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**Program Audio
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 this month in
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Radio's Best Read Newspaper

June 24, 1992

Experts Debate Future of DAB

by Alan Carter

MONTREUX, Switzerland Calls for global compatibility in digital audio broadcasting (DAB) were repeated throughout the first international symposium on DAB held here June 8-9.

But there may be more diversity of opinion than the approximately 520 delegates—mostly from Europe—are willing to admit. Dr. Georg Plenge from the Institut fur Rundfunktechnik (IRT) admitted, "It may take more time to implement DAB than first projected."

The symposium, sponsored by the European Broadcasting Union (EBU), the NAB and the Eureka 147 project, preceded the NAB/Montreux radio show.

L-band and S-band are the only frequency ranges allocated worldwide for DAB, Plenge said. This conflicts with the planned introduction of DAB at lower frequencies to allow for single-frequency networks, he said.

"A combined effort of all bodies involved in the promotion of DAB . . . is necessary to solve the conflict either of having two or more different receiver types," Plenge said, "or of a 15-year delay from now for a possible start to DAB worldwide in 20007."

In the keynote address, Richard Kirby of the International Telecommunications Union (ITU), said he is convinced that DAB is a needed technology. "DAB would be needed even if compact disc did not exist," he said.

John, Abel, NAB executive VP for operations, outlined the six in-band DAB systems under development stateside. He cautioned, however, "The success of in-band systems is no ways certain."

Abel also reviewed the diversity of opinion in North America, with Canada and Mexico appearing to support the use of Eureka 147 in the L-band range.

"No single approach or system has emerged as the clear winner in the race to create a new DAB service in North and South America," Abel said. "U.S. broadcasters are hopeful that an in-band system for DAB can overcome its formidable technical obstacles and develop as an improvement to existing broadcast services.

"With Canadians planning to demonstrate and test their systems, the next year could reveal whether either of the approaches will prove feasible," Abel added.

The U.S. could be pressured into rethinking its opposition to Eureka 147 and the use of L-band, Abel suggested, with Europe and Canada heading in that direction.

"The only thing I can say with any certainty about DAB," Abel said, "is that the future seems uncertain."

Radio's Heyday Revisited

by Nancy Reist

SAN FRANCISCO "Oh look, it's a radio!" the woman laughed, pointing to the 1957 Guild Teapot to her son. She looked closer at the spice chest, lamp, portable bar, beer keg, miniature piano, and microphone that shared the display case with the teapot. "They're all radios!"

They were walking through an exhibit of nearly 300 antique radios, showing at the San Francisco Airport North Terminal through July. It's part of Grateful Dead sound engineer Dan Healy's collection. Healy isn't sure how many radios he's gathered over the years, but he's documented more than a thousand and knows he has at least five hundred more.

The collection includes the now valuable Bakelites of the 1950s, several of the acclaimed Hallicrafters, a Colonial New World "globe" radio, an exquisitely crafted Motorola console from 1940, and an Adler Royal, three-dial tuner radio from the mid-1920s with a 1926 RCA horn speaker.

Other notable examples include products from the Remler company, a San Francisco company that once built radios. Yet another classic example reveals a penchant for combining electronics and functionality: the Porto Baradio, which was a bar and radio complete with olive holder for the Martini lover.

Healy is the quintessential audio engineer, best known for pushing audio and radio technology to its limits in his role as the Grateful Dead's sound engineer. Restoring antique radios takes him to the other end of the technological spectrum—a contrast he finds interesting.

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Collector Dan Healy's love of radio dates back to his early childhood.

photo by John Werner

NEWSWATCH

NAB Urges Revision of FCC Group Ownership Limits

WASHINGTON The NAB has asked the FCC to revise its radio ownership rules,

reducing certain of the limits while requesting a minority set-aside for overall station ownership.

The NAB's petitioning of the FCC for partial reconsideration follows a vote on May 20 by its Radio Board to ask regulators for such a revision.

The FCC had adopted national limits of 30 AM and 30 FM stations, with the num-

ber of stations allowed to be owned in a single market based on a percentage of market share as determined by Arbitron ratings data. The limits were met with opposition from Commissioner Andrew Barrett and members of Congress when the rules first were adopted by the FCC. The old rules limited ownership to 12 FM stations and 12 AM stations.

In its petition for reconsideration, the NAB recommends elimination of Arbitron or similar data from the regulation, and elimination of market share as a limitation on ownership in a market.

The NAB petition suggests reduction of ownership limits to 25 AM and 25 FM stations nationally, while allowing common ownership of five more stations if they are minority controlled. Also recommended is reduction of ownership limits in a market to two AM and two FM stations in any market with 30 or more stations. In markets with fewer than 15 stations, the petition asks that the rules allow ownership only up to 50 percent of stations in that market, with exceptions decided on a case-by-case basis.

According to the NAB petition, the measures would be a "safety net" against "the undesirable consequences of using market share in guarding against the possibility of undesirable levels of ownership concentration." The measures also would "create additional opportunities for minority ownership and joint venturing," the petition stated.

FCC Upholds Fine Policy

WASHINGTON The FCC has denied several petitions to reconsider its revised fine policy that substantially increased fine limits last year. The Commission, however,

continued on page 2 ►

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World Radio History

NEWSWATCH

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has reduced one of the base fines—on tower painting violations.

Several parties objected to the 1991 fine schedule increase, which was the result of congressional authorization in 1989. The opposition included the NAB and other groups, which argued that the fine schedule change was a rule change, subject to notice and comment.

The FCC, however, said that the changes constituted a policy statement and therefore were not subject to the procedural aspects of a rulemaking. The FCC said that the fine schedule will be used as a guide and that a fine decision will be based on specific

facts of a case.

The tower painting violation fine limit has been set at \$8,000 for all licensees. Previously the base limit was \$80,000 for common carrier, \$20,000 for broadcasters and \$8,000 for all others.

Ingram to Leave SBE

INDIANAPOLIS The SBE has announced that Executive Director Steve Ingram "will be leaving" the 6,000-member organization in October.

Although SBE President Richard Farquhar praised Ingram's tenure at the SBE, Ingram recently came under fire from some chapter leaders, who said he contributed

to recent problems of the organization, which resulted in chapter dissent.

In a press release, Farquhar said, Ingram made "accomplishments in recruitment and training of office staff, personnel management, relations with other organizations, facilitating the strategic planning process, promoting board and committee involvement, and more efficient relationships with the hospitality and travel industry."

Ingram will stay with the SBE until after the annual convention this year in San Jose, Farquhar said.

Broadcast Standards For Digital Move Forward

LAS VEGAS Manufacturers in attendance at the industry's Digital Interface Standards Committee, Composite Standards Group meeting during NAB '92 nar-

rowed down options for composite data stream sampling rates, a chip for composite transfer and a studio audio transfer standard.

Following some discussion of the possible rates for a composite data stream, it was decided that 480 kHz, 485.1 kHz and 494 kHz should be examined further. All three are integer multiples of either 32, 38, 44.1 or 48 kHz. Ed Twitchell of Harris-Allied and Ed Anthony of Broadcast Electronics will test these rates to determine applicability to digital excitors.

BNC connectors were agreed to as a standard for composite digital connection. Talk about a composite transfer chip centered around the AMD Taxi chip, as well as the "MADI" standard. The MADI standard ultimately was discarded because of the stability and affordability of the AMD Taxi chip in this application.

According to group minutes, it was "overwhelmingly agreed" that the AES3-1985 standard for two-channel digital audio transfer should be adopted for studio use. The AES10-1991 MADI standard was supported for multiple audio channel transfer.

The next meeting of the interface standards committee has tentatively been slated for early July. The location has not yet been determined.

continued on next page ►

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EIA Solicits DAB Proposals

WASHINGTON The Electronic Industries Association (EIA) Digital Radio Subcommittee has begun the process of notifying digital radio (DAB) system proponents and manufacturers that are interested in submitting standard proposals for a U.S. system.

The letter requested a reply letter of intent to participate in the subcommittee's process. The response was due by June 15. Interested parties have been asked to submit detailed technical descriptions of their systems by December 15. The long-range schedule mandates that actual hardware be submitted no later than April 15 1993.

According to EIA, seven industry "segments" will vote on the systems next year, and later this summer, the testing parameters will be developed. A standard is expected by the end of 1993.

Station Fined for Indecency

SAN DIEGO The FCC has ruled that it may fine KGB-FM \$25,000 for broadcasting indecent songs during a morning program last winter and early spring.

According to the FCC, the station first broadcast a song called "Candywrapper," on February 23, then broadcast another song, entitled "Sit on My Face," which aired on March 16 and April 13.

The base fine for airing indecent programming is \$12,500, but the FCC said the fine was increased because the station repeated the programming.

Ad Revenue Up, Down

NEW YORK Radio's combined national and local revenue was virtually flat in the first quarter of 1992, but local ad sales were up by three percent, according to the Radio Advertising Bureau (RAB).

The national ad revenue was down 13 percent compared to the same time period in 1991, but local ad dollars actually have been increasing all year, according to RAB.

Despite the continued downturn in national ad sales, RAB President Gary Fries said the increase in local revenue "points to a return a consumer confidence and spending on the local level."

Fries said that national business is actually increasing, but "softer spot rates are bringing the total dollar figure down."

NAB Concerned about DAT Legislation

by John Gatski

WASHINGTON The NAB has some reservations about the pending digital audio recorder legislation for consumer equipment and blank media, claiming that the broadcasters would be adversely affected by the law.

If approved, the legislation would charge a royalty on blank tapes, recordable discs, and consumer recording decks. It also would require all manufacturers to add the Serial Copy Management System (SCMS), which prohibits digital copying of first generation recordings.

The legislation is the result of a music publishers/consumer audio industry compromise to compensate for a perceived, potential loss of revenue for recording artists, writers and producers. Law supporters said these parties will lose money because digital recorders enable millions of people able to make "perfect" copies of CDs—eliminating the need to go out and buy additional recordings.

Nonetheless, the NAB believes the law will have an impact on professional equipment. "The act may have implications for broadcasters for two reasons," the NAB said. "First, since SCMS prevents second generation digital copies, digital editing in broadcast operations could be hampered. Since only narrowly defined professional models are exempt from SCMS, broadcasters may be forced to purchase more expensive professional equipment—even when the audio quality and reliability of high-end consumer equipment (such as DAT) more than fills the bill."

"Second, the definition of the professional models is arcane. To avoid litigation manufacturers may eventually be forced to include SCMS in virtually all digital audio equipment (including professional). This could restrict the ability of broadcasters to construct entirely digital studio operations," the NAB said.

Confusion over the professional model definition apparently already has had an effect on equipment intended for professional use. A RW reporter checking out the JVC booth at the recent NAB show in Las Vegas saw a prototype portable DAT recorder being shown, with stereo microphone.

But the JVC spokesman at the booth said an internal battle had developed between

U.S. salespeople and design engineers in Japan because the latter want to add SCMS to the recorder.

The legislation exempts pro equipment from SCMS and names the features that a pro unit must have in order to be exempt. The definition however, is somewhat vague,

Confusion over the professional model definition apparently already has had an effect on equipment intended for professional use.

legislation detractors have said. The physical features for such an exemption include XLR connectors, but the pro definition also can extend to a product's intended use or even where it is sold.

Intended use, price and other pro features would appear to exempt the JVC unit, but apparently the factory has interpreted the law differently—that XLR connectors are required to be exempt.

Since the company was planning not to add XLR connectors to the new portable, the JVC spokesman said engineers in Ja-

pan believe that SCMS must be added to meet the law.

The JVC spokesman acknowledged that it would be bad news if the final version has SCMS. At \$1,700, engineers would be hard pressed to find a reason to buy the unit if the tapes can't be digitally dubbed more than once. Professionals can pay \$500-600 for a consumer unit that does the same thing.

Another product that is intended for professional use, and has SCMS as well, is the Sony Scoopman. The Scoopman uses a rotary head digital recording system with a tape approximately the size of a large postage stamp. Intended for journalists, businesses and others who are willing to pay about \$1,000 per unit for such convenience, this tiny recorder is said to provide 10-14.5 kHz stereo audio.

Digital audio legislation critics point out that although there will be a law requiring SCMS in consumer equipment, there is no proposed law prohibiting companies from adding it in pro equipment.

At press time, three similar bills, HR-4567, HR-3204 and SB-1623, were being worked through the House of Representatives and Senate processes. Because two powerful industries—consumer electronics and music publishers—support the legislation and opposition has been late in organizing, if at all, legislative insiders believe a law will be approved by early summer.

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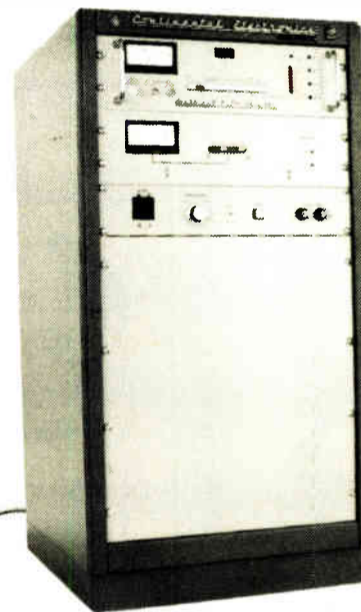
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DAT: Follow the Money

by Alex Zavistovlch

WASHINGTON "Follow the money." Isn't that what Deep Throat told Woodward and Bernstein as they unraveled the Watergate caper?

Follow the money. Well, it's no cover-up, and I'm not Bob or Carl, but looking behind the scenes of the DAT bill gave us here at RW a real sense of how The U.S. Political Machine gets things done.

You're all up to speed on the DAT bill, right? It's covered in this issue. The legislation would charge a royalty on blank tapes, recordable discs, and consumer recording decks. It also would require all manufacturers to add the Serial Copy Management System (SCMS), which prohibits digital copying of first generation recordings. Professional equipment would be exempt from SCMS.

The NAB had been conspicuously silent while The Machine was getting into gear with the bill, but has finally shown some concern about its potential impact on broadcasters.

The NAB thinks that the definition of "professional" equipment as used in the bill is "arcane," and I'd have to agree. The bill distinguishes pro from consumer gear based on a number of criteria, but the one that most industry people seem to focus on is whether there's an XLR connection on the box. If it has XLRs, it's pro, as far as the bill is concerned.

Things get confusing when you factor newly introduced gear into the equation. At NAB '92, for example, JVC showed a professional portable DAT recorder. *Professional*, according to JVC.

The only problem is, this new recorder has no XLR jacks. Result? The Japanese are including SCMS in the device, because they think it will be out of compliance otherwise. They may be right. But there you have it: a real example of a professional product hampered by copy protection, as a direct result of the bill.

When you start trailing the DAT bill, you find yourself taking some pretty interesting twists and turns. For example, someone close to the whole issue tells me that the Home Recording Rights Coalition (HRRRC) is going to be closing up shop pretty soon. Why? Because its work is done.



Does that mean there's no further need to defend home recording rights in the U.S.? Not at all. It means the DAT bill looks like a done deal (one person close to the issue was heard to remark, "The fix is in"), so there's no need to keep shelling out for a lobbying group that's trying to get the law passed.

From what I've heard, that's all the HRRRC ever was: a lobbying group the Electronic Industries Association (EIA) used to get the DAT market rolling in the U.S. Heck, it's headed by Gary Shapiro, VP for the EIA's Consumer Electronics Group.

That's not to say DAT didn't need some kind of help getting going in the U.S. The format was floundering in the consumer arena because recording industry interests were afraid of a flock of pirated digital recordings pecking away at their bottom line. The Recording Industry Association of America (RIAA) even threatened early on to sue any manufacturer selling DAT recorders in the U.S. not equipped with some form of copy protection.

Anyway, things were looking pretty bleak for DAT there for a while. Then came the HRRRC, then the DAT bill, and now a certain amount of cash from the sale of blank media and recorders is going to be collected and

disbursed to everyone who was able to hook himself onto the EIA's gravy train.

Follow the money. Ah, if only we could. Unfortunately, the language of the bill makes sure that the amounts collected will not be disclosed; it's supposedly even exempt from the Freedom of Information Act.

That's the way things work in D.C., though. You scratch my back, I'll scratch yours, and we'll both try to keep it quiet.

What political deal-making went on while the bill was being refined, we may never know. All we know for sure is that the proposed legislation got only token opposition on the Hill and a rather late-seeming objection from the NAB.

Of course, I realize that the NAB always likes to make its points known at the last possible moment, probably assuming that the last opinion you hear about an issue is the one you'll remember best. Still, seeing how little opposition the NAB showed to the DAT bill makes me think about the U.S. radio data system (RDS) standard. Remember how the EIA agreed on an eleventh-hour extension to allow an ID Logic B provision for AM broadcasting in the standard?

I'm not saying that any such deal was struck; I'm just saying that if a deal *had* to be struck, that would be one obvious place for it. What really happened? I guess we'll have to follow the money again.

★ ★ ★

I was watching the country music video channel the other day when I had my first exposure to "Achy Breaky Heart," by Billy Ray Cyrus. Quick first impression: Someone's trying to make this guy the George Michael of the Nashville scene.

It wasn't until I talked to Chuck Taylor, my associate editor and RW's resident music tracking maven, that I realized what a phenomenon Cyrus is.

His naive, sing-songy No. 1 country hit has crossed the great divide—the one between the country chart and the pop singles charts. For the week ending June 6, the song was Number 10 on the Hot 100, while Cyrus' debut CD sprang onto the Pop Album chart at No. 4.

What's most impressive is that his status on the Top 40 chart was earned almost exclusively as the result of frenzied sales ("Achy Breaky Heart" was the fourth fastest-selling single at the end of May). Until recently, CHR radio stations were not playing the song.

Finally, someone in Top 40 radio started to take notice, and now Cyrus is getting air time. Some 23 Top 40 stations have picked up the single at last count. Wow, what bold, risk-taking programming.

As Chuck says, sooner or later, Top 40 PDs and MDs are going to have to accept that what the public buys is what the public wants to hear. Sure, country has been taboo for years. But it's also growing beyond its once-narrow audience; now it's accepted among mainstream demographics as well. A good song is a good song, after all.

My own opinion is that "Achy Breaky Heart" will not leave a very deep trail in the sands of music history. The Billy Ray Cyrus phenomenon, however, may help prod Top 40 programmers out of their complacency, and into a more open-minded attitude about crossover material.

I'm even taking a hint from Billy Ray myself. After work today, I'll be putting the finishing touches on my own country tune to compete with "Achy Breaky Heart." How's "Ouch, Lady, I'm Incredibly Bummed Out" sound to you?

That's it for now. Tune in next time,

Alex

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The other side of mic history

Dear RW,

We would like to respond to the letter from Neumann/USA appearing in your May 6 issue's *Readers Forum*. We feel that certain "facts" as presented by Neumann/USA require clarification.

GOTHAM has made only one claim with regard to the UM 70's pedigree. Its M 7 capsule was originally designed by Mr. Georg Neumann and used in the CMV 3a, U 47, U 48, M 49, M 249 and UM 57 microphones. This is fact. GOTHAM has never inferred, implied or insinuated that these microphones were associated with, manufactured by, distributed and/or endorsed by Georg Neumann GmbH. We will state for the record that indeed, Georg Neumann GmbH was not involved in any way with Microtech Gefell's current product line.

Our published version of Microtech Gefell GmbH's history is very similar to the one related in this letter, with one exception. In 1972, the East German Government changed the name of the company from Georg Neumann & Co./Gefell to VEB Mikrofontchnik Gefell, not Mikrofon Bau, Gefell. Mikrofon Bau is a West German company which did not even exist until the mid-1960s.

GOTHAM's Perestroika advertising campaign was indeed designed to evoke romantic images. GOTHAM pulling Microtech from the ashes of communism after the fall of the Berlin Wall is quite accurate. We have never inferred that Microtech Gefell was a "forgotten or lost" Neumann factory. Any such "notion" exists only in the minds of Neumann/USA. Our advertising and public relations were developed to strike the imagination of our target audience. Launching a campaign for a new microphone in a market deluged with similar products necessitated focusing our creative efforts in capturing attention. We are proud to say that our Perestroika campaign has done exactly that.

