houses turntables, reel-to-reel machines and CD players. It comes standard with a 10½" rack. An optional sand-loaded isolator base can be ordered.

A work surface return module—used as a work surface for computers, keyboards and guest positions—can be built to custom widths. There is a built-in wire pass and it can be ordered with a pencil drawer.

A return completion panel is used to cover the unfinished end of a return. One panel is needed for each return. To provide multiple talent positions, a guest position shelf can be mounted anywhere and can be free standing. A sliding copy holder features a stick-on note surface.

Another system component is a raised rack overbridge, which provides rack space above the return modules or above transport mounted reel-to-reel machines.

A top sloped rack is used mainly to house reel-to-reel machines. This rack can be used for patch bays and any other gear that needs to be kept at a low profile on the countertop.

Attached to the top of the guest position shelf is the guest turret rack—a panel rack. Timers, cough buttons and headphone control can be mounted in the panel face. Finally, there are rack panel covers, which cover empty rack space and should be ordered after equipment installation.

Premium materials

We use void-free birch plywood in the vertical and horizontal support structure and poplar in rack supports. Poplar is also the backing for the non-chip material of our "bumper" base.

The countertop edge band is oak. This trim is 1½" thick and milled with a sloped double radius pattern. We use oak on all exposed corners and on the tops and bottoms of countertop modules. Because of its anti-resonate properties, high density particle board is the foundation of all top surfaces. We can use any national brand of plastic laminate.

Quarter-turn fasteners are standard on all access panels. This provides some security to gear such as processing equipment mounted in the hidden racks. If security is not a problem we can install hidden catch fasteners.

■ ■ ■

For more information, contact the author at: 619-698-4658, or circle Reader Service 65.

Tascam CD-701: Durability Plus

by Steve Keating, Contract Eng
Keating Technical Services

Granada Hills CA Modern commercial production facilities are rapidly making the transition from traditional analog-based, pre-recorded source devices such as vinyl discs to digital-based source units, of which the most popular to date is the compact disc.

The advent of recording audio in the digital domain via R-DAT has allowed for digital performance on par with that of CD technology. There is great acceptance among professionals for the R-DAT format due to its ability to re-record, its instant accessibility and long-term economic feasibility.

However, at present the CD format remains the first choice for playback-only applications since it is considerably less expensive than an R-DAT unit.

TECHNOLOGY UPDATE

At home in commercial radio broadcast environments where music is played direct from CD to air, as well as in demanding video post-production situations that require instant accessibility and "triggerability" from synchronizing equipment, the Tascam CD-701 system offers state-of-the-art performance housed in a durable package.

Design review

A brief review of the design enhancements of the CD-701 will serve to acquaint the potential user with its versatility. First, and perhaps foremost on the list is the proprietary Tascam aero-distortion circuit in which random digital noise (called dither) is added to program data prior to the D-to-A conversion process.

After the D-to-A conversion, the dither is completely subtracted from the analog signal by a process that leaves only the pure program signal remaining.

Four times oversampling and 16-bit D-to-A converters ensure virtually flat reproduction frequency response between 20 Hz and 20 kHz, 96 dB SNR and 0.008 percent harmonic distortion.

Electrically balanced +4 dBm line outputs through industry standard XLR connectors are compatible with interconnecting equipment and facilitate easy installation and removal for maintenance.


Tascam's CD-701 CD player with remote control unit

Mechanically, the CD-701's vibration-free, rigid disc-clamping system virtually eliminates disc-tracking errors and offers compatibility with full-size and single-play (8 cm) CDs.

A single heat sink on the rear of the unit dissipates all heat generated by the voltage regulators, allowing for the side by side mounting of multiple units without concern for heat build up.

Control functions

All access functions to the disc may be controlled from push switches located on the front panel of each player with the STOP, PLAY, and READY buttons illuminated to indicate status. Full remote control and operational status are available with a back panel mounted data connector.

If remote control of the CD-701 is the preferred method of operation, there are two choices. The RC-7 unit remotely controls a single CD player and duplicates all front panel controls found on the CD-701. Optional functions such as auto-cue, repeat-play, indexing, search modes and direct selection of individual tracks are also available.

The more elaborate RC-701 offers full-featured programmability and remote control of up to four CD-701 players. This remote-control unit features two digital displays, indicating timing information for both a player on-line and another player selected for cue.

