

RadioWorld®



Studio Sessions

See pages 16-28.

Vol 20, No 10

Radio's Best Read Newspaper

May 15, 1996

New Gear, Rules Pump Up Radio

LAS VEGAS For radio, NAB '96 was all about the future.

Throughout the show — whether on the exhibit floors, in the conferences or business meetings — the focus was on how the changes in ownership rules, Wall Street's rediscovery of radio and the further integration of digital technology is affecting the industry.

This year's National Association of Broadcasters convention, April 14-18, drew more than 92,000, up some 10 percent from a previous record in 1995.

While attendance was more than ever, the size of the show was a record, too.

Not only did NAB fill the Las Vegas Convention Center and Hilton, exhibits and sessions expanded to the Sands Expo Center where NAB MultiMedia World

and the new internet@NAB.96 were held.

In the audio hall, it was clear radio is undergoing as much change and evolution as the other sectors of the telecommunications industry.

There is a continuing trend toward smaller, more efficient, more powerful and less expensive equipment.

From the Roland VT-1, for approximately \$400, with its clever voice processing ability to the Shortcut, the high-speed broadcast editor from 360 Systems priced at \$2,995, buyers are getting more and more for less and less.

In parallel, the relaxation of the ownership rules and resulting buying and trading of stations is driving the development of delivery systems and application of technologies that allow

owners and operators to take advantage of efficiencies of scale now possible.

The Internet is a great example of how technologies blend together. Information on the Internet could not be avoided.

Broadcasters are setting up web pages for profit and fun. At the same time, non-

broadcasters want to add audio and video to their web pages.

Radio broadcasters also came to find out about EAS, DAB, DARS and a slew of other acronyms.

The switch to the Emergency Alert System was a super-hot topic. "There is nothing like a government mandate to stir

continued on page 3 ►

DAB Field Tests Inch Closer to Start Date

by Lynn Meadows

LAS VEGAS If anyone expected to see dramatic propagation coverage maps from digital radio field testing presented during NAB, they were disappointed.

"It's probably going to be a few months, still, until we actually get out on the street taking tests," Bert Goldman of Patterson Broadcasting told the crowd attending a digital audio broadcasting seminar during the convention. That calculates to mid-July. Tests originally were scheduled to begin in September 1995.

Goldman is helping coordinate the DAB field tests. He said he hoped to have pictures and documentation of the exciting things happening in the field tests. Instead, he admitted he was embarrassed the DAB field tests have not yet begun.

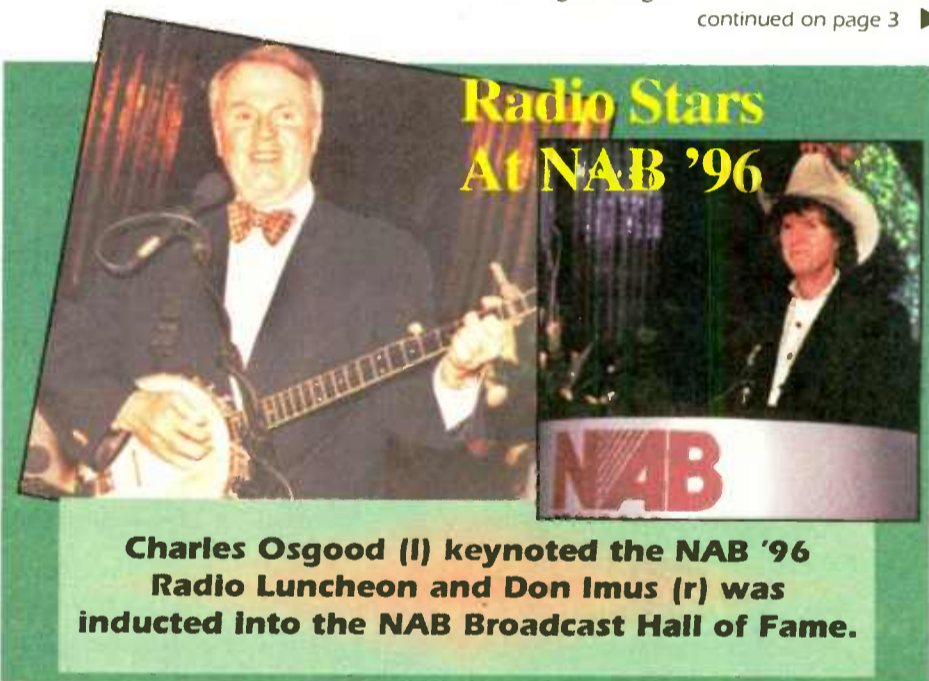
Joint project

A joint committee of members from the NAB National Radio Systems Committee and the Electronic Industries Association is coordinating the field tests. The NRSC will test in-band, on-channel proponents. The other DAB proponents — in-band, adjacent-channel, satellite and Eureka L-band systems — will be tested by the EIA.

Most of the testing will take place from the Mt. Beacon transmitter site in San Francisco. The VOA/JPL satellite system

will originate its test material from a New Mexico location and uplink it to a satellite over the Pacific.

continued on page 10 ►



Charles Osgood (l) keynoted the NAB '96 Radio Luncheon and Don Imus (r) was inducted into the NAB Broadcast Hall of Fame.

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Change Is Hot Issue In Radio

LAS VEGAS Rapid change is the biggest issue facing radio broadcasters today, according to an unscientific survey conducted at the RW booth during NAB.

Other hot issues broadcasters noted include satellite stream programming, the upgrade to digital audio broadcasting, the effect of monopolies on independent stations, the diffusion of advertising dollars and a lack of diversity.

Optimistic for AM

Respondents were generally optimistic about the future of AM. A majority said they had listened to an AM station within the past week, with several writing they listened daily. Asked if AM radio can survive in the face of coming competition, most said yes.

Pete Schartel, president of KCXL(AM) in Liberty, Mo., wrote that costs are lower for AM stations so AM broadcasters are able to produce unique programming. Jo

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NEWSWATCH

ESPN Buys Spanish NBA Rights

DALLAS ESPN Radio Network became the first official National Basketball Association rights holder for national Spanish-language radio broadcasts in the United States.

The network also obtained the rights for English and Spanish radio broadcasts of NBA games outside of the United States and Canada. The agreement extends through the 1997-1998 season.

In addition to domestic English-language broadcasts, ESPN Radio will broadcast NBA games in Spanish to the United States, Mexico, Central America, South America and Spain. English

broadcasts will go to markets in Europe, Asia and Australia.

"The growing socioeconomic and audience demos for the Spanish market combined with the NBA's high product profile make this a tremendous opportunity," said Bart Catalane, executive vice president of ABC Radio Networks, which markets and distributes ESPN Radio.

SFX Swallows Multi-Market

NEW YORK When SFX Broadcasting announced the purchase of Liberty Broadcasting in November 1995, the idea was to turn around and sell 11 of the newly acquired stations to Multi-Market Radio.

But SFX recently announced it now will acquire Multi-Market Radio Inc. outright. According to BIA Publications, including stations with local marketing agreements, SFX will own or operate 77 radio stations in 26 markets after completion of the Multi-Market deal.

Radio Trade Announced

CLEVELAND OmniAmerica Group and Nationwide Communications Inc. announced an agreement to trade radio stations in Cleveland and Orlando, Fla., resulting in what they called the first-ever, three-FM station clusters in each market.

NCI is getting WMJI-FM and WMMS-FM in Cleveland from OmniAmerica. In return, OmniAmerica will get WOMX-FM in Orlando and \$43.5 million in cash. OmniAmerica also announced it would soon sell WHK(AM) in Cleveland for \$6.5 million.

Renewal Procedures Updated

WASHINGTON The Federal Communications Commission adopted the section of the Telecommunications Act that eliminates comparative renewal hearings and directs the commission to grant broadcast renewal applications if statutory renewal standards are met.

For broadcast renewal applications filed after May 1, the statute eliminates comparative renewals and establishes a two-step renewal procedure in their place. ☺

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Compatibility No. 1 MPEG Goal

by Alan R. Peterson

LAS VEGAS Efforts are under way to enhance compatibility and interoperability of products using the MPEG data compression algorithm.

Representatives from several digital audio companies participated in an audio interest group meeting at NAB to discuss the process.

A number of issues still need to be studied and resolved, but by the end of the meeting, many of

the proposals were agreed upon and a name was selected for the enhanced process: MPEG BIF, for Broadcast Interchange Format.

The meeting was moderated by Cate Cowan of Cowan Communications. The main speaker and presenter was Gerhard Stoll, head of audio production and reproduction systems of the Institute for Broadcasting Technology (IRT). The IRT is one of the three developers of ISO/MPEG Layer II technology.

Objectives

The objective of the group discussion was to encourage and enhance interoperability and compatibility across a number of digital audio formats and to encourage broader implementation of MPEG Layer II into an emerging mass consumer market.

"We are not a standards maker," said Stoll. "We are doing this to educate consumers and facilitate choice. By doing this, we are not trying to stifle competition but are looking to enlarge the marketplace."

Indeed, the marketplace is poised to welcome a new set of enhancements. Among them, Sveriges Radio (SR, or Swedish Broadcasting Corp.), whose head of development, Lars Jonsson, wrote to address the interest group.

"We support the new file format," Jonsson wrote. "We have a problem with different file formats. Thus, SR welcomes your work for a file format standard based

on .WAV and AIFF."

In order to ensure compatibility across a number of platforms, a number of standards and proposed standards have been examined and tentatively included in the new definition.

By doing this, we are not trying to stifle competition but are looking to enlarge the marketplace.

— Gerhard Stoll
IRT

Among them, it was proposed that the J.52 recommendation be included. J.52 is a standard proposed by the International Telecommunication Union for digital television and sound transmission using one, two or three 64 kbps channels per mono signal, with up to six per stereo signal.

Tom Hartnett of Comrex voiced the need to examine this standard further.

"J.52 is computationally complex and does not follow the MPEG frame," he said. "There are lots of products that do not have a lot of computer power, and there is no advantage on embarking on anything that large."

Manufacturers of PC plug-in cards also noted the additional work necessary to incorporate J.52 into the new MPEG definition. Among the concerns is the need for bits to be "put aside" for transmission if J.52 is adopted.

Solutions

Two possible solutions were offered. First was to record audio at a lower bit rate. Stoll suggested the possibility of transcoding "by removing some bits."

Digigram's Phillippe Girard-Buttoz pointed out that real-time transmission of audio on the PC platform is not a real concern for him.

Stoll agreed with the concerns, but pointed out, "Complexity will become less and less an issue, even though the broadcaster will want a codec that can talk to the

largest base. The overriding concern is that all codecs be able to talk to each other."

Steve Church of Telos Systems made a proposal that J.52 be made mandatory on decoders only, making the J.52 compatibility issue optional on the encoding end.

A codec that detects J.52 will switch into that mode; otherwise it will default to the de facto standard.

Because the issue could not be resolved at

this meeting, the decision was made to create a subgroup to study the J.52 issue. Findings should be available, but not adopted, by the time the Audio

Engineering Society meets in Copenhagen this month.

By the end of the meeting, the group agreed to adopt the proposals and create the new name MPEG BIF for the benefit of broadcasters and their audio needs.

An amendment was made to one proposal. The standards that were to be in the new definition included the IEC958 standard. The original document stated, "The professional mode (AES/EBU) is considered not within the scope of this document."

In order to be accepted in the professional community, the IEC958 standard must include AES/EBU, so the draft went back for amending. A proposal was also made to include 5.1 channel audio specifications.

Stoll said that next, the group will consider MPEG compression as a new standard for Internet audio. "We will begin examining this about six months from now," Stoll said.

Stoll suggested that people interested in contributing to this effort should contact him via his e-mail address: stoll@irt.de

DCI, Arbitron Form Information Network

by Christopher Nicholson

LAS VEGAS Digital Courier International (DCI) and The Arbitron Co. announced during NAB that the two signed a letter of intent to jointly develop Radio Exchange, an information network for the radio broadcast industry.

Radio Exchange will provide a high-speed link between broadcasters and advertisers that will allow both to instantly access information such as ratings, avails, traffic instructions, etc. The system will be designed to cut down dramatically on the amount of time and paperwork required in the buying and selling of radio advertising.

Jay Guyther, general manager, new ventures, Arbitron, explained that while most of the radio industry has been advancing rapidly on the technical side, the process of buying and selling advertising still requires a tremendous amount of paperwork and back-and-forth interaction between ad agencies and stations.

Al Kozak, president of DCI, noted the high chance for error that still remains in scheduling advertising campaigns because of the amount of manual entry required. Radio Exchange will eliminate much of that risk because all of the necessary information is entered by the advertiser and will already be in the system.

DCI Marketing Vice President Remy Kozak added that with the rise in group ownership and the decrease in middle management, Radio Exchange will be a benefit by allowing groups to consolidate all of their traffic information, simplifying the ability to collect and view all of the data.

Guyther also noted the "overwhelmingly positive reception" he received when he approached industry representatives with the idea.

"Each party sees different applications that will provide for a more efficient sales process," Guyther said.

A formal agreement between DCI and The Arbitron Co. was expected within 60 days.

Summing Up the Show

► continued from page 1

interest," said one distributor.

The deadline for EAS equipment at radio stations is Jan. 1, 1997.

Vendors fielded repeated questions about a possible deadline extension.

There is nothing to indicate that will happen, however, and manufacturers are confident they can meet the equipment demand.

Last year, the talk of the show

was a live demonstration of digital audio broadcasting from USA Digital Radio. This year, after six and a half hours of DAB paper presentations, someone asked if this was one of the darkest hours for U.S. DAB.

Anyone walking the floor would have to conclude it was. In an odd public relations move, neither USA Digital Radio nor AT&T/Lucent/Amati had booths.

Meanwhile, the Federal Communications Commission is ready to move on satellite digital audio radio services (DARS). Commissioner Susan said the FCC will not stand in the way of new technology. She and Commissioner Rachelle Chong indicated that DARS probably will provide niche programming not available on terrestrial radio.

Discussion of the 1996 Telecommunications Act primarily was limited to implementation.

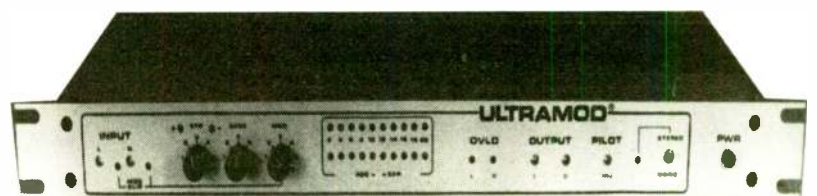
Panelists at a broadcast ownership session predicted regional radio groups will grow in popularity.

In the future, they also predicted more and more stations will be swapped as group owners jockey for better position in their respective markets.

Regional radio groups will grow in popularity

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Thinking about DAB and Road Left to Travel

WASHINGTON Last week's NAB '96 proved to be fertile ground for DAB, with a day-long seminar devoted to it, equipment on the floor devoted to it, and heated discussion surrounding it.

For those of you who did not attend, I thought I'd share some DAB news with you.

Essentially, I see four main areas of interest in DAB:

- progress of the U.S. DAB field tests
- status of the in-band, on-channel proponents
- Eureka-147 roll-out throughout the rest of the world
- DARS regulatory update

The DAB field tests are progressing. Slowly. There were some at NAB who felt that in-band on-channel DAB is traversing its darkest hour. Even as Eureka-147 gathers speed in the rest of the world in pilot projects in Germany, France, Sweden, Poland, England, Canada, etc., Bert Goldman from Patterson Broadcasting told us that field tests won't even be starting, before the end of summer.

What happened? First of all, all the proponents need to sign contracts sent to them by the EIA in order for the outfitting of the test vehicle to begin. Bert told me that EIA was to have sent out the contracts late last month. That gives the proponents 30 days to sign and return the contracts. Only then can equipment from the different proponents be loaded into the van.

Bert believes that after the signed contracts are returned, it will take another 30-60 days before the tests can begin — provided of course that there aren't any other unforeseen developments.

One of the delays has stemmed from radio's deregulated stature. The two stations originally in partnership with the test group that were to transmit the digital signals were sold (The Shamrock Broadcasting stations, now Chancellor).

The new owners have no interest in participating in the testing. New stations are being sought; in fact, Bert said they had two strong contenders they were talking to, but no one had signed on the dotted line as of late April.

Optimistic estimates for the onset of the field tests range from mid-July to sometime in August.

Perhaps the gloomiest moment came during Tom Keller's presentation. A consultant to the EIA, Tom reviewed some of

the DAB lab test data. Specifically, he reviewed the AT&T/Amati and the USADR FM-1 dual sideband systems and their performance in the digital-to-host and the second adjacent channel tests.

The systems pose significant degradation to the host FM and to the second adjacent channels. He deemed the significant degradation of the second adjacent channel by the two IBOCs as "probably a solvable situation."

The more difficult fix, he thinks, is the degradation to the host signal.

Jeff Andrew, USADR project manager, assured the gathered audience during the Q&A session, that the modified FM-1 system that USADR is going to field test — which has not yet been tested in the lab — addresses these problems.

An interesting aside — during that same question and answer session, Glynn Walden, Group W Radio director of engineering, stood up and delivered an

impassioned speech underscoring Westinghouse's commitment to finding an in-band solution to DAB for this country. It was highly believable in light of Westinghouse President and CEO Michael Jordan's personal unveiling — at NAB '96 — of the first over-the-air broadcast of high definition television (HDTV) using a solid-state silicon carbide transmitter.

Eureka-147 has garnered terrific support from countries around the world. As I mentioned earlier, pilot projects abound. In fact, our neighbor to the North has begun issuing DAB licenses, and, some equipment manufacturers are developing gear for Eureka-147, including: Quincy, Ill.-based Harris, Orvieto, Italy-based Itelco, Chelmsford, England-based GEC-Marconi, Dallas-based Continental through its German subsidiary Telefunken Sendertechnik.



NAB '96 was the setting for some thought-provoking DAB discussion with updates from around the world.

Louisville, Colo.-based Larcen-TTC and Fairburn, Ga.-based CCA. CCA built an in-band, on-channel (IBOC) DAB transmitter for AT&T, but did not display it at NAB '96 — the unit is currently in San Francisco for the upcoming field tests.

What is lagging behind, at the moment, is the production of DAB receivers.

On the DARS front, the FCC expects to finalize the specifics of digital satellite radio broadcasting. As you may recall, on June 14 of last year, the commission adopted a Notice of Proposed

Rulemaking which initiated consideration of service and licensing rules to govern what is generally referred to as DARS. Reply comments closed on Oct. 13, 1995.

In Sept. 1 of last year, the FCC granted a waiver to Satellite CD Radio Inc. to begin construction of a satellite that could eventually bring DARS service to the public.

Perhaps the most controversial development of NAB '96 was the news that there might be a way to implement a Eureka-147 solution in the United States.

As you know, broadcast assignments here traditionally are made on the basis of providing service to a specific community. While each Eureka-147 multiplex has the inherent capacity to carry several programs, each of these programs has identical coverage.

By forcing coverage parity, broadcasters would be put onto equal ground, canceling years of efforts in tailoring their programming and advertising to their community — hence the resistance of U.S. broadcasters to Eureka-147.

There exists a new possibility of enhancing the Eureka-147 standard in a way that would protect existing coverage areas and communities of service. This can be done by introducing the idea of Time Division Multiple Access (TDMA) to the Eureka-147 international standard (see Scott Wright's *Guest Commentary*, page 5).

NAB's David Layer made it clear to the assembly that the association staunchly supports an in-band solution for DAB in the United States. And, that NAB is willing to wait for the solution. He argued that the disappointing lab test results are but another step in the evolutionary process of IBOC DAB and not a reason to abandon the idea.

He makes a good point. Eureka-147 is going on its 11th year of existence — IBOCs have only been around for three or four years. NAB's message is clear, give the IBOCs time to mature.

This last point is especially important if you realize that there is no great and urgent consumer demand for DAB.



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GUEST COMMENTARY

A Eureka-147 Solution For the United States

by Scott Wright

KOKOMO, Ind. In recent months, much has been said regarding the performance and application of various digital broadcasting systems within the United States.

Technical performance seems to be at the forefront of the evaluation, but something much larger is at work. Looking strictly at technical performance, one system was shown to be clearly superior. This system is known as Eureka-147. Many countries around the world, including Canada, are broadcasts utilizing this service.

If technical performance were the only measure, then Eureka-147 would be the chosen system in the U.S., as well. Eureka-147 has not been widely embraced by the U.S. community because its operating characteristics do not mesh well with our current broadcast landscape.

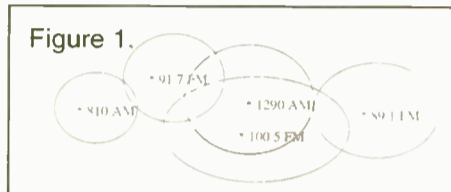
Broadcast assignments in the U.S. traditionally are assigned on the basis of providing service to a specific community. While each Eureka-147 multiplex has the inherent capacity to carry several programs, each of these programs has identical coverage.

By forcing coverage parity, broadcasters would be put onto equal ground canceling years of efforts in tailoring their programming and advertising to their community.

Fortunately, there exists an exciting new possibility of enhancing the Eureka-147 standard in a way that would protect existing coverage areas

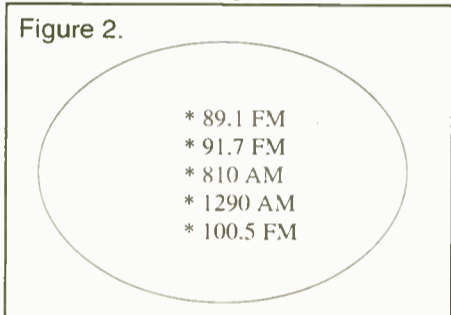
and communities of service. This can be done simply by introducing the idea of Time Division Multiple Access (TDMA) to the Eureka-147 international standard.

A traditional coverage map for both AM and FM stations in a given location may look like that of Figure 1. Here,



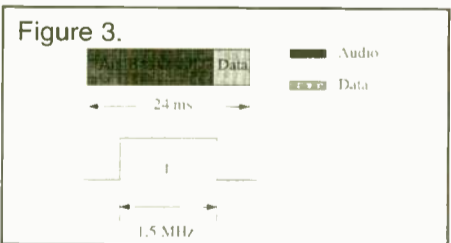
each broadcaster has a unique market that he has developed in both listeners and advertisers. This service area multiplied by the stations' listenership determines the economic potential of the station.

With traditional Eureka-147 implementation, the coverage areas would look like that shown in Figure 2.



Here, each broadcaster is given the same coverage area, is forced to share the same transmission area and potentially has to give up listenership. Everyone is forced into coverage parity, and hence, economic parity. This application of Eureka-147 is commonly referred to as a single frequency network or SFN.

As shown in Figure 3, each SFN is based about a given frequency that is 1.5



MHz wide. Using SFN technology, many transmitters may be used in the single frequency, giving coverage areas that may be very large, including the possibility of covering the entire continent.

By applying TDMA Eureka-147, as shown in Figure 4, the SFN can be divided in time, allowing each broadcaster his own slice of time. Each time slice about a given frequency can now be thought of as a channel.

With this treatment, each SFN is broken down into four separate channels, transmitted over four different transmitters,

continued on page 14

DAB: Stay the Course

Despite Canada and the world's rush to embrace Eureka-147, the domestic radio industry should stay the course and continue its pursuit of an in-band solution.

The day-long seminar on digital audio broadcasting at last month's NAB Broadcast Engineering Conference, revealed that although much progress has been made on DAB, much work remains.

News of Time Division Multiple Access (TDMA) that would allow Eureka-147 to be configured by time — thus allowing allocations that resemble the U.S. radio structure is interesting, but does not solve the issue of where to find new spectrum for it. And as advanced as Eureka-147 may be in the developmental stages, it is still in the pilot project stage and waiting for receiver manufacturers to catch up.

As stated before on this page, the focus of U.S. testing should be directed at finding which in-band system fits the bill for U.S. radio. Broadcasters maintained from the onset they did not want the out-of-band system, Eureka-147. Eureka-147 requires a cost-prohibitive reallocation process, and more significantly, the spectrum is not available in the United States. Period.

After the laboratory test stage, the IBOCs were shown to have serious problems of degradation to the host and second adjacent channels. The modified systems to be field-tested have addressed those issues, according to proponents — let the real world scenarios prove them right or wrong.

The NAB said very clearly at NAB '96 that it supports an in-band, on-channel solution and is willing to wait for the IBOCs to develop. The lack of any urgent demand from the consumer for a DAB solution provides broadcasters with the margin of time they need for the IBOCs to catch up to Eureka-147 development-wise.

When all is said and done, the tests are but one more step in the process of selecting a standard. While there may be some gratification for Canada in being the leader in DAB implementation in this hemisphere, the reality is that the United States is the prime consumer of radios. DAB will wait until the U.S. broadcasting industry has made a reasoned evaluation of the most appropriate system for use inside its borders.

If that decision is ultimately in favor of a new-band system (although highly unlikely) so be it. In the meantime, the broadcasters should proceed with exhausting all the in-band possibilities, as planned, and not succumb to pressure from our neighbors to the North to make such an important decision in haste.

— RW

The RDS bandwagon

Dear RW,

I have designed many receivers for both SCA and RDS applications and would recommend that broadcasters jump on the RDS bandwagon as soon as possible.

Currently, three manufacturers make RDS demodulator ICs for radios that produce an RDS data and clock output. This makes it very easy to produce a receiver that will put out RDS data.

In comparison, an SCA demodulator requires some kind of filtering for the SCA signal of a demodulator. This translates into a lot more parts and potentially higher cost in an SCA receiver. Furthermore, the RDS signal, because of its modulation method, is much more robust and will work reliably at significantly lower field strengths than SCA data receivers.

I suspect that the usual information of call letters, programming format, etc., will be a minor application of RDS, and the main use will be for specialized applications such as load management and special text or data receivers like that on page 20 of the March issue. Because of the block format of the RDS signal, several customers can be served by one RDS signal, and in applications where that data rate does not need to be very high, it could eventually be a big money-maker for an innovative station.

Jon Grosjean
Woodstock Engineering
Woodstock, CT

Expanded band

Dear RW,

The newly revised expanded band list of AM stations is only a slight improvement over the last fiasco, but I wonder if the FCC could have done better.

Again, no expanded band assignments in 12 states: Pennsylvania, Montana, Ohio, Delaware, Vermont, Maine, Connecticut, Rhode Island, West Virginia, Kentucky, Nevada and Hawaii.

There is only one radio station in the United States assigned to 1610 kHz, which should now become the coast-to-coast superstation from Atlanta, Tx., which can be heard on every type of receiver, with or without the expanded band, while the rest of the band supports 10 stations on 1700 kHz alone. I want to see that first station to move from 740, 930 or 1210 on the AM dial taking that first grand leap to the outer limits.

The impact on larger radio markets also shows that the small market broadcaster wasn't really considered seriously. So, congratulations to Phoenix, El Paso (twice), Fort Worth, Atlanta, Seattle and Denver. You big boys got your way in markets of 25 or more signals, when the rest of us just watched from the sidelines again.

My prediction is less than 30 of these stations will really make the move. The expanded band was killed by the commission before it got a chance.

Mark Heller
President and General Manager
WTRW(AM)
Two Rivers, WI

Radio World

Vol. 20, No. 10 May 15, 1996

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Radio World (ISSN: 0274-8541) is published bi-weekly by Industrial Marketing Advisory Services, Inc., 5827 Columbia Pike, Suite 310, Falls Church, VA 22041. Phone: 703-998-7600, Fax: 703-998-2966. Second-class postage rates are paid at Falls Church VA 22046 and additional mailing offices. POSTMASTER: Send address changes to Radio World, P.O. Box 1214, Falls Church VA 22041. REPRINTS: Reprints of all articles in this issue are available. Call or write Giselle Hirtenfeld, P.O. Box 1214, Falls Church, VA 22041: (703) 998-7600; Fax: (703) 998-2966. Copyright 1996 by Industrial Marketing Advisory Services, Inc. All rights reserved.

—PRINTED IN THE USA—

Next Issue of
Radio World
May 29, 1996

Coordinators Plan for EAS Implementation

by Lynn Meadows

LAS VEGAS Do not make your Emergency Alert System purchase in a vacuum.

Stations ready to buy should contact their local emergency planning committee and find out how many inputs they are expected to have in their local plan.

State coordinators

Although the Federal Communications Commission technically only requires stations to monitor two sources, EAS coordinators have other ideas.

Frank Lucia, FCC acting EAS bureau chief, met with several state emergency

coordinators at the end of the NAB spring show to talk about plan progress.

After hearing from Wisconsin coordinator Gary Timm, who already has written out his state's plan, the group discussed specifics like what the second source should be and whether networks will be added back into the plan.

Some coordinators expressed frustration with coverage gaps and daytime stations that fall out of the EAS web after midnight.

"It's a fact of life that from midnight to 6 a.m., many stations are not on the air," said one coordinator.

"We can only use what we have," Lucia responded. If facilities are off the air or

we do not have coverage in certain areas, "we can't do the impossible."

Lucia said he and his staff are willing to work with anybody having trouble with changing or upgrading the existing EBS plan.

"If you don't have your plan in place by Jan. 1, we can at least assign them (stations) to monitor the old EBS assignments on a temporary basis," Lucia told the coordinators at the meeting.

Web system

Unlike the old daisy-chain EBS, the EAS will be a web system. The challenge facing coordinators is avoiding feedback loops and open circuits.


EAS was one of the hottest topics at the Bradley Broadcast Booth, said Marketing Manager Paul McLane. Acknowledging that some stations are hoping for an extension of the Jan. 1 deadline, McLane said he is telling stations to at least be versed in the technology.