The M 7 capsule used in the UM 70, UM 70S, M 71 and M71S is not a "copy" of Georg Neumann's capsule. Mr. Neumann

designed the M 7 capsule in 1932 (not 1947) and he taught the workers at Microtech Gefell GmbH how to produce it. It has been in continual production at the Microtech Gefell factory since 1943 by these same workers exactly as Mr. Neumann taught them. In the 1960s, Georg Neumann GmbH revised its M 7 capsule to make it easier to manufacture. In the process, the "sound" of the capsule was changed and, in our opinion, its integrity was compromised. We feel Microtech, in its strict adherence to Mr. Neumann's original specifications, is truly his ideological heir.

The statement that "The availability in the 'Free World' of truly superior equipment never warranted their (Microtech Gefell GmbH products) serious consideration" is an entirely subjective and self-serving comment. Every consumer should base his buying decision on criteria (including price) reflecting his priorities and needs. The Perestroika microphone, in a very short time, has become a viable alternative to its high priced competition, and for good reason! It is this "fact" more than any other which has engendered the "sour grapes" tactics being employed to discredit it.

GOTHAM has almost 35 years of experience in the professional audio industry. We have a reputation for representing the finest equipment available in the world. We are proud of our standing in this industry and we are proud to represent Microtech Gefell GmbH.

R. Wm. Wanamaker
Director, Publicity & Advertising
GOTHAM Audio Corp.
New York, N.Y.

We aim to please

Dear RW,

Many months ago I received a questionnaire from RW which solicited my opinions and suggestions. I claimed that RW was a "cover-to-cover read"! I also expressed a desire to see more articles of an historical nature.

With the May 6 issue I got my wish:
Page 24: "Look to Your Local Library for Origins of Radio History"
Page 4: "Reliving AM Radio's Good Ol' Days"

Page 30: "On-Air Commercials Began in the Golden Age of Radio"

Excellent articles all!

If your other readers share my observation that radio is one of the most historical of subjects, they too were pleased. Please keep up the good work.

Michael T. Bucci, VP
The Michael Thomas Group
Cherry Hill, N.J.

AM: This I believe . . .

Dear RW,

For the past 15 years I have operated as the chief engineer in the AM/FM broadcasting industry, and have enjoyed your magazine for about as many years.

I for one have a lot of faith in the continued existence of AM radio broadcasting. We have just converted to AM stereo and it sounds quite good, better than some FMs I've heard. AM, as we all know, has been plagued with man-made noise and interference problems. This has probably been our

Ahead to The Past

Radio is moving toward the end of the decade amid a rush of 21st-century technology. With a wide range of technological developments clamoring for the attention of today's broadcasters, it's important not to lose sight of the rich heritage of wireless transmission.

Early transmission gear, as well as acetates, transcriptions and vintage receivers, are reminders of how

far the industry has come in so short a time. The legacy they have left behind for broadcasters is a foundation of technology, and a springboard for the imagination of future generations devoted to testing the limits of the medium. Mass communication owes a debt of thanks to radio's pioneers.

In many cases, however, invaluable examples of this heritage have fallen victim to the passage of time. Early equipment often has been discarded, lost or left to lay uncared for in basements and storage rooms of stations and homes across the country.

Tom Lewis, author of "Empire of the Air," which chronicled the careers of Sarnoff, Armstrong and de Forest, has cautioned broadcasters not to forget the past. In a speech at NAB '92, Lewis lamented the disappearance of early radio gear and urged the preservation of broadcasting relics and early radio programs.

Such warnings have not gone unheeded. A scattering of private collections and museums feature extensive displays of early radios, professional equipment and other broadcasting memorabilia.

The Pavek Museum of Broadcasting in St. Louis Park, Minn., is one such collection; another is the P.R. McIntire collection, donated to Brigham Young University by Salt Lake City's Bonneville International. The private collection of sound engineer Dan Healy, described in this issue of RW, also offers a tribute to the industry's past.

Congratulations to the dedicated collectors and fans astute enough to understand the value in preserving the heritage of radio. Through their efforts, broadcasters will be able to continue taking lessons from the past, even as technology carries the industry into the future.

—RW

single worst enemy.

The problem could easily be overcome with more wattage, however, the FCC hasn't smiled on us in that manner. As with most governmental agencies, they would rather shuffle paper than solve the problems at hand.

We have all seen the advent of digital technology beyond our wildest dreams in the past 10 years. We now have digital audio storage, digital audio processors, and digital editing stations that can remove noise from most audio sources. I think we are on the threshold of seeing an AM tuner that converts everything into the digital world, and all the audio is run through a processor that removes most noise and replaces it with its best guess as to what should be there. I believe within a short time AM received on a digital radio will sound as clean as, maybe better than, our present-day FMs.

Our biggest hurdle will be the radio manufacturers. Can we as broadcasters convince them it's worth their time to design and build these tuners? Are we willing to create new formats for this new technology and revitalize the AM band once more? Or have we as an industry decided to shut off the lights and go home?

Tony Wortmann, CE
WJAG/KEXL
Norfolk, Neb.

Radio's dead?

Dear RW,

After reading "Cable Radio Reaches Out to Broadcasters" (RW, May 20), I feel some clarification is needed. Although I haven't heard Digital Cable Radio or Digital Planet, I am a subscriber of Digital Music Express (DMX).

I can tell you, DMX is NOT radio; it is infinitely better. DMX provides 30 different channels of uninterrupted CD quality music 24 hours a day, with no advertising, no announcing at all. For less than \$15 a month, I can choose anything from opera, reggae, country, blues, six categories of rock, jazz, big band, Latin, and much more—DMX's comprehensive selection leaves nothing else to be desired. If I want to know what is playing, pushing a couple of buttons on my re-

mote control tells me the title, artist, composer, album, and album number on a small LCD display. DMX is everything I want in audio entertainment.

To paraphrase Garrison Keillor from his recent book "WLT," a nostalgic look at early radio: "Today's radios can't pick up a station 30 miles away, and why should they? All the stations sound the same." Why would I want to hear radio on cable? It's still the same thing, just from farther away.

As far as I'm concerned, radio is dead: Long live DMX! No, I am not a DMX employee, just a very satisfied subscriber. Yes, I can hear the skeptics saying, "you can't get DMX in your car." So what? There, I listen to tapes I've made (can you guess the source?).

C.F. Nye
Cottonwood, Ariz.

Correction

Television Technology Corporation (TTC) was inadvertently overlooked in RW's NAB wrap-up issue (May 20, 1992). TTC showed the FMS series of solid-state (FET) FM transmitters available from 200 W to 16 kW, and the J-series tube-type FM transmitters at 10, 20, and 25 kW. Both units use the original digital-quality Model X FM exciter.

TTC also showed the XL series of FM translators available in 1 W, 2 W, 10 W, 20 W, 100 W and 300 W.

For more information, contact Russ Erickson at TTC: 303-665-8000, fax: 303-673-9900, or circle **Reader Service 32**.

Also accidentally omitted from RW's wrap-up issue was The Management. The company displayed its Digital DJ digital audio hard disk and satellite controller. Also on hand was the EZ-Log, Simple-Log and Super-Log traffic systems, and the Music Log computer music selection.

For more information, contact Peter Charlton at The Management: 817-625-9761, or circle **Reader Service 105**.

Radio World

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Next Issue of
Radio World
July 8, 1992

Consultant Opposes Pending RF Mark

by John Gatski

SAN FRANCISCO A west coast consulting engineering firm opposes a proposed revision of an industry radio frequency radiation (RFR) exposure standard, claiming that compliance with the new mark could cost radio stations a lot of money.

San Francisco firm Hammett and Edison has strong reservations about the IEEE C95.1 RFR standard that is now being considered by the American National Standards Institute (ANSI). It also is likely to be adopted by the FCC.

"We are very concerned about the cost

and the burdens of these measurements (contained in the IEEE and proposed ANSI standards). In fact, at this point we don't see how we could certify a site," Hammett and Edison Senior Engineer Dane Erickson said.

If ANSI and the FCC adopt the IEEE RFR standard, stations would likely have to spend unnecessary money on actual measurements at tower sites rather than by field calculations, he said.

For broadcasting frequencies, the new standard consists of a two-level mark, with field level maximums of 1000 mW/cm² for workplace exposure and 200 mW/cm² for public exposure. The cur-

rent ANSI standard is one level: 1000 mW/cm².

A revised standard

RFR has become a topical environmental issue in recent years, amid claims that RFR could cause adverse health effects. Other groups maintain that RFR is not a health threat.

Local jurisdictions have enacted their own standards. Some have said these community standards are too overzealous and not based on scientific fact, but hysteria. Industry organizations, such as the NAB, are depending on ANSI to adopt a reasonable national standard that balances broadcasting interests with assurances of health and safety.

The proposed ANSI standard's sticking point, Erickson said, is a body contact measurement provision that would have to be met. Within the standard, a category was assigned to the body current provision which extends from 3 kHz to 100 MHz.

"Our problem is with the conducted body current," Erickson said. "The limit for the conducted body current stops at 100 MHz. Right in the middle of the FM band. You could have a little class A FM with 6 kW at 99.9 who has to worry about conducted body current measurements. Yet at the same site, you could have a 100 kW circularly-polarized Class C FM at 100.1 MHz who doesn't even have to worry about that."

Erickson explained that if IEEE wanted to apply the body current measurement, it should have extended it to 108 MHz, to encompass the entire FM band. But, more importantly, the body current measurement should not apply to FM at all, he said, because scientific evidence does not indicate adverse body absorption rates at FM frequencies.

Big guy or toddler?

Another problem with the body current measurement portion of the revision is the criterion for evaluating the current, according to Erickson. The proposed standard measurement for body current measurements would be made "for an adult of average height and weight," a criterion that is not workable, Erickson said.

"We feel that measurements of body cur-

rent will depend so heavily on variations among different human bodies that it cannot be a practical criterion in the real world.

"For examples, Section 4.1 (a)(i) of the standard would create a limit of 100 mA of induced body current through each foot of a free-standing individual," he continued. "Is this with or without shoes and socks? Dry or sweaty feet? Leather soles or rubber soles? For a 72-inch adult male or 36-inch toddler?"

Erickson said such subjective measurements are not necessary for an RFR standard for FM frequencies. Using ambient field measurements as used with the old

San Francisco firm Hammett and Edison has strong reservations about the IEEE C95.1 RFR standard

standard "should tell the whole story for compliance certification purposes," he added.

If a body contact provision must be included in an RFR standard and a specific definition of type of individual were to be included, Erickson said his firm would support it from 3 kHz to about 40 MHz, which would encompass the AM band where body current absorption is more likely.

But without a specific human criterion, "we must remain on record as objecting to all limits on body currents contained in IEEE C95.1," Erickson said.

In a letter addressing Hammett and Edison's concerns earlier this year, Dr. Om P. Gandhi, IEEE SC-4 subcommittee member and electrical engineering professor at the University of Utah, said that if the standard did not take into effect body current, the field limits would have to be much lower.

Also, in addressing the break point of the body current measurements at 100 MHz, Gandhi said the safety guidelines were based on the "science of coupling electromagnetic fields to humans and the likely biological effects of the coupled energy."

"The subcommittee decided not to get involved in proposing safety guidelines by industry or application," Gandhi said.

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WGN Overhauls Its Radio Newsroom

by Bruce Ingram

CHICAGO In a move far more common among television than radio stations, Tribune Broadcasting's WGN(AM) is investing an estimated \$250,000 in a technological upgrade of its newsroom computer system.

After nine years of service, Tribune Broadcasting's full service WGN(AM) is retiring its NewStar 1 newsroom computer system in favor of a 30-workstation, PC-based system by Generation Technologies.

Why such a heavy investment? Primarily because news is important to WGN's programming. WGN is one of the last talk stations where news not only plays an integral role throughout the day but can take over programming completely in the case of a "code purple" emergency such as the recent flooding of the Chicago Loop.

"The newsroom is a very critical part of our operation," said WGN's Information Systems Coordinator Judith Hoffman. Hoffman, who helped select the Generation Technologies system, added, "It's certainly worthy of the best equipment we can provide."

Of course, the station can afford high quality equipment. WGN, long the top-rated radio station in Chicago, is one of the top-billing stations in the country, with annual revenues reportedly in excess of \$30 million.

Getting personal

But there are other reasons for the upgrade. Recently, WGN News Director Dave Ellsworth became interested in finding a system that ran on personal computers.

Although he praised the NewStar 1 as a

fine system that worked well for many years, Ellsworth explained that it operates with a proprietary hardware scheme and an internal CPU instead of personal computers.

That arrangement makes the station dependent on the supplier, Dynatech NewStar, for parts and repairs, he explained, and made the system more difficult to maintain over the years.

Ellsworth said that he found Generation

Technologies has sold to WGN differs little from NewStar in the basic service it provides to the broadcast newsroom. It takes wire service information and divides it into easily accessible batches by region and type of news.

Radio oriented

According to Ellsworth, when the General Technologies system is installed in late June, it will take all nine of WGN's wire services (it can handle up to 64) and break the information down, just as NewStar does. The system takes the news and divides it into categories such as national and international news, local, state and regional news, business and agribusiness news, weather, sports and so forth.

It does so, however, with incredible speed, Ellsworth said. "Generation is lightning fast," he said. "It also has great flexibility and ease of use."

If a listener calls one of WGN's on-air personalities wanting to discuss a recent Supreme Court decision, Ellsworth said, the host can simply hit a key and instantly have the story in front of him for reference.

"In radio, speed is absolutely essential," Hoffman explained. "If we have three seconds of dead air while a host is punching up information, he sounds like an idiot."

Hoffman added that while WGN has no desire to stay on the leading edge of technology (often referred to internally as "the bleeding edge," she said), the station does have a commitment to update as necessary to stay on top of things.

This attitude holds true throughout Tribune Broadcasting, she said. All of the company's broadcast outlets updated their computerized commercial traffic systems two years ago.

Apart from its immediate advantages, however, Ellsworth said he was ultimately sold on the General Technologies system because it seems to be digital audio ready.

He envisions a time in the near future when all of the newsroom functions will be entirely digital.

"The sooner the better as far as I'm concerned," Ellsworth said. "We're going to do away with our tape recorders and store all of our stories digitally—editing and playing back from terminals.

"Our morgue, for example, will all be digitized. When a well-known politician or former politician dies, we will be able to type into any terminal and not only search by slug to get the right tape but keyword-search the tape for quotes virtually instantaneously. That's what's waiting for us down the road. We hope this new system will help us prepare for it."



A PC-based newsroom system will be the heart of WGN's bustling news operation.

Technologies founder David Cunningham, who has chosen to head research and development at the company, very radio-oriented. "The things that mean a lot to radio, especially speed and flexibility, mean a lot to him."

(Curiously, Cunningham did not return calls for this article and company president Mike Bennett declined to be interviewed about the WGN system and his company's marketing plans for radio stations.)

Cunningham developed the newsroom system WGN has been using since 1983 for KCBS-AM San Francisco in 1979. He sold the system to NewStar and developed another in the early '80s, setting up Generation Technologies as a competing company.

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"CAT-LINK solved all our problems in 4 minutes—2 minutes to install each end. Performance has been impeccable."

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"CAT-LINK makes money for us, and it improves the sound of the station."

Mike Callaghan, KIIS-FM, Los Angeles CA

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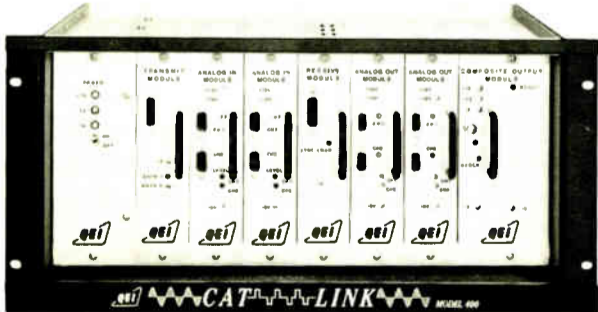
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Circle (131) On Reader Service Card

Radio's Heyday Revisited at San Francisco Airport Show

► continued from page 1

"One side of me works with this cutting edge of sound and the other side of me is like this old dotting doctor that sort of pets and prods his little old radios around," Healy said.

Looking for treasures

Healy started his collection with a 1930s console that was bound for the junkyard. Then starting in the 1960s, Healy began buying them in thrift shops. They were cheap—often just a quarter or two—and he enjoyed tinkering with them.

"If you went to see a movie, the same three hours of entertainment would cost you way more. That's really what it was, it was entertainment for me. Then about 10 years ago all of a sudden I noticed that the price of them was going up."

Many of the radios Healy bought for under a dollar are now worth hundreds and even thousands of dollars, but he said he would never sell one. He describes radio restoration as "reconstructing a world gone by" and the preservation of an artistic form he deeply respects. It offsets the stress of his job as a high-tech sound engineer.

"I can go into my shop and it's my own lit-

"If I had my way, I'd have one of every radio ever made. I mean, that's really the end of that dream."

tle world. I go there with my radios which are a very personal thing with me. I have a rapport with them. The first radio I restored was pretty funky. I spoiled a couple of them. But now I've got it down to where I consider myself the world authority on radio restoration, which probably doesn't really mean too much. But it does to me because that's a goal I wanted to go for."

Restoration is more to Healy than simply repairing the receiver. The radio must be returned to its original condition. Putting modern electronics into an old radio is heresy. "My philosophy about that is that it has to be original. You can't alter the sound of it or the way it performs," Healy said.

A time-consuming passion

It's not always easy to find the components necessary for authentic restoration. Healy has driven hundreds of miles to buy a batch of the original shellack used on old radios. He bought a coil winding machine from a man who used to build radio frequency transformers, so he can wind his own coils. He has thousands of unused vacuum tubes he's collected over the years.

Healy includes photography and silk-screening in his radio restoration repertoire. Many of the dial glasses are broken. He photographs the pieces, blows the copy up, retouches the picture, and reduces it

back. He then transfers this to a silkscreen which he lays down on fresh glass.

Old radios also frequently have broken or missing pieces and knobs. Healy sends one part to a friend with an injection molding system who makes a mold with it and runs off a batch of them. Healy has dozens of bags of knob and dial replicas laying around his workshop. His shelves are piled high with old parts and schematics.

There are no owners' manuals, though. Healy has to figure out how to repair the



The use of plastic in radios became popular after World War II, ushering in an era of curved design.

electronics himself. "In those days you were required to be a little smarter than you are these days," he said. "A few things you had to figure out on your own, which is something I really like."

Healy began developing his radio restoration skills as a boy. He would wrap wire around a Quaker Oats container, connect it to a galena crystal and headphones, hook them to the railroad tracks—which he used as an antenna—and tune in stations by poking around on the crystal.

Tuning was a skill

Some of the earliest models in his collection aren't much more sophisticated than that. He has several breadboard radios with the components mounted on a board. Some have separate batteries and loudspeakers and three or four tuning dials.

"Playing" a radio actually took a knack. I wouldn't say it was as deep as playing a musical instrument, but it was certainly not what we think of today when we think of playing a radio. You'd tune in and get a little bit of the station and then you'd tune in the next dial and it would get louder, and then you'd tune the next one and it would get louder, but then by the time you got that one tuned, the first one was a little bit off. So you had to go back and forth. You didn't just go change the station."

For personal listening, Healy says he prefers the more powerful receivers like some of his Hallicrafters. But he claims he doesn't have any favorites. Instead, he says he's in love with telling the story of radio, and each one contributes a piece.

"If I had my way, I'd have one of every radio ever made. I mean, that's really the end of that dream. I walk into this field that's like about 50 football fields and it's just beautiful green lawn and rows and rows of radios—one of every radio ever made. That's heaven to me. That's like, OK, I went to the better place."

SMART'S JOCK-IN-THE-BOX

COMPLETE TABLE TOP STATION AUTOMATION

By John Schad, President
SMARTS Broadcast Systems

Visiting with a fellow broadcast equipment manufacturer recently, we discussed a concept of designing a "radio station in a box." Something so complete that it would do everything needed to produce continuous broadcast programming—feed it to a transmitter and you're on the air.

Reflecting on that conversation, I took a closer look at a new product we have developed here at SMARTS and realized how close we are to that concept. This system is probably the most amazing piece of broadcast equipment I have ever seen. It uses CDs as a music source, can handle over 540 CD's on line in up to 32 decks, each deck holding 18 CD's. That's over 540 hours of random access music, in a system that fits on a table top!