The display associated with the on-line player shows track, index point, minutes, seconds and frames. Timing data can be made to indicate duration of play or time remaining. The unit selected in cue indicates the same data with the exception of frame information. Pitch assignments for both cue and on-line units are also displayed.

Remote programming

The RC-701 performs numerous programming functions, one of the most useful of which is the sequencing of playback from various tracks located on any of the four units it controls. Automatic repeat or "looping" of a selection of a pre-set duration off any one track is easily accomplished, allowing for the "stretching" of a sound effect that was too short in its original form.

Through a rear panel mounted data connector, digital control signals may be fed into the RC-701 that will automatically tell it to execute pre-programmed functions. Simple "dry-closures" will start any unit previously set in the Ready mode, allowing it to interface easily with a variety of synchronizers.

An audio output, capable of driving either a small pair of speakers or stereo headphones, is available through a standard "TRS" 1/4" jack on the back of the RC-701. A data cable interconnects each CD-701 to the RC-701 for complete CD-system control and status registration.

■ ■ ■

Editor's note: Steve Keating has been a professional broadcast engineer for over twenty years and currently contracts specialized engineering services to broadcast facilities in Southern California. He also works as an audio consultant to Tascam. He may be reached at: 818-363-6064.

For more information on the Tascam CD-701, contact Bill Mohrhoff at 213-726-0303, or circle Reader Service 86.

Cart Decks in the Future

(continued from page 40)

Otari Product Specialist Mark Calice suspects that a digital cart machine replacement may take a non-traditional form. "You are basically talking about a DAT machine, either that or a hard drive," says Calice. He cites the advantages of digital replacement technology—better SNR (assuming the use of a 16-bit system), improved frquency response and little or no wow and flutter.

"Everything's moving toward digital," agrees Calice, "but until the price comes down it is still anybody's show. And there is still always going to be a place for analog, where you can edit a lot easier than you can in digital."

A current contender whose literature is crossing people's desks is Ferrograph, which is offering its Series 9 digital disk cartridge 9500 recorder and Model 9200 player.

The Ferrograph is basically an updated version of the CompuSonics Bernoulli-box floppy-disk recorder/player. The player, priced at $8,000 is intended for studio use, while the 9500 recorder ($11,000) goes in the production studio.

The units have been shipping since September, according to Harry Klane, sales engineer for Gotham Audio, which markets and sells the Ferrograph.

Computer interface

The 9500 recorder uses a removable magnetic disc 5¼" cartridge and is 16-bit digital. It can work with a PC via an optional computer interface. "It works exactly like a cart machine out of the box," says Klane. "The difference is that when it is hooked up to a computer, it can do editing, titling and playlist manipulation."

But other than the floppy-disk-in-a-cartridge concept, it seems that while everyone believes in the future of digital audio, there is not yet a digital cart machine replacement that has proven it can take the industry by storm.

"What you'll see more and more," predicts Wes Whiddon, "are spots produced on R-DAT, which is a production tool. CDs and carts will stay on-air for awhile. Somebody needs to invent something that looks and works like a cart but is digital . . . and costs half as much."

Dolby SR Kills KQLD Cart Noise

by Marc B. Musgrove, CE
KQLD-FM

New Orleans LA On 1 July 1989, Beasley Broadcast Group's KHAA-FM underwent a marathon rebuild of an air studio and production room. Dolby SR (Spectral Recording) and a lot of other equipment was installed in a hurry. Then, at 6 AM on 4 July, we signed on with new call letters and a new format: KQLD, Oldies 106.7!

In planning for this transition, our corporate Director of Engineering, Kevin McNamara, had asked whether I would be interested in trying Dolby SR on our carts. He felt the technology looked promising and that KQLD would be a good location for a field test.

Since signing on as Oldies 106.7, we have been pleased with the benefits of this technology in the broadcast cart application.

Implementing the system

We implemented Dolby SR with the Model 363 mainframe. This unit is a standard 19" rack-mount chassis, one rack unit in height. Each unit accommodates two modules of encode/decode electronics.

Each module supports one audio channel for both encode and decode functions. Thus, the Model 363 with two No. 350 SR modules installed provides everything needed for one stereo cart machine, both for record and playback.

We purchased four of these packages initially. One was interfaced with an ITC 99B for record and playback in our production room. The other three were used with Dynamax CTR 112 reproducers in our air studio.