At the BSW booth, Steve Sorkness, special projects engineer, said people were looking at EAS equipment with "guarded interest." He said he expects heavy fourth quarter sales for EAS equipment.

TFT, which sells its line of EAS gear, and Harris Corp., which markets Sage EAS products, reported that EAS products were extremely successful at the show both in terms of interest and sales. And every stroll by the Gorman-Redlich booth found Jim Gorman explaining how his soon-to-be-certified EAS product worked.

Despite the interest, there were no EAS sessions at NAB '96. Kelly Williams, NAB director of engineering, said that EAS was dealt with in other panels like the unattended operation session.

"The EAS requirements are not necessarily what's new," said Williams adding that the manufacturers have what is new. Asked if the NAB would ask for an extension of the Jan. 1 deadline, Williams said that if they felt or heard from members that they could not meet the deadline, the NAB "would not be opposed" to asking for another extension.

The NAB originally had wanted a year-long deadline extension but was given only six months. Williams said that for a second request to be successful, there would have to be an extraordinary reason for the extension. 



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65 Years Ago

Reprinted from Radio World
(May 23, 1931).

Editor's note: The RW of old, printed for a time in the 1920s and 1930s and today's RW are unrelated except in name.

7 Big Stations Are Affected

The suggestion that license renewals be refused to the Radio Corporation of America and its subsidiaries because of the adjudication that RCA was guilty of violation of the anti-trust law has aroused great interest in broadcasting circles, because the National Broadcasting Company, one of the subsidiaries, holds seven broadcasting station licenses, which stations serve as nuclei for broadcasting networks.

Besides, the National Broadcasting Company holds two television transmitting licenses, nine general experimental licenses and three special experimental licenses.

The largest number of licenses is held by Radiomarine Corporation of America, totaling 1,241, of which 1,175 are ship station licenses.

The list of broadcasting stations issued by the Federal Radio Commission gives the following as licensed to the National Broadcasting Company: WJZ, New York; KGO, San Francisco; KOA, Denver; WTAM, Cleveland; WEA, New York. Since the list was published the company acquired WENR, Chicago.

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'Virtual Digital Highway' Planned

LAS VEGAS Approximately 875 Christian radio stations jumped onto the digital highway with MUSICAM EXPRESS.

The company announced during NAB that California-based Ambassador Advertising Agency agreed to a \$4 million, two-year project to construct a "virtual digital highway" for its 875 Christian radio affiliates. The initial rollout will bring roughly 500 stations on line, to receive high quality digital programming via satellite and ISDN that can be stored and retrieved at convenient times.

In a press release, Jim Sanders, Ambassador vice president of technical services stated: "We believe this system

will revolutionize the industry. It will free stations from the hassle of timing and storage of programming while providing immediacy and quality control to program producers."

Easy fit

MUSICAM EXPRESS Sales and Marketing Vice President Keith LaHonta describes the Windows 95-based technology as having the "look and feel of a production studio product."

With the ability to play to air from the hard drive and a convenient "jock box" interface, the unit fits easily into the studio, allowing DJs to play record releases and promotional tie-ins that can be

prepackaged by the programmer.

For example, explained LaHonta, when Atlantic Records released a single from Hootie and the Blowfish, VISA ran an ad tied to the release. The package was delivered via MUSICAM EXPRESS including a "Hootie" liner, the VISA ad, the single, and a "Hootie" outro.

Standardization

The convenience provided by the transmission technology is only part of the story however. VirteX General Executive Chuck Wagner believes the technology — which uses the MUSICAM compression algorithm — brings an element of standardization to the industry.

It is that element of standardization that piqued the interest of Lynden Williams, vice president of radio group owner Lotus Communications.


"I want to go with whomever is going to win the race," said Williams. "Plus, I am a big supporter of USADR's DAB system (USA Digital Radio), which uses the

The convenience provided is only part of the story.

MUSICAM algorithm."

In addition to Lotus Communications stations, MUSICAM EXPRESS Radio Group Sales Director Sean Bowers brought 15 other group owners on board with a show of support for the technology.

A joint venture between VirteX and Infinity Broadcasting, MUSICAM EXPRESS is being installed in all Westwood One affiliate stations.

Other group owners expressing support include SFX Broadcasting, Heritage Media Corp., Greater Media and Chancellor Broadcasting Multi-Market Radio. 

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Bob Grant, ABC Split

NEW YORK Host Bob Grant and WABC(AM) parted company last month.

Industry insiders believe it was the host's comment about the late Commerce Secretary Ron Brown that led to the split.

Curtis Sliwa read the official Capital Cities/ABC Inc. comment on the air the day after Grant's departure:

"We have had a long-term relationship with Bob Grant. That relationship has been terminated by mutual agreement, and we wish him well in his future endeavors."


Grant had been in the doghouse recently with a group called FAIR (Fairness and Accuracy in Reporting) who questioned his on-air support of a conference of white supremacists (RW, May 1).

Many believe the decision about Grant came direct from Disney CEO Michael Eisner:

"This decision was made at the highest levels of ABC. Disney was informed of the decision and supported it," came the response from ABC.

FAIR was blamed in the New York media for the host's termination.

"We are a free-speech group, and we didn't call for him to be fired," said Steven Rendall of FAIR. "This is not a censorship issue. Any corporation has a right to determine the tone and tenor of any broadcaster they employed."

Rendall said FAIR wanted ABC and Disney to elucidate the standards and practices of the organization and wanted a "forceful anti-racist host" to be added to the WABC lineup as a counterweight to Grant. 

MAY / JUNE 96

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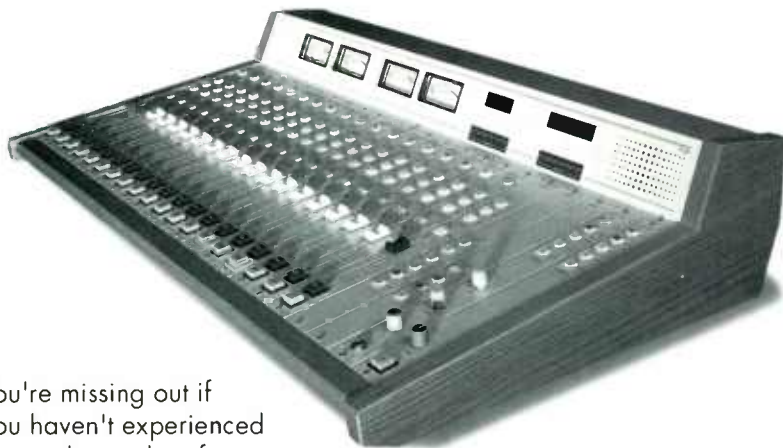
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RDS Push Continues Here, Abroad

by Lynn Meadows

LAS VEGAS New efforts are underway — once again — in the United States and Europe to foster the development of Radio Data Systems.

Meeting during NAB '96, the RDS Advisory Group noted that procedures are under consideration to harmonize U.S. and European standards, so receiver manufacturers can build units that are more easily adapted to different standards or different markets.

Broadcasters, however, might be more interested in the introduction of open data applications in RDS.

Using an application identification code that tells a receiver how to interpret data, the open data applications could let anyone start their own datacasting business.

The chairman of the RBDS (Radio Broadcast Data System) subcommittee of the National Radio Systems Committee, Scott Wright, has been working with the

RDS Forum from Europe on the efforts to harmonize the standards.

Wright said the RBDS subcommittee will review changes to the standard at its June meeting and hopefully will have the changes ready for another meeting at the

next six to eight months.

As of April 15, 240 stations had joined the RDS campaign sponsored by the Electronic Industries Association. The year-long campaign was set to conclude last month. There

Pioneer Electronics announced that Best Buy will roll out Pioneer RDS products in June.

fall Radio Show in October.

In an update from Europe, Dietmar Kopitz of the RDS Forum said that a traffic message channel will be coming on line in Europe sometime in the next two years. The new receivers required for that RDS channel are expected in September 1997.

Pioneer Electronics announced that Best Buy will roll out Pioneer RDS products in June. The company will introduce more RDS products in the

was some interest in beginning a second phase of the campaign to bring RDS to more stations.

Receiver availability is seen as the key to RDS success in the states.

"The 'me too' principal is going to drive things pretty fast," said one presenter referring to what will happen when a broadcaster walks into an electronic store

and sees his competitor's call letters on an RDS receiver.

Daimon Hall, who is based in Europe for Circuit Research Labs, attended the meeting. Hall said he did not know the best way to promote RDS in the United States.

He said that even in the United Kingdom, consumers still do not realize they have RDS or do not make a connection between the letters "RDS" and the functions of their radio.

Kopitz suggested that the U.S. group form a business plan and added that the RBDS group is an "insiders' group" that should be more open.

In fact, only three broadcasters attended the meeting. Dave Wilson of the NAB suggested that engineers coming to the show are already familiar with RDS and are more interested in learning about changes in digital audio broadcasting and Advanced TV.

John Casey of Denon said that for the RDS Advisory Group meeting at the fall Radio Show, the group should consider focusing on radio programming and sales departments.

FCC Downsizing Plan Cuts Offices, Workers

by Patrick Martin

LAS VEGAS Hundreds of pages of rules and regulations and dozens of policy statements are at the heart of the Federal Communications Commission.

Soon, however, the agency will undergo a facelift, creating a "new FCC," a scenario outlined during NAB.

The new agency will be significantly smaller. As of June, the FCC will close more than half of its field offices, downsizing from 35 to just 16. At the same time, the number of employees will be reduced from 374 to 254.

Private sector

Traditionally, the commission paid attention to complaints from the public, such as powerline noise that interferes with the signal of local stations. But with the smaller staff, the commission wants the private sector to start handling such complaints.

In order to keep open the lines of communication with the general public, the FCC plans to employ a toll-free phone number, also available by June. The FCC said the new look will actually make the agency more effective. The commission plans to get out in the field more to visit radio stations.

Another topic that attracted a lot of attention was EEO — perhaps the most significant concern to the commission in broadcast regulation. Stations are not exempt from scrutiny because they passed the minority and female hiring requirements.

Detailed records on each job opening, contacts with recruitment sources, and the number of minorities and women that apply for and are interviewed for each job opening are required by the FCC.

Another area covered was lotteries, one of the most confusing issues that

radio stations face. In the past, any lottery information was strictly forbidden. But times have changed. Now it depends on who is running the lottery. State-run lottery information is acceptable. So are lotteries conducted by Native American tribes, with important qualifications.

As of June, the FCC will close more than half of its field offices, downsizing from 35 to just 16.

The issue of putting telephone conversations on-air also came up. In the old days, certain radio announcers took great pride in putting unsuspecting callers on the air. When the callers finally discovered that they were on-air, they weren't always pleased.

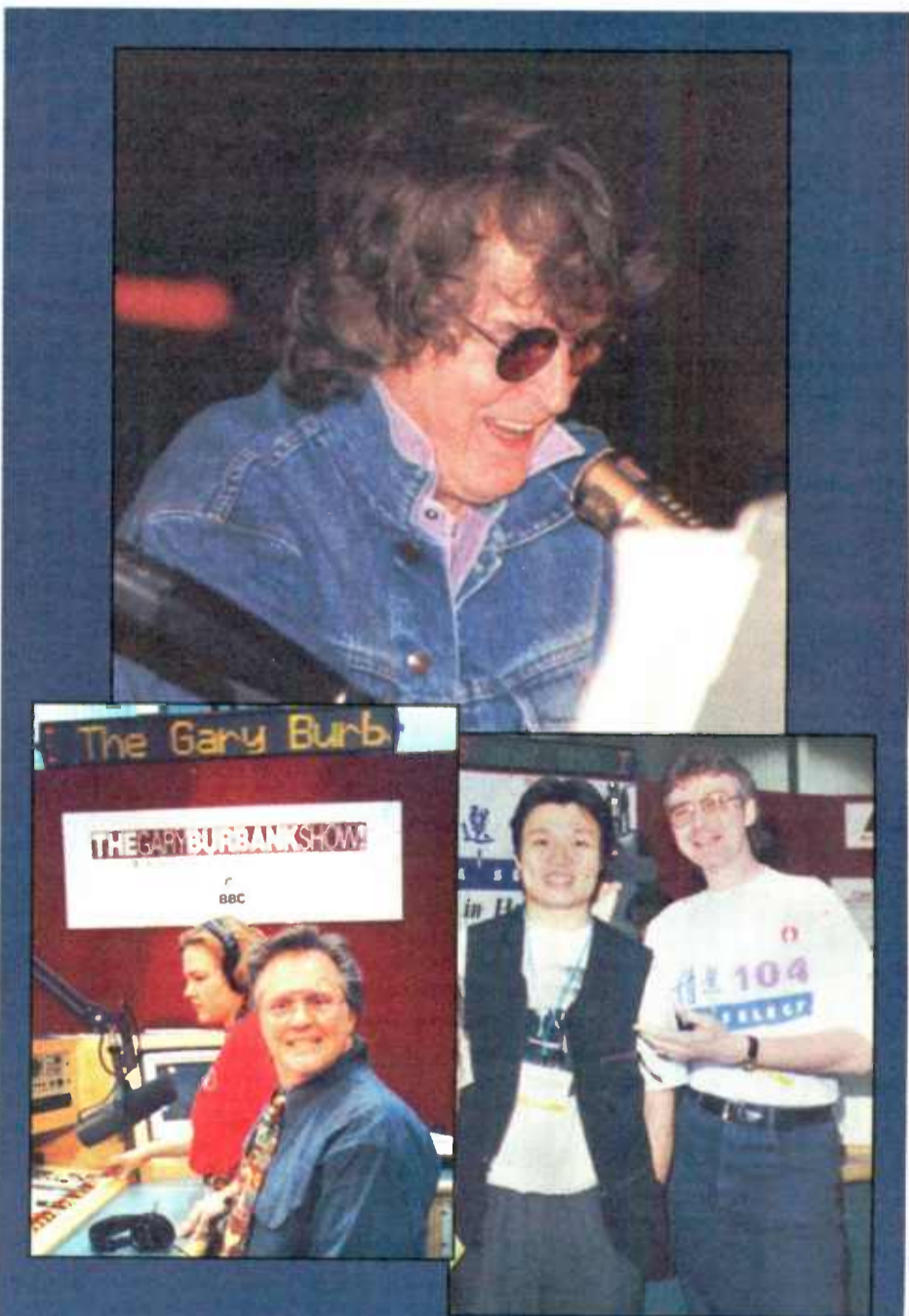
The commission continues to take a negative view of stations that allow their announcers to continue this practice. The rule forbids the broadcast of a telephone call without first advising the person on the other end of the line that the conversation is to be broadcast, or is being recorded for later broadcast.

Hefty fines

The intention is to "outlaw" cold calls to unsuspecting members of the public. The commission warns that "broadcasters who permit this kind of on-air prank run a high risk of a hefty fine."

As contests continue to be an important part of radio's livelihood, station executives need to be aware of the commission's regulations in this area. The FCC makes it simple: All material terms of a contest must be broadcast, including how to play, what prize is being offered and how the winner will be chosen.

And the contest must be conducted just as the station announces it will be. If a winner is to be chosen randomly, it is important that the selection be done at random.



Live Radio at NAB '96

Don Imus (top) joked about the sleeping tigers at the Mirage hotel during his broadcast there which began at 2:30 a.m.

Gary Burbank (middle) broadcast from the BSW booth in the Radio Hall. BSW also hosted Steve James and Harry Wong (bottom)

for the second year in a row. The two began their morning drive show for 104 FM Select in Hong Kong in the Las Vegas mid-afternoon.

Legendary West Coast jock Tom Kelly used the Telos booth as a studio during his live broadcast.

Field Tests Nearly Ready to Roll

► continued from page 1

Audio material for the tests was to be selected at National Public Radio studios in Washington and then recorded on compact disc and sent to New Mexico and the Mt. Beacon site.

A modified Winnebago "Honey" chassis is being built in Cleveland for use in the field tests.

"Currently the interior is ready for installation of the equipment, but the equipment cannot be installed until the licenses are signed by the proponents," Goldman said. Proponents had until May 7 to return their signed licenses.

Systems will be tested sequentially in the van, said Goldman. Visual data of

the paths driven will be recorded on a video system while two spectrum analyzers synchronized with the video

test also will be synchronized and recorded. Software to control these units and take additional measure-

You can expect there will be at least 60 days before we will be able to begin testing in San Francisco.

— Bert Goldman
Patterson Broadcasting

will record spectrum signals under test. Cockpit audio, reference FM audio and audio from the signal under

ments with computers is being designed.

Proponent systems will be tested over

preset long and short routes.

"The long routes may not remain exactly the way that we reviewed them the last time (at the fall show). There has been some controversy over potential tailoring of coverage to maximize quality over the routes that were described," said Goldman.

The routes will be representative of as many different propagation types as can be found in the San Francisco Bay area. Locations of interest noted on the long path tests will be fully tested on identical short routes.

Deciding how to calibrate the equipment has been a challenge because most equipment needs to have a direct feed from the exciter.

It is difficult to get to the transmitter site, but Goldman said they will take the van to a hill under the tower site and roll a cable down the hill and then calibrate the receivers.

Goldman said he hoped the van would be completed about 30 to 45 days from the NAB show.

"We've had many problems getting up to this point, but we have made progress," Goldman said.

He said the site is leased, the electrical service is in, the shop is ready, the closed-loop testing system is ready with cable in place ready to roll down the hill, the staging area is established and Ford Motor Co. measured the antennas.

The Eureka-147 system is installed and operational at the Mt. Beacon site, Mt. Bruno site and a gap filler location, Goldman reported.

The AT&T/Lucent in-band, adjacent-channel system antenna was ready for installation and VOA/JPL was also ready to roll according to Goldman.

One of the problems for Goldman is that the stations that were originally scheduled to do the tests — KBGG(FM) and KNEW(AM) — were sold to Chancellor Broadcasting and will not be used in the tests. He added that temporary authority and experimental licenses are in place but need to be changed or extended. L-Band, for instance, had originally only been granted through April 30. The IBAC system has an experimental license for KEIA from the FCC.

Eureka-147 will test in a single transmitter configuration and single frequency network configuration. AT&T/Lucent/Amati withdrew its in-band, replacement channel, but will still test its IBAC and IBOC systems. Goldman said the company may submit an IBOC modification too.

VOA/JPL will test its satellite system. And USA Digital Radio was expected to test its FM-1, FM-2, FM-1 Modified and AM IBOC systems. AT&T/Lucent/Amati withdrew its in-band, replacement-channel system.

Goldman said more lab tests may be necessary assuming that the modified systems work better in the field than the original systems.

Testers were still deciding how to analyze the subjective testing tapes recorded in the van, who will have access to them and how a report will be written.

If you add up all the delays, said Goldman, "You can expect that there will be at least 60 sixty days — probably closer to 90 days — before we will be able to begin testing in San Francisco and that may be optimistic."

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FCC Rules against Jukebox Radio

by Lee Harris

BERGEN COUNTY, N.J. The decision by the Federal Communications Commission in the New Jersey "Jukebox Radio" case is likely to lead to even more legal wrangling between Jukebox Radio owner Jerry Turro and his local competition.

Dispute over rules

The debate involves a dispute over the interpretation of FCC rules barring FM translators from originating programming. Mass Media Bureau Chief Roy Stewart recently issued a letter finding that Turro was indeed violating the rules governing translators.

As previously reported (RW, Feb. 7), Turro dreamed of serving Bergen County with its own FM station. After years of unsuccessful efforts to get the FCC to change its rules barring program origination on translators, Turro came up with a circuitous system that met his needs.

Jukebox Radio, with studios in Dumont, N.J., sends nostalgia-format programming over landlines some 60 miles northwest to WJUX-FM, a 6 kW Class A facility at 99.7 MHz licensed to Monticello, N.Y. WJUX is owned by Turro's friend Wesley Weis. The WJUX signal is picked up off-air 50 miles to the southeast in Pomona, N.Y. and re-transmitted on W232AL, Turro's 3W translator operating at 94.3 MHz.

That signal is picked up off-air another

20 miles to the south in Fort Lee, N.J. and re-transmitted on Turro's 34.5W translator W267AQ operating at 103.1 MHz. Because its antenna is located on a high-rise apartment building on the Palisades overlooking Manhattan, that little translator covers a lot of real estate and millions of potential listeners.

Critics of Turro's operation say the Fort Lee translator is the real reason for the existence of the rest of Jukebox Radio. As Turro explained, Jukebox Radio is only a service in Dumont that provides programming 24 hours a day, 7 days a week to WJUX. Other stations are also interested in taking the service, said Turro.

FCC rules prevent WJUX from paying Turro to carry its signal on his translators. Instead, Turro is paying WJUX to carry his "programming service." The programs and commercials are then re-transmitted on Turro's translators with the most powerful one located in Bergen County.

Cease order

In response to a complaint from the owners of WVNJ(AM), licensed to Oakland in Bergen County, Turro's arrangement with Weis was found to be in violation of the rules governing translators.

In a letter, Stewart acknowledged that the FCC had issued a letter in 1991 giving Turro permission to have a nominal or "de minimis" interest in the then-unbuilt primary station (WJUX).

However, Stewart wrote the 1991 "letter

did not anticipate — and the commission has never condoned a situation where, as here, Turro would have an ongoing and substantial business relationship with WJUX involving provision of programming to the station on a full-time basis."

Stewart gave Turro 60 days to choose between ending his programming arrangement with WJUX or ceasing to rebroadcast the WJUX signal on his two translators.

Turro said it's "unbelievable that the commission would give you a letter of opinion saying you could do such, and you do it, make it successful, serve the public need and convenience, employ people, pay taxes, abide by the rules and

then because of one complaint, they renege and change their minds and rescind the authorization. It's a smack in the face to every citizen in this country who looks to this government for guidance, and it shows that you can't trust the government."

It would seem the easiest way out for Turro might be to turn the translators over to a listener's guild with the understanding that they would continue to re-transmit the WJUX signal.


"I've always considered the translators to be the family jewels. They're grandfathered. You can't get them anymore," Turro explained. He said he never would have built the translators if he knew it would come to this.

"Stick to your original word, Mr. Government Officer, why should I

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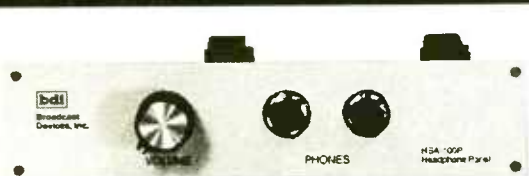
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FCC Says Jukebox Broke Translator Rule

► continued from page 11
have to divest?"

Turro said his listeners have been flooding the FCC's phone lines with complaints, but he said all callers have been assured by the commission that nothing will happen to their station. In the meantime, Turro is weighing his legal options.

Ironically, the FCC's actions are not satisfying Universal Broadcasting, owners of WVNJ, either. Through its Washington counsel, Cohn and Marks, Universal fired off a letter of complaint to FCC

Chairman Reed Hundt which charges that the "grace period and options extended to Turro were wholly inappropriate as the decision should have imposed substantial forfeitures and license revocation proceedings against Turro as requested by Universal."

Allegations

Universal's letter alleges that "the programming produced by Turro and broadcast by WJUX is not intended to serve Monticello or the WJUX service area but rather is directed at Bergen County which

is wholly outside the WJUX service area. This contrivance is wholly inconsistent with Commission rules and policies, a perversion of the WJUX license authority and a misuse of Turro's associated FM translator facilities."

The letter charges that the FCC staff had

Stick to your original word, Mr. Government Officer.

— Jerry Turro
Jukebox Radio

evidence verified by its New York field office that the Fort Lee translator was not — as the rules require — picking up the WJUX signal off-air. Universal maintains that the translator was originating, not

repeating the WJUX programming, noting that when WJUX was off the air due to technical difficulties, the translator continued to carry WJUX programming.

The letter demands the revocation of the licenses for WJUX and the translators adding that such action is "required if the commission is to have any credibility to enforce its own rules and policies."

This conflict pits the demonstrated needs and desires of a radio audience against strict interpretation of FCC rules. The thousands of listeners who have come to depend on Jukebox Radio are probably not concerned with the translator origination rules. In the case of Jukebox Radio, the FCC may have to decide if its own rules are in the public interest or are merely serving to protect the interests of broadcasters. ☺

Responses To Survey

► continued from page 1

McMullen, station manager of KVSC(FM) in St. Cloud, Minn., noted that localism will help AM radio survive.

Dave Reese, general manager of WUJC(FM) in University Heights, Ohio, however, wrote that AM cannot survive unless it becomes a part of digital radio.

Only one respondent said the station he worked at, KHTS(FM) in San Diego, had been sold in the past year. He said the Telecommunications Act will not hurt the diversity of owners in the United States. In contrast, the majority of those whose stations were not sold wrote that the new act will hurt ownership diversity.

Asked when their EAS equipment will be purchased, one respondent replied: "If I have to." Most said they plan to buy EAS equipment by October or November.

The majority of respondents believed that satellite digital audio radio services are a threat to terrestrial radio. One optimist, however, said that the impact of DARS will be the same as 8-track or cassettes.

FM must go digital

A greater number of respondents believe that it is necessary for FM to convert to digital. Opinions on the digital audio broadcasting test results, however, were mixed.

Only a couple of respondents said the government should stop financing public radio. Ric Schmidt, programming director at KNOM-AM-FM in Nome, Alaska, favored foundations and private funds for public broadcasters so there would be no government pressure on programming. Another respondent approved of "some form of commercials" instead of government funds.

Those that approved of government-financed radio said it is valuable in rural and small markets, adds to diversity and provides a good value for the money.

Only one respondent — a public station — took part in the Electronic Industries Association's year-long RDS campaign. Most said they were not using the technology although John Warren, general manager of WEGZ(FM) in Washburn, Wis., noted he was going to purchase the equipment in the near future.

Respondents who favor FCC cutbacks wanted the agency to continue to perform functions like spectrum management, station licensing and those related to emergency management. ☺

—Lynn Meadows

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Jones Uses SpaceCom Service

TULSA, Okla. Jones Satellite Networks planned to begin using the SpaceCom Systems SatVantage satellite transmission service to digitally uplink its radio formats using Wegener MPEG II equipment on May 1.

The SpaceCom Chicago International Teleport (CIT) will serve as the Jones Satellite Networks uplink the SatCom C5 satellite until Jones finishes building its own uplink facility.

Once the Jones Satellite Network uplink facility is completed, SpaceCom will still provide transponder management. SpaceCom will also serve as the disaster recovery uplink site for Jones

Satellite Networks.

"For our affiliates, we wanted to take full advantage of the added benefits of a digital transmission — such as flexibility, addressability and high signal quality," said Eric Wiler, director of engineering for Jones Satellite Networks. Prior to the conversion, Jones had been transmitting programming via analog subcarriers on the Galaxy V satellite.

Jones Satellite Networks is the largest provider of live, 24-hour, satellite-delivered radio music formats in the nation. In addition to U.S. Country, CD Country, Adult Hit Radio, Soft Hits, FM

Lite, Good Time Oldies, Z Spanish and The Word in Music formats, the company will debut a Rock Alternative format in May.

SpaceCom is based in Oklahoma and offers satellite transmission of audio and data services. ABC Radio Networks, Sony's SW Networks, USA

Radio Network and American Urban Radio Network are among the many networks now serviced by SpaceCom Systems.

In addition to providing backhaul of program signals direct from network studios, SatVantage provides radio networks with full-time SCPC uplinking services via the CIT.

The company prides itself in turnkey digital solutions to network transmission needs.

A Eureka-147 Solution For the United States

► continued from page 5

owned and operated by four different broadcasters. Broadcasters could even lease or trade channel transmission

that may not fit well into the current Eureka-147 SFN scheme.

In the United States, the passing of the 1996 Telecommunications Act resulted in a frenzy of station buy-outs across the nation. With changes to the duopoly and ownership rules, it is quite possible to end up with single ownership of four stations in a given market, giving rise to a commercial network.

For this new commercial network, the use of an SFN would be attractive since four stations could be broadcast with one transmission system, thereby saving money.

Therefore, on a global scale, the radio landscape is approaching an equilibrium due to the rise of commercial networks in the U.S. and the rise of local commercial stations elsewhere in the world.

The application of TDMA Eureka would therefore be best suited, on a global scale, to meet the needs of all broadcasters.

Whatever method we choose for DAB transmission, do not forget the 500 million AM/FM receivers that are in the market today. The design and implementation of receivers — and hence performance — vary widely from receiver to receiver.

The listeners of these receivers are the lifeblood of your station. Will you adopt a DAB system that causes listeners to tune away because of interference?

Imagine if you will, your new AM/FM/DAB receiver. AM broadcasting was established in the 1920s while FM was established in the 1940s.

How many years into the future do you want your DAB system to take you?

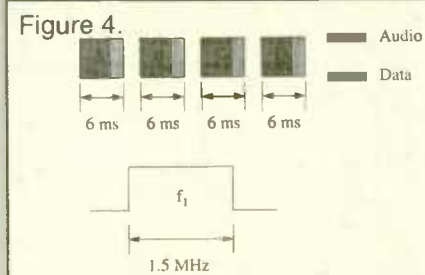
The system you choose is a commitment measured in decades not months. As is often the case, the lowest up-front cost may not yield the highest long-term gain.

DAB test data may be obtained by contacting the National Association of Broadcasters and the Electronic Industries Association. Voice your opinions to the NAB, EIA, and the Federal Communications Commission.

□□□

Scott Wright is a project engineer with Delco Electronics.

He can be reached by e-mail at sawright@mail.delcoelect.com or by phone at (317) 451-1057.



time with one another given they have overlapping coverage areas and most importantly choose to do so.