The really amazing thing is the way our system handles the problem of knowing when a CD ends. We don't have to use special encoding, you can run CD's in our system from K-Mart. You don't have to type in all the running times of the CD's. You don't have to depend on a silent segue, you can actually segue out of the

CD to produce overlap and beautiful transitions to the next cut. Our computer programmers have made the Jock-In-The-Box learn the music it has to play, and know when the end of the cut is coming, without tones, special encoding or time consuming entry of running times! As I write these words a test system is running in the next room. It works flawlessly, and the music transitions are so good it brings tears to your eyes.

We have also addressed another problem with CD audio, excessive programming time needed to run the system. In the open reel system the programmer needed to tell the system which deck to play for the music, and which carousel and tray to play for the spots. Even this is very time consuming.

With a CD system, the problem is multiplied many times. You must specify which deck, which magazine within that deck, which CD within that magazine, and which cut on that CD. In other words, four times the information needs to be entered to program the CD system verses conventional automation.

Here at SMARTS, we solved

that problem by using special music rotation software. The Music Master, developed by one of our own programmers, is a complete rotation system that picks the music for you, allows you to make any changes you want, then programs the Jock-In-The-Box to find the right cuts at the right time.

Of course Jock-In-The-Box also joins news networks, making smooth network switches after top-of-the-hour ID's, or any other time you want the network on the air.

The SMARTCASTER digital audio system, which is part of the Jock-In-The-Box, allows simultaneous record and playback. You can even record the network and play it back at the end of a CD so you can make a perfect net join without regard to timing. Production can be done at the same time the unit is playing spots, CDs or sitting on a network.

The spot scheduling can go in one of three ways; directly programming spots into the system, transferring from our own SMARTS billing, accounting and traffic system, or transferring from one of several other billing systems that have interfaces to the SMARTCASTER.

We take this system, and place it in a custom built table top cabinet that uses standard 19 inch rack mounting. These cabinets are built especially for the Jock-In-The-Box, and don't look like industrial equipment, you'd be proud to put one of these cabinets in your living room.

The system is pre-wired, tested, and shipped with everything possible already mounted. The remainder of the installation can be done by your own engineer.

Adding the SMARTS Billing, Accounting and Traffic System, we are very close to that "radio station in a box" concept. This equipment really does it all, from order entry to on-the-air play.

SMARTS has many products for many purposes, including digital units to replace cart machines for under \$1,000.00; satellite based automation systems for under \$5,000.00, and full CD based automation that fits on a table top for about half the cost of conventional, analog systems.

And please remember, we back up our products and services with free support, 24 hours a day, 7 days a week. We won't leave you out on a limb. Call us anytime for more information.



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COLE'S LAW

The Fine Print in Political Advertising

by Harry Cole

WASHINGTON Let's see, where were we when we signed off on the last column? Oh yeah, hip-deep in the new political rules, and I had stopped just short of the new twists the FCC has imposed on the calculation of lowest unit rates—an area I postponed until this column.

I'll start with the basics. "Lowest unit rate" (LUR) is the price political advertisers are to be charged for *uses* during election periods. I discussed the new meaning of the term "use" in the last column.

"Election periods," of course, include the

periods within 45 days of a primary and 60 days of a general election. The simple, rule-of-thumb definition of "lowest unit rate" is the lowest rate the station charges a conventional commercial advertiser for the purchase of an equivalent class of commercial time.

Even in the past, however, that rule-of-thumb really only skimmed the surface. As you might expect, there were a fairly wide variety of *gotchas* that came into play. Whether through ignorance of those gotchas, or for some other reason (one possible reason being intentional flouting of the lowest unit rate requirement by some licensees), the Commission determined that a sizable num-

ber of licensees were not actually giving candidates the lowest unit rate to which they were entitled.

Accordingly, in order to be perfectly clear about how that rate is to be calculated, the Commission has adopted a new rule dedicated exclusively to that topic.

New rule for LURs

The new rule—Section 73.1942—should be required reading by anyone who has anything to do with the sale of broadcast time. It is relatively long and surprisingly detailed. While our space here is too limited to provide a blow-by-blow description of everything in the new rule, here are some of the highlights:

- *Classes of time.* Historically, a station's lowest unit rate has been allowed by the Commission to vary according to the class of time involved. That is, a station could charge a higher rate for some classes (say, fixed position spots) than for others (say, run-of-schedule).

However, the FCC's precise view of what constituted a "class of time" was not formally written down anywhere. Now it is. The new rule specifies that "the Commission recognizes non-preemptible, preemptible with notice, immediately preemptible and run-of-schedule as distinct classes of time."

Additionally, stations may define their own reasonable classes of immediately preemptible time "so long as the differences between

such classes are based on one or more demonstrable benefits associated with each class and are not based solely upon price or identity of the advertiser."

Valid rationales for such distinct classes of immediately preemptible time include varying levels of preemption protection, scheduling flexibility, or associated privileges (e.g., guaranteed time-sensitive make-goods).

Fire-sale prices

- *Fire-sale charges.* If a station sells any of its inventory for reduced prices at the last minute, such charges must be included in the calculation of lowest unit rate for all time sold to candidates during the period or daypart or program (regardless of when the candidates originally bought or ordered their spots). However, such calculation establishes the lowest unit charge *only* for the period, daypart or program in which such fire-sale spots were actually broadcast.

This means that if a station finds itself with some unsold time at the last minute and, in order to salvage some payment for that time, sells it at a fire-sale price, a candidate is entitled to that same price for any class of availability in the time period/program/daypart in which the first fire-sale spot aired.

- *Treatment of "packages."* Under the old rules, when a station offered commercial advertisers special rates for the purchase of a "package" of different classes of availabilities, a candidate seeking to qualify for the package rate had to buy at least one unit of each class of availability in the package.

That has now been changed. The new rule is that package sales to commercial advertisers must be broken down with allocations

continued on page 20 ►

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70th ANNIVERSARY

TUNED TO
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AM stations around the world have already discovered the competitive advantage of DX Series transmitters in 10, 25, 50 and 100 kW power levels*. Isn't it time you did too? Call Harris Allied today at 800-622-0022 for more information on digitally modulated DX Series AM transmitters.

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Japanese Radio Gets Personal

by Frank Beacham

CAMBRIDGE, Mass. Personalized radio—a digital distribution system which allows listeners to choose their programs on demand—will become the next major innovation in audio, a top Japanese software executive predicts.

Speaking to a conference of American media executives at the Media Lab of the Massachusetts Institute of Technology here, Kazuhiko Nishi, president of the ASCII Corp. of Tokyo, predicted personalized radio will be available to Japanese consumers by 1995.

"I listen to broadcast radio now only for the news. Now I listen to music on CDs. But I'm tired of buying CDs since new ones come out every month. If there is a way I can obtain the music I want on-line at home, that is what I want to have," Nishi said. "We call that personalized radio."

Personalized radio is the next step in an evolutionary chain that began 35 years ago, Nishi said. "In 1957, FM radio started in Japan and people began to tape music off the air from the radio. Then the radio-cassette product became popular in 1968. This led to development of the very portable "Walkman" in 1979. But consumers were not happy with the noise on audio tape. This led to the invention of the compact disc in 1985.

"Now consumers want to choose what they hear and when they hear it," Nishi said. "They want to be free from time and program selection."

Nishi, who is president of the Japanese financing and distribution com-

pany which recently backed the American motion picture, "Fried Green Tomatoes," said personalized radio will be delivered to consumers in the form of a computer readable, machine processable digital signal. It can enter the home through a variety of methods ranging from fiber optic cable to direct broadcast satellite.

As a member of the consortium of companies that will plan Japan's movement into digital media, Nishi's ASCII Corp. will help create a system that will eventually lead to personalized television by the year 2001, he said. "The consumer wants personalized media... I call it WYWIWYS: 'What You Want Is What You See'." Nishi advocates an integrated scalable digital system encompassing all broadcasting, telecommunications, computers and consumer electronics devices. Such a system should have a life expectancy of at least 50 years, he said. The Japanese executive echoed the sentiments of his host, MIT's Media Lab, which is a major advocate of a digital system which encompasses all media and transcends international boundaries.

As well as personalized media options for consumers, such a digital system could allow the integration of ultra-definition television with 70mm film quality, HDTV, current resolution TV, multichannel digital sound, photography, printing, electronic newspapers, libraries and museums, graphics, facsimile machines, videophone, CAD/CAM applications and videotext.

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What we surround ourselves with says a lot. The Auditronics 800 series says you won't settle for anything less than pure, seamless audio. More standard features than the others. Tomorrow's technology with the freedom to add options. The 800 says you know that when you own the best, the sky's the limit. Write or call for a free brochure.



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Circle (56) On Reader Service Card

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- LED bargraph meters with switchable peak/VU ballistics (recorders)
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Series 2 machines run so cool, they don't need vents. The one piece outer case keeps out dust, dirt, spilled coffee and other control room hazards. Inside you'll find ITC innovations like a Teflon™ coated solenoid plunger, Kevlar™ tape guides and an advanced hold-down mechanism. All based on a precision-machined, nickel-plated cast aluminum deck, and controlled by microprocessor logic.

With components and construction like this, it's no wonder the Series 2 is protected by the best warranty in the industry — ITC's four-year protection plan.

... We've Got It.

Harris Allied has the ITC Series 2, plus fast delivery and friendly service you can rely on. Call now for immediate shipment on the advanced ITC Series 2 — today's most versatile value in cart machines.

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ENGINEERING MANAGER

Don't Let Procrastination Slow You Down

by John Cummuta

DOWNERS GROVE, Ill. You have an overnight maintenance to pull, or you promised to write out a detailed maintenance procedure, or you told yourself you were going to review FCC regulations to make sure you were completely up to date. But somehow these tasks have kept moving from one day's to-do list to the next.

Procrastination strikes.

Procrastination is the great drainer of productivity. It makes even the most dynamic managers stumble and blow their images. Yet it's nothing more than dodging the "drudge" tasks that come with any set of responsibilities. There's no perfect job, and every position will come with "must-do" projects or functions that can trip you up if you walk the procrastination road.

In this column, I'll go over some quick steps to help you avoid procrastination potholes in your job.

Procrastinators anonymous

It might sound like trying to recover from alcoholism, but the first step in beating procrastination is to admit that you have the problem. Admit to yourself that you have been pushing certain tasks or responsibilities off, because you just don't like doing them.

Maybe you have a slight fear of not being able to do them as well as you think you'll be expected to. Once you've faced the reality of your procrastination, you can begin attacking it.

Run to the roar. If you're afraid of the beast hiding in a project or task, the fastest way to see how unintimidating it really is, is to run right at it. In other words, attack your most unpleasant or feared task first.

Next, take a moment to visualize yourself already done with it. Think of the task as successfully completed. See yourself getting the recognition for having overcome its obstacles. Feel the good emotions of having this job behind you.

These emotions will help motivate you through actually doing the task, and any time you feel the desire to set the job aside again, resurrect these emotions to propel you onwards.

Tackle 'em one by one

Now that you're fired up to get the job done, analyze the obstacles standing in your way. You may have dodged learning more about some new piece of equipment you installed, or learning how to fully utilize a software package you bought. Maybe you have a less than productive relationship with a co-worker, and that is causing you to avoid tasks that involve him or her.

Whatever the obstacles are, real or imagined, resolve to remove them immediately. Once the obstacles are dealt with, you may find that the task itself is a slam dunk.

Use your best daypart for taking on these tough tasks. You may be a morning person, who gradually fades into complete non-productivity by the end of the day; or you may be the kind of person who can't get started in the morning, but who ends up working late because you're just getting rolling when the whistle blows. Figure out what part of the day is your peak and take on your intimidating tasks when you're best suited to do so.

Organize first and work second. That's another good rule for taking on jobs that you would otherwise avoid. Carpenters have a good saying that goes, "Measure twice, cut

once." Getting everything in line for the task will generally take much of the anxiety out of doing it.

If the project is one that cannot be completed in a single sitting or workday, break it up into mini-projects. Take on one each day, during your most productive daypart. Each segment's completion will give you momentum to carry into the next day's challenges.

Give some jobs back

You may find that some tasks keep falling to the next day's work schedule because they are really not that important. Or at least they are not important enough for you to be do-

ing. These are often tasks that were, what I call, upwardly- or sidewardly-delegated to you by other staff people who should be doing these jobs themselves. If this is the case, give them back.

A great opportunity in these low-priority procrastinations is that you can frequently delegate them to your people, giving them the chance to grow, while you lighten your load. With each task, ask yourself if your salary is best invested in that particular job, or would it be more cost-effective to move it down a notch on the salary scale.

When you begin attacking your procrastinations, make sure you leverage your time as well as you can. If you're not familiar with

time management techniques, it would be worth your while to go to the book store or library and pick up a couple current books on the subject. But I'll give you two quick suggestions that can make big differences in your productivity.

The first suggestion I have is to use a "to-do" list. Make it a habit to write down the tasks you have to complete each day, and prioritize them—you can gain 25 to 50 percent productivity right off the bat.

The best time to write your list is at the end of the day, when you're acutely aware of the jobs that didn't get done. Make a list of the top priority tasks for the next day and set it someplace where it will be the first thing you see when you start the next work day.

At the end of that day, see what you've checked off the list, carry over uncompleted tasks to the next day, and add any new tasks you've identified.

continued on page 17 ►

LOG 14 DAYS OF AUDIO ON ONE DAT, PLAY IT BACK WHILE STILL RECORDING!



MDL-14

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The RCS TRACKER records up to 3 stations simultaneously, and provides random access to any logged time segment - even by phone - without interrupting the recording.

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With "Smart" Rack Mount Option



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Only the RS-700 features full remote control, balanced audio inputs and outputs, auto cue functions, and end-of-cut indication for automatic sequencing and machine control.

For the ultimate ease of operation, add the "Smart" Rack Mount with lighted push buttons. The buttons duplicate the basic front panel functions,

plus convenient "Next" and "Last" functions for one-button re-cue to cut beginning, or next-cut cue-up.

The "Smart" Rack Mount is easily field or factory installed, and connects to the base unit with just one factory-supplied cable.

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Circle (97) On Reader Service Card
World Radio History

A New Face for WLAD

Dear Alex,

Last time I checked in was to tell you about our new studio project for WLAD(AM). Construction continues pretty much on schedule.

Right about now we've started to discover cute little surprises lurking under the console and around the room in general. As Bob Shotwell told me some years back, I'd be more nervous if there weren't any problems. The obvious ones

grounded metal case nearby. The mic input modules came set up for phantom power (useful for condenser mics, but hardly a consideration for our dynamics).

My plans for acoustic correction had to be rethought a couple of times as well. Measurements of the room showed that I'd have a compost heap of resonances that could pile up harmonically to give an unnatural boost around E above middle C.

I give that in musical terms only because most popular songs are in E, A, D or G, and would sound awkward in our monitors. Speechwise I'm not terribly concerned—coincidences under 300 Hz aren't so bad. All I had to worry about was killing the flutter echo in the room.

So out came F. Alton Everest's "How to Build a Small Budget Recording Studio from Scratch" (1979 TAB Books) for the wideband absorber panel anatomy. Three or four of these babies should've given me the taming I needed.

And they would've too, until I saw one wall filled with our station logo cut out of woodblocks *four inches thick* and painted with highly reflective black enamel. Diffusive, but not absorptive. Back to the drawing board.

As I've said before, we're all pitching in to make this studio happen and save some big bucks in the process. Morning man/cabinet builder Pete Summers reglazed the windows on the studio door, FM nightguy Ryan Carrington is a demon with a spackle knife, and even the carpentry guys nipped and tucked a little—especially when the overbridge for the radio mixer came out a half-inch too narrow to fit.



Morning man Pete Summers editorializes on the progress of WLAD's redesign.

make it easy to handle the subtle ones that come along.

Our beautiful Pacific radio mixer fit flawlessly into the cutout made in our new console top. Only a couple of days later we discovered the laminated top beginning to split—it's the same stuff countertops are made from.

Chances are good it's an expansion fault. As it is, we are not really worried about structural flaws, but the crack falls in front of a talk-show guest position and could stand to look a little nicer. Phone call to the countertop guys . . .

The radio mixer caught me by surprise when the mics were wired up and I heard a little arcing 'twixt the mic case and a

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FROM THE TRENCHES

by Alan Peterson



By this time next month we'll be on the air from WLAD's new studio. For now, we're still salivating to get in and let 'er rip, and scraping those dopey little shreds of blue foil off our shoes.

And waiting for my special package from PR&E to arrive: For our weekenders, I'm having a special button cap made up. In-

stead of "jock mic," theirs will say, "Yo dude."

Off to buy the fiberglass,

—Al

Al writes from WLAD Danbury CT, 06810. Besides assisting in studio redesigns, he's also done his own home MIDI studio. Can't spackle worth a hoot, though.



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STATION SKETCHES

Check Lighting Via Remote Readings

by Tom Vernon

HARRISBURG, Pa. Without a doubt, deregulation has made our lives much easier in terms of compliance with FCC rules. However, the remaining rules are strictly enforced. Maintenance of tower lights is one such area, in particular, where stations can run into problems.

This month's column looks at how to remote readings for beacon and tower lights, as well as antenna de-icers. Construction details are shown in Fig. 2. Some experimentation with the number of primary turns may be necessary to get sufficient output to drive the remote circuit.

It's best to start this project by planning how many circuits you want to remote, and how these will interface with your remote control. A control panel will have to be fabricated for the transmitter site as well.

Begin work by installing current transformers on the required AC feeds to the tower. Tower light wiring is usually split to feed side and beacon lights separately. This ensures low voltage drop on long runs and allows each circuit to be fused individually. Usually a single feed will be used for all antenna de-icers.

AC current sampling devices are available from most remote control manufac-

turers, or you may want to fabricate your own. Construction details are shown in Fig. 2. Some experimentation with the number of primary turns may be necessary to get sufficient output to drive the remote circuit.

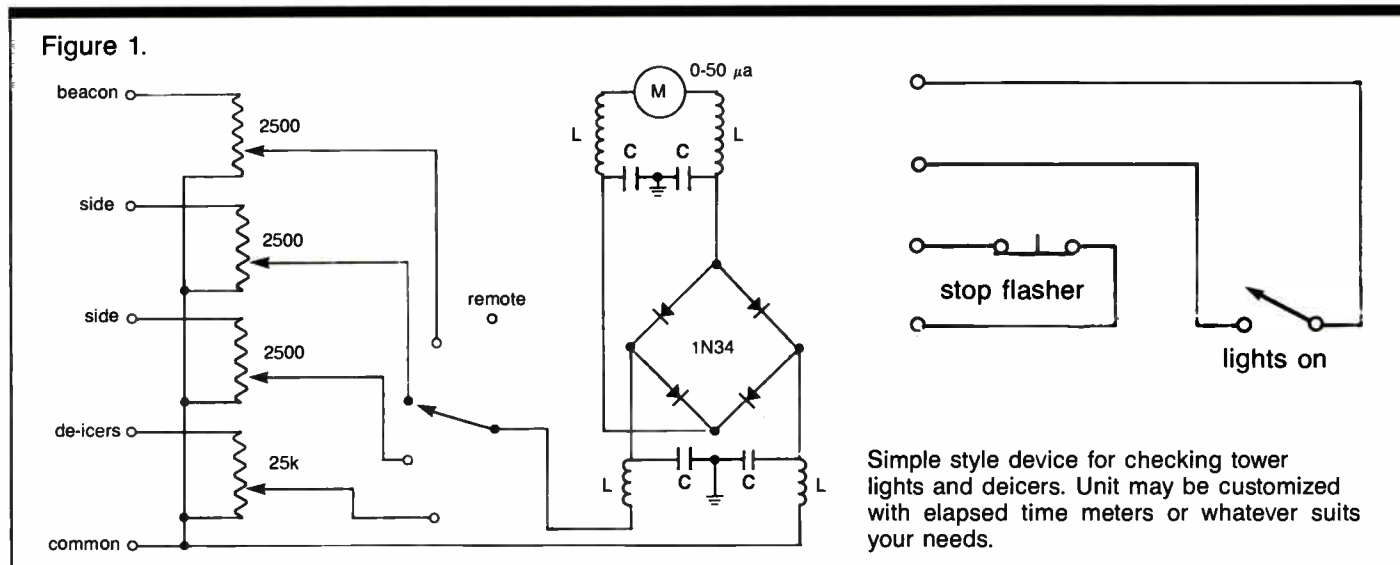
tion looking neat and professional. Be sure to use shielded cable to connect the transformers to your remote interface.