USER REPORT

Installation was straightforward. All audio connections are made with the familiar three-pin XLR connectors and the rear panel is so well-labeled that you could easily make the audio connections without further reference to the manual.

All audio inputs and outputs are electronically balanced. Input impedance is 20 kilohm, output impedance approximately 20 ohm and any level from −10 dBu to +10 dBu can be accommodated on both inputs and outputs. You should be able to interface this unit with almost any type of pro or semi-pro recorder.

A nine-pin D-connector is available for remote switching between the record and play modes and also allows you to disable the front panel record/play switches.

I suggest that if you are using the unit in a decode only application that you wire the remote plug to disable the front panel record/play switches. If these are inadvertently moved to the wrong position the associated cart machine's audio will not reach the console.

The remote control functions are opto-isolated and will operate on any differential from +4 V to +24 V across the appropriate pins. A +15 V source is available on one pin of the remote connector. These features make it easy to interface with dry contacts, TTL level, or CMOS level logic whether positive or negative.

Calibration

After installation, we began to calibrate the processor and recorder together. The first step in this process is to bypass the SR unit with the front panel switches and verify that the recorder is properly aligned to the normal standards.

The remainder of the calibration procedure is fully described in the manual; however, some aspects of it seemed unusual at first.

The unique part of the procedure involves testing with Dolby noise. Unlike with normal recorder alignment, discrete frequency tones aren't sufficient to check the operation of the Dolby SR process. Tones are used, but only for level matching between console, processor and recorder.

Dolby noise consists of internally generated pink spectrum noise, interrupted every two seconds by 20 ms gaps. When the front panel Set-Up button is pressed and you set the recorder into record operation, the unit will go into Auto-Compare mode. In this mode the Dolby noise is recorded on tape and the processor switches between the internal noise generator and the replayed noise from the tape machine every four seconds.

Using this method, an instant and very accurate verification that Dolby SR is working properly can be made, using only your ears. If the noise sounds the same from both sources, they are closely matched in gain and frequency response. This provides a check of both recorder and processor. If you have an audio spectrum analyzer available, you can use it to visually quantify or record what you hear.

Transparent cart audio

Our PD, Chris Miller, and other critical listeners on the staff have really noticed the difference Dolby SR makes.

Carts are no longer the weak link in the noise floor of our facility. Dolby SR has made cart noise inaudible in our application. We've also noticed the cart audio seems to be cleaner, more transparent.

This is because, in addition to noise reduction, Dolby SR offers significant audible reduction of third-order harmonic distortion and modulation noise inherent in magnetic recording. We've not heard any negative side-effects of Dolby SR and have experienced no hardware failures with any of the units in use.

I am currently planning the construction of three new, state-of-the-art studios for Oldies 106.7. The PD and I agree that every cart machine will be equipped with Dolby SR processing. I think this says it all regarding our satisfaction with the equipment.

■ ■ ■

Editor's note: Marc Musgrove started with Beasley Broadcast Group in June 1989, after two years with EZ Communications.

For more information on Dolby SR processing, contact Scott Schuman at Dolby Labs: 415-558-0200, or circle Reader Service 81.

Audi-Cord a Staple At All-News WCNN

by John Talbert, Staff Engineer
WCNN-AM

Atlanta GA I must admit I was a little shocked when our former chief engineer suggested buying Audi-Cord cartridge machines for our new all-news station. After all, Atlanta is a "major market" and, to me, Audi-Cord cart machines were intended for use by small market stations that could not afford something else. I am pleased to say my attitude toward these machines has changed completely.

USER REPORT

A year ago, WCNN (not related to Turner Broadcasting), was to change from a satellite-programmed nostalgia station with three consoles and ten cart machines to an all-news format with twelve consoles and over 60 cart machines.

Buying sixty-four cart machines from the same company is a gamble. Buying sixty-four cart machines on a tight budget is a nightmare. Our primary objective was to find a machine that provided the features, serviceability and durability we needed at a price we could afford.

Kandy Clark, of Broadcasters General Store, sent us an Audi-Cord DL Series DLPM reproducer for evaluation. After hours of torture testing we were convinced that the unit was a good value.

The DL series features two cue tones, a mute control, modular PC-board construction and industry standard CMOS logic. WCNN ordered the optional cart timer on the recorder/reproducers. The timer's only drawback is the fact that it counts only in seconds and not minutes and seconds.

