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See page 21.

Radio World®

Vol 20, No 6

Radio's Best Read Newspaper

March 20, 1996

RDS/RBDS Garners Mixed Reviews

by Christopher Nicholson

WASHINGTON Radio Data System (RDS) technology has divided the radio industry into two main groups.

There are the gung-ho broadcasters who believe the technology's time is now and use the data subcarrier's various functions. The other group is comprised of the cautiously optimistic broadcasters who are educated about RDS but take a wait-and-see approach.

RDS technology allows broadcasters to send an inaudible stream of data on their 57 kHz subcarrier. The data stream can include any text message the station wants from call letters to advertisements. RDS can also automatically tune RDS equipped

car radios to a station's frequency when the listener drives through its service area.

One camp consists of proponents who assert that RDS is a tremendous advance in radio broadcasting. This group believes in the wide acceptance of the technology in the United States. Then there are actual broadcasters and consumers who seem willing to give the technology a chance but remain cautiously optimistic about it.

In an informal poll, RW called a number of radio stations to ask what they were doing with their RDS systems and what kind of listener response they were getting.

Perhaps the most positive response was given by Mark Humphrey, chief engineer of Philadelphia's WPLY(FM). WPLY placed a MusicBoard alongside one of

Philadelphia's busy commuter routes. A huge, three-dimensional RDS car stereo displays the band currently being played on the station.

WPLY has received a good response from the MusicBoard, said Humphrey, and a couple people called to inquire about the technology. But he added that the technology is not 100 percent reliable and sometimes gets out of sync as far as what band is displayed versus who is actually being played.

KBIG(FM) in Los Angeles displays its call letters, slogan, phone number and e-mail address on its RDS system. Chief Engineer Dennis Martin said he received calls from two listeners who said they

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Rhode Island Readies Its New EAS

by Richard A. Bouchard

PROVIDENCE, R.I. Now that the Federal Communications Commission (FCC) has issued type acceptance to at least two models of Emergency Alert System (EAS) decoders and encoders — Sage and TFT as of this writing (Feb. 21) — broadcast stations and the agencies charged with issuing alerts need to get moving now toward EAS implementation.

Time has a way of getting past you, and with the deadline

for all broadcasting stations being required to be operational with EAS equipment about nine months away (Jan. 1, 1997), now is the time to get started.

Given that over 13,000 stations must purchase EAS equipment, there's bound to be the usual delay in availability, shipping and the problems that sometimes plague newly marketed equipment.

So the first order of business in the engineering section is reminding management that an expenditure of at least

continued on page 3 ▶

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Tests Show AM Digital Problems

by Lynn Meadows

ARLINGTON, Va. Problematic news for AM digital radio came from the lab when the Electronic Industries Association (EIA) released its test results.

Despite reports of good performance in field demonstrations, the USA Digital Radio AM system, the only AM system tested, degraded the host analog signal and interfered with the second adjacent channel in the lab.

The first adjacent channel suffered no interference from the digital AM input that was not also felt from the analog input. But the next channel over (the second adjacent) took a dramatic hit from the digital sound.

On a Denon narrow-band receiver with a strong signal level, for instance, the analog reference was degraded by 18.18 dB with the addition of the digital signal at the second adjacent channel. The degradation was just as dramatic — 18.84 dB on an

continued on page 6 ▶



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 NAB '96. Preview
 pp.21-86

NEWSWATCH

FM Station Count Increasing

WASHINGTON As of Jan. 31, the total number of radio stations in the United States had increased to 12,034 according to the Federal Communications Commission (FCC). That count is up from 11,987 last September.

While only one AM station has been added since October, the number of FM radio and FM educational radio stations has jumped. Fourteen FM educational stations have come on-line since October for a total of 1,819. Thirty-two new FM stations were added bringing that count to 5,306. The FCC reports there are 4,909 AM broadcast stations.

Spectrum Hearings

WASHINGTON National spectrum policy is the next item on Senate Commerce Committee Chairman Larry Pressler's (R-S.D.) plate.

Four hearings on spectrum use are planned for this spring. Three will be open hearings. The other hearing will address military and intelligence uses of spectrum. Pressler expects hearings to start in April.

The issue of spectrum policies arose during debate over the telecommunications bill when Senator Robert Dole (R-Kan.) opposed the idea of giving spectrum for digital television away. Pressler

promised Dole to review all spectrum usage once the telecommunications bill passed.

Dole was invited to be the lead-off witness at the first hearing.

Radio Robust

DALLAS The Radio Advertising Bureau (RAB) reported that radio revenues increased at a rate of 8 percent in 1995. They rose to an estimated \$11.47 billion up from \$10.652 billion in 1994.

Local radio revenue — up 9 percent from 1994 — accounted for most of the gain last year. National revenues increased just 3 percent. Network radio advertising also increased posting

revenues of \$426.3 million compared with \$411.2 million in 1994.

The picture for the month of December was not as rosy. The RAB numbers show national revenue slacked off significantly in December compared with December 1994. National revenues fell 18 percent in Southeast markets, 19 percent in Southwest markets and 17 percent in Western markets. The RAB said the decline was due to a sluggish retail sector in the fourth quarter. ☐

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When looking for a digital audio system for automation of satellite programming or live assist, there would appear to be many choices. But if you're looking for a system which is flexible enough to give you total control without sacrificing your sanity, there is only one choice. The Phantom by RDS.

You will see the difference as soon as you see the Phantom in action. The display provides you with all of the information you need to see in a clean, concise manner, without the crowded look that you'll find in other systems. If you are familiar with the most popular software on the PC, then you may already know how to use the Phantom. The Phantom's pull-down menus guide you through all of the steps involved in setup and daily operation, from creating and scheduling clocks to creating and editing logs.

The PHANTOM Digital Audio Automation

The Phantom ends the confusion of automation by keeping everything organized. The Phantom simplifies your daily operations by keeping information such as input changes, voice changes, and clock changes in their own individual schedules rather than in the log. You can leave those liners and other voice drops out of the log because the Phantom will do them for you. The Phantom allows you to date new schedules to begin weeks, months, or even years in advance. When your satellite network informs you that there will be a voice substitution on Thursday, two weeks from today, you can prepare for it *today*.

The Phantom can retime spots to fit them cleanly into a satellite break without inserting silence, overlapping, or running late. The Phantom



can create reports to keep you informed on a number of topics, from a list of expired spots to an analysis of potential mistakes in your log. The Phantom also maintains a history of system activity.

The Phantom has the features that others would want you to believe are theirs exclusively. The Phantom remains *completely* functional during recording, sensing relay closures and starting breaks as easily as it does when it is not recording. The Phantom can fill incomplete breaks with spots from a list you specify without ruining product separation.

While other systems tie your hands and limit your flexibility by only offering 3 or 4 inputs, the Phantom gives you 6 stereo inputs, using its AMX-84 solid state switcher, with the option of increasing the number of inputs to 14 or more. If your station is News/Talk, you know how important this can be.

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► continued from page 1

\$2,000 will be necessary to purchase the equipment. Hopefully the money has been budgeted.

Program directors will need to be briefed on the new EAS testing requirements which differ substantially from the current EBS tests. They will appreciate hearing that after the new

If your EBS was merely on paper, you have considerable work to accomplish.

EAS gear is operational, less annoying EAS tests will be required one quarter as often (one a month to the public).

In order to use EAS equipment however, you will have to have a new EAS plan that defines how EAS codes will work in your state or local operational area. How the system will work in national emergencies will be defined in the FCC EAS Operating Handbook that is described in sections 11.15, .16, .17, .18 and .19 of the new rules.

Old time veterans of EBS will recognize there is not much change in these rules except some changes in EAS designations. The FCC has defined the old and new designations in appendix F of its report and order FCC 95-420 which provides all the details.

To simplify, we are including in this article a handy dandy "EAS term designation decoder" which you may wish to clip out. It could prove useful. See Figure 1.

One of the features of EAS that most broadcasters will appreciate is the system allows for unattended operation and compliance by simply setting the equipment so that any activation is automatically broadcast; programming will return within two minutes of interruption.

Most stations using satellite programming will be thrilled over this, and the system can be set for manual operation while a duty operator is present.

For optimum utilization and benefit, broadcasters from engineering, programming, news and management should all be aware that the system cannot function without a viable state or local FCC approved EAS plan much like the EBS plan already required to be at the operating position of every licensee now.

I have just completed the draft of our state EAS plan and among the most difficult requirements was determining if we desired to add any new EEE codes. That's the three letter designator that "denotes the type or cause of an emergency event."

The commission has issued a listing of 32 Events and Event Codes and our state planners suggested several others be added. We are requesting the FCC allow us to add the following to its recommendations:

Event	Event Code
Ozone Alert (unhealthy)	OAA
Emergency Public Info	EPI
Radiological Accident	RAD
Hazardous Materials Incident	HMI
Earthquake Alert	EQA

Many broadcasters are going to wonder about the FIPS codes and Julian dates that are commonly used in the military and federal establishment and have filtered into the new EAS header codes. The FIPS codes are readily available from any state emergency management

agency office and are used by the federal government to give numerical identification to states and counties.

A problem we experienced in drafting our plan was the FCC choosing to use

zero through nine for subsequent identification of locations within counties. We used the EAS protocol described in 11.31 (c) to define political subdivisions located within the counties.

The simplest way to utilize P (the first significant digit) of the Location Code is to use a zero (0) which means all of the counties whose FIPS code follows will be notified. More finite definition of the locations within the county and the numbers begin in a strange quadrant system which starts with Northwest=(1), North=(2) and Northeast=(3), then West Central=(4), Central=(5) and East Central=(6) ending with Southwest=(7), South=(8) and Southeast=(9).

It's sort of like taking three strokes with a wide paintbrush on a map of each county and then cutting up the map into nine pieces. The resulting grid lines allow the planner to assign a single digit to each of nine sectors within the county regardless of its physical size. We discovered that the process worked out only fair.

EAS DECODER CHART COURTESY OF RADIO WORLD

OLD	NEW	FUNCTION
PEP	NP=National Primary	National (Presidential)
CPCS	LP=Local Primary	EAS Local Area
OPRELAY	SP=State Primary	State Level
RELAY	SR=State Relay	Relay of State Level
PRIMARY	PN=Participating	Retransmit Message
NON-EBS	NN=Non-Participating	Sign Off during National

To illustrate a typical quadrant grid system, see Figure 2 which illustrates how a perfectly shaped county might be broken down.

Another problem we dealt with in producing the draft Rhode Island EAS plan is call sign identifications. This is placed in the header under LLLLLLLL; to avoid any confusion, we offered in our plan, a translation of the various ways call letters are imprinted on FCC licensees and FCC "map books" and how they will actually appear in the header code.

We simply used every space allocated in the header by the FCC eight characters. We used parentheses immediately after the four call letters to further and completely identify the station and use up the eight characters i.e:

WXXX(AM)
LLLLLLLL

The other header code elements are self explanatory and will be the same everywhere. Without a plan, you cannot legally use EAS. Without planning, EAS is impossible to implement as this article is meant to suggest.

A further plan needs to be developed within each station as to the new procedures that need to be followed under EAS, once implemented. These procedures need to deal with specifics to the station and what protocols, management wishes to follow when EAS messages are received even when duty personnel are present.

For example, are tape recorders ready to record messages? Have the audio outputs been wired into the "board" to replace previous EBS input(s)? Are personnel familiar with the new system and do they know where to find the EAS plan that the FCC has approved for your operational area? Has the program department been advised that EAS tests only need to air monthly as opposed to weekly EBS tests?

The size of stations and the way each operates varies so much that it is impossible in this short space, to describe the variables especially in television control rooms. Needless to say, it will have to be done and, as each procedure is written, questions will arise which should be discussed with the your state or Local Operational Area Emergency Communications Committee.

You may also want to brief your staff on what a Julian date is (imprinted on most desk calendars) and what Greenwich Mean Time (GMT) is all about because both are required to be used in EAS headers.

activations are via the weather service, according to our records.

Our SP station will be the former CPCS-1. Your state or local plan may differ, but you will probably need a second receiver and an external antenna for the RF source you presently do not receive. Good luck. ☺

EDITOR'S NOTE: Richard Bouchard is a Certified Emergency Manager and Project Manager for the State of Rhode Island Emergency Management Agency. He is also the chief engineer for WNRI(AM).

Bouchard has already detailed plans for Rhode Island's switch to the Emergency Alert System (EAS) from the Emergency Broadcast System. He agreed to write about issues he encountered during that process.

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0=all or an unspecified portion of a county

Northwest=1	North Central=2	Northeast=3
West Central=4	Central=5	East Central=6
Southwest=5	South Central=8	Southeast=5

Radio's Change Obvious at NAB

Computers, Telephones and Broadcasting Are Becoming Intrinsic Parts of Each Other's Worlds

WASHINGTON Welcome to our NAB '96 preview issue. As the cover art and thousands of inches of editorial content convey, radio as you have known it is quickly metamorphosing into radio in the age of cyber-mania.

From our vantage point here in the offices of *RW*, NAB '96 is shaping up as the turning point exhibit where the lines between once divergent media are drawn by the cables networking digital audio editor to automation system to digital console to digital RF equipment. Soon (I hope), the ensuing 1s and 0s emanating from the transmitter will complete the digital chain.

The artwork on the cover, illustrating the PC as radio receiver, reminds us that the next generation of radio consumers will be dramatically different than our own.

The artwork on the cover, illustrating the PC as radio receiver, reminds us that the next generation of radio consumers will be dramatically different than our own. This coming generation will expect an interactive radio — control of which will be at its fingertips, in its PC. That same technology that is revolutionizing the way you do business and create radio, will allow the new breed of radio user to find the medium and exploit it at will — just in a radically different way.

I know that much has been written and speculated about the ties between radio and the on-line services, and many are still not convinced of the benefits one can provide for the other. But the rush of tools and technology building this radio of the future will be on display on the NAB floor. Come on out and see it.

★ ★ ★

A little history on the artwork. The photograph of the 1933 Model 627 Atwater Kent radio came to us courtesy of Stephen Raymer, the managing director of the Pavek Museum of Broadcasting in St. Louis Park, Minn.

The beautiful radio is part of the Charles Bradley collection. Mr. Raymer was kind enough to photograph the radio and send us the negatives for use on our cover.

According to the Pavek, Arthur Atwater Kent incorporated the Atwater Kent Manufacturing Co. in 1919. A versatile inventor, Kent already had, at that time, 25 patents. He became hooked on radio

in 1921 and decided that it was the perfect field for his company to enter. He had all the equipment and knowledge for Bakelite molding, metal-forming and electrical coil winding, as well as a national reputation and a network of dealers well-suited to handling radio.

The company would stay in business until 1936, when Kent closed his factory doors rather than succumb to the pressures of local trade unions. Many of the Atwater Kent radios are highly prized among collectors, including its model 3925, which is on permanent display at the Pavek Museum.

The morphing sequence was created from two photographs that were scanned into a computer — the Atwater Kent and a shot of a Dalet digital workstation. Using Adobe Photoshop on a PC, the background behind the digital audio workstation was painted

out by hand and replaced with one similar to that behind the old radio.

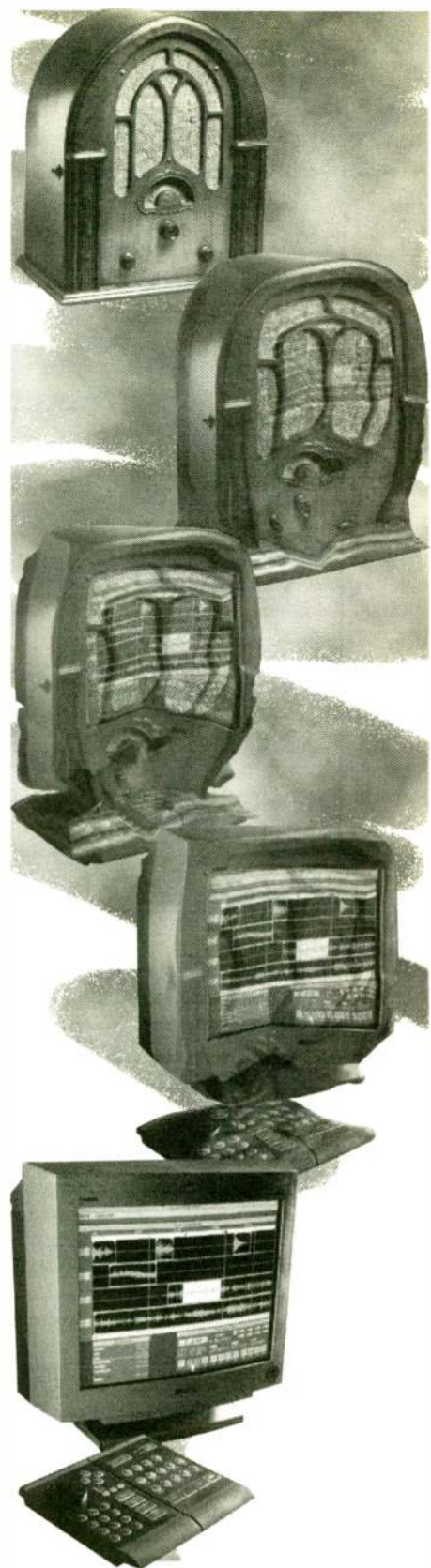
Once that modification was made, the two images were loaded into Photomorph 2 (North Coast Software). Even though Photomorph 2 is primarily video production software, it is able to work at sufficient resolution for print.

Once the morph was set up, the computer was left overnight to calculate a sequence of 20 frames. Of these, the five most interesting frames were selected, and further touched up in Photoshop, to produce the sequence on the cover.

The artist was our own John Spofford, the editor of *RW*'s sister publication, *Computer Video Production*, a magazine that covers computer-based hardware and software used in video production. John is a self-taught computer artist who studied Fine Arts, and computer programming, at the University of New Hampshire. He started as a commercial illustrator who worked in, and eventually ran, an audio-visual/video production department of a Fortune 500 company for 14 years. He was later self-employed as a computer animator, and taught computer graphics at the high school level, before accepting a steady paycheck as editor of CVP.

★ ★ ★

As usual, *RW* will have a booth on the audio hall floor. Come by and see us at Booth 900. We'll also see you around reporting for the NAB Daily News. That is it for now ... see you in Las Vegas.



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Keep the RDS faith

Dear RW,

I'm writing in response to "Where are the radios" in the Feb. 7 issue of *RW*. As many of those articles mentioned by Don Danko referred to the EIA/CEMA's nationwide RDS program, I feel the need to respond.

While I can understand Mr. Danko's frustration concerning growth of market penetration, I caution him to not give up on RDS technology too soon. RDS has found itself in a chicken-and-egg situation in the United States for several years now. But, as the number of broadcasters going online has grown in recent months, so now grows the availability of radios.

For the last 10 months or so, the EIA/CEMA and its member sponsors, Denon, Delco and Pioneer Electronics (USA), have been working to raise awareness of RDS technology in the United States and expand the nation's broadcast capability.

In terms of expanded capability, the results of this program have been impressive. To date, nearly 150 stations, many in the top-10 markets, have adopted RDS, joining the several hundred FMs already online. But, more importantly, these EIA/CEMA program stations have committed more than \$700,000 in advertising and underwriting credit to educate their listeners about the technology they have adopted. We believe that's a lot of awareness.

Already, radio listeners in every major market in the country have access to several RDS broadcasts. In some markets, like Baltimore, Boston and Philadelphia, well over 50 percent of the FM audience is now receiving RDS data. Other major markets are not far behind.

But, without RDS radio, those data streams aren't very useful to listeners. Fortunately, on the radio front, things are also changing rapidly. At January's International Winter Consumer

Electronics Show in Las Vegas, the EIA/CEMA's Wall of RDS Radio featured home, car and portable products from 10 manufacturers. Additionally, at least three major manufacturers (Denon, Audiovox and Pioneer) unveiled new RDS products at the show. Last year, three automobile manufacturers announced they had made RDS a standard feature on their cars sold in the United States. And the EIA/CEMA understands other car manufacturers are moving ahead with plans to introduce RDS as standard in the coming months.

Each of our program sponsors, of course, offers RDS radio in the U.S. market. Additionally, Delco maintains a toll-free number, 800-748-0422, for RDS product information and ordering.

As for retailers, many are now offering RDS products in home and car versions and are training their sales associates to sell them. In particular, Circuit City has gone to great lengths to ensure their sales staff is knowledgeable of RDS and how to sell it. Other major national and regional retailers selling RDS radios include The Good Guys, Tweeters Etc. and Incredible Universe. As additional manufacturers phase in their RDS product throughout the coming year, more retailers will join the list.

It's important to bear in mind, new technologies — FM itself for example — aren't built in a day. RDS won't be an exception. But, with the continued support of broadcasters like WKSU-FM, manufacturers, and retailers around the country, U.S. radio listeners will be assured the convenience and ease of Radio Data System features.

Gary Shapiro, President
Consumer Electronics Manufacturers
Association (CEMA)
Arlington, VA

Still not sold on RDS

Dear RW,

I agree with most points raised by Don Danko (*RW*, Feb. 7) regarding RBDS. After three years and a great deal of ballyhoo, RBDS is starting to smell like AM stereo.

It's not bad enough that there are no receivers available to consumers and every indication is that when (if?) there ever are any, they will cost more than satellite systems — or even that the after-market crowd has no idea what you are talking about. What's worse is all the "vapor-ware" that might be available soon, if ever.

Of all the neat stuff RBDS is supposed to do that I've seen at the last two NABs, I still haven't seen anything you can buy off the shelf and plug-'n'-play on RBDS that means anything to anyone except futurists and technogeeks. And, what is out there is expensive and complicated — more stuff to break down. Beyond that, RBDS proponents haven't sold the production directors and sales managers, so it's not a management priority and the profit potential is tenuous.

Starting up information and entertainment delivery systems (i.e. radio stations) to sell receivers may have been a great ploy in the 1920s, but I don't see it

NAB '96: Be There

Even as the harshest winter in recent history in the Northeast begins to recede, radio's overall business picture continues to look rosy. Politics and the Olympics promise to make 1996 another bellwether year for an industry that continues to grow at a respectable clip, year-in, year-out.

Now, more than ever, broadcasters should make every effort to attend the NAB '96 convention and exhibition.

From the standpoint of equipment manufacturers and service providers, a large number of product introductions and new services — including a whole new conference on data networking and telecommunications to a whole new exhibit floor devoted to the Internet — further support the feeling that business is strong and growing.

So with the convention about three weeks away, the NAB is faced with the happy prospect of a trade show filled with new products and services, attended by station owners and engineers who have money in their budgets and a strong optimism about the future of their industry.

The high-tech parade of equipment innovations is a classic signature of the NAB convention. It is important, however, not to lose sight of the fact that NAB '96 is also a place to learn about the latest in regulatory changes, management issues, engineering issues, digital audio broadcasting, in short, the business of running a radio station.

The NAB's annual gathering offers you a chance to meet with your colleagues and swap ideas and techniques for the enhancement of your industry.

The times are looking bright ahead, but mostly for those who stay on the cutting edge of the breaking news and improved technology to help them run their stations.

Make the trip out to 'Vegas, and sample what the future holds for radio.

—RW

working in the electronics-saturated '90s. I've got better things to do with my money than buy \$600-\$1,000 receivers so I can watch call letters or clever slogans crawl across the dial — and I work in the industry!

Unless something big happens soon, I concur with Don, and as soon as management forgets I talked them into spending over three grand to get in on the ground floor, the RBDS generator we've been running for a year and a half, with no planned software upgrades materializing nor comments from any listeners, will join the quad gear in the closet.

Clif Glasgow
Chief Engineer, KSIQ-FM
Brawley-El Centro, CA

RDS facts

Dear RW,

I want to set the record straight regarding RDS radio and retailers by addressing a letter published in the Feb. 7 issue of *RW* from Mr. Don Danko/WKSU-FM in Kent, Ohio.

First of all, I want to speak on behalf of one consumer electronics manufacturer, Denon Electronics, which has already sold over 100,000 RDS equipped radios to the U.S. after-market. Denon has over 1,000 retailer locations nationwide and at least 60 in the state of Ohio that sell RDS receivers for both home and car. Denon makes sure to include RDS information in its product brochures as well as the operating manuals that are shipped with each RDS product. Every Denon field sales representative has received RDS training during the past three years. All this is done purposely to promote RDS sales awareness and consumer education.

Mr. Danko made his first mistake by calling on a broadcast equipment manufacturer, RE America, for consumer product information. To my knowledge, Denon did not receive a phone call from Mr. Danko regarding his request to purchase an RDS

after-market radio in his region. Furthermore, Denon Electronics has published its telephone number in *RW* every quarter for the RDS Roll Call feature. Denon has even run a consumer product ad for RDS Smart Radios in *RW* to further promote consumer product availability to broadcasters. Mr. Danko need only look as far as *RW*'s list of radio manufacturers that accompanies every RDS Roll Call list for complete RDS information.

I agree that more consumer and retailer awareness must happen for RDS to become a success in America. That's why a promotional program to increase the number of RDS stations has been executed by the EIA and several receiver manufacturers. Most importantly, we need broadcasters to encourage their sales staff to develop joint promotions with their local retailers who are coincidentally, the advertisers. Some markets are already enjoying RDS revenue success, such as Philadelphia.

Lastly, we need broadcasters to take care of what they are transmitting via RDS. Ironically, when I drove through Kent, Ohio, during the Christmas holiday season (in my VW equipped with after-market Denon DCT-950R RDS radio), I noticed that WKSU was transmitting the wrong clock time. A little RDS data maintenance isn't too much to ask for, nor is it hard to do, especially when new RDS automation software has become available.

I would advise Mr. Danko or anyone else not to lose faith so quickly with RDS technology, especially as it begins to steadily fall into the hands of listeners and broadcasters. I commend *RW* for reporting on RDS and keeping us all up-to-date. Please continue the good work. After all, it took FM stereo close to three decades to fully develop as an industry and it's still making the news. By these measures, RDS is only in its infancy.

John D. Casey
Marketing Manager, Denon Electronics
Parsippany, NJ

Radio World

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**Next Issue of
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FCC Nixes Nighttime Power for WPMZ

by Alan R. Peterson

EAST PROVIDENCE, R.I. Last month the Federal Communications Commission (FCC) denied a Special Temporary Authority (STA) to Bear Broadcasting's WPMZ(AM) here, ending the station's quest to continue nighttime operation of 250 W at 1110 kHz.

What makes this notable is the station had been broadcasting at night for nearly a decade without authorization and was creating widespread interference to clear-channel station WBT(AM) Charlotte, N.C., even though little or no objection was raised by listeners.

What follows is a curious story of forms, calls, communiques and complaints that took a decade to iron out.

History

The timeline began in 1985, when Bear's predecessor, East Providence Broadcasting, owned the station; known previously as WWRX and WHIM before the present-day calls.

In 1985, East Providence Broadcasting claimed to have received FCC authorization for 250 W nighttime power in the form of an Order to Show Cause. A letter sent to the station from the law firm of Hogan and Hartson confirmed the station could begin 24-hour operation. East Providence commenced night operation on Jan. 1, 1986.

According to the original June 30, 1993,

STA request, the general manager and president of East Providence Broadcasting stated they had spoken with a Mr. Rosenberg at the commission several months later, who confirmed the authorization to broadcast at night.

Timothy Z. Sawyer, technical consultant to Jefferson Pilot Communications (owner of WBT), commented, "The station has never been able to produce anything that indicates authorization. Anything the station has submitted has been the first sheet of a Show Cause order, which is like the instruction sheet — it doesn't have their call letters on it, it has no indication that it pertained to their station."

In 1988, Bear began negotiations to buy WHIM. No complaints of interference had been filed and no proceedings were pending with regard to WHIM's night operation. Bear received FCC approval to take over the station on Jan. 24, 1989.

In 1992, a phone call to WHIM prompted Bear to investigate the validity of its nighttime operation. It was discovered the FCC had no record of WHIM's night authorization and a channel allocation study revealed such entitlement was unlikely to begin with, due to the Class 1-B status of Jefferson-Pilot's WBT(AM).

First request

WHIM initially requested continuing night operation on 1110 kHz, but proposed these options: priority ranking to migrate to the expanded AM band, or split-

frequency operation where WHIM would move to the first adjacent frequency of 1120 kHz at night. On July 20, 1993, the FCC's May Bradfield issued a one-paragraph telegram to Bear, denying the STA.

Bradfield cited the station's Class II (Class D) status and lack of records authorizing night operation. Bradfield also requested a detailed engineering study and filing of FCC Form 301 if WHIM desired nighttime operation. Copies were forwarded to James Burtle, chief of the AM Branch, Audio Services Division; Bear's attorneys and the Engineer in Charge (EIC) at the FCC's Boston bureau.

No suspension

While the telegram denied temporary authorization, nowhere did it say in plain language that WHIM was to suspend nighttime operation. WHIM continued to stay on the air after sunset, changed calls to WPMZ and, pursuant to an LMA, programmed a Spanish-language format.

Sawyer notes the format caused some confusion as to the signal's origin.

"We received reports as far as South Carolina. We weren't sure where it was coming from; whether it was a Cuban station or anywhere in Central America."

On Feb. 7, WPMZ again applied for 250 W nighttime operation, "or some lesser amount that the commission may determine." The STA was filed as a result of a Notice of Violation by the Boston EIC, requiring a reply within 10 days. On one occasion witnessed by the Boston District Office, WPMZ ran a full 5 kW after sunset. The station had been operating at night for over a decade.

WPMZ continued to operate, believing the FCC's 1993 denial was issued "without the apparent knowledge of any supervisory commission official ... not properly authorized and not an official response," even though copies were submitted to Burtle, Bear's attorneys and the Boston EIC.

The new STA request contained a disturbing passage that claimed oral

permission was given by an unnamed FCC official to continue nighttime service until the staff could review the matter. Such a "backroom deal" would have been in violation of the commission's own public regulations and would not have been binding in the first place.

Disputes

On Feb. 8, Carter Broadcasting — owner of crosstown WRIB(AM) — filed an Opposition to Request. In the opposition, Carter called WPMZ a "pirate" station, claimed Bear knowingly and willingly violated the commission's rules and was actually trying to obtain a waiver of established FCC rules disguised as an STA.

The opposition accused Bear of not practicing "normal due diligence" for not investigating FCC files to determine parameters of operation. Another part addressed Bear's interpretation of the original denial in 1993 and subsequent post-sunset operation.

The opposition also accused WPMZ of convincing WRIB's clients its night signal was superior to the Carter station's, succeeding in drawing business away from WRIB with "illegal nighttime activity."

Strike two

The FCC issued a second denial to Bear's STA on Feb. 16, this time including the order to cease and desist nighttime operation immediately.

In the end, the crux of the issue was WPMZ's license: authorization for daytime operation only. The commission's judgement stated "... the burden rested with Bear to officially ascertain WPMZ(AM)'s nighttime authority prior to initiating such service."

Following receipt of the denial, Mark N. Lipp, Counsel to Bear Broadcasting, notified the FCC that WPMZ was terminating nighttime operations immediately.

But Bear is not down and out. Lipp tells RW that other options are being explored to return WPMZ to the air at night.

"We're in the process of deciding whether there are any other options to do that. We don't have anything nailed down but we are thinking about it. We are trying." ☐

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Obstacles for AM DAB

► continued from page 1

average basis — for the Delco narrow-band, Denon wide-band, and Panasonic receivers.

The degradation was just as great on second adjacent channel tests when a medium strength signal was evaluated and the environment was noisier. The differences were minimal, however, when a weak signal was evaluated on the second adjacent channel thanks to interference that affected both the analog and IBOC input.

USADR Engineering Manager A.J. Vigil explained why the second adjacent channel seemed to perform so much worse than the first. He pointed out that within the first 10 kHz, the in-band, on-channel (IBOC) spectrum does not differ much from the existing analog spectrum so the first adjacent IBOC channel interferes about the same as a first adjacent analog channel.

But the IBOC system being tested generates modulation out to 20 kHz, said Vigil, which could increase the amount of energy present in the band-pass of a receiver tuned to the second adjacent channel.

While the first adjacent channel interference is not a concern thanks to allotment plans, in crowded markets, Vigil agreed there are cases where a second adjacent digital channel could interfere with existing analog signals.

"We're aware that these cases exist," said Vigil adding that USADR is working on modulation techniques and spectrum occupancy.

The AM digital system also caused serious interference to the host analog signal. On average across the four receivers in strong signal tests, the analog signal took a 20 dB signal-to-noise degradation when the digital input was added.

Vigil pointed out that during last year's NAB show when USADR demonstrated the AM IBOC system on 1660 kHz, DXers who heard the analog signal and wrote to say the quality of the signal was very good had no idea that a digital signal occupied the same spectrum. The systems being tested now are over two years old.

"We haven't sat still," said Vigil. USADR has been working on a newer AM system, but it is not clear if that system will be tested in the field. ☐

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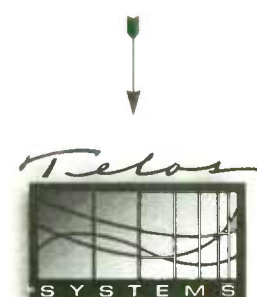
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World Radio History

REGULATORY UPDATE

This page is designed to bring you up to date on hot issues heading into the NAB '96 show. We will have another in the next issue.

New EAS Products

ATHENS, Ohio While Sage Alerting and TFT Inc. were the first companies certified to sell Emergency Alert System (EAS) equipment, they will soon have company.

Gorman-Redlich was testing its prototype at WOUB(AM), a CPCI station in Athens, Ohio, in mid-February. The company was planning to submit its

application for certification shortly thereafter. It will display a prototype at NAB '96 and prices will be available if certification is finished in time.

Multi-Technical Services (MTS) is planning to enter the EAS marketplace at the end of the third quarter. MTS plans to have a single box, self-testing solution. J.T. Communications, is rumored to be developing a third EAS product.

EAS is scheduled to push the Emergency Broadcast System (EBS) aside come Jan. 1, 1997. Equipment purchases are only half the battle. States and localities also need to establish their regional EAS plans.

Rhode Island is now finalizing its plans for the new system. See R.I. Emergency Management Agency Project Manager Richard Bouchard's article on page 1.

RW readers may recall that a company called Quad Dimensions has a patent on an area specific emergency alert system — the same technology the National Weather Service (NWS) uses. The Department of Commerce is reviewing the patent file to see if a reexamination is necessary.

That leaves Quad Dimensions in limbo. In letters sent last summer, Quad encouraged manufacturers to license its technology. But manufacturers are

not convinced the technology is proprietary.

Meanwhile, the NWS is outfitting all its NOAA field offices with encoders compatible with EAS. Sources expect they will finish by summer's end.

Hope for AM

WASHINGTON Given the billions of dollars made auctioning spectrum licenses and the political hay made promoting children's television, it will not be surprising if plans for AM expansion gather dust in the in-baskets at the Federal Communications Commission (FCC).

At last look, the AM branch of the FCC had sent the latest AM plan to the eighth floor for the commissioners to review. But a source could not say if the package included a revamped allotment plan for stations eager to move to the expanded band.

The FCC still has to address the four comments received last fall when it asked for corrections to the database used to determine who gets to move where on the 1610 to 1700 kHz band.

The comments dealt with protecting traveller's information stations and other radio interests. The FCC did its own fixes to its database last fall.

Now the world awaits.

HSDS Standard To Be Announced

CLEVELAND Still going. Lab tests to find a high speed FM subcarrier standard were expected to be finished by the end of March according to Michael Rau, co-chair of the National Radio Systems Committee (NRSC) FM High Speed Data Subcommittee.

Rau hoped to announce the test results at the NAB '96 spring show in April. The data will be used to choose a high speed standard. That will be a boon for the Federal Highway Administration (FHA) which is developing an architecture for Intelligent Transportation Systems in the United States. But states will still be at liberty to choose the technology they want to use.

With three different systems being tested at the NASA Lewis Space Center in Cleveland, that means Arizona could select a subcarrier system which might not work on a car from Iowa.

How stations will accept a high speed standard is difficult to predict. Some stations do nothing with subcarriers for fear of damaging quality of their main channel broadcast. Others are being paid thousands of dollars each month to lease their subcarriers and will probably have to be persuaded that the standard's grass is greener.

The three systems are Digital DJ's FM Subcarrier Information Service; Seiko's High Speed Data System (HSDS); and Mitre's Subcarrier Traffic Information Channel. All three use FM subcarriers to transmit data.

The FHA contracted Mitre to build the STIC system. Scientific-Atlanta Inc. will be taking the STIC system on a real-world test-drive in Atlanta this summer during the Olympics.

Minneapolis is expecting to experiment with the Seiko system next spring and Seattle will test it out this summer. ☺

Worried that this is all you'll see at this year's NAB?



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INTERNATIONAL UPDATE

Deregulation Works Wonders for Kiwi Radio

Marlborough Media Flourishes in Deregulatory Environment that Favors Entrepreneurs

by Nick Gerritsen

BLLENHEIM, New Zealand In the early 1990s the New Zealand government decided to turn the nation's radio industry on its head.

Although the government itself was the country's main broadcaster, total deregulation was the order of the day.

Deregulation raised many questions similar to those U.S. broadcasters are grappling with: What impact would the proliferation of new broadcasters have on the media in general, could small operators thrive, would programming quality be maintained, how could the industry adapt?

Harness the forces

Five years after the initial phase of deregulation, Marlborough Media Ltd. illustrates how the forces of deregulation in the province have been harnessed and made to work to the advantage of entrepreneurs, even in the smallest and most marginal of markets.

A true child of deregulation, Marlborough Media is one of New Zealand's smallest radio broadcasters. Formed in 1991, the company operates two separately formatted stations in the Marlborough province at the top of the South Island.

"The company's genesis was in 1984 when a small group of us at Marlborough Boys' College started ExStatic 89 FM — one of New Zealand's first student radio stations," said Director Adrian Sawyer. His broadcast proved very successful and was used as a training model for media studies throughout New Zealand.

"We have been lucky that many of those initially involved have continued their association with the business, and it is for this reason that we have been able to go fully commercial, survive and now move to a multiple broadcast model," Sawyer said.

The province of Marlborough has a very scattered population, mixing both urban and rural settings. The local retail revenue base is limited and tied very closely to the local economy, which is oriented mostly toward exporting wine, seafood and horticulture.

Marlborough Media is the only locally owned and operated private radio broadcaster in the province. Within four years of its founding, the company was operating both the hot adult contemporary (AC) station Sounds FM and Easy FM, which plays a mixture of easy listening and greatest hits.

By broadcasting on four separate frequencies, Marlborough Media has the most extensive geographic FM coverage in the province.

As the pace of deregulation pushed forward, Marlborough Media had to grow to achieve the widest possible demographic coverage.

"Because the local population age characteristics are extreme," said Program Director Chris Cotton, "it was obvious that in order for us to achieve the listenership necessary to justify coverage expansion and technical development we needed to move quickly to multiple broadcast offerings."

"Approximately 32 percent of the population is aged 50-plus, making Easy FM an important priority. It is now beginning to generate listenership levels that give us a clear market lead."

Marlborough Media now has the opportunity to build on its existing base. This may mean entering into new broadcasts or even new facets of the media.

Sitting on licenses

As with many other Kiwi broadcasters, the company has a number of unused frequencies that it purchased during the March 1995 frequency tender.

The most apparent impact of deregulation is that existing broadcasters look to purchase any newly released frequencies in order to protect their existing position. In markets as small as Marlborough there is a real risk of too much competition ruining it for everyone.

The prices paid for these frequencies reflect the determination of broadcasters to protect existing market positions rather than any hope of economic return from them.

When it comes to buying frequencies, there are two schools of thought. Either a broadcaster should buy every frequency that becomes available and store them in the general manager's top drawer. Or they should purchase new frequencies only with the intention of expanding into or further expanding multiple broadcasts.

Difficult situation

In provincial markets, increased competition can lead to greater losses; earnings are generally lower in these markets and the revenue pie is very precisely defined. Consequently, provincial broadcasters find themselves in a difficult situation.

"Somehow you must arrive at a comfortable position between having enough spare frequencies to meet any new competition directly and simply getting on with the task at hand, providing listeners with the best programming and advertisers with the best service," said Sawyer.

"We have reached this point and now will consolidate into a strong strategic position. I guess it comes down to risk taking and judging how far your human resource can stretch. One thing that we are aware of is that growth does not necessarily lead to increased profitability."


For the company's managers the key task is to grow into the current position without detracting from the programming or the service provided to listeners and advertisers.

Nine full-time staff plus a sales team operate both Sounds FM and Easy FM. The company emphasizes multitasking

among its staff, which means it must constantly find people with the right skills in the local community.

Late in 1995, Marlborough Media was moving further down the path toward maximizing the efficiency of its operations by installing the first Scott Studios digital audio systems in Australia. This marks a unique development in the company's operation.

The only local competition Marlborough Media faces is Radio Marlborough, one of the 40 Radio New Zealand commercial stations that is coming up for sale. The fact that Radio Marlborough has broadcast in the Marlborough market for many years means that despite substantial growth in both coverage and listenership, Marlborough Media still is perceived as the new kid on the block.

Operating upbeat radio in a very traditional market brings with it a whole new set of concerns and issues. But since 1991, local listeners have been able to thank Marlborough Media for improving the quality of commercial programming in the province. 

Nick Gerritsen, a broadcaster and lawyer, reports on the radio industry for Radio World International from Blenheim, New Zealand.