You may want to construct some sort of readout panel for the transmitter site, as this

raise/lower positions. This is especially important for beacon lights if you have a digital readout at the studio, and no easy way to connect an analog extension meter.

If remote metering is fed both to a transmitter box and back to the studio, be sure to have an unused switch position labeled "remote," so none of the circuits are loaded by the internal meter.

If there's space left on the panel, you



Sampling devices may be easily located near the breaker box. You'll have to break out of the Romex and have access to individual wires to loop through the transformers. Junction boxes keep the installa-

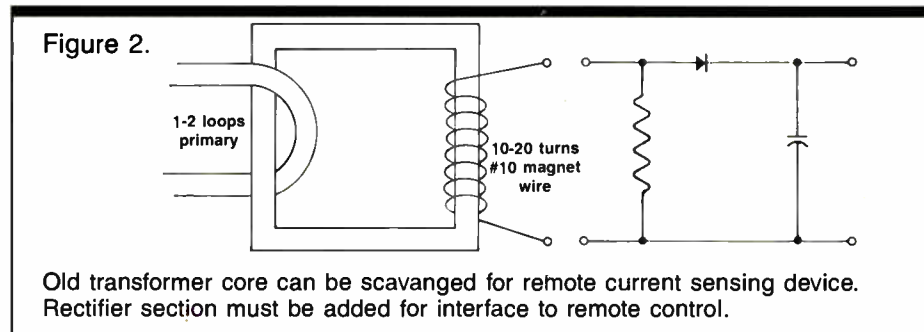
tion looking neat and professional. Be sure to use shielded cable to connect the transformers to your remote interface. You may want to construct some sort of readout panel for the transmitter site, as this

might want to include elapsed time meters for tower lamps and de-icers. Used ones can be found for less than \$10 in surplus catalogs. Logging elapsed time for bulbs and de-icer elements (and knowing the life-expectancy of these devices) may reduce the number of surprises that wreak havoc with your maintenance budget.

If you have a steady hand, and like to do small work, you might want to modify the meter scale to better suit your needs. A 0-50 μ A scale doesn't mean much here. Carefully disassemble the meter case, remove the face, and rework with correcting fluid, an artist's 000 brush, and rub-on lettering.

Sampling lines are connected to calibrate pots, the outputs of which are connected to a rotary switch. The selected output is rectified by a bridge rectifier of 1N34 diodes, which in turn drives a 0-50 μ A meter.

It's best to breadboard the entire circuit to determine the correct value for calibration pots before committing to final construction. A more or less sensitive meter movement might be needed, depending on your requirements. The values shown in the



schematic should be a good jumping-off point.

Note the LC components at the input rectifier and meter movement must be determined by your transmitter frequency. Sites with several transmitters may need multiple circuits to keep RF out. As with all construction projects for the transmitter site, proper shielding and grounding are a must to prevent erratic operation.

Note also the two additional switches labeled "stop flasher" and "lights on." Due to the brief on-time of beacon lights in some installations, it may be difficult to get a reading. This button is wired through a relay interface of the AC feed to the beacon flasher circuit.

The "lights on" button is connected to a relay interface whose contacts parallel the photocell. This makes it possible to check tower lights during daylight hours—a useful thing when the crew comes by to re-lamp the tower. It also saves some trauma when the photocell fails and can't be replaced right away.

You may want to remote both functions back to the studio via unused

If you have a three-bay FM antenna with de-icers, you might want to create a 0-3 scale, with current indications for 3, 2, and 1 de-icer functioning. A second scale may be calibrated for the number of beacon and/or side lights operating. This is much more convenient than guessing what less than full-scale readings mean.

A high-tech solution to the new meter scales might involve creating a new face using desktop publishing software. Many of these programs allow you to place letters and numbers on an arc, which is really all you need. Use the old face for a template to determine size and length of the arc.

If you are a real desktop publishing enthusiast, you may want to scan in your station's logo and place it on the meter face for a real custom look. This whole project is limited only by your imagination and creativity.

□□□

Tom Vernon divides his time among broadcast consulting, computers and instructional technology. He can be reached at 717-367-5595.



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Circle (42) On Reader Service Card

CONSULTANT'S CORNER

A Statistical Model for DAB Coverage

by Steve Crowley

WASHINGTON Some of the most complicated propagation environments are those inside buildings. Field strength can vary as a function of building materials, temporary office partitions, and even whether coats are hanging in a closet.

The reliability of propagation prediction depends a lot on the model. The Mobile and Portable Research Group at the Virginia Polytechnic Institute and State University in Blacksburg, Va. has developed a model that removes some uncertainties of L-band and S-band propagation. It's another tool that can be helpful in predicting L-band and S-band digital audio broadcasting (DAB) coverage.

The propagation, or radio channel, simulation model is called SIRCIM (Simulation of Indoor Radio Channel Impulse Response Measurements). It simulates the characteristics of 1-4 GHz indoor propagation.

Simulated DAB performance

The model was developed to provide an accurate, inexpensive way to provide realistic simulation of the performance of digital systems in the presence of multipath and fading channels. For DAB, it can be used to study co-channel interference, equalization, diversity and modulation performance and bit error rates in frequency-selective and flat-fading building environments.

SIRCIM uses a statistical approach. Most propagation prediction techniques rely on empirical data for their construction. SIRCIM is based on extensive propagation measurements made at Purdue University and ongoing measurements at Virginia Tech.

The database used for SIRCIM uses measurements collected in 10 different open-plan and partitioned buildings, including office buildings, retail stores and factories. Propagation characteristics of several other buildings are being studied to expand SIRCIM's database.

The program recreates the multipath power delay profiles of multipath signals. These profiles show how multipath from an RF

pulse spreads out over time.

The program first generates power delay profiles at 19 equally spaced locations as an assumed mobile receiver moves along a one-meter path.

Traveling receivers

SIRCIM uses a stationary transmitter and a moving receiver as its model. An omnidirectional antenna having unity gain and vertical polarization is assumed at both the transmitter and receiver.

SIRCIM ignores the effects of moving people and equipment in a building. Measurements using fixed transmitters and receivers

show only slight variation of multipath components due to that type of movement. The measurements found that individual multipath fades of 10 dB or more below the median had a less than 0.05 percent chance of occurring.

The bit error rate results can be used to drive hardware or software models of the digital system being tested. This can enable system developers to get more realistic estimates of system performance for a given environment.

Multipath mitigation techniques such as adaptive equalization or diversity antenna systems can be tested because SIRCIM recreates the statistics of individual multipath

components as the receiver moves.

For DAB, the program would be the most useful for modeling office interiors at the 1500 MHz and 2500 MHz bands. Since coverage will be challenging at these frequencies, the program might be used to find optimum locations for on-channel booster transmit antennas.

Eventually, it may be possible to allow the program to input data files from architectural drafting programs containing building details. An optimum interior on-channel booster system could be designed before building construction starts.

□ □ □

Steve Crowley is a consulting engineer with the firm of du Treil, Lundin & Rackley Inc., 1019 19th Street, N.W., Suite 300, Washington, D.C. 20036. He can be reached at 202-223-6700, or by fax at 202-466-2042.

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Vic Jester and Rick Stacy
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How to Beat Procrastination

► continued from page 13

The second time management tip is to group similar tasks together. This will give you the advantage of having your mental and other resources already marshalled for that type of job. Take a break between the tasks, though, or you may find your mind slipping out of phase from too much of a certain type of concentration.

Lastly, avoid undertaking unpleasant tasks when you are physically or mentally fatigued. And quit for the day when you feel tired. The worst thing you can do is to attack your procrastinations, and then have it turn out to be a horrifying experience because you were too tired to handle it. In other words, get enough rest, then do your capable best.

Follow these tips and you'll not only do well at what you like doing, but also at what you don't like doing—and that's what separates good managers from great managers.

□ □ □

John Cummuta is an independent marketing and management consultant. He can be reached at 708-960-5999.

Circle (77) On Reader Service Card

KEYBOARD CONNECTION

Protecting Your PC Against Viruses

by Barry Mishkind

TUCSON, Ariz. Was all the media hype in February about the Michelangelo virus, set to debut on March 6, a case of crying wolf? Was it a ploy to sell lots of anti-virus software? Or, was it fair warning of a problem not yet truly appreciated by computer users?

The warnings were out there. It was on every news program and in every magazine.

The sales certainly were there. According to "PC Week," some vendors reported sales increases of 3,000 percent and more. One software company even gave away 250,000 free copies of a program to find Michelangelo.

Michelangelo lives

And find it they did. One official of a company that provides anti-virus software to the government did over 300 cleanups of government computers—and found many infected machines.

Among the locations where the virus was reported were the U.S. House of Representatives (as if they didn't have enough trouble!), Bell Atlantic, New Jersey Institute of Technology, and even the CIA. Overseas, up to 25 percent of the computers in Poland were reportedly infected.

Today, with the number of identified viruses racing past 1,000, they're true be-

lievers. One survey of Fortune 100 companies showed that nearly half had been hit in the past year with one virus or another. While 80 percent said they were aware of safe computing practices, most still didn't know how to rid their computers of viruses when hit.

What to do?

Keeping viruses out

A key point to remember is that "safe computing" starts with avoiding programs from unknown origins. Don't let anyone bring diskettes in from home. An Ohio college reports that its information center has been repeatedly infected by Kent State graduate medical students bringing diskettes from outside.

Sadly, even shrink-wrapped packages aren't always safe anymore. Some stores will re-wrap programs that have been returned.

And yes, there are verified reports of major vendors supplying "free" viruses with their product. Several software vendors and even a computer manufacturer have admitted sending infected products into the world.

The list of active viruses includes some that are merely annoying as well as some nasty specimens that are simply destructive. For example, the most common virus is the "Stoned" virus which infects the partition tables of hard disks.

Not normally destructive, Stoned can overwrite directories of high density floppies

or cause some RLL hard disks to hang. On the other hand, "Dark Avenger" infects .COM, .EXE, and .SYS files, increasing their size by 1800 bytes. Each 16th infection triggers the destructive overwriting of a random sector of your hard drive, destroying whatever file was saved there.

And then there's "Disk Killer." This one is a really fiendish virus. After the infected computer operates for 48 hours, Disk Killer slowly changes random bytes on the hard drive one at a time.

Disk Killer even gives warning messages not to turn the computer off while it does its dirty work. That's definitely a warning to disobey.

Danger signals

There are several danger signs that indicate you have a problem in your computer—an unexplainable increase in the size of some files is one. Frequent system crashes, normal functions noticeably slowing down, lost data, programs suddenly becoming unreliable, or failing to load with a "not enough memory" message popping up are some others.

Of course, it's best not to wait for this to happen, because these are signs trouble has already occurred. Computer experts recommend regular checks with a virus detector to detect invaders before heavy damage occurs. Several packages are available that are worth consideration.

One choice we've commented on in the past is Symantec's Norton AntiVirus™. Recently updated to version 2.0, the program is designed to detect and repair damage from all current viruses, as well as detect unknown viruses by their activity.

Another excellent package comes from XTree Company. ViruSafe™, originally developed five years ago in Israel to combat the first of the viruses (Jerusalem virus), is now in its fourth major release. Used by many government agencies and Fortune 1000 companies, ViruSafe (there's a LAN version, too) has developed a reputation as a comprehensive product that prevents problems.

Since software companies will tell you that there can be as many as 20 new viruses showing up in an average week, including new self-mutating viruses, some programs can be outdated before you've installed them.

VirusSafe avoids this problem by utilizing a unique method. When it discovers viral behavior, ViruSafe isolates the file and incorporates the "signature" into its database. This allows you to scan and identify other files and backup diskettes that are infected so they're not used until the virus is removed.

Many shareware users are familiar with the McAfee shareware scanning and disinfecting engines, but feel uncomfortable with using the several modules and somewhat cryptic commands. This led Parsons Technology to team up with McAfee to produce the modestly priced ViruCide Plus™ and ViruCide Shield™.

There are at least three good reasons why you'll find ViruCide a good value. First, it's menu driven, so it's easy to run and get the job done without being a computer whiz. Also, Parsons supports the product, so in the event of trouble, friendly, competent help is just a quick phone call away. Finally, Parsons' upgrade policy is easy on your wallet.

□□□

Barry Mishkind is a consultant in Tucson, Ariz. He can be reached at 602-296-3797, or 325-9883 on MCI Mail, or "barry@coyote.datalog.com" on Internet.

SBE BBSs Connected

by Barry Mishkind

TUCSON, Ariz. Communication is the essence of our industry. During the last few years, however, the engineering community and the SBE have not always communicated very well. Now some efforts are underway to foster real communication again.

Steve Tom, SYSOP of the Southern California MediaLine (home of MediaNet), and Ray Vaughan, SYSOP of Telcom Central (a FidoNet BBS) have joined forces and linked their respective SBE conferences.

Another network, RFNet, has also jumped on board.

Both Steve and Ray saw the need to create a forum where engineers from all over the country could share thoughts and discuss issues of importance. Originally, the conferences were parallel, but separate. Each had its own "regulars."

Participants on both sides soon expressed interest in tying the nets together, so everyone could exchange messages. With the upcoming NAB show and SBE national meeting, it seemed like the right time. Bill Blomgren, a SYSOP in south Florida, provided the technical link, and the networks were plugged into each other.

Right on time, discussions of SBE dues and direction began to flower. In addition, several other discussions started, as engineers all over the country began to share their knowledge and experience with each other.

In Las Vegas, the SBE board endorsed the goal of each chapter having a local BBS, so members could share their questions and thoughts. SBE headquarters in Indianapolis will eventually be on line, so questions and problems can be directly addressed to SBE national.

Would you like to join the conference? Likely it's available on a local call. Here's how to get on-line quickly:

- **MediaNet.** Several dozen MediaNet BBSs are on line around the country. Many SBE chapters are aware of the nearest one. Or connect your modem to the Southern California MediaLine at 619-298-4027.

- **FidoNet.** Thousands of these BBSs cover the world. To get the SBE conference, ask your local SYSOP to contact Ray Vaughan at 1:135/23. Or call Ray's Telcom Central BBS at 305-828-7909.

On either of these BBSs, leave a message with your location, and someone will quickly point you to a local number.

I also want to mention National Supervisory Network's BBS. Bill Sepmeier carries the SBE conference; he's also expanding his free services to callers.

For example, Bill now has an electronic copy of the FCC Rules on line. NSN's BBS is at 303-949-3253.

□□□

Barry Mishkind is on-line too, at FidoNet 1:300/11.3. He also can be reached at 602-296-3797.

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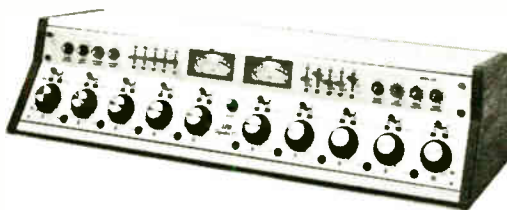
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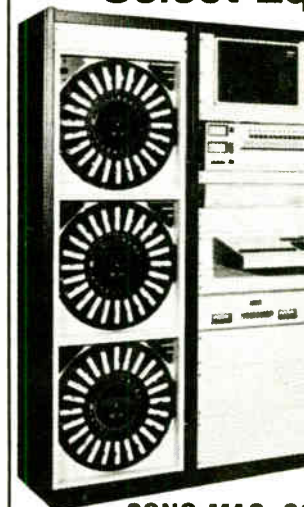
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WORKBENCH

Rollers, Boxes and Cans

by John Bisset

FALLS CHURCH, Va. Jim Sorensen of WJQY(FM) in Miami wrote in with what he calls two basic truths about cart machines.

Truth number one: Most cart machines are dirty, and cleaning them is always important. Truth number two: Few stations have an engineer with the time to do this on a regular basis.

The result was that over time, performance was degraded. Jim found that while the heads were being cleaned, the pinch rollers got very dirty. Changing rollers, while not a major project, was expensive.

Prior to working out a solution to the problem, Jim was changing rollers every 90 days. With 10 cart machines in each of three control rooms, you're looking at close to \$1,500 in pinch rollers a year. Figuring that cleaner rollers would run longer, Jim launched into a cleaning modification for his ITC Delta machines.

To the right of the cart opening on the front panel, two holes were drilled. One hole was for an LED; a small DPDT switch was mounted in the second hole. To make the project easier, Jim chose LEDs that had a built-in dropping resistor to take 6VDC

(at about 10 mA) and wiring pigtails. Since the ITC Delta machines have a 5VDC supply, these worked well.

Jim drilled the holes with a drill press, pulled the cards, and blew out each machine with compressed air—just to make sure that no metal chips shorted anything. A further caution would be to cover the motor hole and capstan with masking tape.

Using a Kroy-Type machine, Jim made little white "clean" labels to place on each cart machine, under the switch and LED. These labels were solvent-welded to the front of the machine using Krylon "Crystal Clear," which can be obtained at a drafting supply shop.

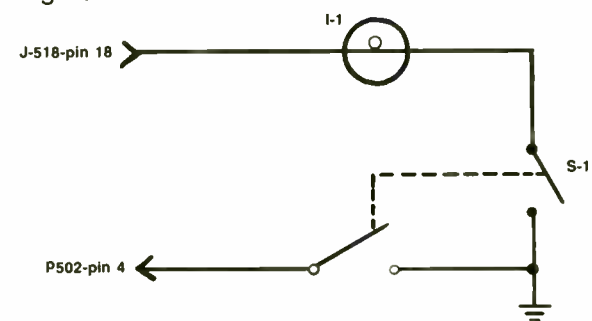
When the switch is thrown to "clean," one side fools the machine into thinking that a cart is in place. The other set of contacts turns on the warning LED—informing the jock that something different is happening.

To clean a machine, throw the switch to the clean position, push the "play" button and clean the pinch roller. When you are done, push the "stop" button, and turn the clean switch off. If your jock forgets to throw the clean switch off, the Delta machine will work just fine, as long as they don't try to load a cart into a running machine.

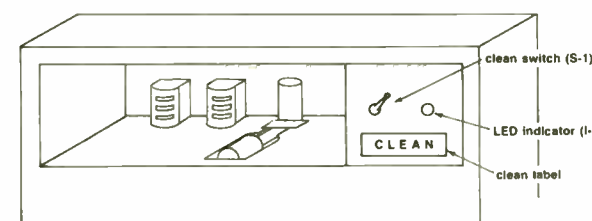
If your cart machines reset timers or open console channels, a 3 or 4-PDT switch acting as an interrupt would work.

To prevent the dirt from the roller contaminating a clean capstan, type up a cleaning protocol: *Do in this* continued on page 33 ▶

Figure 1.



I-1 is lamp or LED with resistor for approx. 10mA @ 6V



Adding a "clean" mode to the ITC Delta machine saves pinch roller replacement cost.

The Fine Print in Political Ads

► continued from page 10
of prices for the various components of the package, and the candidate is entitled to buy any of the components at the allocated

price. If the station does not come up with a per-component allocation, the price of any particular component for lowest unit rate purposes is calculated by taking the average price for all items in the package as a whole.

• *Disclosure to political advertisers.* In an apparent effort to make sure that these rules operate as they are intended to, the FCC is now requiring all stations to make extensive and specific disclosures to political advertisers concerning the station's commercial practices.

Disclosure Information

The disclosure must include, as a minimum, the following information:

A description and definition of each class of time available to commercial advertisers sufficient to permit candidates to "identify and understand what specific attributes differentiate each class";

A description of the lowest unit charge and related privileges (such as priorities against preemption and make-goods prior to specific deadlines) for each class of time offered;

A description of the station's method of selling preemptible time based upon advertiser demand (commonly known as the "current selling level"), with the express stipulation that candidates will be able to purchase at these demand-generated rates in the same manner as commercial advertisers;

An approximation of the likelihood of preemption for each kind of preemptible time; and

An explanation of the station's sales practices, if any, that are based on audience delivery, with the express stipulation that candidates will be able to purchase this kind of time, if available to commercial advertisers.

Write It down

Because the new rule *requires* that this disclosure be made, it would probably be a good idea to have it prepared in writing, so that it can be provided with a minimum possibility of misunderstanding or misstatement. Even so, if the policy is provided to a potential political advertiser in person, it would proba-

bly be wise to have the advertiser sign a receipt indicating that they were, in fact, given a copy of the disclosure.

One alternative approach to lowest unit rate calculation not set forth specifically in the rule, but mentioned by the Commission in a footnote in its decision adopting the new rule, would permit each station to develop its own special discount rate for a non-preemptible, candidate-only class of time.