WCNN placed an initial order of twenty-one DLPM reproducers and twelve DLRM recorders. When the units arrived, we made a jumper modification to defeat the power/heat conservation feature, which turns the motor off when a cartridge is not inserted. With the exception of routine maintenance and a few logic problems that were probably static related, we haven't been inside the machines since.

Audi-Cord provides all the necessary output and remote connectors for interfacing the machines with the console and the manual provides complete information for proper connections.

Seven months after WCNN changed

(continued on page 50)

KKLI Upgrades to DN 950FA

by Dan Remy, CE
KKLI-FM

Colorado Springs CO KKLI went high technology when it moved its studios and changed from automation to a live format. One of the biggest changes was to use CD players as the foundation for the music format. Joining KKLI in this change was Denon and the DN 950FA CD cart player. This article will discuss the machine and point out a few aspects of CDs for your consideration.

USER REPORT

Over the past years CDs have been attempting to replace the cart machine as a method of presenting music formats. It seems that much of this has happened as the result of stations realizing the potential CDs have. Unfortunately the manufacturers have been rather slow in providing a good variety of broadcast-quality CD machines.

Started with earlier model

KKLI originally installed Denon DN 950F CD machines (the older Denon machine). This was done for a variety of reasons. First there was cost; the Denon machine was around $1500 (show me a $1500 cart machine that has the electrical specs of a CD). Next was reliability: the Denon machines seemed to be gaining in popularity and it was easy to find users with experience.

Then came simplicity. After comparing many of the machines at trade shows and other stations it seemed the front panel of the Denon machine presented important features/information you want in the air studio. And it did not have the clutter you might expect in a machine more oriented toward heavy production.

Last, but not least, was the issue of how to handle the media. The notion of indestructibility that was presented when CDs first came out is now changing. CDs are delicate and demand careful attention. If they are not handled with care you better have a big budget to replace damaged ones.

Treat it like a cart

But how can you expect talent to treat a CD like a record when they have gotten use to cartridge tapes? The solution is the Denon cartridge. In this way, the CD can be handled much like the cartridge tape without undue concern.

This is one of the strongest features the Denon machine has. The CD is permanently inserted into a plastic housing. Following insertion, the CD will never be touched.

KKLI installed two Denon DN 950Fs. They were used as air machines and received constant use. At first we were very pleased with them, but after about a week they began to develop skipping problems. After some discussion with Denon, the manufacturers of our CD format and other stations using Denon machines with our same format, we determined that a degree of skipping was not unusual.

I might add that we found the library had skipping problems with other CD manufacturers in the past. Unfortunately for us the problem with the Denon 950F was unacceptable and the machines were returned to Allied Broadcast after about a month.

New unit suggested

But here I must give credit to Allied Broadcast (Tom Lewis) and Denon (Laura Tyson) for the companies' willingness to do whatever it took to make us happy. After about two months, Denon discussed the possibility of KKLI beta site testing two of the new DN 950F upgrade machine, DN 950FA.

KKLI agreed to be a test site and after over 12,000 cuts and 1300 hours the new machines had no failures attributed to their operation and we were very favorably impressed.

Shortly after testing the beta machines, KKLI purchased two 950FAs. They have been on the air 24 hours a day. Each machine has collected over 29,000 cuts and 1620 hours with no failures. And I can honestly say that I have been impressed with Denon's resolution of our 950F problems with the DN 950FA.

The DN 950FA does not lack features. The remote connector on the back provides the remote start and End of Message (EOM) functions. The EOM is sent out after the end of the elapse time or, if you use one of the more popular CD libraries, you can take advantage of something called Index 3.

Index 3 and level presets

Index 3 is a special EOM code sent at a "musically appropriate place" from the CD. Either way, with the code you can do auto segues or just remote starts.

Twelve switches on the rear panel control the presets. The cue level can be detected at four different presets (−54, −60, −66 and −72 dB). These levels enable you to set the cue to music, not just some track flag. I was very impressed by the effect these levels have on cue.

Additional rear panel features include stereo/mono, EOM time, frame ID and elapse/remaining time. If you are one of those stations interested in the 2% faster wars, no problem, the machine can be set for that also.

The service manual is included with the DN 950FA at no extra charge! The manual is comprehensive, with performance tests and schematics. To make service easier you might want to buy the test CDs and the tool kit. The test CDs are used for service. One is sample audio that is completely digital. The other CD is used for alignment and testing (similar to the NAB test CD).