Scientific Atlanta Makes Sale

ATLANTA Scientific-Atlanta Inc. is wrapping up an agreement to sell its Satellite Audio Distribution business unit to StarGuide Digital Networks Inc. — formerly VirteX — based in Reno, Nev. Closure on the agreement was expected before the end of March.

The unit develops and markets products for the radio broadcast industry including Digital Audio Transmission System (DATS) compatible products and products using Scientific-Atlanta's proprietary SEDAT audio compression technology. The business unit also recently began shipping equipment using MPEG1 Layer II audio compression technology.

Scientific-Atlanta's Director of Satellite Audio Broadcast Systems Jack Fenster will join StarGuide and serve in a similar capacity.

Scientific-Atlanta said it is selling the satellite audio distribution business unit because it is no longer aligned with Scientific-Atlanta's core business strategies.

The company's satellite audio products are used in North America by the ABC and Westwood One radio networks, CBS Radio and many state and regional radio networks. The U.S. Armed Forces Radio and Television Service also uses the company's products as do broadcasters in Great Britain and South Africa.

StarGuide Digital Networks Inc. owns StarGuide Satellite Systems, VirteX Technologies and MUSICAM USA. StarGuide Satellite Systems manufactures the StarGuide II receiver, a bandwidth on-demand digital networking receiver.

NAB '96: Waiting for U.S. DAB Standard

by Lynn Meadows

LOS ANGELES Broadcasters eager to start transmitting zeros and ones in digital audio broadcasting (DAB) should not expect much news on DAB from this year's NAB '96 spring show.

Sure, you can attend the two-part seminar — DAB: U.S. and Worldwide Planning — on Sunday, April 14, but you will not find out what the U.S. DAB standard is.

And there will not be any demos to top AT&T's in-band, adjacent-channel demonstration from the Radio Show in New Orleans last fall. Nor will USA Digital Radio repeat its much lauded AM/FM in-band, on-channel (IBOC) demonstration from NAB '95.

This spring, the seven systems competing to become the U.S. DAB standard are embroiled in field tests. So while demonstrations made news in 1995, don't look for the new DAB standard to grab headlines before 1997.

Boothless DAB

The Electronic Industries Association (EIA), co-sponsor of the DAB test process will not even have a booth at the spring show.

But EIA spokesperson Lisa Fasold said she hopes that next year at the NAB '97 show, testing will be finished and

the EIA will be able to showcase at least prototype DAB receivers.

Neither VOA/JPL nor Eureka-147 DAB, the two out-of-band proponents, plan to have booths at the spring show. Don Messer, broadcast satellite program manager for the VOA/JPL S-band system, said he did not plan to be in Las Vegas in April — not surprising given the current crimp in government funding.

Clink Pinkham, manager of technology applications for Eureka-147 DAB sponsor Thomson Consumer Electronics, said someone from Eureka-147 DAB may speak at the show, but there will be no booth.

Only USADR, sponsor of one AM and two FM IBOC systems, will have a booth at the spring show this year. And USADR Project Manager Jeff Andrew said it will be a small booth because most of USADR's resources will be directed towards the DAB field tests in San Francisco in April.

By NAB '97, with luck and cooperation, testing will be finished, reports and recommendations by the EIA and the National Radio Systems Committee (NRSC) will be written, and the Federal Communications Commission (FCC) will be using that information to select a standard.

But luck and cooperation are not words that describe the

continued on page 10 ►

DAB Progresses to Field Stage

► continued from page 9
test process so far.

The National Association of Broadcasters (NAB) hopes the U.S. DAB standard will be an in-band, on-channel system. With IBOC, broadcasters can transmit their digital signal on the same channel as the analog sound eliminating the need for messy spectrum auctions.

Unfortunately, the two proponents with IBOC systems, USADR and AT&T/Amati, took a beating in the lab tests jointly sponsored by the NAB and EIA.

Eureka-147 DAB is the strongest alternative system to the IBOC systems and

some say the EIA's pet proponent. EIA members — electronic manufacturers — might prefer the United States choose Eureka because Canada and much of

rejected Eureka-147. One problem is that the system requires multiple stations to share the same transmitter and the same antenna. Stations would have a single

Luck and cooperation are not words that describe the test process so far.

Europe have selected it as their standard. That would make for tidy worldwide production of receivers.

But U.S. broadcasters have consistently

point of failure and broadcasters who currently have superior signal strength would wind up on level playing ground with weaker AMs and FMs.

Another strike against Eureka-147 is that it operates on the L-band. The EIA tried for several months to convince the National Telecommunications Information Administration (NTIA) to share the L-band for field testing.

Because the L-band is used by the military and government, it could take years to convince the NTIA to surrender that band to U.S. broadcasters.

Unfortunately for the NAB, both the AT&T/Amati and USADR IBOC systems were battered in the lab tests. A caucus of consumer electronic manufacturers compiled a list of questions (see RW, Feb. 21) asking the companies to explain their system's failures.

While the questions for Eureka-147 DAB address L-band implementation problems, those for USADR and AT&T/Amati involve system failures relating to signal-to-noise degradation of the host analog signal, second-adjacent channel interference, and reacquisition time.

Proponents were asked to return their answers to the DAR Caucus by Feb. 22. By Feb. 23, Fasold said nobody had returned their answers. Pinkham said he had seen the questions but never officially received them.

USADR did receive the questions, but is talking with receiver manufacturer individually to answer the tough questions instead of responding to them en masse via the EIA.

Field tests

Originally, the field tests were scheduled to begin in September, 1995. That date was bumped forward for various reasons: multipath retests in the lab; USADR; delays in L-band approval; Eureka; and proponent requests to modify their systems.

Last summer, Eureka informed the EIA that it needed an additional transmitter to cover certain areas in the field tests. When the EIA agreed, USADR, VOA/JPL, and AT&T/Amati wrote that they, too, should have the option to "modify" their systems for the field tests.

Proponents agreed on a Jan. 31, deadline for modifications. No one met the deadline. The first round of testing was scheduled to start in February as soon as the test van was equipped. The field test van was still in Cleveland being outfitted with equipment in late February.

How much delay?

But the delays cannot continue much longer. As Pinkham pointed out, the band agreement with NTIA is only guaranteed through spring. To continue testing Eureka after that will require extension.

Proponents have until April 30 to submit other modifications to their equipment. A second round of field tests was supposed to begin in May.

If the schedule stays on track, Mess said VOA/JPL did not plan to submit any changes to its system. Andrew said USADR planned to submit a modified FM system for the first round of testing although they had missed the January cut-off date. Andrew said USADR would demo the new system at the Radio Show in Los Angeles this fall.

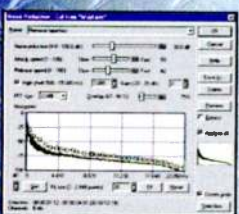
Once the field tests are complete, the NRSC and EIA have to write the rules and their recommendations and submit them to the FCC. There is still a year before NAB '97. A lot can happen in a year.

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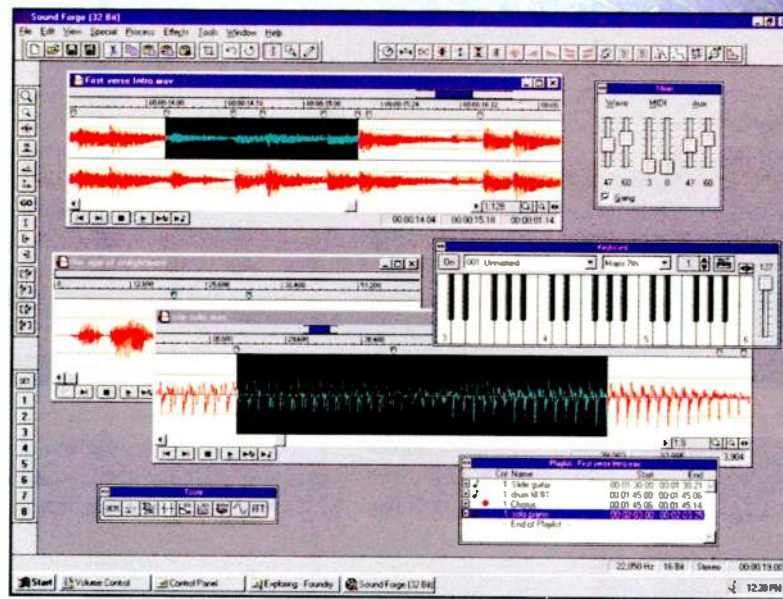
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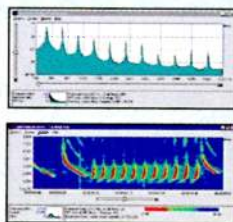


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New Crop of Datacasters Springs Up

by Frank Beacham

NEW YORK Over the past few months a new breed of data broadcasters has hit the airwaves, bypassing the FM subcarriers and RDS technology of commercial radio stations in favor of low cost paging frequencies.

Newcomers such as VideoGuide and Ex Machina have joined well-known names such as Motorola, ESPN, CompuServe and Reuters NewMedia to deliver information via radio signals to a wide range of subscribers across the United States and Canada.

One of the most innovative new systems is VideoGuide, a service that turns any television receiver into a real time news, weather and sports service. It also includes an electronically updated television program guide with one-touch VCR recording.

At a retail price of under \$100 for the hardware, VideoGuide uses BellSouth's national Mobile Comm paging network to deliver a constant trickle of new information from a central "newsroom" at the company's headquarters in Bedford, Mass.

VideoGuide, which launched late last year and is sold through electronics retailers, offers a real-time personalized "newspaper" featuring regional, national and international stories from the AP and UPI news wires. The newspaper feature automatically learns the types of stories that the subscriber is interested in and positions those stories at the top of the newspaper screen.

The service also offers up-to-the-minute sports scores, lines and game summaries. Viewers can watch the progress of dozens of sporting events at the same time.

VideoGuide also has an interactive, on-screen television program guide, updated to always provide seven days of TV and movie listings.

"We are working on other services," said David S. Wu, director of marketing for VideoGuide. "Financial, entertainment, soap opera guides and local movie



Wireless sports information is at your fingertips with ESPN To Go.

information are being considered."

The bulk of VideoGuide's information is broadcast between 11 p.m. and 2 a.m. during Mobile Comm's off-peak hours, Wu said. This allows the busier daytime hours to be used for the transmission of breaking news and sports information.

Each VideoGuide receiver is essentially an alphanumeric pager with an internal 68000 processor and memory which stores graphics and operating software. The device knows how to filter local information by knowing the user's ZIP code, which is entered into memory at the time of initial setup.

Though new data is constantly being pushed through the pre-designed graphics frame, the firmware that holds the graphics and operating program can also be updated remotely.

"If we wanted to change the look of the graphics or add a new service we can do that remotely," said Wu. "We even have an expansion slot on the back so that the user

can add more memory to accommodate future services."

Scheduled for launch at the end of March is AirMedia Live!, a new national wireless network from Ex Machina, Inc., a New York City-based firm that specializes in paging software. The new venture will connect on-line services to computer users

without the need of telephone lines. PageNet's national wireless system will be used for broadcasting the signal.

A small radio receiver costing under \$150 will be coupled with filtering software that will allow users to receive selected news, sports, financial, weather and industry news without having to go on-line. The service will also offer e-mail alerts when new messages arrive in the subscriber's electronic mail box.

The user can customize the interface and select only desired information from the continuing stream of broadcast data. The software will feature photorealistic sports scoreboards that show inning-by-inning results, updated regularly and punctuated by the crack of the bat and roar of the crowd. The software can also simulate financial tickers with info from Wall Street.

Participating as content providers in the launch is CompuServe, Reuters NewMedia, Sportsline, quote.com, LottoWorld, FreeseNotis Weather, Communications Now, TravelGram, Metro Networks Traffic, COMTEX Information Service, Business Wire, PR Newswire, Ziff Davis Wire Highlights, Knight-Ridder/Tribune Business News and The Sports Network.

One of the most interesting features of AirMedia Live! is its ability to combine Internet information with the broadcast data stream. URLs, the "addresses" of the Internet, are transmitted over the air with each headline, message or news item, and

continued on page 13 ▶

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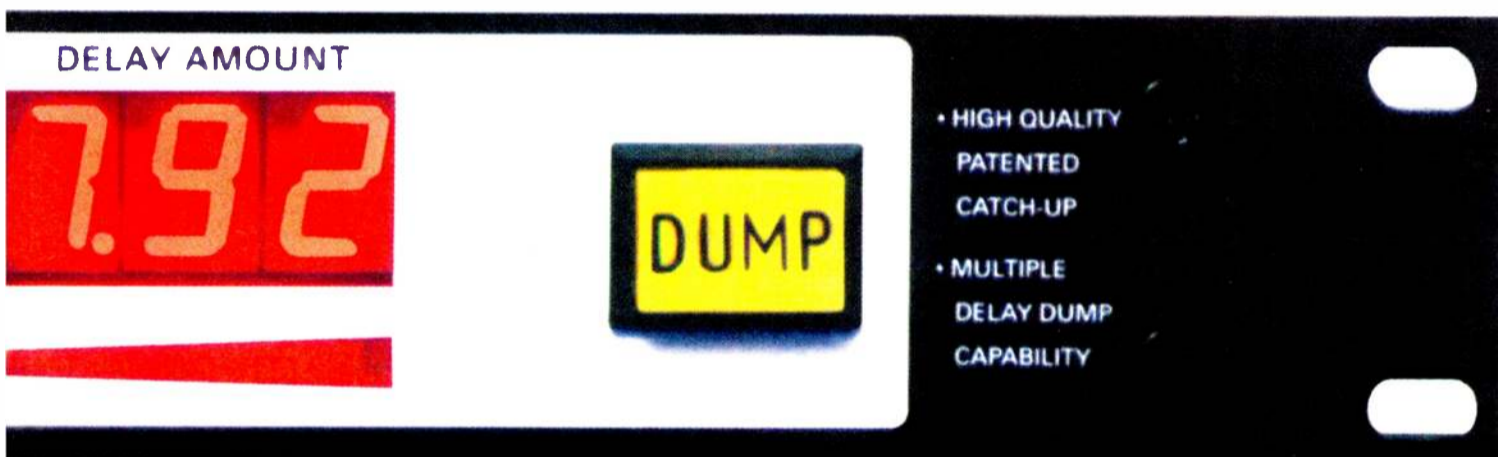
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World Radio History

FCC Aims to Streamline EEO Policy

by Lynn Meadows

WASHINGTON If you have anything to say about the Equal Employment Opportunity (EEO) policies of the Federal Communications Commission, speak now.

Stations tired of worrying about paperwork and fines for their EEO efforts have until April 30, to send comments and May 30, to send reply comments on Mass Media Docket No. 96-16.

The commission wants to streamline EEO requirements for broadcasters — especially those operating in small markets or small stations. The FCC is also asking for comments on its forfeiture guidelines.

At an open meeting, all commissioners stressed that they were still committed to the goals of the FCC's EEO policy. Those goals are to prevent employment discrimination and to promote programming that reflects the interests of minorities and women in local communities.

The commission calls its program an "efforts-based" program; the FCC focuses on a station's efforts to contact sources likely to refer qualified minority and female applicants. That means a station with a diversified work force can be socked with fines totaling thousands of dollars for poorly documenting recruiting efforts.

Stations with more than four full-time employees have to file information on recruitment and hiring practices as part of their license renewal applications and work force data as part of their annual employment reports.

The FCC seeks comments on what stations should qualify for reduced record-keeping requirements. Suggestions

include giving relief based on staff size, market size or size of local minority labor force.

One idea suggested was to reduce reporting requirements if broadcasters consistently participated in recruitment options like job fairs. Another was to allow broadcasters to skip the detailed job by job recruiting records if their

Far too many licensees ignore their fair employment duties.

employment profiles meet certain benchmarks.

Commissioner James Quello said he wanted to make sure guidelines do not fall too heavily on small broadcasters and that forfeitures are not unreasonably high for first time or inadvertent violations.

"I think this item attempts to take into account the realities that broadcasters — particularly small broadcasters — face a problem in meeting the paperwork burdens of an efforts-based rule," said Quello.

"I am more concerned that bigotry and fundamental unfairness exist whether one is small or large," said Commissioner Andrew Barrett. "I have a very difficult problem relieving someone simply because they are small when they are consistently putting forth the same kind of unfairness that large people do who can handle the paperwork."

Quello's comments were supported by Edward Fritts, president and CEO of the National Association of Broadcasters, who said that the present EEO policies "rely too

heavily on record keeping over results."

The Minority Media and Telecommunications Council (MMTC) was saddened by the NPRM.

"EEO doesn't need to be 'streamlined' or 'reinvented,' unless it's to express zero tolerance for discrimination. Discrimination has not been reinvented; far too many licensees ignore their fair employment duties," the group said in a release. MMTC is encouraging both the U.S. Civil Rights Commission and the Justice Department to file comments opposing the NPRM.

New EEO forfeiture guidelines will be an asset to the commission which has assessed seemingly random fines in the past. Three stations, for example, received three different forfeitures for EEO violations last fall: \$7,500 for WMAX(AM) in Kentwood, Mich.; \$10,000 for WKZQ-AM-FM; and \$15,000 to Metro Media Broadcasting for WQPW(FM) in Valdosta, Ga.

FCC Chairman Reed Hundt said the new forfeiture guidelines would help EEO cases move quickly through the commission. Without them, he said, there is a backlog of EEO items pending before the commission.

The outcome of this rulemaking will hopefully make EEO requirements clearer for many broadcasters. Commissioner Susan Ness said in the meeting that it does not make sense to fine stations for failing to document outreach efforts when the staffing reflects the community at large.

"We harm our EEO program to the extent that the way we set forth these policies and rules might be complex or unclear," Ness said. She said she hoped that clearer rules would be more effective. ☺

Info Providers Relay by TV, Radio, PCs

► continued from page 11

are embedded in the graphical, animated multimedia viewers. These provide hot links so that a single mouse click can automatically launch an on-line session with the originating Internet site.

Graphical viewers used by AirMedia Live! can work in the foreground of running computer applications or can be minimized and tucked-away, appearing automatically as events unfold.

In another project, Motorola's EMBARC Communications Services, Boynton Beach, Fla., has teamed up with CNBC, the cable television network, to broadcast financial news and information services directly to pocket-sized receivers. The service will use EMBARC's Wireless Broadcast Network, a nationwide web of satellite-linked paging transmitters, and will be accessible in 230 major metropolitan areas in the United States and Canada.

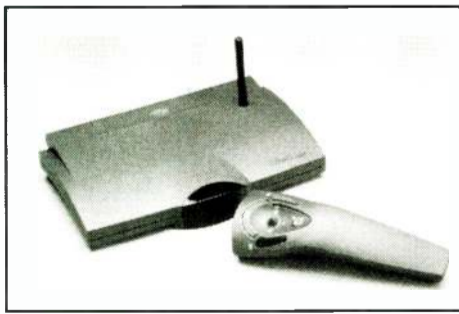
The first product of the alliance, the CNBC Market Page, is scheduled to begin broadcasting in mid-May. Monthly subscription prices are to range from \$14.95 to \$18.95 per month.

Another EMBARC wireless product is "The Know It All" electronic sign. Available in various sizes, the signs have built-in radio receivers that allow them to pick up national and world headlines, business and financial news and headlines, entertainment news and sports. The sports information is provided by ESPN and SportsTicker and includes NHL, NBA, NFL, major league baseball and college basketball and football scores and schedules.

The signs, which range in price from \$349 to \$2,899 depending

on size, include a hand-held keyboard to allow the owner to combine the broadcast information with custom, local messages. Prices for information services range from \$40 to \$50 per month.

Also from Motorola is SportsTrax, a new wireless sports information monitor that delivers data on the user's favorite professional baseball or basketball teams. SportsTrax uses a 900 MHz receiver and provides coverage in all major metro areas of the United States.



The VideoGuide receiver

In the baseball version, the user receives batter-by-batter, inning-by-inning game status on a 1.5 inch LCD screen on a unit weighing 3.5 ounces. The device holds the score of the last game played, the scheduled start of the next game and even informs of rain delays. SportsTrax went on sale at the Brookstone retail store chain this past Christmas. It costs about \$200 including a three-year subscription to the information service.

Not be outdone, ESPN Enterprises has launched its ESPNET To Go, a wireless sports information service that also uses the EMBARC network. It offers scores from pro baseball, basketball, football and hockey with five minute updates. Also available will be college scores, ESPN news and analysis, game schedules, PGA golf updates, injury and weather reports and the point spread and indication of favored teams twice a day. ESPNET To Go service is priced from \$11.99 to \$14.99 a month.

For more information: VideoGuide, (607) 276-8800; AirMedia Live!, (800) 843-6029; The Know It All, (800) 905-3776; CNBC Market Page, (201) 585-6240; ESPNET To Go, (800) 926-3776; and SportsTrax at Brookstone, (800) 351-7222. ☺

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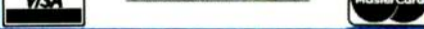
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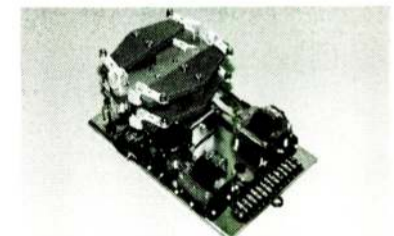


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INTERNATIONAL UPDATE

Canadians Have Doubts about DAB Roll Out

by James Careless

OTTAWA Although Canada now has an official DAB licensing policy, many broadcasters here still have doubts about digital radio.

The doubts are serious enough for some broadcasters to keep them on the sidelines when the roll out of L-band stations begins in the next few years.



Straightforward

According to Canadian Association of Broadcasters (CAB) Technical Adviser Wayne Stacey, simulcasting via a Eureka-147 DAB transmission system is "a fairly straightforward investment."

"There are five broadcasters that will be sharing a single transmitter," Stacey said. "A basic service similar to what we now have on the air in Ottawa would probably run about US\$56,000 to US\$60,000 per broadcaster for five per channel."

No extra costs would be incurred by broadcasters already feeding digital signals to their current AM/FM transmitter.

"If on the other hand," he said, "you are looking at a fairly substantial datacasting capability in addition to the audio, then you might be looking at larger investments."

According to Stacey, the costs will depend on the type of terminal equipment necessary at the originating end and perhaps at the terminating end if a service is being provided to a private customer.

As of late 1995, the major players in Canadian private radio — companies such as CHUM-AM-FM, Rogers Broadcasting, Shaw Radio, Power Broadcasting and Pelmorex Communications — were officially backing Eureka-147 DAB in L-band.

They are all members of Digital Radio Research Inc., the consortium spearheading DAB research in Canada, including the installation of experimental stations in

Toronto; Montreal; Ottawa and Vancouver, British Columbia.

But the commitment to actually implement the technology varies from company to company.

Steve Edwards, vice president of corporate engineering and technology for Rogers, said his company intends to put both of its Toronto outlets — 680 News and CHFI-FM — on DAB in 1996.

Power Broadcasting, however, is taking a more cautious approach, said Executive Vice President Yvon Chouinard.

"Our stations are mainly in small and medium-sized markets, so there is no rush there for us to proceed with (DAB) applications," he said. "I think we will wait a little bit and see what happens."

Meanwhile, the publicly funded

We have been talking as if digital radio is going to be the savior of radio and I do not see that.

— Gary Slight
CAB

Canadian Broadcasting Corp. (CBC) is backing DAB also, despite looming cuts of \$171 million from its \$1 billion budget.

Given the current budget crunch, DAB "will be phased in over a considerable period of time," said CBC President Perrin Beatty. "It is not something that is going to be happening overnight, but we are doing experiments even today."

Affordability

Asked if the corporation can afford DAB, Beatty said, "Yes, the same way as the private sector (can). We are not unique in this; every second radio station in Canada today is losing money, so that pressure on the private sector is as heavy as it is on us."

"But the very survival of the industry

will require that we adapt to new technologies. And digital represents for us a tremendous opportunity to do things that are new and exciting and discharge our public policy mandate in a very different way," Beatty said.

All the public broadcaster support for Eureka L-band DAB does not change the fact that many Canadian broadcasters still have doubts about moving to digital.

Most of the doubters seem to be small-station operators like Nick Frost, owner of SILK-FM in Kelowna, British Columbia.

AM stereo fiasco

The biggest fear about DAB for Frost is that DAB might prove to be another AM stereo fiasco. In his opinion, the sound quality is not appreciably better than FM stereo, at least not to the average listener.

Frost also thinks Canada is undervaluing the difficulty of implementing L-band DAB without the support of the U.S. marketplace, which will have no need for L-band receivers as long as U.S. broadcasters continue to pursue in-band, on-channel (IBOC) DAB.

In the end, however, Frost thinks that consumer interest will be the final arbiter of DAB's future. "It is the consumer who drives technology," he said, "not the guys who invent it."

No one went out and asked the listeners if they wanted DAB, Frost said. Canadian broadcasters are "proceeding along as though the demand will be there. But I do not think it is."

Arguably, Frost's was the most negative opinion expressed by delegates to the 1995 CAB convention in Ottawa in late October. However, other broadcasters also expressed concern about Eureka-147 DAB.

Don Brown, vice president and manager of CJC(B)AM and CKPE-FM in Sydney, Nova Scotia, endorses DAB as "what we need, especially (for) the AMs if they are ever going to get back in competition with the FM's." But he expressed "discomfort" about the fact that DAB technology in Canada will not be the same as in the United States.

Meanwhile, Tom Bedore, general manager of CFGP(AM) in Grande Prairie, Alberta, simply does not see a demand for digital radio in rural areas such as his.

In the hinterlands

CFGP is just now making the move from AM to FM, he said.

"If you are in a small station on the outskirts of Toronto or Montréal, where digital is likely to be a force in the next few years, it probably makes a difference. But out in the hinterlands, I do not see digital as going to be in high demand ... for a number of years to come."

Adding his voice to this chorus of skepticism is Gary Slight, president and CEO of Standard Radio Inc., which owns 11 stations across Canada including CRFB(AM) in Toronto.

The only major player to vociferously criticize the industry "rush" toward DAB, Slight believes DAB is being pushed primarily by manufacturers, for whom "there is a huge amount of money to be made."

For the ailing Canadian radio industry, however, Slight fails to see the benefit of getting DAB on-air fast.

"What has bothered me for the last few years (is) we have been talking as if digital radio is going to be the savior of radio," he said, "and I do not see that. I do not see that it is going to get us more listeners and therefore any more revenue than we are already getting."

"I do not think people are going to listen any longer or turn on the radio any more just because the audio is slightly better than what they currently get on FM stereo."

Despite Slight's views, outright opposition to L-band in Canada is difficult to gauge, particularly when things come down to the crunch and DAB stations start going on-air.

Enlightened self-interest

CAB President and CEO Michael McCabe, for example, noted that "Standard is a very forward-looking company. Eventually they will come on side."

Slight also echoed this sentiment, saying that despite his misgivings, Standard cannot afford to opt out of DAB if everyone else in the market adopts it.

"We do not want to be left behind," he said. "We are going to have to do whatever is necessary to make sure our competitors do not get an edge on us."

In markets like Toronto, where DAB is poised to launch despite a lack of consumer receivers, self-interest will prod naysayers into DAB. In smaller markets like Grande Prairie, the pressure to move to DAB will be considerably less, if not nonexistent.

In the end, despite the hoopla, many broadcasters are sure to proceed with caution, holding off on any real investment until they are certain that DAB can meet its expectations. ☺

James Careless, an audio producer, covers the industry in Canada for Radio World International. Contact him via e-mail at careless@magi.com



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by Alan Haber

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Have a hankerin' for echo? It's always on the stove in Uncle Ricky's cyber-kitchen of top 40 memories. Crave reverb? Bring your appetite — it's today's blue plate special! Need a double-shot of top 40 energy? Uncle Ricky's your man!

Classic clips

Uncle Ricky, also known as Richard Irwin, webmaster at Internet service and development provider Sacramento Network Access (SNA), is a 30-year veteran of the top 40 wars and the proprietor of the Top 40 Radio Repository. Although stocked with only five airchecks and corresponding stories at this writing, Irwin will be adding more from time to time, and hopes to receive contributions from other radio fans.

If future offerings on the site are anything like what's available there now, classic top 40 radio fans are in for a consistently sweet treat. For example, there's a 1972 clip of classic jock Charlie Tuna on San Diego's KCQB and a tasty chunk of the sound of Los Angeles powerhouse 93 KHJ(AM) from the very first week of "Boss Radio" in 1965.

There's also a priceless 1961 clip of newscaster Britt Huey delivering the "Fundamental News" on Miami station WFUN, complete with a variety of typical period vocal effects and music underlying the serious nature of the news.

Uncle Ricky's is the place to go on the World Wide Web for blasts from the past that will trigger rockin' memories of fun, fun, fun.

This treasure is a particular dose of retro joy: "This is Britt Huey with the Fundamental Facts," says Huey, opening up the newscast. A booming voice hits the bricks at the end, noting that "Any portion of the preceding Fundamental News Report is released for rebroadcast or publication to all news media 20 minutes from now!"

You can't go wrong at Uncle Ricky's Top 40 Radio Repository.

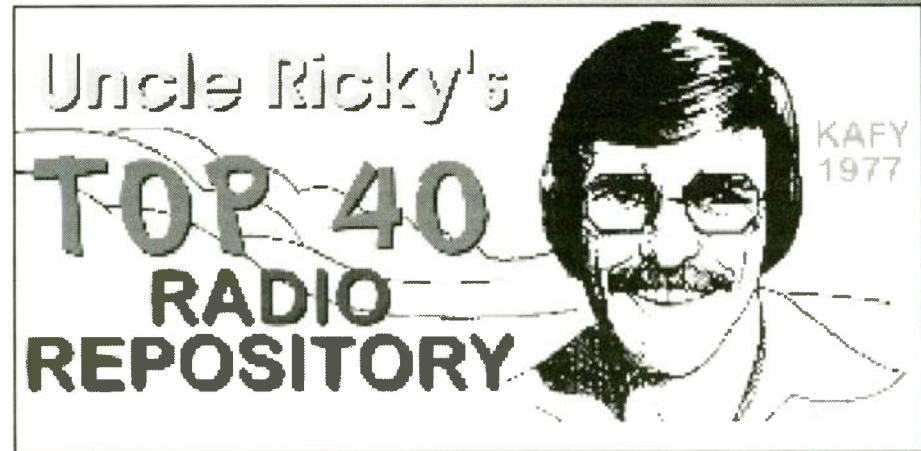
Retro Ricky

Irwin, as passionate a radio fan as you're ever likely to meet, logged his first radio job at age 14 in Concord, N.C., where he ran New York Yankees baseball games on WPEG(FM). He subsequently did an afternoon show, after school, on sister station WEGO(AM) where he was known as "Screaming Richard."

The radio veteran, who has fond memories of listening to WABC(AM) at night while growing up in Concord, remembers learning how to run a board at WEGO. Irwin called up the station when he was 13, looking for a job, and was told he had to be 14 to legally work in North Carolina. That was 1965.

When he turned 14, he called the station again, and was told he needed a third class "ticket" and had to know how to run a board. After poring over a study guide he'd seen a listing for in an elec-

tronic catalog, he took the big step. His family, on a drive up to New York to see the World's Fair, stopped off at the Federal Communications Commission Office in Norfolk, Va., where he took the third class test.



<http://www.reelradio.com/>

tronic catalog, he took the big step. His family, on a drive up to New York to see the World's Fair, stopped off at the Federal Communications Commission Office in Norfolk, Va., where he took the third class test.

Although nervous, he passed. Back home, he called Jack Becknell, who had a Saturday afternoon shift at WEGO. Becknell said Irwin could come down to the station and learn how to work the board which he soon did.

After making his mark at a variety of other stations, including WJAR(AM) in Providence, R.I., and KAFY(AM) in Bakersfield, Calif., Irwin landed in 1979 at KROI-FM in Sacramento, Calif., where he was the program director.

Introduction to the Web

After KROI became KROY-FM and the station was sold and changed to a Spanish format, Irwin suddenly found himself "pretty much out of radio in Sacramento," but not wanting to leave the city for another radio job.

"It's fun to move all over the place when you're 20 years old," he said, "but it's not much fun when you're 40."

Irwin was introduced to the wide world of the Web by a friend who worked at an Internet service provider. A three-month crash course in web page design and programming followed.

Because he missed being in radio, Irwin decided "it was time to do something that for me would be a Web project that would be a hobby, that would allow me to kind of keep some activity involved in the business that I worked in for 30 years."

Irwin realized he had hundreds of radio aircheck tapes stacked in boxes and hidden away in closets. He converted some airchecks so they could be played through Real Audio 2. They sounded good, so Uncle Ricky's Top 40 Radio Repository, which Irwin calls "An

Authentic Analog Archive of Classic Top 40 Radio," was born on the Web. Irwin considers the airchecks on the site to be in the public domain. The site has apparently struck a chord in Web surfers — four days after its Feb. 12 starting date, Uncle Ricky's had already logged over 1,100 different visitors.

Appeal

"People have very, very strong feelings of association with the stations and the personalities and the period of time, the

formatives, the call letters — all these things that basically are not represented by the music," said Irwin.

An April, 1970, aircheck on the site from morning man Jack Gale at WAYS(AM) in Charlotte, N.C., elicited a response from somebody who grew up in the state and "was just delighted" to be able to hear Gale again.

"It's something that he thought was lost forever," said Irwin. "It was something he could hear only in his head. And now he can hear it on the Internet."

Irwin is not only targeting his site to classic top 40 fans and people who are looking to recapture a bit of their pasts. He's also aiming his site at young people who have "a great love for radio" and might be considering careers as disc jockeys.

"They should start by learning what happened before they ever turned on the radio," said Irwin. "They should learn what was done, hear how the sound was manipulated, hear how the jocks approached their performances on the air. I think it's a tremendous learning resource for the few kids who may be left who want to get into broadcasting."

Irwin is committed to his cause. He's excited about the prospects of adding more airchecks to his site.

"I think that there's a requirement — call it karma or whatever — but I think that people have an obligation to give back some of the things that they've been given," he said. "Let's make an attempt to at least archive some of this material before we're all dead and nobody cares."

If you care, email Irwin at ricky@sna.com, and help classic top 40 radio prosper on the Web.

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Review in *Line Up - The Journal of the Institute of Broadcast Sound*
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Internet Ad Revenue to Blossom

NEW YORK Not on the net yet? Judging from revenue predictions by Jupiter Communications, you will want to be soon.

A research and publishing company, Jupiter Communications, is marketing a new report that predicts on-line advertising revenue will reach \$4.6 billion by 2000 — close to half of what radio revenue was in 1995.

Considering that the Jupiter on-line ad revenue estimate for 1995 was \$55 million, Internet growth will be incredible.

Radio advertising revenue does not grow quite so exponentially. According to the Radio Advertising Bureau, radio ad revenue increased eight percent in 1995 to reach an estimated \$11.4 billion.

Hand in hand

What does this mean for radio stations? Reed Bunzel, vice president of communications for the Radio Advertising Bureau, said the Internet is not a potential threat to radio but a potential relationship.

Just as radio benefited from the introduction of television and cable, Bunzel said the industry will benefit from the newest service on the block.

Bill Goldsmith, operations manager at KPIG(FM), said he believes advertising revenue from KPIG's website could surpass the station revenues by the year 2000. Right now, advertisers use the popular site to provide links to their home pages or to a page on KPIG's server. Goldsmith said to look for more and more multimedia ads on-line in the future. Recently, on KPIG's site, 400 people waded through a visual tour of a nearby hotel and convention center with two minutes of audio in order to fill out an entry form to win a weekend trip to the hotel.

"The client was very pleased," said Goldsmith. While no one had responded to a similar ad in the yellow pages, KPIG could hand the hotel 400 names, addresses and phone numbers to add to its direct mailing list.

As that example suggests, the type of companies that advertise on-line is evolving. At first, computer companies were the most logical advertisers said Marc Harrison, reports editor for Jupiter Communications. But car companies and others are enjoying the opportunity to provide a variety of information all at once as the marketplace becomes more mainstream.

An on-air advertisement at KPIG still costs more than an on-line ad. But Goldsmith said he can see that turning around as the Internet changes from a communications to an entertainment

device and the size of the on-line audience grows.

When things really take off, Goldsmith said the Internet will provide another revenue stream for KPIG. He eventually plans to send Internet-specific ads on the audio feed to the Internet; the on-air feed will have one set of ads, the Internet feed another, and still another will be the point and click type on the site.

Counting hits

Harrison said that Internet ads are "a matter of survival at this point" because consumers have resisted subscribing to

Internet services.

Jupiter Communications found the cost per thousand ad exposures on leading Web sites ranged from \$10 to \$450. Like radio and television, the Internet now needs an Arbitron or Nielsen.

Nielsen Media Research has a company called I/PRO that is looking into internet profiles. They are trying to find a way to measure visits to sites without double counting redundant visits.

Harrison echoes Bunzel in his assessment of the Internet's place alongside radio.

"It's not going to displace the value of any other medium," he said. But, he added, it will offer advertisers unique opportunities to present information more creatively than they can in a 30-second spot. ☺

Buyer's Market in Digital Editors

LAS VEGAS It is a buyer's market in the digital audio arena. Manufacturers exhibiting at NAB represent all facets of the technology: from recorders and editors to sample converters and storage systems.

Permanent and portable systems have established their places in the realm of digital audio and effects processors keep getting more powerful.

Orban will be in Las Vegas with its legendary DSE-7000 DAW. Major upgrades this year include real-time 24-bit internal effects processing, with Lexicon reverb, Optimod compression and parametric EQ.

Broadcast Electronics will return to the NAB show with the Mix Trak recording and editing system as an adjunct to its AudioVault studio storage and playback product.

Roland Corp. U.S. is introducing the VS-880 digital studio workstation, the latest in the company's line of DAWs that include the DM-80 and DM-800.

SADiE will roll out the Octavia modular digital editor with SADiE3 software. The company's SASCiA real-time net-

work can exchange multiple-channel audio between SADiE and Octavia DAWs. Its SADiE portable hard disk editor returns to the exhibit for another year.

Dalet Digital Media Systems will debut the Surfer8 stereo eight-track digital editor for radio with time compression/stretch and punch-in recording capability. Dalet also provides digital multitrack production ability in its established broadcast automation system.

TimeLine Inc. will exhibit the MMR-8 modular multitrack recorder with magnetooptical or hard disk storage capability. A new software upgrade for the Studioframe version 6.20 DAW will be debuted, featuring fast waveform display and wave file transfer over several file formats.

360 Systems will bring the Instant Replay hard disk digital audio recorder back to Las Vegas and introduce Shortcut, a stereo digital audio editor for quick editing, expected to cost less than \$3,000.

Fostex Corp. of America will debut the

DMT-8 eight-track hard disk recorder with version 2.0 software. The unit combines a recorder with integral 8x4x2 analog mixer. Fostex will also introduce the D-80 rackmount disk recorder and the CX-8 ADAT-compatible multitrack tape-based recorder.

Computer Concepts Corp. will return to NAB with StudioFrame; the digital multitrack audio production module available for the company's line of digital broadcast products.

Innovative Quality Software, makers of SAW (Software Audio Workshop), will introduce SAW Plus; extending the power of the original product to maximum simultaneous playback of 16 mono or stereo tracks. Another new product, SAMM, provides an audio console interface to the computer screen, bringing all the functions of the Yamaha ProMix 01 console to Windows.

Watch for ABC-Digital's D-Cart, a multi-user digital audio recording, editing and playback system. This is an adjunct to the company's digital radio broadcast on-air system, D-Radio.

Tascam will add two new digital audio products to its lineup at NAB: the DA-38 digital multitrack recorder and the 564 digital portastudio.

Sonic Solutions debuts a next-generation PCI-based audio processing board for audio and multimedia production. The component is capable of 264 Mflops of DSP power and can handle 30 tracks of simultaneous playback.

Otari will be displaying its established RADAR multitrack hard disk recorder, MR10 digital MiniDisc recorder and DTR90T time code DAT recorder. Otari's newest product will be the UFC 24 universal digital audio code format converter.

Apogee Electronics Corp will also introduce new conversion systems. The AD-1000 is a standalone A/D converter with up to 20 bits of resolution, mic preamplification and ADAT interface. The AD-1000 Platinum Edition will combine an AD-1000 with an ADAT/DA-88 digital format converter.

Digital processing technology moves ahead at this year's NAB show. Yamaha will introduce the ProR3 reverberation unit for professional studio use, which will incorporate Yamaha's new DSP chip with 32-bit processing ability. Watch for Yamaha to display its much-talked-about 02R digital console, debuted last fall at the

continued on page 40 ►

EAS Is Here... and Bradley's Got It.

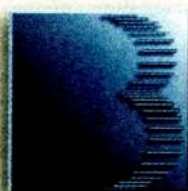


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INTERNATIONAL UPDATE

DAB Receivers Delayed in Europe

MUNICH, Germany Sweden, England and Germany all have started DAB projects. And both Sveriges Radio and the BBC have been broadcasting digital audio since September 1995.

But the question is to whom? As the months drag on, there is still no sign of the now infamous DAB receivers.

In Germany, one of the largest pilot projects is taking place in Bavaria. The project requires approximately 3,000 receivers, which were ordered from the Bavarian firm Grundig.

The order was placed even though Grundig did not have a prototype receiver at the time.

The Advanced Development Center of Dutch electronics giant Philips, on the other hand, had a deliverable product that, according to the company, could have been adapted into a mass-produced product in time for the Bavarian pilot project.