The idea would be to come up with a discounted rate that would, in effect, confer a greater benefit on candidates than that afforded to the station's most-favored commercial advertiser. Such an approach might also simplify the station's internal routines considerably.

You should be aware that there are other intricacies in the rules that you must pay attention to—the political-advertising materials which must be placed in your local public inspection file, for example, or your obligation with regard to the availability of make-goods, or the on-going obligation to review your advertising records "periodically throughout the election period" to determine whether rebates or credits to candidates may be necessary.

There are others, and there are also a variety of details, twists, etc., which we just can't fit into this limited space, but which may be very relevant to your practices. Again, it is important that you be sure to obtain a copy of the new rule, study it carefully, and take every possible step to conform your routine practices to the requirements.

The political advertising rules have never been something you could afford to ignore. With the recent revelations that, apparently, a number of licensees have been ignoring them, and with the resulting pressure from Congress and the courts to correct that situation, there is even greater reason to walk the straight and narrow in this area. As complicated and thankless as it may seem, you unfortunately have very little choice in the matter.

If you have any questions about the new rules, you should be sure to contact your communications counsel as soon as possible.

□ □ □

Harry Cole is a partner in the Washington-based law firm of Bechtel & Cole, Chartered. He can be reached at 202-833-4190.

Digital automation for engineers

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Those "silly things" that most digital automation makers overlooked. Whoops!

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Circle (54) On Reader Service Card



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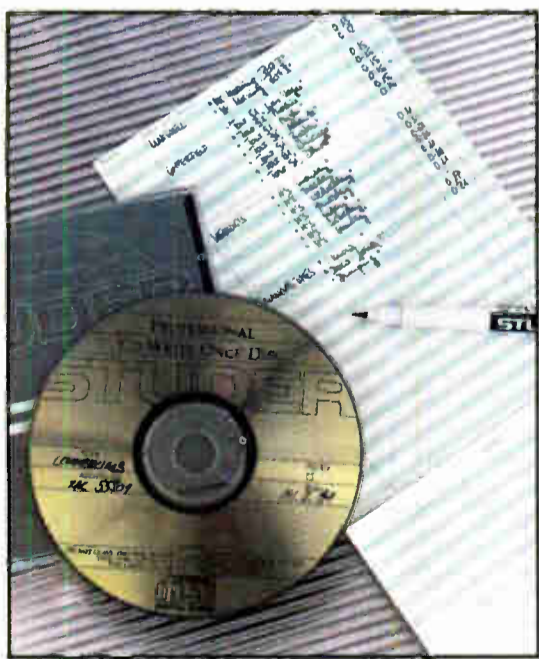
OPTIMUM PERFORMANCE. With Studer's D740 Compact Disc Recorder, custom CDs can now be produced conveniently in-house for demos, sound effects, studio refs, masters, jingles, com-

plete music libraries and more. For archiving tasks, the D740 offers the highest quality digital audio on a virtually nondestructive medium that takes up very little inventory space.

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the same compact disc, and the D740 CDRs may be played back on any standard professional or consumer deck.

OUTSTANDING AUDIO QUALITY. Featuring the latest optical technology, Studer's D740 delivers the legendary audio quality you've come to expect. And as always, you'll get the complete service and on-line support from Studer's team of professional audio technicians to keep your facility up and running. To find out more about the D740 CD Digital Recorder, call the Studer office nearest you.



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Circle (87) On Reader Service Card

World Radio History

STUDER



Vincent Marchese

The cart room at WLTW-FM, New York, a Viacom station

Carts with Dolby SR give us a reliable, time-proven playback system with all the quality of CD's."

"So far, there's no digital 'solution' that compares to our carts with Dolby SR for performance, reliability, and convenience versus cost. And should that day come, Dolby SR will keep us competitive without having to spend another dollar.

"With Dolby SR, everything we air sounds clean and noise-free, including commercials. After all, our sponsors deserve the best quality audio as much as our listeners."

Bob Tarsio, Chief Engineer

"Dolby SR has brought us to a new level of on-air fidelity in the competitive New York market. Yet there are none of the gaffes that crop up with CD's, like playing cuts out of order or accidentally cueing up a cut that doesn't fit the format.

"Except for initial set-up, Dolby SR is completely hands-free. Our production and air staff make and play back carts the same as they always have: quickly and easily.

"The sound is more transparent than I could have imagined. Dolby SR recordings really do sound like the original."

Al Bernstein, Production Director

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Circle (141) On Reader Service Card

PRODUCER'S FILE

A Guide to Stereo Mics

by Ty Ford

BALTIMORE Around the end of last year, after acquiring my first portable DAT machine, I started thinking about stereo mics. I had a few projects that really lent themselves to digital stereo field recording: a live-music CD and an audio montage.

As a result of my own research, I've included a handy chart of all the stereo mics I could find that are currently being made (see accompanying chart). There are a few discontinued models out there, like the Cal-rec, that have been absorbed by AMS, and some of the AKGs. I'm sure I'll hear about it if I've accidentally overlooked somebody.

Stereo microphony has been in existence for a long time; as such, there are a number of different ways to do it. *Co-incident* is a word that pops up a lot. The most general definition of co-incident is the use of multiple mic capsules whose patterns overlap.

Co-incident mics

The co-incident category includes the M/S, X/Y, ORTF and A/B mics. M/S, or mid-side, combines a cardioid (directional) element pointed at the source, with a bi-directional (figure eight) element that picks

are right on the mics.

The other mics in this category use external boxes to perform these changes. Consider them for applications in which the mic remains mounted in a fixed position, or when adjusting the pattern from the control room makes more sense than running back and forth between the soundstage and the control room.

Watch for cancellation

Technically speaking, matrix conversion from M/S to X/Y may be stereo, but not X/Y. Due to phase cancellation, a lot more than stereo image may be lost when M/S that has been matrixed to X/Y is summed to mono.

In fact, any time you set up more than one mic in a soundfield you can expect some sort of phase cancellation. If you ever expect the finished product to be heard in mono, make sure your spread doesn't disappear, taking with it a lot of sound you can only hear in stereo.

ORTF specs include placing two cardioid mics 17 centimeters apart at a fixed angle of 110 degrees. A/B recording is usually done by separating two omni-directional mics at least a foot apart, facing the sound source. A/B, or spaced-pair, is defined as any

STEREO MICROPHONE GUIDE

Company	Model	Method	Bal/Unbal	Power	List	Comments
AKG (610) 361-3500	C-426	M/S-X/Y	Balanced	Phan.	\$3699	Inc. remote controller, stand adapter, shock mount, w/screen.
	C-622	X/Y	Balanced	Phan/Bat	\$1299	Inc. roadcase, shockmount, w/screen. Plugs in to recharge.
AMS (303) 792-4997	SoundField MkIV	W/X/Y/Z	Balanced	PS	\$5850	Inc. processor, B-format connector, w/screen, roadcase.
	ST 250	M/S-X/Y	Balanced	Bat/PS	\$3800	Inc. processor, w/screen, roadcase. Uses "C" cells.
AUDIO TECHNICA (218) 686-2800	AT825	X/Y	Balanced	Phan/Bat	\$400	Inc. clamp, AA battery, w/screen.
	AT822	X/Y	Unbal.	Bat	\$300	Inc. clamp, cam. shoe, AA bat, w/screen, mini & 1/4" plugs.
AUDIX (610) 483-1112	ST-1	X/Y	Unbal.	Bat	\$129	Inc. pistol grip, AA bat, cam shoe, w/screen, mini & 1/4" plugs.
	ST-2	X/Y	Unbal.	Bat	\$129	Inc. clamp, AA bat, 1/4" plugs.
BRUEL & KJAER (619) 745-1168	3529	A/B	Balanced	PS	\$7000	Inc. power supply, boom, grids, roadcase, w/screen.
	3530	A/B	Balanced	Phan	\$5300	Inc. boom, grids, w/screen, roadcase.
CROWN (219) 294-8000	SASS-P MK II	Boundary	Balanced	Phan/Bat	\$899	Uses two 9V bat. SASS-B housing for B&K mics \$799.
FOSTEX (213) 921-1112	M22RP	M/S	Balanced	None	\$695	Ribbon mic. Optional X/Y converter.
MOBILE FIDELITY (702) 831-4469	MS-4	W/X/Y/Z	Balanced	PS	\$8500	Inc. power supply, proprietary M/S matrix.
NEUMANN (203) 434-9190	SM69	M/S-X/Y	Balanced	Phan/PS	\$5720	Inc. controller, P/S, cable.
	USM69	M/S-X/Y	Balanced	Phan/PS	\$4600	Inc. cable, adapter.
	RSM-191a	M/S	Balanced	Phan/Bat	\$3695	Inc. matrix, power supply, w/screen, cables, roadcase.
	KFM100	Head	Balanced	Phan	\$5600	Inc. cable, adapter, auditorium hanger. Spaced omnis.
SANKEN (213) 469-4773	CMS-7a	M/S-X/Y	Balanced	Phan/Bat	\$2500	Inc. PS, switchable matrix box, 4-AA bat.
	CMS-2	M/S	Balanced	Phan	\$1900	Inc. Mount, box. Optional cables, matrix, PS.
SENNHEISER (203) 434-9190	MKE44	X/Y	Balanced	Phan/Bat	\$795	Inc. mount.
	MKH-MS	M/S	Balanced	Phan/PS	\$4450	Inc. 2 mic, matrix, P/S mixer, clip, s/mount w/screen, roadcase.
SCHOEPS (212) 242-3737	KFM 6	Spherical	Balanced	Phan	\$5795	Spaced omni pressure capsules on the surface of a sphere.
	CMTS 601	M/S-X/Y	Balanced	Phan	\$3425	Two coincidental caps on a common axis, both rotate.
	VMS 02 IB	M/S-X/Y	Balanced	Bat/PS	\$3000	Inc. preamp, M/S matrix, cable, ORTF, choice of capsules.
SHURE (708) 866-2200	MSTC 64	ORTF	Balanced	Phan	\$2065	
	VP88	M/S-X/Y	Balanced	Phan/Bat	\$995	Inc. built-in switchable matrix, holder, 6V bat, w/screen, Y cable.
SONY (201) 830-1000	ECM-MS5	M/S-X/Y	Balanced	Phan/Bat	\$1250	Inc. built-in switchable matrix.
	ECM-737	M/S	Unbal.	Bat	\$150	Switchable pattern, w/min plugs.
LOW COST MODELS	ATR-25	X/Y	Unbal.	N/A	\$30	N/A
AUDIO TECNICA	ECM-R100	Boundary	Unbal.	Bat	\$100	N/A
SONY	33-1065	X/Y	Unbal.	None	\$28	Dual dynamic mic heads. Manually adjustable angle.

up the left and right side. Some people like M/S recording because they can control the width and apparent distance to the source by varying the amount of "mid" and "side" during playback.

The X/Y method entails crossing two mics or capsules of identical patterns so that the angle between the business ends is somewhere between 120 and 90 degrees. The exact arithmetic depends on how wide the sound source is (a symphony versus a soloist) and how close you are to the source.

Some mics such as the AKG C 426, Sanken CMS-7s, Shure VP88, Neumann SM 69, USM 69i, Schoeps CMTS 501, VMS 02 IB and Sony ECM-MS5 can achieve both M/S and X/Y by either physically or electronically adjusting their patterns and angles.

If you're doing a lot of hand-held or temporary recording, the Neumann USM69, Shure VP88 and the Sony ECM-MS5 deserve extra notice because the adjustments

matched pair of mics spaced more than a foot apart and aimed at the sound source.

The AMS Soundfield MkIV and the Mobile Fidelity MS-4 are arguably the most sophisticated mics I researched. Their higher prices reflect the extra cost of four capsules and very sophisticated processors that allow for amazing flexibility . . . and yes, the ability to record spatial height as well as width. Their controls let you "steer" the mic while seated at the console. Consider seat belts before doing a demo.

Mic a la carte

Less spectacular, but charming in their own way, are the Crown SASS-P MKII, Neumann KFM100, KU100 and Schoeps KFM 6. To oversimplify, these mics all use some sort of head-like mounting fixture that approximates the way our own ears work.

If you grew up with Tinker Toys™ and

continued on page 24 ►

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- Air Trak 90™—affordable linear consoles.
- 150/250 Series—rotary consoles.
- Phase Trak 90™—phase correcting cart machine.
- Dura Trak 90™—high value cart machine.
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Circle (91) On Reader Service Card
World Radio History

LOWPOWER LOWDOWN

Basic Problems in Translator Operation

by Howard Enstrom

MOUNT DORA, Fla. Putting an FM translator on the air can mean dealing with a series of complex and specialized problems. This is true particularly at sites with co-located communication and broadcast services. You can encounter problems of desens, intermod and crossmodulation.

A translator's receive section can be desensitized (desens) or "blocked" by an off-frequency unwanted high voltage signal that de-controls an amplifier or mixer stage bias level, resulting in non-linear operation. When this happens, the rectified signal cur-

rent alters gain-control characteristics so as to drop the overall gain—severely reducing sensitivity for the wanted signal.

Spurious products

Intermodulation is a form of distortion where amplifier or mixer stages generate spurious products called "dirt" or "spurs." The energy, at various levels and frequencies, results from beats (sums and differences) between the components of the desired signal in the receiver, or between the two received signals.

In short, whenever two signals pass through a non-linear device, such as a tran-

sistor, many unwanted signals can be generated. That such products are not a greater problem is due to circuit selectivity: high-Q tuned circuits that pass RF energy at the wanted frequency but not so readily at unwanted frequencies. When an equipment's inherent selectivity is lacking, we must add an external filter to pass and reject energy at different frequencies.

Another weird phenomenon is crossmodulation—where modulation intelligence is transferred from a strong unwanted signal to a weaker wanted signal. Sometimes this happens when a translator antenna is mounted on the same tower as a high power

FM station—translator listeners may hear the FM station's programs. The remedy calls for optimum selection of mixing devices and signal levels.

It is possible to have desens, intermod and crossmodulation all at the same time. As the state of the art climbs with more sensitive equipment, so do side-effects.

RF equipment

If you're ever inside an equipment building at the base of, for example, a 1,000-foot tower supporting dozens of broadcast and communications antennas, you'll see a lot of space is taken up by racks of isolators, combiners, couplers, splitters, dummy loads and cavity filters in tandem. They deal with mind-boggling combinations of RF energy products that cannot be permitted entrance to VHF and UHF equipments.

And there are many kinds of interference, including lowpass, high pass, bandpass, bandpass-bandstop, single and multisection in helical resonator and cavity-type designs. Their attenuation versus frequency selectivity characteristic curves can have many shapes, according to design and tuning.

Generally speaking, helical resonator-type filters are less expensive, present greater insertion loss (i.e., 7 dB) and less steep selectivity skirts than cavity-type filters, which are more expensive, have less insertion loss (nominal 1 dB) and steeper skirt selectivity characteristics. In some critical situations, only a cavity type filter does the job.

Try the antenna first

It's nice to have all these optional devices, but they're not always needed if you are able to do anything with antennas to increase the ratio of desired-to-undesired signal voltages. With a receive antenna this can be done by improving gain and directivity in one or both planes.

Changing its aperture can reduce interception of an unwanted field. Lowering the

continued on page 33 ►



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Stereo Mics

► continued from page 22

really like putting things together, head for AKG, Bruel & Kjaer, Neuman, Schoeps, and Audix. These companies stock a multitude of mic capsules of different patterns and frequency responses that fit stock bodies. They also have a lot of different mounting brackets so you can experiment fully with creating your very own stereo recording scheme. It's a much better obsession than slot cars and video games.

Be aware that, for proper operation, some condenser mics require full 48 V and some don't. That means you have to make sure the power supply you have generates enough juice for the mic to operate properly.

Some mics have removable batteries; others have rechargeable batteries that aren't as easily replaced. That means if you forget to plug them in and recharge them, you can't just slip in another set of fresh batteries, you have to wait until they are recharged.

Sony has about a half-dozen consumer models under \$100 that I didn't have space for, and I've also included a couple low cost entries from Audio Technica and Radio Shack. You may not win many technical merit awards with these, but that shouldn't stop you from having fun.

□ □ □

Ty Ford is planning on doing a few in-depth articles on individual stereo mics. Contact him with your own stereo mic experiences, or questions at 410-889-6201, MCI mail #347-6635 or America Online (Tford).

PRODUCTS & SERVICES SHOWCASE

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

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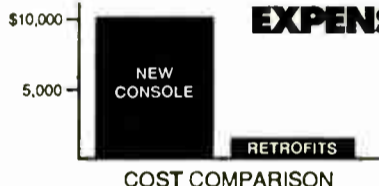
Programmable Digital Remote Control.
What others promise, Hallikainen & Friends delivers to your exact specs with the DRC 190. With its extended BASIC language, the DRC 190 can control, alarm, display and log measured and calculated system parameters. Typical installations also generate a daily report showing the minimum, maximum and average of each parameter, simplifying oversight of the system. For true flexibility of user control over evolving equipment demands, get with the program. get the DRC 190.



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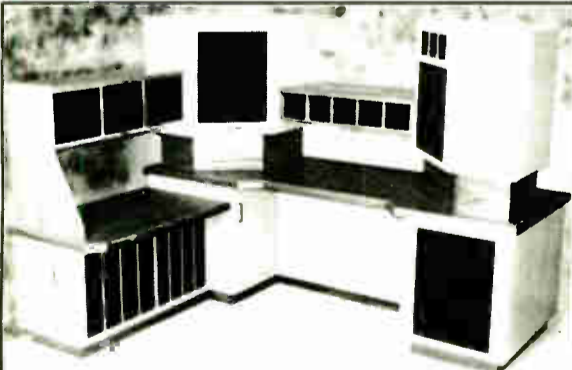
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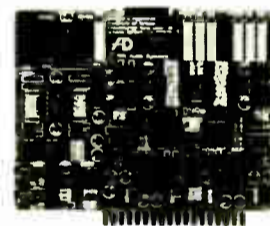


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READER SERVICE NO. 10



MICROPHONES . . . WTS

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EV RE-20 (2), gd cond, \$325 ea. C Kanz, PSI, N 27901 Sr 2, Reardan WA 99029. 509-796-5550.

EV 664 dynamic cardioid, works well, on/off switch, \$530+s/h; EV 655C wide-range dynamic 50/150/250 ohm output choice, \$30+s/h; Shure omnidirectional dynamic SM50 50/150 ohm dual impedance, \$40+s/h; Shure isolation shock mount A55M for SM57, will work w/any mic of similar diameter, \$15+s/h; Realistic FM wireless system w/rcvr & 3 tavalier xmtrs, works well, \$30+s/h. R Zimmer, Sound Enhancement Specialist, 2430 N Dodge Blvd Ste 134, Tucson AZ 85716-2639. 602-326-2080.

EV RE-20 w/309 shock mount, like new, \$400. P Choroas, PCE, 192 Tacoma Ave, Buffalo NY 14216. 716-875-4352.

RCA classic ribbon, send for list. W Davies, Virgo Prods, 5548 Zimer Ave, N Hollywood CA 91601. 818-761-9831.

RCA 88 mint cond, salt shaker mic, BO. R Miller, KUAU, 490 Ulamalu, Haiku HI 96708. 808-572-5534.

EV RE-20 recording w/cable, \$275. S Russell, 616-782-9258.

Desk mics (hiZ), EV-Shure mic stands, also baby booms (3); tubes, new (32) RCA, GE, Sylvania; Sams tube sub books #8 & #6; RCA tube manual; Sony head demagnetizer (new); jack femal connectors; EV 502 transformer primary/secondary. Mr. Oliver, 212-874-7660/0274. Call afternoons till 10PM.

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Telefunken U-47, Neumann U-67, KM-54 mint; RCA ribbon mics (2) KU3A's 100001, (3) 77-DX, (1) 44-BX, (2) BK-5; Altec tube mics M-11, M-20, M-30; 639 film version mic ect. Trade or sale. Tracy Eaves, 615-821-6099 (evenings before 10PM EST).

HP any lab ref mics, 1" versions. S Dorsey, WCWM, 173-7 Merrimac Tr, Williamsburg VA 23185. 804-229-1547.

RCA ribbon 44E/77E. W Davies, Virgo Prods, 5548 Zimer Ave, N Hollywood CA 91601. 818-761-9831.