As for the tool kit, it consists of extender cable assemblies and special jigs to make reassembly easier. To go with the service aspects of the machine I found Allied offered very good technical support by phone. I would recommend you call them before you attempt to make a repair (a quick phone call can save you lots of time and money).

I would like to encourage you to take a closer look at the new Denon DN 950FA. The "FA" offers many of the solutions needed for the CD to be an on-air machine.

■ ■ ■

Editor's note: Dan Remy is a contract engineer who operates Dryan Communications, based in Colorado Springs, CO. He is also a product regulations engineer for a major electronics corporation. He may be reached at 719-636-1000.

For more information on the DN 950FA, contact Laura Tyson at Denon: 201-882-7467, or circle Reader Service 34.

CONSULTANTS

CONSULTANTS:
It's still not too late to have your cards run in the ***Radio World 1990 Annual,*** *our year-end wrap-up. For more information, call Simone Leeser at 800-336-3045.*

Audi-Cord Gets Nod

(continued from page 45)

formats, parent Ring Radio Company decided to start SRNN, a regional radio news network service. Operations Manager John Wheeling wanted to automate the network as much as possible to allow staffers to concentrate on programming.

After comparing price and flexibility, we decided to use an ESE 790 programmable clock, an ROH audio switcher and eighteen individual DLPM reproducers for SRNN. Purchasing this many machines made the overall cost comparable to that of one multiple-deck machine.

In an effort to reduce the amount of heat generated by twenty-four cart machines in the same rack, we opted to leave the factory-set motor control in place. SRNN then purchased six additional DLPM reproducers and one DLRM recorder/reproducer for its studio.

In the year WCNN has been using Audi-Cords, the machines have endured 24-hour use by several operators, a leaky ceiling, the coffee-spilling syndrome and extreme heat. They have worked remarkably. Audi-Cord President Carl Martin and his staff have been very helpful in providing spare parts, advice and service.

Martin's years of industry experience in machine design have contributed to a unit that is durable, easy to maintain and inexpensive. The DL Series does not offer many bells and whistles, but it does what a cart machine should do best . . . it plays carts. All in all, the DL Series machines are a great value.

■ ■ ■

Editor's note: John Talbert may be reached at 404-688-0068. WCNN Radio operates from its store front studios in the CNN Center (next door to the Georgia World Congress Center in Atlanta, home of the 1990 NAB Convention).

For more information on Audi-Cord cartridge machines, contact Carl Martin at 309-452-9461, or circle Reader Service 13.

Technics Scores at WNCN

(continued from page 45)

music and then back-cue. You can cue as "tight" as you want and the Technics will "start on a dime."

The operation then practically resembles that employed when cueing vinyl records, except it is much easier. We use the wired remote input that appears on the back apron of the machine, permitting fader start from the console.

Door switch glitch

The major problem we had with the 1200X player was the intermittent operation of the disc compartment door switch. Sometimes the disc would not "load" on the first try and occasionally the CD player would stop at random. The problem was the electrical contacts were not maintained when the door switch was closed.

The Technics 1300 seems to have an improved door switch mechanism, but we had some problems nevertheless. Returning the machine to Technics for repair takes about three weeks of turnaround time; the company also seemed to replace the laser assembly at the same time.

Our CE, Richard Koziol, has cleaned and readjusted the disc compartment door switch so that the machine will continue to operate. We are next going to purchase some replacement door switch assemblies so that we can do the repair in-house.

We have had many compliments on the sound of the Technics SL-P1300 CD players. And they are a joy to program and cue manually. We are quite pleased with these machines.

■ ■ ■

Editor's note: Sid Feldman is Engineering Supervisor for WNCN, NY. He worked at several radio stations and recording studios in New York City while earning a BEE degree from Pratt Institute.

For more information on the SL-P1300, contact Bruce Adams at Technics: 201-392-4449, or circle Reader Service 29.

ADVERTISER INDEX

This listing is provided solely for the convenience of our readers. *Radio World* assumes no liability for inaccuracy.