Channels can be reallocated for a different broadcaster some distance away just as AM or FM frequencies are reallocated today. Most importantly, the existing coverage areas can be maintained without disruption as shown in Figure 5 (like Figure 1).

TDMA Eureka-147 preserves the benefits of non-TDMA Eureka-147. All the following features can be utilized by the broadcaster:

Elimination of multipath interference. Due to wide bandwidth, multipath actually reinforces the signal. No interference to existing AM or FM services. In fact, broadcasters can continue to develop and utilize subcarriers.

Audio programs can be reconfigured "on the fly." This could allow you to change from one CD-quality stereo program to two reduced-quality audio channels and a news service, for example.

Sixty-four K Baud Data Capacity: This can allow broadcasters to transmit video stills, newspapers, maps, etc. Services can be offered either free or for a fee.

The U.S. has been typified in the past as all local broadcasting, while Europe and many other parts of the world were only nationally run networked programs. A network here is defined as a single program source broadcast over a large geographical area by means of multiple transmitters.

But things have a way of changing over time, and the radio landscape we are all used to is changing rather rapidly in some instances. Outside the U.S., local, commercial broadcasters are growing in ever increasing numbers.

In England alone, there are now more than 350 commercial stations

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The Master Control Studio, shown right, is one of seven Arrakis studios in Sony's Manhattan network origination center for SW Networks.



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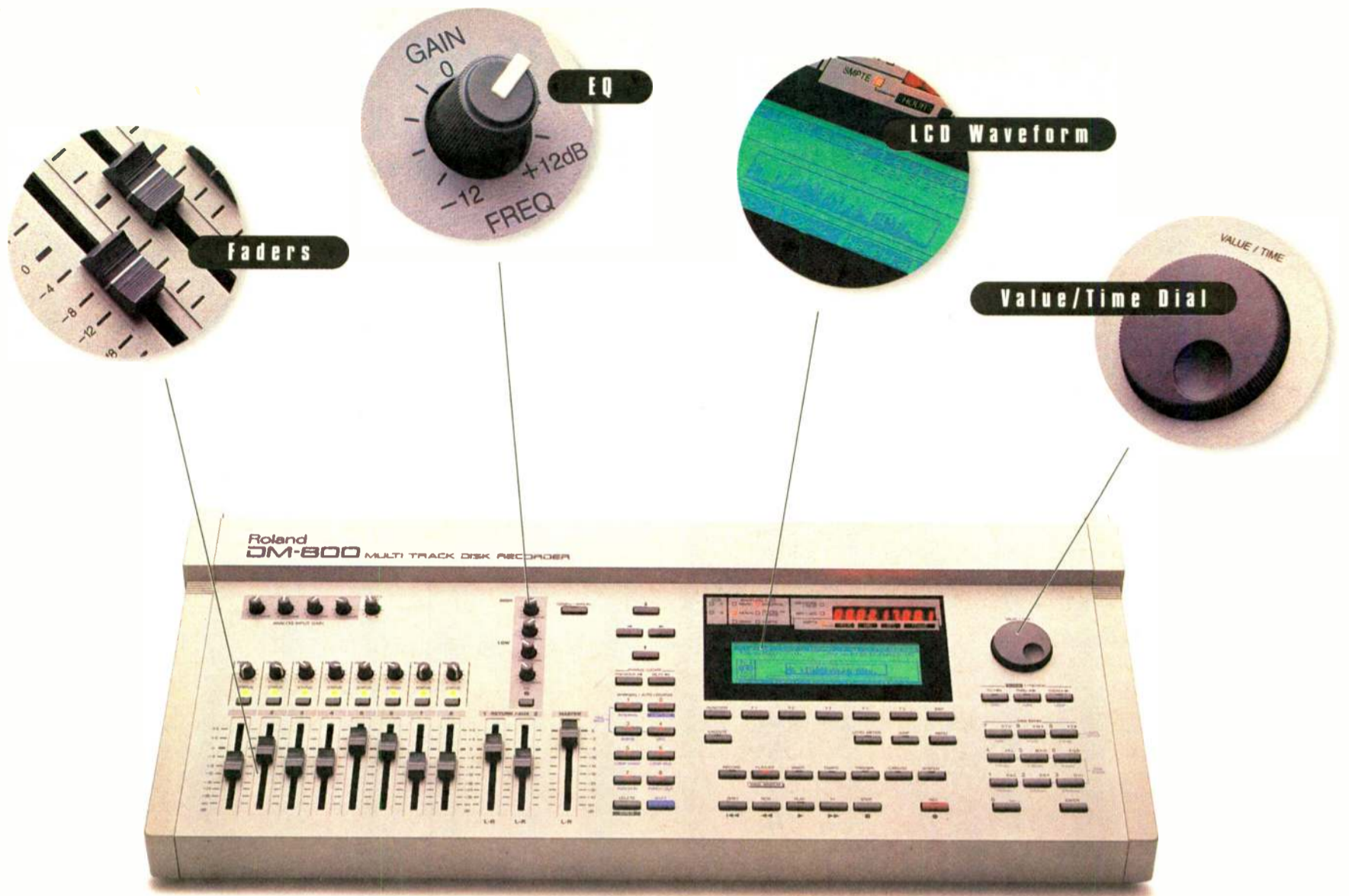
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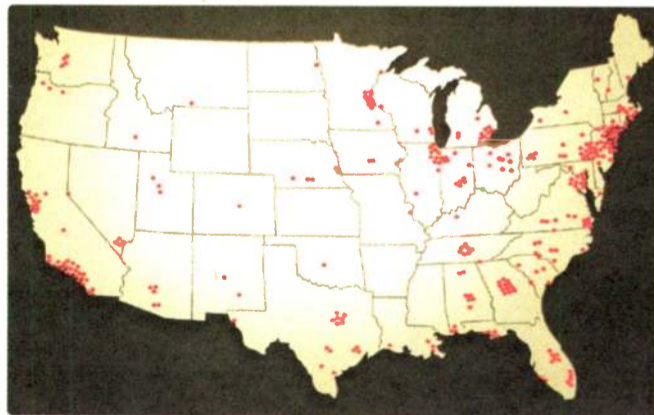


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Circle (74) On Reader Service Card

Studio Sessions

Reviews of
Hafler P1000 and
Otari DTR-8
See page 25.

Equipment and Applications for Radio Production and Recording

PRODUCT EVALUATION

Mackie: A Mighty, Miniscule Mixer

by Alan R. Peterson

WASHINGTON For 10 years, I produced songs and bits on a Teac 2A mixer at home for my radio show. It was a 6x4 mixer that used discrete components and lacked a meter bridge.

An effect send would have been nice. Stereo input control would have been desirable — to Teac's credit, it did include a plastic bracket that clipped over two faders for one-finger stereo control.

How I wanted a meter on that thing. I had to depend on my tape deck meters and their questionable ballistics. I could have bought the 2A optional meter bridge, but I felt a small mixer should already have metering capability.

When Mackie Designs began making mixers a couple of years ago, I sat up and took notice. When the company began moving some ideas from its 1604 mixer into the new 1202-VLZ, it was time to go shopping for one.

Drawing board

Mackie Designs debuted the original 1202 MicroSeries mixer in the early '90s, spawning dozens of clones from other companies. Last year, Mackie jazzed up the 1202 with some new features and a slightly different enclosure. The result was the 1202-VLZ mixer.

Right out of the chute, the company kept the board awfully tiny. Solid steel construction is still used throughout; The 1202-VLZ weighs the same as a weekend jock's bag of donuts (6.5 pounds) and the internal power supply means there is no wall wart to clog an outlet. The 1202-VLZ still has four mic inputs and four

1202-VLZ. Balanced XLR outs, line outs, tape outs and control room outs. Plenty of signal to go around without tacking on a DA.

The EQ section has a nice addition: a mid-range control. This knob controls a peaking EQ stage centered at 2.5 kHz. At last, mixes are not limited to the shelved



The Redesigned 1202-VLZ from Mackie Designs

stereo line inputs.

It was all the new extras that proved to be the true delight.

There is no shortage of outputs on the

high-low "smile" curve of simple two-band EQ.

Two buttons borrowed from the 1604 mixer are on each input channel: a Mute/3-4 key and a Solo button. The Solo button disengages all other signals and routes the pre-fader audio of that channel directly to the outputs. It also flashes a "Rude Solo Light" LED, which is very hard to ignore.

The Mute/3-4 key is what made me go with the 1202-VLZ for my home studio. The Mute key is engaged to silence an unused channel. But the key also routes the signal to a separate stereo bus labeled Alt L and R, essentially making the 1202-VLZ a 12x4x2 mixer.

Control over Aux sends and returns has become more complex but a lot better. Aux 1 functions as an effects send and doubles as a monitor mixer to send cue mixes to musicians, if indeed this is your use for the 1202-VLZ.

A button switches Aux 1 between pre-fader and post-fader send. The post-fader function allows the "wet" effect signal to follow your "dry" mix decisions. In cases where you want to fade the dry signal but retain a wet reverb tail — "Pleasant Valley Sunday" by the Monkees is a good example — you set Aux 1 to the Pre position. Now the Aux 1 feed remains independent of the channel fader.

Aux 2 is another auxiliary bus for feeding a second effects line. On the original Mackie 1202 mixer, Aux 2 had to share duties with the two-track Tape Return feature. Not on the 1202-VLZ; the Tape switch returns the output of a two-track reel or cassette deck to the 1202-VLZ while leaving Aux 2 alone.

Both new and old 1202 mixers share

phantom mic power capability and both have side-by-side power and phantom switches. Only now the 1202-VLZ uses different-sized switches to control each. Even if you cannot see which switch is the one you want, you can figure it out by feel.

Speaking of the mic channels, the Low-cut button on each input was a nice addition. It digs an 18 dB/octave hole at 75 Hz and below to kill HVAC noise and rumble. Used with the Low EQ dial, it is possible to retain bottom on a recording while taming the junk.

A lot of users have commented on Mackie mic preamps being too harsh or brittle. I like and appreciate their clarity. My rule for contemporary radio production has always been "start clean, end clean," and the 1202-VLZ mic preamps do it for me. If I have the need to "warm up" the sound, I just plug an outboard tube doodad into the mic channel insert jack.

VLZ is an acronym for Very Low Impedance. The Mackie philosophy in this generation of mixers is to keep all internal impedances as low as possible to minimize thermal noise. The company did this by scaling down resistor values by a factor of three to four.

The specs bear this out. With all knobs down and EQs set flat, the 1202-VLZ main mix noise level is -100 dBu. At unity gain it reads -84.5 dBu. THD from Mic In to Main Out is .0025 percent.

Frequency response? From any input to any output, the 1202-VLZ scopes out 20 Hz to 60 kHz, +0 dB/-1 dB and 20 Hz to 100 kHz, +0 dB/-3 dB.

See that? One hundred kiloHertz. That is a good two octaves higher than you can hear. You want "air" in your recordings? You want mixes your dog will hear? This is the mixer to do it.

So does VLZ design philosophy work? It must; my old 2A sounds like surf crashing when A/B'd against the Mackie.

Uses

I have seen original 1202s in radio stations for mini-mixes, quick recording projects and submixes prior to the main console. Television stations and cable head ends have them in editing suites for deck-to-deck editing and dubbing with voiceover. Live sound mixers, DJs and home studio aficionados use them. The new 1202-VLZ will find similar uses.

I am using mine now to mix my synth rack, PC sound card, a CD player, two- and four-track tape machines, cassette deck and mic. So many signal lines and so few mixer inputs means I am constantly repatching the 1202-VLZ depending on the project.

No problem; the jack field on the top of the mixer makes this much easier than on my old 2A. Besides, I am already budgeting for a patch panel.

I see the extra 3-4 bus making the board more attractive to small studios using PC-based DAWs or multitrack cassette decks. Used multitrack tape decks are now hitting the classified ads for pocket change

continued on page 36 ►

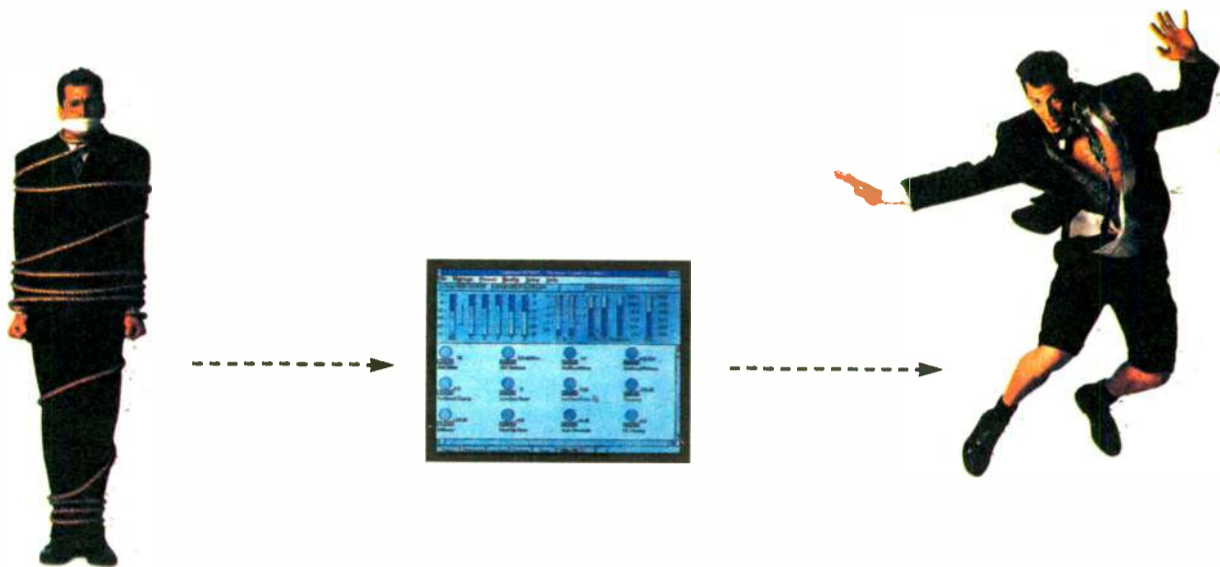
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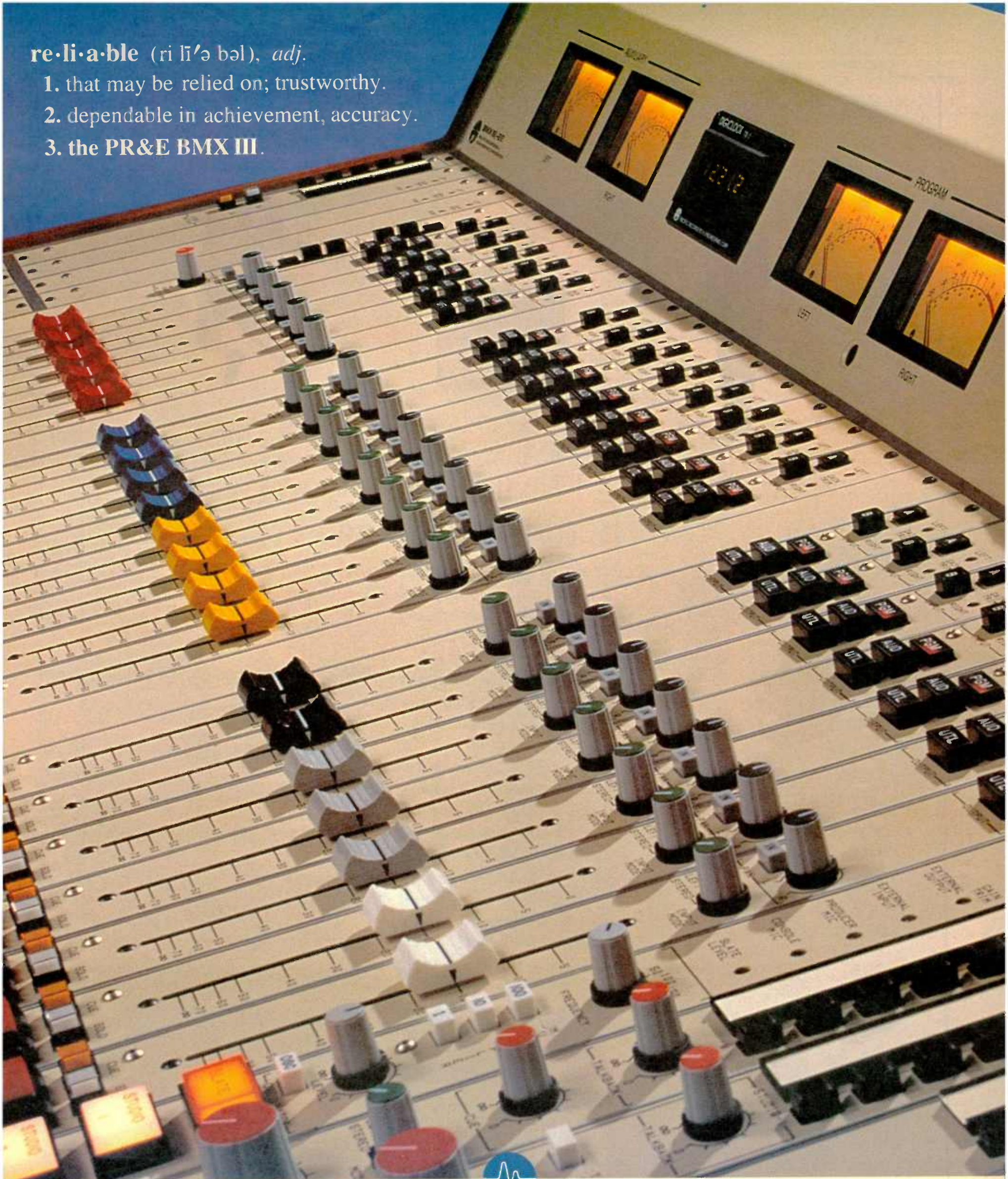
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DIGITAL DOMAIN

New Audio Possibilities for Video Disk

by Mel Lambert

LOS ANGELES Just in case you missed the news, what we used to refer to as the Digital Video Disk (DVD) was recently renamed the "Digital Versatile Disk."

Not wishing to needlessly quote the Bard and all that nonsense about roses smelling as sweet, the accolade does have more than a passing significance in the pro audio and broadcast communities.

Format War Truce

As *RW* readers may already be aware, the various protagonists in the consumer-video format wars spent most of last year hissing and spitting about the best way to obsolete familiar tape-based record/play technologies with random-access disk technology.

Above all, they wished to avoid the horrors of another VHS-Betamax fiasco. So late last year a format war was finally averted when Sony, Philips, Toshiba, Time-Warner, Matsushita, Pioneer, JVC, Hitachi and Mitsubishi announced that they had buried their collective differences and unveiled specifications for the newly re-named DVD format.

You should recall that Sony/Philips, with their Multimedia Compact Disc format (MMCD), had faced off against Toshiba/Matsushita with their Super-Density Disc. This hybrid DVD now combines Sony's dual-density encoding with Toshiba's double-sided format.

Whatever we feel like calling the darned thing, it should be noted that DVD is capable of carrying a remarkable amount of information; up to 18GB. This higher data-packing density results from the use of smaller pit dimensions than those found on conventional audio CDs. This is courtesy of a red reading laser featuring a shorter optical wavelength.

The first DVD systems will hold 4.7GB of data, using one side/one layer of the format's dual side and layer capability. And while the easily replicated

format will hold a full-length movie with data-compressed 5.1-channel surround sound, there are already proposals being put forward for an Enhanced-Audio version of DVD, and one that might offer as many as 10 discrete playback channels.

No secret

How do I know so much about these options? Mainly through a well-organized two-day colloquium held in mid-March at the University of Southern California in downtown Los Angeles.

Whatever we feel like calling it, it should be noted that DVD is capable of carrying up to 18GB of information.

Hosted by the EC2 at USC and TMH Corporation, and sponsored by Motorola, the fascinating International Alliance for Multi-Channel Music (IAMM) colloquium had been organized to look at the basics of multichannel audio, and how they may be incorporated onto an Audio-only DVD format.

It has not gone unnoticed that many of our homes now feature pretty sophisticated home-theater systems, with as many as six playback channels. The combination of a new release medium with many times the replay capacity of Compact Disc and an installed base of multichannel replay systems could open up a cornucopia of creative possibilities for enhanced Audio-DVD formats. We cannot ignore the potential for new music and entertainment outlets as well, including advanced-capacity cable, network and satellite systems.

IAMM '96 was co-chaired by John Eargle, well-known classical recording

engineer and currently director of recording at Delos, plus Tomlinson Holman, innovator of THX sound and founder of TMH Corporation. Various sessions discussed a wide cross-section of topics, including key differences between the use of multichannel audio for music playback and mixing techniques for film and video. Discussions on hardware requirements for professional and consumer users were also included.

"The challenge for the music and recording industries," Tom Holman said,

As in the past, a consumer format can drive the development of professional audio-production systems. Witness early PCM digital audio processing systems derived from the innovative Sony PCM-F1 and companion systems, as well as the popular DAT machine currently gracing our control rooms.

Moving forward

While it is too early to speculate about specific features and functions, I am convinced that the pull-through of a versatile consumer-replay format beyond two-channel stereo at 44.1 kHz will fuel the development of multichannel recorders derived from consumer hardware.

There is no reason why today's generations of recorders, based on removable media such as magneto-optical and Iomega Jaz formats, cannot co-exist with enhanced versions of DVD systems. And multichannel audio is only one way to go.

What about using the data capacity to provide a format that unitizes, as has been suggested by several Japanese manufacturers, 96 kHz sample rates at 24-bit or more precision? The options, it would appear, are virtually unlimited.

□□□

Mel Lambert has been involved with production and broadcasting on both sides of the Atlantic for almost 20 years and is now principal of Media&Marketing, a Los Angeles-based consulting service for the professional audio industry. He can be reached at (818) 753-9510 or mediapr@earthlink.com

Digital Versatile Disc: Specs for the New Format

Disc Diameter: 120mm (5 inches).

Disc Thickness: 1.2mm (0.6 mm disc x 2).

Memory Capacity: 4.7GB single side.

Error Correction: RS-PC (Reed Solomon Product Code)

Data Transfer Rate: Variable speed data transfer at an average rate of 4.69 Mb/secs for image and sound.

Image Compression: MPEG-2 digital image compression.

Audio: Dolby AC-3 (5.1 channels), LPCM for NTSC and MPEG Audio, and LPCM for PAL/SECAM (a maximum of eight audio channels and 32 subtitle channels).

Running Time: 133 minutes per side (at an average data rate of 4.69 Mb/secs for image and sound, including three audio channels and four subtitle channels).

File Management Structure: Micro UDF and/or ISO-9660 for computer applications.

"is to define the best audio-only uses for such emerging technology, and to prepare the infrastructure required to service and expand the existing market for multichannel music. Our intention in organizing IAMM '96 was to provide a unique opportunity for music industry professionals to discuss, define and influence this new music technology."

"IF YOU DON'T YET OWN ONE AND YOUR COMPETITION DOES, WORRY."

Review in *Line Up - The Journal of the Institute of Broadcast Sound*
February/March 1996

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DeoxIT is a spray compound used for cleaning and lubricating metal connector and contact surfaces. It dissolves resistive oxides and sulfides by chemical action and contains compounds that inhibit arcing and RFI.

The pocket spray is for field and portable use and delivers a spray of DeoxIT into tight areas.

Caig Laboratories also makes DeoxIT available in wipes, pen applicators and in bulk quantities up to 55 gallons.

For more information, contact Caig



Laboratories at 1-800-CAIG-123 or circle Reader Service 233.

dbx Dual Compressor/Limiter

dbx Professional Products is expanding its innovative Project 1 line with the Series 262 stereo compressor/limiter. The unit is priced at less than \$200 and provides classic dbx sound to professionals and amateurs alike.

OverEasy compression provides natural sounding gain control when mastering to DAT or two-track analog. Hard-knee operation and negative compression ratios are also available on the

262. The compressor uses the same patented voltage-controlled amplifier circuitry found in more expensive products in the dbx line.

All inputs and outputs are TRS differentially balanced quarter-inch jacks and an internal transformer eliminates wall wart power supplies.

For more information, contact dbx Professional Products at 801-568-7660 or Circle Reader Service 141.

Antex Sound Card

Antex Electronics has two audio products for the IBM PC-compatible computer; the high-quality Model Z1e multimedia digital audio adapter and Z.Wav synthesizer module.

The Z1e uses the Texas Instruments TMS320C31 DSP chip and features mic and line inputs, MPEG Layer I and II and 4:1 MS-ADPCM compression and stereo or dual mono operation. Sample rate is from 7.35 to 48 kHz in software-selectable increments. Frequency response is 20 Hz to 20 kHz with .06 percent THD+N. Dynamic



range is 85 dB. List price for the Z1e is \$595.

The Z.Wav synthesizer module is designed to integrate with the Antex Z1e stereo sound card and complements the onboard Yamaha OPL-3 FM synth chip. It features General MIDI compatibility specifications and uses the Ensoniq OTTO synthesizer engine, which combines 16-bit samples with wavetable synthesis technology. Samples are contained in 4MB ROM. Frequency response of the synthesized samples is 20 Hz to 15 kHz. List price for the Z.Wav is \$195.

For more information, contact Antex Electronics at 310-532-3092 or Circle Reader Service 136.

Switchcraft Connector

Switchcraft is offering the Silent-Plug two-conductor quarter-inch plug for audio applications.

The Silent-Plug features a switch near the base of the plug that prevents feedback and pops. The switch is depressed when the plug is completely inserted and released when withdrawn from the jack. This switching action turns the audio circuit on or off.

The plug handles cables up to .370 inches in diameter and the one- or two-piece handle is made of nickel-plated brass.

Price of the Silent-Plug is \$12.45 to \$14.10, depending on OEM quantities.

For more information, contact Switchcraft at 312-792-2700 or circle Reader Service 218.

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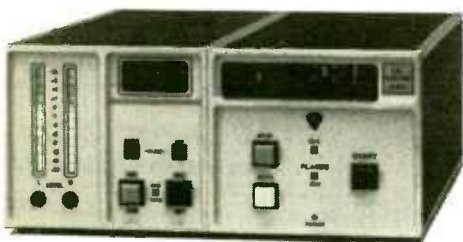
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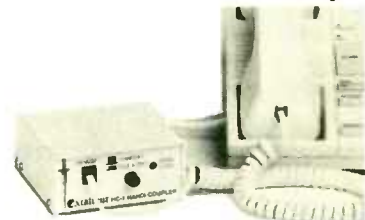
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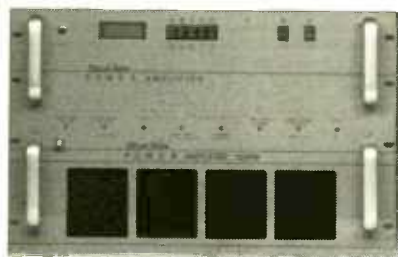
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READER SERVICE NO. 216

PRODUCT EVALUATION

Alesis Reverb Easy and Inexpensive

by Ron Streicher

MONROVIA, Calif. It is just amazing what can be done with chips these days.

In a small, single rackspace box barely four inches deep, Alesis has managed to produce the MicroVerb 4, a stereo effects processor which can create a vast array of special effects ranging from simple delay to complex chorus and reverb.

While not a challenge to the sonic quality or facilities of some of the more expensive and complex digital processors on the market, the low \$299 list price of the MicroVerb 4 belies its simplicity and capabilities. It comes packed with one-hundred preset program effects, and has another one-hundred "user program" addresses.

Simple setup

Designed for the working musician or "project studio," the unit is provided with quarter-inch unbalanced phone jacks in and out. The left jack serves as

As I said at the outset, it is remarkable what can be done with modern electronic circuits.

a mono input and feeds both channels of the processor unless a signal is fed to the right channel input. The output is stereo.

When used in a production environment, the levels can be adjusted to match the surrounding equipment via front-panel input and output controls.

A four-segment two-channel LED display is provided to assist in setting levels.

Nominal input level is specified as -10dBV, adjustable to +4 dBV with a maximum input level of +10 dBV; maximum output level is specified as +17.5 dBV. The input A/D converter is listed as 18-bit Sigma-Delta with 128-times oversampling; the output D/A is also 18-bit Sigma-Delta, with 8-times oversampling.

The essence of the Alesis MicroVerb 4 is its simplicity. Once installed and the input/output levels have been established, there are only four controls needed for the unit's basic operation.

There is the "Value Encoder" which selects the program to be used. "Edit A" and "Edit B" which adjust the two parameters available to each program and Mix, which adjusts the blend of dry and wet signals.

Other controls allow the storing of modified effects into the user programs, implementation of MIDI protocols (yes, it does that too) and a footswitch controller which may be implemented via a rear-panel jack.

Let's hear it

Enough of the physical factors already. It is time to hear what the unit can do. Looking through the list of 100 preset programs, there are thirty dedicated to reverb: halls, rooms, and plates.

Another forty are available for chorus, flange, delay, and pitch-shifting effects. The last thirty are "multi-

effects" which combine some of the single effects such as room with chorus, flange with delay, chorus with delay, etc.

To my ears, the most critical effect is reverb; this must be able to emulate the natural decay of real acoustical space without unwanted artifacts. If they can get the reverb right, the rest is gravy;



after all, what is a "flanged guitar" supposed to sound like, anyway?

Putting the MicroVerb 4 to the test, I auditioned a variety of program material with several of the preset programs. While some of the sweetness I am accustomed to hearing from my \$3,000 digital processor was missing, this \$300 unit performed quite respectably. At no realistic setting was the sound grainy or fuzzy — a problem not uncommon to inexpensive processors of the recent past. As I said at the outset, it is remarkable what can be done with modern electronic circuits.