EV RE20 w/boom; Sennheiser MD421U w/boom. D Jackson, WQGL, POB 566, Butler AL 36904.

Carbon, old. T Ryan, WGOL, Rt 3 Box 467-B, Rustburg VA 24588. 800-877-2652 ext 6027.

MISCELLANEOUS

Want to Sell

Signal splitters (1) 75%, 9%, 9%, 7%; (1) 32%, 29%, 22%, 17%; (1) 33%, 29%, 20%, 18%; (1) 33%, 28%, 25%, 14%; (1) 54%, 46%, excel cond, \$40 ea. R Rossmann, WEHR, 103 Daniel Bldg, 2766 W College Ave, State College PA 16801. 814-863-0072.

1955 Bristol Coach Bus award winning remote system w/30' ant, photos on request, \$32000. B Eberline, Eberline Broad, 1413 6th St, Bay City MI 48708. 517-892-6530.

Onan 5 kW natural gas generator, used 4 hrs, excel cond, \$4000. C Arnold, KIPR, 415 N McKinley #920, Little Rock AR 72205. 501-663-0092.

EMPLOYMENT

To place ads in this section, use the ActionGram form. To respond to box numbers, write Radio World, PO Box 1214, Falls Church, VA 22041, Attn:

POSITIONS WANTED

Looking for Chiefs pos exper in all phases, high power AM directional & FM, audio, 20 yr vet, major & top 100 mkt exper, prefer warm climate anywhere, will consider 2 companies in single mkt on contract basis. Peter, 207-645-3019.

Experienced, friendly highly motivated adult communicator w/great prod skills seeks stable opportunity, solid airwork, team player, AC/oldies/country. Dave, 712-262-7954.

Marketable pro seeking air talent pos, skilled, responsible, personable team-plyr w/creative quality, AOR/AC/CHR/N/T. Randy, 919-294-2608.

Quick fix solution for troubled stations, AM/FM, instant cash flow+ratings. B Elliott, 813-849-3477.

Exper AT seeks rated AC/oldies/country/classic rock/AOR outlet in South, AM/PM. Jack, 919-671-1162.

Energetic & hard working former GM seeks FT pos at small/med mkt station, willing to relocate. J Rushton, 10 Windemere Rd, Worcester MA 01602. 508-799-7537.

13 yrs of Metro NY exper can be put on your airwaves, avail for prod. Zal, 718-252-5274.

Gen/Station/Ops Mgr PD w/10 yrs bdct exper, BET degree, working on business. D Koehn, 609 S 15th, Quincy IL 62301. 217-228-2115.

CE w/18 yrs exper w/high pw FM & AM, audio & construction, 3834 W 55th Pl, Chicago IL 60629.

CE seeks employment, BSEE, exper small to large operations, air shifts, quality prod, mgmt, long/short term, travel OK. G.B., 805-481-1426.

Personality/Prod/Promos energetic, dedicated team plyr w/exper in AOR/metal looking for anything PT/FT in Chicago area. Tony, 708-499-3035.

NYC prod, writer w/6 yrs exper, bd ops, prod, creative, talk, music background, excel knowledge of bdct ops. Robert, 212-863-0745.

Seeking new opportunities, gd pipes, high energy, will relocate anywhere, team plyr, top 100 sound CHR/HOT ac/ac 8 yrs. D.K. Pierce, 800-683-4272.

Contract engineer wishing to relocate to Southern California area. 26 years in radio, low rates and reliable 24 hours service. Inquiries to: Radio World, POB 1214, Falls Church VA 22041. Attn: Box 06-24-01RW.

Seeking responsible, challenging position w/company or association that can provide opportunities to match my qualifications & experience as Corporate/Association Exhibit Manager or Marketing Events Meeting Planner. With 20 yrs exper, my strongest assets are interpreting work situations, coordinating effectively w/all levels of mgmt, organizing & guiding projects to completion & providing team leadership. Will relocate if necessary. Robert Schwartz, 10934 Woodchuck Ct, Penn Valley CA 95946. 916-432-4722.

HELP WANTED

Field Engineer Position

Broadcast consulting company from Midwest looking for field engineer to work on contract basis. Must be experienced in RF field measurement techniques. Experience in construction, inspection and maintenance of AM/FM transmitting facilities preferred. Send resume to: Radio World, POB 1214, Falls Church VA 22041. Attn: RW06-24-02.

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POSITIONS WANTED: Any individual can run a "Position Wanted" ad, FREE of charge (25 words max), and it will appear in the following 2 issues of Radio World. Contact information will be provided, but if a box number is required, there is a \$10 fee which must be paid with the listing (there will be no invoicing). Responses will be forwarded to the listee, unopened.

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 PO Box 1214, Falls Church, VA 22041

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TAPES . . . WTS



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7" boxes empty, gd cond, used. J Reed, Voice Svcs, POB 74, Westmoreland NY 13490. 315-768-0210.

TAX DEDUCT EQUIP

DJ, CD, A/V equip needed, rcpt provided. M Mesch, Gulf Elem School, 3400 SW 17th Pl, Cape Coral FL 33914. 813-549-2665.

Want to Buy

Beautiful music format, prefer stereo & 10 1/2" reels, for collector not air, 414-794-1800. Source of programming for gospel non-comm educ FM under construction. F Hollon, WAHI, Box 195, Augusta IL 67311. 217-392-2340.

Wavetek 3002-B RF signal gener, DC-520 MHz, GC, \$1000; URM-26B RF signal gener, 4-405 MHz, GC, \$100. K O'Malley, 804-446-2731.

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We can save you \$ on your next equipment or supply purchase. Ask for our current list of quality pre-owned equipment.

Circle (7) On Reader Service Card

HP 334A dist/audio analyzer w/switchable low-pass filter & padded alum carry case; Tektronix TM515 suitcase port mainframe w/SC502 oscilloscope, DC502 freq counter, SG502 oscillator & storage mod; Altec-Lansing decade step attenuator. H Ginsberg, WMEEC, 2915 Maple Rd, Ft Wayne IN 46816. 219-447-5511.

Want to Buy EIA 1 5/8 flange 50 ohm for dummy load, able to dissipate at least 5 kW on EIA 1 5/8 flange, water loads OK. J Hoge, WTLN, POB 607000, Orlando FL 32860-7000. 407-682-9494.

TRANSMITTERS

RCA BTE-15A w/2 SCA generators, extender board & book. NationWide Talk Radio, POB 680888, Oak Grove OR 97268. 503-774-0459.

TRANSMITTERS

15 watt FM Versa-Count Exciter 30 watt FM B-E FX-30 Exciter 250 watt FM Wilkenson 250E 1 kW FM 1975 Harris 1H3

RCA BTF 3B 3 KW, working when removed, \$350. Karen, KYKA, 1109 W Chestnut, Yakima WA 98902. 509-453-6296.

STILL USING A TUBE EXCITER? Upgrade it with solid-state technology on a single 3x5 PC board for only \$189.95. JT Communications, 579 N.E. 44th Ave., Ocala FL 32671. 904-236-0744.

LPB LA-25 25 W AM RF linear (14), tuned for 1100 kHz, excel cond, \$380 ea. R Rossman, WEHR, 103 Daniel Bldg, 2766 W College Ave, State College PA 16801. 814-863-0072.

LPB AM-25 25 W AM, 1100 kHz, gd cond, \$500. R Rossman, WEHR, 103 Daniel Bldg, 2766 W College Ave, State College PA 16801. 814-863-0072.

NEW 6 kW FM transmitters for under \$18,000. Call for details Bill Hoffman 518-583-9490

LPA AM-25 PSSA/PSRA solid state, \$500; LPB Mid T-8 power line interface, \$100. M Bowers, 703-389-7473.

RCA MDS w/Andrews ant, nds tube, Brad, KZPI, POB 2207, Deming NM 88031. 505-546-0944. Harris TE-3 10 W amp, \$150; spare semiconductor kit for TE-3, \$150. G Kenny, KCL, POB 932, Neosho MO 64850. 417-451-1440.

GE BT-25A 50 kW AM, tuned to 1540 kHz, gd working cond, has PCBs, free if you pay for disposal, disassembly & haul. P Thurst, WPTP, POB 12279, Albany NY 12212. 518-456-1144.

Harris SX-1A 1000 W 1985, solid state, used 5 yrs, \$12000/BO. W Smith, WHHM, POB 203, Henderson TN 38340. 901-989-5981.

Gates M-609S FM exciter 10 W, 88.1 w/manual, \$300. T Rosen, KBCC, 1129 Acacia Ave, Bakersfield CA 93305. 805-871-6094.

RCA AWQ-10 radar w/flat ant, pwr supply, spare parts, BO. A Ramsey, WITWO, Box 299, Terre Haute IN 47808. 812-696-2121.

Bext T-800 800 W wideband PA, 1.5 yrs on air, pristine cond, \$4500. J Paoli, Bdt Eng, 16715 Kalisher St, Grand Hills CA 91344. 818-774-5378.

Harris MX15 like new cond, will put on your freq, \$3600. G Gabriele, WFOG, 215 Brooke Ave, Norfolk VA 23510. 804-622-6771.

Collins 830 D 1 kW FM, \$2500; Harris 20 kW FM, excel cond w/spare parts, \$18000. M Jones, 314-431-1216.

CCA AM1000 nds work, \$500. B Kidd, Airwaves Co, 510 W 2nd, Rayville LA 71269. 318-728-4574.

Sparta 680 solid state FM exciter, works OK w/composite input, excel cond w/manual. H G subberg, WMEEC, 2915 Maple Rd, Ft Wayne IN 46816. 219-447-5511.

NEC 4763A FM, 20 kW w/3) 4CX 15000As, \$25000; 25 kW dummy load, \$2000. R Miller, KUAU, 490 Ulumalu, Haiku HI 96708. 808-572-5534.

Andrew 3" Helix 820', gd cond on B' spool, \$1500. 816-635-5959.

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Want to Buy Low power AM for post-sunset use, 60 W, solid state pref. T Alexander, WELW, POB 826, Wiloughby OH 44094. 216-953-1330.

Any 60/100 W AM, used, tunable, 530-1610 kHz. F Smith, 615-624-7126.

Student needs working FM exciter to learn, no more than \$100. C Webb, 402-330-1645.

Harris FM 3.5 5 kW 1980-85 w/MX-15 exciter, close to 95.9 MHz. D Rose, KAAA, 2534 Hualame Mtn Rd, Kingman AZ 86401. 602-753-2537.

Continental 5 kW FM for 103.3 & exciter. C Tiemann, WAIV, POB 103, Spring Valley IL 61362. 815-663-8221.

Harris MW1/5X1 AM, no tubes under 10 yrs old, 1 kW around 1400 kHz. C Mellon, WILI, 720 Man St, Willimantic CT 06226. 203-456-1111.

7 1/2/10 kW FM in gd cond. B Kelso, WAAQ, 220 1/2 S Michigan, Big Rapids MI 49307. 616-796-7000.

McMartin AM/FM xmtr, any model, exciter or stereo modules. Goodrich Ent., 11435 Manderon, Omaha NE 68164. 402-493-1886.

TUBES

Want to Sell RCA/Syl 845, 810, 828, 8008, some new, BO. R Glenn, WIGK, 1718 Shenandoah, Wimauma FL 33598. 813-634-1940.

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4-1000A, 8877, 4CX250B, 4CX1500B, 4CX3000A & more. We carry large inventory all major brands, Eimac, Amperex, RCA, etc. Call Stew 1-800-842-1489.

Want to Buy ML 6623 & 6427 rebuildable duds. G Proctor, Sat Cable, POB 5386, Galveston TX 77554. 409-737-2142.

ML 6623 & 6427 rebuildable duds for GE xmtr. G Black, WCRJ, 5900 Picketville Rd, Jacksonville FL 32205. 904-693-1530.

TURNTABLES

Want to Sell Technics SL-1200 almost new, \$400/BO; SP-25 (2) w/tonarms, light use, \$350 ea/BO. G Fullhart, WVKK, 4665 W Bancroft St, Toledo OH 43615. 419-531-1681.

Rek-o-Kut B12H 3-spd w/S-120 tonearm & 2 head shells, \$100. J Parsons, 2781 Fayson Cir, Deltona FL 32738. 904-532-0192.

ScullyWestrex System record mastering lathe, updated, VP-131, \$35000. F Virtue, Virtue Studios, 8807 Rising Sun, Philadelphia PA 19115. 215-763-2825.

Technics SP-15 w/Audio Technica 12T tonearm on heavy BSW black shock mount base & Radio Systems PA-1 preamp, very gd cond, \$500. T Stine, KCGQ, 106 Farrar Dr, Cape Girardeau MO 63701. 314-335-9099.

RCA 70-C1 transcription TT 16" 78/33 rpm w/Gray Rsch viscous damped arm, GE elec low impedance carts. 214-233-8516.

Want to Buy

RCA 70-C/D transcription, will pick up in New Eng/NY. C Brescia, WNBZ, Box 211, Saranac Lake NY 12983. 518-891-1544.

16" SME tonearm, D Dintenfass, Transcription Svc, 7549 27th Ave NW, Seattle WA 98117. 206-784-4803.

RCA/Presto 16" disc rec w/blanks, needles & misc equip, any size. W Davies, Virgo Prods, 5548 Zimer Ave, N Hollywood CA 91601. 818-761-9831.

VIDEO PROD EQUIP

Want to Sell Sony RM-430 auto video editor, exc cond w/cables, \$525. M Johnson, Westhampton Video, POB 195, Nutting Lake MA 01865. 508-582-6381.

Sony LDP-1000A (4) laser video disc plyrs, CAV & CLV intext drive, gen lockable RS232C port w/remote, manual & cables, excel cond, \$400 ea; 3M CRL (3) NTSC encoders, RGB in composite NTSC out, complete signal proc, \$300 ea, \$700 for all. J Krepol, RNDL, 7 Dustin Dr, Claymont DE 19703. 302-798-4076.

Want to Buy

Sony RM 580. Also AMCO 10 or 20 position stereo audio/video switch boxes. TKV, 301-445-5450.

VIDEO TAPE RECORDERS

Want to Sell

Sony CP5000U (2), \$125 ea; CP5200U, \$150, both 1/4" U-Matic. J Krepol, RNDL, 7 Dustin Dr, Claymont DE 19703. 302-798-4076.

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WORKBENCH

► continued from page 20

order. (1) Clean heads and guides. (2) Clean the pinch roller. (3) Clean the capstan.

Jim's cost per machine was about \$11.00 for parts and about 20 minutes of shop time. Justification for the modification can be made to your GM by pointing out that at least one roller replacement can be eliminated per machine (at \$12.00 each), and if you save two per year, you've made a profit.

One final thing—make sure the head cleaning fluid doesn't ruin your pinch rollers. Some pinch rollers will gum up or self-destruct if certain cleaning fluids are used on them. Stick with the isopropyl, or other manufacturer-approved fluid. Jim uses a magnetic head cleaning fluid manufactured by a local chemical company in Fort Lauderdale, Fla. Super-Tech Products, at 305-977-0468 sells their concoction under the name "magnetic head cleaner". Jim Sorensen can be reached at 305-484-8107.

★★★

A few issues back, Larry Albert described using electrical switch boxes as in inexpensive means of housing projects. Norman Litsche from Air Navigation Industries then wrote to tell about electrical "pull" boxes. I received a fax from Norman the other day, giving some ordering information for these pull boxes.

Trouble-Shoot FM Translators

► continued from page 24

antenna enough to not significantly change the primary signal voltage, yet greatly reduce interception of an unwanted RF field can be an effective remedy.

In a crowded radio spectrum, a frequency search and terrain study gives few choices for a translator's transmit frequency. If the study shows one must be channeled closely to that of the primary station, a translator can create its own problem if receive and transmit antennas are close, causing desens.

On the other hand, if the receive-transmit channels have wide spacing, we still can have a problem. Minute quantities of translator-generated spurious energy (undesired) might fall close to or on the same frequency as the primary (desired) signal. In this case, a filter is installed in the RF output line of a translator.

Whether to fix the problem by having someone move antennas and lines, or to use a type of line filter, depends upon field findings and technical judgment.

Adding an amplifier to a problem translator would likely aggravate matters, so it is better to activate a system one step at a time. An unwritten rule in trouble-shooting is to isolate or localize a problem's cause, and make

As more and more FM stations and translators are keyholed into spectrum use, there will be nothing but more interference problems with co-located station sites. I encourage my clients to hire a professional person to oversee installation and activation of a system.

□□□

Howard L. Enstrom is a broadcast consultant. He has owned and managed an AM station and is president of FM Technology Associates, Inc., specializing in engineering design and sale of FM translator equipment. He can be reached at 904-383-3682 or by fax: 904-383-4077.

Keystone Corporation builds a variety of screw cover pull boxes in various sizes. These boxes are constructed from one piece of sheet steel, with folded and welded corners. For a catalog, circle Reader Service 28, or contact your local electrical supplier.

★★★

Also from an earlier issue comes another suggestion for those empty plastic film cans. Tom McGinley, RW's Technical Advisor and DE for Cook Inlet Partners, was telling me of a high school musician who lived near an AM site. He was in a 2-3 volt RF field, and the RF just loved his keyboard and amplifiers.

Tom's solution was to mount a quarter-inch

MIDI jack on the bottom of one of those 35mm film cans. A 2.5 milliHenry (mH) choke was then installed in series with a short pigtail that ran through a hole punched in the lid. The pigtail terminated in a quarter-inch plug.

By Tom's calculations, 2.5mH is a brick wall at AM. For even more suppression, a 500 picoFarad (pF) capacitor across the jack will form an L-section when combined with the choke. Tom McGinley can be reached at WPGC-AM-FM: 301-441-3500.

★★★

Keith Arnett of Broadcast Services/EME wrote to tell us about a surge protection primer that his company is offering. As we move toward the worst of the thunderstorm months, the surge protection primer is good reading. Its contents include suggestions on installing surge protection systems at transmitter sites, as well as some case studies of

how to improve the electrical wiring of a transmitter site.

Surge protection for UPS systems is also discussed. If you'd like a copy of the surge protection primer, call Keith Arnett at 703-635-1413 or circle Reader Service 189.

□□□

Editor's note: Field modifications to equipment may invalidate the manufacturer's warranty. Before attempting any repairs or modifications, consult the manufacturer for advice and guidance.

Always use the utmost care and follow good engineering practices when working with or around electrical equipment. RW will not assume responsibility for any loss or injury.

John Bisset is a principal with Multiphase Consulting, a contract engineering and projects company. He can be reached at 703-379-1665.

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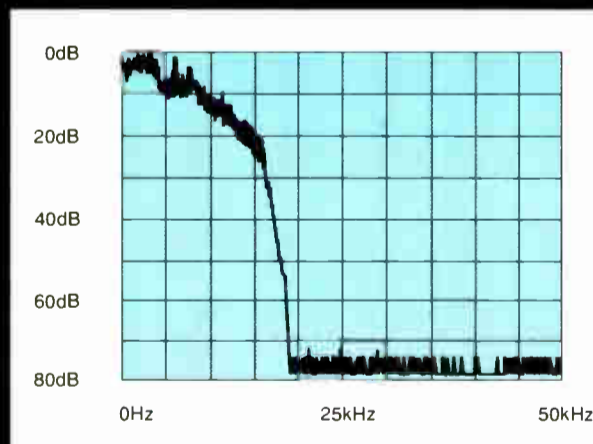
The 4000 provides transparent limiting with any source. Blind tests confirm that the sound of the Orban Transmission Limiter 4000 is virtually indistinguishable from the original source when driven as much as 15dB into limiting—even to trained listeners. Try it for yourself and hear what your facility can deliver when it is protected, not just restricted.