Page No.	Advertiser	Reader Service No.
17	3M	74
19	3M	66
21	3M	11
25	Allied/Audiopak	33
14	Allied/Fidelipac	6
22	Allied/Studer Revox	77
12	Allied/Technics	31
07	Altronic Research	39
07	ATI	19
49	ATI	24
42	Audiopak	76
06	Bext	59
03	Bradley Broadcast	70
44	Bradley Broadcast	68
01	Broadcast Electronics	49
03	Broadcast Electronics	25
26-27	Broadcast Electronics	42
29	BSW	94
38	CCA	85
16	Comrex	12
44	Conex	14
15	Continental Electronics	47
16	Cortana	38
04	CRL	43
30	Dataworld	28
23	Di-Tech	58
09	Dolby Labs	63
48	EMC	92
18	Eventide	32
52	Fidelipac	46
06	Gentner	23/36
23	Gorman Redlich	30
43	Hallikainen & Friends	62
45	Harris	72
31	Harrison (GLW)	61
46	Hnat Hindes	40
46	Hnat Hindes	27
33	Inovonics	45
49	Jampro	99
32	Kintronics	83
20	Logitek	26
30	LPB	17
24	Marti Electronics	8
36	Modulation Sciences	16
37	Modulation Sciences	78
13	Moseley Associates	44
08	Myat	51
29	New York State Thruway Authority	71
47	N.E. Broadcast Labs	10
39	Orban Associates	50
40	QEI	37
41	Radio Systems	7
10	RF Specialties Group	55
20	Ron Radio	41
10	Sine Systems	75
11	Studer Revox	89
28	Studer Revox	54
33	Tascam	22
34-35	Tascam	67
24	Titus Technology	64
02	Wheatstone	18
51	Wheatstone	53

Advertising Sales Representatives:

East & Midwest, Art Constantine: 800-336-3045 Fax: 703-998-2966
West Coast, Pat Macsata: 415-786-2198 Fax: 415-786-2754

WHY DIDN'T SOMEONE THINK OF THIS BEFORE?

A FAST-PACED PRODUCTION CONSOLE

THE WHEATSTONE SP-6 AUDIO CONSOLE lets production people quickly accomplish 8 and 16-track work, yet easily handle routine transfers and dubbing operations. With its unique track monitor section it can facilitate simultaneous stereo mixdown during the multitrack bed session – almost halving typical production time cycles. Input channels are laid out just like an air console, with machine starts below the channel fader, so staff familiar with on-air consoles can quickly become comfortable in the production environment.

For those interested in more advanced techniques, the SP-6 employs a powerful talent monitor section designed to rapidly call up live mic and track combinations, making difficult punch-ins a breeze. Standard SP-6 input channel equalizers are more comprehensive than those supplied as optional items on competing products, allowing much greater creative freedom. Input channel auxiliary send sections are designed to be the most versatile in the industry, providing 4 different auxiliary buses to allow digital delay, reverb, talent foldback, and mix-minus feeds. Stereo input channels can provide either mono or stereo effects sends. Even more, the SP-6 has 4 auxiliary effects return inputs that allow effects to be recorded onto the multitrack or sent to the monitor buses.

The SP-6 provides independent headphone, control room and studio monitor feeds, as well as stereo cue/solo. Control room and studio mute and tally functions are independently dipswitch selectable on individual input channels. Additional studio modules may be ordered to accommodate larger, multi-studio installations. The SP-6 may be configured with any combination of mono and stereo input modules, in mainframe sizes ranging from 16 to 32 or more inputs. The console is available in either an 8-track production format or a 4 stereo subgroup TV master control configuration. So why not profit from Wheatstone's experience and reputation? Call us today and learn more.

Wheatstone® Corporation

6720 V.I.P. Parkway, Syracuse, NY 13211

Circle 53 On Reader Service Card

TEL 315-455-7740 FAX 315-454-8104

GO WITH THE WINNERS. **DYNAMAX CTR10 SERIES**

"The Dynamax CTR10 Series is the most reliable and cost-effective cartridge machine available. Five of our stations use them and ten more facilities will be reequipped with CTR10s over the next few years as old gear needs replacement."

Lindy Williams
V.P. Engineering
Lotus Communications Corporation

DYNAMAX™
BROADCAST PRODUCTS BY FIDELIPAC

Fidelipac Corporation
☐ P.O. Box 808
☐ Moorestown, NJ 08057
☐ U.S.A.
☐ 609-235-3900
☐ TELEX: 710-897-0254
☐ FAX: 609-235-7779

Circle 46 On Reader Service Card