Missing was the ability to make critical and minute changes of the various parameters. There are only two controls available for making these adjustments and both tend to be rather broad in their actions. Again, the price must be considered when comparing this unit to the "high-priced spread."

Trying out some of the other effects, the unit performed well and created the usual range of swimming pitches, flanged whooshes, slap delays, and "spiral staircases" one would expect from a modern digital processor. One nice touch was the "tap tempo" delay feature, which allows the unit to follow musical tempo either

via the control footswitch or even the input signal itself.

Compromises

If I have any complaints at all, these are also a result of the compromises necessary when producing a low-cost product. First, I would have to say that the four element (-32, -12, -6, and Clip) LED level indicators do not provide sufficient resolution to be very helpful.

This, together with the fact that the input and output level controls seem to confine most of their action to the last 25 percent of their rotation, makes establishing the proper input and output operating levels somewhat tricky; not difficult,

but cumbersome.

If the incoming signal level varies widely, such as from a keyboard or other musical instrument, I suspect overload difficulties could be encountered. In a more controlled studio environment, however, this should not be a problem.

My only other complaint stems from the restriction on user program storage options. When a preset program is modified, it can be saved only to one specific user location.

Put simply, a user-modified version of preset program 37, for example, must be saved to address 137. This means that if you like a particular program and want to save different versions of it, you cannot. You are allowed only one user location for each preset program.

On the plus side, however, I must return to the ease of use, low cost and the generally good sonic quality of this unit. For a production studio on a budget, the Alesis MicroVerb 4 would serve as a very cost-effective special effects processor.

Ron Streich is owner and chief engineer for Pacific Audio Visual Enterprises in Monrovia, California. For more information contact Alesis at 310-558-4530 or circle Reader Service 35.

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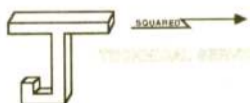
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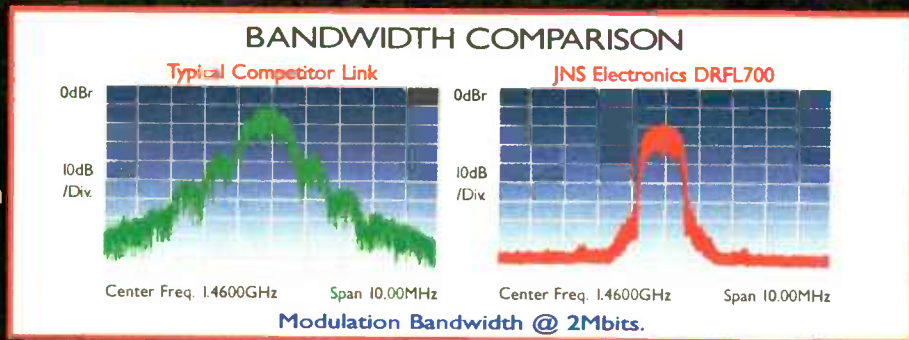


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Features

The 1200 series is a full featured radio broadcast console and is available in five or ten channel models. The ten channel model, featured in this ad, has two stereo outputs: Program and Audition. All stereo outputs feature mono mixdown, and the console has an internally assignable mix minus bus for use with telephone hybrids. Each console channel has a momentary, lighted, on-off switch below the fader which also actuates an isolated start relay for source equipment. The Monitor-headphone system is stereo, selects the main program buses plus two external off air inputs, and features a talkback input with dim logic. Cue is available as Autocue into the monitor system or as an independent output. The console is single input per channel with two unwired remote selector switches of six inputs each, raising the total number of console inputs to 20.

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PRODUCT EVALUATION

Hafler P1000: Encore Performance

by Tom Vernon

PHILADELPHIA It was like déjà vu all over again. After reviewing the Hafler P1500 power amp for RW a few months back, I anxiously awaited another one of their products to scrutinize here at the red brick mansion on Spruce Street.

"What would the folks at Hafler do for an encore?" I wondered. Turns out what they did was put the P1500 into one of

controls and power switch, as well as LED status indicators for each channel.

The Thermal indicator light comes on when the overtemp circuits have shut down the channel. The Clipping LEDs indicate when the amp is being overdriven, and helps protect your speakers. The Signal indicators glow in the presence of an audio signal. There is also a headphone jack and recessed bridged mono/normal switch.

Removing the top cover reveals an interior that is as thoughtfully designed as the exterior. The large heatsinks facilitate passive cooling, so there are no noisy fans or filters to deal with.

Although Haflers have a reputation for never failing, their design makes servicing easy. Each channel is a self-contained module. All that is required to swap out modules is to disconnect the heatsink and a few push-on terminals. The only tools required for a module swap are a 9/64-inch Allen wrench, small Phillips screwdriver, and needlenose pliers.

Although you will probably never have

to service a Hafler, the tech manual is most thorough. The installation, operation, and technical reference sections of the manual all cover their topics well. Included are PC board layout, schematic diagrams, and a parts list.

Tweakery

The technical reference section includes theory of operation and calibration procedures. Bias and common mode rejection are the only adjustments. Chances are you will probably never be tweaking these, but just the same, alignment procedures using simple test equipment are fully described.

If there is a secret to the sound of Hafler amps, it probably has a lot to do with their innovative use of MOSFETs. The trans-ana (TRANSconductance

continued on page 26 ▶



Hafler P1000 amplifier

those laundromat steam presses, squashed it down to one rack unit, reduced the power to 50 W and presto, the P1000.

Baby brother

In appearance, specs, and sound, this unit is a baby brother to the P1500. The attention to close mechanical tolerances and paint finish are evident throughout. The front panel has the usual level

Around back are two rather clever input connectors that accommodate both XLR and quarter-inch TRS phone jacks, and also RCA connectors for unbalanced sources. Recessed switches for each channel allow you to select between the balanced and unbalanced connectors. Outputs are via screw terminals. Another recessed switch floats the audio ground or connects it to the chassis.

PRODUCT EVALUATION

Otari DTR-8 Recorder Filled with Features

by Rich Rarey

WASHINGTON When I opened the shipping box for the Otari DTR-8, I had a distinct feeling I had seen this DAT recorder before.

Indeed, the design of the DTR-8 has been used by several manufacturers, and one manufacturer has even used the design for a high-speed/high sam-

ple playback, time-shifting programming, simple DAW support, and especially searching and archiving projects.

For this evaluation, I used the DTR-8 as a mastering DAT, recording the AEU/EBU signal into and out of a digital workstation. I did not particularly need advanced features for this. ID control and flexible sampling rate were sufficient to do the job.



Otari DTR-8 DAT recorder

pling rate DAT recorder.

Still, when different manufacturers market an identical design, one assumes that the design and construction must be basically solid. Otherwise, why else would so many want to market it?

The basics

The DTR-8 will be a good performer for situations where confidence heads and SMPTE time code are not required; such as for dubbing, on-air

I did appreciate the DTR-8's ample search and locate features, as they made browsing a DAT more efficient.

The DTR-8 offers the usual set of subcode ID management functions. Start, Skip, and End IDs can be written and erased as needed using conventional methods, either by the front panel controls, or the included CB-163 wireless remote control.

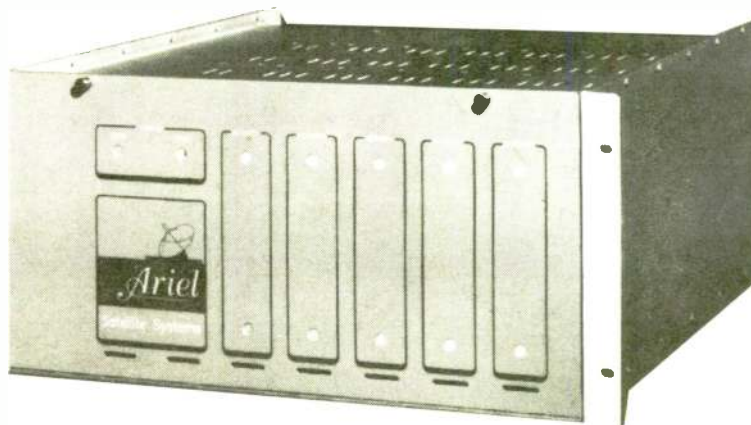
More interestingly though, up to 60 alphanumeric characters can be

continued on page 28 ▶

SATELLITE SYSTEMS

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Hafler Amp a Winner

► continued from page 25

Active Nodal Amplifier) circuit is a simple and efficient design using vertical MOSFET output transistors. They are connected in a source-on-rail configuration to deliver their full voltage gain. The input and pre-driver stages operate at low voltage.

This output stage configuration increased the power gain by about 10 times over conventional follower circuitry. This increased gain allows for a reduction in active stages from five or more in conventional amps to four in the P1000.

Vertical MOSFETs also have a lower "on" resistance than their lateral

counterparts, and this accounts to a large degree for the lower heat dissipation. This in turn means smaller heatsinks and enables the unit to be reduced to one rack unit in height.

Additionally, a soft-start circuit isolates destructive turn-on and turn-off transients from the speaker. A thermal sensing network keeps tabs on the heatsink temperature, and shuts the amplifier off long before a thermal meltdown can occur.

Published specs for this box are impressive. The P1000 has a frequency response of 20 Hz to 20 kHz, ± 0.1 dB. Signal-to-noise is 100 dB below rated output "A" weighted. Distortion is 0.2 percent THD

at 1 kHz. The power rating is 55W per channel into 8 ohms. Input sensitivity for rated output power is 0.375V into 8 ohms.

Our unit easily outperformed the published specs. Response was flat from 10 Hz to 30 kHz, with deviation less than 0.1 dB; virtually unmeasurable. Full-power distortion at 1 kHz was 0.1 percent. Signal-to-noise was measured at 110 dB "A" weighted.

In the real world

So much for looking, poking and testing. In the rarefied air that high performance equipment such as this breathes, outstanding specs are a given. What really matters is the more subtle characteristics of the sonics.

Our listening environment was the recording studio used for "The World

Product Capsule: Hafler P1000 Power Amp



Thumbs Up

- ✓ outstanding sonics
- ✓ modular construction
- ✓ rugged design
- ✓ good tech manual
- ✓ 5-year warranty



Thumbs Down

- ✓ screw terminal outputs
- ✓ dysfunctional headphone jack

For more information, contact Hafler at (800) 366-1619; or circle Reader Service 3.

Cafe," a nationally syndicated program from PRI that showcases singer-songwriters. The P1000 was connected to our EV Sentry 100 speakers in place of a Crown D-60.

The most frequently heard comment was that so much more detail was audible in the sound. Music has texture when heard through this amp. This was both good and bad.

Good, in that we could hear detail in live recordings that was never there before. Bad, in that tapes of some of our older recordings had a noticeably gritty high end that had gone unnoticed with the old system.

But ...

While the sonics of this amp are close to perfection, not everything about the P1000 tickled my fancy. First off, the screw terminals for output connections are inconvenient. Getting really large cable through them is a chore. I guess you could put your speaker cable on spade lugs, but finding the right size lugs would be a chore too. I yearned for the standard double banana plugs, both for the ease of setup and tear down in remote broadcast environments, and for rapid troubleshooting in the studio.

Another thing is the headphone jack. I guess you could use the P1000 as an oversized headphone amp, but that is not the usual application. It is more likely you will have speakers attached, and occasionally want to use headphones. And there is your problem.

Short of removing cables from the screw terminals, there is no way to mute the speakers. And having two level controls to adjust is inconvenient. Wouldn't it be nice if there were a speaker muting switch and a separate headphone volume control? All that elegant sound could be piped directly into your favorite headphones.

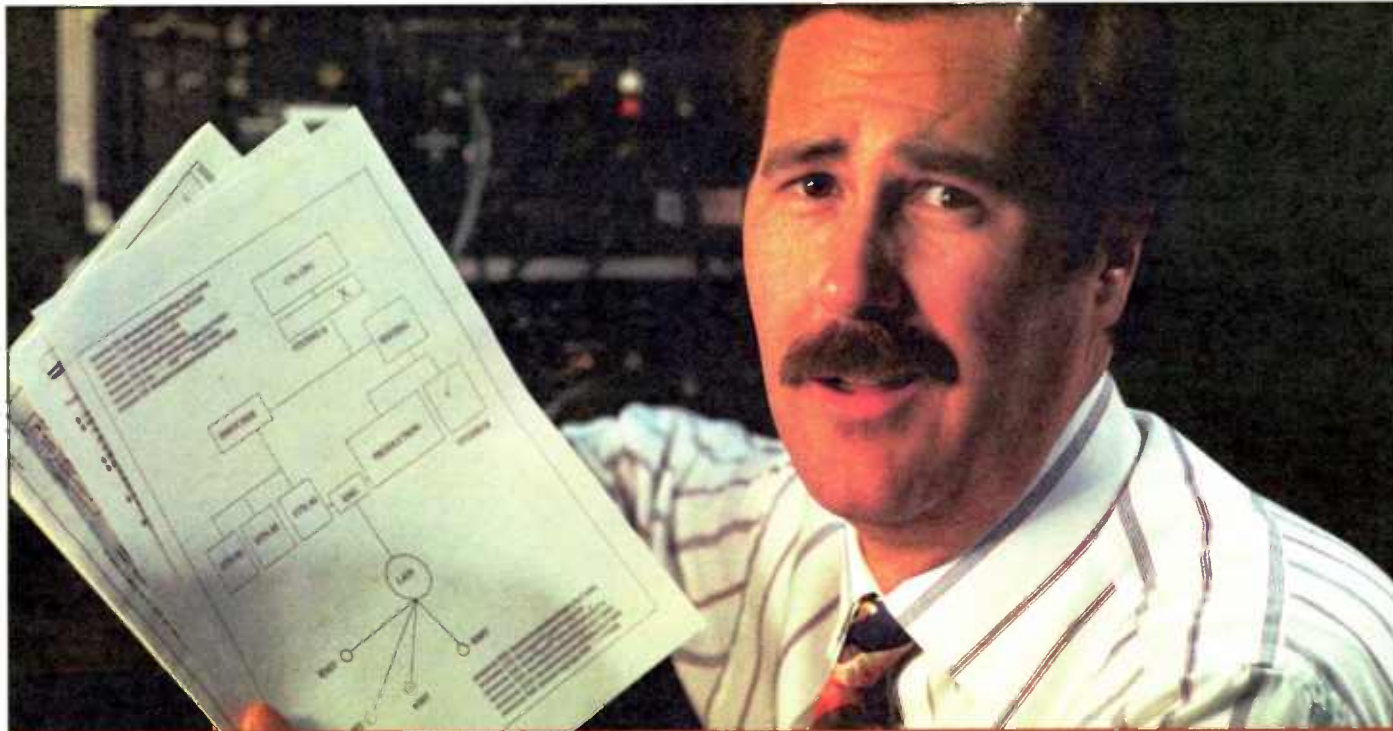
In all fairness, this problem is not unique to Hafler. Several power amps are set up the same way, and it is always inconvenient.

The Hafler P1000 fills the niche for a moderately-powered compact amplifier long dominated by competitors with obsolete circuitry. An A-B comparison between the old standard and the Hafler is startling. The P1000 simply leaves it sitting in the dust. Combine this distinct sonic advantage with the lower price for the Hafler, and the P1000 is a clear winner.

Special thanks to Chris Williams and Joe Taylor, producers of "The World Cafe," for lending me their ears, so to speak.

□ □ □

Tom Vernon is a regular columnist for RW. He also writes about multimedia software. Reach him via e-mail at tlvernon@aol.com or (717) 367-5595.



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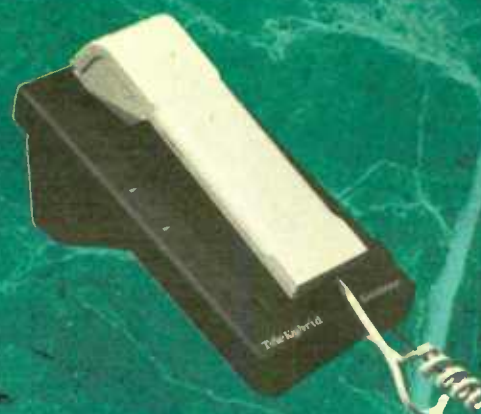
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TS612 System

It looks like a regular multi-line business phone but it actually provides capabilities that meet the unique requirements of broadcasting, distance-learning, business TV, video and audio-conferencing. Although, this system is highly sophisticated, it is still easy to learn and use.



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Microtel

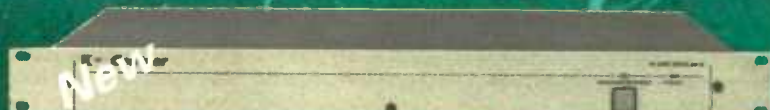
Microtel is a small, battery operated "mini mixer" that connects to the handset jack of your telephone for easy connection to the phone line. It is not a telephone coupler-Microtel does much more than standard couplers. With Microtel you can easily accomplish news reports, business, weather, ski reports, remote broadcasts, and as a tool for your salespeople.

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Otari DTR-8 DAT Recorder

► continued from page 25
 embedded within each Start ID. The text is great for labeling cuts on a DAT, and is a welcome feature for archivists.

Reading text

During playback, the text is scrolled across the tape counter display, and remains available for viewing during the cut by pressing the Character button. The characters themselves can be entered one at a time from the front panel or the remote control.

The DTR-8 has three input

sources. Analog on active balanced XLR connectors, AES/EBU and SPDIF (IEC958), presented on RCA connectors. Input selection and sampling frequency is made from front panel selectors. Three sampling frequencies are available for analog recording, and four are possible for digital recording.

The conventional 48 and 44.1 kHz rates work as expected, but the third sampling frequency is the tape-extending 32 kHz Long Play mode. This selection is fine for voice recording or situations where doubling the

length of possible recording time is necessary.

The DTR-8 does not offer 32 kHz Standard Play recording from the analog inputs. It is only available when using the digital inputs.

The operation manual claims better sound quality is achieved for analog sources by the use of 1-bit wide-range linear A/D converters, and "pulse flow 1 bit D/A" converters.

To really exploit the search features, one must write a Table of Contents (TOC) information at the beginning of a DAT. The

"Table of Contents/Renumber" feature does this by renumbering Start IDs on a DAT, rewinding and writing a TOC on the first Start ID.

This TOC information enables the DTR-8 to search the tape at a speedy maximum of 300 times play speed. To use this high speed search feature, the tape must have an END ID, the Start IDs must be at least 30 seconds apart and the AUTO ID feature must be enabled.

The data in a TOC contains information about each cut on the tape, such as its location and duration, and the DTR-8 uses these data to calculate the exact position of the desired cut.

When the Counter Mode button

is pressed repeatedly until the "Total" indicator is lit, the total number of program IDs and total time are displayed.

Fine print

Some caveats, however, about using the Table of Contents. The DTR-8 can record TOC data for a maximum of 50 tracks. Further, if the TOC/Renumber feature is engaged on a tape that does not have an End ID, the TOC will not be written.

It should also be noted that the DTR-8 does not renumber more than 99 Start IDs on a DAT; if there are more, the Start IDs will be recognized in normal operations, but not numbered.

Fortunately, the recorder also has a "one point" memory feature, that allows the user to store the present tape position for later fast wind location. This feature will be invaluable if you will need to return to one of these "unnumbered" Start IDs.

Additional search features are engaged by selective pressing of the Fast Forward and Rewind buttons. Pressing one of the buttons while in Play mode will move the tape at three times normal speed, holding the button will move the tape at five times normal speed. Pressing one of those same buttons while in Pause will move the tape at half-normal speed, useful indeed as a primitive audio "scrub."

The DTR-8 also handles other DAT chores. Pressing the front panel Record and Mute will automatically record four seconds of silence. Pressing Peak Reset momentarily will clear the "held" peaks from the display. Holding the button for four seconds turns off the Peak Hold feature.

If you wish to use more than one DTR-8 in close proximity, reception of wireless remote control signals can be disabled by a rear panel DIP switch (eliminating the messy electrical tape over the infrared window). Simple diagnostic displays can be had by pressing the Error button and viewing the percentage of errors for each of the two heads.

Pressing the Mute and Counter Reset button displays drum rotation time in hours; handy if you want to institute a standard head cleaning program every few hours.

The DTR-8 also has a wired remote control DIN jack on the rear panel that controls basic transport functions.

Because the DTR-8 looks familiar, one tends to approach it as an already-familiar piece of equipment. It is simple to use for basic tasks, and handy to have for more demanding search and locate tasks.

□ □ □
 Rich Rarey is the technical director for National Public Radio's "All Things Considered" and the author of RW's "Public Domain" series. For more information contact Otari at 415-341-5900 or circle Reader Service 4.

Move Up from Carts to Touchscreen Digital Audio

Play Any Audio at a Touch

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Here's how it works: Six buttons on the left of the 17" computer touchscreen play what's on your program log. Scheduled spots, promos, PSAs and live copy come in automatically from your Scott System Production Bank and your traffic and copy computers. You see legible labels for everything, showing full names, intro times, lengths, endings, announcer initials, outcues, posts, years, tempos and trivia. Your jocks can rearrange anything easily by touching arrows (at mid-screen), or opening windows with the entire day's log and lists of all your recordings.

On the right, 18 "hot keys" start **unscheduled** jingles, sounders, effects, comedy or promos **on the spur of the moment**. You get 26 sets of 18 user-defined instant "hot keys" for your jocks' different needs.

Large digital timers automatically count down into times, and flash at 60-, 45-, and 30-seconds before endings. You also get countdowns the last 15 seconds of each event.



The Scott Studio System is your **best** way to make the move to digital audio and eliminate troublesome carts. Each button on the touchscreen plays whatever you want instantly. All scheduled spots, jingles, promos and scripts come in from your traffic and copy computers.



The World's Fastest Playback!

Touch either of the two buttons at the top right of the main screen to see our "Wall of Carts" with all your audio **on-line!** Touch the sound, spot, jingle, promo, PSA or comedy you want and it plays **instantly**. Or, you can put it anywhere you want in the day's schedule. Audio is displayed any five ways you like.

The Scott System also gives you a "Make Good" button so it's quick and easy to reschedule missed spots or promos.

Instant Requests from Hard Drive

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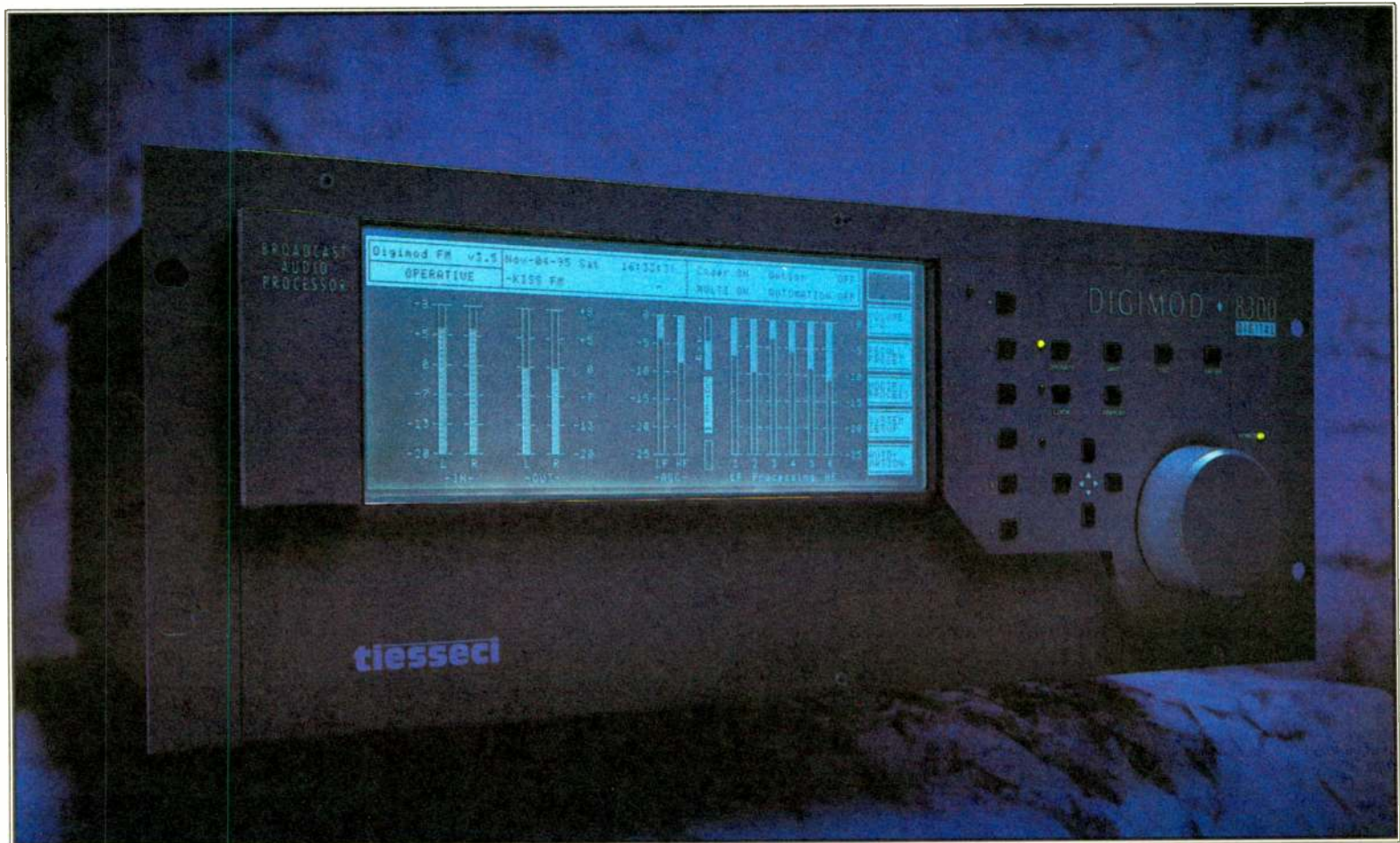
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World Radio History

Design a Basic Audio Level Meter

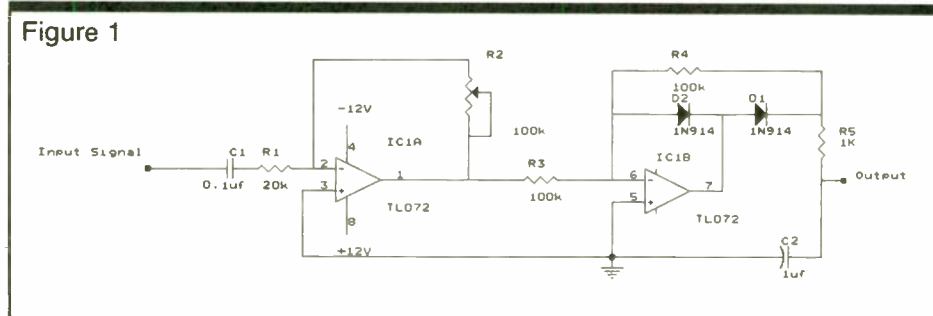
Design and Construct a Simple LED Meter That Can Be Used to Monitor Audio Levels or Overload Points

by Jim Somich

BROADVIEW HEIGHTS, Ohio Designing and constructing low-cost, simple LED meters is easy and fun.

These meters are useful wherever it is important to monitor audio levels or overload points. LED meters are not only easy

to read, but they also add a touch of professionalism to your projects. And, they cost less than conventional meters. The D'Arsonval (moving needle) analog meter has been the instrument of choice for setting input levels in audio systems for years. Conventional meters are becoming scarce and expensive. LED meters can be more accurate and cost effective. Like anything else, they are simple to implement once you understand a few of the basics.



to read, but they also add a touch of professionalism to your projects. And, they cost less than conventional meters.

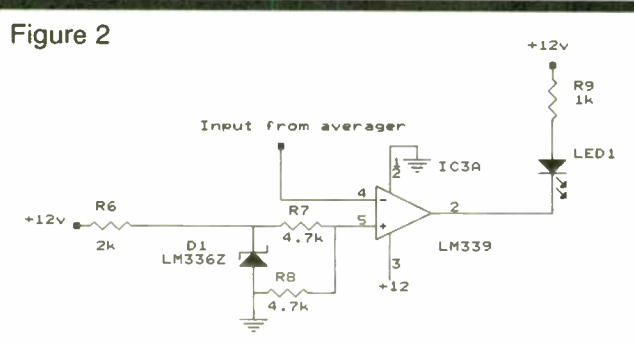
The D'Arsonval (moving needle) analog meter has been the instrument of choice for setting input levels in audio systems for years. Conventional meters are becoming scarce and expensive. LED meters can be more accurate and cost effective. Like anything else, they are simple to implement once you understand a few of the basics.

The LED audio level meter is nothing more than a series of DC comparators that fire light-emitting diodes. A reference voltage is applied to each comparator and when that reference is exceeded the LED lights.

Signal averager a must

Audio must be preconditioned before being applied to the LED meter. Figure 1 is a schematic of the averager. The op-amps are general purpose types.

The simplest solid-state level indicator is a single LED that flashes ON when the input level is at a given reference point. LED indicators are normally used where it is important to alert the opera-



tor that the circuit is approaching overload and input gain should be lowered. Most commercial amplifiers use a single-LED indicator for this purpose.