The Grundig receivers were promised for October. Then, for November. The next word was that there would be just a small delay, and they would arrive before Christmas.

The Christmas trees came and went, so did Carnival, but the receivers still have not been delivered.

The reasons behind the delay seem confused. When first contacted, Grundig Audio Projects Press Officer Dieter Kreasle said the receivers would be delayed until April 1 because of last minute changes in part of the DAB standard.

He said the change deals with the way data is sent from the radio station to the receiver. However, Kreasle later called back, saying that after phone conversations with Heinz Gerhäuser of FhG, he felt there was a misunderstanding and that the receivers would not be delayed until April.

When first contacted by **Radio World International**, Heinz Gerhäuser of FhG, who chairs the Eureka-147 subcommittee WPD, which recommended the change, was surprised to hear that Grundig was going to delay the receivers further.

He said the recommended changes to the standard were quite minor and dealt mostly with editorial content. He said receiver manufacturers' representatives are on this committee and, for the most part, they agreed with the changes.

Gerhäuser said the changes needed to be made because there was room for inconsistency in the standard.

The change deals with packet data (PAD) and the way it is sent. As it stands now, packet data can be sent in 16- or 32-bit form. Under the proposed change, it must be sent in 32-bit form, with an identifier bit.

Philips Eindhoven, which has had the only DAB test receiver on the market for some time now, said the changes will affect the current generation of Philips 452 receivers in a very minor way. Packet mode data in the 32-bit form will not be compatible with the current version of the 452 because the receiver really is not designed for that application.

At first Philips was a little confused by the change, according to Henk Begas of Philips, but once they had a look at it, they were no longer worried.

"Especially," he said, "since we are using the 452 receivers mostly for audio, and secondly for PAD. The packet mode

data is something that is of more interest in the future."

The packet mode data is important to



Grundig's DAB receivers are not ready yet.

nonprogram-associated data that is sent, such as electronic newspapers, and other information unrelated to the audio program.

While this sort of data information is not being used in all DAB projects, it is going to be used in the Bavarian pilot project.

Antenne Bayern, one of the biggest private stations in the state, is sending two programs to the still nonexistent DAB audience of Bavaria. One is the normal Antenne Bayern program. The other is Rock Antenne, a rock-oriented program produced

solely for the DAB project.

Antenne Bayern hired five people to help produce and manage the program which as of now, no one can receive.

A spokesperson, who declined to be identified said, "We have been able to use the people for other purposes, but it is discouraging that there are still no receivers out there."

However, the Antenne said it remains optimistic about the future of its new program and of DAB in general.

Thuringia announced it will start a pilot DAB project.

Saxony-Anhalt, which borders Thuringia on the northeast, announced a similar pilot project. Both plan to supply 1,000 people with receivers this year.

However, neither project has selected a manufacturer for their DAB receivers so far.

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INTERNATIONAL UPDATE

New ENG Units Perfect for Field

by Tim Frost

HIGH WYCOMBE, England

Although computer-based recording is widely used inside radio stations, it took some time for the technology to spread to program acquisition applications.

Instead of computers, the traditional open-reel and cassette recorders gave way to DAT, which offers additional quality, stereo and a low enough noise floor to reclaim under-recorded interviews.

But DAT cannot address the problem of downloading audio over a phone line or via the ISDN links that are available at most news sites. DAT cannot transfer a

tape in real time to a workstation for editing. It does not increase the ability of reporters to expand the flexibility of on-site news gathering and preparation.

So it is not surprising that ample interest is being shown in the first generation of radio ENG systems using non-linear workstation technology. The units fold recording, editing and an ISDN link into a single, battery-powered, portable unit.

All these machines — SADiE Mobile, Maycom DigiCorder, mediatron DigiReporter, Nagra Ares-C and the soon-to-reemerge Telos Polaris — are essentially workstations with a shoulder strap.

The two prime functions common to all

these systems are non-linear recording and simple editing.

"This sort of technology is ideal for the reporter or free-lancer covering a news item who wants to choose the best take, to do some basic top-and-tail editing, or maybe to tailor a report for different organizations," said Mary Ann Seidler, sales director for Telos Europe.

Individualize reports

"Reports can be edited and individualized in the field, before they are sent in," Seidler said. "With editing and codec functions, these systems are far more than a high-tech DAT recorder."

With their DigiReporter, mediatron took a slightly different route, building an at-home editing system around a notebook PC.

"The DigiReporter is based around a notebook PC equipped with recording, modem, fax and ISDN functions," said mediatron Managing Director Markus Stein. "Our system is more designed for the reporter to use at home than in the field."

Two features found on some tapeless ENG units are an ISDN codec and the ability to transfer data instantly to a workstation. These two features are seen as the tapeless ENG systems' trump cards.

The SADiE Mobile has removable disk drives that can be plugged directly into a SADiE editor at the station.

"The big logjam in acquisition is the transfer of the data to the workstation," said SADiE Marketing Manager Julian Mitchell. "With the Mobile, you record to a removable SCSI drive that you can then slot into a SADiE Workstation," he said.

Mitchell said that this allows users to take the Mobile recorder immediately back to

the field.

Similarly, the Nagra Ares-C uses flash memory cards. As its unit incorporates two PCMCIA slots, the length of a continuous recording is theoretically limited only by the number of cards available.

Something else common to all the machines is a relatively high price tag in comparison to a moderate portable DAT machine — \$4,000 to \$5,000, at least. But stations are seriously considering them, because these systems are truly cost-effective, said Hein Schillings of Maycom.

"Specifically, it is attractive because of the editing and communications via ISDN, and when you get to digital broadcasting, you can then work from start to finish in just the one file format — ISO/MPEG layer II."

Similar advantages

Mury said she sees similar advantages for tapeless ENG gear. "Some have said it is expensive, but take a moment to directly compare two reporters, both wanting to do the same ENG job.

"Both will be able to record, but to do the editing, the DAT reporter will need a second DAT machine and a small mixer, so that starts pushing the price up. Then to get it back to the station you will need a codec, which will definitely push the price of the DAT system above the Ares-C, and they now have lots of boxes to work with instead of just one."

It is specifically the ISDN link that alters the balance of cost between DAT and ENG. Because the tapeless ENG system has most of the data-coding electronics already built into it, adding an ISDN codec facility is relatively cheap. But for a DAT machine all this has to be bought separately.

Some may question the value of embracing a first-generation ENG system when technologies and standards are bound to change in the future. But, according to Mitchell, customers are not that concerned about equipment becoming outdated. ☺

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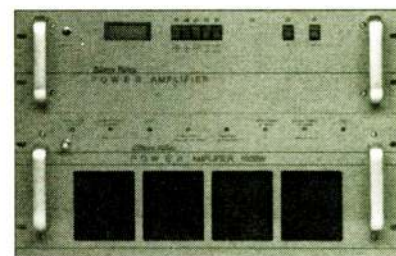
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Take No Chances on Gambling Ads

by Harry Cole

WASHINGTON Kenny Rogers knew when to hold 'em and when to fold 'em, and he may even have known when you could advertise 'em.

Odds are the question of whether you can advertise gambling of any sort on your station is going to come up. And, if you're like most folks, five'll get you 10 that you haven't bothered to check out the law.

The area of gambling advertising is subject to at least two separate sets of regulations — state and federal.

In other words, your pals here in Washington have come up with one set of

regulations and your pals in your state capital have come up with a separate set. In many instances the two regulatory regimes may include the same prohibitions and the same permissions, in which case life is easy.

But in many instances, that may not be the case. You may find yourself in a state which takes a much dimmer view of gambling than does the federal government. Or vice versa.

Of course, you may find that, in some aspects of the law, the locals have the last word, while in other aspects, the federales hold sway.

We are going to address federal policies. Before you jump into the sale of gambling

advertisements, consult with someone who does know a thing or two about what the local law says.

With that in mind, let's take a look at the law of gambling advertising. First, what exactly is gambling? For federal purposes, the term "lottery" is normally used to refer to gambling activities. Lottery is defined as an enterprise involving three distinct elements: prize, consideration and chance.

Prize means something of value, whether in the form of money, goods, services, etc.

Consideration means "pay to play." Pay, in this sense, includes not only the actual payment of cash money, but also the expenditure of substantial time and/or energy; also

it requires that the payment go to the entity which is conducting the lottery.

Chance requires that the award of the prize is determined predominantly by luck, and not skill.

It is useful to be familiar with this three-element definition. If the lottery you are looking at does not contain one or more of the three elements, it's not really a lottery.

Can dos

It used to be the Feds wouldn't let you air any lottery ads at all. Nowadays, things are different: as far as the federales are concerned, you can broadcast some lottery ads.

For example:

- you can advertise any lottery conducted by the state in which your station's city of license is located.

- if your station's state (i.e., the state where its city of license is located) conducts its own lottery, then you can also air spots for state-operated lotteries from any other state (but not lotteries run by or in foreign countries).

- you can advertise lotteries sponsored by charitable organizations and civic groups (i.e., groups which would qualify for exemption under Section 501 of the Internal Revenue Code).

- you can advertise a lottery conducted by a commercial organization as long as the lottery is only occasional and ancillary to the organization's primary business.

- you can advertise bingo-like games (and some card games) operated by Native American tribes on Native American lands, as long as the games in question are "Class II" games as defined in the Indian Gaming Regulatory Act.

- you can advertise casino gambling (e.g., craps, roulette, slot machines, some types of card games) operated by Native American tribes on Native American lands, but only if the federal Indian Commission approves a tribe-state compact.

Make sure that the gambling occurs on "Indian lands" as defined in the Indian Gaming Regulatory Act: the term "Indian lands" has a particular definition which would not encompass, say, land outside of a reservation that an Indian tribe bought for the purpose of establishing a casino.

High stakes

Notwithstanding all of these permissible advertisements, the federal law still prohibits ads for casino gambling (other than the narrow exception for Native American casinos), even in states where casinos are completely legal. That prohibition extends to references to any and all casino gaming activities, and even to use of the word "casino" (unless that word is part of the formal name of the actual establishment being advertised).

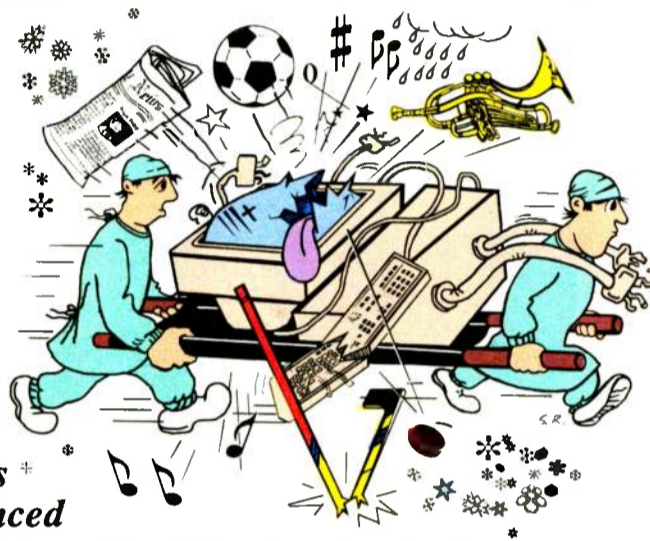
You can advertise other features of a casino — for example, the restaurants, floor shows, hotel facilities, and the like — but not gambling activities.

The foregoing should give you some idea of what the federal laws permit relative to broadcast ads for gambling. Again, the states regulate this area, too, and state regulations are not always the same as their federal counterparts.

It's still a sure thing that that area of the law is relatively complex, and your odds of avoiding problems will be a lot better if you consult with your communications counsel before any problems arise.

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

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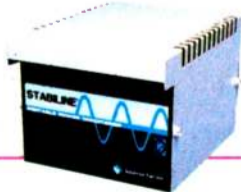
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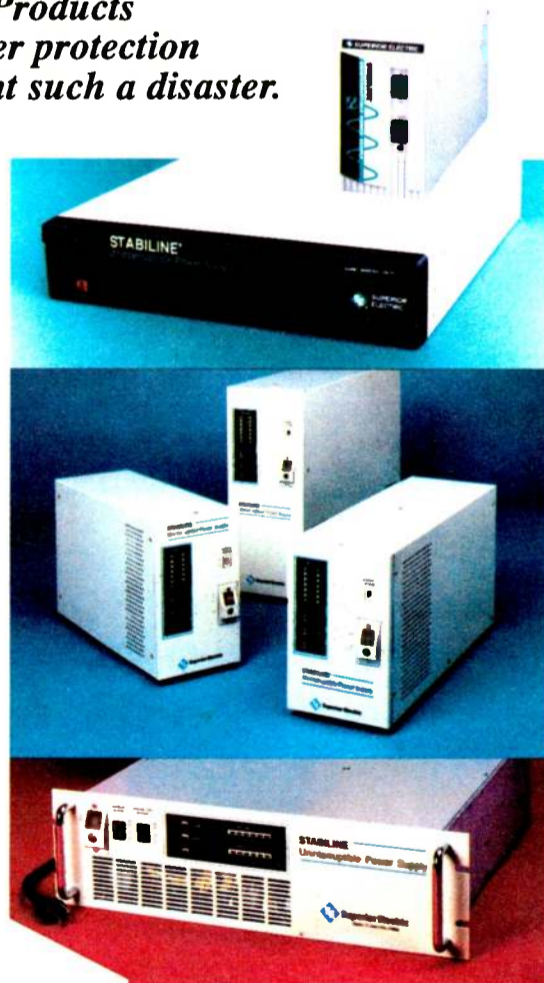


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1996 NATIONAL ASSOCIATION
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LAS VEGAS • APRIL 14-18



NAB '96 Opens in Las Vegas

by Angela Novak

AS VEGAS Whether you are an audio or video professional, your workday has probably changed dramatically over the last few years, maybe more than in the previous five or six years collectively.

Change has been nonstop, from the entrance of the computer into the studio, to the switch to digital technology throughout your facility. Do not expect the changes to slow down anytime soon, as you will soon discover at NAB '96.

This year's exhibitors will show you the gear you are wearing and reading about. Digital equipment is at almost every booth, and no matter which aspect of broadcasting you work in, digital broadcasting and technology will impact your future.

igger role

Non-linear editing tools, as well as automation, production and traditional office systems play an ever-increasing and important role in broadcasting today. On the NAB exhibit floors, you will discover the range of exciting computerized technology that is available.

Like digital broadcasting, the information superhighway is rapidly finding a place in every corner of the globe. Visit the Internet Pavilion at the Sands and learn how to reach out to a worldwide audience and interact more closely with listeners.

Also stay on alert for more integration of computers and broadcasting.

The NAB show itself is not immune to the changes taking place in the world of broadcasting. This year's conference and exhibition has expanded to accommodate and reflect our growing industry.

Most noticeable is the expansion to the Sands Expo & Convention Center, which makes room for some of the most exciting exhibits and sessions for 1996.

MultiMedia World, the fastest growing segment of the

show floor; internet@NAB.96, one of the hottest group of exhibits; and the Data Networking and Telecommunication Conference, a brand-new conference, are all at the Sands. Registration will also be handled at the Sands.

General exhibits at the Sands are open Monday through Wednesday, 8 a.m. to 6 p.m. and Thursday, 8 a.m. to 2 p.m. The exhibits at the Sands open an hour earlier than those at the Las Vegas Convention Center, in order to provide attendees more time and opportunity to visit all locations.

Orientation

If this is your first visit to the NAB convention, attend the Newcomers' Orientation on Monday morning. The special session will provide you with information about the exciting exhibits and special features of NAB '96.

Alongside the exhibits, 11 conferences offer a wide variety of sessions.

For the fourth year, NAB will feature its premier sister conference and exposition on multimedia technologies, NAB MultiMedia World. This popular exhibit area is co-sponsored by the Interactive Multimedia Association (IMA) and the NAB.

Through exhibits and sessions, learn how multimedia technology is creating new business opportunities and reshaping radio, TV and computer service around the world. Buyers can see the latest in products, tools, techniques and platforms for full-motion video, interactive applications and emerging corporate on-line services. The newly expanded IMA Multimedia Boot Camp will offer multimedia newcomers an overview of interactive technologies and tools.

Experience live demonstrations of the hottest Internet applications and technologies at the "What's New, What's Cool!" Internet and World Wide Web

Education and Demonstration Theater at the Internet Pavilion.

These free sessions will run every hour during the exhibit hours at the Sands.

Industry experts will show you how to make the Internet work for you in sessions such as: Internet Basics, The Nuts & Bolts of Getting Your Station On-Line, The Basics of Creating Internet Content, and Local Broadcasters and Successful Internet Strategies.

Other sessions include: Broadcasters as Internet Providers



The Las Vegas Convention Center will once again host broadcasters from around the globe when NAB '96 opens.

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Engineering anniversary

Celebrating its 50th anniversary, the 1996 NAB Broadcast Engineering Conference, produced in association with the Society of Broadcast Engineers (SBE), will feature technical papers on TV and radio technologies. Sessions will discuss digital audio broadcasting, digital

continued on page 27 ▶

CBS's Osgood Tuned to Radio

by Alan Haber

NEW YORK Splashes of rhyme, the nattiest bowties in broadcasting, and generous dollops of heart-laden insight are three of CBS Radio Network Correspondent Charles Osgood's trademarks.

Osgood, who will be delivering the keynote speech during the National Association of Broadcasters/Radio Advertising Bureau Radio Luncheon on Tuesday, April 16 during NAB '96, says he doubts he'll be writing a speech beforehand.

"I'll sort of tell them what's on my mind at the time," he said.

But CBS Radio's "Poet in Residence" has a few ideas. "We get very preoccupied with the technology — now we can do this and now we can do that — and we have digital this and satellite that and different kinds of editing tools, and it's all very nice that we can do that," he said.

"But the main component in this whole equation has got to be the person who is communicating, and the other main component is the person who's listening. The rest of it is there to serve that communication."

Osgood, who rises at 2:30 every weekday morning to begin preparing his four daily "Osgood File" commentaries, is a 1990 inductee of the National Association of Broadcasters Hall of Fame, a 1993 Marconi Radio Award winner for Syndicated/Network Personality of the Year, and a 1995 winner of the Lowell Thomas

Electronic Journalism Award. He will be celebrating a quarter century at CBS News in September.

Before joining CBS, Osgood spent time as a general assignment reporter for ABC Radio News and as a morning anchor and reporter at WCBS(AM) Newsradio 88, (the former CBS Radio) flagship AM station in New York City. His first professional radio experience was at classical music station WGMS-FM, which he joined, and eventually became program director at, after graduating from Fordham University in New York.

Osgood belonged to radio clubs while attending high school in Philadelphia.

"It was not unusual for KYW, say, in Philadelphia to devote a half an hour to the Catholic Youth Organization's workshop," remembered Osgood.

Sometimes, the man who colleague Charles Kuralt has called "one of the last great broadcast writers" would function as the narrator of plays the workshop put on, and "sometimes play a part or sometimes both, and sometimes I would play the organ," said Osgood.

"All radio stations had organs in those days. I would play the theme and stings and stuff like that for the drama."

One of Osgood's poems, titled "I'll See You on the Radio" — a

phrase which he uses to sign off "Sunday Morning," the CBS Television program he has hosted for nearly two years — sets up the power of a favorite medium.

"It was based on the idea that the pictures are really better in radio," said Osgood, "because they were cast

continued on page 40 ▶



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World Radio History

NAB '96 Packs Enormous Internet Wallop at Sands

by Alan Haber

WASHINGTON Look no further than NAB '96 for proof that the Internet has found a willing partner in radio.

The cyber action at the National Association of Broadcasters' annual get-together is centered around a whopping dozen workshop sessions divided between the Radio Management, Multimedia World, Broadcast Engineering and Broadcaster's Law and Regulation conferences, and the cleverly titled internet@NAB.96 pavilion.

A brand-new convention feature, internet@NAB.96 is open Monday, April 15 through Thursday, April 18 and currently weighs in at nearly 7,000 square feet, although it could potentially be much larger. The pavilion is located within Multimedia World at the Sands Expo & Convention Center.

While the Internet is not the only focus at NAB '96, it does appear to be this convention's heart and soul. Whether your station is just getting its feet wet on the Net, or it's a cyber-veteran, NAB '96 looks to be the place in which to schmooze, find out what's happening and discover how your station can benefit by going on-line.

The Internet has "moved far out of the computer-only domain," said Rick Ducey, senior vice president in the NAB's Research and Information Group. "A lot of stations are organizing around the possibilities that Internet enables." NAB '96 "reflects in various ways what's happening with the industry and its beginnings of embracing Internet technology," Ducey added.

The NAB looks at the Internet as the real deal.

"Just for business applications," said Ducey, "Internet is a wonderful resource, let alone the way to keep in touch with advertisers and your audiences."

Much of the Internet-related action in Las Vegas looks to be centered around activities taking place in the internet@NAB.96 pavilion.

Within the pavilion, Ducey noted, there will be a split between proprietary technology demonstrations and a variety of educational and paid-commercial presentations. The presentations will be delivered in the What's New! What's Cool! Internet and World Wide Web Education and Demonstration Theater, sponsored by Silicon Graphics Computer Systems and Sprint.

As many as 50 companies, including America Online, CompuServe, Progressive Networks, and Xing Technology are expected to showcase their Internet products in the pavilion's exhibit area. The What's New! What's Cool! theater will feature a 40 x 40 foot stage with a large screen that will be used for all presentations, which will cover a variety of timely topics — everything from how to get a radio station on-line and preparing content for Web sites to making the Internet count in a station's sales effort.

The dozen workshop sessions being held during the conferences that make up NAB '96 will provide radio professionals with a unique overview of the steps necessary to make any Web adventure a success. The sessions cover a wide variety of topics: For example, "Radio & The Internet: Into the Future," being held as part of the Radio Management conference on Monday, April 15, provides a broad introduction to cyberspace. Expanding a station's local

reach is the subject at hand during "Extending Local Services Through the World Wide Web," being held on Wednesday, April 17 as part of the Multimedia World conference.

Another Wednesday session, "Advertising & Marketing with Interactive Media," also being held as part of Multimedia World, will showcase "effective case study examples of the use of interactive multimedia, including CD-ROM and the Internet, for advertising and marketing applications." Don't forget to check at the convention site and in the NAB '96 Daily for session times



The Sands Expo & Convention Center will host internet@NAB.96

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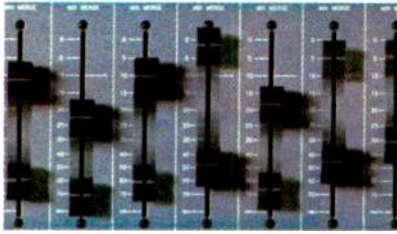
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Radio Groups Step Up to Digital

by Thomas R. McGinley

WASHINGTON Contrary to the normal way new technology is assimilated by radio broadcasting, digital storage and retrieval of programming elements has enjoyed much wider use and acceptance in small market stations than with their big market brothers.

Probably the majority of the smaller stations in the United States now employ some kind of computer-based controller or automation system using SCSI hard drives, most of which are hooked into satellite-delivered programming. And while most large market stations use digital editing in production, they are still using cart machines to deliver almost everything on-air except perhaps music.

Why are the big market players so reluctant to upgrade?

A number of directors of engineering with large market groups echoed similar thoughts about why they've stuck with the venerable cart tape infrastructure for so long. Viacom's Frank Kramer cited cart tapes as "a very reliable, multi-redundant system which still works very well, and which everyone in the station can deal with."

"We're moving slow because converting to all digital will be expensive and it's not clear which system is completely ready to do everything we need done." Viacom is testing the digital water at WLTW(FM) in New York this April with the installation of a BE Audio Vault. Kramer anticipates most Viacom stations will be converted during 1997.

Absolute assurance

Charley Morgan of Susquehanna Radio points out that "when you're charging big money for a spot, the general manager and sales manager need absolute assurance that it will run when scheduled." If a cart deck doesn't fire, there are always several others to use.

"Running with live operators around the clock, we don't need walk-away digital automation which most small markets require." Morgan also related hearing about horror stories with almost every digital storage system on the market.

"This technology is still evolving and is not a simple science. The hard part has been getting it to fully integrate with traffic, billing, music, and news within a network and getting all events to talk both ways when last minute changes occur."

Susquehanna has started digital storage conversion, first with its corporate home-based facilities in York, Pa., last year, and just very recently with WNNX(FM) "99X" in Atlanta with ENCO systems. Morgan observes that "getting into full scale digital is like jumping onto a fast moving train." There are many risks which have to be carefully considered by every department in the station.

Greater Media's Milford Smith agrees with Morgan but is waiting to fully commit to all digital storage when a linear system becomes practical and affordable. There presently remains the need to run data compression to conserve harddrive space which can result in distortion artifacts appearing when different types or several layers of compression are used in the typical all-digital plant.

"Until drives get cheaper and bigger than they are now, running a linear system (with no data compression) is still

not yet economical," said Smith. Most systems use some form of bit-rate reduction, usually 4 to 1 or 6 to 1.

Slow responses

One of the very real problems with network-based systems is slow response time when too many users want to access common files. Smith favors a system which uses a large server at every work station/studio which does not move audio over a network when needed for air play.

We would not take out a perfectly good analog facility just to go digital.

— Jim Smith

ClearChannel Communications

New files load to every station in non-real time. Such a system today can cost \$250,000 for the typical large facility running multiple stations.

He has evaluated all of the popular systems and acknowledges that "most work pretty well," but for him, "they need to work nearly perfectly all the time before we would risk letting any of them run an entire radio station."

Greater Media's WCSX(FM)-WRIF(FM) in Detroit are both using the Harris/Radio Systems DDS Unix-based cart replacement system with good success, but Smith observed that "it is not yet a full featured system which integrates with all the other needs we have."

"We are still trepidatious about complete conversion to digital. It takes only a few major glitches to put a pall on any system. We're getting closer though, and could jump in almost any time, but the decision on which system will be largely determined by the local station's needs."

Jim Smith of Clear Channel Communications, now owners of 44 radio stations, was hoping that a digital storage system's standard would have emerged at last year's NAB Convention. Instead, he said, "all the competing systems were singing from their own hymn books." Smith hopes this year will reveal a better answer.

Clear Channel has placed the BE Audio Vault at WBGW-FM/WHYI-FM, Miami, and Computer Concepts DCS systems in three of its other markets, but "only when we needed to upgrade an old analog studio or construct new studios from scratch." A new DCS system is slated to go into WOAI(AM)-KTKR(AM) San Antonio, Texas, very shortly.

"We bought our last cart decks about three years ago, but we would not take out a perfectly good analog facility just to go digital," said Smith. "The best analog equipment still does a great job and sounds just as good for commercial radio."

Working out wrinkles

Smith observed that it is fortunate analog still does so well, because the industry has needed to buy some time to allow the digital platforms "to work out their wrinkles." He too has heard many a horror story of stations "jumping way out ahead of the edge of technology just to be all digital and getting burned."

Smith stated that Clear Channel has no hard time line to convert all their stations

to full digital, but "wants to be as close to the cutting edge as possible without significant risk."

At Capital Cities/ABC radio, the decision of when to convert from cart machines to digital is fairly straightforward. "When the depreciation schedule runs out on the cartridge hardware or when we have to move and build new studios, we'll put in a digital system," said Director of Engineering Al Resnick. "Programming defines their needs and

all new studios based around the RCS system.

Resnick indicated that each station does a lot of research and planning, and asks lots of questions of the vendors and suppliers of all systems under consideration before one is chosen. But he qualifies the need to convert to digital: "We are not going to force things. If a new system will not really improve the product or the listeners can't tell any difference, it may just have to wait."

Concerning integration problems with traffic and music systems, Resnick believes such glitches will always get solved, with enough time and expert resources. "It's just a matter of finding your way through the maze," he said. Resnick observes that data compression is a real consideration, because much of what we put on the air has already undergone a cycle of compression-decompression, including MiniDiscs, ISDN, spots via DGS or DCI, satellite feeds, etc.

One station at a time

While Infinity Broadcasting has no corporate director of engineering, several stations in this major market group have acquired digital systems to do specific tasks. John Hurni, chief engineer at WJMK/WJJD, Chicago installed an ENCO system to handle the AM talk radio format with good success. Bob Hanke, chief engineer at KYNG(FM) Dallas, and former director of engineering of Alliance Broadcasting installed the Scott Studio Systems "Troll" for the young country stations in Detroit and San Francisco.

continued on page 26 ►

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Stepping Up to Digital

► continued from page 25

"The only real problems we had was when we tried to make the system do things it wasn't designed to do," said Hanke, adding that "a system's capabilities must match specific station needs." He is now seriously considering the ITC digital for KYNG. "No matter what system you select," advises Hanke, "dual mirrored SCSI chains and redundant servers are a must at the major market level."

Dan Ryson at Washington's WJFK-FM still sees the trusty cart decks as the easiest and most cost effective way for his station to execute its product for the next year or two, but likes the 360 Systems Digidart and Instant Replay as good transitional platforms into digital.

The CBS Radio Station Group (formerly Group W Radio and CBS Radio) decided several years ago to start converting its news/talk stations to digital storage and automation assist. Director of Engineering Glynn Walden paid heavy digital dues early by not only evaluating but buying many of the available systems for his stations.

"KPIX-AM-FM San Francisco may be the second largest all-digital news operation in the country, next to the ABC network," according to Walden. Both KPIX and KFWB(AM) Los Angeles use ENCO systems. KILT-AM-FM and KIKK-AM-FM Houston recently converted to a Scott Studios system, perhaps the largest one of its kind to go

into a major market operation. And WBZ(AM) Boston as well as KYW(AM) Philadelphia are using Media Touch systems which may soon be upgraded.

Local decision

Walden offered an excellent overview of the do's and don'ts when considering all-digital at last year's World Media Expo. "Any new system will have some problems in the beginning. Careful training and a thorough dress rehearsal before the

Careful training and a thorough dress rehearsal before the system goes on the air will eliminate many of the problems and frustrations.

admitted that he had been a bit negative on digital radio stations until about the last three months, "when things started to click." Now he says, "I feel much better."

Of all the major groups contacted, Bonneville International has perhaps taken the longest stride towards full digital implementation. Bonneville recently made a corporate decision to convert 16 of its 18 stations to the completely integrated RCS system, including Selector (music scheduling), Master Control (digital commercial/music storage), NewsLink stories and soundbite editing, plus Linker (shedule manager) KIRO-AM-FM and KING(AM) Seattle have already converted.

— Glynn Walden
CBS Radio Station Group

system goes on the air will eliminate many of the problems and frustrations," he said.

"The best advice I can give anybody contemplating doing this is to make sure the local people buy into the system chosen, with one of them as the designated system champion or mentor who will become the resident expert." Walden feels that problems with using data compression, cross-coding, and mixing algorithms are somewhat exaggerated. But he

According to Director of Engineering Talmadge Ball, "Bonneville initially chose the ENCO system for KSL-AM-TV Salt Lake City, and would have installed it at our other properties, if station program directors had not insisted on full connectivity for Selector into the complete package." RCS does not share the source code of any of its software products with anyone and charges monthly software licensing and use fees.

Bonneville uses the Marketron traffic

system which does share source code and successfully integrates with automatic reconciliation of changes with RCS.

Ball indicated that "RCS customized our system so that it would accommodate linear audio when very large hard drives become affordable." He doesn't feel all his eggs are in one basket, depending on one company for everything.

"The hardware is available from many sources, plus we have a much larger support group within the company with everyone knowing one system well." Ball said the real bottom line was reliability. "We waited for the digital options to mature and we think RCS has arrived with the best possible solution for us." (See related story, page 28.)

Watershed year

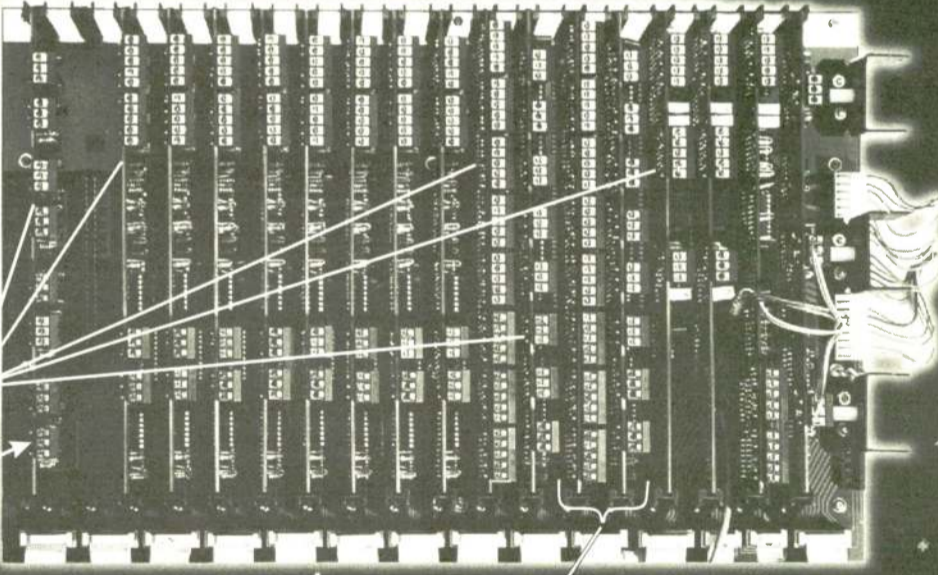
All agreed that this should be a watershed year for many stations in formulating and executing their plans to retire the cart machines and make the jump to digital. With both 3M and Ampex announcing plans to stop making quarter-inch tape and fewer stations using carts, the costs of maintaining cart based systems may escalate more quickly than we now anticipate (see related article, page 35). You can bet that engineers and general managers from all these companies and hundreds more will be very active on this year's NAB Convention exhibit floor, looking hard to make the right decisions for their stations.

□ □ □

Thomas R. McGinley is the director of engineering for WPGC-AM-FM in Washington as well as RW's technical advisor. Reach him care of RW.

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Radio Undecided on RDS

► continued from page 1

actually discovered the station because of their RDS receivers. Martin said KBIG would eventually like to display the different personalities on the air and develop a tie-in with its call-in show.

Other stations with RDS remain more apprehensive about the technology. A common reaction from broadcasters was that because consumers do not have RDS receivers and nobody is receiving their data, there is little point displaying anything more than call letters or a slogan. Most agreed if the technology caught on, they would like to take a more active approach to RDS.

Consumer support will play a decisive role in the long-term acceptance of RDS technology. As a consumer electronics manufacturer, Denon Electronics Marketing Manager John Casey said he could not be any more pleased. Denon has sold more than 100,000 units with RDS capabilities; with the introduction of five new products, Denon will have over 20 car and home RDS products available.

Casey explained that RDS is something that sets products apart and is the single-most demonstrable feature that can affect a consumer's choice. He sees RDS as the most advanced feature to come to radio since FM stereo.

Casey added that stations need to make sure they take the time to monitor their RDS display. He said Denon has received numerous calls from customers concerned that their RDS receivers were broken because the wrong time was being displayed. Broadcasters were not keeping track of what time was programmed into their encoders.

For close to a year, the Electronic Industries Association Consumer Electronics Manufacturers Association (EIA/CEMA) and member sponsors Denon, Delco and Pioneer have conducted a promotional campaign designed to raise awareness of RDS in the United States and increase the number of broadcasters utilizing RDS systems. Gary Shapiro, president of CEMA, agreed that RDS was not fully developed in the United States.

"The manufacturers have not yet responded with the array of product and the broadcasters have not come on (line) on their own the way it is absolutely necessary to say that this is the product which will be 100 percent here in two years," said Shapiro.

Shapiro said the "tremendous" interest in RDS of individual broadcasters and the "unshakable" interest from car manufacturers convince him the technology

will take off.

One reason the EIA/CEMA proceeded with RDS is because the top audio buyer from Circuit City approached them and said that RDS would be a terrific product, Shapiro explained. In a recent letter to **RW**, Shapiro noted that Circuit City had gone to great lengths to make sure its sales staff is knowledgeable about RDS and how to sell it. Shapiro added that — among others — Incredible Universe was another major retailer selling RDS radios.

RW included both stores in its informal poll. During a visit to Circuit City, no RDS equipment could be found on display. When two salespeople were asked if they knew what RDS was and if they had any products, both said they thought they had heard of the technology but did not know anything about it.

An RDS inquiry to the audio section of

Incredible Universe produced even less promising results. The audio sales representative said the store did not have anything like RDS and admitted he had never heard of it.

But in a call to Crutchfield's catalog order department, the sales representative did immediately recognize RDS and did his best to explain the technology when asked. Crutchfield carries several RDS receivers and has even published an RDS primer to inform its customers of the technology.

Both Casey and Shapiro are confident that RDS technology will be accepted in the United States. But RDS has a long way to go: When **RW** called a major New York City radio station with an RDS system on line, the programming department representative had never heard of RDS and, after an explanation, was still not convinced her station used it.

NAB Opens in Vegas

► continued from page 21

networking, audio storage and on-line opportunities for broadcasters.

The debate in Congress over broadcasting issues will be discussed at a special government relations session titled "Free Time, Spectrum Auctions ... You Name It!" The session takes place Monday morning at 10:30 and features a panel of key congressional staffers who help shape many of the policies their bosses enact into law. Spectrum auctions for digital TV, free time for political candidates and copyright concerns are among the topics to be discussed.

Interested in increasing your bottom line? The RAB Sales and Marketing Conference offers sessions to help improve sales and marketing operations. RAB President Gary Fries will present his annual analysis of the state of radio sales on Tuesday morning. He will discuss radio's current financial health and the effects of the new ownership rules.

The Radio Management Conference will present an array of workshops encompassing all aspects of the radio business. Sessions will cover management, programming, promotions, the Internet and technology. At the radio luncheon on Wednesday, Don Imus will be inducted into the NAB's Broadcasting Hall of Fame and the NAB Crystal Radio Awards for community service will be presented. Charles Osgood will deliver the keynote address.

Broadcast finances will be discussed in the BCFM (Broadcast Cable Financial Management) Financial Management Workshops being held Sunday. Broadcast accounting principles will be reviewed and panelists will discuss case studies of problems that occur on an everyday basis and answer audience questions about specific situations.

The fifth annual NAB Broadcasters' Law and Regulation Conference will

provide broadcasters with a wide range of money-saving and money-making tips. The chairman, commissioners and staff from the FCC, well-known communications lawyers and other experts, will lead the discussions designed to give radio and TV broadcasters a jump on the competition and greater control over their role and success in the communications marketplace.

The UPLINK '96: International Satellite Conference is designed for organizations that are operating or planning to operate at every level of the international video business. The conference will feature presentations and panel discussions by experts on the state of the international satellite video business — from understanding the global marketplace to understanding the confluence of technology and regulation on a worldwide level. Topics covered will include technological changes driving the marketplace, emerging markets for new satellite technologies, turnkey operator services, and worldwide direct-to-home (DTH) audio and video services providers.

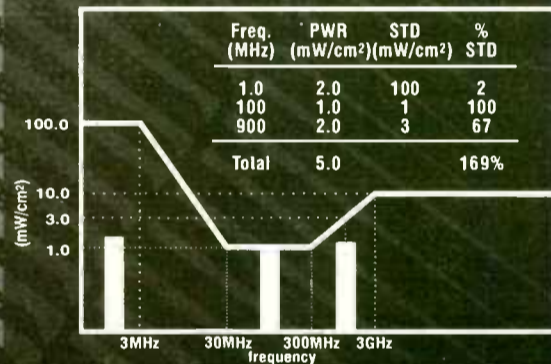
A newcomer to the NAB family of conferences, the Data Networking and Telecommunications Conference, will be presented by AT&T Bell Labs. The conference is an introductory program to help broadcast and communications professionals better understand telecommunications technologies.

Sessions will be presented by professional training experts from AT&T Bell Labs. Participants will explore the basics of ISDN, ATM, TCP/IP PCS and the latest cellular technologies.

The conference is designed for non-technical professionals, such as radio and TV employees, telecommunications attorneys, consultants, academics, sales managers, account executives and technical writers.

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SBE/NAB Build Engineer's Agenda

by John Marino

WASHINGTON This year, the National Association of Broadcasters (NAB) celebrates the 50th anniversary of the Broadcast Engineering Conference. The conference is being held April 13-18, in Las Vegas as part of NAB '96.

The progression of technology in the past 50 years has taken the radio industry from vacuum tubes to integrated circuits, from mono to stereo and from analog to digital. Engineering sessions during this year's conference will focus on many of the technologies destined to chart the industry's course for the next 50 years.

The transition from analog to digital transmission will be covered in depth during the "DAB: U.S. and Worldwide Planning," session scheduled for Sunday, April 14. Leaders in digital audio broadcasting technology from around the world will offer insight into how DAB may affect the future of radio.

Expert presentations will cover the U.S. DAB testing program, the outlook for in-band, on-channel (IBOC) digital broadcasting, satellite DARS, European planning strategies plus other international digital broadcasting developments. A special open forum on DAB, moderated by RW's Lucia

Cobo, will provide a unique opportunity for the audience to have its questions answered by a world-class panel of DAB experts.

Monday sessions explore digital audio implementation and datacasting technologies for radio. As broadcast engineers update their facilities, the role of digital automation and its impact on station staff must be clearly identified.

Advanced audio compression and storage technologies coupled with lower costs and intense product competition leave the station chief engineer with the responsibility of providing expert guidance as to what equipment to purchase. Clearly, an in-depth knowledge of digital implementation is mandatory. The implementation session is designed to provide engineering guidance on digital compression, storage and automation.