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Power spectral density at the 4000's output using "maximum peak hold" measurement. (10kHz/div. horizontal; 10dB/div. vertical)

USER REPORT

IBC Gets an Edge with Unity 2000

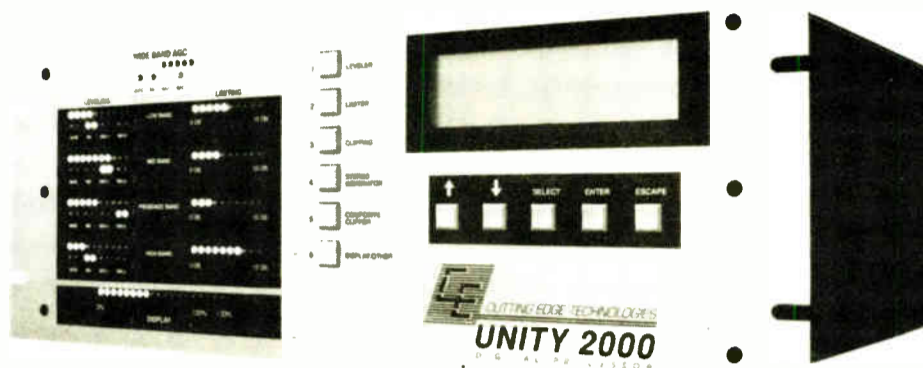
Processor Offers Ease of Operation and Flexibility

by **Jeremy Millar**
Group Program Director
Independent Broadcasting Co.

AUCKLAND, New Zealand Independent Broadcasting Co. (IBC) installed the Unity 2000 digital audio processor recently. Manufactured by Cutting Edge Technologies (CET), the processor now can be heard on both IBC's rock station in Wellington and its CHR station in Auckland.

The Unity 2000 came to our attention by way of our program consultant and our contract engineers. Both the Pollack Media Group (U.S.) and Broadtech (New Zealand) suggested we take a look at the Unity 2000 to determine whether it would fit our needs here in Auckland. Like many programmers, I like to keep myself well-informed on processing developments. So it was with real enthusiasm that we placed an order with CET.

Upon its arrival, we were reassured that the unit was easy to use and install. The Unity takes up about six inches of rack space. It has a silver/gray front panel with



The Unity 2000 from Cutting Edge Technologies offers a variety of processing options for IBC in New Zealand.

The unit comes with suggested pre-programmed settings for different formats. While these were helpful, we found it worthwhile to experiment with our own settings, as we believe each of our applications is unique.

One of the biggest advantages we found is that the Unity 2000 actually allows you to change crossover points. We had been looking for more of a "brick wall bass," rather than a "wooly super bass." Custom setting our own crossover points allowed us to get the bottom-end punch we wanted.

automatically switches back to its original settings. With the Unity, adjusting processing levels is no problem.

Do everything

At our stations, the Unity has been placed just after the studio and before the composite link. We removed all other processing, because the Unity is a complete

audio chain in a single chassis and does the work of several "boxes." It can literally do everything—multiband processing, limiting, composite clipping and stereo generation.

The only improvement I would have suggested would be an output signal prior to the stereo generator for increased flexibility. The company tells me that as of May 1, this has become a standard feature.

We have been extremely happy with the Unity. It was easy to install, easy to use, flexible and programmable. Just what we were looking for in a processor.

Independent Broadcasting Co. owns and operates seven FM radio stations throughout metropolitan centers in New Zealand. Additionally, IBC operates IRN, a news network servicing 32 client stations.

For information on Cutting Edge Technology, contact Margot Daly at 216-241-3343; fax: 216-621-2801; or circle Reader Service 196.

We found the Unity easy to operate. It was clear that a lot of consideration had gone into developing and designing the unit.

an LED panel to the left and a large LCD panel to the right, making the controls both accessible and easy to use from the front of the box.

Easy to operate

We found the Unity easy to operate. It was clear that a lot of consideration had gone into developing and designing the unit, right down to the ability to change the contrast on the display screen.

We also were interested in getting more punch at night for our CHR dance-based station. The Unity made it easy. Since the Unity comes with a daypart option, we simply programmed the settings we wanted with the times we wanted them to take effect, and let the Unity do the rest.

At a pre-designated time each evening, the Unity automatically alters its settings to match our programming. Later, the unit

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USER REPORT

Lazer Gives Digital Advantage to WEZW

by Terry Baun
Owner
Criterion Broadcast Services

MILWAUKEE The march toward the digital radio station will inevitably include digital audio processing. Gentner offers the Lazer, a software-driven, all-digital processing system that can replace a variety of other limiter/stereo generator devices.

One of my Milwaukee clients, WEZW, has had the Gentner Lazer on-air for about 18 months. The station, switching from Easy Listening to a Soft AC format, was interested in upgrading the audio chain to

provide more aggressive and flexible processing, while maintaining the audio quality for which the station was known. I suggested that one of the new generation of digital processors might be the answer.

Having heard rumors in 1990 concerning the imminent release of the Lazer, WEZW asked Gentner to provide a unit for evaluation. The station participated in early field trials, which used Version 1.1 software. At the time, we liked the exceptional flexibility of the box, but were concerned about the AGC action, which seemed a bit heavy-handed in its operation.

Pleased Listeners

Gentner advised us to bypass the AGC completely (a software-selectable choice) and utilize our existing analog Prisms ahead of the unit to get the sound we wanted. WEZW also made several changes to the factory-defined "Light AC" format parameters before arriving at a sound that pleased our program director and our listeners.

Among the more unusual characteristics of the system is that the incoming audio is put through an A-to-D converter (housed in a separate chassis) and then output to the Lazer on a fiber-optic link. With future development of digital STLs and exciters, that could mean an all-digital path from console output to the transmitter. In addition, the complete isolation offered by the optical encoding eliminates any possibility of ground loop problems in that part of the chain.

Unlike some other digital processor, the Lazer incorporates a true digital stereo generator, which produces the best-looking composite baseband I've ever seen. No main/sub balancing, no pilot phase, no injection level to set (although it is adjustable)—just a very clean-looking signal.

Running the Lazer on the bench for several days into a Tektronix 5L4N audio spectrum analyzer only confirmed what the oscilloscope had shown earlier. The baseband is as clean a signal as you have ever

seen. Even under aggressive modulation, the true digital processing and lack of clipping artifacts makes the baseband above 53 kHz clean as a whistle (no SCA pun intended).

All the processing parameters are controlled via user-definable software, including AGC and spectral mix of the four bands

But what is especially intriguing about the Gentner box is the potential for software upgrades. For example, the change from Lazer Version 1.1 to Version 2.0 was accomplished by replacing three chips. That was a major change, involving not only eight different pre-defined formats, but some changes in the center frequencies for the tri-band limiters. Installing three chips made the Lazer essentially a new processor.

Other features of interest on the unit include an RS-232 port, which with addi-



The Gentner Lazer Digital FM Limiter/Stereo Generator has been on-air at WEZW for more than 18 months.

of audio processing. The controls available are very similar to those found on the older analog Audio Prism.

Besides allowing 25 different processing variables, the Lazer comes equipped with eight predefined "suggested" formats. Instant switching is possible between formats, so you can hear how your AC station might sound if set up with "Top 40" processing.

Be all that it can be

This box can be configured to be just about anything you want it to be. With its digital composite peak control providing an absolute top limit to the composite signal, you can run the system anywhere from relaxed and open to tightly controlled and aggressive.

The original Version 1.0 software offered format choices such as AC, AC Light, Top 40, Country, etc. In the newest Version 2.0 software, the choices are modified somewhat to include Standard, Music Light, Music Aggressive, Music/Talk, Mostly Talk, Loud, Easy Listening and Classical/Jazz (in addition to your own user-definable choices).

tional software will allow complete control of the processor from a remote terminal or PC. This also will permit dayparting of processing parameters and adjustment of the audio processing from a reference system in your living room or anywhere else via modem.

The Lazer features both analog and digital outputs. In addition to the usual BNC analog out, the chassis has a DB-36 digital composite output connector, providing a 24-bit word to be used with a digital FM exciter. One of the new digital STL systems might also be configured to accept this output, resulting in a full digital link from the console output to the RF stages of your exciter.

Evaluating and debating

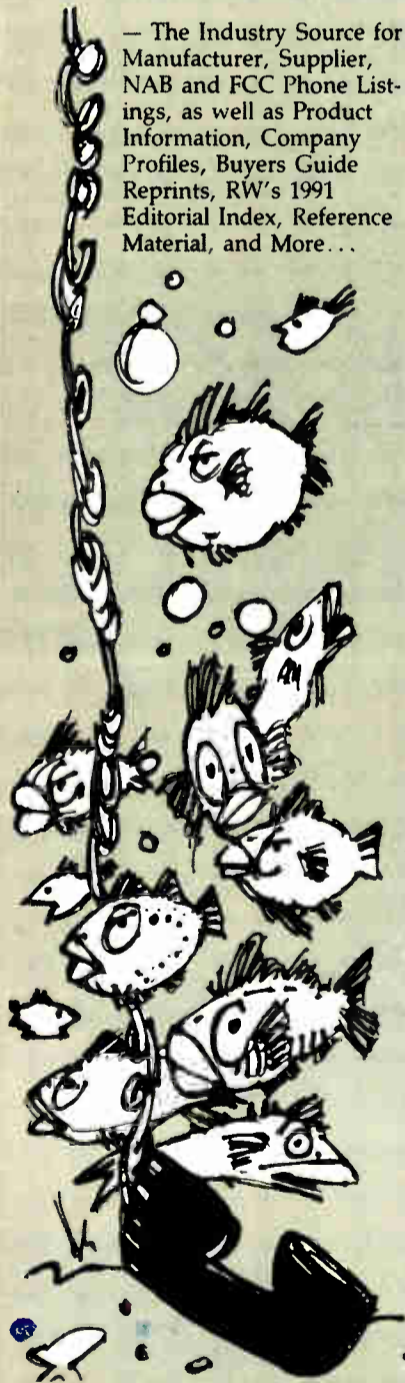
Constructive criticism about the Lazer? Well, like many things in life, having lots of variables can present quite a challenge to your patience. It's possible to spend a good deal of time evaluating and debating the audibility of some relatively minor parameter changes.

continued on page 40 ►

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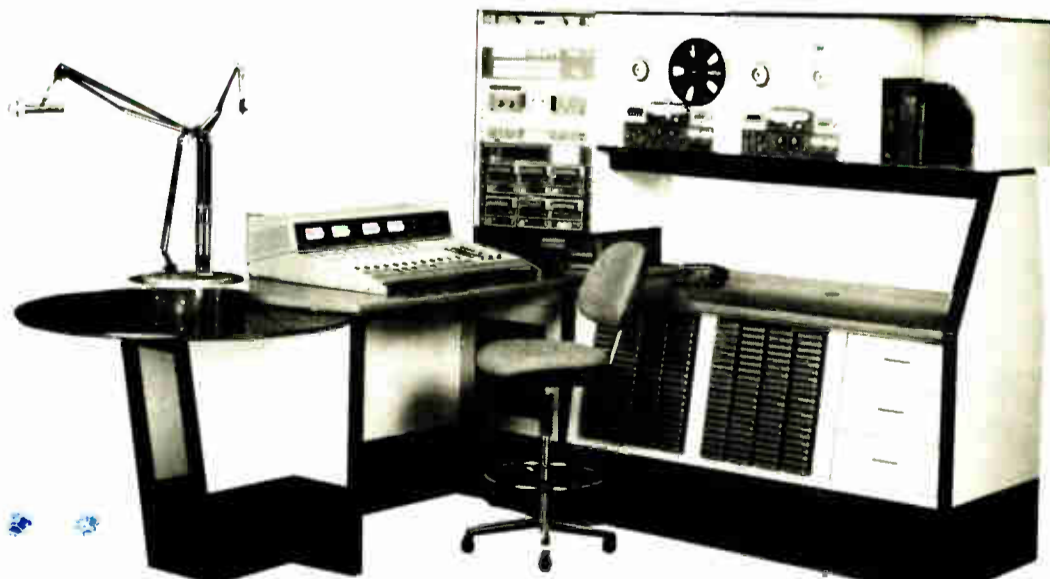
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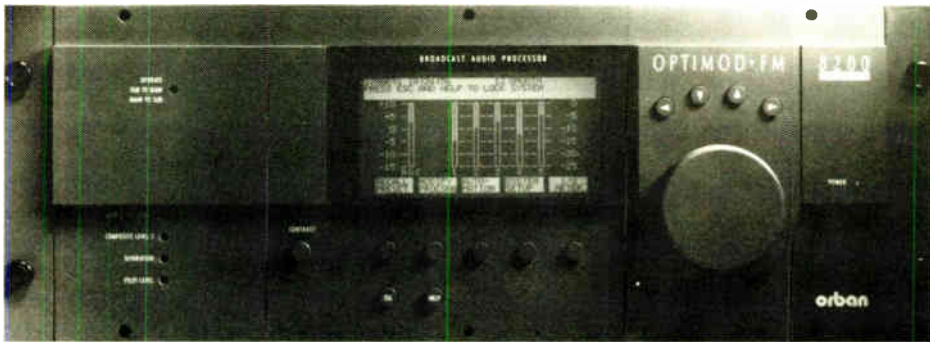
TECHNOLOGY UPDATE

Optimod-FM 8200 Puts Control in Your Hands

by Philip Moore
Product Manager
Orban Associates

SAN LEANDRO, Calif. In 1975, the aim of most engineers and program directors regarding the sound of their radio stations could be encapsulated with one phrase—louder, cleaner and brighter.

A simple concept, yet difficult to achieve in the very practical world of radio transmission. In that year, Orban introduced the Optimod-FM model 8000A and altered the future of radio broadcasting by combining a compressor, limiter, high frequency limiter and stereo generator into one high-quality system.



The 8200 is the latest member of Orban's audio processing family.

Re-thinking the industry's previous "multiple box" mentality, Bob Orban not only combined several parts of the transmission chain into one system, but also upgraded the technologies used to do it.

Without overmodulation

The Optimod 8000A was the first processor with overshoot-compensated low-pass filters, permitting a higher average modulation level without overmodulation. This permitted the station to be louder because it could raise its average modulation without overshoot; cleaner because less peak limiting and clipping were required to control modulation; and brighter because the design of the high frequency limiter completed the rest of the design.

Since that time other companies have introduced quality products based on similar principles.

Altered the concept

With the recent introduction of the Optimod-FM 8200, Orban once again has altered the concept of audio processing. The criteria of louder, cleaner, and brighter are still out there, but control also has become important. The issue of control has now been addressed through the use of digital signal processing (DSP), both in the audio portion of the system and in the control functions of the unit.

The research on the digital signal processing (DSP) algorithms and circuitry took Orban engineers more than four years, and built upon the many years of development invested to achieve the reliability and performance of the 8200's ubiquitous predecessor, the 8100. The most noticeable results of this effort were the presence of sophisticated processing structures, programmability and expandability of the unit, and a PC interface.

Each processing structure is the software equivalent of a dedicated processor. In a typical 8200, two processors act as

two-band processors (one a "phase linear purist" limiter and one an "improved 8100 emulation"). In addition, another structure acts as a multiband processor, and yet another as a transparent protection limiter.

Programmability is achieved via the fully digital design of the 8200 that allows radio stations to start with one of the many built-in presets and then access a wide range of factory optimized settings by using the "Less-More" control to simultaneously adjust all of the processor's adjustable processing parameters.

The chosen settings can then be saved as a new preset. Up to 32 presets can be saved and recalled at any time via the front panel,

or by the internal day- and time-based automation, by a remote contact closure or by computer interface port. A large LCD panel shows all metering functions of the processing structure in use.

Clearly labeled "soft" keys allow recalling of a preset, modification of processing, programming of the automatic preset switching or the ability to access system setup parameters. A dedicated Help button provides step-by-step instructions at any time.

Expandability

The structures are stored on a plug-in module, making upgrades easy, and the DSP cards can be added as needed when future software upgrades and additional processing structures require more processing power. Since processing is accomplished through software, a radio station's sound can be changed by replacing the software, not the entire audio processor.

Optional software increases the 8200's power by allowing full remote operation of all front panel features from an IBM-compatible PC. With a standard computer modem, the 8200 can be controlled from the studio, home or even a car.

All the high technology DSP chips and sophisticated computer control are great, but what does it really offer a station trying to compete in today's fast-paced industry? In the final analysis, what it means is that a station can adjust its sound how it wants, when it wants and with much finer control than was available before.

For the smaller stations, the help screens and simple control of multiple adjustments will mean they get the processing they need to remain competitive, while larger stations can take advantage of the additional control capabilities of the 8200.

For information on the Orban 8200, contact Philip Moore at 510-351-3500; fax: 510-351-0500; or circle Reader Service 177.

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TASCAM.

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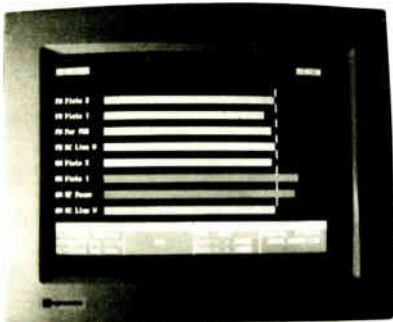
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USER REPORT

Imagination Is Only Limit of "paragon"

by **Daryl McQuinn**
CE, KMJQ/KYOK

HOUSTON Audio Animation's "paragon-transmission" digital audio transmission processor is a RAM-based, software-driven digital audio processing system in one box, limited only by the user's imagination.

A user with no extraordinary audio processing experience can use the five factory presets, or modify almost every conceivable parameter in a standard audio chain. This flexibility makes the "paragon-transmission" a compliant unit for any situation.

The "paragon-transmission" has analog XLR connectors for audio in and out and is available with digital in and out. The unit has all the normal analog audio processors including an AGC, a six-band parametric equalizer, a four-band compressor, four-band limiter, and a peak controller. All of the parameters of these blocks of the system are completely adjustable via a touch screen-equipped nine-inch VGA video monitor and one large knob.

Input/output screen

From the input/output screen, any one of the processing blocks can be called upon

A user with no extraordinary audio processing experience can use the five factory presets, or modify almost every conceivable parameter in a standard audio chain.

simply by touching the button for that block. After making adjustments to that block, another processing block can be selected.

Each block gives you a visual representation of that type of processor. For example, the four-band compressor displays four bar meters that indicate how much compression is in each of the bands. Next to each meter are all of the adjustments for that specific band. This is similar to what



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you would find on a traditional analog compressor, except with much more comprehensive control.

The "paragon-transmission" takes this one step further. After setting the parameters for a specific band, you can see an input/output mapping graph of the compression curve you have set. With program audio it is possible to see how each band of the compressor is working and whether or not it is doing what you anticipated. These same input/output mapping graphs are available on the AGC, the four-band limiter and the peak controller sections.

Another helpful screen is in the six-band parametric EQ block. The equalizer section is much like any sophisticated parametric EQ with selectable frequency, Q and gain. However, after setting all six bands for the desired settings, press the "Draw Graph" button on the touch



Because the paragon is software-driven, future updates and revisions are only a floppy disk away.

"paragon-transmission" allows for two levels of security. One level is a Full Access password that lets the user make any changes to any parameter and load, delete, rename and save setup files.

The other level (Limited Access) of security is adjustable. The Full Access user can

determine what changes can and cannot be made by the Limited Access user. This gives the Limited Access user the ability to allow some adjustments. For example, it is possible to allow limited access users only the ability to input and output, and make no other changes.

Other controls include a stereo image controller, selectable pre- and de-emphasis, and 30 Hz high-pass filter. The stereo image controller is used to increase or decrease the amount of L+R and L-R. In addition to user selectable 50 μ sec, 75 μ sec or no pre-emphasis before the limiter section, the "paragon-transmission" also provides selectable complementary de-emphasis after the limiter to accommodate installations with pre-emphasis elsewhere.

Future updates

Because the paragon is software-driven, future updates and revisions are only a floppy disk away. All of the system software is on floppy disk, and simply by inserting a new disk in the machine and rebooting, the unit will load the latest version.

The "paragon-transmission" is a computer, so it takes about two minutes to boot after a power failure, and an uninterruptible power source is recommended. If the system is operated without protection and power fails, it defaults with programmable attenuation while the reboot is in progress, so there's no loss of airtime, just a temporary low level.

If this is not acceptable, there is contact closure available during reboot to engage an alternate processing chain.

The Audio Animation program is an audio processing-oriented engineer's laboratory. It can be any type of processor that can be imagined. It can also be used to learn about processing. By trying different settings and A/B comparing, much can be learned about how settings interact with each other. And because it's largely software-driven, there's no fear of future obsolescence, which makes it a very attractive investment.

□□□

For information on the "paragon-transmission" from Audio Animation, call James Ruse, product development and marketing manager, at 615-689-2500; fax: 615-689-7815; or circle Reader Service 75.

After making changes
After loading a factory setup file in "A," a copy of that setup can be loaded in "B" with changes made to only the copy. After making changes, a touch of the screen will switch between the two setups with no audible pops, clicks or muting.