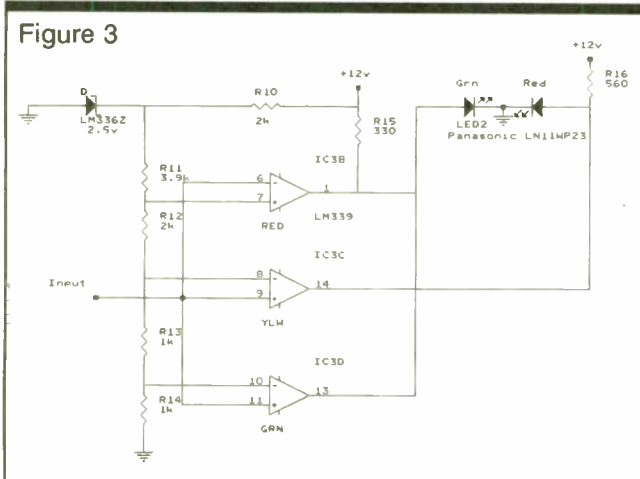
The single-color peak LED circuit is shown in Figure 2. Unlike the TL072 operational amplifier discussed previously, the LM339 is configured as a comparator. Whenever the voltage at the inverting input of the LM339 is higher than the voltage at the noninverting input, the output of the comparator is internally grounded.

However, whenever the voltage at the inverting input is lower than the voltage at the noninverting input, the output of the comparator floats (effectively an open circuit) and no current flows.

The voltage divider, consisting of resistor R6 and 2.5 V precision voltage reference IC2, forms a reference whose voltage is divided in half at the junction of resistors R7 and R8. This places a reference voltage of 1.25 V at the comparator noninverting input.

Whenever the inverting input voltage exceeds the reference voltage, the output will be connected to ground internally and the LED will light.

By connecting the input of this circuit to the output of the averager circuit, the LED will flash on whenever the audio input exceeds the level set with gain potentiometer



Almost anything will work in this circuit. I chose the TL072 dual op-amp. It is reliable and quite inexpensive and has enough quality for the job at hand.

The first operational amplifier, IC1a, is an inverting amplifier whose gain can be adjusted up to five. Adjustable feedback resistor, R2, sets the circuit gain and thus calibrates your LED meter. The second op-amp, IC1-b, forms a half-wave rectifier and signal averager that clips the brief peaks and displays them over a longer period of time.

R2 in the averager. Adjust R2 by applying a maximum level signal to the input of the averager, and then reduce the level slightly to allow for headroom. With the input level now set, adjust R2 until the peak LED just turns on.

Tri-color

Some LEDs will light in three colors. Tri-color LEDs have two LEDs in one package (generally one red and one green) that are controlled independently. By applying a voltage greater than about 2 V to the separate pins, the LED can glow red, green or yellow (when both LEDs are on).

Figure 3 is a tri-color LED indicator continued on page 36



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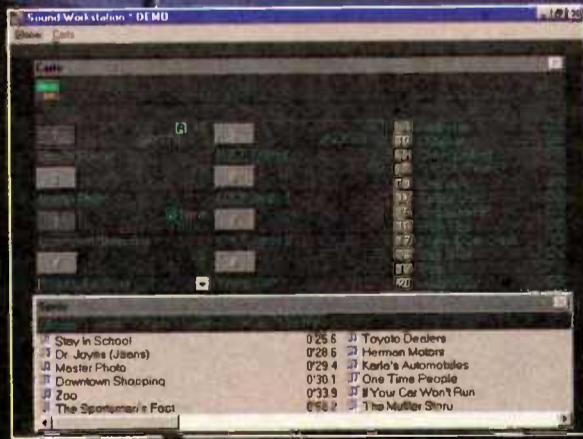
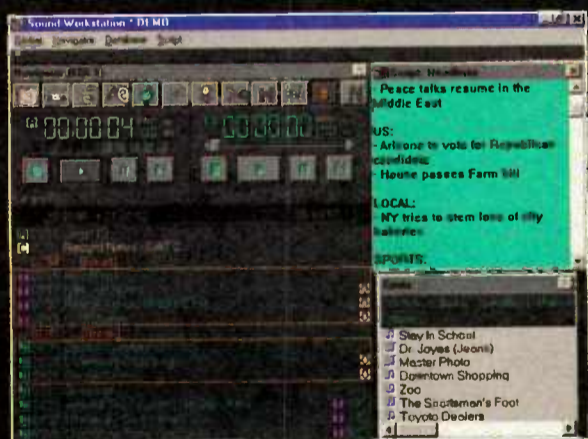
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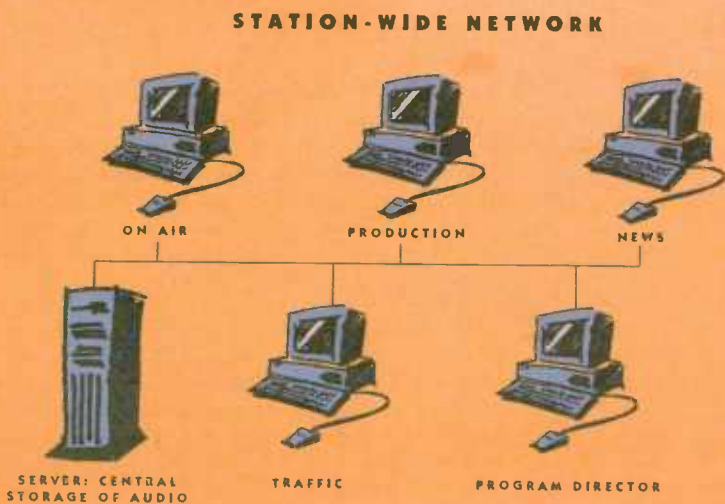
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STATION SKETCHES

Learn Telco Language, Technology

by Tom Vernon

HARRISBURG, Pa. Broadcast engineers are frequently called on to procure telecommunications services from the telephone company.

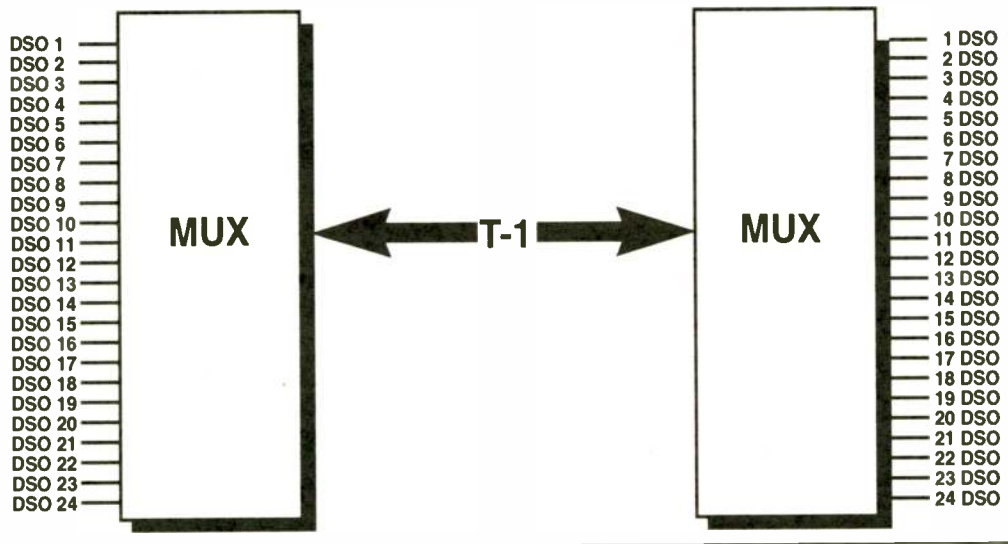
In the old days, this usually meant ordering equalized lines or local service. Nowadays, there are a host of options to choose from, including GlobeSpan, ISDN, T1 and fractional T1. While it is not necessary to understand the details of these services to talk to telephone salespeople, it helps to speak the language.

This month we begin a brief introduction to T-1 technology, in hopes of breaking down the language barrier between telco and broadcast folks.

Although T-1 has only been a popular buzzword in recent years, it has its origins in 1963. It was originally developed by AT&T as a digital terrestrial service, hence the name T-1.

To make things complicated, there are other names for T-1 service. It may also be referred to by its data stream specification,

Figure 1 Simplified T-1 span. The "mux" takes in multiple inputs or channels and transmits them simultaneously on a single channel. Up to 24 DSOs may be accommodated.



DS1 (digital signal, level 1). Some carriers may refer to T-1 as a facility or "high-cap," because it handles high-capacity circuits. AT&T's tradename is "Acunet 1.5." Other names include T-span or T1 pipe.

With deregulation in the early '80s, this service, by whatever name, could be delivered by a number of companies in addition to the telephone company or common carriers, or through privately owned equipment.

kbps is added to the composite for framing and overhead, bringing the total to 1.554.

The equipment that does all this is called a channel bank.

You may be wondering how all this can be accomplished with existing twisted pair. Researchers at Bell Labs discovered that if the terminating impedance was reduced to 100 W, and repeaters were installed every 6,000 feet, the data stream coming off the far end would be identical to that at the input.

There are limitations to how far a T-1 signal can go on twisted pair. There is a maximum limit of 50 repeaters, for a top limit of 50 miles. DS1 signals can be multiplexed together into higher rate signals that can be sent over "faster medium." Although T-1 is about all you'll encounter in the field, Table 1 compares standards for digital transmission.

Did I say that a T-1 data stream output was identical to the input? Well, almost. We live in an imperfect world, and some errors do creep in. T-1 delivers 95-percent error-free seconds. That works out to an equivalent bit error rate of better than 10⁻⁶. And speaking of reliability, T-1 circuits are specified as available 99.7 percent of the time.

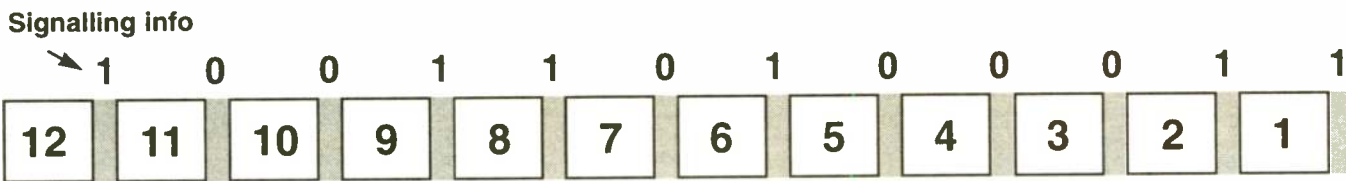
There are standards that define how information is packaged and sent over a T-1 line. The basic unit is called a frame. Each frame is 193 bits long, and comprised of 192 data or voice bits and one framing bit.

Framing bits are used for synchronization and identifying which frames carry signaling information. Figure 3 shows such a frame.

Twelve frames can be combined to form a superframe. This is the AT&T standard for transmitting information over a T-1 link. Each of the 12 frames has a framing bit. Six are used for synchronization and six contain signaling information. All 12 framing bits together identify the pattern as a superframe. Figure 2 illustrates the data stream of a superframe.

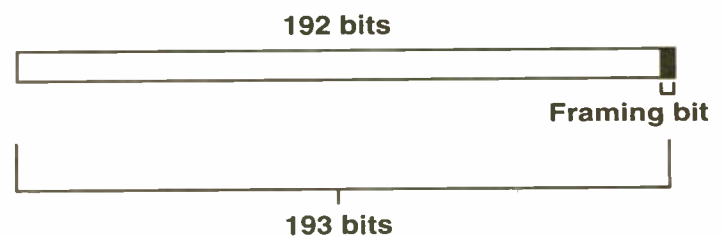
The cost of digital services varies widely, but it averages to be about the same for a stereo pair and a control circuit. The trend

Figure 2 12 Frames are combined to form a superframe. Within a superframe, each of the frames has a framing bit. The sequence of 12 framing bits identifies the pattern as a superframe.



Technically, T-1 is a high-speed channel that operates at 1.554 Mbps to transmit signals from up to 24 inputs over one facility. These inputs can include any combination of voice, facsimile, data or

Figure 3 The basic unit of data is a frame. Framing bits are used for synchronization and error correction.



video. It is a full duplex service, meaning signals can flow both ways. Figure 1 shows a simplified T-1 circuit.

Each channel operates at 64 kbps and is time-division multiplexed with the other 23 channels to create the T-1 (DS1) data stream. Each of these 64 kbit signals is known as a DSO channel. This time-division multiplexing works to assign successive bit times to each of the 24 channels, and thus the composite signal. If the 64 kbps of each channel is multiplied by 24, the result is 1.536 Mbps. An additional 8

is for prices to continue dropping. There are advantages to a digital studio to transmitter link in addition to audio quality.

Remember that T-1 service is full duplex, meaning that feeds from satellite and RPU receivers may be returned over the same line. Put in this light, the cost differential may be even more attractive.

Tom Vernon divides his time between consulting and completion of a Ph.D. You can e-mail Tom at tlvernon@aol.com or call (717) 367-5595.

Table 1 Comparison of Digital Standards

| Facilities voice | Signal Level | Bit Rate | Equivalent circuits |
|------------------|--------------|--------------|---------------------|
| T1 | DS-1 | 1.544 Mbps | 24 |
| T2 | DS-2 | 6.312 Mbps | 96 |
| T3 | DS-3 | 44.736 Mbps | 672 |
| T4 | DS-4 | 274.176 Mbps | 4032 |

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Design a Basic Meter

► continued from page 31

circuit. With a low input level, LED 2 is off. As the input voltage increases, LED 2 turns on and first glows green, then yellow, and finally red.

Resistor R10 and 2.5 V precision voltage reference IC4 provide a reference that is further subdivided by resistors R11, R12, R13 and R14. This chain of resistors creates three different reference voltages that set the voltage thresholds for the three LED colors. These reference voltages are fed to the three comparators along with the input signal. Notice that the input signal is connected to the inverting input of one comparator and to the noninverting input of the other two comparators.

The output of these comparators is then connected to LED 2. If the output of all of the comparators is floating, the red and green LEDs in the tri-color LED are biased on by R15 and R16, causing LED 2 to glow yellow. However, if the output of a comparator is internally grounded, the connected color element will be pulled below 2 V and the element will turn off.

The comparator reference voltages are set so that reference V_y is twice as large as V_g and reference V_r is twice as large as V_y . This power-of-two relationship is commonly found in audio electronics. The reference voltages are: $V_r=1.26$, $V_y=0.63$ and $V_g=0.32$.

To set the gain level of the amplifier, connect the input to the output of the averager circuit. As with the previous level indicator, apply a maximum-level signal to the input of the averager, and reduce the level to allow for headroom. Then adjust R2 in the averager until LED 2 just turns red. Now slowly reduce the audio input signal level at the input to the amplifier. LED 2 should change in sequence from red to yellow, then to green and finally to off.

The third solid-state level indicator consists of a string of 10 LEDs in one package. With a low-level signal input, all LEDs are off. As the signal level increases, more LEDs light up until finally all 10 are turned on to indicate maximum level.

The heart of this circuit is the National Semiconductor LM3915. Internally, this IC is similar to the tri-color LED circuit. The LM3915 contains a precision voltage reference, resistor divider chain and 10 comparators to drive the LEDs without the need for separate resistors, and logic to select either a bargraph or a moving dot display.

The selection of the most appropriate LED level indicator depends on your individual requirements. If all you need is indication of an impending overload, or if space is scarce, the single LED circuit works just fine. If you require more information, consider the tri-color or 10-LED indicator.

Add a touch of professionalism to your next project with an LED level indicator.

□□□

Jim Somich is a radio broadcast

engineering consultant and president of MicroCon Systems Ltd., a manufacturer of broadcast equipment. He can be reached at (216) 546-0967.

Mackie 1202-VLZ

► continued from page 16

and the 1202-VLZ makes a fine companion when setting up a first-time studio or backup multitrack production booth.

If you have a new ISDN codec for remotes, the 1202 makes a nifty little on-site mixer for mics and music sources. It can take a little knockaround treatment in the remote kit.

Well written

It is hard to find fault with the Mackie 1202-VLZ. The manual is well-written and illustrated and is peppered with humorous references.

What other company not only encourages hacking but shows you how, with circuit diagrams and instructions? Mackie walks you through the process from opening the case to which printed circuit traces you should cut.

I suppose I could wish for more input channels. A set of linear faders instead of rotary pots would have been nice, too. Mackie beat me to it and built another mixer — the 1404-VLZ —

with those very features.

I would like to have seen a separate LED meter tree for Alt buses 3 and 4 to monitor actual four-track work. And those knobs are awfully tiny for serious and intensive radio production.

A side interest of mine is field recording. If Mackie whips up a low-drain battery-powered location mixer for film, video or high-quality sampling, it would find clientele ready and waiting. If it ever decided to build an on-air broadcast console, stand back.

Greg Mackie's little baby is growing up very nicely. At \$429 list, the 1202-VLZ is embarrassingly inexpensive and an exceptionally fine little mixer.

Product Capsule: Mackie Designs 1202-VLZ Mixer



Thumbs Up

- ✓ New features
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Thumbs Down

- ✓ No LED meter for ALT channel

For more information, contact Mackie Designs at (800) 898-3211 or circle Reader Service 144.

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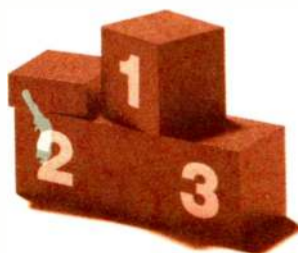
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FEEDLINE

Old Ways To Take Simple Measurements

by W.C. Alexander

DALLAS We take the Operating Impedance Bridge and the data it gives us for granted these days. By just inserting the OIB into an RF circuit under test, this handy little device gives us the load resistance and reactance. It also gives us the standing wave ratio (SWR) at that point in the circuit.

Simple adjustment

With a nondirectional AM antenna, adjustment of the LTU or ATU is simple. Insert the OIB at the end of the transmission line, read the resistance and reactance on the dials, then by trial and error, adjust the Tee- or L-network for 50-ohms resistance and no reactance (or whatever the desired load impedance). Takes just a few minutes.

In a directional array, the OIB is inserted at the driving point, i.e., the point where the tower connects to the ATU or LTU. The transmitter is turned on and the phasor adjusted for the proper array parameters on the antenna monitor. This is done because there is an insertion effect caused by the insertion of the OIB into the circuit. Sometimes the insertion effect is pronounced, sometimes it is hardly noticeable. Once the antenna monitor indicates the proper parameters, the resistance and reactance are read on the dials, corrected for frequency and used to recalculate the ATU or LTU network leg values. Simple.

There was a time, though, when simple measurements such as these were much more difficult and less accurate. The OIB that we know and love was not available until the late 1950s and did not come into common use until the early 1960s. Before the OIB was available, engineers had to use other methods of determining the resistance and reactance of a driving point or other load under power.

Methods

Low-level impedance bridges were used, but they had several disadvantages: First, measurements had to be made at very low power. Measurements had to be made with the load under measurement disconnected from its driving source. Finally, there was no means of determining the stability of the load impedance being measured with varying input or over a period of time.

Sometimes impedance measurements of those days were little more than educated guesses. There was one method, however, that was in common use way back when. It was known as the three-ammeter method of power measurement. Here is a quick sketch of how it worked.

The first of three thermocouple RF ammeters, M1, was inserted in series with the circuit under test close to the driving source. Another meter (M2), this one shunted across the load, was connected downstream of the first ammeter and in series with a capacitor of known value to ground. The third ammeter (M3) was connected in series with the circuit under test on the load side of the shunt ammeter. The three ammeters formed a T, with their arrangement resembling that of a conventional T-network.

With the three ammeters connected, power was applied to the circuit and the currents in the three ammeters were read and noted. The load-side ammeter, M3, measured the current in the unknown load Z. The shunt ammeter, M2, (in series with the capacitor) gave the value of the source

voltage E, because $E=I_2XC$.

From these two meter readings and the value of XC, the absolute value of Z could be determined: $Z = E/I_3 = I_2XC/I_3 = XC/I_3I_2$. The source-side ammeter, M1, was used in conjunction with the other two meters to determine the relationship between load resistance R and reactance X. Because, when added vectorially, I_2 and I_3 must always equal I_1 , it was possible to determine the angles between the three current vectors.

I won't bore you with all the math necessary to extract this — I do that enough from time to time in other Feed Line features — it is enough for you to understand

that it can be done. It would occur to me that with the advent of the programmable pocket calculator, extracting the values of R and X would have become easy using the three-meter method. With the OIB available, though, why bother?

The results obtained using the three-ammeter method were remarkably accurate for the day and age in which the method was used. It was the best they could do at the time and those who routinely used that method no doubt became quite proficient at it.

With the R and X known, the engineers of that day were able to compute the ATU or LTU leg values needed to match the

transmission line impedance to the load while maintaining the needed phase shift. This was little different from the procedures we use today, with the main difference being those engineers used mechanical slide rules. (I still have one around here someplace!)

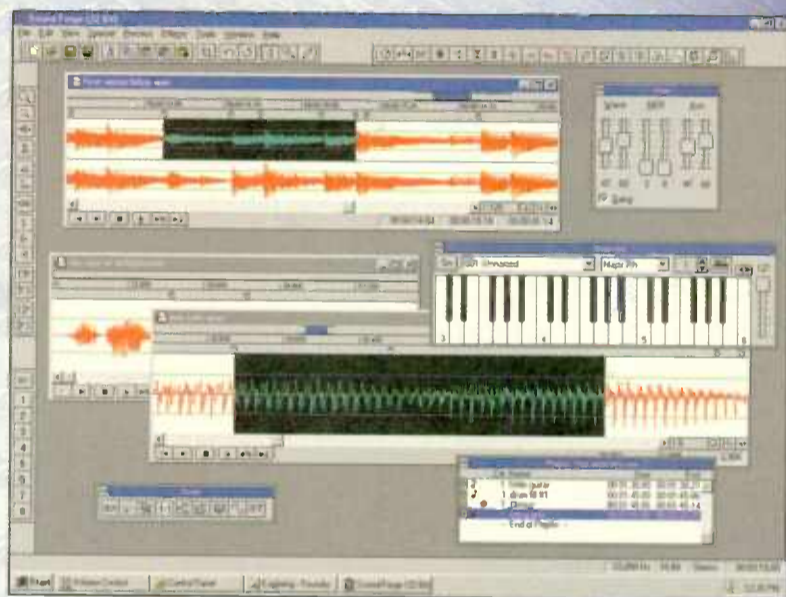
Another technique used in the pre-OIB days to match a transmission line to a load used two RF ammeters — one on the input side of the line and one on the load side of the line. The ATU or LTU network was adjusted so that the transmission line input and output currents were as nearly the same as possible while maintaining the needed network phase shift.

continued on page 48 ▶

We've Strengthened Our Cast

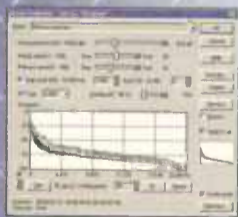
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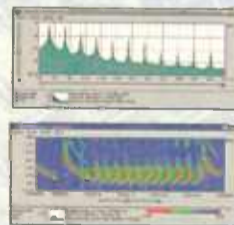
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Roots of Radio:
Early Baseball
Coverage
See page 41.

OFFBEAT RADIO

Drama Radio Still Thrills Audiences

by Dee McVicker

PHOENIX It appears drama radio is not dead after all. If you have written it off, you could very well miss the second act.

So it seemed recently when 135 stations changed the script entirely on this old radio genre by snatching up "Imagination Theater" within a matter of weeks.

"In all my years at Westwood One, I've never had a program that cleared so many stations so quickly," said Tim McDonald, previously with Westwood One but now with TransMedia of San Francisco, which began syndicating the two half-hour mystery and science fiction dramas in March.

"Imagination Theater" is one of the few radio drama shows being produced commercially today. It is known for such yarns as the adventures of Harry

Niles, a private detective who doesn't always win the case; and its contemporary, fast-moving science fiction stories.

The mastermind of writer/producer Jim French, a veteran radio personality who became interested in radio dramas when he heard Edward G. Robinson in a series called "Big Town," the show got its first

commercial following in the Seattle market.

Known there as the "KIRO Mystery Playhouse," it has been on the air on Seattle's KIRO(AM) most Saturday and Sunday nights from 9 to 10 p.m. for 10 years. Prior to that, it had been aired on



Executive Producer and Announcer Dave Adams and His Assistant Lynn Brandon

KVI(AM), also in Seattle. Now the flagship station for the syndication of "Imagination Theater," KIRO recently netted an 11.7 share, again positioning it as the No. 1 spot on the dial Saturday and Sunday nights.

Under syndication, the show will now be broadcast on stations from around the

country, having been picked up under a standard exclusive barter agreement. On March 17, TransMedia, along with sponsors Valu-Rite and Schering Plough Pharmaceuticals, delivered "Imagination Theater" to listeners tuning into at least 135 stations, including powerhouses WCCO, WGN, KSL and KEX.

"To get those kind of stations right off the bat, that's a testament to the value of radio drama and the value of this particular show," said David Adams, executive producer and announcer with TransMedia, who had recognized the popularity of contemporary drama when TransMedia sponsored Halloween and Christmas specials four years ago.

Several years prior, actors in the Bay Area tried to resurrect radio drama but because of the expense involved and the lack of good scripts, they abandoned their ventures. Still, feedback from stations and listeners indicated to those at TransMedia that radio drama was indeed alive and well.

Unfortunately, said Adams, the cost of producing dramas and the unwillingness of advertisers to pay for those productions continued to preclude the introduction of drama radio into TransMedia's syndication lineup. Until, that is, an article appeared in RW last year regarding the then "KIRO Mystery Playhouse." Adams and McDonald spied it immediately as being a viable, cost-effective show to add to its syndication lineup, which included at the time its "Point of Law" program, a "People's Court" for radio listeners.

Particularly appealing was that unlike other dramas, the show is recorded from the local Seattle Museum of History and Industry, filling up the 400-seat Radio City Music-like auditorium with devoted drama enthusiasts who come as much for the sound effects and Hollywood talent as they do the drama.

Moreover, unlike the majority of non-commercial drama productions on public radio, the show is acted out by union actors and actresses under contract with the American Federation of Television and Radio Artists (AFTRA) union. Harry Anderson, Tom Smothers, John Aston and Patty Duke are among the name talent that make appearances on "Imagination Theater."

Adding to the excitement, actors and sound personnel create all the sound effects and music live on a Foley stage, complete with all the effects parapher-

nalities typical of the '30s and '40s stage. But although the stage is vintage radio drama, the recording techniques and equipment are not.

French uses digital Sony MiniDiscs to prerecord special effects, such as airplane sounds overhead, and the same medium for post production and to download the final digital production onto the KIRO computer hard drive.

Ironically, the new digital mediums could bring radio production full circle.

"When radio drama began, everything was broadcast on the air live. We were able to go back to that style on New Year's, because we found that with the new equipment, we can record as we go," said French. Other aspects of the show will likely remain contemporary.

"We talk about current settings, the World Wide Web. It's up-to-date, contemporary and people can identify with it," said Adams, attributing this in part to the show's syndication success.

"The idea that radio drama is dead in a lot of people's minds is because for the past 40 years, it has been reruns of old shows ... the situations, scripting and style of acting, and the language used, it definitely comes off as old," he said.

Recognizing the viability of contemporary radio drama acted by professionals and produced live by a paying audience instead of produced under the studio clock, Adams and McDonald decided to give the show its best efforts at syndication, beating out another syndicator who was also interested in the program.

They were pleasantly surprised at the immediate response from the 135 stations interested in airing the dramas. For his part, French was ecstatic that the radio



Harry Anderson

market so openly embraced his murder mysteries and science fiction.

"I don't know what to expect, really. And right now it's too early to see what the impact will be around the country, but I think it will be favorable," he said. French is confident, as are the folks at TransMedia, that there will be thousands more tuning into the show every week to hear what will happen next.

□□□

Dee McVicker is a free-lance writer who lives in the Phoenix area. She can be reached at (602) 545-7363 or via e-mail at roots@primenet.com



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PERSONNEL LEVEL

Avoid Chancy Office Romances

by Sue Jones

BURKE, Va. Whenever men and women work together, sexual attraction is part of the workday. Just about everyone has observed work environment romances or perhaps been involved in them.

Arguments could be made that co-workers are potential life mates as well as anyone else one may meet in another setting. After all, where else could one so easily observe how a person handles stress, problems and success?

You might also be able to think of several office romances that led to marriage. If not marriage, you reason, it could help you advance your career if the romance is with the boss or influential business relationship. So what is the big deal? It just seems to be the natural thing to do if the situation presents itself.

Adrenalin and emotions

It is true that co-workers get to know each other very well. Activities such as achieving a long sought goal, coordinating as an on-air talent team, working and meeting impossible deadlines and supporting each other for special assignments often involving long and unusual hours lend themselves to soul mate understandings that are full of adrenalin and emotions.

The strong work intensity that two may share should not be confused with romance and sexual intimacy. They are two different sets of emotions. Success on the job is usually an artificial stimulant — and it usually lasts about as long or until the next challenge presents itself.

Other factors can come into play as well. Sometimes the taboo of getting involved with a supervisor or a married partner can make the atmosphere even more exciting and stimulating. Perhaps the person of your affection happens to have the looks and most of the qualities highest on your desire list. You may feel uncontrollably attracted to him or her. Maybe you are just interested to see if you can capture the prey.

You may not be able to deny or ignore attraction to a co-worker or client. However, you do not have to act on it. You would not yell at your boss because he or she was not impressed with your on-air performance, the report that you just completed or your sales goal figures for the past month. Managing your emotions and feelings can be crucial to your career survival and success.

Office liaisons today may be more dangerous than ever. Affairs can wreck not only marriages but careers (emphasize more than one career) as well. Several problems can stem from just one workplace romance.

In the past, only the woman risked losing her job if the affair did not work out. In today's work environment, sexual harassment charges are increasing. Many of these charges come from employees who have been seduced and abandoned by a co-worker. Management is increasingly holding men accountable for what is seen as a lack of good judgment.

Hostile feelings

Even if the sexual harassment charge is proven to be false, the additional burden it places on management to investigate the charge and defend the facts in court absorbs enormous amounts of time, ener-

gy and money resources. Given a choice for promotion, management would opt for someone untainted with judgment errors and one who would not create unneeded problems for the station/owner.