The rapid development of radio datacasting technologies may offer broadcasters new revenue opportunities. As spectrum continues to become scarce, broadcasters could find themselves in the enviable position of being able to supply lucrative datacasting services in addition to their regular entertainment and information programming.

Many of the presentations during the datacasting session promise to show how

high-speed subcarrier technologies can provide a transparent data channel for ancillary uses. Questions regarding the compatibility of the various technologies will be addressed. Additionally, the latest information on RBDS will update broadcasters on what the consumer electronics industry has in mind for this service.

Tuesday morning sessions are devoted to high-quality RF for radio. A variety of presentations inform broadcasters of new ways to evaluate FM transmitter sites and measure FM signals. An efficiency comparison between AM medium wave series-fed and skirt-fed radiators will be explored. A case study on building the first expanded band AM station will cover the challenges of diplexing two stations with 130 kHz frequency separation. And for those who need a refresher on AM directional antennas, a special presentation will take you back to the basics.

Tuesday afternoon sessions are especially important for broadcasters looking to build new or upgrade existing facilities. The session, "Radio Facilities Design: Radio's Missing Digital Link" provides a group of experts who will answer your questions relating to the conversion of your facilities from analog to digital.

Wednesday, technical regulatory issues

critical to station engineers and owners will be presented in an open format panel atmosphere. On hand will be representatives of the FCC, communications attorneys and industry experts. Issues scheduled for discussion include FCC tower registration, new RFR guidelines and unattended station operation. A special presentation on disaster planning will focus on what you need to know in order to keep your facility operational during earthquakes, weather emergencies or terrorist attacks.

The 50th NAB Broadcast Engineering Conference concludes Thursday morning with a look at the newest platform for broadcasting — the Internet. "Radio Online: Internet Applications" focuses on what the Internet has to offer for radio broadcasters. Demonstrations will show just a few of the many applications your colleagues are using to enhance their stations' exposure. This is a great opportunity to learn what the future may bring as broadcasters explore cybercasting.

For up-to-the-minute details on the NAB Broadcast Engineering Conference, including registration information, check out the NAB Website at <http://www.nab.org> or call the NAB Science and Technology Department at 202-429-5346.

□ □ □

John Marino is director, technical conferences, at the National Association of Broadcasters.

Bonneville Buys Digital

by Alan R. Peterson

WASHINGTON Digital audio systems for radio can now be considered a mature technology. This is according to Talmadge Ball, director of engineering for Bonneville Broadcasting; a company that has recently been cruising the digital waters quite aggressively.

Stations that will be shopping for on-air storage and playback systems at the NAB show need to consider a number of points as the technology evolves further. Success will

go to manufacturers who can customize systems for a station's specific needs, create seamless integration with other elements at the station, devise multiple redundant backups and allow upgrading with higher-capacity drives as the technology allows.

Adopting mature technology

Ball also predicts an eventual move away from current user interfaces that emulate existing studio machines.

Bonneville got aggressive only after the dust in the digital arena settled.

"We like to jump on a technology that has matured well enough to have proven itself," Ball said. "The president of Bonneville has indicated he doesn't want to be on either the leading edge or the bleeding edge. It just isn't necessary to do that. Once the technology has been proven and is mature, then we want to adopt it."

After evaluating a number of systems in real-world tests, Bonneville recently decided on Master Control from Radio Computing Services Inc. (RCS). (See the related article by Tom McGinley on page 25). A single system architecture throughout the chain allows engineers to become familiar with the entire device. They can exchange information and resolve problems as a group that perhaps only one or more stations may have encountered.

According to Ball, "We all get together every year in Salt Lake City, and on systems as important as the on-air operation, we'd like to have the same system in place."

Although all stations will use the RCS storage and playback system, choice of a digital production device is still up to individual stations. Bonneville's Los Angeles and New York stations use the PR&E system, Kansas City has the Orban DSE-7000 and Chicago will soon join San Francisco in choosing ProTools.

Part of the success of any digital system will be based on how accommodating the manufacturer will be in customizing a system based on a station's particular needs.

Ball involved the Bonneville music programmers thoroughly in the process, and

educated himself on their requirements. He knew they had to have something that would behave as one seamless system.

"We still have (another brand) in our Salt Lake City station which functions very well, but it didn't have all the parts and pieces necessary that are required for the music stations," said Ball. "RCS didn't have all the needs that I wanted, but we were able to come to the table and figure out a way to make the whole thing



The RCS Master Control is the system of choice at Bonneville.

work. We asked to put modifications in to serve our needs, the way we wanted it to be set up."

Ball says there have been numerous little problems, like control and interfacing.

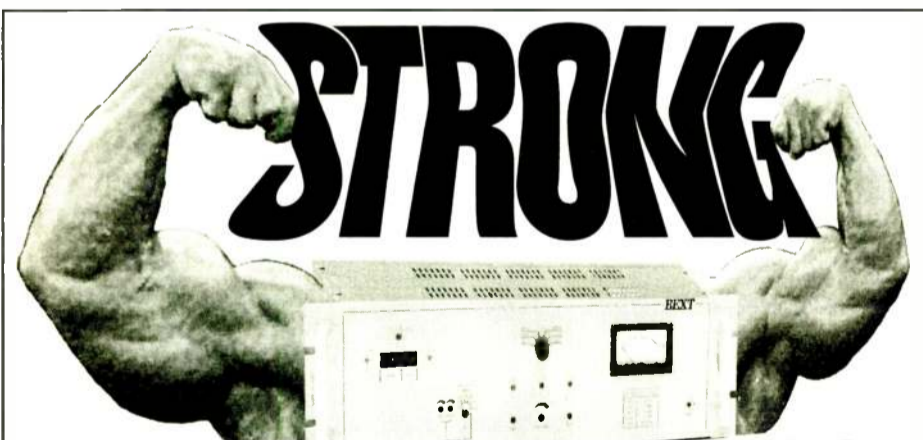
"We have discovered you cannot just plug them together like analog machines and expect them to record," he says. "We expected that problem in advance, therefore it hasn't bitten us."

Audio quality

On the subject of digital audio, Ball notes the importance of many devices speaking one language.

"The equipment Bonneville is using is

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Radio Entering the Cyber Age

by Alan Haber

WASHINGTON Back in 1789, before there was an Internet and the word computer would likely have been used to describe a person's brain, Benjamin Franklin made the rather astute observation that "In this world nothing can be said to be certain, except death and taxes."

In 1996, Franklin, who undoubtedly would have been trading insights via the Internet with other scholarly types, would more than likely have had to include the World Wide Web in his pearl of wisdom.

Last February, there were only 200 or so commercial and non-commercial radio stations and radio-related services on-line. As of this writing, there are somewhere in the neighborhood of 850 radio stations on-line with World Wide Web sites, and that's not counting service sites. There's a growing trend toward not only having a visual presence, but an aural one, as well — stations are starting to broadcast live on the Internet to a world-wide audience.

Radio's embracing of the Internet will likely be one of the biggest, if not the biggest stories at NAB '96 — a dozen workshop sessions are slated to cover various angles of the Net, and a brand-new pavilion, carrying the rather clever moniker internet@NAB.96, will showcase as many as 50 exhibitors of Internet products and present a variety of educational and paid-commercial presentations on a giant 40 x 40 foot stage.

Wedded bliss

Radio and the Internet have entered into a cyber-marriage that is unlikely to ever end in divorce. Radio has pretty much welcomed the Internet with open arms, although, certainly, there is still a long road to travel. The journey along this long and winding road, which is ripe with benefits, is more easily traveled if you know how to negotiate it.

Perhaps the first thing the designated Internet person at a radio station considers when looking towards cyberspace as a promotional vehicle is Internet usage by listeners. While it's basically impossible to determine how many people using the Net are radio fans (or even fans of your station, unless, of course, you ask them), thankfully more general statistics that can be used by stations when making Net-oriented determinations are available.

The Graphic, Visualization & Usability Center's (GVU) fourth annual World Wide Web User Survey, which was conducted last fall, is endorsed by the World Wide Web Consortium, a body which develops common standards for use on the Web. The survey's findings, which are available at http://www.cc.gatech.edu/gvu/user_surveys/survey-10-1995/, were culled from the more than 23,000 responses received from Web users and are both useful and enlightening.

For example, the survey found the average age of Web users to be around 31 and the use of the Web by females seemingly on the rise — results showed that 30 percent of Web users are female, a 10 percent increase since the third survey was conducted.

The survey's executive summary pointed out that "Most users prefer to use the Web to gather product information rather

than make purchases," which bodes well for stations providing links (for a price) to advertisers' Web sites or sponsorship opportunities for their site pages.

Because radio is indeed a business, the

looking for ways to make their Web sites pay off in terms of revenue increases.

Stations like Christian talkers KKLA-AM-FM in Los Angeles (<http://kkla.com/>) have started offering space on their sites



decision to stake a claim in cyberspace usually isn't made without consulting the bottom line. So, it shouldn't be much of a stretch to hear that radio stations are

for advertisers to do what they do best, advertise. But this opportunity is not usually offered out of the goodness of stations' hearts — a fee is usually involved

for the privilege of sponsoring a page on a station's site, an opportunity offered by Cincinnati, Ohio, talker WCKY (<http://www.550wcky.com/home.html>), or for providing links to advertisers' sites — Tucson, Ariz., rocker KLPX-FM (<http://biz.rtd.com/klpx/>) is one such station offering this choice.

Shopping web

Another growing trend that can help stations increase their bottom line is the "shopping mall," just like your local mega-retail hangout, except this particular variety has set up shop in cyberspace. Portland, Maine, album rocker WCLZ-FM (<http://www.wclz.com/>), for example, spotlights its Consumer Value Program in its on-line shopping mall, which offers site visitors opportunities "to save money

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when out and about in southern and central Maine."

WEBE-FM in Westport, Conn., (<http://www.webe.com/webe.html>) is using a page on its site to promote its annual Kids Fest. On this page, the name of the company functioning as the event's title sponsor for the fifth straight year is noted, and a call is put out to companies that may be interested in exhibit booths and sponsorship opportunities.

Perhaps the oldest and most successful approach to the on-line shopping mall concept is Seattle country station KMPS's Country Mall (<http://www.kmps.com/html/online/online.mall.htm>), which is

divided up into six areas, from automotive and electronics to home improvement and health. Prospective advertisers can click on a handy hyperlink to learn how to "set up a storefront" in the mall.

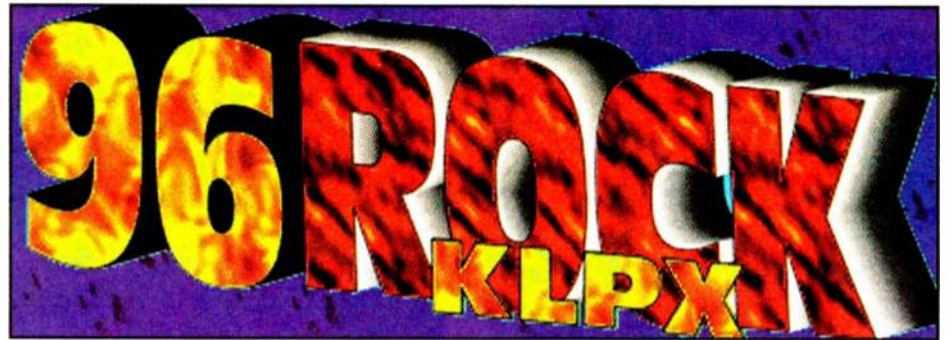
The look you like

After consulting the bottom line, stations should consider how their site is going to look. While it's certainly true that it's the information that ultimately makes a site worthwhile, it's the window dressing on a site that initially attracts visitors, and the cooler the window dressing, the longer a visitor is likely to stay at your site, and, perhaps more importantly, the more likely he or she will return.

The look of radio station Web sites has been improving dramatically over the past year or so. Sites like the one operated by Atlanta's WNNX-FM (<http://www.com/99x/>) exude tremendous visual appeal with eye-catching graphics, while stations such as news radio KNX(AM) in Los Angeles (www.gointeract.com/knx/) achieve a lot with a rela-

tively understated yet extremely attractive design. Whether you go for the all-out "wow" or the sophisticated, under-design approach, the most important thing to remember is to make sure your message gets to visitor's eyes and is retained. The rest is gravy.

Unfortunately, there is no magic formula that will produce the most magical visual



look for a Web site — one that will guarantee more visitors than any other.

Fortunately, however, there are professional Internet service organizations that will help your station to design the perfect site — for a fee, of course, and as time marches on, these fees seem to be increasing by leaps and bounds ... anywhere from a couple of hundred dollars to thousands for site design and ongoing maintenance.

Of course, your station may already have a couple of gurus on staff who can do the job and thereby save the expense of hiring a consultant firm to do the deed. Make sure, however, that these gurus can handle the load — if your station's site becomes really popular, and you constantly update it with new information and features, they may well become nothing more than tired, wrung-out gurus who are of virtually no use to your station.

Whether you entrust your station's site to in-house gurus or an outside group of experts, updating your site should be of primary importance. Indeed, a site that is not constantly refreshed with new information will not be valuable to visitors and will likely wither away on the cyber-vine. Stations that are constantly blowing the trumpet for the new tidbits they've uploaded to their sites usually wind up winners in the Web sweepstakes.

On your station's Web site, you should include everything from a clear description of the station and coverage area to wattage and format nuggets. Don't forget to include a listing of your programming and bios and photos of your air staff — believe it or not, Netizens want to see what your overnight jock looks like!

You will want your station's site to be the source of information on the Web about ... well, whatever you want it to be the source of information about. So, you should include as many features as possible to increase the chance that visitors will "bookmark" your site and come back to it often. Weather and traffic reports, local sports coverage, and a list of links related to your station's programming are also good bets to insure repeat visitors.

Live on the Net

Another safe bet that will keep the number of people who visit your site on the rise is perhaps the newest, most whiz-bang, yet likely sensible thing imaginable — broadcasting live. Now, your station probably does this already — okay, of course it does — but does your station broadcast live on the Internet?

continued on page 32 ►

We put the finger on 3 more stations.

TALK RADIO 1070
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What do these numbers have in common?

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1,576,800.

26,280.

1,095.

36.

3.

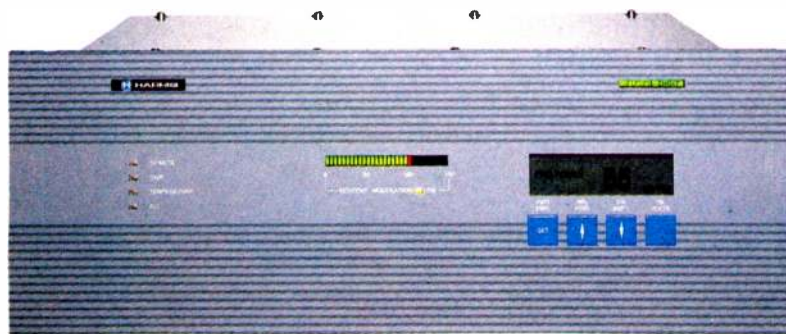


The Clearly Digital answer? They all represent the length of warranty on Harris' DIGIT™, the world's only truly digital FM exciter. And, whether you look at these numbers by seconds, minutes, hours, days, months or years, they add up to the **only 3-year** FM digital exciter warranty in broadcasting!

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✓**Only** DIGIT has a DCL, a secret weapon that eliminates overmodulation peaks and provides the loudest, cleanest signal on the dial.

✓**Only** DIGIT--standard in all Harris tube and solid state FM transmitters above 1 kilowatt-- gives you assurance that you can upgrade from an analog to an all-digital air-chain quickly and easily when you are ready.

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HARRIS

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likely sensible thing imaginable — broadcasting live. Now, your station probably does this already — okay, of course it does — but does your station broadcast live on the Internet?

Stations like New York City information powerhouse WOR(AM) (<http://www.commspec.com/wor.htm>) do. So does talker KLIF(AM) in Dallas (<http://www.pic.net/klif/index.html>). Sports talker WMVP(AM) in Chicago is bellowing on the Net, and so is Prime Sports Radio (<http://libertysports.com/radio.htm>). Music stations like KPIG(FM), coming out of Freedom, Calif., (<http://www.kpig.com>) — undoubtedly the most

uniquely formatted music station on the Web — are entertaining Netizens, as are new rocker KDFE-FM in Dallas/Fort Worth (<http://server.iadfw.net/kdfe/>), and classic rocker WRRK-FM in Pittsburgh.

Services

Services like AudioNet (<http://www.audionet.com>), which offers links to live feeds of the stations described above (except KPIG) and others, are grouping stations broadcasting live on the Internet in much the same way as a radio listing might in your local newspaper — except listings such as the ones on AudioNet and RealAudio's site



(<http://www.realaudio.com>) are comprised of actual links to live broadcasts. This puts current and perhaps most importantly

potential listeners in touch with your station; listeners who purchase your advertiser's products and, in turn, pump up your bottom line.

Radio stations are not the only broadcasting-related entities getting in on all of this cyber action. An ever-increasing number of radio-related services have popped up on the Web in the past year, and, undoubtedly, more will be doing so in the months and years to come.

People who may not know that your station has a Web site can look it up simply by consulting one of the many general Internet search sites like the venerable Yahoo! (<http://www.yahoo.com>), or one of the growing number of targeted radio station lists, the granddaddy of which is maintained as part of Massachusetts Institute of

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End the struggles of a complex contract, and keep it simple for your client.
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Now your sales staff can enter their own orders at the station or from the field.

And there's more...

For example, revenue projections far into the future, spot and program avails projections, powerful sales management reports, operator rights and security, CBSI interactive manuals, a variety of log presentations, Laz E-Forms™ and CBSI's faster than ever backup utility.

The truth about your station's Web adventure is out there.

Technology station WMBR-FM's site (<http://wmbf.mit.edu/stations/list.html>).

Such services as the aforementioned AudioNet, and Radionet (<http://www.radionet.com>) and 440: International (http://www.440int.com/index_x.html), are proving to be valuable to radio station personnel, who will want to keep up with and can benefit from what's being said about radio on the Internet.

A number of Usenet news groups, particularly rec.radio.broadcasting and the relatively new Radio-Forum (subscribe by sending e-mail to majordomo@sojourn.com — put the word "digest" in the subject field and "subscribe RADIO-FORUM" in the message field), provide valuable, ongoing discourse on all things radio.

Take the leap!

If your station has already leaped onto the Web, you've probably encountered some of the considerations outlined here. If your station hasn't yet committed to cyberspace, more than likely you soon will. But don't ever feel like you're alone out there — you can always air your concerns about being online on rec.radio.broadcasting or Radio Forum. Or you can contact some of the stations whose Web sites you've seen and admired to find out what kind of experiences their personnel have had.

It's been said time and time again on television's "The X-Files" that "The truth is out there."

Well, it's true. The truth about your station's Web adventure is out there. It may take some burning of shoe leather to find it, but the time spent will be well worth the effort.

Retailers Not Up on RBDS Yet

by Bob Rusk

ARLINGTON, Va. More than four hundred FM stations nationwide are already on-line with RBDS (Radio Broadcast Data System), the new technology that is slowly changing the way listeners use their radios.

It's not a question of will RBDS catch on, but rather when. The answer lies with broadcasters and manufacturers, who must work together to educate the public. And therein lies the problem. Sales people at home electronics stores typically have not heard of RBDS — even though a receiver may be just an aisle away. Moreover, many employees at stations with RBDS aren't even aware of its existence.

"This is a problem," acknowledged Lisa Fasold, director of the RBDS campaign for the Electronic Industries Association. "The engineering people at stations know about it, general managers know half-way. Promotion, sales, and disc-jockeys are all 'maybe.'"

In an effort to educate broadcasters, until April the EIA is giving RBDS encoders and software to FM stations — commercial and public — in the Top 25

markets. In return, the stations must air a minimum of \$5,000 worth of advertisements to promote RBDS to listeners (public stations do underwriting credits). The hope is, once people hear about RBDS they'll go out and buy one of the radios.

One RBDS manufacturer, who spoke on the condition of anonymity, stated that the spots stations are airing is not enough.

"That's very minor," he said. "A lot more needs to be done. But who will do it? Maybe it'll take a big company like Pioneer, or someone else who has the muscle."

A chief engineer at a station in a top five market said that the spots are not effective because many consumers don't understand them.

"I don't see anything happening at the local retail level to promote the receivers," he added. "When people hear the spot and try to go and buy the radio, they aren't going to get very far. That's where the EIA needs to pick things up, with a point-of-sale display.

"We were doing a remote at a store and I asked the manager if he wanted me to

make sure that the RBDS radios were tuned to my station. He didn't know what I was talking about. I had to go and do the demonstration for him."

Crutchfield, the home electronics mail order house, is doing a good job of educating its staff and customers. The Denon model DCT-950R is featured in Crutchfield's winter/spring 1996 catalog with an explanation to consumers that the receiver displays call letters and formats of RBDS stations.

John Casey, Denon marketing manager, said that his company has "25 rep firms throughout the United States to handle our products. They educate the dealers. The dealers educate their sales staffs. Some dealers have a high turnover in retail staffs, so that's the hardest part."

Denon ran an inside back cover advertisement in the young adult magazine Details last September. It drew 5,000 reader inquiries, the largest single

response in Denon's history. The company also ran the ad on the inside front cover of Car Sound magazine, with a Denon jumbo poster attached.

According to Casey, more than 100,000 Denon RBDS units have been sold since 1993 and are available at over 1,000 retailers across the country, including chains such as The Good Guys on the West Coast and Nobody Beats The Wiz on the East Coast.

Onkyo RBDS tuners are available at



KTBZ Houston's RBDS Billboard

authorized dealers in all 50 states, including the Circuit City chain. But, admitted senior marketing manager Michael Strange, "the awareness is low with consumers. Until we start to get lower priced units, I don't know where it's going to go. It's a catch-22. You have to get requests before you can put it into the product, but you don't get all that many requests."

Several automobile manufacturers now offer RBDS, or an RBDS option, including GM, Porsche and BMW. Ford and Toyota are expected to offer RBDS by 1998. Motorists in a dozen markets across the country are learning about RBDS from billboards, known as MusicBoards, developed by Seattle-based Specialized Communications. Radios measuring 14 feet wide and three feet tall are pictured on the billboards, with a working RBDS display showing station call letters and the artist that is currently on the air.

"We think it's a great idea," said Mark Humphrey, director of engineering at WPLY/Philadelphia, which has had the MusicBoard since last May.

"The whole idea is to stimulate interest and get people to tune in."

Another MusicBoard station, KTBZ in Houston, would like to run a promotion to get receivers in the hands of listeners as soon as RBDS becomes better known to the general public.

Industry-wide, many manufacturers and stations are just starting to consider such a campaign.

With broadcasters increasingly talking about RBDS, the future of DAB must also be looked at. It will be sometime, however, before anyone can seriously consider digital. As an engineer at one Los Angeles station put it, "We first have to get the molasses out of the FCC."

Mark Olkowski, director of broadcast operations and engineering at CBS/Group W-owned WNEW-FM and WINS(AM) in New York, commented, "You can look at all the options and amuse yourself, but until there is a standard how do you really plan for it?"

WPLY's Humphrey concluded, "As an industry, we must ask ourselves why we should do it and then decide what problems this would solve. The question is, can we salvage in-band and make it more robust? If we approve a system that doesn't solve the fundamental problems, we'll have spent a lot of time and money without accomplishing anything — except the right to use the word digital."

Don't Let Las Vegas Fool You; Tips from JG

by Judith Gross

Las Vegas You've just arrived in Las Vegas for your first NAB convention. Lucky dog! As you get used to the perpetual clanking of the slot machines, the way the desert air makes your mouth feel like 5,000-year-old Egyptian papyrus and the blitzkrieg of neon in colors you've never imagined, allow me to impart some invaluable survival hints, gleaned over my 17 years (yikes!) of working the Show That Keeps On Growing in the city that really never sleeps.

Comfy is as comfy does

There are some very basic rules you need to etch on your brain as you gather with 70,000 of your intimate colleagues for four days of sensory overload. First and foremost: Wear Comfortable Shoes. The aisles of the Las Vegas Convention Center are strewn with fashion victims who put style before comfort.

Sneakers, Docs or other comfortable footwear are an absolute must if you want to make it through more than the first six hours. For my sisters who insist on style: any heels over an inch and a half are suicidal.

Getting to and from the Convention Center is easy. Take shuttle buses where you can. If you're staying off the beaten path, go to the nearest hotel where the buses depart. Save all available energy for the exhibit floor.

Taxis are plentiful in Vegas, and you don't have to be a high roller to afford them. Forget about the Big Apple arm wave. Get to the entrance of any casino and board cabs there. Hint: it's customary to tip the bellman who hails the cab. (For an extra special treat,

catch the antics of the night cab barker at the Hilton, who's a comedy act all to himself).

What's where?

The "strip" is the section with all the big casinos and runs parallel to the street where the convention center is located. Every hotel is a casino. A bus serves the entire strip and it's cheaper than cabbage. The streets which cross the strip are named after the casinos which are closest to them. I would tell you to use the tower of the old Landmark to locate the convention center, but too late; it was blown to smithereens a few months ago.

Walking the streets of Las Vegas? Don't. Distances are deceiving in the desert; it could be really hot; and anyway you can't get there from here. I know; I've tried.

The main part of the convention center houses radio/audio exhibits in one hall and TV exhibits in another, larger hall. A long, long, long corridor connects the two, going past the NAB store, international lounge, information booths, another NAB store; a large cafeteria, a small bar; restrooms, special exhibits; a concierge, and several more NAB stores.

Seminars, workshops and offices are adjacent to the TV hall, usually up one of the escalators, and you do need to be registered for the conferences or you'll be stopped by the guards if you sport an exhibit hall-only badge. Registration is now held down the road at the Sands, but there are shuttle buses, so save your feet.

Separate exhibit areas are adjacent to the Hilton and there is a new area at the Sands. Many events are held in the Hilton Ballrooms, which are located in the part of the Hilton closest to the convention center.

The NAB is a terrific opportunity to catch up on new technology, research new products for your station and especially to network with your colleagues. Carry more business cards than you'll think you need.

It's worth it to take an hour your first day to plan your attack. The big program book lists everything in detail; smaller pocket sizes will keep lists of conferences and booth numbers at your finger tips. Make sure to pick up a copy of the official NAB Daily each day of the show to help plan your day. And do plan your day.

Hint: for the first day, it helps to be methodical. Get a feel for the hall layouts and tackle the aisles one by one. If a booth looks too crowded, make a note to come back. You'll spend less time at each booth if you focus on specific products or technology features.

Once you've seen what you need to, offer your key card to get more information later. You can take literature home with you, but make sure to grab one of those plastic bags many companies give away and don't take more info than you need. Hint: the day before you leave, you might want to have your hotel ship a box with all the literature you've gathered back home. It will save you carrying it on the plane.

If I only spend four seconds, I can go to the rest room

Don't be fooled into thinking you can do the whole show. Even in four days. Last year somebody calculated that if you were to take the hours the exhibit halls are open and divide by the total number of booths, you could spend only about 12 seconds at each one. Sure, you could, but it would take you 12 weeks to recover.

There are ample rest rooms, telephones and a few lounge areas in both halls, and you should set aside "down time" several times during the day so you can stay productive. There are food

continued on page 34 ►

Watch Out in 'Vegas

► continued from page 33

and beverage stands, but resist the temptation to gulp a hot dog and go for a yogurt instead. Drink more water or juice than you normally would; Vegas is very dry and first timers are often afflicted with desert-throat, which is not painful but turns even the most resonant voice into a scraping whisper.

The LVCC has a great business office, by the way, although it does get crowded. It's an office away from home with any business service you could desire.

Why they call it lost wages

This is Nevada, and everything is legal. Where else could you find Jack Daniels in the 7-11 at 2 a.m.? Gambling is everywhere, not just in the casinos. And once you're inside a casino, the management makes it as tough as possible to get out. Fun? Sure. But remember that they would not stay in business if more people won. If you gamble, expect to lose. Enjoy the adrenaline rush but don't get hooked on it.

Everything else in Las Vegas exists to support the casinos, although there are hordes of new attractions for families and even children. As you might expect, food is a little bizarre.

Casinos offer two kinds of eateries: cheap and fast, or slow and expensive. The cheap and fast are usually self-service buffets for breakfast, lunch and dinner. If you see prime rib for \$4.99, you get exactly what you pay for.

The expensive restaurants in the casinos don't offer anything more than convenience over other restaurants in town. Last year I timed a different one each night and no matter what, it takes 45 minutes to get your first course. If you want to find a better meal at a better price, get away from the strip. The corridor between the airport and the strip has added some good values.

The convention center concierges are helpful and they'll make reservations — always a must in this town.

This is your brain ...

This is your brain at the NAB

The most perplexing question for any convention goer is always: how much should you party. Well, you are here to work, (aren't you?) but temptations are everywhere. Even the cocktail servers are budding Adonises and Cindy Crawford wannabes.

There are exhibit hall cocktail offerings, parties, receptions and late night hospitality suites where food and booze flow freely and where over-indulging is encouraged. Every casino hosts an embarrassment of bars.

I've tried surviving this convention with, without and every shade in between. Here's my word to the wise or unwise, as the case may be. Try to get the sleep you need, even if you're obligated to be social for business reasons. As we've gotten older, my industry cohorts

(whom shall remain nameless to protect the guilty) and I have gotten in the habit of delayed gratification.

We limit our drinks and late nights for most of our work days and then set aside one evening when it's okay to let loose and party hardy. I take a wad of "fun money" with me, which I know I won't miss and won't feel guilty about blowing on the dollar slots, my personal downfall.

Oy, you shouldn't ask

A few quick answers to questions you didn't know you had: Dress is more casual than not and Vegas is usually 80-90 degrees in the day, in the fifties at night. People dress up for parties and night events. You'll always win within your first five pulls of the one-armed bandits, but lose when you keep going. Somebody else's spouse always hits the big jackpot.

The shows are good, especially when NAB comes to town, but they can be expensive. Tipping is a way of life here. Yes, that was what's-her-name-from the TV you saw at the roulette wheel. The restaurants at the Hilton are the most crowded on any convention night — and the most expensive. It's worth a trip to Caesars for the shopping mall underground; stay for the talking statues to feel really surreal. You can get married at those little chapels and a real imitation Elvis will sing to you at the one called Graceland. There really is a Liberace museum.

The white tigers at the Mirage, the outside of the Excalibur, the lion's mouth doorway of the MGM, the volcano outside the Mirage and the

Egyptian attractions at the Luxor are all worth a look. The laser at the point of the Luxor can be seen many, many miles away from the city. The tropical Lagoon Saloon at the Mirage is my favorite watering hole. The Golden Nugget is in the downtown area, which is separate from the strip.

And, yeah, it's worth it to take a drive



The Forum Shops feature talking Roman deities.

into the desert, away from the insanity for an hour or two, where the only light is your moon shadow and the only sound is the wind in the telephone wires.

□ □ □

Judith Gross, formerly JG of JG's Earwaves, runs her own PR and marketing agency for broadcast and pro-audio companies. She plans to take the red-eye from New York to Las Vegas where she will party hardy only one night of the convention (probably). You can reach her at 718-392-3288.

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Ubiquitous Cart on Its Way Out

by Bob Rusk

NORMAL, III. For about 40 years, analog carts have served radio well. They were perhaps the most important audio innovation following World War II. But, as the expression goes, all good things must come to an end. Such is the case with carts and tape, which are about to go the way of the turntable.

Digital technology is here — which we haven't know — but for stations that already know the switch, now is the time to look at the facts and consider your options. And along with carts and tape, the machines will also be gone soon.

At Audi-Cord, the largest supplier of cart machines, company president Andrew Rector talks about them in the past tense.

"That tells you something about how I view their future," he said.

"I bought this company in 1991, but not for the cart machines. I bought it as a

commercial broadcasters in the United States, "Fidelipac exports 50 percent to 60 percent of its volume. We sell in 65 countries. There are many areas in the world where we still do a very large business in cartridges — including Mexico, throughout South America, Spain, Indonesia, the Philippines and Sri Lanka."

In addition, about 15 percent to 20 percent of Fidelipac's business is with various federal agencies such as the Voice of America, which Thanhauser said has "80 to 100 of our cartridge machines."

Fidelipac has a three-year supply of tape left in the warehouse. So the time will soon come when Thanhauser must think

about removing it from his product line.

"There's a point at which you have to make a decision and decide if it's a worthwhile pursuit relative to the whole business," he said. Fidelipac began diversifying about eight years ago and now manufactures on-air consoles.

Just as the cost of tape has increased, so has the cost of the machines.

"It's much more expensive to build them today," said Woods. "This is driven both by the fact that the manufacturers are not building them in the same quantities and some of the parts are difficult to get. Motors are becoming very difficult to get."

"Sooner or later," added Audi-Cord's

Rector, "the cost of the motor will go up so high that the cart machine will be prohibitively expensive to build."

Carts, machines and tape are definitely on the critical list. What little life that remains is mainly in the hands of the large market stations that haven't yet converted to digital.

"It's going to be awhile before the comfort level of the major market stations goes to where they are satisfied that the hard disk platforms are stable enough, without having system crashes that would be intolerable," said Schwieger.

"The amount of lost revenue for a station could be devastating. Now that reliability has improved, we're starting to see that medium and major market stations are definitely making the switch."

Just as the cost of tape has increased, so has the cost of the machines

launching pad for other businesses. At that time, I figured we had a three- to five-year window with cart machines. Today stations are buying them only out of necessity. They haven't made the decision yet to go digital, so when a machine breaks they buy a new one."

With so little business left, Rector thinks "by the turn of the century, the cart machine will be a thing of the past." There will be a market, albeit a small one, for used machines, but getting tape for carts will be difficult — and expensive.

"It's going to be difficult to find reel-to-reel tape, let alone backcoated tape for carts," acknowledged Tim Schwieger, vice president/marketing at Broadcast Supply Worldwide.

With the departure of 3M from the analog tape business and the sale of Ampex, the price of the remaining supply has increased significantly.

According to Jim Woods, director of studio products at Harris Broadcast, 4,000 feet of tape now sells for \$68 — about double the price of just five years ago. But, he added, "as long as there are machines out there, someone will be selling tape."

Fidelipac, one of the most recognizable names in the business, still manufactures analog carts and cart machines. They also sell tape, but no longer manufacture it.

"The decline in the size of the market made that uneconomical, said Fidelipac president Roger Thanhauser. "So we built up a very large inventory of tape, which we felt would last a few years and take care of our needs for the remainder of the life of tape cartridges."

Interestingly, Thanhauser pointed out that while his company services

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► continued from page 28

mature, fully tested equipment, so we haven't had too many problems there. I think an AES/EBU interface on any digital equipment should be a standard feature. We want to stay 'in the bits' once we do a digital edit ... we don't want to go back to analog, through those converters again."

Ball cites the DSE-7000 at the Kansas City station, shipped without a stock AES/EBU interface; available as an option from Orban. In order to transfer work from the DSE to Master Control, an unnecessary D/A and A/D conversion needs to be done.

"I think AES/EBU on any digital equipment ought to be a standard feature. That

perturbed us a little," says Ball.

Ball is looking to linear audio when the time and price become right. Linear audio is digital audio stored with no compression scheme — music and data have a 1:1 relationship. But noncompressed audio requires more disk space.

Bit-form throughout

"We can't do it now," said Ball, "the hard drives are too expensive. But when drives become dirt-cheap and you can get a terabyte (1,000GB) for a thousand bucks, people won't want to compress any more than they absolutely have to. It's just one more time you're throwing in a compression algorithm."

In the future, Ball looks forward to audio remaining in bit form from the start all the way to the air.

"I will want spots to arrive on CD. We will take it out via an AES/EBU interface into our system and let it ride all the way

head crash can bring down an entire music library and commercial inventory and cost a station dearly. Ball cites the backup scheme used by Master Control.

"The control room hard disk plays off one machine. If that disk crashes, everything is

The continuing evolution of user interfacing is likely to move toward a Windows-based environment.

to our transmitter and never come out to analog. We are not looking at any digital consoles yet; that is still too 'leading edge' and we're still waiting."

Stations waiting on the digital sidelines are concerned about disk reliability. A

mirrored on every disk in each control room. If there is a crash, we can take spots, music and everything off the hard disk in the file server. Even the file server is mirrored with duplexed hard drives. If the entire computer in the studio crashes, you have a backup studio which is ready to roll."

All computers are lined up in a rack in one single area. In the worst-case scenario of a major computer crash, one 36-pin plug can be swapped over to an adjacent computer in the same rack, control is switched over and access to the entire audio library is restored. Because of the multiple mirrored, data is available at all positions.

User interface

The continuing evolution of user interfacing is likely to move towards a Windows-based environment, eventually abandoning the familiar "tape feel" standard of present machines.

"I think everybody's going to have to do that," says Ball. "Bill Gates has really been able to get everybody onto Windows, even though radio engineers occasionally have their bad days with it."

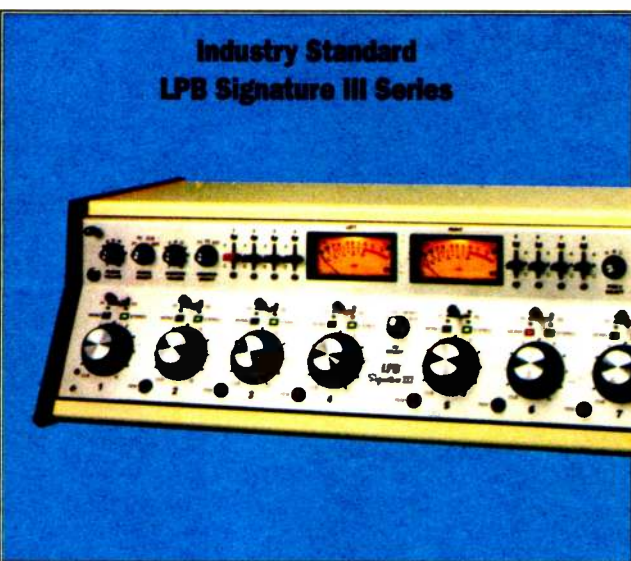
Ball observes the future generation of broadcasters are now being raised on point-and-click computer operations. To them, "tape feel" and "cart walls" will be foreign concepts and they will demand a friendlier interface.

Ball notes, "The interface will be something that they will already be using on Netscape, the World Wide Web, Windows, all their games and everything else. When we bring in the youth that have communicated with a computer that way — from childhood on up — that is what they will expect to find."

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The whole is the sum of its parts and the studio is no exception. And there is plenty of new and time-tested studio gear to see at NAB '96.

New products from **Acoustical Solutions** include AlphaSorb wall panels and hanging baffles — rigid sound-absorbing panels available in custom sizes up to four feet by 10 feet in a one-inch or two-inch thickness and covered in Guilford fabric with a wide color selection. You will also find two-foot-square AlphaTec ceiling tiles made of sound-absorbing foam panel mounted against a rigid fiberboard backing and designed to drop into a standard grid. Both products are Class 1 fire-rated. Acoustical Solutions will also exhibit established products including AlphaPyramid and AlphaWedge acoustical foams, Sonex acoustical foams, AudioSeal sound barrier, Soundtex fabric wall covering and modular broadcast recording booths.

DataTek Corp. returns with its D-2800 series routing switchers for analog and digital audio systems and its D-2400 series control panels. Also on display will be analog and digital audio modules. DataTek will introduce the D-2600 series analog and digital audio routing switchers and the D-2800 series eight-character alphanumeric keypad control panels.

GEPCO International Inc. will exhibit its new GEP-FLEX jacket compound for 22-gauge and 24-gauge series multipair audio cable. The company will also show its audio cable, custom audio cable assemblies and breakout boxes and panels.

As its name implies, **Studio Technologies Inc.** will have a variety of studio equipment on display, including a line of professional audio products such as the StudioComm Series and the Studio Tools series of digital audio workstation accessories.

Audio Accessories Inc. will show its collection of audio patch panels, prewired audio panels, patch cords, project patch and RS-422 units.

The new AD2004 quad 20-bit A-to-D converter from **Benchmark Media Systems Inc.** will make its debut at the show. You will also find familiar Benchmark products including true VU meter systems, mode controllers and the System 1000 modular DA and processing package.

Look for more studio essentials at the **Autogram Corp.** booth. Autogram will have its collection of RP series audio switchers, clocks and timers for your review.

Neutrik USA Inc. will exhibit its NPP-TT-14-PT, Easy Patch panels. The company will have several connectors on display including its Speak-On speaker connectors, Minicon 12-pin miniature connector, XY Series of IDC connectors, the Neutricon eight-pin modular commercial connectors and Nanocon three-pin miniature connectors. ProFi professional RCA connectors and A and B series center-to-center connectors will also be on display. Neutrik will also show its Easy Patch panel accessories and a complete line of XLR connectors, accessories, adapters, and wall plates as well as a wide assortment of quarter-inch jacks and plugs for high-end audio applications.

Bradley Broadcast Sales will have the Excalibur HA-1 hybrid adapter on display at its booth.

There is a plethora of new products from **Wohler Technologies** this year. Check out Wohler's new alarm systems that identify audio error conditions and location. You will also find new horizontal level meters from one to eight full range (analog or digital) in 1RU at this booth. Wohler is introducing the AES/EBU 1U or 2U digital level meters — the difference is decibels. There are new digital audio routing switchers, a serial digital audio extractor, phase flipper, and digital source selection switch DSS-8. In addition, several established Wohler products including level meters, phase indicators, audio routing switchers and source selectors will be on display.