If the user likes what is heard, the changed setup can be saved and named as a new setup file. Any setup file can be loaded, modified and saved as a new file. The number of setup files is only limited by disk space. Therefore, many similar setups can be saved and called up for later use.

Another feature in the latest release of the paragon software (Version 2.2) is Daypart Management. It is now possible to load two setup files and program the "paragon-transmission" to switch between the two. It can make four changes daily, seven days a week, and every day can be different. This allow the user to set the processing for different types of programming.

The password system in use on the

TECHNOLOGY UPDATE

Give Your Station the CRL Signature

by **Gerardo Vargas**
International Sales Manager
Circuit Research Labs

TEMPE, Ariz. The Signature Series from CRL (Circuit Research Labs) has two major components: the Audio Signature and the Modulation Signature—both from the most powerful and flexible FM audio processor designed by CRL to date.

The modular design approach has been a CRL trademark in the broadcasting industry in the USA and abroad. CRL's original FM system has four modules. Each unit specializes in one major function: i.e. AGC, compressor, limiter and stereo generator.

The Signature Series continues CRL's modular design approach. This time, however, the complete FM system has only two primary modules. The Audio Signature combines an AGC and compressor into one unit. The Modulation Signature integrates a limiter with a stereo generator in one module.

Wide range

High-tech components like the Motorola MC 68HC11A1 microprocessor, located in the Audio Signature, the first unit of the system, have allowed CRL engineers to design an audio processor with a wider range and more flexibility than the previous models.

In its quest to accommodate the diverse needs of broadcasters, CRL offers two options for the Signature Series System: the timer and noise reduction. The timer provides daypart capabilities and enhances the system memory preset to 26. The noise reduction module is the single-ended model DX-3.

The two primary modules provide a user-friendly audio processing system without sacrificing the flexibility of the modular design. With the Signature Series improved technology, CRL is able to provide an affordable top-of-the-line FM audio processor.

The Audio Signature contains a separate wideband and multiband AGC with computer-controlled attack and release times. The AGC is followed by a four-

band compressor having "steerable" bass and HF crossover frequencies. The four-band output levels can then be adjusted or equalized using the built-in RTA metering.

out affecting mono programs, voice or true separation beyond the current enhancement level.

One of the most sought-after features of the new Modulation Signature is the Low

equalizers placed in front of other audio processing systems.

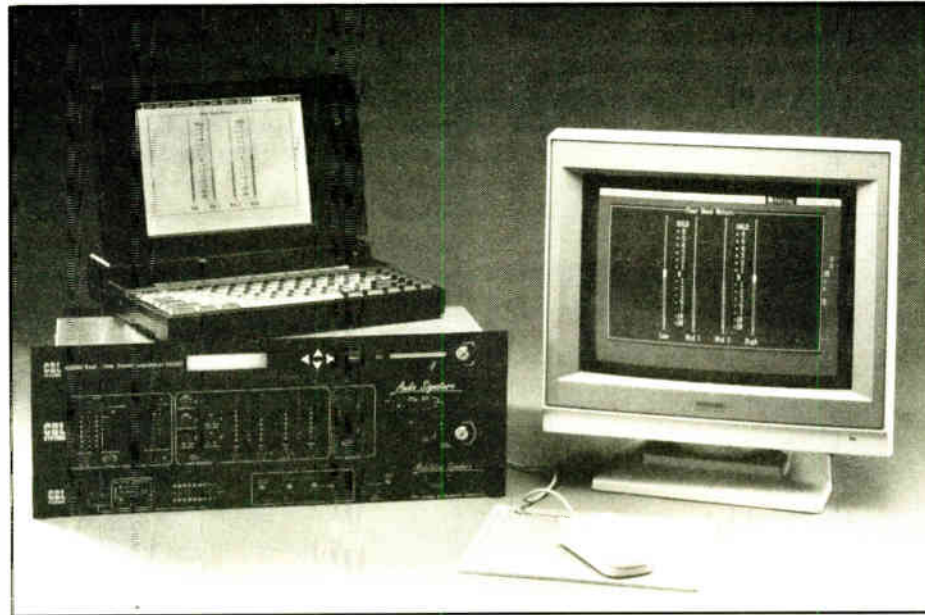
Possibly the most important feature of the Modulation Signature is the patented FM stereo multiplex generator. The stereo generator consists of a digital synthesis design that provides a drift-free pilot and extremely low distortion multiplex signal generation.

The CRL Signature Series combines the merits of digital control with the finest analog audio circuitry. Four memory presets are built into the Audio Signature so different processing sounds can easily be stored for later retrieval. The Signature Series becomes a fully automatic dayparting processor when coupled with the optional real-time event sequencer. As a bonus, the event sequencer can also automate other remotely controllable devices in your station, using its eight auxiliary outputs.

When under personal computer control, the Signature Series has an even wider range of processing settings available, including full control of density tables. Also, an unlimited number of processing presets can be stored on the computer's hard disk (or floppy disk).

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For information on the CRL Signature Series, contact Kent McGuire (western U.S. sales) or William Ammons (eastern U.S. sales) at 602-438-0888; fax: 602-438-8227; or circle Reader Service 85.



The Signature Series from CRL includes the Audio Signature and Modulation Signature (lower left).

Computer and/or terminal control of the Audio Signature using RS-232 is a standard feature. An IBM PC-compatible software program for complete computer control of the processor also is standard.

Newest product

The Modulation Signature is CRL's newest FM product. It is designed to complement the power and flexibility of the companion Audio Signature. Main features of the Modulation Signature include CRL's proprietary Transfer Function Limiting, along with a linear phase and patented overshoot compensated 15 kHz LP filter system. These features allow an emphasis on low distortion limiting or extremely loud smart clipping coupled with absolute over-modulation control.

Other Modulation Signature features include a unique stereophonic sound field enhancement that allows additional separation of stereo program material with-

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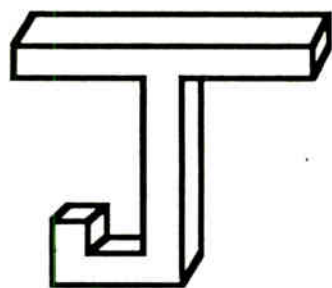


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TECHNOLOGY UPDATE

Inovonics' David Features Simplicity

by Jim Wood
President, Inovonics

SANTA CRUZ, Calif. The first successful integration of audio processing into the multiplex-FM stereo generator gave FM broadcasters an elegant solution to problems that had plagued their industry since the beginning.

The years since have brought improved generations of the original product, and entry into this same arena by other broadcast equipment manufacturers.

Inovonics' recent development of an integrated processor/generator was prompted

by the climate of the current equipment market, and directed by recent sales trends of existing Inovonics products.

For example, despite the keen interest in, and enthusiasm for, more technically advanced and complex audio processing

devices, a market exists for simple, easy-to-use and affordable products.

At the same time, the product must be effective; that is, not only does it have to perform all the basic functions, but also has to provide the "competitive sound" that is

software algorithms to emulate analog processing, so that various laws of physics and acoustics will not be violated and the result will be—if not pleasing—at least tolerable to the ear.

Audio signal path

In keeping the audio processing section of the new Inovonics product simple, portions of the design were adapted from earlier endeavors that placed the fewest active components in the audio signal path.



"David" is a giant among processor/generators, according to manufacturer Inovonics.



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universally believed to draw listeners like moths to a flame.

Garden-variety chips

With the proliferation of IC logic devices, a digital approach to FM subcarrier and pilot generation is reduced to a handful of garden-variety chips. What is commonly referred to as "digital synthesis" is related to the elementary "switching" type of stereo generator, but a number of intermediate sine-weighted sampling points are interposed in the commutation between left and right channel program signals.

Today, simple digital logic can yield stereo separation performance and freedom from spurious modulation products that previously could be realized only by fine-tweaking carefully balanced analog designs.

Digital logic makes stereo generation a simple matter. Not so in the case of audio processing—despite the decreasing cost and complexity of true digital signal processing (DSP) hardware and subsystems for audio applications, DSP is not yet as easy as its analog counterpart. Further, DSP requires the appropriate

The surprising result immediately suggested the product's nickname: "David." For, like its namesake, this simple, unassuming processor/generator, while maybe not a giant-killer, is more formidable than its modest stature might suggest.

Features of the David include a slow, "gain-riding" AGC and a split-spectrum compressor/limiter conforming to the selected pre-emphasis characteristic. Aside from input and output level adjustments, user controls have been reduced to a single knob, which simultaneously varies several different factors affecting program density, or loudness.

Primary low-pass filtering, flat to 16 kHz, includes proprietary overshoot compensation to maximize modulation without composite clipping. Internal combining for an SCA or RDS subcarrier is provided, as is a separate TTL-level pilot output to sync an RDS generator. All component parts used in the David are multiple-source, distributor-stock items for worldwide ease in servicing.

□□□

For information on "David," contact Jim Wood at Inovonics: 408-458-0552; fax: 408-458-0554; or circle Reader Service 23.

WEZW Goes Digital with Lazer

► continued from page 36

And I still am not fully pleased with the action of the built-in AGC. Even with the level 2.0 software, WEZW continues to use external gain riding prior to the optical encoder.

One other factor to be aware of (and this applies to all digital audio processors) is the effect of the time delays imposed by the analog/digital/analog conversions. This processing delay, if coupled with an STL system and the return path time from the transmitter site to the studio, can cause some announcers to have difficulty when monitoring off-air on headphones.

The simple solution is to feed the con-

sole headphones from the program line instead. Obviously this is not a problem for monitoring on speakers in the control room, where the slight off-air signal time delay is of no consequence.

For those stations wishing to upgrade to a true digital processor offering an incredible amount of flexibility, the Lazer is a box that you need to consider.

□□□

Criterion Broadcast Services is a broadcast contract engineering firm in Milwaukee. For information on the Lazer from Gentner, contact Elaine Jones, broadcast sales manager, at 801-975-7200; fax: 801-977-0087; or circle Reader Service 160.

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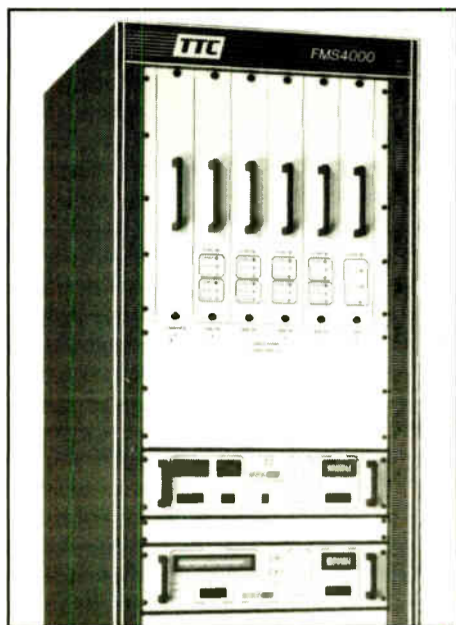
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The Model X FM exciter is utilized, giving transmitter specs like 90 dB FM signal-to-noise ratio, -60 dB synchronous AM noise and distortion figures less than 0.01 percent.

Reliability has been proven since 1989, and the product's operating performance saves customers more than \$3,000 a year when compared with tube transmitters.

For information, contact Russ Erickson at TTC at 303-665-8000; fax: 303-673-9900; or circle **Reader Service 34**.

S.C.A.M. Multiplexer

ESE announces the ES-ACM7, seven-channel audio multiplexer (S.C.A.M.).

The ES-ACM7 enables a radio station to log its own stations and/or monitor as many as seven other stations simultaneously by recording audio onto the video channel of any VCR. On playback, the ES-ACM7 receives the encoded video signal and provides an output of the selected channel.

A front-panel thumbwheel switch provides this selection.



Two more sources of audio or time and date data can be recorded on the audio tracks of the VHS tape, giving the user a total of nine audio sources recorded on one

VHS tape.

For information, contact Brian Way at 310-322-2136; fax: 310-322-8127; or circle **Reader Service 59**.

Sports Mic

The beyerdynamic MC 833 is an intermediate-size stereo condenser microphone designed for the most demanding field production, broadcast sports and special sound effects applications.

The single housing microphone contains three separate internally shock-mounted diaphragms that provide smooth and natural wide range frequency response and can be used in a variety of MS or X-Y stereo miking techniques.

The MC 833 also will handle high SPL miking assignments, which makes it a perfect choice for sound effects and crowd ambience miking applications.

For information, contact Mike Solomon at beyerdynamic at 516-293-3200; fax: 516-293-3288; or circle **Reader Service 171**.



Alpha Iso-Booth

Acoustical Solutions has developed a portable sound booth that provides sound isolation and acoustical control. It is commonly used for on-location work or temporary setups where quality audio is your goal.

The Alpha Iso-Booth is easy to assemble. The frame system consists of lightweight one-inch tubular aluminum with twist-lock connectors. The walls attach to the frame with a Velcro® fastening system.

The standard booth includes one clear, vinyl window; hinged door; floor and roof.

The outer skin is a weather-resistant reinforced vinyl material with sound transmission coefficient rating of 27 (STC 27). The interior is covered with alpha wedge acoustical foam, which has a noise reduction coefficient of 0.80 (NRC .80).

For information, contact Michael Binns at Acoustical Solutions: 804-358-3852; or circle **Reader Service 71**.

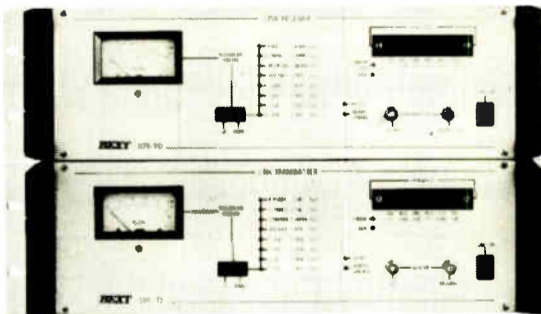
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USER REPORT

Aphex Keeps KLON-FM Sound Pure

by Garry M. Greth
CE, KLON-FM 88

LONG BEACH, Calif. It would be great to be able to say that we have no need for audio processing. However, for many reasons, that statement just will not work in the world of electronic media.

But what if we could make it sound like there was no processing? For my application at KLON-FM, the best audio signature is in fact none at all.

Transparent audio processing is what my station has been looking for, and the folks at Aphex Systems have created products that fit the bill.

Diversity of needs

KLON-FM 88 is the only jazz station in Southern California. The station's audio is also distributed nationally via satellite video subcarrier and Digital Planet. Eurojazz is another department at KLON that broadcasts to all of Western Europe via digital satellite. The station has become the voice of jazz from the West Coast. The diversity of needs I have with regard to my audio processing goes without saying.

For the KLON air sound, I use a four-stage system that includes the Compellor, an Aural Exciter Type 3, a Dominator and the Digicoder. Even though I haven't any direct format competition, listener perception in the Los Angeles market is that a sta-

tion not as loud as the others is not as powerful.

I need to create a strong, clean, listenable signal that holds true to the honesty of mainstream acoustic jazz. Pianos and saxophones need to sound pure; sound-staging needs to be accurate.

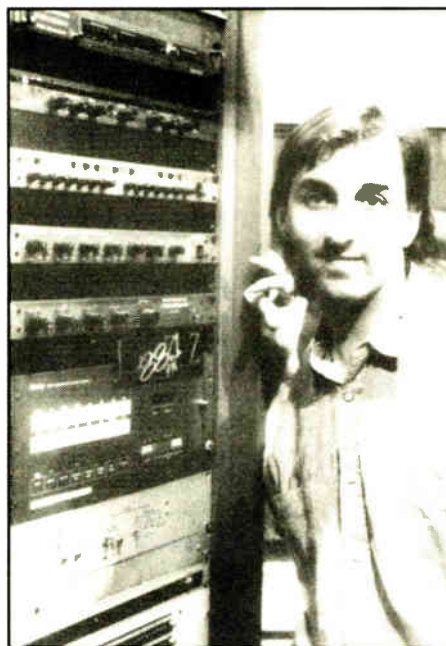
Bingo! There is the word of the day—accurate. I am able to use the Compellor heavily (above 15 dB) and then limit another 10 dB in the Dominator and still maintain a sense of accuracy in my program material. The newest addition to the chain is the Digicoder. This stereo generator has one of the most transparent low-pass filters made.

The result of this filter is absolutely no ringing, overshoot or distortion in the composite signal. It also provides a pre-emphasis limiter that can help achieve maximum loudness by performing frequency dependent limiting after pre-emphasis circuitry. The limiting control can really build density without the loss of transparency in the composite world, making the need for composite clipping a thing of the past.

Front-panel security and remote control of the front-panel functions make it an easy install either in the air control room or at the transmitter. The chassis is RF tight, so I would not even hesitate to place it next to a 50 kW box. The majority of my Aphex processing gear lives near transmitters or computers.

European and national distribution are

both processed less aggressively and the sound is great. In both cases, I use the Compellor and Dominator with no more than 6 to 10 dB in total gain reduction. The audio is clean and I have comfort in know-



Garry Greth stands by KLON-FM88's Aphex gear.

ing that the analog-to-digital converters will not be overloaded before the data travels to the uplink, no matter what the operator does.

Live remote

The radio station also does a great deal of live remote broadcasting. To drive 15 kHz stereo conditioned telephone lines, I recommend the Compellor Model 320, which can do some limiting as well as control average level to prevent telco overload.

When the remote is a simple one—for instance, a personal appearance—only the breaks are sent to the station via a mono 8 kHz telephone line. We send a mix minus from the studios back to the remote site for the house public address system. I uplink the channels on the 320, drive the broadcast line with one channel and use the other for level control to the house. This way I can easily mix both the house and broadcast, keeping personnel costs low and preventing feedback and the subsequent destruction of the audio quality from the remote.

We find the new 9000 series from Aphex is great for sidechain level control of microphones in the studios or on the road. In every radio station, the music is loud and the processing is doing its job, but the jock gets on mic and the sound levels just vanish.

The Expressor on that mic in the control room is going to make the announcers jump off the dial. The Expressor cards fit right into the old dbx 900 series rack and make an excellent replacement and upgrade. One caution: The dbx power supply can't support the increased current of the rack filled with Aphex 9000 cards.

Maintain high frequency

Due to the pre-emphasis curve in FM, maintaining high frequency while trying to achieve loudness is a real battle. Many stations just have no high end, or use aggressive multiband compression and limiting to force the high end. Neither approach is satisfactory, particularly for acoustic instruments and for vocals in which lyrics are important.

The Aural Exciter gives our on-air sound an open, detailed high end. I use the modular unit during remotes on the audience mic to get a more "live" feeling. Another key word about this equipment—transparent.

All the equipment is built well. Logical circuit topology, quality components and very stable power supplies make the gear hardy and reliable. I have numerous pieces in house, in a variety of applications and have never had a failure.

Audio inputs and outputs all are transformerless, servo-balanced and can be run in an unbalanced mode if necessary. Nominal operating level selectability make the units easy to interface with any installation—be it pro, semipro or consumer grade equipment.

Company support is there. The folks at Aphex know about the types of modifications that can be made to custom tailor the devices to the application. Additionally, they are willing to give information, and suggested settings for each of the products in the line. They also are well aware of what competing audio processing companies have going and what any number of combinations of processing devices together may produce.

Enlightening

The staff of the company seems to come more from a pro-audio or even audiophile point of view, yet they know radio. This is refreshing and enlightening when you call with questions or comments.

The only thing difficult about this brand of equipment is learning a certain language that makes the use and discussion of the equipment more clear. Let's call it "Aphexese." The operating manuals walk the new owner through what a device means by "Drive," "Stereo Enhance," "Aural Excitement," "Spectral Phase Refractor," "Null Fill" and a few others that really can throw you.

The manual for the Compellor metering system is, at first glance, confusing at best. But once you are used to looking at it and understand what is going on, then the well-calibrated metering system gives you input, output, peak, average and gain reduction level indications at a glance. Bottom line: Read the manual!

The final word on this manufacturer is that transparent audio processing is what you will get upon the implementation of the processing chain. Whether or not loudness is an issue, the thing that made FM broadcasting so neat to begin with is that it sounded really good. My experience with Aphex tells me that my FM station can really sound good and compete in the loudness war.

□□□

For information on Aphex West, contact Paul Freudenberg, sales manager, at 818-767-2929; fax: 818-767-2641; or circle Reader Service 122.

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