Even if there are no sexual harassment charges involved in a failed relationship, working together with wounded or hostile feelings is next to impossible. Imagine, for instance, a highly rated on-air team that emanated entertainment energy whose romance turned sour. That energy may become explosive or flat, which would send the ratings into a tail spin — a professional disaster for the two involved and a major problem for management.

If a relationship with a person who is outside your work environment does not work out, you can immerse yourself in your job as you rebuild your life. However, there is no escape at the station if your former love works there as well.

If the relationship ends unhappily, you may reason that you can handle it. After all, you are both mature adults. You may discover, much to your embarrassment, that your rejected love has no integrity about keeping the intimate details of your relationship confidential.

He or she may tell everyone at the station who will listen his or her version of the excruciating details of what went wrong

with your relationship. By the time you hear the stories through the grapevine, the damage is done and has added insult to injury.

Being civil to someone under these circumstances could test the demeanor of a saint. Working with the former love and others at the station after everyone knows the sordid details may be more humiliating than you can imagine. Your only way to preserve some dignity may be to find another job or ask for a transfer, if that is possible.

Asking for a transfer creates a management headache and does nothing to enhance your career. During the new job or transfer search, your love life is shot and your working life will be miserable.

Keep in mind, management has plenty of daily business problems to resolve. The last thing a general manager needs is to

continued on page 44 ▶

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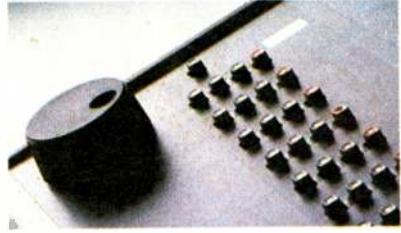
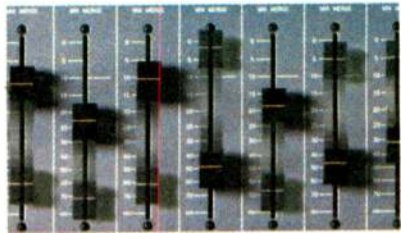
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ROOTS OF RADIO

Early Baseball No Walk in the Park

by Richard O'Donnell

PORT RICHEY, Fla. Play ball! Nowadays, baseball games last a lot longer on the radio than they did in the good old days.

First off, there is a half-hour program, during which the sportscasters fill you in on what happened yesterday, give you an idea of what's on tap for today, comment on the weather and condition of the field and interview a few notables. In some cities, this happening can be stretched out to an hour, if needed.

Then there is the game itself. You never

In my town, there were two teams back in the '30s and for most of the '40s. Boston had both the Red Sox and the Braves — who headed for other parts after the second world war.

Following their games was an experience today's listeners might not want to endure. The games went on the air at three o'clock sharp, precisely when the very first pitch was headed for home. The only announcer on hand got tangled tongue trying to fill you in on who was pitching, who was playing where and who was at bat, as well as the names of the umpires. The poor guy was exhausted by the time the first half-inning was over.

In Boston we had Fred Hoey, and later Jim Britt who did those solo performances. Later, the color guys came aboard. They included Leo Egan, Bump Hadley and Tom Hussey. By the time Curt Gowdy hit town, he had Ned Martin, any spare sports writers who were handy and even comedian Danny Kaye to help him with the games.

In the beginning

But in the beginning, we had Fred Hoey, and he wore out his tonsils telling you about the games. Only home games were aired. The Red Sox dominated for a week or 10 days, then hit the road, and the Braves took over for a while. Fred Hoey

handled both teams, and did a pretty good job, all things considered.

The sponsors had a tough time getting a word in edgewise. They could only sell their products between innings. These sponsors sold products that appealed to men. It was felt women had little, if any, interest in listening to a ball game. Beer, cigars, cigarettes and haberdasheries were sold over the airwaves. Also cars, because, at the time, men were supposed to be the only ones who knew how to drive those magnificent machines.

Scores of games in other towns were given every three innings, if the teletype was working. There were only eight teams in each league, so there weren't too many scores available.

In Boston, the games were aired over WAAB, which later became WNAC. At

continued on page 44 ▶



Babe Ruth

know how long that will run. Mostly, it depends on how many relief pitchers are used by the crafty managers in their battle of wits. A new relief pitcher usually kills about 10 minutes just getting ready, and some of them are only in there to toss one pitch, after which another rescue hurler may waste 10 minutes more before getting to work. Some games can take an eternity, if enough relievers are available.

Pre- and post-

Then there is the show after the game, during which the sportscasters tell you all about what happened during the long running game you have just heard. They also tell you the scores of other games, fill you in on what's next on the old schedule, and grab an interview with the batboy, or some other individual who figured prominently in the game that day.

When all is said and done, the idea is to get as many commercials in as possible. Games are expensive to broadcast today, and those commercials foot the bill. The more the merrier. So be it.

During the early years of radio, baseball had trouble sticking its nose in the door. In those days, everything had to be on time. If a program was due on at a certain time, and the game was still in progress, fans sitting close to their radios were stuck with the regularly scheduled show, and often did not learn the final score, until they read it in the next day's newspapers. Babe Ruth might have slugged a game-winning homer and it would be hours before his fans were aware of the fact.

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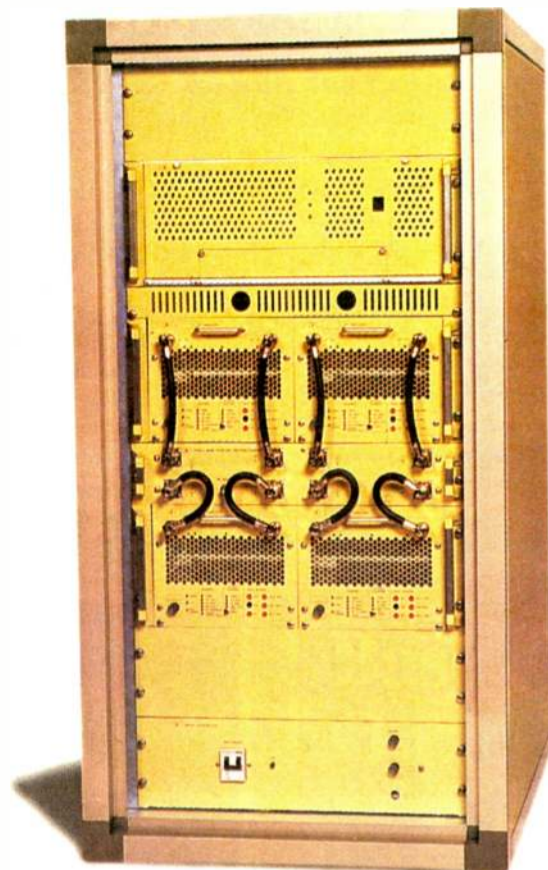
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Choose between News and Privacy

by Jerry Woods

LOS ANGELES When covering news or just mentioning a private individual on the air, many radio personalities do not give their coverage a second thought. Then the phone rings and an irate listener asks for the management or a letter comes threatening legal action against your station.

Are you prepared for someone to accuse your station of invading his or her privacy? What would you do if it happened?

Right to know

For a long time, privacy has been an issue relegated to college classes on journalistic ethics. All 50 states have statutes involving privacy and the broadcast media. No two of those statutes are the same. The issue of privacy continues to evolve and it is an issue that can cost money and your reputation.

News people from all media sources have long taken a traditional approach to privacy that says if it is news, then people have a right to know. That approach is consistent in radio as well.

Our interest isn't in protecting the individual's privacy. It's our job to get as much information as possible and convey that information to the public, said Doug Esser of the Associated Press Seattle bureau.

While this is a view many broadcasters cling to tenaciously, failing to at least adjust it could be costly to your station. The goal is to find the middle ground where broadcasters do not have to restrict their freedom of speech yet do not jeopardize the privacy of individuals.

Supreme Court Justices Samuel Warren and Louis Brandeis first addressed the issue of privacy around the turn of the century in the Harvard Law Review. They wrote "A person who unreasonably

and seriously interferes with another's interest in not having his affairs known to others ... is liable to another.

Since then, many cases involving radio have faced civil actions in courts in all 50 states. Because privacy is dealt with differently in every state, it is important for broadcasters to examine potential problems that a careless phrase spoken on the air about a private individual could cause.

Talk show hosts and DJs have had their own scrapes with privacy issues. However, the news sector of radio works quite a bit differently. In recent history, not too many air personalities involved primarily in news have faced civil action involving privacy.

Our interest isn't in protecting the individual's privacy. It's our job to get as much information as possible and convey that information to the public.

News is construed to be truth, and truth is considered an absolute defense against any type of suit. Still, your station can be placed in a very negative light if it appears to be picking on Joe or Jane Average without good cause.

I had the opportunity to face this type of situation at KGTS(FM) in Walla Walla, Wash. In May 1993, I did a follow-up story on a man being sentenced for intentionally starting a forest fire in the summer of 1992.

I quoted the local newspaper in part of the story regarding the man's mental health. Soon after finishing my newscast,

I received a call from the man's wife who threatened to take action against my station.

After offering to interview her and assuring her that I was interested in presenting a balanced view of the story, she thanked me and ended the conversation. What started as a touchy situation turned into a fairly amicable one. This is proof that avoiding a privacy conflict can be as simple as hearing the involved party out.

Guidelines

While there will always be those listeners who are never satisfied with your station, there are some steps you can take to help protect yourself and keep complaints to a minimum. Most leading stations and networks produce their own

protocol manuals for news people, but anyone could benefit from reading the guidelines on reporting.

Most seasoned air talents agree that it is a good idea to keep some guidelines regarding privacy in mind. Bill Lorin, the Orange County correspondent for KNX(AM) in Los Angeles, suggested taking only information most relevant to your story and making sure it is attributed carefully to the proper sources. He said most of the time when someone requests anonymity, you can use his or her information to find someone else to confirm your story. This can avoid

conflicts about what was said on or off the record.

You need to have consideration for everyone involved in your broadcasts, but don't get sidetracked from your story, said Lorin.

At San Diego's KCEO(AM), a talk-format station, the policy is to call anyone the station plans to discuss before the broadcast.

Program director John Van Zante said individuals who are discussed on a program are always given opportunities to voice their opinions on the air on the show in question. He said this eliminates many problems. If anyone calls to complain, he can always say, "We offered you air-time and you didn't take it."

While no guidelines are all encompassing and nothing can solve all of your privacy conflicts and complaints, having a defined policy can help.

First, focus on essential details when covering news. Second, always remember to keep your target audience in mind.

It is what they want to hear that counts. Third, if you are expressing strong opinions, be willing to give the other side a voice. Fourth, do not give in to the temptation to pander, to hype or morbid curiosity. Finally, remember that different people have different media tolerances and what is OK in Los Angeles may cause an uproar in Little Rock, Ark.

Considering privacy issues does take time, but it will pay dividends.

In worst-case scenarios, it may even help you avoid a lawsuit. It will help your station build a reputation of integrity and bring you positive reactions about being a people-friendly station.

You will be one step closer to the goal of serving your community and it couldn't hurt your bottom line either.

□ □ □

Jerry Woods is a news anchor at the Positive Life Radio Network in the Northwest. He is currently on sabbatical in Southern California. He can be reached by fax at (619) 747-8087.

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READER SERVICE NO. 155

Romance Can Be Risky Business

► continued from page 39

untangle the problems of an office romance and the impact it has on station operation and performance. If you are the cause of this type of problem, your promotion potential drops drastically, if you manage to keep your job. You have unwittingly added to the management's problems.

Double trouble

Engaging in an affair with the management carries all of the above potential problems plus more. Most likely, you will be given preferential treatment during the upswing of the relationship. This favored status will be immediately noticed by the rest of the staff and many

will be resentful. This resentment will be even greater if you are promoted to a position over other more experienced and qualified staff members.

Your skills will be immediately attacked. Staff members will openly discuss whether your newly elevated status is a result of bedroom skills instead of your improving business/broadcasting talent. Your relationship with your co-workers will become estranged. They will no longer trust you with information about the station and confidences they may have shared with you in the past, for fear that you will pass it along to your new sweetheart.

Emotional involvement clouds objectivity. Teachers are not permitted to teach

their own children. Doctors are not allowed to treat their own family members. When a manager is emotionally involved, he or she will either be too lenient with your performance, always protecting you or be too harsh so as not to appear to be playing favorites. Either way, you lose. One thing the staff member rarely thinks about when involved in an affair with the supervisor is what happens if the supervisor is no longer employed at the station. The protection that you enjoyed with the former boss is gone. The staff will laugh at you, at best, or they may become hostile. The hostility often is transmitted in derogatory comments (truthful or untruthful) to the

new manager, influencing the perception of your abilities. This could be malicious enough to set you up for dismissal.

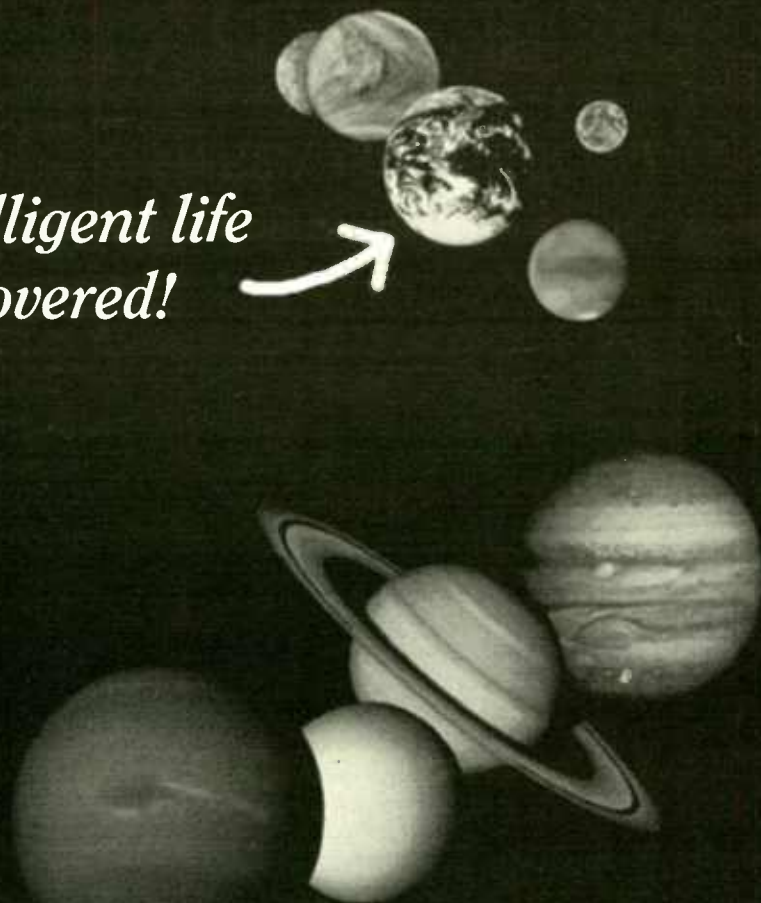
Look at work environment romances from another perspective; you will naturally make some mistakes in your position by not being careful enough, through dumb luck, by not knowing the correct thing to do or because of circumstances beyond your control. Engaging in these types of liaisons guarantees the potential for problems. Controlling your attraction in the work place can eliminate one career busting problem for you.

Next time I will discuss the way you can protect yourself and avoid these types of situations.

□ □ □

Sue Jones is a principal in Bisset Communications, a communications management firm located in the Washington, D.C. area. She can be reached at (703) 503-4999.

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Baseball On the Air

► continued from page 41

exactly 5:15, "Superman" came on, followed by "Captain Midnight" and "Tom Mix." During the winter, when there were no games, they were great listening. During the summertime, if you were tuned to the baseball game, you grew to hate poor Superman.

Ted Williams could have been at bat, Bob Feller pitching, and the pennant at stake. It didn't matter. At 5:15, "Superman" went on. That meant the game went off. You were left waiting for the next pitch to be tossed.

Later on, at 6:15, on the same station, after the news, there was a sports show with Fred Hoey, or Jim Britt, and you finally were able to learn what happened. If you missed the sports show, you had to wait for the newspapers.

A matter of style

Then there were those "telegraphic recreations" of road games, when the local games were rained out. Say the Braves game was called off, and the Red Sox were visiting the Yankees. Naturally, there was an audience for the New York contest, but in those days, live games on the road, in my town, were banned.

Jim Britt and Tom Hussey would sit in a studio with a Western Union chap who knew Morse Code. Pitch by pitch, the game would be teletyped into our area. Britt and Hussey would try to make the game as lively as they could and that was a task with that teletype clattering away in the background.

Also, a lot depended on the dramatic ability of the announcers. If your announcer was a frustrated actor, or had a sense of the dramatic, the telegraphic shows might not put you to sleep.

The clicker would sound once or twice, and then Britt would say: "Strike two. That one was low, and on the corner, folks. Jimmy Foxx eyed it carefully, then elected to take it. It was a close call, and the Foxx gave the umpire a dirty look, but didn't say a word."

Hussey's approach was a bit simpler. The clicker would sound and Hussey would say, "Called strike two," and let it go at that.

continued on page 50 ►

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READER SERVICE NO. 167

INTERNATIONAL UPDATE

Tapping Potential Ad Dollars in Europe

Part II of II

by Frank A. Aycock

BLAGOEVGRAD, Bulgaria Given the oft-cited problems undercutting the success of commercial radio in Central and Eastern Europe, how can broadcasters and others create a healthy market for radio advertising?

The four major problems facing stations — the non-management background of station operators, the lack of an aggressive sales culture, market saturation and hesitant advertisers — are all real problems,

but ready solutions are available.

The first thing to realize is that the market saturation effect is largely artificial, existing mainly in the minds of owners and salespeople.

Sofia, Bulgaria, for example, has 12 private and two government radio stations as of summer 1995, for a population of 1 million to 1.5 million people. Station owners were sure the market was completely saturated and that weak stations or stations without major financial backers might have to fold. However, in the United States, a city the size of Sofia might have 25 or even 30 radio stations,

most of which would be profitable.

A deeper understanding of market potential and possibilities, and how to draw upon them for the additional revenue needed by their respective stations, is required of station owners.

Tap small companies

It is not enough to attempt to sell airtime to McDonald's, Coca-Cola, Sprint, major banks, corporations and so forth. Those clients are helpful, provide income and often are willing to pay inflated prices. But small and indigenous companies, which stations believe will not or cannot afford to advertise, go untouched in each market.

Furthermore, because all station owners want major and Western corporations advertising on their stations, the corporations are able to pick and choose with whom they will advertise. Being well versed in market competition, these companies select only those stations that can deliver, at a reasonable price, a large or stable audience of consumers likely to purchase their products.

With the realization that the market saturation effect is artificial, a complex series of education plans is needed to remedy the problems of revenue generation for private radio and television stations in Central Europe.

Market transition

When these nations began their transitions to market-based economies, experts, consultants and academics from the West immediately began to develop programs to encourage the development of free and independent media. Free and independent media was viewed as essential to the success of each country's transition.

Often forgotten in the rush to develop Western journalistic practices was the fact that a free and independent media that did not know how to survive in a market situation is an economically doomed media.

The West missed the boat.

Often, seminars and workshops on the revenue side of media were one-shot, piecemeal events, with little to no follow up and no sustained support. Only recently have Western organizations focused on sound business practices and continuing support and follow up with the developing private stations.

The end result is that private stations have had to struggle to develop economically.

To address these problems — and to ensure the development of a free, independent and successful media — an educational program must be developed to train radio station personnel in the market-economy survival skills they need.

Station personnel need immediate education in selling and advertising. It is not enough to be order-takers; the sales force of private radio stations must be aggressive.

They must understand the basics of making sales calls, closing sales and overcoming client objections — probably the most important aspect for the average radio salesperson. Station personnel also must understand the importance of radio to the community and to their clients.

Furthermore, sales personnel must

understand exactly what advertising on their radio stations can mean to potential clients. Potential clients in Central Europe are inexperienced in using advertising to increase store traffic and sales. Sales personnel must be prepared to explain in detail the advantages of advertising and of advertising on their station in particular.

Finally, salespeople must understand how to "service" a client, being the liaison between station and client and providing clients a face and a name they can trust.

Educate sales team

Sales managers must be educated in making a sales force productive. Unfortunately, many station owners are also sales managers and they are so overburdened with trying to keep revenues and expenses at least equal that little time is left to guide their sales team.

Also, stations often have adjunct sales personnel, free-lance salespeople who make occasional sales for the station in exchange for a commission. While such adjuncts can lower costs, the practice does nothing to build a stable sales force, one that clients come to know and trust.

Furthermore, free-lance salespeople often know little more about the station they are working for than the average listener. Therefore, the free-lance salesperson is not in a position to address the concerns of potential clients or to counsel them as to the importance of advertising on a particular radio station.

Finally, there is no one liaison between the station and client in the event of a problem. The ultimate result of relying on free-lance salespeople can be the station's loss of reputation and clients.

Sales managers also must set prices for advertisements that ensure station profitability and these prices must be used when salespeople meet with clients. The sales initiative must be regained from the clients.

Good product

Radio stations have a product to sell — a good product — and, except in very unusual circumstances, they should not lower the prestige of a station by accepting whatever a client will offer just to make a sale. Leadership is key for sales managers.

Both sales managers and salespeople must be creative in developing revenue for the station. Salespeople should be encouraged to develop new ideas, including marketing and promotional ideas that combine with advertising. Often, for stations with the capability, outside broadcasts from the client's location are good for both the station and the client.

Finally, salespeople should be encouraged to seek out new clients among businesses that do not ordinarily advertise. The constant development of new revenue sources is critical to newly formed stations.

Stations should work to provide opportunities for new and small businesses to advertise. New businesses can become long-time, supportive clients to attentive stations that help them become established in a community. Likewise, small businesses can become major businesses

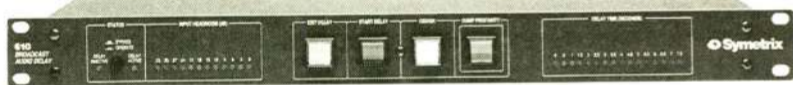
continued on page 48 ▶

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World Radio History

Simple Measurements

► continued from page 36

The term "line balancing" was really a misnomer; there was nothing at all balanced about the transmission line. I suppose because the input and output currents were in balance, the name was coined and stuck.

Take your best guess

In my travels, I still see many old phasors that have RF ammeters for each of the transmission lines. At each ATU or LTU, there are usually two RF ammeters — one for line output current and another for base current. With those meters always in place, the engineers that kept watch over such arrays could keep a close eye on the transmission line match.

There was one other method used in the pre-OIB days, one that was used perhaps more than any other. I call it the "best guess" method, and that is just what it was — a guess. The driving point impedance was not exactly known, but some assumption about its value was made and the ATU or LTU network values were set using this assumed driving point impedance. This is, incidentally, the same thing we do today as the first step in an array setup, although, with the help of moment-method analyses, our guesses may be a lot closer than they were back when.

Often, nothing beyond the adjustments necessary to produce the proper directional pattern was done to try and match

the transmission lines to the loads. Engineers of that day knew there were sometimes horrendous mismatches on the transmission lines, and to ensure that the lines would not arc over and fail, the size and type of lines used was selected to provide a large safety margin.

At MW frequencies, the mismatches themselves resulted in very little loss, so in a sense the mismatches were acceptable. There was, no doubt, a negative effect on bandwidth, and reactive loads at the phasor output surely made the phasor controls have unpredictable results. I have seen a lot of old phasors where the

label on the phasor controls had little relationship to what the control actually did!

In light of the primitive tools available, it is amazing that engineers in the pre-OIB days were able to make some of the complex directional arrays of that era work at all! The reality is that many of the "old masters" were truly that: masters of the antenna art. Some of the best working, most stable and best sounding directional arrays ever built were successfully tuned up and commissioned without any means of accurately measuring impedances under operating conditions. This is a real credit to those engineers, and my hat is truly off to them. I wish I had even a sprinkling of their knowledge and skill.

Today, we have all kinds of tools at

our disposal that the old masters never dreamed of. We have the OIB, which, perhaps, has made the biggest change in AM antenna work to date. We also have vector impedance meters, frequency synthesizers that don't drift, computers that can very accurately model antennas, and digital, direct-ratio antenna monitors.

Makes me wonder what one of those antenna wizards could do with all these tools at his disposal. Who knows? He might chuck 'em all and hook up three ammeters!

□ □ □

Cris Alexander is director of engineering for Crawford Broadcasting in Dallas. He can be reached at (214) 445-1713 or by e-mail at 76440.1670@compuserve.com

Selling Ads in Europe

► continued from page 46

over time, and they do not forget attentive stations. But it is not enough to educate only the station sales force. Clients themselves must also learn the importance and benefits of advertising.

Many business people in Central and Eastern Europe do not see the need for advertising, do not understand advertising, consider advertising a waste of hard-earned income or even find the effect of successful advertising a fearful proposition.

In the confusing business regulatory climate of Central Europe, small business owners may view growth and expansion

in their businesses with a certain amount of trepidation. Advertising increases store traffic. To stay apace of increased traffic, more inventory must be purchased. Increased floor space is needed for the increasing inventory and traffic. A new building may need to be built. All of this means additional costs.

Why should a person want to take such a big risk when a change in the government — local, regional or national — could suddenly shut a business down, leaving large bills and no means to pay them, all because the entrepreneur appeared too prosperous and a possible threat to someone in the government?

This notion may be incomprehensible to Western businessmen, however, it is within the realm of possibility in some parts of Central Europe.

Successful radio station salespeople must overcome these situations. The fears and misgivings of potential clients must be alleviated, and they must be counter-balanced by the advantages of business. Private radio in Central and Eastern Europe is at a critical stage in its development. The nations of the region need free speech and free media. But free speech and free media are only theories when private, independent media outlets cannot afford to operate.

□ □ □

Frank A. Aycock is associate professor of journalism and mass communications at the American University in Bulgaria.

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KEYBOARD CONNECTION

Organize Business Cards on Computer

by Barry Mishkind

TUCSON, Ariz. Right now, do me a favor and look in your desk drawer. What do you see?

If you are like me, chances are you found a bunch of business cards there. Try another drawer. More cards? I understand. They seem to come from all directions. And worse yet, I have four cards from some folks, and no idea which address and phone number is current.

Get organized

I have tried sorting the cards into piles. There is one for broadcasting, one for computers, one for friends and one for ... well, for those I can't figure out where they belong!

It is all very frustrating, and by the time you read this, I will have acquired another pile of cards from the NAB show.

A solution presented itself at last fall's COMDEX computer show. It is the Seiko Smart Business Card Reader. This little desktop unit plugs right into your parallel port (the one your printer uses); there is no card to be inserted into your PC.

The software scans in each business card in a couple of seconds. Better yet, an OCR (Optical Character Recognition) module kicks in and reads the cards, and then adds the information to a database ready for you to export to most popular PIMs (Personal Information Managers).

Like any OCR system, the Smart Business Card Reader is not perfect. A sheet packed with the unit explains that reversed, angled or curved text, or cards with very low contrast will yield poor results. However, I found that on well over 90 percent of the cards I fed to the SBCR, it delivered useable text to the database. That last statement bears a bit further explanation.

Minimal typing

It is one thing to do OCR. The SBCR system does more. The software is programmed to recognize patterns of words and numbers. This means the phone number is automatically put in the phone number field; the address is separated into street, city, state and ZIP. In other words, you have little typing to do.

Of course, with so many variations in business cards and what is on them, sometimes the SBCR is unsure of where to put some information. In this instance, the user can drag and drop text from one field to another while viewing the original business card in a window. It is even possible to zoom in and double check information.

Among the database features, each card can be marked into any of several different categories. With them, the search function and a set of lettered tabs allow you to jump to a section of your card stack in an instant.

The SBCR installation was quick and easy, once I figured out that long parallel cables are as bad for SBCR scanning as long runs of unshielded audio are in your studio. Avoid problems by keeping the cable attached to the computer port to six feet or less.

Adding a switch box is no problem, and allows you to use both card reader and printer easily. Seiko also makes a nice label printer that allows use of the database directly. The printer plugs into a serial port

on the computer, so there is no interaction between it and the card reader. As a result, making address labels is a snap.

There were two software matters that

an initial capital and then lower case letters. Perhaps this will be added later.

Also, I found that once I started scanning cards, the SBCR kept my processor

I found that on well over 90 percent of the cards I fed to the SBCR, it delivered useable text to the database.

caught my attention. As I scanned more and more, I noticed many cards used text in all capitals. However, the software did not have an option to set each word with

usage (as reported under Windows 95) at 100 percent until I closed the program. Using it only to read the database was no problem, but you won't want to leave the

program in the background all day after scanning.

Are there scams and ripoffs in the on-line world? Certainly.

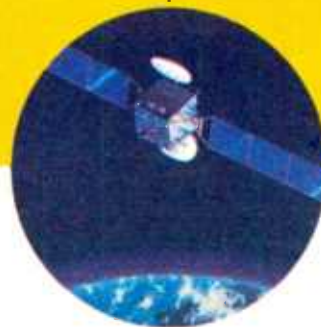
As more and more people go on line with the different e-mail and Internet services, it becomes important to learn about those who pose potential dangers to your data, as well as to your privacy or financial security.

"Bandits on the Information Superhighway," by Daniel Barrett (O'Reilly & Associates) points out the simple precautions that will save you from problems with hackers and others who might intercept your password or e-mail, or might try to trick you into helping them gain access to your computer account.

Real life examples and anecdotes will

continued on page 50 ►

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Circle (46) On Reader Service Card

World Radio History

Computerize Your Business Cards

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help keep those of you new to the Internet from falling victim to the "Make Money Now" posts, as well as many of the "in" jokes that persist and are played on each newbie.