In addition to its familiar master clock systems, audio D.A. family and timers, **ESE** will present its new ES-160 master clock with one sec/mo. accuracy. Other new items to preview at the ESE booth will include the ES-245 quad 1x6 audio D.A. with individual gain pots and a four-inch display family of clocks, timers and slaves.

Wireworks Corp. will bring its selection of cables, cabling assemblies and cable testers. You can check out multimedia cabling assemblies, control cables, coaxial cables, broadcast-quality sound and communication cables, custom broadcast panels and cable testers for every application.

The **Rip-Tie Co.** will introduce Rip-Tie Lite Cablewrap, which is designed for less demanding use in terms of release cycles — it will withstand approximately 300 cycles

will also display the ICS-92 nine-key programmable intercom station and the XPL-12 and XPL-22 expansion panels with electronic LED labels to add 60 keys to Matrix Plus II.

Henry Engineering will introduce the new StereoMixer eight-input, three-output stereo mixer for line-level sources. The mixer can combine four stereo, eight mono or a combination of stereo and mono sources to produce both stereo and mono outputs simultaneously.

J.N.S. Electronic Industries Pty. will show its 8000 System, a modular system with the new RFM-8323 FM receiver module, DTM-8552 FM composite monitoring module and 8310B 10x1 matrix switcher.

Best Power will debut the Unity/I three-phase uninterruptible power systems (UPS) that range in single-module capabilities from 10 KW to 220 KW. The systems may be operated in parallel for total system capacities approaching 2,000 KW (2 MW).

The whole is the sum of its parts and the modern radio studio is no exception.

— than the original Rip-Tie Cablewrap. The original Rip-Tie Cablewrap with adhesive back used to organize bundles of cables in coils or harnesses will also be on display.

Lexicon will present its new Lexicon 300L digital effects system that supports the LARC remote controller. Lexicon will also show its Pitch FX card for the PCM 80 Digital Effects Processor.

The TTP96 audio patch — new from **Switchcraft Inc.** — will be displayed at the show. The company will also show its wide collection of familiar studio gear including audio connectors, jacks, plugs, audio patch panels, patch cords, molded cable assemblies and audio accessories, switches, jackfields, jack panels, power cords and EAC power receptacles.

SMARTS Broadcast Systems will showcase a new switcher and a new temperature announcer, along with a new log manager designed for interfacing music and traffic logs in an automation system.

ADM Systems Inc. will have its collection of bar-graph meters on exhibit along with its stereo source selector and mix-minus IFB system.

International Tapetronics Corp. has a new audio routing switcher available. It will be on display alongside the company's established audio routing switcher that is expandable to 512x512. You will also find the RS-232 control at this booth and 124 custom remote control units.

Sandar Electronics AS has a host of new routers to introduce, including 32x32, 64x64 and many other sizes for audio as well as 34, 140, and 155 Mbps. The company has new AES/EBU routers to show and will have its pre-existing analog and digital audio routers on hand too.

New products on display from **Clear-Com Intercom Systems** will include the Tel-1000 auto-nulling telephone interface for Party-Line and Matrix intercom systems, the TW-20 two-way radio intercom interface and Windows 95 programming software for the Matrix Plus II Intercom. Clear-Com's P1-Pro party-line intercoms with two- to 12-channel stations with linking features will also be on display. The company

will also show the Ferrups uninterruptible power systems (UPS), which deliver no-break computer-grade power to vital broadcast equipment while providing lightning and surge suppression.

CANARE will show Star Quad mic cable, cable reels, snake systems, tools and cable strippers.

New on display from **EDAC Inc.** will be a shielded rack and panel connector and cover set, a combined audio/video rack and panel connector and a new three-pin audio connector. EDAC will also exhibit audio rack and panel connectors.

New products on display from **Leitch** will include VIA 32 Series Routing Switchers; XPress Series Monitoring Routers; Smart Panel Controller, a programmable, push-button control panel; Router Works, a PC-based routing switcher control program; DigiBus, which allows users to transition between almost any digital and analog standard for both audio and video; time and temperature option and VBI control features to LogoMotion; video and audio distribution amplifiers and various compatible frames; Routing Scheduler; adaptive comb filter module; X plus 16 x 16 analog video and audio routers; AES digital-to-analog converter; StillFile Gateway object server; MediaPort; EDH Mix Box; EDHview Software; and ADM-6800 audio signal monitor.

Lemo USA Inc. will show high-quality, self-latching circular connectors for audio and video applications.

Nemal Electronics International will introduce composite audio/video cables with extra-flexible jackets. The new products are available from stock in 15 versions with no minimum order, or in custom constructions with a 1000-foot minimum and two weeks' lead time. Also on display will be serial digital audio and video patch panels.

Torpey Controls & Eng. Ltd. will introduce NPR code-compatible time displays, developed to offer NPR stations an alternative, operating from their OS2 computers. The company will also show a wide range of digital or analog clocks, running from SMPTE, DQS, ESE or NPR codes.

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It Is a Buyer's Market

► continued from page 16

AES show in New York.

Lexicon will exhibit the PCM 90 Digital Reverberator, companion to the PCM 80 Effects Processor, a new program card to accompany the PCM 80 and the 300L effect system that supports the company's LARC controller.

Gefen Systems' TSE 241 monitor and keyboard extender will augment the flexibility of studio computers. This product allows operation of two separate computers from one keyboard and monitor up to 500 feet away from the computers. The company will also debut M&E Pro-SFX, a production music locator database product to search, organize and locate effects.

DigiGram will introduce the PCX19 soundcard, specially designed for the requirements of the PCI bus. Also available will be the Windows version of

returning to NAB with the company's established Axiom digital console and recording system.

Digital storage solutions will be addressed by companies such as **Denon**, who will exhibit the DN-1100R MiniDisc recorder/player with 10 independent hotkeys for instant playback. The DN-045R MiniDisc Replicator will also be showcased.

Disc Manufacturing Inc. will promote the benefits of its CD mastering, replicating and fulfillment services while at the NAB show.

AirWorks Media is introducing TuneBuilder, its proprietary self-editing music software that allows users to automatically create the length of music required for a production. AirWorks will also debut AutoConform for perfectly synchronized audio and video; S/Link for Macintosh that moves digital audio files; and TuneFinder, software for finding tracks in a music library or group of music libraries.

Fairlight USA will be presenting F.A.M.E., its completely integrated digital audio recording, editing and mixing system. Fairlight will also be displaying the MFX3 digital audio workstation with up to 24 inputs and outputs and its Timefx software and four-band EQ.

On display by **HHB Communications Ltd.** are its PDR 1000 and 1000TC portable DAT recorders along with a line of accessories for the equipment.

Newswire Information Systems Ltd. is introducing its latest version of NewsWire 2000 with graphical user interface and video, audio and text editing on the same workstation along with its interface to the Quantel Clipbox. Newswire is also debuting its interface to the DAVID audio editing software and two new systems based on Sun Microsystems technology and another running Windows 95, respectively.

Arrakis Systems will be introducing its Digilink 4 systems and will also be displaying the Digilink 2 and 3. Arrakis will also have a number of digital consoles on hand.

Permanent and portable digital systems have established their places.

Xtrack, a multitrack digital audio editing tool for OEM integrators. Additionally, the company will exhibit its other established sound products: the PCX9, PCX11 and PCX80 soundcards.

With digital recording technology, it makes sense to start out digitally at the console. Many such consoles offer control far beyond what was expected of their analog counterparts.

Korg USA will exhibit the 168RC recording console. This 16x8x2 device features internal effects processing and optical ADAT connections. The company also will debut the DRS 1212 I/O PCI Multichannel Audio Interface, which features analog and SPDIF inputs and outputs and an eight-channel ADAT optical I/O.

Harris also goes beyond established console design when the company returns to Las Vegas with the DCR1000 digital audio console.

Solid State Logic will introduce the SL 9000 J series Total Studio System, while

Osgood Focused on Radio

► continued from page 21

on the screen of your imagination, you provided the pictures and they were ever so much stronger as a result."

So strong was the effect that radio had on him as a child that Osgood can remember even today the sponsors of old radio shows. He rattles off a few: "The Shadow," sponsored by Blue Coal, "The Jack Benny Program" by Jell-O.

Osgood's heart is firmly entrenched in radio. Although both radio and television exhibit qualities that Osgood likes, radio and CBS's Poet in Residence go back further.

"I do not think of myself as a television guy who happens to do some radio," he said. "In fact, it's the other way around. I'm a radio guy who happens to do some television."

Poems began showing up in Osgood's broadcasts while he was with ABC News. He continued his poetic ways at Newsradio 88, which he joined before the station changed to all-news.

"I was doing newscasts in the middle of the Pat Summerall disk jockey show," he remembered. The idea of incorporating rhyming into his broadcasts "didn't seem like it fit the format that they were talking about," he said with a laugh. "I mean, they had sort of something in mind and that wasn't it."

Listeners reacted favorably to Osgood's poems, asking for copies of some of them. Newsradio 88 had a good thing on its hands. "As long as I didn't overdo it or take myself too seriously," said Osgood, "it seemed to be okay."

Osgood thinks poetry appeals to people "on some very elemental level." A lot of children's stories, he said, giving Dr. Seuss's tales as an example, are done in rhyme.

"The nursery rhymes that you learn as a kid were by definition in rhyme," he noted. "A lot of those stories — it's just more fun to listen to them because they're that way."

When people listen to the radio, they're likely to hear just about anything. But where does the responsibility lie for what air talent say over the air? Broadcasters "have some responsibility for that," said Osgood. "They hold a license."

How do broadcasters know how to conduct themselves on the air? "The censorship is not worse today than it was," mused Osgood. "In fact, in the old days, if you were on CBS and you mentioned NBC, they would pull the plug on the show."

Broadcasters "wouldn't say 'hell' or 'damn' or anything like that on the radio," said Osgood. "Unthinkable. Now, of course, we go a lot beyond that. But I would say over the years, as some of these things have become sort of part of standard language, it's lost a lot of its shock value."

Should broadcasters be under the watchful eyes of an organization such as the Federal Communications Commission and be told that they can't say something or they'll be fined? "I don't like the idea of the government trying to put this kind of stuff into stipulated law, because you end up in absurd situations," said Osgood.

The key to it all may simply lie in the

arena of common sense. "If you try to censor yourself so that you never utter anything that anybody will take offense at, that's going to be pretty tame stuff, and you find yourself with all these ... politically correct constructions that don't help with communication at all," said the keeper of "The Osgood File."

The "thing to do," said Osgood, "is to try to speak as directly as you can and remember that it's always one on one."

Whether radio in 1996 is fulfilling its promise of being a one to one medium "depends on where you're tuned," said Osgood. "It depends on what you want. The promise that they're talking about on television of a whole bunch of different channels and competing services has long since existed in radio, and if you like a certain kind of music, you're going to be listening to a certain kind of station. If it's information you want, you'll find it one place or another — talk or sports or whatever it is."

Today, information garnered from the news can often be depressing. Osgood approaches his commentaries by trying to find stories that offer listeners hope and encouragement.

"We have, I think, gotten into the habit of just looking for warts," he said. "People who are doing wonderful (things) ... are no less real than people who are doing terrible things."

There's a lot of talk about people on the radio these days, and, fittingly, a lot of it is heard on talk radio. Osgood feels there is room for a diversity of style and opinion.

"These things should be subject to supply and demand," he said. "If you're doing something that nobody wants to hear, then they won't listen to it."

But people listen to Osgood's "files" — 12 million a week, in fact, according to CBS. And such is the power of radio, of its trademark theater of the mind aspect, that Osgood enjoys the freedom to deliver his commentaries in a way that makes him feel the most comfortable.

"I suppose people do picture you talking and they have something in their mind," he said. "I do some of my broadcasts from home, and since I do get up at 2:30 in the morning, I'm not going to run into anybody in the hallway or anything. Everybody's sleeping, including my wife and kids, and I can walk around without fear of running into somebody who might be shocked at the way I'm dressed."

A trip into town would necessitate some serious shaving, showering and dressing. But broadcasting from the comfortable confines of home rarely requires such primping. At home, Osgood walks down the hall to the room in which the Switched 56 equipment is installed and delivers his broadcasts to the waiting world.

"You're focusing on different things," said Osgood. "I mean, nobody is seeing you." The picture that's being created in listeners' minds, he offered, is "based on the way you sound. If you sound as if you need a shave," he said, laughing, "then that's not so good."

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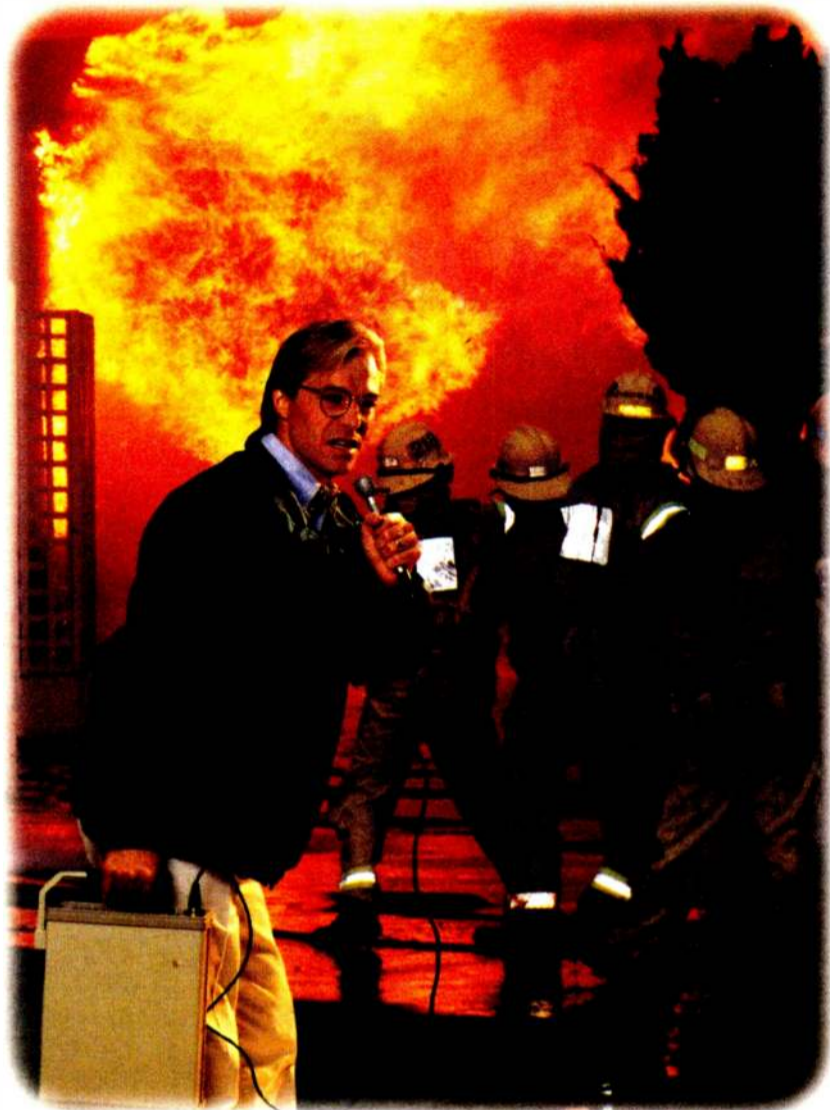
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FURNITURE

Rack 'em and Stack 'em on Floor

The NAB meets again, introducing the latest equipment and technology to the industry.

But where does one put all that equipment once you get back to your station?

Every year several furniture manufacturers and distributors bring their latest supplies. The range of products include racks, shelves, canopies, desks, cabinets, drawers, doors and modular furniture.

Wheatstone will display its line of modular studio furniture, and Murphy Studio furniture will be on display at the Fidelipac booth.

Pacific Research & Engineering will show its line of custom cabinetry.

New for Spring, Arrakis Systems is

of its Deskstar series. Look for Deskstar and Modulux furniture products to be on display as well.

Zero Stantron will have its modular electronic cabinets on hand including vertical racks, low-profile and slope-front consoles and instrument cabinets.

This year Anthro Corp. introduces the Anthro Console, designed to support multimonitor systems. It comes in four color combinations with two shelves and a keyboard surface. The company also is introducing the Anthro Rack-N-Stack, designed to support and move 19-inch rack equipment and non-racked hardware on the same cart.

KD Kanopy Inc. is presenting the KD Majestic canopy. The structure weighs 48 pounds and is 40 percent stronger than steel-framed units, according to the company. Some of the canopy's most attractive characteristics include a one-piece, scissorlike design with no loose parts or ropes that is water-resistant and fire-retardant.

In addition to its familiar workstation furniture for audio production, Nigel B. Furniture will introduce product furniture for distance learning and video conferencing applications. The company is also exhibiting new monitor display systems including mobile, wall and ceiling mounts.

Winsted Corp. this year will introduce an expanded line of Digital Desks

for linear and non-linear editing systems, including corner consoles and low-boy racks under the work surface. Other Winsted products include Plexiglas doors for the economy racks, 22-inch-wide System/85 rack bays, fabric side panels and tops.

Some of Winsted Corp.'s established furniture include integrated multimedia workstations, wood-trimmed decorator panels and vertical equipment racks and cabinets.

Wenger Corp. will return to the NAB show with its line of acoustic treatment and equipment mounting components. These include the V-Room sound isolating modular broadcast booth, computer/synthesizer workstations and quadratic room diffuser panels.

Breford Manufacturing Inc. also will display multimedia workstations available in a variety of colors. And a variety of accessories including doors, drawers and shelves for studios will be presented by AMCO Engineering Co.

Solutions Custom Furnishings Inc. is introducing monitor bridges in two new sizes. First, there is the single monitor stand that can be added to an existing system. Another larger Crescent monitor bridge that holds up to three 20-inch monitors on a height-adjustable base will also be introduced. Solutions also has added new components to the Crescent product line to exhibit as well as a collection of ready-to-assemble furnishings including Slimline, Diamond and Crescent product lines. Plus, you can talk to Solutions about available custom design and installation options available.

Don't forget about the furniture needs you'll have once you lug your equipment bounty home from NAB.

introducing DigiLux, a major market line of furniture. The company will exhibit a variety of modular furniture and as part

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DAB

Tune in to DAB in Vegas

Digital audio broadcasting (DAB) will be at NAB in another form other than the high-profile public demonstrations of past years: transmission equipment on the exhibit floor.

But the catch for broadcasters in the United States is the gear is for the much-further developed European Eureka-147 system. Eureka-147 is on the air in most of the major cities in Europe and being tested worldwide, while the United States has ruled it out as a possibility.

Of those companies that supplied

information to RW. Harris will show the DAB 2000 transmitter based on the D-CAST COFDM encoder developed for Eureka-147 by the French company ITIS.

From Italy, Itelco will exhibit a 200 W DAB transmitter for L-band.

GEC-Marconi, based in the United Kingdom, will display a Band III Eureka-147 transmitter system.

Many of these companies are involved in the pilot DAB project across Europe.

DATA SERVICES

Dig for Data at NAB '96

If it details you need to know, several established radio data service providers will be at NAB to answer your most minute questions.

Communications Data Services will promote a line of on-line engineering databases for broadcast engineers. Also available will be software products and services for radio wave propagation analysis and prediction.

Dataworld will introduce CD-ROM-based database software, including detailed ethnic and demographic reporting via tubular and graphical map formats. New ethnic/demographic shading overlays for any base map will be offered. On-line data bases also are available, providing instant access through

such services as the Internet.

In addition, Dataworld will have its existing line of map books, coverage analysis, terrain digitizing and various other databases offered for 24-hour access.

V-Soft Communications/Doug Vernier Telecommunication will exhibit INTERDLG for Windows. The service includes coverage mapping for AM, FM and TV utilizing digital line graphing with access to three or 30 second terrain data, FAA/FCC tower data, 1990 census data and national geodetic information. Also available will be SEARCH FM for Windows, an FCC minimum spacings channel search program with FCC data station filler.

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Features

The 22000 series Gemini console is available in 18, & 28 input module mainframe sizes and may be ordered with or without the VGA monitor mount. Three extended range LED meters display the 3 main console output buses. The mainframe supports input modules, a variety of option modules such as input selectors and DA's, and the 99 button Gemini control surface for Arrakis digital workstations. The Gemini control surface makes this product perfect for live on air studio applications when connected to one or more Arrakis digital workstations. With Gemini each of up to 40 jocks may have his own set of carts on the 99 button panel. You have push button control of record, trim, and playback of phoners. Station personnel may call in and record a news or sports event cart for insert into the play list from a simple touch tone phone. The optional integrated video switcher allows the operator to view and control his PC based X-mitter remote control, news wire computer, and even produce a new spot off the Arrakis digital workstation in the production room. This reduces or removes altogether the need for multiple video monitors in the control room. Designed for fast paced live on air shows, Gemini is choice for live on air.

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Designed for the radio station of the digital '90's, the 22000 series Gemini high performance console has a dynamic range of over 100dB. This makes it ideal for use with digital audio sources such as CD players and digital audio workstations. Use of Analog Devices monolithic mic preamps assures you of the lowest noise and distortion that current technology can provide. Active balanced in and out, the 22000 is the high performance, professional solution to your studio's needs.

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The 22000 series console is a rugged and reliable broadcast product. The modular mainframe simplifies service and provides for future expansion. The use of VCA's and DC channel On-Off switching increases fader life, reduces channel dropouts and noisy switches. The modules feature polycarbonate plastic overlays for scratch resistance. Penny and Giles faders, 5 million operation channel on-off switches, and ITT Schadow switches assure a long life. Use of heavy hardened aluminum panels, polycarbonate module overlays, and solid oak trim will provide a durable and attractive appearance through the years.



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CONSOLES

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From small, two-channel ENG mixers to fully digital, 48-channel post production studio boards — and, of course, traditional 12-channel on-air boards — numerous consoles for every application will be exhibited in the many exhibit spaces of NAB '96.

Over the past few years, the industry's growing emphasis on digital has been evident in the products being brought to the show. 1996 is no different.

New from **Wheatstone** will be the D-500 digital audio console, which is capable of handling analog, digital or mixed format signal sources and the A-300 and A-500 radio on-air consoles. Wheatstone will also display the A-6000 Master Control Console and the SP-4 stereo production console.

In the production room, the **Korg USA** 168RC Recording Console will surely find a home. Designed for use with the Korg SoundLink, the 168RC is a fully digital 16x8x2 device equipped with two ADAT optical inputs, eight analog inputs with 18-bit A/D converters, two internal effects processors and full console automation capabilities.

Yamaha will highlight its new 02R digital recording console, which features 40 analog and digital inputs, digital bus outputs, eight digital direct outputs and eight aux sends.

New from **Studer** will be the D940 digital console, and **Harris** will return with the DCR1000 digital audio console, which drew much attention last year. **Arrakis** will introduce its new 22000 Digital console.

Zaxcom will introduce the Deva, a four-channel portable digital audio mixer and removable hard disk recorder for fieldwork, alongside its established Arria and DMX1000 digital audio consoles.

Also intertwining digital recording with a digital board will be **AMS Neve** and its Logic 2 multifunction digital mixing console with optional AudioFile recorder/editor. **AMS Neve** will also show the Capricorn digital console and the Logic 3 compact digital mixer along with the Series analog broadcast console.

Traveling from Down Under will be the **ABC-Digital** D-Radio system, an integrated digital console and live-assist system.

While digital consoles are sure to draw the attention of many visitors, innovation has not ended on traditional analog boards. Many on-air mixers will also be displayed at NAB '96.

Being shown on the **LPB** stand will be the new Signature III series audio consoles.

Audio Developments will show the new Mercury, a two-output, dual-aux mixer, with electronically balanced I/O. Also new will be the AD149 mixer with transformer-balanced I/O, comprehensive equalization and Penny + Giles (P+G) faders. **Audio Developments** will also bring several of its established console products to NAB '96 along with the AD261 M-S stereo ENG mixer and AD146 four-output M-S compatible location mixer.

Fidelipac will show its series of Dynamax MXE consoles with three new optional modules — five-band mic EQ

with pan, a talkback/studio monitor and a telephone interface module.

New from the Spanish company **AEQ** will be the BC-2500 and BC-300 mixing consoles, and from Italy, the new Excalibur console from **AEV** will be shown. **AEQ** will also show its established BC-2000 and BC-500 mixing consoles along with the new PME-02, TLE-02 and MP-10 portable mixers.

The Canadian company **Videoquip** will



Wheatstone's A-6000 Master Control Console

show its new MX-G audio mixer.

Alongside all these new offerings will be many reliable boards that have shown their mettle year after year in radio stations the world over.

Arrakis will have its 1200, 12000 and 22000 Series consoles on display and **Audio Technologies Inc. (ATI)** will show its Vanguard Series of broadcast on-air consoles. Vanguard boards are available in six-, eight- and 12-mixer, dual-channel stereo versions. New the NanoAmp Series of portable and desktop mixers from **ATI** will be the MXS100 stereo, three input mic/line mixer, which will be shown alongside established **ATI** NanoAmp products.

The newly rechristened **Pacific Research & Engineering (PR&E)** will show its well-known BMX III and RMX RadioMixer on-air consoles as well as its production mixer and production multitrack consoles. **PR&E** boards will also be on display at the **Broadcast Supply Worldwide (BSW)** stand.

Broadcast Electronics will show its established Mix Trak and Air Trak on-air consoles, and **Soundcraft** will display its RM100 and Series 10 on-air consoles.

The **Audioarts** line of studio mixing consoles will be showcased at the **Bradley Broadcast Sales** booth. **Bradley** will also be displaying a number of **Mackie** mixers at its booth.

The 2500 Series audio console system from with the new MM-10 mini-mixer **Auditronics** will be on display alongside the company's 210 Series audio console system and 801/851 Series audio console system.

Autogram will show its established Mini-mix, IC/AC series, Pacemaker and R/TV audio console lines.

The Renaissance line of radio consoles will be shown by **Ward-Beck Systems**

and **Otari** will show its B-10 production and on-air console. **Otari** is also displaying the STATUS digitally controlled analog console and the CONCEPT 1 digitally controlled two-bus analog console with fader, mute and snapshot automation.

Euphonix will show the CS2000B broadcasting system, a complete on-air broadcast audio mixing system with 12 mix-minus busses.

On display at the **Cooper Sound Systems** stand will be the CS 106 + 1 Audio Mixer, which is available with four to seven modular mono/stereo input



Yamaha's EMX3500 Powered Mixer

channels and a comprehensive communications system. **Cooper** will also show the new CS 104 "ENG-style" four-channel stereo mixer.

Soundcraft consoles will be back this year, including the RM100 on-air radio console and Series 10 on-air consoles. **Soundcraft** will also display the B-800 compact production console, Ghost professional recording console and DC-2020 automated postproduction console.

ADM Systems, Radio Systems and



Sony Electronics will also be in attendance with on-air consoles.

Of course, before any audio can be played out via an on-air console, someone has to put together the commercials, stingers, IDs and whatnot. Don't think for a moment that production studio consoles will not be found on the show floor.

New from **DDA** is the CS3 console, which features true LCR panning and four stereo effects returns. It is available in 16-, 24-, 32- and 40-input versions.

The U.S. arm of **Amek** will introduce a working version of the Digital Mixing

System, a 32-bit system with control surface, host Pentium computer and DSP engine. Also on display, the Rembrandt post-production mixing console.

Midas will show the new XL-200, XL-4 and XL-42 consoles, all of which have four-band parametric EQ and a host of other features.

The SL 9000 J Series total studio system from **Solid State Logic** is new at the 1996 show. Being shown alongside it will be the established SL 8048 series console and the 48-channel Axiom board.

New from **Yamaha** will be the EMX3500 mixer, available in 12- and 16-channel versions. Established **Yamaha** consoles being shown include the PM4000 and PM3500 live mixing consoles, RM800 eight-bus analog recording console and the ProMix 01 digitally programmable mixer.

On the **Tascam** stand will be the M-5000 production console and the M-2600MKII recording console. **Penny & Giles Inc.** will return to the NAB show with the assignable 16-fader MM16 Digital Controller for MIDI music and DAW control.

Mackie, whose consoles will be on the Harris, BSW and Bradley stands as well as at its own booth, will show the new SR40-8 40-channel, eight-bus console along with the established SR24-4 and SR32-4 consoles for sound reinforcement and/or live mixing.

A new console series is coming from **Calrec Audio Ltd.** Watch for the T Series digitally controlled production console, the Q Series production and dubbing console and S Series production and dubbing console.

Out in the field, the 12-channel board you know and love in the studio simply will not do. For that reason, you may want to cast an eye over the variety of portable and ENG mixers that companies will show at NAB '96.

Micron Audio Products will show the new SQN Series IIIa portable stereo location audio mixers. Other SQN location audio mixers for other applications will also be displayed.

New from **Studio Technologies** will be



an audio mixer for ENG, SNG and small production vehicles. **Calrec Audio** will also have compact & minimixer modular audio consoles to take into the field.

Comrex will show its Codec Buddy cue system, a small console designed for use on outside broadcasts. **JK Audio** will show its RemoteMix professional mixer for quick remote broadcasts, and **Dongseo Electronics** will show a portable audio mixer too.

Soundcraft will show its LM1 and GP1 location recording mixers and the GP1 portable console.



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LIVE-ASSIST, AUTOMATION

Live-assist, Automation Figure Big

Computer technology has found its way into virtually every aspect of station operations. This fact is reinforced with the tremendous amount of companies displaying their related products at NAB '96. Everything from traffic and billing to music management, hard disk storage and recording and live assist and automation will be on hand for attendees to sample.

MusicMaster will be displayed by **A-Ware Software**. The system is used for music scheduling and inventory and features an advanced scheduling algorithm that improves average turnover control. MusicMaster interfaces with other automation and traffic systems and offers an optional RealTime control room interface.

CartWorks/dbm Systems Inc. will debut its CartWorks digital automation and storage system based on Windows that allows for live assist or automation with networking capability. CartWorks features a graphical-based operating system and apt-X digital audio compression.

New on display from **Datacount** will be its MusicBox music management and scheduling system. The company will also display the Darts accounts receivable and traffic system.

Prophet Systems will be present with its new Version 5 automation system with Live Show interface that can run up to 14 stations from one system. Among other

DAD 486dx digital audio delivery system.

Register Data Systems (RDS) will premier its PhantomLite digital audio automation system for use with simple satellite or live-assist operation along with its Traffic for Windows traffic and billing system. RDS will also demonstrate its Phantom digital audio automation system along with the System 6 and 7 DOS-based traffic and billing systems.

New on display from **AEV RSL** will be its Virtual Radio radio automation system.

Computer Concepts will be showing its new product, Maestro, which integrates music, commercials and copy into station operations. Computer Concepts will also display the DCS hard disk audio storage, digital audio cart replacements, a computer newsroom system and traffic and billing program.

The DigiCenter 2.0 will be introduced by **International Tapetronics Corp. (ITC)**. Version 2.0 integrates MPEG Layer II files with DigiCenter's linear file format, increased networking capacity and new CD jukebox interfaces. Also new from ITC is News 2.5 with additional text editing features and extended file management. ITC will also display the DigiCenter virtual console and PD Mate schedule simulation software.

Radio Systems will display its Digital Delivery System (DDS).

On display by **A.E.Q.S.A.** will be its MAR system automation on hard disk.

The Scheduler, a broadcast automation and scheduling system integrated with D-Radio system, will

be introduced by **ABC-Digital**. The company will also demonstrate its D-Cart multi-user digital audio recording, editing and playback system as well as its D-Radio integrated digital on-air system.

The new PowerSat downlink control system that will be displayed by **Dalet** uses a satellite's data channel to transmit explicit orders and textual information. Dalet will also display its broadcast automation system that integrates live assist, walkaway and multitrack production on one network.

Sonic Science will demonstrate its new Sonic Search sound effects and music management system that enables users to search manufacturers' libraries, select and play effects, control a digital audio workstation (DAW) and transfer sound digitally to a selected position and track.

Broadcast Electronics will exhibit the AudioVault digital studio system.

DCM Inc. will introduce DCM for Windows 95 and Windows NT.

Adirondack Software Corp. will debut the Multi Event Scheduling System, a desktop program for scheduling employees and administering benefits, which is designed exclusively for the broadcast communications industry.

Arrakis Systems will debut Digilink 4 and exhibit Digilink 2 and 3.

Columbine JDS Systems Inc. will launch Paradigm, the Program Control program management system; the Comparagraph Plus market information system; the MultiMedia Reach & Frequency Windows-

based multimedia sales presentation and Quality Works qualitative data access system. The company will also show BIAS, Columbine and JDS/2000 Sales & Traffic Systems; Sales Analysis; Master Control Automation; Program Scheduler and Accounting/Finance systems.

Grey Matter Response Inc. will demonstrate the new Mezzo Media Collaborator software, a project-based management of on-line data for multi-room facilities and networked studios. The system features intelligent tracking of projects while editing, broadcasting of incremental updates to project subscribers, and server capabilities for managing gigabytes

of data. Mezzo Media Archiver software for backup and archiving of digital media projects will also be on display.

MediaTouch will introduce new touch-screen technology, including Background Record, which offers cherry-picking of multiple satellite feeds and automated recording; MediaDisk IV, which enables simultaneous record and play and improved cut management; and Virtual OpLog, featuring multiple studios under complete control and simultaneous access of audio files and logs. The company will also show OpLog, with all audio sources accessible through touchscreen; MediaTouch Voicetracking, featuring the production of automated dayparts; and the UltraTools log generation tool, which can interface with any music or traffic software.

Everything from traffic and billing to music management, hard disk storage and recording will be on hand.

features, Version 5 includes drag-and-drop of commercials and songs, audio source management, quick record and macro buttons.

The AXS digital hard disk storage and control system will be demonstrated by **Electric Works**. AXS has new modules that cover the requirements of any broadcast or audio operation and can handle live, live assist, satellite, CD and hard disk music for news/talk and specialty formats.

TM Century will present the EDS CoStar digital audio storage system and will also have its Ultimate Digital Studio digital audio management system on hand.

Smarts Broadcast Systems has included a true live mode on current versions of its Smartcaster software. The feature allows a user to independently start, stop and fade multiple audio cuts played by the system.

The TS35 digital radio automation system will be displayed by **Tiesseci**.

New from **Radiomation** is release 8 of its Traffic program and updated versions of its News and Management and Information systems.

The Premier traffic and billing system designed to meet the needs of duopolies and major market stations is a new product that will be displayed by **Custom Business Systems Inc. (CBSI)**. Also featured by CBSI will be its Classic and Elite traffic and billing systems and its InterAcct accounting system.

Enco Systems will be demonstrating the

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FM TRANSMISSION

Shopping for the Best in FM Technology

As the radio consumer becomes more demanding for quality sound, station competition to achieve the best possible signal is also escalating. Manufacturers at NAB '96 will be present with their established and newest lines of FM transmitters and related equipment to help broadcasters provide their listeners with the best sound possible.

Davicom Technologies will be presenting its established line of FM antennas, low-power circulators and low-power filters.

FM transmission lines, switches, combiners and related RF equipment are being displayed by **Dielectric Communications**.

Broadcast Electronics is bringing its line of FM transmitters and accessories to display.

The FMST-1/FMS-2500 transmitters designed for low-power FM broadcasting are being demonstrated by LPB.

The Digit FM exciter will be displayed by **Harris**.

The new HF1000 power amplifier with two power supplies, MOSFET technology and multiprocessor with protection control and command options is being showcased by **Elenos**.

Crown is introducing its FM 500, a 500 W FM solid-state transmitter as well as its FM 1 nearcast transmitter and FM

receivers/translators. **Crown** will also show its line of integrated solid-state FM transmitters.

T.E.M. S.p.A. will be present with its new 1 kW FM transmitter. Also on display are the company's solid-state FM transmitters from 20 W to 1 kW.

Continental Electronics is displaying its complete line of FM transmitters.

New from **GEC-Marconi Communications** is a low-power FM transmitter as well as its L-Band Eureka 147 DAB transmitter system. GEC-Marconi will also be showing its Band III Eureka 147 DAB transmitter systems.

CEMTYS will be demonstrating its

new 5 and 10 kW FM transmitters along with its regular line of 150, 300 and 500 W compact transmitters.

New single-tube, grounded-grid, high-power FM transmitters from 15 to 30 kW will be displayed by **Energy-Onix**.

Nautel Maine will be on hand with its new FM10 solid-state, 10 kW, all-digital FM transmitter and NE50 digital FM exciter with AES/EBU digital interface. Nautel is displaying its FM4 solid-state 4 kW FM transmitter as well.

Comark Communications Inc. will exhibit its line of FM transmitters from 30 W to 10 kW. **Bird Electronic Corp.** is presenting its new air-cooled dry load resistors and will also demonstrate its Thru-line wattmeters, high-power loads, attenuators and filters.

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World Radio History

Station competition to achieve the best possible sound is escalating.

The new Mozart digital FM stereo generator will be displayed by **DB Electronica Telecomunicazioni S.p.A.** along with its line of FM transmitters/excitors and FM microwave links.

QEI is bringing its Quantum high-power solid-state FM and Quantum "E" series low-power transmitters and its FMQ series single-tube FM transmitters, 695 and 675B excitors, 691 modulation monitor and 710 digital stereo generator.

New from **Inovonics** is the model 630 tunable, single-channel relay receiver, a professional FM receiver for FM translator service. The 630 features selectable IF bandwidth, carrier-loss and program-loss alarms, multipath meter, auto-mute and auto-blend. Inovonics is also displaying its FM stereo generators along with its processor generator combinations, FM modulation monitor and RDS/RBDS encoder and decoder.

CCA Electronics is showing its line of FM broadcast transmitters to 65 kW and its complete line of RF systems. **OMB America** will debut its new 1 kW solid-state FM amplifier and modulation monitor. OMB brings back its line of radio transmitters rated up to 15 kW and antennas.

CTE International will introduce the MOD.VL3000, a 3 kW FM radio solid-state amplifier featuring modular construction and the MOD.VL62 60W premium-quality FM radio transmitter, available with built-in stereo encoder or for mono/MPX audio signal. CTE will also exhibit its established line of FM transmitters, STL equipment and antennas.

Larcant-TTC Inc. will be on the floor with the FMS4000 4 kW solid-state FM transmitter, the FMS500 500W solid-state FM transmitter, XL10FM FM translator and Model X1-30W exciter/transmitter.

AUDIO PROCESSING

Processors for Digital and Analog Shine

A mixture of radio-oriented digital and analog processing products — from digital recording to transmitters to microphones — will be showcased at the 1996 NAB convention.

Apogee Electronics will show its AD-1000 conversion system, featuring the UV-22 process, offering 20-bit resolution. Other features include an ADAT interface, DA1000E A/D and mic preamp. Available in software version: MasterTools.

Dan Dugan Designs will unveil the D-1 mic processor for control of multiple mics. The D-1 features the company's gain-shifting algorithm that provides instant cross-fades without gating. The Model D auto-

matic mix controller will also be shown.

BSS plans full demos of its OMNIDRIVE signal processing system. Orban's new Optimod FM-2200, an affordable-priced system, will be of interest to small stations. The unit features eight presets, two-band processing with HF enhancement and all-digital stereo encoder/generator.

Harris will show the S-23EXT mobile digital/analog production uplink systems as well as the DCR1000 digital audio console and systems from Orban and others in its display.

Modulation Science will highlight its MYB-2 StereoMaxx spatial image

enlarger and CP-803 composite processor. Cutting Edge Technology will present the Unity 2000i FM and Unity AM broadcast processors. The FM processor includes RDS capability.

Solid Electronics Laboratories will feature its DCP-1 FM composite processor. Superscope/Marantz will show the Philips IS5022 and IS5021 digital sound processors.

Symetrix will highlight its 528 voice processor, which also works as a microphone preamp, de-esser, compressor/limiter, EQ and voice symmetry alignment. Established products include the 620 A/D for studio DATS, CD players, etc.

Aphex Systems' patented Tubessence has been added to the Model 109 parametric EQ and the Model 661 compressor/limiter. The Model 107 mic preamp also will be presented. Benchmark Media will introduce the AD2004 quad 20-bit A/D as well as show its existing products: the System 1000 modular DA and processing package.

Lexicon will show its new 300L digital effects system that supports the LARC remote controller. Also new from the company: the Pitch FX card for the PCM 80 and the PCM 90 digital reverberator. Klark Teknik will introduce its 300 and 400 Series of EQs.

New from Tiessecci will be the company's new DigiMod broadcast audio processor and its MX 77 stereo enhancer. Innovonics will feature its full line of FM and AM processing products.

STL Connects Remotes to Good Results

As radio stations take their shows on the road more frequently, getting a clean signal from the remote location has become a priority. Manufacturers of studio-to-transmission link (STL) equipment will display many new products to meet those important needs.

General Microwave Services Inc. will introduce 6 and 7 GHz 1 W transmitters and 6 and 7 GHz receivers.

Dolby Laboratories will debut its DSTL Digital Studio-to-Transmitter Link system.

A new line of high-fidelity audio modules will be on display from Intraplex. The modules have AES/EBU digital transport capability that allows broadcasters to feed AES/EBU digital audio over the company's STL PLUS digital STL system and stay all digital, end to end.

QEI Corp. will launch the Quick-Link II spread-spectrum digital STL/TSL/RPU system. QEI will also exhibit the Cat-Link digital STL/TSL system.

J.N.S. Electronic Industries Pty. will introduce the DRFL-700 series digital microwave link. According to the company, the DRFL-700 uses two-thirds less channel space than current digital systems.

CTE International will be present with its line of STL equipment for both audio and video applications.

Irte S.p.A. is debuting its array of microwave links and accessories for radio and TV.

Marti Electronics will be introducing its Smarti telephone frequency extender that sends full broadcast-quality sound over standard dial-up phone lines. Marti will also introduce its new family of frequency-agile remote pickup transmitters and receivers for all U.S. and export bands. Additionally, Marti is displaying its established line of discrete and synthesized composite STL systems.

Moseley Associates Inc. is introducing its digital STLs for RF, TI/EI along with its new remote pickup links and digital remote broadcast equipment.

OMB America will be on hand with its line of radio and TV links.

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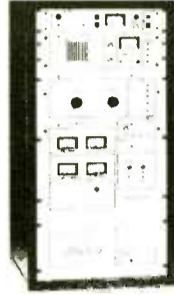
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ANTENNAS, TOWERS

Antennas, Towers Stand Tall at NAB

There is never a shortage of new products and services on the NAB exhibit floor, and it is no exception from the manufacturers of broadcast antennas, towers and associated lines.

A review of those companies that supplied information to RW include **Andrew Corp.**, which will display the new dual HMD antenna along with the ALPac antenna and tower system. The company also will show a new 2.4 meter SNG antenna.

Micro Communications will show new high-power FM multiplexers, a FM broadband dipole antenna, a FM switchless combiner and coaxial transfer switches.

Scala Electronics will exhibit a series of FM antenna systems, as will **Kathrein-Werke KG** and **Sira Sistemi Radio**.

TRW Lighting will display FAA-approved and ETL-certified aviation obstruction lighting.

Stainless will be at NAB promoting tower design, fabrication, construction and maintenance. The company also will inspect and provide structural analysis of existing towers and conduct field operations for antenna installation, repair and maintenance.

From **Will-Burt** will be the new Night Scan ENG lighting unit for directing a powerful wattage under 20 seconds. The company also will exhibit pneumatic telescoping masts from 20 feet to 134 feet to elevate antennas and cameras.

Antenna Concepts will introduce the LPSaver and Ultra Tracker, along with showing a range of low- to high-power directional and omnidirectional broadcast antennas.

SWR will show high-power and low-power FM antennas, and associated equipment for which the company is well known.

Doty-More Tower Service, a full-service broadcast communication tower maintenance company, will promote its range of RF services including Naptex RF protective clothing along with RF analysis and troubleshooting, and RF mapping.

Shivley Labs will show the Model 6832 broadband FM antenna and its range of traditional systems for radio.

As its names states, **Clark Wire & Cable** will have products including the MINK* jacketed cables.

Belden Wire & Cable Co. will display a variety of new products including 9913A high-flex coax cable, which the company said provides the lowest cost of any flexible RG-8/U type cable on the market.

Phasetek will promote a motor-driven detuning system and high-power switching system, with its existing line of antenna phasing equipment.

From Italy, **ABE Electronica SpA** will promote a line of antennas and microwave equipment.

Central Tower has a comprehensive range of antennas, filters, combiners, rigid line and components.

On display from **Kintronic** will be weatherproof medium-wave dummy loads for quick installation for outside new high-power contractors, along with associated gear.

Lightning Eliminators and Consultants will promote its existing line of lightning protection and prevention products and related services including Dissipation Array, Chem-Rod Grounding Electrode, Spline Ball Ionizer

and AC/DC Power Surge protection.

Davicom Technologies will exhibit FM antenna systems and site monitoring systems.

New on display from **Coaxial Dynamics Inc.** will be terminating RF liquid/air loads.

Dawn Satellite Inc. will introduce a Foxcom satellite fiber link, which allows satellite dish antennas to be located away from receivers. The company will also exhibit a Coversat snow cover for satellite dish antennas and a motorized inclined orbit tracking satellite downlink.

In addition to showing its omni and directional FM antennas, lambda mounting

systems, towers, filters and combiners, **ERI** will debut the CP-11 series low-power, circular-polarized antenna, a low-weight wind-load FM antenna available in pressurized or nonpressurized options with an input power to 2 kW. The company will also introduce the Lightning Dissipation Spur, which offers the cost advantages of a rod.

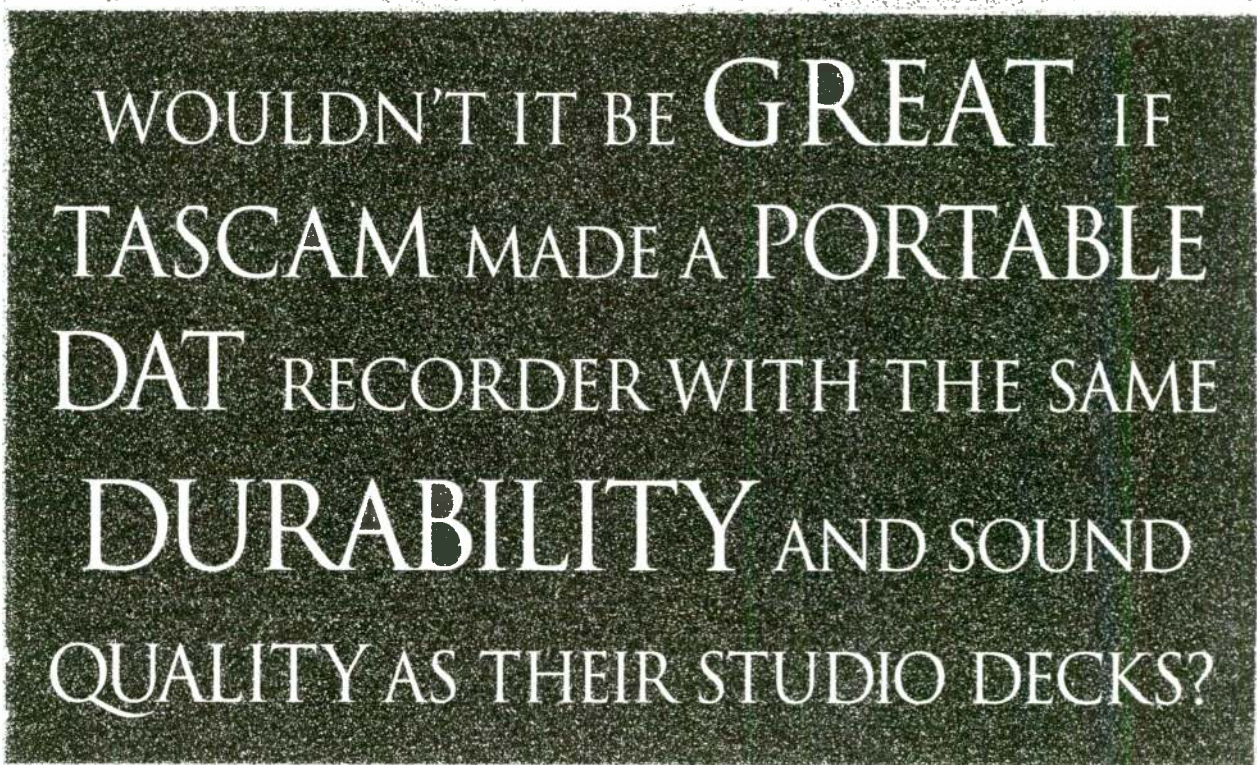
Jampro Antennas Inc. will exhibit new HDTV antennas and dual-mode UHF/VHF antennas. Also on display will be JUHD-UHF panel antenna, a JTW slot antenna, frequency-matched tower sections, waveguide, rigid transmission line, filters and combiners.

Kline Towers will introduce a prototypical

transmitter facility design, developed and copyrighted by Thomas G. Crowder, AIA, of ARCHITEKTUR. The design uses the latest advances in ice protection and component-style construction, allowing Kline Towers to now provide a complete turnkey transmitter site. The company will also display guyed and self-supporting towers for broadcasting and communications.

New on display from **LDI Communications** will be antennas manufactured by Alan Dick & Co., for HP or CP operation stations; and towers for both guyed and self-supporting applications, up to 2,000 ft.

MYAT Inc. will exhibit its complete line of rigid coaxial transmission lines, systems, components and accessories, including 7/8-inch 50 ohm through 12-inch 100 ohm; patch panels; power dividers; and test quality adapters for EIA and DIN standards.



It's here. The TASCAM DA-PI. The ideal portable DAT for field recording in broadcast applications.

You need a durable and high-quality DAT recorder for your team to take into the field. You'll get higher quality digital audio, plus be able to dump it to a digital audio workstation for quick and easy editing. That's why TASCAM makes the DA-PI. It has the features demanded by broadcast professionals. Things like XLR-type MIC/LINE inputs with phantom power so you can use a wide range of microphones and input devices. A 20dB pad, and a versatile, easy-to-read display. But field reporters and production personnel will love the DA-PI's extended life 2-hour battery that recharges in just 1 1/2 hours.



If you can get the DA-PI back from your field personnel, you'll find it performs outstanding in the studio, too.



With a built-in SPDIF direct digital I/O, it integrates with DAWs, and other digital gear. Also, it supports multiple sample rates (48 kHz and 32 kHz) and utilizes next-generation A/D and D/A converters delivering studio-DAT quality sound.

Standard accessories include a shoulder belt, AC adapter and battery — carrying case optional.

So if you're torn between a new recorder for the field, or a DAT for the "B" suite, think no more. Pick up a DA-PI. You get the best of both worlds. In fact, once you get your hands on a

DA-PI, you may want to buy two. So get to your dealer today and order your new portable DAT from TASCAM.

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PRODUCT SERVICES

Libraries: It's a Jingle out There

If it's a jingle you need or a music library you're looking (and listening) for, check out the wide assortment of these goodies on the NAB '96 exhibit floor.

The **Production Garden** will offer a crop of new products, including "Tune Ranch," (volumes 1-10), which is largely acoustic and features Nashville players. The company will also show a new collection of contemporary CDs featuring a variety of music styles: In Your Face tracks, Real Rock, Urban Rave and Worldbeat. New Manchester Music volumes, Hip Hop and Acid Jazz, Worldbeat and Dance round out the list of the company's new products.

Also at The Production Garden booth will be the Broadcast Series 100 library with more than 2,000 tracks and the AV/Video Series 200 library of longer-length themes.

To search for, organize and locate all your effects in seconds, **Gefen Systems** will feature its new M&E Pro SFX production music locator database. Gefen will also feature its M&E Windows SFX and production music locator database for Windows, and the Digifffects SFX sound effects library.

The **Aircraft Production Music Libraries** will touch down at NAB '96 with its AirCRAFT Music Library 75+ CDs and updates, along with new products to complement this library. These new items include Co-Pilot, which customizes the company's AirCRAFT Music Library, and Connecting Flights, which are lists printed inside the cover of each CD that suggest other CDs with similar styles in the AirCRAFT library. The American Music series will also be on display.

In the **Sonic Science** booth you will find a host of established products alongside the company's new sound effects

and music management system. This system enables users to search manufacturers' libraries, select and play effects via a CD auto-changer; control digital audio workstations; and transfer sound digitally to a selected position and track.

The other Sonic Science products to be displayed include the Dynamic Range two-CD library, The Works 10-CD col-

Check out the assortment of goodies on the NAB '96 exhibit floor.

lection of recordings of mechanical and electrical sound produced by machinery, the digitally recorded Foley Footsteps collection, the Sonic Source Music Library 10-CD collection of 500 original compositions, and the Sonic Source CD-ROM Music for Multimedia two-CD collection of royalty-free production music.

Anyone who has experienced a hard drive crash will appreciate **Halland Broadcast Services'** new Hitdrive service — custom playlist music, preloaded on a digital hard drive or on new magneto-optical (MO) noncrashable drives, holding up to 700 songs per drive.

Halland will also feature its CD music libraries for oldies, '70s Gold, AC, CHR and country formats.

TM Century will introduce its EDS CoSTAR digital audio storage system and A-Ware Music Master music scheduling software. The Dallas-based company will also feature its new Country House Band promotion library.

In addition to these new items, TM Century will display its Ultimate Digital Studio digital audio management system,

GoldDisc music format on CD and HitDisc weekly CD updates, as well as jingles and production libraries.

Manhattan will meet Las Vegas as **Manhattan Production Music** unveils its new Apple Trax music library, covering the latest music trends and targeting a younger corporate audience. The company will also showcase its distinctive

libraries, including timeless specialty music, classical music and sound effects.

Killer Tracks will be looking to knock you out with its new Tunebuilder self-edit-

ing software system, which allows the user to specify the exact length of music required. Another new Killer product will be the Atmosphere Music Library, comprised of 70 diverse CDs for use in broadcast or nonbroadcast productions.

The company will also feature its 85-CD Killer Tracks Music Library, the 21-CD Killer Tracks Classics Classical Library, the 25-CD NJJ Library and the 33-CD BMG Scoring Library, all of which clients can license individually, or from which clients can choose to create a custom package.

A deluge of new products will greet you at the **River City Sound Productions** booth. The company will display its Broadcast series of buyout production music. The CDs feature song-length music followed by 60-, 30-, 15- and 10-second edits. Categories on each disc include Sports, Mellow, Country, Rock, Hi-Tech, Atmospheric, Urban and Miscellaneous. The company's Specialty Series features discs dedicated to specific musical styles, including Weddings, Nature, Country, Mellow, Christmas, Sports, Classical I (orchestral) and Classical II (solos and duets).

Network Music Inc. will demonstrate its new Presentation Audio-Spike and Glide Production Elements Library, a 12-

CD production library, with music volumes 149-152 and sound effects volumes 72-73, as well as its Presentation Audio five-CD-ROM audio library for PC-based operations, as well as the new Private Label division.

Visitors to the Network Music booth can also check out the company's 150-CD Production Music Library, the Trakfinder CD-ROM catalog, the Network Sound Effects Library, the Network Classical Library, the Shock Wave for ear-opening production elements, the Brainstorm Library and the Primrose Music Library of Italian music.

TRF Production Music Libraries will introduce its new music library containing instrumental combinations ranging from full symphony orchestra to small groups and single instruments. All discs in the library are recorded, mixed and mastered digitally. TRF will also feature a large collection of broadcast production music libraries.

Stop by the **Match Production Music** booth and see what strikes you. The company will showcase its new Jinglefile Series library, composed in standard advertising lengths, the Producer Series multipurpose, fully interactive CD library, the Broadcast Box CD box of more than 1,400 cuts and the Power FX sound effects series library. The Match Production Music Library will be featured as well.

"Simply the Best" is what you will find at the **Non-Stop Music Library** booth as the company demonstrates its 1996 version of this CD. Non-Stop will also feature new categories of music and more CDs.

Audio Action will offer just that with its new extensive and diverse production music library. Other libraries to be displayed include Koka, Kosinus, Josef Weinberger, SoundStage and No Boyfriend Music.

Promusic will display its production music and sound effects library of more than 1,300 CDs, offering diverse musical styles.

Other companies that will feature libraries and related products include **Omnimusic** and **FirstCom Music**.



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EAS, RDS

Shop for EAS, RDS Gear

It is time to get ready for the future — specifically Jan. 1, 1997. That is when stations must have their Emergency Alert Systems (EAS) in place. Be sure to check out the freshly certified EAS equipment on display to make your shopping easy.

TFT Inc. has several certified EAS components to display and this year TFT can provide pricing. Check out its EAS 911 encoder/decoder, the EAS 930 multimodule receiver; the EAS 940 program/transmitter interrupt unit; and the EAS 941 remote control/status module for EAS 911. **Bradley Broadcast Sales** will also have TFT's EAS products on display.

Gorman-Redlich Manufacturing Co. will introduce its brand-new EAS encoder/decoder this spring. Gorman-Redlich will also have its line of NOAA weather radios on hand — a good companion for EAS.

The Federal Communications Commission encouraged the use of radio broadcast data systems (RBDS)

with the new EAS. **Sage Alerting's** ENDEC for EAS is fully compatible with RBDS and will be on display at the **Harris Corp.**, broadcast division booth.

Several other purely RBDS products will be on display as well. **Modulation Sciences Inc.** will have its established line of RDS/RBDS generators, receivers and monitor/analyzers.

Circuit Research Labs (CRL) Inc. will debut its RDS/RBDS receiver for LED motion sign control and exhibit its established SC-100 RDS/RBDS generator with pager.

Belar Electronics Laboratory Inc. will display its line of RDS/RBDS monitors.

Nokia Paging is introducing the FM 10 RDS Data Receiver. Nokia's receiver receives RDS messages via commercial FM network and decodes them.

Last, but by no means least, **Inovonics Inc.** will be showing its RDS/RBDS encoder and decoder at its booth.

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The DCR1000 is old news, but the Magneto Optical drive is recent and the street price of the rewritable diskettes has declined by more than 65% **to under \$9.00.** MO disks are now substantially less than any other rewritable media including the MiniDisc which sells for about \$15.

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World Radio History

MICROPHONES

Stepping Up to the Mic at NAB '96

Refinements and new designs in mic technology by a number of manufacturers will be on exhibit at this year's NAB show as well as the return of classic models.

As wonderful as the new digital studio technology is, no company has come up with a direct digital larynx-to-console interface ... yet. Which is why microphones are such an important element of the studio. Without one, there can be no voice transmission.

Long-established mic manufacturers have not been sitting quietly. Sennheiser will debut the MKE104 condenser, a cardioid lavalier mic with a removable capsule. This joins the HMD25-1 headset

combination, with HD25 headphone and supercardioid mic.

Audio-Technica's new lineup will include the AT4041 transformerless studio capacitor microphone, the Quad Mic multi-element boundary mic and AT8446 pop filter. New wireless systems will include the 16-channel ATW-7174 UHF wireless, ATW-1237 VHF with handheld mic/transmitter and three new 1100 series VHF wireless systems.

Electro-Voice will roll out the RE1000 studio condenser mic (companion to the RE2000), the RE200 true condenser probe mic, the CO2 ultra-miniature omni lavalier mic, the CT30

boundary mic for table miking and the 635L "long neck" dynamic mic based on the company's classic 635. All join the established line of RE series mics, including the RE27N/D and RE38N/D.

AKG will return to the NAB this year with its full line of professional microphones and headphones, including the D230.

Sanken Audio Systems will debut two new products: the CSS-5 shotgun stereo microphone and the COS-11 lavalier mic, in addition to classic mics now made by the company.

The established mics in the Shure line include the VP64 broadcast mic and the SM7 and SMB1 studio microphones.

The line will expand this year with the addition of Shure's LX wireless mic systems and the SCM810 automatic mixer with IntelliMix circuitry and high RF-resistant circuitry.

Harris Corp. will return to the NAB show with the Russian-made Oktava; the large-diaphragm condenser mic that drew a lot of attention at last year's show. Mic processing from Orban, Audiotronics and others will also be on display.

Group One Ltd. will introduce the Soundlux tube microphone, joining other products from KRK, Uptown and the new Focusrite Blue 245 A/D converter.

Sony Electronics will exhibit its extensive line of precision microphones for studio recording and broadcast use. Last fall in New York, Sony demonstrated its mics in a soundproof isolation booth; watch for it to possibly reappear this year at NAB.

Schoeps/Posthorn Recordings will debut the CMBI battery-powered microphone body. This device accepts 15 different capsules and can be used with wireless transmitters or portable DAT recorders. For stereo recording, the CCM 8 miniature figure-8 mic that mounts on existing shotgun microphones will be on display.

beyerdynamic will return to the NAB with its established line of broadcast mics and the U600 UHF wireless system. New this year will be a Windows-based computer monitoring system for the U600 and U700 wireless mic systems, featuring user logging and an antenna placement walk-around program.

Telex Communications enters the NAB show this year with the new ENG/UT 500 UHF broadcast wireless receiver, joining the company's wired and wireless microphone and intercom lines.

Lectrosonics Inc. will introduce its QUAD195 and QUADBOX multichannel UHF wireless mic systems and UDR200 synthesized UHF receiver. Also on display will be a full range of ENG and EFP wireless microphones, automatic mixers and signal processing.

Micron Audio Products will display the new SQN Series IIIa portable stereo location audio mixers, to join the company's existing line of wireless mic systems and Tram mini-lavaliers.

Microphone processing is available from companies like Aphex Systems, which will display its model 107 mic preamp with Tubessence. The company also will introduce the model 109 Tubessence parametric equalizer and 661 Tube compressor/limiter.

The model D-1 live mic processor will be introduced by Dan Dugan Sound Design. This automatic mic processor/gain controller rides gain and cross-fades multiple mics without gating. It is patchable to a mixing console to take advantage of high-quality mic preamps and individual channel EQ.

Studer will roll out a number of new products including the D19 Series of mic and line preamplifiers.

Mic accessories from Redding Audio include the company's established Rycote Windshield Systems with synthetic fur for wind attenuation and mic support and isolation. New from the company, Rycote Softie Windjammers for camera mounting of microphones.

To get signals from the mic to the studio, Clark Wire & Cable will introduce MINK* jacketed cables. For audio use, this will be available as the MINK4 microphone quad cable.

HHB Communications Ltd. will exhibit Coles microphones.

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MCA Music Media



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DMP Records



Ronnie Montrose
Recording Artist



Pat Weber
Engineering



Chaton
Recordings



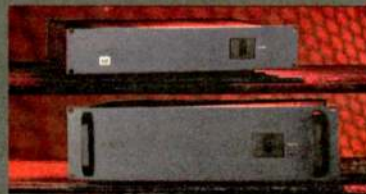
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See Us at NAB Booth 2016

Conference Schedule

Saturday, April 13

1 - 2:30 p.m. To Web or Not to Web? Planning a Corporate Internet Strategy
NAB MultiMedia World Conference
Rooms 101/102, Sands

IMA Multimedia Boot Camp: Part I The Basics
NAB MultiMedia World Conference
Rooms 105/207, Sands

1 - 5 p.m. Tying Together Pieces in the Digital Plant
NAB Broadcast Engineering Conference
Rooms N109/N110, LVCC

3:30 - 5 p.m. IMA Multimedia Boot Camp: Part II — Technology Issues
NAB MultiMedia World Conference
Rooms 105/207, Sands

The Role of Graphics in Interactive Media: Part I — Management Strategies for the Real World
NAB MultiMedia World Conference
Rooms 101/102, Sands

Sunday, April 14

9:30 a.m. - 12 p.m. DAB: U.S. and Worldwide Planning - Part I
NAB Broadcast Engineering Conference
Rooms N109/N110, LVCC

1 - 2:30 p.m. The IMA Multimedia Boot Camp: Part III - Marketing/Distribution Issues
NAB MultiMedia World Conference
Rooms 105-207, Sands

Interactive Media Design Strategies
NAB MultiMedia World Conference
Rooms 101/102, Sands

The Role of Graphics in Interactive Media: Part II - Design Strategies for the Real World
NAB MultiMedia World Conference
Rooms 103/104, Sands

1 - 5 p.m. DAB: U.S. and Worldwide Planning - Part II
NAB Broadcast Engineering Conference
Rooms N109/N110, LVCC

2 - 3:15 p.m. BCFM Financial Workshop #1
Joint Radio/TV Management Conferences

2 - 4 p.m. Small/Medium Market Idea Swap
Joint Television/Radio Management Conferences
Rooms N239/N241, LVCC

3:15 - 3:45 p.m. BCFM Reception

3:30 - 5 p.m. Multimedia Title Authoring Strategies
NAB MultiMedia World Conference
Rooms 101/102, Sands
Asset Protection for New Media Content
NAB MultiMedia World Conference
Rooms 103/104, Sands

3:45 - 5 p.m. BCFM Financial Workshop #2
Radio Management Conference

4 - 5:30 p.m. Radio's Opening Reception
Radio Management Conference
RAB Sales & Marketing Conference
Rooms N238/N240/N242, LVCC

Monday, April 15

10:30 a.m. - 12 p.m. Digital Audio Implementation
NAB Broadcast Engineering Conference
Rooms N109/N110, LVCC

Broadcast Ownership - New Rules; New Opportunities
Broadcasters' Law & Regulation Conference

FCC Enforcement - A Fine Plan
Broadcasters' Law & Regulation Conference

11 a.m. - 12:15 p.m. Management Techniques for Success
Radio Management Conference
Rooms N235/N237, LVCC

Radio & The Internet: Into The Future
Radio Management Conference
Rooms N239/N241, LVCC

12:30 - 1:45 p.m. New Technologies in Plain English
Radio Management Conference
Rooms N235/N237, LVCC

In Search of New Dollars
Radio Management Conference
Rooms N239/N241, LVCC

1 - 5 p.m. Datacasting Technologies for Radio
NAB Broadcast Engineering Conference
Rooms N109/N110, LVCC

2 - 4 p.m. Avoiding Libel, Privacy & Related Problems On-air
Broadcasters' Law & Regulation Conference

2 - 3:15 p.m. Revised Obligations and Rights
Broadcasters' Law & Regulation Conference

Under Your Nose: Bringing Out The Best In Your Staff
Radio Management Conference
Rooms N235/N237, LVCC

Making Your Production Department a Profit Center
Radio Management Conference
Rooms N239/N241, LVCC

2 - 4 p.m. EEO
Broadcasters' Law & Regulation Conference

3:30 - 4:45 p.m. Powerful Promotions
Radio Management Conference
Rooms N235/N237, LVCC

From "Been there, done that," to "Wow, let's do it!"
Radio Management Conference
Rooms N239/N241, LVCC

3:30 - 5 p.m. Interactive Training Systems and Methodologies
NAB MultiMedia World Conference
Rooms 101/102, Sands

DVD and DVD-ROM: The Next Wave in Multimedia Publishing
NAB MultiMedia World Conference
Rooms 103/104, Sands

6 - 8 p.m. NAB MultiMedia World Reception

NAB MultiMedia World Conference
Exhibit Hall Foyer, Sands

Tuesday, April 16

7:30 - 8:45 a.m. Policymakers' Breakfast
Broadcasters' Law & Regulation Conference
Rooms N245/N247 LVCC

9 - 10 a.m. NAB MultiMedia World Keynote Address
NAB MultiMedia World Conference
Rooms 105-107, 205-207, Sands

9:30 - 10:30 a.m. Radio: The State of Industry Sales
Radio Management Conference
RAB Sales & Marketing Conference
Rooms N235/N237, LVCC

9 a.m. - 12 p.m. Transitions: The Path From Analog to Digital
NAB Broadcast Engineering Conference
Rooms N113/N114 LVCC

High-Quality RF for Radio
NAB Broadcast Engineering Conference
Rooms N109/N110 LVCC

Introduction to Data Communications
Data Networking and Telecommunications Conference
Rooms 201/202, Sands

Executive Seminar: Digital Data Broadcasting Business
Rooms 111-112, LVCC

10:30 - 11:45 a.m. Political Broadcasting - A Radio Update: Broadcasters' Law & Regulation Conference

continued on next page ▶

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Tax Reform School Broadcasters' Law & Regulation Conference

Radio Music Licensing Broadcasters' Law & Regulation Conference

10:30 a.m. - 12 p.m. NAB MultiMedia World Plenary: CEO Perspectives NAB MultiMedia World Conference Rooms 105/207, Sands

10:45 a.m. - 12 p.m. The New Retail Paradigm Radio Management Conference RAB Sales & Marketing Conference Rooms N235/N237, LVCC

How to Lead, Mentor and Motivate Radio Management Conference RAB Sales & Marketing Conference Rooms N239/N241, LVCC

12 - 1:30 p.m. Radio Luncheon Radio Management Conference RAB Sales & Marketing Conference Barron Room, Las Vegas Hilton Ticket required.

1 - 2:30 p.m. Managing the Media in Multimedia NAB MultiMedia World Conference Rooms 101/102, Sands

How to Differentiate Your Web Site With Multimedia Objects NAB MultiMedia World Conference Rooms 105/207, Sands

Virtual Reality in the Real World: Applications That Work NAB MultiMedia World Conference Rooms 103/104, Sands

1 - 5 p.m. Radio Facilities Design: Radio's Missing Digital Link NAB Broadcast Engineering Conference Rooms N109/N110 LVCC

2 - 3:15 p.m. Contests, Lotteries, Promotions and Casino Gambling Ads Broadcasters' Law & Regulation Conference

Layering Architecture: TCP/IP Data Networking and Telecommunications Conference Rooms 201/202, Sands

2:30 - 3:45 p.m. The Truth About Cable Radio Management Conference RAB Sales & Marketing Conference Rooms N235/N237, LVCC

Body, Mind and Sales Radio Management Conference RAB Sales & Marketing Conference Rooms N239/N241, LVCC

3:30 - 5 p.m. FCC Chairman's Forum Broadcasters' Law & Regulation Conference Understanding Your Role in the CD-ROM Title Food Chain NAB MultiMedia World Conference Rooms 103/104, Sands

Industry Update: PC-based Open Architecture NAB MultiMedia World Conference

Wednesday, April 17

9 - 10:15 a.m. DAB - A Turn Away from Localism Broadcasters' Law & Regulation Conference

9 a.m. - 12 p.m. Radio and Television Technical Regulatory Issues NAB Broadcast Engineering Conference Rooms N109/N110, LVCC

Evolving Telecommunications Technologies: ATM, Frame Relay, Cellular, PCS and ISDN Data Networking and Telecommunications Conference

Rooms 201/202, Sands 9:30 - 10:45 a.m. Negotiating To Win Now Radio Management Conference Rooms N235/N237, LVCC

Applying 4x4 Management Instead of 2x4 Radio Management Conference Rooms N239/N241, LVCC

10:30 a.m. - 12 p.m. International Investing Opportunities in European and U.S. Media Broadcasters' Law & Regulation Conference Developing Multimedia Content for Data Broadcasting NAB MultiMedia World Conference Rooms 105/207, Sands

Managing Interactive Creative Teams: Confessions of the Veterans NAB MultiMedia World Conference Rooms 103/104, Sands

10:30 a.m. - 1 p.m. Broadcasters in Cyberspace - Untangling the Web Joint Broadcasters' Law/TV Management/Radio Management Conference Rooms N238/N240, LVCC

11 a.m. - 12:15 p.m. Mining The Gold In Event Marketing Radio Management Conference Rooms N239/N241, LVCC

Marketing Radio with State/Market/City Associations Radio Management Conference Rooms N235/N237, LVCC

12 - 2 p.m. Engineering Luncheon NAB Broadcast Engineering Conference Barron Room, Las Vegas Hilton Ticket required.

1 - 2:15 p.m. Everything You Ever Wanted to Know About Managing People

Radio Management Conference Rooms N239/N241, LVCC

Computers, RadioLink, The Internet And You Radio Management Conference Rooms N235/N237, LVCC

1 - 2:30 p.m. The Good News from the Broadband Services Trials NAB MultiMedia World Conference Rooms 101/102, Sands

Advertising & Marketing with Interactive Media NAB MultiMedia World Conference Rooms 103/104, Sands The Future of On-line Content: Consumer Services and the Internet NAB MultiMedia World Conference Rooms 105/207, Sands

2 - 3:15 p.m. Special Events Management Primer - Planning Success and Avoiding Suits Broadcasters' Law & Regulation Conference

AM/FM Station Upgrades Broadcasters' Law & Regulation Conference

2:30 - 3:45 p.m. 1990 Selling: The New Super Sophisticated Selling Radio Management Conference Rooms N239/N241, LVCC

Media Targeting 2000: Radio's Great New Sales Tool Radio Management Conference Rooms N235/N237, LVCC

3:30 - 5 p.m. Roundtable Discussion: Will Success Destroy the Internet? NAB MultiMedia World Conference Rooms, 101/102 Sands

Point Counter-Point: What Future Set-Top Devices Should Do NAB MultiMedia World Conference Rooms 103/104, Sands

4 - 5:15 p.m Subcarriers - Leases, Money and Opportunities Broadcasters' Law & Regulation Conference

6 - 8 p.m. Ham Radio Operators Reception NAB Broadcast Engineering Conference Las Vegas Hilton Ballroom C

Thursday, April 18

9 - 10:30 a.m. Internet Commerce: Security Issues and the Public Trust NAB MultiMedia World Conference Rooms 101/102, Sands

Case Study Applications of Distanced Multimedia: Education & Collaboration NAB MultiMedia World Conference Rooms 103/104, Sands

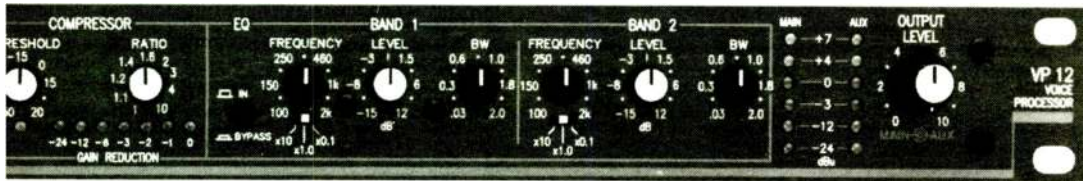
9 a.m. - 12 p.m. Radio On-line: Internet Applications NAB Broadcast Engineering Conference Rooms N109/N110, LVCC

9 a.m. - 4 p.m. Radio License Renewal Seminar Registration for this seminar is separate. Radio Management Conference

MOUTHTRAP

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P U R I T Y B Y D E S I G N

Please Don't Call It A Fish Finder!



Pictured above is Dennis Greben, manufacturing manager at Radio Systems. As you can probably guess from the snapshot: when he's not supervising the production of consoles, clocks, DAs, and digital systems, he's out on his boat. (He's pictured here with his "Penn Yan Sport Fisherman" which he personally completely refurbished over a period of 30 months.)

But, to get to the point: two years ago, when Dennis saw the first prototype of the trademark Cart Emulator Interface for the DDS Digital Delivery System, he unceremoniously announced, "Hey that looks kinda like one of the **Fish Finder** sonar units I want for my new boat!"

The name stuck. Despite all of our marketing efforts and rave product reviews from major markets, people still call it a "Fish Finder."

The truth is: the Cart Emulator is actually a custom, sophisticated, exclusive broadcast control surface for the Radio Systems DDS Digital Storage System which is the only digital audio system built on a UNIX-style, real-time, multi-user operating system, it's the only platform that can simultaneously support dozens of our custom cart emulators for live operation, touch screen and windows CRT applications for live assist, and automation and traffic applications.

It is absolutely no good for finding fish.



Radio Systems DDS Cart Emulator Interface



Radio Systems DDS Digital Delivery System

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See Us at NAB Booth 3517 & 5809

Circle (69) On Reader Service Card

World Radio History

TEST AND MONITORING

Check Out Test and Monitoring Gear

Manufacturers of testing, monitoring and remote equipment will debut many new products for monitoring and controlling both analog and digital systems.

Davicom Technologies Inc. will show MAC 16/32, its new site monitoring system for RF communications. The system sends alerts via phone, computer, pager or fax, and can monitor up to 16 analog inputs, 32 digital inputs and 16 audio inputs and control up to 32 relays.

Audio Precision will launch its System Two Dual Domain audio analyzer featuring an Intervu digital interface analyzer for AES digital signals. The system tests analog and digital audio devices, generates and measures signals in both domains and tests the AES interface, including jitter and eye pattern, according to AES3. Established products from Audio Precision will also be on display.

Modulation Sciences will exhibit the FMMM-2 FM modulation monitor, RDS/RBDS monitors/analyzers and FM modulation monitors.

An all-new series of analog-reading loudness meters will be launched by **Dorrrough Electronics**. The new microcontroller-based design features no calibration, precise display, sum and difference detection and peak hold and is drift-free. Dorrough will also show its new "Big LED" giant audio meters and the Model 40-A2, a new software version of the standard Model 40-A. Dorrough also will bring established products, including AES/EBU digital meters and the Model 1200 Stereo Signal Test Set.

In addition to its new EAS products, **TFT Inc.** will show established monitors, including the model 850 BTSC TV stereo

aural modulation monitor and the model 855 SAP/Pro channel monitor.

Tektronix Inc. will launch its AM700 audio measurement set and TG2000 signal generation platform, a multiformat analog and digital precision signal instrument. Look for established Tektronics monitors, including the 764 digital audio monitor and the WFM90/91 handheld monitor.

Radio Design Labs (RDL) will exhibit the ACM-2 amplitude component monitor.

In addition to showing its line of level meters and phase indicators, **Wohler Technologies** will introduce alarm systems that identify audio error conditions and locations; horizontal level meters from one to eight full range (analog or digital) in 1RU; and AES/EBU 1U (50 dB) or 2U (90 dB) digital level meters.

Wireworks Corp. will display cable testers for every application.

Logitek will debut the VU-TRAX vertical audio meter line. Established products from Logitek include the Bright-VU, Super-VU and Ultra-VU horizontal bargraph LED meters in rackmount and desktop enclosures.

The established true VU meter systems will be on display by **Benchmark Media Systems Inc.**

Established products from **Asaca/ShibaSoku Corp. of America** will be on display, including the AM51A two-channel audio generator/analyzer.

Whirlwind will be giving away \$89 cable testers to booth visitors throughout the show. Also on display from Whirlwind will be mixers, amplifiers, splitters, cable and connectors.

Delta Electronics Inc. will exhibit impedance bridges, ammeters, generators,

AM stereo exciters and monitors, a splatter monitor, coaxial switches, sampling toroids and a pulse reflectometer.

Digital antenna monitors for AM directional arrays will be on display by **Gorman Redlich Mfg. Co.**

Holiday Industries Inc. will introduce the HI-3702 induced current meter.

Established products on display by **QEI Corp.** will include the 691 modulation monitor and the 710 digital stereo generator.

J.N.S. Electronic Industries Pty. will exhibit the 8000 system, "Frame," a modular system with the new RFM-8323 FM receiver module, DTM-8552 FM composite monitoring module and 8310B 10x1 matrix switcher.

Inovonics Inc. will launch the model 630 tunable, single-channel "relay" receiver - a professional FM receiver for FM translator service that features selectable IF bandwidth, carrier-loss and program-loss alarms, multipath meter, auto-mute and auto-blend.

Gentner Communications Corp. will debut the GSC-3000 site control system, which is a Windows-based, networkable and expandable remote control system for broadcast transmitters and other sites.

Pulizzi Engineering Inc. will unveil the microprocessor-based IPC 3300 series for monitoring and programming up to 2,000 ports remotely from one telephone line. The system operates as a standalone or a master/slave in a local area network

(LAN) of up to 250 IPCs, each having a maximum of eight ports for a total of 2,000 controllable outputs. Pulizzi will also launch the microprocessor-controlled RS-232 remote power on-off intelligent systems, which provide individual outlet control via an RS-232 port.

Burk Technology will show its established line of transmitter remote controls.

Moseley Associates Inc. will be on hand to introduce its new remote pickup links, digital remote broadcast equipment and transmitter remote controls.

Standard Communications Corp. is introducing its Windows-compatible software that, used in conjunction with the CAM830 module, provides computer remote control of all features and functions of the Agile Omni Global VU satellite receiver.

Leader Instruments Corp. will be on hand to demonstrate its new LV 5100D digital/analog component waveform monitor and LT 425D digital component 525/60, 625/50 generator. Leader is also showing its DSO and analog oscilloscopes, frequency counters, RF generators and audio test equipment.

Hewlett-Packard will be introducing additions to its family of MPEG testing products.

A full line of FM, AM and shortwave modulation monitors, frequency monitors, RDS/RBDS monitors, FM rebroadcast receivers and digital stereo decoders will be on display by **Belar Electronics Laboratory Inc.**

Coaxial Dynamics Inc. will be demonstrating RF test and measurement equipment and filters.

TELCO, TELECOM

Plenty of Products to Call on for Telco Needs

Telco equipment manufacturers will launch a wide range of products at NAB '96.

Gentner Communications Corp. will debut the ET 10 room conferencer, a small, full duplex audioconferencer that works with analog or digital phones. Gentner will also display the TS612 multiline phone system with screenwair call screening software, a full line of digital telephone hybrids, teleconferencing products, patchbays and a distribution amplifier. Broadcasters General Store Inc. will also display the Gentner TS-612 phone system.

Telos Systems will launch the Link system for connecting phone lines to intercoms; One plus One dual hybrid; and Call Screen Manager software for talk show production.

The new SMARTI telephone frequency extender from **Marti Electronics** sends full broadcast-quality audio over standard dial-up phone lines. Marti's new family of frequency-agile remote pickup transmitters and receivers will also be shown. Look for the company's complete line of cables and accessories for Marti products.

New products on display from **Clear-Com Intercom Systems** include the Tel-1000 auto-nulling telephone interface for Party-Line and Matrix intercom systems, TW-20 two-way radio intercom interface and Windows 95 programming software for the Matrix Plus II intercom. The company will also display P1-Pro party-line intercoms; two- to 12-channel stations with linking features; ICS-92 nine-key programmable intercom station; XPI-12, -22 expansion panels with electronic LED labels that add 60 keys to Matrix Plus II; and the AB-100 on-air announcer's console.

Fidelipac Corp. will introduce a Telephone Interface module as one of three options for the company's Dynamax MXE series console.

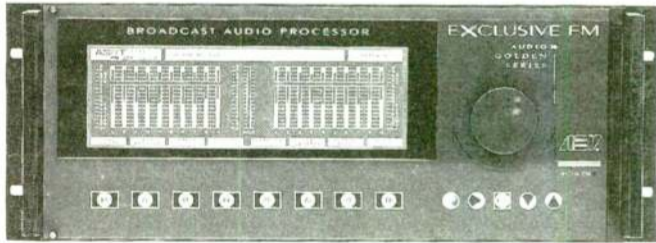
BSW-Broadcast Supply Worldwide will display PhoneByte.