Knowing how the Internet services work will demystify a system that is both arcane and simple at the same time.

You have likely heard about Yahoo and Infoseek.

However, searching for something specific on the Internet is not always easy, especially for those still on a 2,400 baud connection.

One solution is the "McKinley Internet Directory and Yellow Pages" (New

Riders Publishing).

The directory has over 15,000 Internet resources, including web sites and e-mail lists.

Each site is evaluated and rated, to give you a clear idea of what is available and how to get there fast. If you pay by the hour for Internet access, this book will quickly pay for itself.

Speaking of Internet resources, I would be remiss if I did not mention two resources of particular interest to broadcasters.

First, <http://www.broadcast.net> special-

izes in the needs of professional broadcasters. Recent additions include the daily FCC filings courtesy of Mike Elliott.

Many SBE Chapters can be found there, as well as State Broadcast Associations. There are even e-mail discussion lists for professionals only.

The news department will want to know about a new book from the RTNDF.

"Wired Journalist: Newsroom Guide to the Internet" is a tutorial on how broadcasters with limited time can get on the Internet and quickly locate material of

Finding something on the Internet is not always easy.

value to the newsroom. (For information call RTNDF at 202-659-6510.)

Finally, for those of you who administer the computer systems and Internet connections at your site, "Managing Internet Information Services" by Liu, Peek, Buss, and Nye (O'Reilly & Associates) is an indispensable guide to everything from uucp to setting up secure web sites.

Clearly written, "Managing Internet Information Services" walks you through the steps in setting up configuration files and links so the information you wish to disperse is accessible to others, while your private material stays private.

□ □ □

Barry Mishkind can be reached at 520-296-3797, or barry@broadcast.net via the Internet. Check out his home page at <http://www.broadcast.net/~barry/>

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Baseball On the Air

► continued from page 44

Whether the baseball games were live, or telegraphic, they went off the air at 5:15, no matter what was happening. "Superman" prevailed.

Bright Idea

Then somebody had a bright idea. It was decided, at 5:15, that the baseball game would be switched to WMEX, another Boston station. It was located in Kenmore Square, and only had power enough to send its message to the other side of the street.

Greater Boston followers of the sport twisted their dials all over the place, until they heard WMEX whispering the games. That way, if they were lucky, they found out how the game ended.

WMEX was a classical music station, and at six o'clock some announcer with a nasal condition played recordings of the great music of yesteryear.

He would talk about Mozart or Brahms, or some other great composer for five minutes, and then fill you in on the symphony about to be played, after which he put the record on.

If the baseball game lasted beyond six o'clock you had to listen to classical music — if you were able to pick up WMEX. You may not have heard the final score, but at least you were blessed with a slice of culture.

After the second world war, they started broadcasting the road games live.

This meant another station, WHDH, got in on the act. Curt Gowdy was brought in to broadcast the Sox games on that station, and Jim Britt remained with the Braves on WNAC, which had become WAAB by then. Poor Britt! The Braves left town shortly after that, and he didn't have a team to talk about.

Baseball, as it is done on radio, has definitely changed. They even broadcast spring training games now.

It is all over the airwaves — that is, when the players are not on strike.

Stations Can Be Found in Unusual Places

by Lee Harris

NEW YORK Despite their varied formats, facilities and ownerships, America's 12,000-plus radio stations tend to be found in the same kinds of buildings.

Big city stations are usually located in office buildings, while smaller market stations are frequently found in their own buildings, often at the transmitter site. There are exceptions to this rule of course, and sometimes they seem inappropriate to the point of hilarity.

Cheesy rocker

I had the misfortune of working for a station located in a cheese factory, and you'll never guess the state (right). This was WYXE-FM, Sun Prairie (Madison), Wis., circa 1976.

While this location actually didn't present any operational problems, it was embarrassing to tell my friends that the really cool rocker where I held down the coveted night shift had studios inside "The Wisconsin Cheeseman."

More problematic was the temporary location of WLIX in Islip, N.Y., a couple of years earlier.

For about three months, the station operated from a trailer at the transmitter site, directly across the street from "Islip International Speedway."

Somewhere I have an aircheck in which I'm attempting to read a newscast while being drowned out by 50 or 60 mufflerless stock cars.

Silly station locations proved a popular topic on the Internet's Airwaves Radio Journal recently. George Carden of the WAY-FM Network in Nashville, Tenn., shared the story of WHRT in Hartselle, Ala., which had studios in a bowling alley.

Long before Sprint, this station had audio so good you could hear a pin fall, or if somebody was having a good night, 10 pins.

Sometimes extraneous noise isn't completely inappropriate.

When I was the co-owner of WIBU in Poynette, Wisc., we had 60 head of Red-Poll cattle grazing the 29 acres behind our scenically located studios.

Folks can stop in, buy some of that fine Wisconsin cheddar and request the new George Strait record.

The jocks tended to keep the windows open during warmer months, so it was not unusual to hear the not-too-distant lowing of cows during breaks.

Because the station programmed a lot of farm news, it sort of enhanced our credibility.

The crashing of pots and pans might be a problem at WEBK-FM in the ski resort of Killington, Vt.

WBZ Boston's Scott Fybush reports that the K-105 studios are located above a restaurant in a small strip mall. You have to go through the kitchen to get to the station.

Radio to go

Also on the food and beverage beat, KFBK Sacramento, Calif., newsmen Mike Ward tells us that he spent about four months in 1990 broadcasting from a pizza concession trailer, the kind used at county fairs.

This was at WOKG(AM) in Warren, Ohio, after the station's actual studios (in

a farmhouse) burned down.

As it turns out, the station's owner had no intention of building new studios. WOKG was sold to a crosstown rival later that year, and now operates from that station's studios in Niles, Ohio.

Security is often a problem at radio stations, but not at the old WEFA-FM in Waukegan, Ill. This station had its air studio in a unused vault in the basement

But the prize (if we were awarding one) for the most bizarre station location would have to go to WNOP(AM), Newport, Ky. (Cincinnati), which is housed in three upright gasoline tanks welded together into a multistory three-pod ark of offices and studios floating on the Ohio River and tied up at the Covington Marina.

Visitor Lee Kent reports that WNOP played LP jazz and called itself the "Jazz Ark."

"Now that was an interesting permanent location for a station. I was promised that my family could sit on the top of the great Jazz Ark to watch the Labor Day fireworks on the river, and I up and left town before it could happen," Lee said.

Mark Howell, news director of KUZZ/KCWR, Bakersfield, Calif., reported that he too had the peculiar experience of visiting WNOP shortly before they moved.

Mark said in "rough weather you'd occasionally hear a tone arm skitter across a record, even though the jocks would weight them down. CDs were a godsend to that station."

There are no doubt many other examples as we look back through the history of broadcasting (didn't pioneer KDKA start out with studios in a restroom?), but such oddities are fading as the industry matures.

Still, for the listeners, the physical location of these stations was probably never important.

As all broadcasters know, good radio (and maybe bad radio, too) has always been theater of the mind.

□ □ □

Lee Harris, former station owner/manager, is currently morning anchor at all-news WINS(AM) in New York. Reach him by e-mail at lee@harrisnet.comnab-dab

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Marketplace

The following is a sampling of product information from NAB '96. Look for complete product coverage of NAB '96 in the May 29 issue.

APT-Q ISDN Audio Codec

The apt-Q ISDN audio coding system from Audio Processing Technology (APT) is the result of a technology cooperation with AT&T. The apt-Q system is designed to deliver high-quality stereo at low bit rates over a single, direct dial ISDN or Switched 56 channel.

The apt-Q complements the company's apt-X 4:1 compression incorporated within the WorldNet product range of codecs and peripherals.

BE AudioVAULT Now in Windows '95

Broadcast Electronics (BE) introduced AudioVAULT for Windows '95. According to the company, the new software is backed by a more stable and reliable 32-bit operating system.

BE also announced the addition of the AV-Schedule to the AudioVAULT digital audio application suite as part of the Windows applications. The application imports traffic and music data from a scheduler, merges the two and allows the resulting playlist to be modified.

In addition to playlist control, the AV-Schedule allows for a number of reporting functions such as automatic production orders and discrepancy reports.

EV Releases Several New Products

Electro-Voice introduced several new products this year, including a new 635L



LAS VEGAS A number of customers of Intraplex Inc., were awarded plaques and recognized as "Digital Broadcast Pioneers" at NAB '96.

The Westford, Mass., company acknowledged customers that were among the first to realize the advantages of T1 broadcasting technology and to implement it for their stations.

Christine Doyle of Intraplex marketing communications explained the Intraplex Digital Broadcast Pioneer award recognized "the vision of individuals in the broadcast market for being the first to usher in this new technology."

The first awards were presented at NAB to (top, l-r) Andy Laird, Heritage Broadcasting Corp.; Bill Ruck, KNBR(AM)-KFOG(FM); Mike Kirk, National Public Radio and Peter Kingslien of Wisconsin Public Radio. Shown in front: Jack Kelly and Christine Doyle of Intraplex Inc.

Other recipients received their awards after the show.

microphone, the RE200 True Condenser studio instrument microphone and the RE1000 True Condenser Microphone for the home. The Electro-Voice 635L extended, interview-length handle allows for carrying a mic flag while leaving room for the reporter's hand.

The RE200 condenser microphone is an externally biased, high-voltage condenser microphone that lowers noise and distortion while increasing sensitivity, the company said. A continuous presence rise

enhances the overtones of an instrument to maintain definition in dense mixes.

In addition, the RE1000 studio microphone has a self-noise floor of less than -14 dB which is ideal for digital recording, the company said. The RE1000 has a low-frequency roll-off switch that engages a 12 dB per octave filter at 130 Hz.

Enco Adds Pentium/PCI Computer Hardware

Enco expanded the DAD486x audio delivery and storage system to include Pentium/PCI computer hardware and renamed the unit the DADpro to reflect the additional support.

DADpro is DOS-based software that provides production, library management and multiple-output audio for live mode or automated on-air playback. The DAD system is non-proprietary and uses commonly available off-the-shelf computer components and network architecture.

Additional developments from Enco include new software drivers allowing implementation of fully networked linear (uncompressed) PCM audio and the DADjr lower-cost workstation for non-staffed downlink sites. Also included is RAID Level 7 data storage technology that allows hot-swapping of hard drives.

Broadcast Verification Debuts

The AudioAudit independent electronic audio broadcast verification system is in operation and ready for use in Los Angeles and New York.

Burton Greenberg, president of AudioAudit, expects a nationwide rollout of the technology by summer. Eventually 225 radio, television and cable markets will be covered by the system.

During NAB, the AudioAudit system was shown at the Westwood One Radio

stand. For the past year, Westwood One has been testing the system successfully.

The system uses a proprietary method, called Electronic Audio Receivers (EAR), that can tune into any broadcast frequency in a local market.

It functions as a national computer network. The basic unit, the encoder, tags all broadcast material at the source, distribution point or local site. A national server collects the files from regional servers and local sites to compile daily or weekly reports that, in turn, are sent to data links at end users' offices.

Gentner ET10 Desktop Teleconferencer

The ET10 Teleconferencer from Gentner is a teleconferencing unit that connects to most digital or analog telephones used in business and is compact enough to fit discreetly on top of a desk. The ET10 features full duplex audio that, unlike speaker phones, does not cut off caller audio when local participants speak.

The ET10 also is portable, making it easy to take along on business trips or to set up for conferences in any location. A headset port and tape recorder jack are included.

ITC Windows Software Controller

The International Tapetronics Corp. (ITC) WIN-ARM2 is developed to control the company's Audio Routing Switcher product. WIN-ARM2 improves the programmability of the switcher by allowing interactive editing of configuration and control files on a PC computer via serial links with the Switcher Master Controller.

New features include executable schedules of time-driven events, increased SALVO capacity, configuration editing features, a matrix map display and on-screen logging with selectable printer and file logging.

RCS Highlights All-digital Console

An all-new, all-digital console from Klotz Digital Audio Communications is available from Radio Computing Services (RCS).

RCS is customizing the Klotz Digital board for radio stations interested in adding a digital interface to their studios.

With rapid pace of digitization — and the impending widespread introduction of Digital Audio Broadcasting (DAB) in much of the world — RCS expects more and more stations to upgrade their facilities in the coming years.

The console can be equipped with up to 48 input channels, each outfitted with five-band parametric EQ and level-control functions. An IBM-compatible PC is also connected for graphical display.

Pioneer Intros DJ Series

Pioneer New Media Technologies introduces its new Pro DJ Series for the broadcast industry. System components include the Pioneer CDJ-500II CD player and the DJM-500 mixing board.

continued on page 56 ►

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READER SERVICE NO. 194

Polishing Salvages Scratched CDs

by John Bisset

SPRINGFIELD, Va. Feedback suggests that salvaging scratched CDs by coloring the scratch with a black Sharpie marker seems to have mixed results.

Craig Rogers is the production director at WHO/KLYF in Des Moines, Iowa. His program director was generous enough to donate some CD singles that stiffed, and Craig tried his hand at scratching the disks with a pocketknife and his thumbnail. Some of the smallest scratches seemed to skip less after being colored-in using the black marker, but none were repaired fully.

Keep the Sharpie in the production room with the cart labels, Craig, and read on ...

Nick Kratz worked in a stereo shop and, during his time there, serviced over 1,100 CD players. He has a trick of his own to pass on to Workbench readers.

He has found Meguiar's Mirror Glaze 17 Professional Plastic Cleaner, sometimes followed by the company's Mirror Glaze 10 Professional Plastic Polish, makes all but the severest of scratches disappear.

The fluids are applied sparingly, with a very soft cloth — Nick recommended old, but clean, cotton shorts or t-shirt material — and rubbed on the disk in a radial direction. The compound sometimes adds

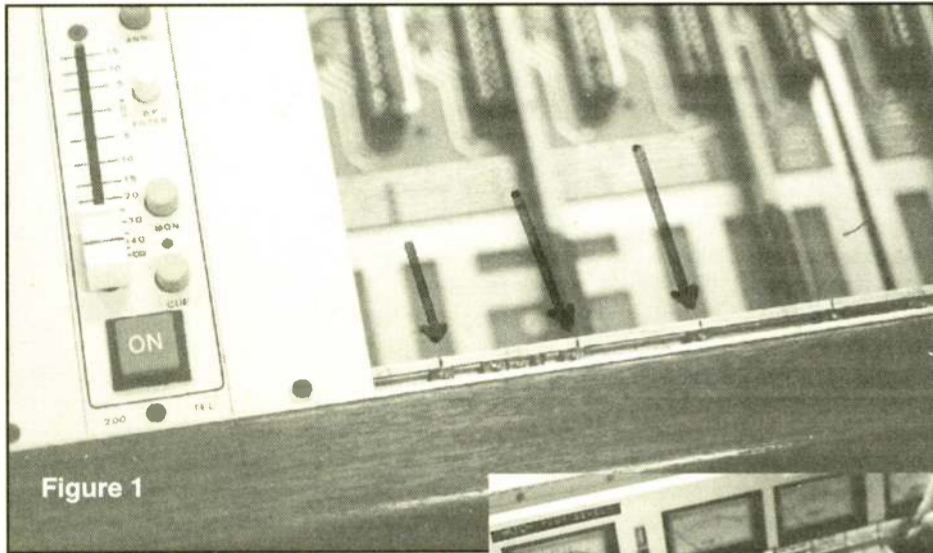


Figure 1

a number of smaller "micro-scratches," but even old, poor tracking machines seem to have no trouble with these.

Keep in mind not to use excessive force, and/or excessive cleaner and, finally, make sure to remove all of the compound to avoid leaving a haze on the CD surface. Nick's suggestions assume that the scratches are on the readout (thick protective layer) side. If the scratch is on the label (the thin layer, next to the pits) side, give up. The disk is trashed. If held up,



Figure 2

you will probably see light through the scratch.

Craig, if you still have those "stiffs" the PD gave you, it would be interesting to see if the Meguiar's treatment works.

In addition to "polishing" CDs, Nick wrote that it's not a bad idea to check before and after waveforms off the CD, to ensure one is not sitting on the edge of the digital go/no go cliff. With this in mind, Nick keeps an old working player opened up and available for the sole purpose of evaluating disk problems.

Look for the test point marked "RF," "Eye" or "HF" and dial in 0.5v/div (50mv if you're using a x10 probe); and about 500uS/div for checking scratches, or 2uS/div for checking disk quality.

Although you'd expect your favorite test-tone disk to serve as an exemplary optical/servo reference, don't count on it! Grab a couple dozen disks and measure them all. You are looking for the disk that gives you the largest amplitude and clearest, most stable "eye" pattern to make as your reference disk.

At the beginning of each test session, pop this CD in to verify proper player operation and scope adjustment. As you compare waveforms, you'll be amazed at how bad some disks look, while they play just fine.

If possible, pick an early-generation player, as these tend to have less AGC at the "eye" test point, which makes comparisons easier. The Yamaha CDX1 or CD2 are two good choices.

Given the extreme variability of disk quality, keeping a machine hooked up in the shop is an excellent tool for avoiding endless arguments about CD players not working correctly on the air, but testing perfectly on the bench.

Speaking of the "bench," next time you decide to air out the inside of your Auditronics 200 series console, take a couple of minutes to mark the location of the little nuts that the modules screw into (see Figure 1). Using a blank panel and that infamous Sharpie permanent marker, mark the center of each module on the little brass lip as shown (Figure 2).

As you remove and reinsert modules, it's easy to line up the little nut so the retaining screw will thread properly, using the black mark as a guide. If you really want to get creative, grab a tube of "super glue" and glue just a corner of the nut into the brass channel. The nuts stay put, and if you use the glue sparingly, you'll avoid the devastation of getting glue in the threaded nut hole. Thanks to both Jon Banks and Nick Martinelli for sharing these ideas.

By the way, opening up a console like this can be enlightening. In addition to the cannabis seeds and white powder, a variety of things may be encountered. If you have a minute, share with your fellow engineers your most unusual console "find"! Fax or e-mail your response to the numbers at the end of the column and let me know if you want to remain anonymous.

★★★

With good weather on the way and thoughts of painting your towers in your head, here is another resource to add to your RW Workbench resource card file: the number of your local Sherwin-Williams Paint store. John DiMarco is an industrial paint specialist at the Sherwin-Williams store in Springfield, Va. His number is (703) 644-6555. Specialists such as John are based out of many of the Sherwin-Williams stores across the country. Call your local Sherwin-Williams for more information.

What makes this service so special is that in addition to evaluating your tower, the specialist will prepare a bidding spec for painting your tower, recommend several reliable painting contractors in your area who can paint the tower and even come back to measure the thickness of the paint, to ensure the bid spec was met. This service is free from Sherwin-Williams, and guards against getting ripped off by unscrupulous painters.

★★★

While we're on the subject of maintenance, high fives to the UPS folks at BEST. Bet you wondered why you filled out those warranty registration cards when you got your BEST Uninterruptible Power Supply. The answer is so BEST can send you a reminder after your batteries are three years old and ready for replacement. If you'd like more information on battery replacement, contact the BEST Battery Specialists at (800) 356-5737.

□□□

John Bisset is a principal in Multiphase, a broadcast engineering technical services company located in Washington, D.C. He can be reached by fax at (703) 764-0751 or via e-mail at wrwbench@aol.com

Useful engineering tips are encouraged, and published submissions qualify for SBE recertification credit.

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Circle (22) On Reader Service Card



► continued from page 52

The CDJ-500II has been specifically designed to complement the DJM-500 for optimal fit and performance. The CD-500II's new digital features include its Master Tempo Control, which locks in the music's pitch even when the music is changed.

Nagra ARES-C Digital Recorder/Editor

The ARES-C from Nagra is a digital audio field recorder/player that uses standard PCMCIA cards instead of tape or disc as a storage medium. A single 64MB PCMCIA card holds more than two hours of mono recording, and by using multiple cards and a standard double battery "D" cell pack, the ARES-C has the capability to record for 10 continuous hours.

The ARES-C features built-in editing

capabilities along with a standard two-way analog telephone transmission port as well as ISDN built-in circuitry.

Spike & Glide Combine Music, Comedy

Network Music is offering a new 12-CD production library, "Spike & Glide."

The set includes elements, stagers and transitions, news, weather and traffic beds, and music. Four CDs are in a hard-edged, contemporary rock sound (Spike), and four in a soft, adult contemporary sound (Glide), as well as a four-CD comedy pack.

Spike features 323 cuts with "big dog" production elements and an attitude that Network Music claims "growls out a heavy metal mood." Glide features 302 cuts that "purr," with refined, fresh sounds.

The Spike & Glide comedy pack contains more than 340 cuts of silly and wacky sounds, weird effects and comedy bits.

Orban Takes Processing Internal with New DSE-7000 DSP Engine

Offering the first major DSP upgrade in five years, The Orban DSE-7000 digital audio workstation now can feature multiple internal effects including Orban parametric EQ, Optimod compression, digital delay and Lexicon digital reverb. Previously, effects were externally routed to the DSE.

The upgrade consists of a new DSP engine and version 6.0 software. Retail price will not increase.

According to Orban, the DSP engine/software upgrade will be available free to existing DSE 7000 owners who purchased their units after Jan. 1. Those with older DSEs will get the software upgrade for free, but will have to purchase the new DSP hardware.

The upgrade is the first for the DSE-7000 in five years and is based on a lot of customer input. About 500 DSE-7000s are now in use worldwide—with the majority in radio production.

Digitally Controlled Status Otari Console

Status from Otari boasts maximum flexibility to achieve a wide range of tasks with high audio quality. The console features programmable master switching, dual path input modules, fader grouping and recall of all input module faders, pots and switches.

The digitally controlled system is managed by the Status Control System, an internal computer, and features a centrally located master Module. The Master Module provides control of all routing functions for one, many or all modules.

New Software Upgrades RE660 Audio Codecs

New software for the RE 660 Series MPEG Layer II audio codecs allows the RS-232 interfaces on the units to operate in two further modes, including Astra Digital Radio (ADR) and Digital Audio Broadcasting (DAB).

In the DAB mode, the RS-232 interface supports DAB program-associated data as specified by the IRT.

In addition, the software upgrades the RE 662/663 Layer II ISDN codecs to include additional features including multiple subscriber number (MSN) support, remote control of ISDN-related functions, and a closed user-group function.

MSN support allows the user to connect

up to nine units with different ISDN numbers to share the same physical ISDN network connection.

With the closed user-group function, the codec verifies that an incoming call is authorized to make a connection to the codec via the public ISDN network.

Pioneer Introduces RDS Units

Within the next six to eight months, Pioneer Electronics plans to bring to market a line of car audio single-play CD and cassette players equipped with RDS.

According to the company, all of these units will support radio text "heavily."

Best Buy will be the first national retailer to offer the Pioneer DEH-P725R RDS receiver.

Pioneer, along with Denon and Delco, supported the EIA RDS promotion last year, which equipped 210 U.S. radio stations with RDS transmitters.

Shure Introduces New Mics and Mixer

Shure Brothers introduced a frequency agile, microprocessor-controlled UHF wireless microphone system, a third generation upgrade of its popular stereo ENG mixer and several new models of its Beta family of dynamic microphones.

The new Shure single rack space UHF diversity receivers — available in single and dual-channel models — use tone-key squelch and the manufacturer's proprietary MARCAD (Maximum Ratio Combining Audio Diversity) circuitry. The receivers and transmitters are each capable of selecting 191 separate frequencies throughout the system's 782-806 MHz operating range. As many as 20 systems may be operated simultaneously.

Handheld transmitters are offered with Shure microphone elements, including the new Beta 58A and Beta 87 models. Body-pack transmitters have an option of Tini QG or LEMO connectors.

To monitor performance, the receivers provide RF and audio metering LEDs as well as headphone outputs. In addition, both receivers and transmitters include user-programmable LCD displays for setup, information and control. A battery fuel gauge for the transmitter is located on both the transmitter and receiver.

LPB Adds to Console Line

The LPB 7000 series console features a solid front panel over modular input plug-in cards, gold contacts, two inputs per channel, three stereo output buses with independent tape outputs, standard mono-mixdown, programmable muting, remote starts, remote channel on and off and digital logic. The series is available in stereo 12- and 18-channel models.

The LPB Signature III series consoles feature three inputs per channel, two output buses, plug-in output cards and a built-in 12 W monitor amplifier. LPB Signature III consoles are available in 6, 8, 10 and 12 channels, stereo and mono.

Studiophone Expands POTS Technology

StudioFone, the rackmountable version of the MUSICAM USA FieldFone expands the utility of plain old telephone service (POTS).

Like the FieldFone, StudioFone is a bidirectional POTS codec that sends quality audio over a single analog phone line. It achieves up to 6.7 kHz frequency response and includes a V.34 modem that

connects at rates between 19.2 and 28.8 kbps.

Four remote relay contact closures allow the StudioFone to control other broadcast equipment, such as cart machines or automation units, from the field. It also includes two mixing inputs, each switchable for mic or line sensitivity.

The StudioFone also includes a built-in talkback feature. Either the front-panel mic can be used in conjunction with a front-panel IFB button or a remote mic/IFB setup can be used.

A front-panel speaker is automatically muted when headphones are used.

Telex Debuts Intercom Master Station

Telex Communications debuted the RTS 803 TW intercom master station. The new RTS 803 is the successor to the 802. The TW unit offers new level controls and 12 channels for IFB and ISO support. A key feature of the new product is its reduced depth for easier installation in tight locations such as mobile trucks and cramped areas.

The 803 is fully compatible with the entire RTS TW line of user stations, belt-packs, headsets and accessories. The product will be available for shipping in early summer.

Telex also introduced the Windows Keypanel, a Windows-based PC program, designed to work with the RTS matrix intercom series of products. The Keypanel is designed for broadcast news directors, program directors and station managers who need point-to-point or party line communications in their office but don't want a large black box on their desk. The product is also designed for matrix intercom users who don't want to leave the comfort of their office.

The Keypanel is an application that appears as an intercom panel on a computer screen just like a word processing program would appear. There are buttons on the unit that allow the user to talk to any RTS matrix product. An interface card that can be inserted into the computer for connecting to the intercom matrix is included.

The product also includes a speaker and a voice commander microphone. The Keypanel will be available in June.

TM Century, EDS Put CoSTAR System on Display

The CoSTAR system, from TM Century and EDS, is a digital audio and text management program that offers critical mirrored redundancy and centralizes expensive audio and text files ensuring that the costs associated with workstation expansion will be held to a minimum.

The file server-based system also features the ability to edit compressed files without leaving the compressed domain, which eliminates the audio degradation of layered compression.

Localized audio cards allow for economical expansion without the hidden costs associated with server-based cards.

Dorrough Introduces Second Generation of Audio Meters

Dorrough Electronics unveiled its new line of loudness meters at NAB '96. The new 40, 12, 10 and 400 series meters incorporate all the standard Dorrough features along with new circuitry

continued on next page ►

LMA/DUOPOLY CONTOUR MAPS

The **dataworld** LMA/DUOPOLY Contour Analysis is a precise electronic verification of overlapping and intersecting contours.

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enabling users greater flexibility. The new system interface incorporates XLR and computer-style connections.

These meters offer a peak-hold feature as standard and an alarm function alerts the user of undesirable operating parameters. A wide range of user-supplied visual and/or audible warning devices can be accommodated with a built-in relay. Inputs to these new features are accessible via the computer-style connector.

The Academy Award-winning DPS audio metering system is incorporated into this new series.

Eventide Debuts Digital Talk Show Delay

Eventide launched its next generation digital talk show delay for radio, the BD500. The stereo BD500 features an enhanced version of Eventide patented catch-up circuitry, as well as a host of new features. The new unit allows users to divide the total available delay time among several discrete segments. Other new features include a "sneeze" button that momentarily edits the audio entering the delay, and enhanced readouts that enable the user to instantly see the delay status at a glance.

Available options for the BD500 include AES/EBU digital audio inputs and outputs and additional field-installable delay memory. The unit can be fully remote controlled — both an RS-232 port and dry contact closures are provided.

ATI Shows New Mixer

ATI - Audio Technologies Inc. displayed its new Nanoamp Series, stereo mixer and input expanders.

Nanoamps, a compact, convenient and rugged series of low-cost mixers and utility amplifiers are on display at the ATI booth. Nanoamps feature professional XLR type connectors; high-performance, low-noise circuitry; and quiet, UL and CE approved remote power modules. They are 5-5/8 inches wide and can be used free-standing, stacked, or rack-mounted one, two or three across in only 1-3/4 inches of space.

ATI also showcased the MXS100 mixer, a studio or portable, three-channel, switchable microphone/line mixer. The MXS100 features low noise balanced inputs; phantom power; pan pots; switched low cut filters; and a test tone oscillator driving stereo, metered, low distortion servo balanced outputs with switchable peak limiting. A stereo 100 mW headphone output is switchable from normal stereo program to split L+R / Q monitoring. The headphone Q feed is internally selectable from any input channel and/or an external cue input jack.

Input expanders for the MXS100 are on display. The XPS100 adds four additional microphone inputs with pan pots and the XPS200 adds two stereo line level inputs to the MXS100.

Miles Technology Powers Up With New Amplifier

The MPR-450 six-channel power amplifier made its debut at the Miles Technology booth at NAB '96.

Housed in a compact, two-rack-space chassis, the new power amp features six independent channels delivering total power in excess of 450 continuous watts with audiophile fidelity.

Each pair of channels is bridgeable with the flip of a switch for higher power with

three, four or five channels, and independent gain controls allow the level of each channel to be individually tailored.

The simple, straight-path design of the MPR-40 provides extremely accurate sound reproduction, according to the company. An R-Core power transformer, in combination with a proprietary design, automatically sends extra power to channels where it's most needed. With independent, active current limiting and SOA protection, each output stage easily drives any load impedance (even a short) without adverse effects.