Cellcast Inc. will show the RBS-400 remote broadcast unit, which utilizes cellular technology.

R-Columbia Products Co. Inc. will launch the MS/PW-22 single-channel, portable Intercom Main Station/Control Console with a built-in Fail-Safe power supply.


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SOURCE GEAR

Studio Source Equipment Abounds at NAB '96 Show

As always, broadcasters are constantly searching for new studio source equipment, monitors, headphones and accessories to make their studios as easy and efficient to work in as possible. Equipment to fill a broadcaster's every studio need can be found at NAB '96.

Apogee Electronics Corp. will be on hand with a number of different A/D and D/A conversion systems and accessories. Apogee will also show its DAT media along with its Wyde Eye line of bulk and preconfigured cable.

DIC Digital is demonstrating its DAT media and cleaners along with recordable CDs, 4mm DDS-MRS data cartridges and 8mm data cartridges.

A Type III tape degausser approved by the Department of Defense to purge Type I, II and III magnetic media with coercivities of up to 1700 Oersteds including 8mm, 4mm, S-VHS and DLT will be introduced by **Data Security Inc.** The company is also displaying its established line of bulk tape degaussers.

Denon Electronics will introduce its

DN-1100 MD recorder/player with 10 independent Hot Start buttons to which any 10 tracks can be assigned. The company will also debut the DN-610F CD/cassette combo deck and the DN-045R MD replicator for digital-to-digital dubs. Additionally, Denon is showing its DN-995, -990, -981, -961 and -951.

DGS Pro Audio is introducing its channel identification system for Deltron XLRs and 1/4-inch plugs along with halogen-free installation cable by **Gotham Audio**. Also on display by DGS will be Deltron XLRs, 1/4-inch plugs, RCAs and midis and Gotham microphone cables.

Bradley Broadcast Sales is introducing Denon's DN-1100 along with the Sony TCD-D8 portable DAT recorder and **360 Systems'** Instant Replay with 16-hour storage.

Established products being displayed by

Studio Technologies Inc. include the IFB Plus series of mobile talent cueing systems along with its line of professional audio products.

Symetrix will be on hand to introduce its 610 Broadcast Audio Delay for eliminating profanities and unwanted comments on live or taped conversations and will also demonstrate its 528E voice processor.

Wegener Corp. is debuting the V-Room sound isolating modular broadcast booth and its quadratic diffuser panel.

Radio Systems will display its Digital Delivery System (DDS).

Tascam will be introducing its DA-38 multitrack recorder along with the 564 digital portastudio.

Audio Technologies Inc. will be present to introduce a number of new studio source accessories along with an established line of products.

Studio mastering tapes and digital media will be displayed by **BASF Magnetics Corp.**

Fidelipac Corp. is debuting the MO version of the Dynamax DCR series digital cartridge machine and will also feature **Murphy Studio Furniture**.

360 Systems will be displaying its Instant Replay and DigiCart/II hard disk digital audio recorders.

Otari Corp. is introducing the UFC 24 universal digital audio format converter. Otari will also demonstrate the MR10 MD recorder/player; the CDC-600 dual drive, 360-capacity CD changer; MX-50II two-track tape recorder; and the DTR90T time code DAT recorder.

Illbruck Inc. will display its Sonex acoustical materials for the complete sound treatment of radio, audio recording and video studios.

Fostex Corp. will debut the D-80 rack-mount hard disk recorder with a removable/removable front panel and the CX-8 ADAT compatible digital multitrack recorder. Fostex will also display its studio time code DAT recorders and the PD-4 portable time code DAT recorder.

Clark Wire & Cable is showing new and established lines of cables and connectors for remote and studio applications.

Group One Ltd. will introduce the KRK powered monitors along with its 245 A/D 20-bit converter.

Broadcast Supply Worldwide will display the 360 systems Instant Replay.

Various products and services for recorder care and head reconditioning, including new DAT head reconditioning, will be demonstrated by **Sprague Magnetics Inc.**

Studer will be on hand to introduce its D424-2 stereo MO recorder and the second generation D741 CD recorder.

Industrial Acoustics Co. Inc. is introducing its high performance modular studios complete with diffusion and appropriate acoustics. The new construction features a deeper panel system to obtain good low frequency attenuation.

AKG Acoustics will be displaying its full line of professional headphones.

A full line of speakers and sound reinforcement equipment will be on display by **JBL Professional**.

Sony Electronics is debuting its 14-inch Evergreen display evaluation monitor and standalone evaluation monitor along with the SMS-1P monitor speaker with built-in amplifier.

beyerdynamic is demonstrating the DT 200 series monitoring headphones/headsets.

Electro-Voice Inc. is displaying its Sentry and S series of studio monitors.

Major-League Pitch Control.



Whether you need your music high and tight or low and slow, the Marantz PMD320 and PMD321 CD players are certain to brush you back. That's because the PMD320 and PMD321 can change the speed and pitch of CDs. Which is pretty remarkable for CD players.

For instance, they're perfect for adjusting the pitch of soundtracks to match the vocal range of performers. Or changing the tempo of music to match choreography. And that makes them invaluable to everyone from choral directors to DJs to aerobic instructors.

Both models are pro-level CD players. With features such as a fader start trigger, an all-metal 2U rackmount chassis, (and on the PMD321, a cue-to-music feature and balanced XLR outputs) you simply can't find something comparable in a consumer retail store. Plus, their outright versatility and convenience is simply unmatched.

So when your music needs a major-league change-up, count on a major-league CD player: Marantz.

Both the PMD320 and PMD321 Pitch Control CD Players offer:

- ±12% pitch control in .1% increments.
- CAL key for quick speed calibration.
- Fader Start Trigger input so an engineer or DJ can start a track simply by bringing up the associated fader.
- All-metal 2U rackmount chassis.
- 32X oversampling and 4th-order noise shaping.
- Cue and review keys for audible searching.
- Connection to the Marantz CD-R system via the IEC958-II digital interface for convenient digital copies of both music and track information.
- 10-key direct track access.
- Optional wired remote control, RC-5 bus for IR or third-party remote.

The PMD321 adds:

- Cue-to-music feature for starting a track from the first bit of musical information, rather than at the pause or subcode start points.
- +4 dBu balanced XLR outputs.

marantz

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Katz Finds Working Women Listen Longer

NEW YORK Radio advertisers will find a study by Katz Radio Group quite interesting. It reveals that working women listen to the radio more hours than both women in general and nonemployed women. And helps quantify how much.

According to the study, radio is heard by 98 percent of all women who work. Katz reports that during the week, employed women listen for two hours more than all women and almost four hours more than nonemployed women.

To do the study, Katz randomly chose 40 Arbitron Spring 1995 markets to evaluate including 10 from the top 25 markets and 10 each from markets 25 to

50, 50 to 100, and 100 plus. Then Arbitron Maxi\$er data for working women, nonworking women and all women was compiled for the 18+ and 25 to 54 demographics for major dayparts.

The study stresses the importance of women to advertisers. Of the 102 million women age 16 and older, 57 million are employed according to Katz. Seventy percent of women between the ages of 20 and 54 work.

The study compares listening times for working women and all women during

middays and morning and afternoon drives.

During morning drive time, working women listen to the radio for 38 minutes more than all women and nearly an hour more than nonemployed women according to the study. That is 11 percent more than all women and 18 percent more than nonemployed women. Middays and afternoon drive time numbers reveal similar trends.

Working women outlistened all women by one hour and 35 minutes or 21 percent in middays.

They outlistened non-working women by almost three hours — 46 percent — during the same time.

In afternoon drive, employed women listen 25 minutes longer — nine percent more — than all women. The study found working women listen 58 minutes longer — 24 percent more — than nonemployed women during afternoon drive.

“Working women are key consumers, and radio is a perfect medium to influence their purchasing decision,” said Katz Research Specialist Don Jones. “The number of working women will continue to grow, and we feel that they will be the prime consumers in the next century.”

98 percent of working women listen to radio.

We Design Reliability

SWR products and services continue to surpass industry standards. We offer new systems as well as provide service and upgrades on existing ones. Stations all over the world depend on SWR technology to meet broadcasters' needs.

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World Radio History

NAB Booth 1123-1126



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| 3CX3000F7 | 5CX1500B |
| 3CX10,000A3 | 572B |
| 3CX10,000A7 | 5U4G |
| 3CX10,000H3 | SV6550C |
| 3CX15,000A3 | 6AS7G |
| 3CX15,000A7 | 6BM8 |
| 3CX15,000H3 | 811A |
| 4CX250B | 833A |
| 4CX250BC | 833C |
| 4CX250BM | EL34 |
| 4CX250R | SV811-3 |
| 4CX350A | SV811-10 |
| 4CX350AC | TH5-4 |
| 4CX400A | TH5-6 |
| 4CX800A | TH6-3 |
| 4CPX800A | TH6-3A |
| 4CX1600A | YC130/9019 |
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NAB Booth 1123-1126

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AM TRANSMISSION

AM Equipment Makes Strong Showing

The upcoming presidential election is certain to spur a new batch of radio talk shows in addition to the shows that will be gaining new listeners looking for the latest campaign news and debate. With so many of these shows on the AM band, broadcasters are surely trying to produce the clearest signal possible to keep up listenership. NAB '96 will provide broadcasters with a look at a large array of the latest AM transmission equipment and technology to ensure the best possible signal.

Altronic Research will introduce the model SW77300, a shortwave band, 300 kW, air-cooled dummy load and model

3500W, a digital calorimetry system installed in a 5 kW heat exchanger for frequencies from 60 Hz to 800 MHz. The company will also exhibit the 6700 series of air-cooled loads and digital calorimetry for air-cooled dummy loads.

In addition to showing established AM transmitters and accessories, **Broadcast Electronics Inc.** will debut the rack-mounted, AM-1, solid-state 1 kW AM transmitter.

LPB Inc. will launch AM-30/AM-60/AM-100 transmitters that serve PSSA/PSRA and backup applications and are also AM stereo-compatible.

Harris Corp. will exhibit the DX

series 10 and 50 kW digital solid-state MW transmitters and the Gates 5 MW transmitter.

Thomcast will debut the RCA solid-state AM transmitter line, from 5 to 50 kW in 5 kW steps.

A complete line of AM/FM transmitters will be on display by **Continental Electronics Corp.**

Established products on display from **Delta Electronics Inc.** will include impedance bridges, AM meters, generators, AM stereo exciters/monitors, a splatter monitor, coaxial switches, a pulse reflectometer and sampling toroids.

CEMTYS will introduce a 5 kW solid-

state transmitter and a 10 kW solid-state transmitter.

Nautel Maine Inc. will debut the XL12 and XL60 12 kW and 60 kW solid-state AM transmitters. The company will also show the ND5 solid-state 5 kW AM transmitter.

New products on display from **Omnitronix Inc.** will include the OMNI-500I 500 W AM broadcast transmitter and OMNI-100SW 1000 W solid-state tropical band shortwave transmitter. Omnitronix will also show the OMNI-100A 1000 W AM broadcast transmitter and the OMNI-25KW 25,000 W AM broadcast transmitter.

Bird Electronic Corp. will show new air-cooled dry load resistors and the established Thruline wattmeters, high-power loads, attenuators and filters.

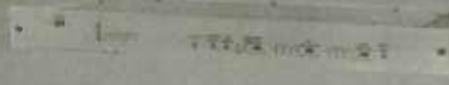
CCA Electronics will exhibit AM

AM, RADIO-DATA AND MEASUREMENT PRODUCTS


An all star cast...

Combining stellar performance with down-to-earth value for more than 20 years.


222




510




710



530



"TVU"



222 Asymmetrical AM Low-Pass Processor

Guarantees US "NRSC" compliance, or is available in several versions for international medium- and short-wave service. Combines compression, peak control and adaptive pre-emphasis.

530 Off-Air FM Modulation Monitor

Tunable Mod-Monitor gives accurate measurement of total mod., pilot injection, stereo separation, etc. The peak flasher, metering and alarms may be remotely located.

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.

"TVU" On-Screen Audio Level Display

Our unique "TVU" places stereo audio level metering on the TV monitor screen. Indispensable for teleproduction, cable head-ends, video duplicators. May be switched between VU and PPM measurement characteristics; image may be positioned anywhere in the picture.

NAB Booth 1300

Radio/Audio Hall

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Broadcasters
are surely trying
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possible.

broadcast transmitters to 100 kW and complete RF systems.

An extensive line of power tubes will be on display from **Svetlana Electron Devices**.

Communications & Power Industries will exhibit a wide range of tubes including microwave power tube products and traveling wave tube products.

Richardson Electronics will display power tubes, capacitors, camera tubes and studio products.

Established products on display by **Econco** will include high-quality rebuilt power tubes and Klystrons for radio and TV transmitters.

ADC Telecommunications will be on hand with what it calls the first single-channel fiber transmission system that supports more input signal options than any other digital transmission system available.

Comark Communications is bringing its new line of AM medium-wave transmitters along with its established line of 5 - 2000 kW AM transmitters.

**Don't Miss our
Complete NAB '96
coverage coming up:**

**May 15
NAB News Coverage**

**May 29
NAB Product
Coverage**

Move Up from Carts to Touchscreen Digital Audio

Play Anything...At A Touch

The best way to improve your radio station is to put all your spots, sounders and sweepers **on-line** and **ready to play instantly** from hard disk. Creative talent sounds better than ever with **Scott Studios'** new touchscreen digital audio system.

Here's how it works: Six buttons on the left of the large computer touchscreen play what's on your log. Scheduled spots, songs, promos, PSAs and live scripts come in automatically from your production studios, traffic, music and copy computers. Jocks can revise sweeps at a touch (with the arrows at mid-screen), or work with the full day's log and add or rearrange anything.

On the right, 17 "hot keys" start or fade **un-scheduled** jingles, sounders, effects, comedy or promos **on the spur of the moment**. Your morning show will benefit from 26 sets of 17 user-defined instant audio "hot keys".

You can **preview** anything in a cue speaker at a touch. The Scott hard drive even lets you listen to endings **while** that song or spot is playing on the air!

And **nothing** beats the Scott System for easy levels. Touch the label on the screen, moving right to left to fade as desired. If you'd rather adjust levels on the console, channel numbers show clearly on each start button.

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

Phone Recorder On Screen

Touch **one** button and you're recording phone calls to hard disk. Another button and you've got the world's easiest editor. When it's ready, one touch and your call's on the air. The phone recorder only adds \$1,000 to the system.

The Best Digital Audio

When spots, promos, PSAs, or any other digital audio is recorded, they're immediately playable in **all** your Scott System air studios. Nobody wastes time carrying carts down the hall or redubbing spots for additional stations.

One question you **don't** have to worry about with the Scott System is "What if it breaks?" The Scott System comes complete with **every** spot and jingle stored **redundantly** on **two** hard disks. It's a snap to switch to the "hot standby" system! You get touchscreen convenience, digital quality, and backup redundancy for no more money than tape machines and commercial carts.

The World's Fastest Requests!

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 spot, sounder, jingle, promo, PSA or comedy you want and it plays **instantly**. Or, you can put it anywhere you want in the day's schedule.

During play, all Scott screens include large digital timers that automatically count down intro times, and flash warnings 60-, 45-, and 30-seconds before the end. You also get clear countdowns the last 15 seconds of each event.

Instant Songs on Hard Disk

Scott Studios is radio's premier source of high quality music on hard drive. **All your songs** will be pre-dubbed **free**.

Nothing could be faster than requests from the Scott System! You also get five "Wall of Carts" with music that plays at a touch! Songs are shown by title, artist, year, length or category.

The Full Day's Log

Scott Studios lets you see the whole day, and make any changes you want.

See It at WME Booth 935!

The Scott System **leads the industry** with major broadcasters like Capitol Cities/ABC, Group W, Shamrock, Alliance, Salem, Liberty, Saga, Liggett, Regent, Tichenor, Benchmark, Max, Atlantic, and Rawlco in Canada. Scott Systems are in Detroit, D.C., Dallas, Houston, Philadelphia, San Diego, Denver, San Antonio, Ft. Lauderdale, Cincinnati, Dayton, Lansing, Las Vegas, and smaller markets coast-to-coast from Bangor to Bakersfield.

Scott Studios Corp.
13375 Stemmons Freeway, Suite 300
Dallas, Texas 75234 USA
800 726-8877
(800) SCOTT-77

On Air
Screen

Navigator (KDLT)

Track A: 00:04:14 intro: 09
Track B: 00:00:00 intro: 00

All Around The World

11:00:00 -> 11:49:10 00:49:02

A	04'23	All Around The World - Lisa Stansfield	19"
M	04'10	I Wish - Stevie Wonder	T 18"
M	04'29	Set Them Free - Sting	35"
C		START DAT2	
	01'19	[Bottom of the Hour]	
M	00'03	R-r-r-r-Radio.. -	
M	00'45	Casual Furniture -	
M	00'30	Harley Davidson -	
M	00'35	News Call 1 -	
T	00'34	Cancer	
T	00'34	Japan	

"Hot Keys"

Carts

ON

1
Applause

2
Window Crash

3
Roar II

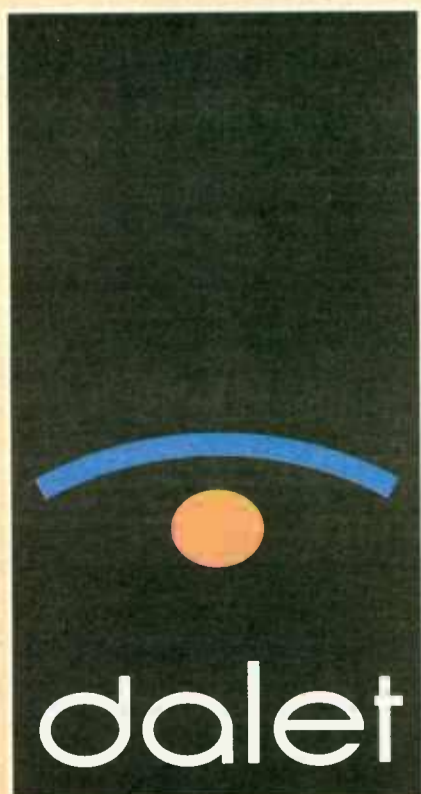
4
Plane & Car Crash

Inflight M

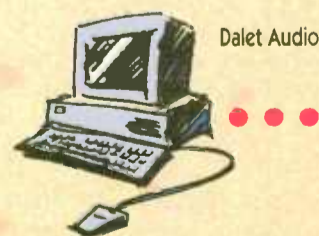
10s 5s 0 5s

All Around The World	I Wish
fade out...> 00:04:108	fade in...> 00:00:000
xfade.....> 00:03:459	begin off...> 00:00:000
end off....> 04:23:280	att. (dB): 1:0

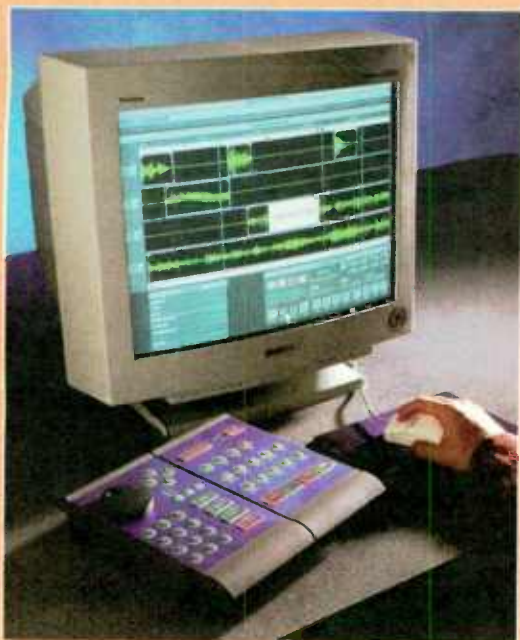
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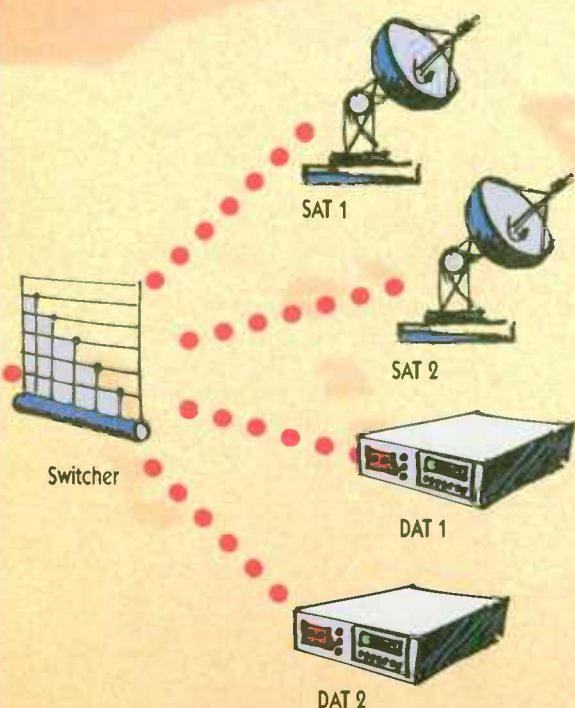
Kerry Fink, GM, Mix 106
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New ISDN Products Lined up for NAB

Audio Processing Technology Ltd. will launch the hardware implementation of the new apt-Q audio coding system, in cooperation with AT&T, which delivers stereo at low bit-rates over a single, direct-dial ISDN or Switched 56 channel. The company will also display the WorldNet range of compatible audio codecs, studio-studio links and remote feeds with units that incorporate the appropriate coding systems for the mobile reporter.

New products on display from **Telos Systems** will include the Zephyr digital audio network transceiver, capable of transmitting bidirectional 20 kHz stereo and audio over a single ISDN line using MPEG

audio Layers III and II. Telos will also debut the Unity 2000i FM and Unity AM broadcast transmission processors, which have Unity Remote Software for processor control from anywhere by modem. **Bradley Broadcast Sales** will show the Telos Zephyr codecs and telephone hybrids.

Digital studio-transmitter links for RF, T1/E1 will be introduced by **Moseley Associates Inc.** Remote pickup links, digital remote broadcast equipment, transmitter remote controls and digital encoder and decoder with ISO/MPEG audio from Moseley will also be on display.

Systembase Ltd. will introduce the C300xr ISDN audio codec, which features an ISDN terminal adapter, keypad and VFD display. Housed in a one-unit-high rackmount enclosure, the C300xr is based on the apt-X 100 coding system and can provide a 7.5 kHz mono link over 64 kbps ISDN channel. Also on display will be the C100xs desktop audio codec, the C100xr rackmount audio codec and the RG two-wire converter.

Dolby Laboratories will launch the DP503 multirate, multi-algorithm digital audio encoder with Dolby AC-2, Dolby AC-3 and MPEG Layer II algorithms and front-panel interface to an ISDN terminal adapter. Dolby will also introduce the Dolby Fax system for sending high-quality digital audio in real time via an ISDN line; the DSTL Digital Studio-to-Transmitter Link system; and the SEU4 Dolby Surround Encoder, now available to customers for \$2,000.

RE America Inc. will debut the RE660 series MPEG Layer II audio codecs; the linear PCM RE8930 audio/data/voice codec; and RE532 and RE533 RDS/RBDS encoders for FM broadcasting and paging applications.

MUSICAM USA will display the FieldFone, the first of a new product category POTS (plain old telephone service) codec. FieldFone takes original audio and converts it from analog to digital, then compresses the digital bit stream to reduce the bit-rate and sends the transmission over one analog phone line to the base FieldFone unit. The base FieldFone unit then decodes the digital transmission, eliminating the need for ISDN lines. Established products on display from MUSICAM will include CDQPrima codecs for radio broadcasters, recording studios, film, voice-over use and satellite operators. **Broadcasters General Store** will show the MUSICAM CDQ220 ISDN codec.

New products on display from **CEM-TYS** will include two- and four-channel audio coders/decoders.

Intraplex will launch a new line of high-fidelity audio modules with AES/EBU digital transport capability. The system allows broadcasters to feed AES/EBU digital audio over the company's STL PLUS digital STL system and stay all digital, end to end. The modules can also work with the company's analog modules. Intraplex will also demonstrate "cost-effective and cost-reducing" transmission solutions for duopoly/LMA applications using T1 lines, as well as the model 4464 digital audio codec.

The broadcast division of **Harris Corp.** will introduce the S-23EXT mobile digital/analog production/uplink system for digital and analog uplinking and digital production. Harris will also launch the S-15 compact SNG vehicle.

Wegener Communications will promote its satellite distribution services for programming and services. **COMSAT**

Corp. will also be on hand at the show.

Windows-compatible software used in conjunction with the CAM830 module will be introduced by **Standard Communications Corp.** The software gives engineers computer remote control of all features and functions of the Agile Omni Global VU satellite receiver. It incorporates a graphical user interface allowing for easy access, control and status monitoring of up to 36 Agile Omni receivers.

The MT830BR/IBR series satellite receiver, an RS-250 certified advanced computer remote controller and video/audio receiver, will also be on display along with the Intercontinental

Digital and analog, long- and short-term global services will also be on display.

MT900 satellite receiver, a low-profile, RS-250 certified, multistandard receiver.

Vyvx Inc. will exhibit its new satellite transmission services and audioconferencing and enhanced fax service.

In addition to showing Telstar 4, **AT&T Skynet Satellite Services** will introduce the Telstar 5 C-/Ku-band hybrid satellite for service to the United States, the Caribbean, Mexico and southern Canada.

Several satellite service options around the globe will be on display from **PanAmSat**. The company plans several launches this year and next including two over the Americas, one over the Indian Ocean and one over the Pacific. They will join PanAmSat's already established satellites — two above the Atlantic region, one in the Pacific region and one above the Indian Ocean region.

GE American Communications will have both its C-band and Ku-band Satellite Service on display. **Intelsat** will introduce its digital C-band and Ku-band SNG service. Intelsat will also show its complete range of digital and analog, long-term and short-term global broadcast satellite services.

Deutsche Telekom will debut an ATM connection transportable over satellite and ATM access to broadcast studio LAN. Digital and analog, long- and short-term global broadcast services will also be on display.

Digital Courier International will exhibit a two-way digital PC-net for delivering CD-quality audio and text cross-country to radio stations, record companies, studios and distributors.

Dalet Digital Media Systems will introduce PowerSat, a downlink control system that uses the satellite's data channel to transmit explicit orders and textual information.

NTL Satellite Services is introducing a joint service platform with Orion that provides digital distribution service to the United States and Europe. **Orion Atlantic, L.P.** will also be talking about its Orion 1 international communications satellite launched Nov. 29, 1994.

In addition to displaying fiber-optic transmission systems and analog routers for audio, **Lightwave Systems Inc.** will debut single-mode converters that allow for transmission distances of 100 kilometers or more. The converters utilize an existing product that operates as multimode.

ENCO Systems Inc. will launch the DADSAT satellite-based store forward controller and exhibit the DAD486x digital audio delivery system.

Nokia Paging will debut the FM 10 RDS data receiver, which receives RDS messages via commercial FM network and decodes them.

On display from **Digital DJ** will be its new high-speed data system for delivering information to high-speed data receivers with display screens that are also AM/FM stereo radios. The company will also launch an FM subcarrier system that datacasts information and graphics to hand-held receivers.

International Datacasting Corp. will debut the DataNet PC Card, a satellite broadcast receiver on a PC card. Compatible with the company's DataNet Data broadcast system, the Card installs in a standard PC ISA card slot and utilizes the PC's power supply and chassis. Data is available directly on the PC Bus or via an optional serial data connector. Data is output at RS-232 and RS-422 levels at rates of 1.2 to 192 kbps. International Datacasting Corp. will also launch EchoCom Plus, a Windows-based package of multimedia data broadcasting software, which is compatible with all the company's satellite communications systems. Established products on display will include EchoCom, the FlexRoute satellite digital audio system and the MPEG Pro satellite digital audio system.

Microwave Radio Communications, Broadband Division, will exhibit the Millennium series radios and antennas for portable and mobile systems used for high-performance electronic newsgathering and outside broadcast.

Portable equipment for the new ENG microwave band and fixed link transmission equipment (Digital Series) will be introduced by **Nucomm Inc.** this year. The company will also exhibit its TPI ENG mobile truck package.

N Systems Inc. (NSI) is introducing its MC5 Version 3 PC-based remote control system for control and monitoring of central ENG receive systems. The Silhouette LP low-windload central ENG receive antenna system and Super Pod SP3 helicopter ENG antenna system with GPS-controlled transmit antenna are other new products making their debut. Both the Superquad central ENG receive antenna system and Silhouette transmit antenna for ENG vans will be displayed.

Gigawave will introduce the MVL series of outside broadcast microwave links capable of up to 300 m remote control via triax cable this spring. Software-controlled local and remote control systems for a range of microwave links and central receive antenna systems will also debut. Established products displayed will include the MTV series of miniature transmission systems and PTV series of portable ENG links.

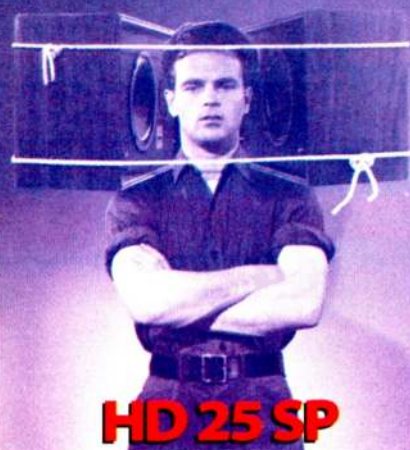
RF Technology Inc. is introducing the ACL series, full-performance heterodyne links covering 1.2-16 GHz and fully digital-capable. The UPL series, broadcast-quality portable transmitters covering 1.2-16 GHz will debut alongside the ACR series, central ENG receiver and SNG-60/140 DT-C/Ku-band analog and digital satellite system.

Established products on display include the D-series of portable transmitters and receivers and the SVX series of analog and digital satellite modulators, exciters and upconverters. RF Technology will also exhibit its fully upgradable central receive remote control system.

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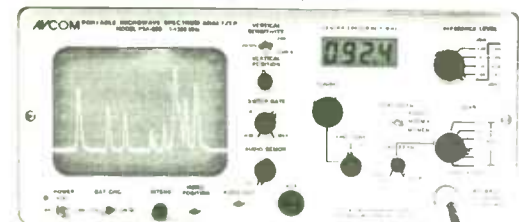
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when either free running or phase-locked to an AES/EBU reference signal.

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360 Systems 1605
Intro: Shortcut, a stereo digital audio editor for quick editing, with a suggested retail price under \$3,000.
Also: Instant Replay, a hard disk digital audio recorder; DigiCar/II digital audio hard disk recorder; AM-16/B audio routing switcher.

A-Ware Software Inc. 1023
On Display: MusicMaster - music scheduling and inventory system. Advanced scheduling algorithm improves average turnover control. Interfaces with many automation and traffic systems. RealTime control room interface also available.

A.E.Q. S.A. 2617
Intro: PME-02 portable mixer; BC-2500 mixing console; BC-300 mixing console.
Also: BC-2000 and BC-500 mixing consoles; MAR system automation on hard disk; TLE-02 portable mixer; TH-02EX MK-II digital hybrid; AM-03 stereo monitor; System-3000 multiconference system; MP-10 portable mixer.

ABC-Digital 3717
Intro: Scheduler, broadcast automation and scheduling system integrated with D-Radio system.
Also: D-Cart, multiuser digital audio recording, editing and playback system. D-Radio, integrated digital on-air system for radio broadcasting.

ABE Elettronica S.p.A. S1844
On Display: Comprehensive range of RF equipment, including microwave links for fixed, mobile and ENG applications; transmitters and translators for VHF bands using solid-state or tube technology; antenna panels and complete arrays, parabolics, multiplexers and accessories.

AccuWeather Inc. 8563
Intro: ULTRA Weather System; AccuNet On-Line; FirstWarn 2000 and 3000.
Also: UltraGraphix-32 Weather System; exclusive

AccuWeather Forecast Service; WeatherShow; AccuData and AccuWeather Fax; Ray-Ban UV Index; AccuWeather radio service.

Acoustical Solutions 8349
Intro: AlphaSorb wall panels and hanging baffles, rigid sound absorbing panels available in custom sizes up to 4 feet by 10 feet in a 1-inch or 2-inch thickness and covered in Guilford fabric with a wide color selection. Class 1 fire-rated, NRC.80; AlphaTec ceiling tiles, 2 feet by 2 feet tiles designed to drop into a standard grid, sound absorbing foam panel mounted against a rigid fiberboard backing. Class 1 fire-rated NRC.75, white, gray, beige in five patterns. Sonex Classic and ColorTec acoustical foams.

Also: AlphaPyramid and AlphaWedge acoustical foams; Sonex acoustical foams; AudioSeal sound barrier; Soundtex fabric wall covering; modular broadcast recording booths.

ADC Telecommunications 10849
Intro: DV6300, which the company calls the first single-channel fiber transmission system that supports more input signal options than any other digital transmission system on the market.

Also: A representation of analog and digital audio and video bays; FL2000 fiber optic patch system; a line of fiber and copper patch cords and components.

Adirondack Software Corp. S1156
Intro: Multi Event Scheduling System, a desktop program for scheduling employees and administering benefits. Designed exclusively for the broadcast communications industry.

ADM Systems Inc. 10318
On Display: Stereo audio consoles, stereo and monaural distribution amplifiers, stereo source selector, mix-minus IFB system, bar graph meters.

AEV SRL 3720
Intro: Excalibur broadcast console; Virtual Radio, radio automation.

Aircraft Production Music Libraries, The 6961
Intro: Co-Pilot, for customizing the AirCraft Music Library; Connecting Flights, printed on the inside cover of each CD, suggest other CDs with similar styles in the AirCraft library.
Also: AirCraft Music Library 75+ CDs and updates; American Music series.

AirWorks Media 3417
Intro: TuneBuilder proprietary self-editing music software, allowing users to automatically create the length of music required for a production; AutoConform, for perfectly synched audio and video; S/Link for the Macintosh, to move digital audio files; TuneFinder, for finding tracks in a music library or group of music libraries.
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AKG Acoustics 7126
On Display: Full line of professional microphones and headphones including the D230.

Altronic Research 3508
Intro: Model SW77300, a shortwave-band 300 kW air-cooled dummy load; model 3500W, a digital calorimetry system installed in a 5 kW heat exchanger for frequencies from 60 Hz to 800 MHz.
Also: Altronic 6700 series of air-cooled loads. Digital calorimetry for air-cooled dummy loads.

AMCO Engineering Co. 6828
Intro: 120-page catalog on enclosures for monitoring applications, featuring the TFBX "sloped monitor" series. Line includes variety of consoles in 19-inch and 24-inch models. Accessories include doors, drawers, shelves, power taps and cooling devices.
Also Enclosures for electronic packaging, including audio and video.

Amek U.S. Operations Inc. 6944
Intro: A working version of the Digital Mixing System, using a 32-bit floating point DSP engine and comprised of a control surface with host Pentium computer, DSP engine, I/O rack and automated crosspoint matrix.
Also Amek Rembrandt music and post production mixing console; Big by Langley, providing the facilities of a large-scale in-line console; Amek/Rupert Neve R.C.M.A. remote controlled microphone amplifier with analog or digital outputs; Amek/Rupert Neve system 9098 EQ, a microphone amplifier, four band equalizer and swept filters.

AMS Neve PLC 6819
On Display: Logic 2 multiformat digital mixing console with optional AudioFile recorder/editor; Capricorn digital console for large scale multitrack recording, mixing and overdubbing; Logic 3 compact digital mixer; 55 Series broadcast analog console.

Andrew Corp. 10857
Intro: Dual HMD antenna; ALPac antenna and tower system; higher power HJ9HP Helix coaxial cable; a new 2.4-meter SNG antenna; type-approved earth station antennas; rectangular waveguides; Shadowmaster translator antennas for wireless cable applications.

Antenna Concepts Inc. 3711
Intro: LPSaver; Ultra Tracker.
Also Full range UHF, VHF, FM low- to high-power directional and omnidirectional broadcast antennas, including panels, dipoles, vertical, horizontal and circular polarization.

Anthro Corp. M4036
Intro: The Anthro Console, designed to support editing stations and other multimonitor systems. Comes with 2 shelves and a keyboard surface, and is available in four color combinations. The Anthro Rack-N-Stack, designed to support and move 19-inch rack equipment and non-racked hardware on the same cart.
Also Rack carts and rack workstation.

Aphex Systems 1808
Intro: Model 109 Tubessence parametric equalizer, suited for applications from the studio to touring sound reinforcement. It includes a mode switch offering either dual or mono four-band equalizer configura-

tions in the same unit; Model 661 Tube Compressor/Limiter.

Also Model 107 mic preamp with Tubessence; Dominator II precision multiband peak limiter; Aphex Airchain.

Apogee Electronics Corp. 1200
Intro: AD-1000 conversion system, a standalone A/D converter offering up to 20-bits resolution. The UV22 process captures detail even for 16-bit systems. Other features include microphone pre-amplification and an ADAT interface. AES and SPDIF inputs can be format converted to ADAT in place of analog sources. DA1000E-20 digital to analog converter, with 20-bit resolution, low jitter clock and a 1 kHz high resolution test oscillator. UV22 processors, allowing information beyond the 20-bit level to be encoded into a 16-bit medium such as CD; Red Book CD compatible; clean audio up to 30 dB into the low (-96 dB) digital noise floor. FC-8 ADAT/DA-88 digital format converter. AD-1000 "Platinum Edition": a complete package containing a fully upgraded AD-1000 plus an FC-8 format converter.

Also MasterTools suite of CD mastering tools for TDM systems such as ProTools; UV-1000 digital mastering system; Wyde Eye line of bulk and pre-configured cables; DAT media.

Arrakis Systems 2611
Intro: Consoles: 22000 Digital; Digital: Digitlink 4; Furniture: DigiLux, major market line.
Also Consoles: 1200, 12000, 22000 Series; Digital: DigiLink 2 and 3, AVCR; Furniture: Modulux and Deskstar.

Asaca/ShibaSoku Corp. of America 10024
On Display: AM51A two-channel audio generator/analyzer.

AT&T Skynet Satellite Services 8013
Intro: Telstar 5 C-Ku-band hybrid satellite for service to the United States, the Caribbean, Mexico and southern Canada.
Also Telstar 4.

ATI Audio Technologies Inc. 8460
Intro: Nanoamp Series BGD200, two channel VU and PPM meters with phase indicator and headphone outputs; Nanoamp Series L200 two-channel line amplifier; Nanoamp Series MXS100 stereo three input mic/line mixer, XPS100 four input mic/line stereo input expander, XPS200 two stereo line level input expander.
Also Vanguard Series broadcast on-air consoles, six, eight and 12 mixer, dual channel stereo; Nanoamp Series portable, rack and deskmount mixers and mixer expanders, battery packs, mobile DC converters, IHF to PRO interfaces, two- and four-channel VU and PPM audio level indicators; Encore series audio distribution amplifiers, precision phono preamplifiers; Microamp series microphone, line buffer, distribution, power and turntable amplifiers, headphone drivers, studio metering systems, System 10,000 modular rack system.

Audio Accessories Inc. 5362
On Display: Audio and video patch panels, pre-wired audio panels, patch cords, project patch, RS-422 units.

Audio Action 8382
Intro: Extensive and diverse production music library.
Also Koka, Kosinus, Josef Weinberger, SoundStage, No Boyfriend Music.

Audio-Cord Corp 1817

Audio Developments Ltd. 2823
Intro: Mercury: two output, dual auxiliary mixer, electronically balanced I/O, MS I/P, O/P and monitor decoders, industry-standard Pico EQ; AD149: two-output, dual-auxiliary mixer, transformer balanced I/O, channel inserts and limiters, MS I/P, O/P and monitor decoders, comprehensive EQ, P+G faders.
Also M-S matrixes: AD066-11 M-S stereo mic amp with separate monitor matrix; AD066-12 line level MS/AB matrix with inserts and monitor; AD081-12 three channel M-S matrix module for 3U Flexilink system. Audio mixers: AD146 four output M-S compatible location mixer; AD148 four output M-S compatible edit calibrated mixer; AD261 M-S stereo ENG mixer; ADO96 compact four meter meter bridge, for AD146 or AD148. Parametric EQ: ADO66-13 Portaflex, two channel, two filters per channel; ADO83 3U/19 inch, three filters/module, up to eight modules per rack.

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Audio Precision 1405
Intro: System Two Dual Domain audio analyzer, featuring Intervu digital interface analyzer for AES digital signals. Tests analog and digital audio devices; generates and measures signals in both domains, plus complete testing of the AES interface, according to AES3.
Also System One, Portable One, ATS-1 audio analyzer for rack mount applications, and Portable One Plus for field and bench applications.

Audio Processing Technology Ltd. 3702
Intro: Hardware implementation of the new apt-Q audio coding system, in cooperation with AT&T, to deliver stereo at low bit rates over a single, direct-dial ISDN or Switched 56 channel; ADK 200, a new range of integrated 16- or 20-bit fully featured digital audio PC cards.
Also WorldNet range of compatible audio codecs, studio-studio links and remote feeds. Units incorporate the appropriate coding systems for the mobile reporter. Also, APT board-level products for audio workstation developers wishing to record, store and replay stereo audio from a PC.