Nustar Console Digital, Affordable

The Audiotronics NuStar 3000 Series broadcast digital audio console combines usability with affordability.

It looks, feels and acts just like familiar analog consoles, but includes digital capabilities throughout.

It is a drop-in style control surface with wooden end panels and features 22 universal module positions and a four-meter bridge with four VU meters. Both analog and digital I/O are supported.

Standard modules include the 3000-CPU console control computer module, the 3000-CRM control room monitor module and the 3000-HPC headphone-control module.

Module options include the 3000-LI line input module, the 3000-LIB line input module with pan/balance, the 3000-TEL telephone interface module, the 3000-CSM communications/studio monitor module, the 3000-SEL meter select module, the 3000-RC14 remote control 14-switch module and the

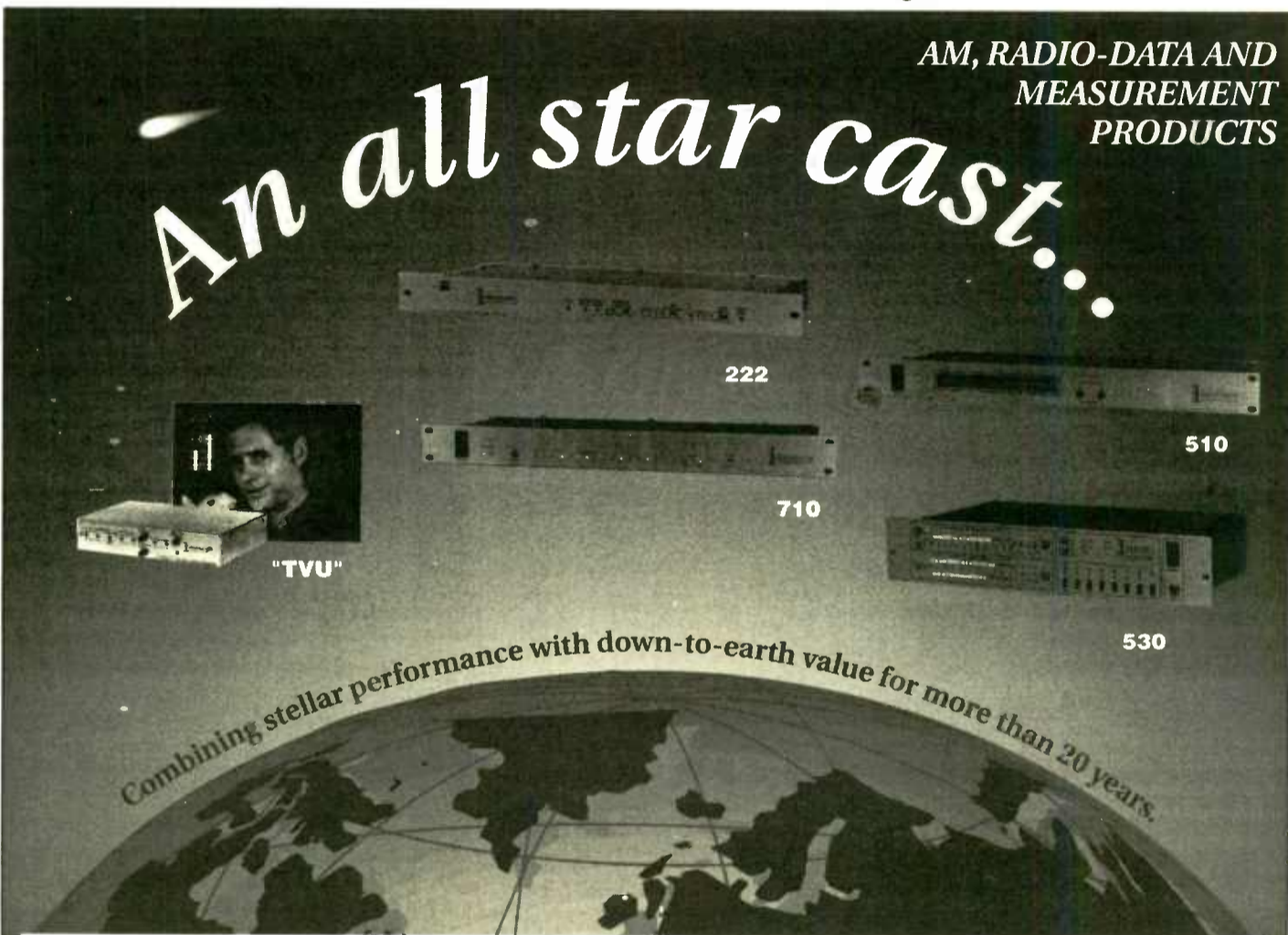
3000-RC6 remote control six-switch module.

A rack-mountable version can be outfitted with a full array of digital signal processing electronics. Analog input A-to-D conversion is 16 bit; analog output D-to-A conversion in 18 bit.

Standard modules for the DSP engine include the 3000-DSP control computer card, the 3000-MON monitor card and the 3000-OUT output card.

Optional cards for the DSP rack include the 3000-KI digital input interface card, the 3000-AI analog input interface card, the 3000-TLR telephone interface and the 3000-CSR communications/studio monitor card.

The NuStar console measures 23 3/16 inches (589 millimeters) front to back and 36 inches (914 millimeters) left to right.



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710 PROM-Based RDS/RBDS Encoder

Easiest, fastest and least-expensive Radio-Data implementation. "Static" mode permits selective transmission of 15 separate frames of data (IDs, flags, messages, etc.) with no computer or user-programming required. "Dynamic" mode allows optional on-line operation for song titles, contests, etc.

510 RDS/RBDS Decoder-Reader

Connects to any Mod-Monitor to give accurate subcarrier injection measurements, and to decode and read all the common RDS/RBDS data groups. Features an 80-character LCD display, simple, menu-driven operation, and an auxiliary RS-232 output port for data archiving.

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Micro-Trak HE-1 stereo head-phone amp, \$50. T Devine, WVLK, POB 1559, Lexington KY 40592. 606-253-5900.

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ERI 3 1/8" rigid transmission line, 360' in good condition, O-rings and bullets incl. \$2000/Best Offer. C Marker, 906-249-1423.

Andrew 1-5/8" 200' w/connectors, \$1100; 100', \$500; med pwr rototiller 2 bay, 97.7, \$1400. Ron, KPIK, 1206 N Main, Beebe AR 72012. 501-882-1015.

Rohn 45G tower sections, \$125/BO. Rick, KBZO, Lubbock TX. 806-763-6051.

AUDIO PRODUCTION

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Orban 245E stereo synthesizer, \$225. J Gelo, 941-642-6890.

Ampex AG-500 2 trk stereo recorder, 7.5 & 15 ips, needs belts, \$250; Ampex 2160 4 trk stereo recorder, auto reverse w/speakers, \$150; Ampex AG-350 R/P electr, \$150; Ampex AG-350 play electr, \$100; Crown IC-150 pre amp, \$150; Thorens TD-126 MK II TT, needs belt, \$100; Altec 128B tube pwr amp, needs pwr transformer, \$50; Roberts 6000 4 trk stereo battery recorder, NMR, \$50; (2) 40 W outdoor horn speakers, EC, \$30 ea; antique Berlant 2 trk mono recorder in portable case, \$75; various antique radios. R Barwig, 5254 W Agatite Ave, Chicago IL 60630. 312-283-2820.

Fostex T-10 regular phase stereo headphones, brand new, will swap for pair of AKG K-240 or K-141 headphones, must be working pair. J Roper, 812-877-2663.

Pultec EQH-2 tube EQ; RCA BA-11 vintage mic; UREI 535 stereo EQ, \$350; White 4400 EQ; Millennia media HV-3 mic; Altec 352-A mixer/amp, \$150; Gates M-5576 vintage tube program amp; Allison Labs variable filters; Tannoy System 8 studio monitors. T Coffman, 619-571-5031.

Spectrasomes 1100, 6x1, 2 space rack mount w/meter & head-phone jack, very quiet, exc cond, inputs balanced mic or line, balanced output, \$199. Tom, 609-222-0636.

ADC patch bays, 1/4" 52 points, \$169; ADC TT bays, \$129 up; Furman 1/4" to 1/4", \$95 ea; Rane ME15 graphic EQ, \$150; Digitec 3.6 sec delay, \$150. W Gunn, 619-320-0728.

Auratone two way rack mountable monitor speaker system, \$50 + shipping. D Tonelli, 510-444-1200.

EVENTIDE H-3000. 1-616-782-9258.

SAE 5000 pop & scratch filter, mint cond, \$150. R Links, Links Sound, 1656 California St, Berkeley CA 94703. 510-845-5557.

RCA BA-11 vintage mic pres; UREI 535 stereo EQ, \$350; White 4400 EQ, \$350; Millennia Media HV-3 mic pres; Altec 352-A mixer amp, \$150; Gates M-5576 vintage tube program amp; Allison Labs variable filters; Altec passive filters; Tannoy System 8 studio monitors; Altec pwr amps 1590-E, 1594-C, 1593-C. T Coffman, 619-571-5031.

Soundcraftsman SG2205-600 prof stereo graphic EQ, \$50; Quad-Eight RV-10 variable decay reverb system, \$95; Thomson CSF FM Volumax 4111, one chnl needs work, \$150. D Vernier, KUNI, Cedar Falls IA 50614. 319-273-6400 ext 0.

Want To Buy

Neve, API, MXR, Lexicon mic, EQs, delays, compressors, Harmonizers, reverbs. T Coffman, 619-571-5031.

Volumax 4110 FM processor; Harris MSP-100 or MSP-95. D Davis, KRZN, 1217 Valencia NE, Albuquerque NM 87110. 505-255-2431.

JBL 4401 compact monitor, need another to make pair, needs to be cosmetically clean, working or not, will trade. Tom, 609-222-0636.

Neve, API, MXR, Lexicon mic pres, EQs, delays, compressors, Harmonizers, reverbs. T Coffman, 619-571-5031.

AUTOMATION EQUIPMENT

Want To Sell

IGM EC w/2-24 Go-Carts, complete unit working, need to sell together, Best Offer. K Smith KYCN, 450 East Cole, Wheatland WY 82201. 307-322-5926.

Systemation X7 on air brain needs repair, prod fine, will sell for parts, Best Offer. P Wahl, WWIB, 5558 Hellie Rd, Chippewa Falls WI 54729. 715-723-1037.

Arrakis Digilink (2) Track Star production software & hardware w/network card, also Gemini software/hardware w/network card & Gemini cart wall for live assist, all have latest software upgrades & have been in use 6 mths, \$10500 firm. L Zeve, 717-249-1717.

CART MACHINES

Want To Sell

Audi-Cord TDS Series twin deck PB, gd cond, motors & pinch rollers in gd shape, \$200 ea; BE 5000 Series tri deck player, new front face, motor & recently refurbished w/new pinch rollers, \$400; Tapecester 700-P player, gd cond, PB only, \$50. R Chambers, KSUE, 3015 Johnstonville Rd, Susanville CA 96130. 916-257-2121.

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HE HALL Electronics

ITC Delta 3 decker, stereo, P/B, excel cond w/spare parts & manual, \$700 +shpg. D Haley Smith, WMOD, 100 E Market St, Bolivar TN 38008. 901-658-7328.

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Tapetronics RP-700, needs work, \$95. D Jackson, WNBX, 203-762-9425.

ITC SP stereo play, 3 tones, \$350; Tapecester 701P mono play, \$150, or both for \$450. Guaranteed in excel cond w/manuals. K Lamson, 510-447-7405.

ITC Delta - new pinch rollers: Mono playback (2), record/play (2), stereo record/play (1). MOTIVATED! Spotmaster series 2000 record (1). Wes, 818-798-9128.

ITC PDII mono PB (3). W Osenga, Pace Bdctg, 704-648-3588.

ITC record amps, 3 tone, stereo, \$250 or mono \$150. W Gunn, 619-320-0728.

ITC 3D mono (3) w/rec amp, tones, parts, \$650; (3) RP mono w/tones, parts, \$500; ESL w/eraser, splicefinder, \$400; blond solid oak Carousel cart rack, 384 slot & other cart racks & 100's of carts, 40s & 70s. P Wahl, WWIB, 5558 Hellie Rd, Chippewa Falls WI 54729. 715-723-1037.

Want To Buy

ITC, BE, Fidelipac cart machines: single, triple, mono, stereo, play & record/play. Call M O'Drobinak @ 619-758-0888.

COMPUTERS

Want To Sell

Radio Shack TRS-80 mdl II, 1 floppy, \$25; Radio Shack TRS-80 mdl II, dual 8.5" floppy drive, \$25. D Vernier, KUNI, Cedar Falls IA 50614. 319-273-6400 ext 0.

Want To Buy

Tandy 6000 HD with at least one floppy drive. Mel Crosby, 408-363-1646.

CONSOLES

Want To Sell

McMartin MX-5, 5 input mixer, excel cond, \$125/BO. D Meyer, 805-962-8273.

Sony MX-20 8x4 chnl mixer/line mixing board, \$175. D Meyer, 805-962-8273.

Tascam 3700 mixing console w/automation 32x8x2, \$9974. 615-292-9459.

Fostex 2016 16 input, 4 output line mixer, rack mount, new in box, \$100 + shipping. D Tonelli, 510-444-1200.

LPB Monogram II mdl M55 board w/5 rotary faders, 12 inputs, perfect cond, \$650. T Hamilton, Mid Way Bdctg, 501-367-6854.

Pacific Recorders BMX-14 (2), just removed in excel cond, 17 SLI 7 6 mic plus all other modules. R Corcoran, WTEN Radio, 419-227-2525.

Ramko DC5AR 5 chnl mono. J Parsons, Parsons Sound, 2781 Fayson Circle, Deltona FL 32738. 904-532-0192.

Gates 994-5136-002 dual mic mixer w/meter, miniature tube type in cabinet, BO. Mel Crosby, 408-363-1646.

LPB model M-5M-01 "Monogram II" 5-channel mono console. 12 total inputs, built-in monitor amp. \$300. 206-337-6695 leave message.

Mackie 1604, \$725; Tascam 512, \$950; Tascam 520, \$1750; Allen & Heath SYNCON 28x24, \$8000; Ramsa 820, \$2200. W Gunn, 619-320-0728.

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Gregg Labs audio processors (2), \$200/ea. T Nelson, WCAL-FM, 507-646-8618.

CBS 410 peak controller, \$150. D Vernier, KUNI, Cedar Falls IA 50614. 319-273-6400 ext 0.

Want To Buy

Optimod 8100A. Howard, 601-832-5111.

UREI LA2A, LA3A, LA4A 1176, Gates, RCA, Collins, Altec, DBX 160, 165, all types, working or not. T Coffman, 619-571-5031.

Orban XT-2 for Optimod 8100A. R Scheibly, WLGC, POB 685, Greenup KY 41144. 606-473-7377.

UREI or Teletronix LA2A, LA3A, LA4A, 1176, Gates, RCA, Collins, Altec, dbx 160, 165, all types, working or not. T Coffman, 619-571-5031.

Teletronix LA-2A's, UREI LA-3A's & LA-4's, Fairchild 660's & 670's, any Pultec EQ's & any other old tube compressor/limiters, call after 3PM CST, 214-271-7625.

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Want To Sell

Neuman U-87 w/shock mount. T Coffman, 619-571-5031.

Lapel mics "condensator piezo-electret" in pouch (3), \$60; Shure 444T magnetic desk mic, \$20. D Jackson, WNBX, 203-762-9425. Audio

Technica AT-855 unipoint condenser mic, new in box, \$50 + shipping; Sennheiser MKH-405 classic studio mic system w/all access, \$250 + shipping; RCA 44-B chrome & black bi-directional ribbon mic, \$550/sell or trade for McMartin BBM-4500A monitor in clean working cond. D Tonelli, 510-444-1200.

Neumann U-87 w/shock mount. T Coffman, 619-571-5031.

RCA 44BX w/stand, \$1000; RCA 77DX, mint, \$1200; RCA ribbon, \$250; (2) Altec/WE, \$200 ea; (2) Cetec Vega Pro Plus R42 mic, systems w/Anvil cases, \$1200 ea. F Spinetta, 415-306-4548.

Want To Buy

Neuman, Sennheiser, EV, Altec, RCA, Coles. T Coffman, 619-571-5031.

RCA 77 & 44; Neumann, Sennheiser, EV, Altec, Coles. T Coffman, 619-571-5031.

Ring stand w/springs for Western Electric carbon mic, also Western Electric 387 mics. B Hunter, 103 Forest Acres Drive, Greenville NC 27834. 919-752-7181.

RCA 77-DX's & 44-BX's, any other RCA ribbon mics, on-air lights, call after 3PM CST, 214-271-7625.

RCA 77-DX's, 44-BX's, WE KU-3A's On-Air lights, recording lights. Top price paid. Fast response. Bill Bryant Mgmt, 2601 Hillsboro Rd, G12, Nashville TN 37212. 615-269-6131, FAX: 615-292-3434.

MISCELLANEOUS

Want To Sell

Format Rock & Roll, 442 selections of the 50's & 60's, 18 reels; MOR, 76 reels, excel cond. J Gelo, 941-642-6890.

Rotron Blowers for Elcom, Harris, CCA, CSI, McMartin, rebuilt & new. Goodrich Enterprises Inc. 11435 Manderson St. Omaha, NE 68164 402 493 1886 FAX 402 493 6821

Large quantity silvered mica bypass capacitors, teflon spacers, plate blockers & socket parts for driver & 6166 final for RCA TT10-AL low band 10 kW TV transmitter. R Meyers, 305-995-2115 or 305-264-5963.

Hewlett-Packard 334A dist analyzer; Hewlett-Packard 5245L freq counter; RCA BW75A FM monitor tuned to 100.3 MHz; RCA BW85A stereo monitor; 2 RCA BTE-15A FM exciters; Dictaphone 625 telephone announcement system w/mic & call counter, many extra tapes; Regency Executive scanner w/many extra crystals; Vega 01-0003 wireless mic receiver; Gates single cart reproducer; 2 Gates mono cart record amps, all items B/O. Jeff, 515-242-3500.

CRL PMC 450; Tru-Fidelity reactor transformer for Gates BC5 xmtr; EF Johnson RF scissor switch; PBX system w/6 phones. W Osenga, Pace Bdcg, 704-648-3588.

ESE ES-2657, BO; SMC PDC-4 superclock, BO. J Mueller, 510-568-6200 x.240.

Records, 1100 LPs, Big Band, MOR, Rock & Roll; 45's Contemporary, Big Band, MOR, Rock & Roll. J Gelo, 941-642-6890.

Zetron DAPT-1000B dial access paging terminal, assorted Spantel 1004 SCA pagers, Marti SGC-8H subcarrier generator, BO.T Hamilton, Mid Way Bdcg, 501-367-6854.

Custom 2-line call counter, good for call-in telephone polling; 2 Gentner EFT-900 extended frequency transceiver telephone units w/rack mount kits; Gentner EFT-900A extended frequency transceiver unit; older Ampex R-R transport w/Inovonics 370 rec amp electronics, boxes of various Ampex & Scully spare parts; Ford in-dash AM radio; old US Army Signal Corp field phones; various Lapp insulators, Johnny Balls, etc, some from early 30's WHO-AM longwire days; vintage 1950's RCA TV equip; Fairchild turntable assembly w/tonerarm, all items B/O. Jeff, 515-242-3500.

Shure SME 3009 pick up arm (2), \$50 ea; Shure SME 3009 pick up arm, Stanton cartridge (2), \$50 ea; Gates CB1200 TT w/Grey Research pick up arm, Stanton cartridge w/Opamp Labs preamp (2), \$75 ea; Gates CB77 TT w/Grey Research pick up arm, Stanton cartridge, no preamp (2), \$75 ea; Gates CB1200 TT, no pick up arm, \$75; Technics SP-10 MK II TT w/SH-10E pwr unit (2), \$95 ea. D Vernier, KUNI, Cedar Falls IA 50614. 319-273-6400 ext 0.

Lyrec tape timers (3), \$300 ea; (7) Seike/Spotmaster tape timers, \$175 ea; (5) Spotmaster TP1B cart winders w/timer, \$225 ea; (5) Spotmaster TP1B cart winders, no timer, \$50 ea. Mel Crosby, 408-363-1646.

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Jazz record collections, 10" LP/12" LP be-bop, swing, dixie, highest prices paid. B Rose, Program Recdgs, 228 East 10th, NUNY 10003. 212-674-3060.

MONITORS

Want To Sell

Belar FMS-1 stereo FM monitor, \$200. J Arzuaga, 809-895-2725, FAX 809-895-4198.

Belar SCM-1 SCA monitor, \$95; McMartin TBM-2000A SCA mod/freq monitor, adaptor has one defective transistor, \$95. D Vernier, KUNI, Cedar Falls IA 50614. 319-273-6400 ext 0.

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Want To Sell

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Ampex, Sony 300-4; 630, Mod 2 Ampex vintage 1/2", 4 chnl rdr w/tube electronics, \$750; Sony 630, \$75; Mod 2 Ampex, \$75, no shpg, just come w/truck & \$\$\$. T Houston, 805-324-0736.

Approx 2900 carts, mostly music in various lengths, \$1 ea +shpg. T Thompson, 318-445-1234.

Revox PR-99 rcd/PB, excl cond, \$1500; BE 5400C 3-stack stereo PB cart machine, 3 tones, excl cond, lw hrs, \$900; Revox R-R PR-99 pb w/25 Hz, gd cond, \$250. J Arzuaga, 809-895-2725, FAX 809-895-4198.

Tascam 32 mastering R-R deck, 7.5-15 ips, excel cond, manuals, box, etc, \$1050 +shpg. Globe Music, 540-344-3283.

Teac Tascam 80-8 8-chnl 1/2" tape R-R, \$1200; Ampex 1091 stereo w/separate amp, \$65; Dukane 28A18 (2) rcd/pulser, Best Offer. D Jackson, WNBX, 203-762-9425.

Teac X2000M R-R, excel cond, 6 yrs old, \$399 +shpg. R Erak, 206-839-9414.

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Tascam 32 R-R decks w/rack-mounts & manuals, excel cond, \$800 ea or all for \$2000. Q Audio, FAX 208-736-7616.

Ampex AG602, unmounted, \$250; rackmount for 600 series, \$30; (2) Samsonite cases, 600 series, mono, brown, gr cond, \$50 ea; Samsonite case for 600 series, stereo, grey, gr cond, \$50; 601 tube type in case, \$200; (7) Ampex 7.5 ips alignment tapes, unused, \$20 ea, BO; various used Ampex capstan & reel motors, working, as is, \$50 ea; Microtran table top degausser, like new, \$150; AL 500-2 recorder, as is, \$100; (2) AG440A mono FT, as is, \$150 ea; AG440 mono FT, play only, \$100; Scully 282-4, 4 trk 1/2" tape, \$800. Mel Crosby, 408-363-1646.

MRL short test tapes 2", \$229. W Gunn, 619-320-0728.

Otari MX70, \$5950; MX70 video layback system, \$900; gd used 1/2"x2500' 456 tape, \$20; 1"x2500' 996 & 250, \$35; Nagra III sync recorder w/SLO resolver, \$695/both; Nakamichi 550 great port cassette, \$250; W Gunn, 619-320-0728.

Scully '100' recorders, record/play amplifiers, 8, 16, 24 track heads. Sequoia Electronics, 4646 Houndshaven Way, San Jose CA 95111. 408-363-1646.

Tascam 424 1/4" 4-track, new, never used, \$500. Call 314-227-5749.

Tascam 32 and 34B. Like new, \$700/\$100. 603-647-9491.

Tascam ATR60, \$2950; ATR60, \$1250; Tascam AQ-85 locator for 85-16, \$395; Otari 5050BII, \$800; Custom Locator, \$495; Tascam DX-8 dbx for 80-8, \$295. W Gunn, 619-320-0728.

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Moseley PCL-303 951 MHz, \$250; Moseley PBR-15 for parts only, \$95, +shpg. D Vernier, KUNI, Cedar Falls IA 50614. 319-273-6400 ext 0.

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Sine Systems RFC-1B/RP-8. D Davis, KRZN, 1217 Valencia NE, Albuquerque NM 87110. 505-255-2431.

Telos Zepher or other codec. 213-466-3595, FAX 213-466-3596 Email oncue@earthlink.net.

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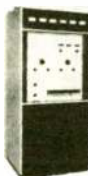
HP 330D distortion analyzer, \$100. James, 405-265-4496.

RCA WV98C senior Voltohmsyst, missing probe, \$25. D Vernier, KUNI, Cedar Falls IA 50614. 319-273-6400 ext 0.

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LPB AM-30 30 watt solid state AM for PSSA, etc, \$650; LPB TCU-30 (2) 30 watt carrier current coupling units, \$175/ea. D Jackson, WNBX, 203-762-9425.

LPB 60 W AM 1460 on air less than 30 mins, like new, \$1500, replaced w/larger xmtr. R Swan, WROY, 618-382-4161.

Collins 831-D 2 kW w/Collins 310Z-2FM exciter, 2 spare 5CX1500B tubes, very clean, upgraded, \$4000. T Hamilton, Mid Way Bdcgt, 501-367-6854.

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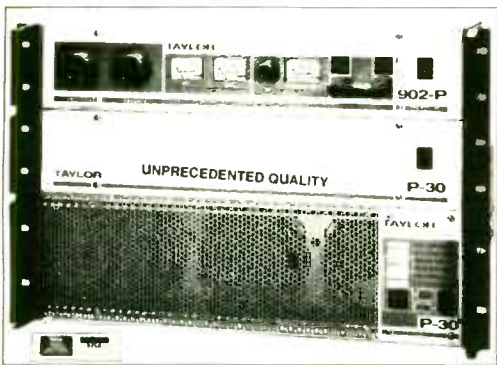
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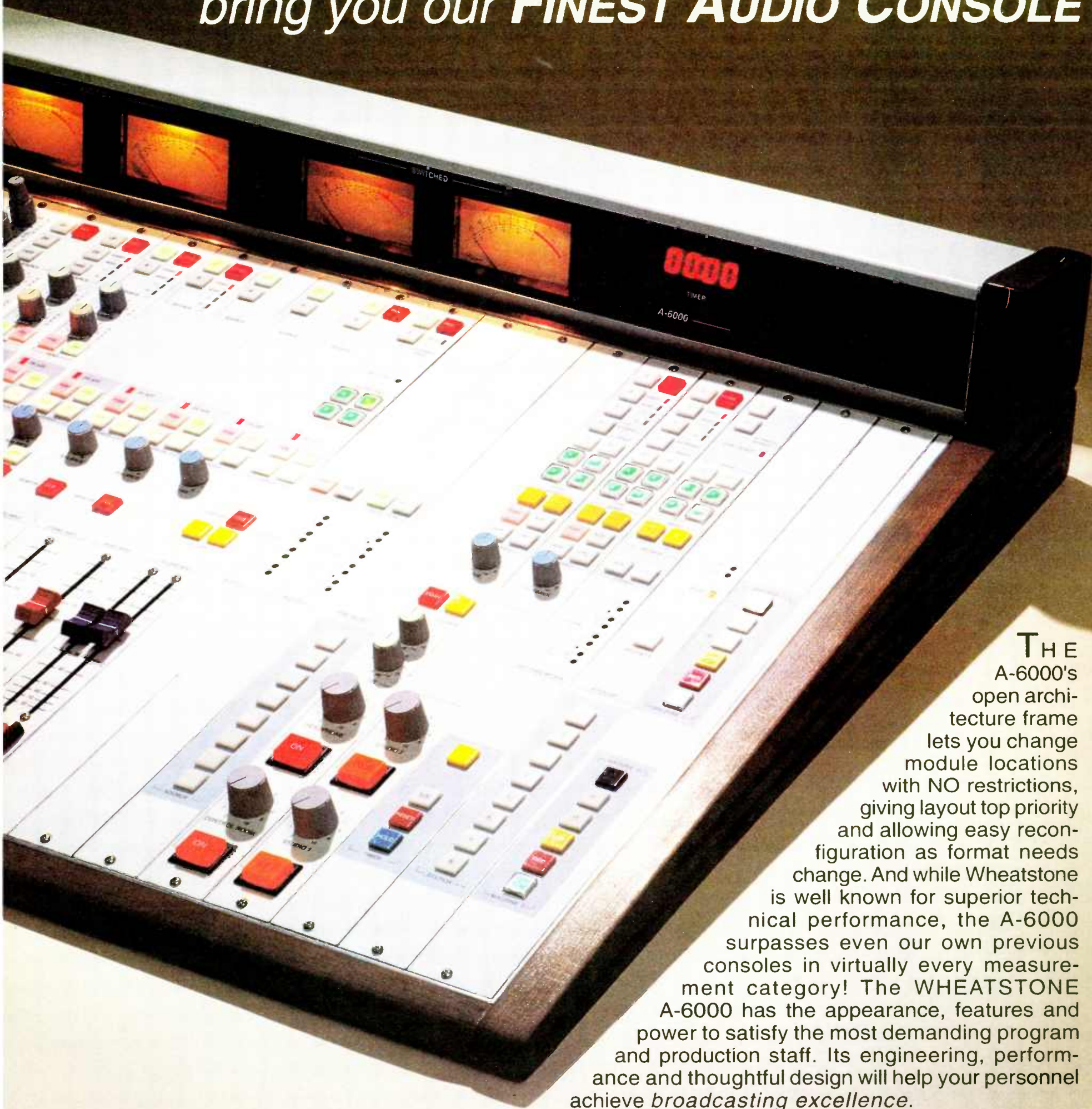
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