Audio-Technica U.S. Inc. 5646
Intro: UniTools remote-powered in-line microphone accessories; ATW-7174 UHF 16-channel PLL-synthesized wireless system; ATW-1237 VHF wireless system featuring handheld microphone/transmitter with UniPoint condenser element; three new 1100 series VHF wireless systems; AT4041 transformerless studio capacitor microphone; "Quad Mic" multi-element boundary microphone; AT8446 pop filter.
Also AT4050/CM5 and AT4033 studio capacitor microphones; AT4071a, AT4073a, AT815b and AT835 "shotgun" mics; AT-MX341a SmartMixer automatic microphone mixer; ATH-M40 and ATH-D40 closed-back dynamic Precision Studiophones; AT873R UniPoint handheld condenser mic with interchangeable pick-up patterns; COM series combination headphone/microphones; AT825 and AT822 XY stereo condenser mics; AT804 omnidirectional dynamic microphone.

Audioarts Engineering 1611
On Display: Full line of on-air and production consoles.

Audiotronics Inc. 3005
Intro: 2500 MM-10 mini-mixer added to the 2500 Series line and more.
Also 2500 Series audio console system; 210 Series audio console system; 801/851 Series audio console system; 1900 mix-minus system.

Autogram Corp. 3405
On Display: Mini-mix, IC/AC series, Pacemaker and R/TV audio consoles. RP series audio switchers, clocks and timers.

Avcom of Virginia 8480

BASF Magnetics Corp. S2035
On Display: Studio mastering tapes; digital media.

Belar Electronics Laboratory Inc. 2408
On Display: Full line of FM, AM and shortwave modulation monitors, frequency monitors, RDS/RBDS monitors, FM rebroadcast receivers and digital stereo decoders.

Belden Wire & Cable Co. 8883
Intro: 9913A, a high-flex coax cable which, according

to the company, provides the lowest loss of any flexible RG-8/U-type cable on the market; Brilliance Plenum Speaker Cables, highly-flexible, two-conductor open twisted-pair cables.

Benchmark Media Systems Inc. 2320
Intro: AD2004 quad 20-bit A-to-D converter.
Also System 1000 modular DA and processing package; true VU meter systems; microphone preamplifier systems; interface amplifiers; mode controllers; MicroFrame system.

Best Power 8380
Intro: Unity/I three-phase uninterruptible power systems (UPS), range in single-module capabilities from 10 to 220 kW, and may be operated in parallel for total system capacities approaching 2 MW.
Also Ferrups uninterruptible power systems (UPS) delivering no-break computer-grade power to vital broadcast equipment, while providing lightning and surge suppression.

Bext Inc. 3511
Intro: SF 800, SF 1200 (800 W, 1.2 kW MOSFET amplifiers); VHF/UHF amplifiers up to 40 kW.
Also HPL series translators, boosters, exciters; SF series Mosfet amplifiers; FM composite STLs (1.5 to 15 W).

beyerdynamic 6632
Intro: Rackmountable computer monitoring system operating in the Windows environment, offering complete monitoring of the U600 and U700 UHF wireless systems. This unit features a walk test program for antenna location and a user logging file.
Also DT 200 series monitoring headphones/headsets, on-air/broadcast microphones and the U600 UHF wireless system.

Bird Electronic Corp. 4011
Intro: Air-cooled dry load resistors.
Also THRULINE watt meters, high-power loads, attenuators and filters.

Bradley Broadcast Sales 1611
Intro: TFT Emergency Alert System (EAS); Mackie 1202-VLZ mini mixer, Hafler P-1000 power amp, Denon studio MiniDisc with Hot Start, Sony TCD-D8 portable DAT recorder, 360 Systems Instant Replay with 16 hour storage, and Excalibur HA-1 hybrid adapter.
Also Audioarts studio mixing consoles and distribution amps, new DAT machine shootout, Roland DM-800 digital audio workstation, and Telos Zephyr codecs and telephone hybrids.

Bretford Manufacturing Inc. 10969
Intro: Bretford is a communications furniture company offering a complete range of TV mounts, projector screens and multimedia workstations in a variety of colors.

British Information Services S1874
On Display: "Newsbreaks from Britain," a free daily news feature audio actuality service filed by digital ISDN circuit from London to stations/networks in English and Spanish.

Broadcast Electronics Inc. 2601

Intro: Rack mounted, AM-1, solid state 1 kW AM transmitter.
Also OnVault digital studio systems, Mix Trak and Air Trak on-air consoles, AM and FM transmitters and accessories.

Broadcast Store S2913, 6952
On Display: Used switchers, monitors, and accessories.

Broadcasters General Store Inc. 8446, 1617
Intro: MUSICAM USA Fieldfone.
Also Gentner TS-612 phone system and MUSICAM USA CDQ220 ISDN codec.

BSS 7126
On Display: Full line of signal processing equipment including the Omnidrive system.

BSW-Broadcast Supply Worldwide 1400
On Display: Pacific Research & Engineering consoles, 360 Systems Instant Replay, PhoneByte, and Mackie consoles.

Burk Technology 2623
On Display: Transmitter remote control and EAS gear.

Calrec Audio Ltd. 4013
Intro: T Series digitally-controlled production console; Q Series production and dubbing console; S Series production and dubbing console; compact and minimixer modular audio consoles; RQ Series signal processors.

CANARE 5860
Intro: Cable, connectors and patchbays for serial digital video transmission.
Also Star Quad mic cable; cable reels; snake systems; tools; and cable strippers.

CartWorks/dbm Systems Inc. 2826
Intro: CartWorks digital automation and storage system based on Microsoft Windows v3.11 graphical-based operating system and apt-X digital audio compression. Allows for live assist or automation, with networking capability.
Also CartWorks Script

Bob Bure, Sales Mgr. 1375 Beasley Rd Jackson, MS 39206 601-856-9080 FAX: 601-853-9976

CBSI - Custom Business Systems Inc. 3011
Intro: Premier traffic and billing system designed to meet the needs of duopolies and demanding major market stations.
Also Classic and Elite traffic and billing systems and InterAcct accounting system
Marlene Lee, Mktg. Communications P.O. Box 67 Reedsport, OR 97467 541-271-3681 FAX: 541-271-5721

CCA Electronics 3505
On Display: Line of FM broadcast transmitters to 65 kW; AM broadcast transmitters to 100 kW; complete RF systems.

Cellcast Inc. 1524
On Display: Cellcast RBS-400 remote broadcast unit utilizing cellular technology.

CEMTYS 3917
Intro: Audio codecs: two and four channels; SCA generator; 5 kW solid state transmitter and 10 kW solid-state transmitter.
Also Compact transmitters: 150 W, 300 W and 500 W.

Central Tower 1515
Intro: Antennas, filters, combiners, rigid line and components.
Also Guyed towers to 2,000 feet (610 meters); self-supporting to 500 feet (152.5 meters); structural analysis; turnkey projects to include antennas, line and construction. Full service and inspection of existing towers.

Circuit Research Labs Inc. 2008
Intro: RDS/RBDS receiver for LED motion sign control.
Also DP-100 all-digital FM audio processor; SC-100 RDS/RBDS generator with pager; Amigo AM and Amigo FM; Audio Signature; TV audio processing; SAP generator; BAP FM mono or TV processor.

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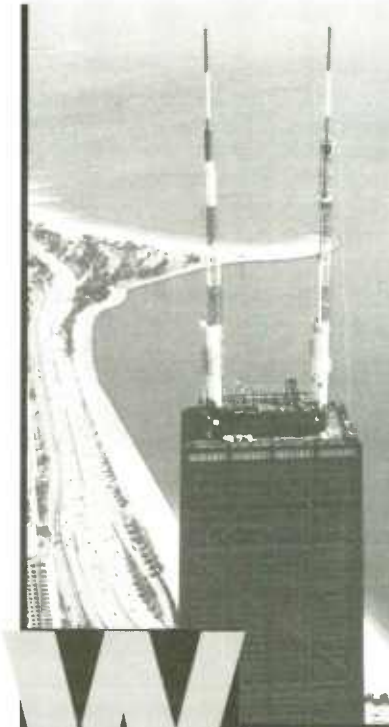
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Clark Wire & Cable S1404, 1414
Intro: MINK[®] jacketed cables, available on the MINK4 microphone quad cable; redesigned TV7559 Triax cable.
Also RCC cables, ideal for remote applications requiring audio, video and even power; Hannay Reel; custom cable assemblies; rack panels; multi-pin connectors.

Clear-Com Intercom Systems 10369
Intro: Tel-1000 auto-nulling telephone interface for party-line and matrix intercom systems; TW-20 two-way radio intercom interface; Windows 95 programming software for Matrix Plus II Intercom.
Also P1-Pro party-line intercoms, two- to 12-channel stations with linking features; ICS-92 nine-key programmable intercom station; XPL-12, -22 expansion panels with electronic LED labels add 60 keys to Matrix Plus II, AB-100 On-Air Announcer Console.

Coaxial Dynamics Inc. 3908
Intro: Terminating RF liquid/air loads.
Also RF test and measurement equipment and filters.

Columbine JDS Systems Inc. 8521
Intro: Paradigm; Program Control program management system; Comparagraph Plus market information

system; MultiMedia Reach & Frequency Windows-based multimedia sales presentation; Quality Works qualitative data access system; TV Works Windows-based sales system.
Also BIAS, Columbine and JDS/2000 sales and traffic systems; Sales Analysis; Master Control Automation; Program Scheduler; Accounting/Finance.

Comark Communications Inc. 7109
Intro: AM medium-wave transmitters.
Also IOX line of IOT transmitters. Thomcast: FM transmitters from 30 W to 10 kW; AM transmitters from 5 kW to 2 MW; DAB transmitters and systems.

Communication Graphics 3905
On Display: Screenprinted decals and bumperstickers.

Communications & Power Industries (formerly a division of Varian) 7131
Intro: K260W Klystron IOT - EIMAC Division; 4CM1000KG - EIMAC Division; 28 GHz LMDS wireless cable amplifier.
Also EIMAC Division: 4CM1000KG; 4CM300,000GA; 4CM500,000G; 4CX250BC; 4CX20,000C; 3CX6000A7/YU-148; 3CX800A7; YU-328; YU-338; YU-339; 8916/4CX24,000A; K260W Klystron in stand with HA-600A hardware; 3CX10,000A7 remanufactured;

4CX3500A; 4CX7500A; 4CX15,000A; 3CX1500A7/8877; 3-500ZG; communications and medical products; SATCOM products; microwave power tube products; traveling wave tube products.

Communications Data Services Inc. 3307
On Display: On-line engineering databases for broadcast engineers. Provide software products and services for radiowave propagation analysis and prediction.

Computer Concepts Corp. 3017
Intro: Maestro, which integrates music, commercials and copy into station operations. Company claims it to be "the cornerstone of all station airplay"; countdown intros and outros, get full music data base info on screen at any time.
Also DCS hard disk audio storage; full range of integrated digital products including digital audio cart replacement, computerized newsroom system and digital multitrack audio production. Traffic and billing for radio and digital integration for TV will also be on display.

Computer Video Production M5234

Comrex Corp. 7009
Intro: Nexus ISDN audio codec with terminal adapter and NT1.
Also DXR.1 and DXP.1 digital audio compression devices; DX200 MusicLine; DX100 mono/stereo apt-X encoding/decoding system; Codec Buddy; Cue System; Basic LXT/R One Line Frequency Extender System; 2X system; Multiline Frequency Extender System; NEXUS ISDN Audio Codec.

COMSAT Corp. 6958

Comtech Antenna Systems Inc. 8350
Intro: Inclined orbit mount in 3.8-, 5.0- and 7.3-meter sizes.
Also 0.9 to 7.3 meter satellite antenna systems; transportable and flyaway antenna systems.

Comunicacion Integral Consuliores S.L. M5165

Continental Electronics Corp. 2605
On Display: Complete line of AM, FM and SW transmitters.

Cooper Sound Systems 1901
Intro: CS 104 "ENG-style" four-channel stereo mixer.
Also CS 106 + 1 Audio Mixer, available with four to seven modular mono/stereo input channels and a comprehensive communications system.

Crouse-Kimzey 1719
On Display: Hospitality area! Cold water, comfortable couch and good conversation!

Crown Broadcast/Crown International 2523
Intro: FM500, a 500 W FM solid-state transmitter; FM receiver/FM translator in 30, 100, 250 and 500 W versions. FM1 Nearcast transmitter
Also Integrated solid-state FM transmitters: 30, 100 and 250 W.

CTE International 2526
Intro: MOD.VL3000, a 3 kW FM radio solid-state amplifier, modular construction; MOD.VL62, a 60 W premium-quality FM radio transmitter, available with built-in stereo encoder or for mono/MPX audio signal.
Also FM radio transmitters, solid-state and tube; STL equipment; power dividers, antennas and associated products.

Cutting Edge Technologies 4023
On Display: Unity 2000i FM and Unity AM broadcast transmission processors, which provide the widest range of processing settings appropriate for every format, according to the company; also, Dividend composite filter for full spectral protection, including RBDS and other SCA signals.

Dalet Digital Media Systems 4007
Intro: Modular keyboards: mix and match with user-definable hot keys, job/scrub wheel, and selection/function buttons; PowerSat: a downlink control system using the satellite's data channel to transmit explicit orders and textual information; Surfer8, an eight stereo track digital editor for radio featuring compression/stretching, EQ, punch-in/out recording.
Also Broadcast automation system integrating live-assist walk-away and multitrack production on one network.

Dan Dugan Sound Design 1901
Intro: Model D-1 live mics processor for control of multiple mics, with Dugan's patented gain-shifting algorithm that instantly crossfades mics without gating. It patches into the insert points of a mixing console, so high-quality mic preamps and individual channel equalization can be used.
Also Model D automatic mixing controller.

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Data Security Inc. 5858
Intro: Type III tape degausser approved by the

Department of Defense to purge Type I, II and III magnetic media with coercivities up to 1,700 Oersted including 8mm, 4mm, S-VHS and DLT.

Also Bulk tape degaussers including MP-14 designed to erase metal particle tape through 2,000 Oersted; TC-14, designed to erase all conventional and oxide tape through 1,000 Oersted.

Dataccount Inc. 1526
Intro: Music Box music management and scheduling system.
Also DARTS accounts receivable and traffic system.

Datatek Corp. 10324
Intro: D-2600 series analog and digital video and audio routing switchers to 32-by-32. D-2800 series eight-character alphanumeric keypad control panels.
Also D-2800 series routing switchers for systems 32-by-32 to 1024-by-1024 analog and digital video/audio systems; D-2400 series control panels; virtual tally systems; analog/digital video/audio modules.

Datatek Corp. 10324
Intro: D-2600 series analog and digital video and audio routing switchers to 32-by-32. D-2800 series eight-character alphanumeric keypad control panels.
Also D-2800 series routing switchers for systems 32-by-32 to 1024-by-1024 analog and digital video/audio systems; D-2400 series control panels; virtual tally systems; analog/digital video/audio modules.

Dataworld 1608
Intro: CD-ROM-based industry database software. Detailed ethnic and demographic reporting via tabular and graphical (map) formats. Large on-line database provides instant access. Internet communications capability. New ethnic/demographic shading overlays for any base map.
Also Allocation map books, coverage analysis, terrain digitizing, AM, FM, TV, LPTV and wireless cable databases, interference studies, directories — 24-hour remote access.

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Davicom Technologies Inc. 8657
Intro: MAC 16/32 site monitoring system for RF communications. Alert is via phone, computer, pager or fax. The system can monitor up to 16 analog inputs, 32 digital inputs, 16 audio inputs and control up to 32 relays.
Also FM antennas; low-power circulators; low-power filters.

Dawn Satellite Inc. S2149

Dawn Satellite Inc. S2149
Intro: Foxcom satellite fiber link that allows satellite dish antennas to be located away from receivers.
Also Coversat snow cover for satellite disk antennas; motorized inclined orbit tracking satellite downlink; digital-ready LNB amplifiers.

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DB Electronica Telecomunicazioni S.p.A. 3126
Intro: Mozart, digital FM stereo generator; KE 20, 20 kW FM transmitter/exciter; PM 120/PM 300, 100 W/250 kW FM transmitters/excitors; FM microwave links.
Also Full line of radio transmitters, translators, both solid state and tube based. Transposers, VHF and UHF antennas, combiners, power dividers and accessories.

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DCM Inc. 7675
Intro: DCM for Windows 95 and Windows NT.
Also PC-based newsroom automation and election reporting.

DDA 8026
Intro: CS3 console featuring true LCR (left-center-right) panning, four groups, four stereo FX returns; 16, 24, 32, 40 inputs.

Delta Electronics Inc. 1602
On Display: Impedance bridges, ammeters, generators, AM stereo exciters/monitors, splatter monitor, coaxial switches; pulse reflectometer, sampling toroids.

Denon Electronics 1020
Intro: DN-1100 MD recorder/player with 10 independent Hot Start buttons to which any 10 tracks can be assigned; DN-610F CD/cassette combo deck providing steady stream of background music; DN-045R MD replicator for digital-to-digital dubs.
Also DN-995; DN-990; DN-981; DN-961; DN-951.

Deutsche Telekom A101
Intro: Transportable ATM connection over satellite; ATM access to broadcast studio LAN.
Also Digital and analog, long- and short-term global broadcast services.

Developing Technologies Distributor 9383
Intro: Sanken Studio Systems: CSS-5 Shotgun Stereo microphone, under 12 inches in length; COS-11 lavalier microphone. Brainstorm Electronics: SR-3 time code repair kit; SA-1 time code analyzer.
Also Brainstorm Electronics: SR-15+ time code distributor/reshaper; SR-26 dual time code SR-1 distributor/reshaper; SR-2 reshaper/frame rate reader; TB-4 communicator infrared talkback remote control.

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DGS Pro-Audio 1423
Intro: Channel identification system for Deltron XLRs and 1/4-inch plugs; Halogen-free installation cable by Gotham Audio.
Also Deltron XLRs, 1/4-inch plugs; RCAs and MIDIs; Gotham Audio mic cables.

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Also Deltron XLRs, 1/4-inch plugs; RCAs and MIDIs; Gotham Audio mic cables.

DIC Digital S2941
On Display: Digital audio tape (DAT) and cleaners;

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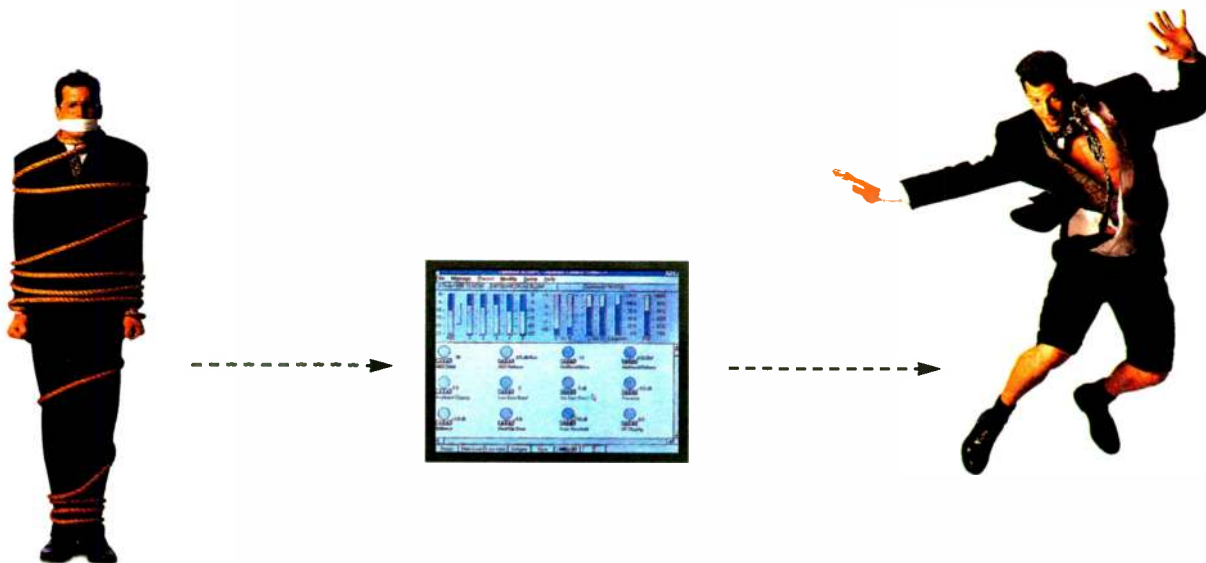
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recordable compact discs; 4mm DDS-MRS data cartridges and 8mm data cartridges.

Dielectric Communications 8016

Intro: UHF Elliptic Function Filter for common amplification.
Also FM antennas; transmission lines; switches; combiners; related RF equipment.

Digigram 7768

Intro: PCX19 digital audio card, specially designed for the PCI bus; Windows version of Xtrack, a multi-track, digital audio editing tool for OEM integrators.
Also PCX9 record/playback card; PCX11; PCX80.

Digital Courier International 1926

On Display: Two-way digital PC-net for delivering CD-quality audio and text cross country to radio stations, record companies, studios and distributors.

Digital DJ 3326

Intro: High-speed data system for delivering information to high speed data receivers with display screens that are also AM/FM stereo radios; FM subcarrier system datacasting information and graphics to hand held receivers; car audio receivers; laptop computers with PCMCIA cards installed.

Direct Connections M4927

Intro: Exabyte mammoth, 480, 220; CD recorders Ricoh, Yamaha; RAID systems.
Also A variety of SCSI storage products.

Disc Manufacturing Inc. M3926

On Display: CD mastering, replicating and fulfillment services.

Dolby Laboratories 10552

Intro: DP503 multirate, multialgorithm digital audio encoder, accommodating Dolby AC-2, Dolby AC-3, and MPEG Layer II algorithms, front-panel interface to ISDN terminal adapter and more; Dolby Fax system, allowing you to send high-quality digital audio in real time via an ISDN line; DSTL digital studio-to-transmitter link system; now available to customers, the SEU4 Dolby Surround Encoder for \$2,000.

Dongseo Electronics Co. Ltd. M4752

On Display: Portable audio mixer, audio distribution amp, audio/video switcher and monitor, commentator box; tally control; audio monitor; on-air lamp; clock display.

Dorrrough Electronics 10953

Intro: An all-new series of Dorrough analog reading loudness meters; no calibration, drift free, precise dis-

play, sum and difference detection and peak hold are all part of the new microcontroller-based design. "Big LED"-giant audio meters for scoring, re-recording and concert/location situations; Model 40-A2, new software version of the standard Model 40-A.

Also AES/EBU digital meters; Model 1200 Stereo Signal Test Set.

Kay Dorrough, Partner
20434 Corisco St.
Chatsworth, CA 91364
818-998-2824
FAX: 818-998-1507

Doty-More Tower Services Inc. S2832

On Display: Full service Broadcast Communication Tower maintenance company, with RF services including Naptex RF protective clothing, along with RF analyzation and troubleshooting and RF mapping.

Dove Systems/Hallikainen and Friends 7032

Econco 3911
On Display: High-quality rebuilt power tubes and Klystrons for radio and transmitters.

EDAC Inc. 3902

Intro: Shielded rack and panel connector and cover set; combined audio/video rack and panel connector; new three-pin audio connector.
Also Audio rack and panel connectors.

Electric Works Corp. 3523

On Display: AXS digital hard disk storage and control system with new modules to completely cover the requirements of any broadcast or audio operation. Can handle live, live assist, satellite, CD and hard disk music for news/talk and specialty formats.

Pete Charlton, Pres.
P.O. Box 136457
Ft. Worth, TX 76136
817-625-9761
FAX: 817-625-4975

Electro-Voice Inc. 8026

Intro: RE1000 studio condenser mic (little brother to the RE2000); RE200 true condenser, probe mic for studio and live work; CO2 omnidirectional, ultraminiature lavalier mic; 635L, a version of the 635A with better reach; CT30 boundary mic for stage and table miking.

Also RE series of mics, including the RE27N/D and the RE38N/D; Sentry series of studio monitors; S series of studio monitors, including the S-40, S-60B and the S-80B.

Elenos 3502

Intro: HF1000 power amplifier with such features as: two power supplies; MOSFET technology; 19-inch 5U rack; multiprocessor with protection, control and command options.

ENCO Systems Inc. 4105

Intro: DADSAT satellite-based store forward controller.
Also DAD486x digital audio delivery system.

Larry Lamoray, V.P. Sales & Mktg.
24403 Halsted Rd.
Farmington Hills, MI 48335
810-476-5711
FAX: 810-476-5712

Energy-Onix 4100

Intro: Single-tube grounded-grid high-power FM transmitters from 15 to 30 kW. Also featuring the MK Series design with 1 and 2 kW solid-state drivers and 3 CX 15000A7 final tube.

ERI 3000

Intro: CP-11 series low-power, circular-polarized antenna, a low weight-wind load FM antenna available in pressurized or non-pressurized options with an input power to 2000 W; Lightning Dissipation Spur, which offers the cost advantages of a rod.

Also Omni and directional FM antennas, lambda mounting systems, towers, filters and combiners.

ESE 8434

Intro: ES-160 master clock with 1 second per month accuracy; ES-245 quad 1 by 6 audio DA. with individual gain pots; 4-inch display family of clocks, timers and slaves.

Also Master clock systems; audio and video D.A. family; clocks and timers.

Euphonix 3123

Intro: Version 2.5 software; MX464 master expander module; clear displays, channel label electronic alphanumeric readouts.

Also CS2000B broadcasting system, a complete on-air broadcast audio mixing system with 12 mix-minus buses.

Event Production Supply Inc. S1031

Intro: Tents for both indoor and outdoor; customized graphics on the new EPS Majestic Event Tent; Supergraphics printed on Event Tent.

Also Custom banners, crowd control fencing, tents, race bibs, roll banners, trade show booths, banner support systems and portable PA systems.

Eventide 2020

Fairlight USA 7668

Intro: F.A.M.E., a completely integrated, digital audio

recording editing and mixing system.

Also MFX3 digital audio workstation with up to 24 inputs and outputs; Timefx software and four-band EQ.

Fidelipac Corp. 2405

Intro: Dynamax DCR Series digital cartridge machine, now available in MO version; Dynamax MXE Series console with three new optional modules—five-band mic EQ with pan, Talkback/Studio Monitor and Telephone Interface module. Also at the Fidelipac booth is Murphy Studio Furniture.

FirstCom Music 8276

Flash Technology Corp. of America 1408

Intro: FTB 224 and FTB 225 high intensity dual strobe systems (red/white light); FTB 302D dual AOL strobe (red/white light); FTB 312 dual medium intensity strobe (red/white light).
Also Obstruction lighting and systems.light).

FM Systems Inc. 8177

On Display: ALM771 audio gain control.

Fostex Corp. of America 5544, 3314

Intro: DMT-8 V.2.0 software. 8-track hard disk recorder with 8 by 4 by 2 analog mixer; D-80 rack mount hard disk recorder with remotable/removable front panel; CX-8 ADAT compatible digital multitrack recorder.

Also Studio time code DAT recorders (D-10/D-25/D-30); PD-4 portable time code DAT recorder.

Garner Industries 6840

On Display: Magnetic tape erasers for all formats of media.

GE America Communications 7121

On Display: Satellite service, C- and Ku-band

GEC-Marconi Communications Ltd. 2002

Intro: Low power FM transmitter; L Band Eureka 147 DAB transmitter systems.

Also Band III Eureka 147 DAB transmitter systems.

Gefen Systems 1520

Intro: TSE 241 monitor and keyboard extender that allows you to work on two different computers from the same monitor and keyboard up to 500 feet away from the computers; M&E Pro-SFX production music locator database searches for, organizes, locates all your effects in seconds.

Also M&E windows SFX and production music locator database for Windows; TSE series monitor and keyboard extenders that extend up to 500 feet away from your Mac computer; Digifects SFX library sound effects library.

Genelec S1039

Intro: 1039A Active main control-room monitoring system, consisting of two 320 liter enclosures and two 7U racks to house the amplification system, active crossovers and protection circuitry. Monitors can produce sound pressure levels in excess of 126 dB. The system features Genelec Directivity Control Waveguide technology.

Also Studio monitors and active subwoofers.

General Microwave Services Inc. S1736

Intro: 6 and 7 GHz 1 W transmitters; 6 and 7 GHz receivers; X-band antenna systems.

Also L-, S-, and C-band transmitters for ENG applications. Power amplifiers and antennas.

Gentner Communications Corp. 2016

Intro: GSC-3000 site control system is a Windows-based, networkable, expandable remote control system for broadcast transmitters and other sites; ET10b telephone interface is digital hybrid for digital phone sets.

Also TS612 talk show system; teleconferencing products and services; assistive listening system; telephone hybrids; and couplers.

Elaine Jones, Sales/Mktg. Bus. Mgr.
1825 Research Way
Salt Lake City, UT 84119
801-975-7200
FAX: 801-977-0087

GEPCO International Inc. 7884

Intro: VSD 2001 serial digital video cable for extended distance, providing 82 percent velocity of propagation; GEP-FLEX jacket compound for 22 gauge and 24 gauge series multipair audio cable.

Also Audio and video cable; custom audio and video cable assemblies, breakout boxes and panels.

Gigawave S1241

Intro: MVL series of outside broadcast microwave link, capable of up to 300 meter remote control via tri-ax cable; software controlled local and remote control systems for range of microwave links and central receive antenna systems.

Also MTV series of miniature transmission systems and PTV series of portable ENG links; range of microwave antennas.

Gorman Redlich Mfg. Co. 3323

Intro: EAS encoder/decoder.

Also NOAA weather radios, digital antenna monitors for AM directional arrays.

The show is going no where. Then suddenly you get "the call." The best call you've heard in years. You have to edit it and get it on the air by the end of the football promo.

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Designed to meet the special needs of the on-air broadcast professional, VoxPro is the first digital audio editing system that is both fast and easy to use.

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No matter the size of your station or the size of your budget.

DP-100 FM DIGITAL PROCESSOR

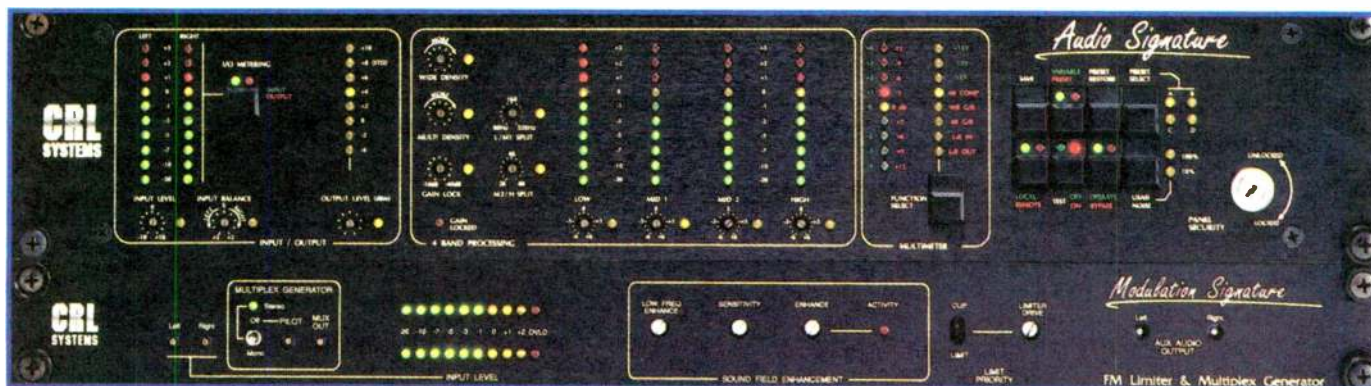


The *NEXT GENERATION* of FM Audio processing has arrived. Our newest system, the **DP-100**, uses the latest in 32 bit floating point DSP technology to bring your station to a new level of sound quality that will attract and hold your listening audience. CRL's **DP-100** will give your station a natural sound with superior loudness and outstanding audio clarity.

Unlike other systems, the **DP-100** is based on a 100% digital platform. Our exclusive GUI processing menu system lets you harness its full

power with only a few finger strokes. Of course we offer full RS-232 remote control, a wide variety of program presets and multiple level password protection. The **DP-100** consists of an wideband leveling AGC, 5 band compressor and multi-band limiter. The **DP-100** offers two composite outputs, AES/EBU, fiber optic and analog outputs. Four internal expansion ports make the **DP-100** ready for the future. The **DP-100** is your answer to staying ahead of the competition!

THE SIGNATURE SERIES FM PROCESSOR



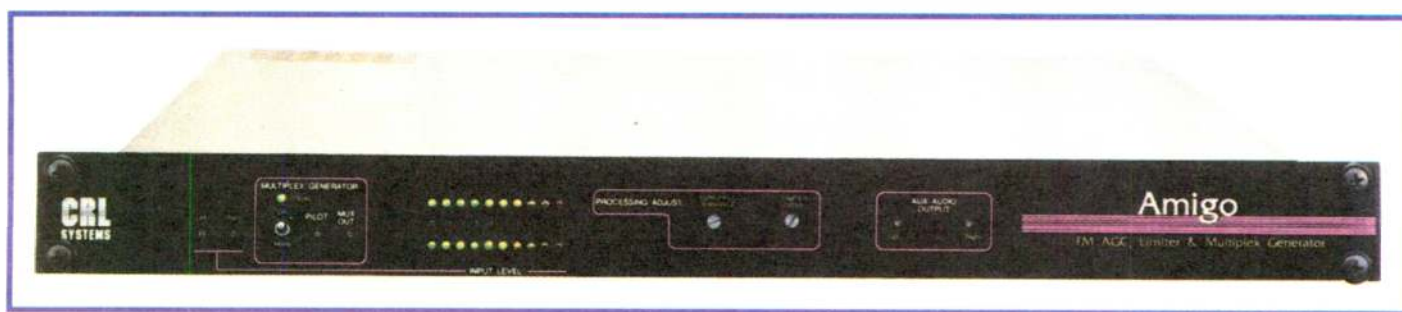
Looking for real value in a processing system? Then CRL's **Signature Series** is for you! Our two unit system is perfect for those with split-site processing needs.

Our popular **Audio Signature** is an easy to use AGC / four band Compressor that features program pre-sets and full RS-232 remote control.

Our powerful multi-band Limiter, the **Modulation Signature** is combined with a digitally synthesized Stereo Generator. Plus, our exclusive stereo soundfield enhancement circuitry is included.

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The **Amigo FM** is a complete FM processing system in a single rack high chassis. It includes a wide range dual band AGC (over 25 dB), transfer function multi-band Limiting and a drift free digitally synthesized Stereo Generator. The **Amigo FM** is a very popular upgrade from the old 8000 and

will provide you with years of rock stable operation. The **Amigo** works well with any format. Internal processing options let you tailor the **Amigo** to fit your station's needs. The **Amigo** costs much less than you might think and delivers much more!

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Circuit Research Labs, Inc.

2522 West Geneva Drive • Tempe Arizona 85282 USA

602 438-0888 • 800 535-7648 • Fax 602 438-8227

E-mail: crl@crlsystems.com • Web site: <http://www.crlsystems.com>

Graham-Patten Systems 10542

Intro: D/ESAM 200 digital edit suite audio mixer features four-channel 24-bit digital paths and integral sample-rate converters, eight inputs-routing to four digital and analog outputs.

Also D/ESAM 400 digital edit suite audio mixer features redesigned user interface and operational software; D/ESAM 820 digital edit suite mixer features master processor board.

Grey Matter Response Inc. M5045

Intro: Mezzo Media Collaborator software, a project-based management of on-line data for multiroom facilities and networked studios. Features intelligent tracking of projects while editing, broadcasting of incremental updates to project subscribers, and server capabilities for managing gigabytes of data.

Also Mezzo Media Archiver software for backup and archiving of digital media projects.

Group One Ltd. 3425

Intro: KRK powered monitors; Focusrite Blue 245 A-to-D 20-bit converter; Soundlux tube microphone.

Also KRK monitors; Focusrite signal processing; Uptown automation.

H.L. Dalis Inc. 9583**Holland Broadcast Services Inc. 4108**

Intro: "Hitdrive" service: custom playlist music, pre-loaded on digital hard drive or on new MO non-crashable drives. Up to 700 songs per drive.

Also CD music libraries for oldies, '70s Gold, AC, CHR, Country formats.

Hardigg Cases, A Div. of Hardigg Industries Inc. 10981

On Display: Rotationally molded 19-inch EIA rack-mount cases.

Harman Pro North America

Intro: See AKG, BSS, JBL and Soundcraft.

Harris Corp., Broadcast Div. 5809, 3517

Intro: DAB 2000 transmitter based on the D-CAST COFDM encoder developed by ITIS of France. Sage Endec EAS system.

Also Harris Platinum Series 10 to 60 kW FM transmitters. Gates and DX series medium-wave transmitters. DIGIT digital FM exciter. DCR1000 digital audio console. Audio systems from Orban, Auditronics, Oktava, Mackie and others.

Harrison by GLW Inc. 5318

Intro: Series Twelve and M.P.C. series Digital Audio

I.O. TV950 Broadcast Console with six frame size options, mono or stereo inputs, multiple program feeds, mix minus and clean feed options for IFB, remote machine logic, broadcast mute logic, universal router switcher, eight-character electronic source displays.

Also Series Twelve audio console desk for television broadcast, television postproduction and film post-production.

Henry Engineering 4108

Intro: StereoMixer eight-input, three-output stereo mixer for line-level sources. Can be used to combine four stereo or eight mono sources. Can also combine stereo and mono sources, and produces both stereo (left and right) and mono outputs simultaneously.

Hank Landsberg, Owner

503 Key Vista Dr.
Sierra Madre, CA 91024
818-355-3656
FAX: 818-355-0077

Herman Electronics 4845

Intro: Brady; Neutrik; Belden; Shure.
Also More than 500 different products.

Hewlett-Packard Co. 9177

On Display: Test and monitoring equipment.

HHB Communications Ltd. 1424

On Display: HHB PDR 1000 portable DAT recorder; HHB PDR 1000TC portable DAT recorder with time code; PortaDAT accessories, media products, Cedar audio restoration equipment, Pioneer D9601 DAT recorder, ATC loudspeakers and Coles microphones.

Holiday Industries Inc. 5219

Intro: HI-3702 induced current meter.
Also RF/microwave hazard instruments.

Illbruck Inc. 2223

Intro: Colortec Sonex Classic.
Also Sonex acoustical materials for the complete sound treatment of radio and audio recording studios.

Industrial Acoustics Co. Inc. 10469

Intro: High performance modular studios complete with diffusion and appropriate acoustics. New construction features a deeper panel system to obtain good low-frequency attenuation.

Innovative Quality Software M4273

Intro: SAW Plus digital audio workstation product, which extends the power of the Software Audio Workshop (SAW) to a maximum of 16 mono or stereo tracks of simultaneous, live playback on any Windows-compatible sound cards (a maximum of 32 tracks of real-time playback with no additional proprietary hardware required). Also, SAMP Software Audio MIDI Mixer, a program that runs under Windows and provides an audio console interface that is graphically represented on a computer screen. It brings all functions of the Yamaha ProMix 01 to your screen, and adds other features as well.

Kathy Johnson, Dir. of Sales
4680 S. Eastern Ave., Ste. D
Las Vegas, NV 89119-6192
702-435-9077
FAX: 702-435-9106

Inovonics Inc. 1300

Intro: Model 630 tunable, single-channel "relay" receiver; a professional FM receiver for FM translator service, which features selectable IF bandwidth, carrier-loss and program-loss alarms, multipath meter, auto-mute and auto-blend.

Also Audio processing for AM/FM/TV; FM stereo generators; processor/generator combinations; FM modulation monitor; RDS/RBDS encoder and decoder.

Jim Wood, Pres./Chf. Eng.
1305 Fair Ave.
Santa Cruz, CA 95060
408-458-0552
FAX: 408-458-0554

Intelsat B101

Intro: Digital C-band and Ku-band SNG service.
Also Complete range of digital and analog, long- and short-term global broadcast satellite services.

International Datacasting 2000

Intro: DataNet PC Card, a satellite data broadcast receiver; EchoCom Plus, a Microsoft Windows-based package of multimedia data broadcasting software.

Also EchoCom; FlexRoute Satellite Digital Audio System; MPEG Pro Satellite Digital Audio System.

International Tapetronics Corp. 2005

Intro: DigiCenter 2.0, integrating MPEG Layer II files with DigiCenter's linear file format, increased networking capacity, new CD jukebox interfaces; DigiCenter NEWS 2.5, with additional text editing features, extended file management; audio routing switcher, new PC controller with full matrix view grid, simple configuration and programming of inputs, outputs, remotes and salvos.

Also DigiCenter digital audio management system; DigiCenter NEWS; DigiCenter virtual console; PD MATE schedule simulation software; DPR-612 solid-state CD-quality digital program repeater; audio routing switcher expandable to 512 x 512, RS-232 control, 124 custom remote control units.

Intraplex 3900

Intro: New line of high fidelity audio modules with AES/EBU digital transport capability, which allows broadcasters to feed AES/EBU digital audio over the Intraplex STL PLUS digital STL system and stay all-digital end-to-end. The modules can also work with the company's analog modules. Also, the company will demonstrate "cost-effective and cost-reducing transmission solutions" for duopoly/LMA applications using T1 lines, as well as the Model 4464 Digital Audio Codec.

Irte S.p.A. S3064

Intro: 3.5, 6, 10, 12, 13, 14, 18 and 23 GHz microwave links; digital 2048 Mbps PSK 6 CH sound system; parabolic antennas for microwave links; accessories for microwaves, radio cameras, GSM antennas, broadcasting antennas; parabolic antennas for satellite reception.

Itelco 10724

Intro: 10 kW solid-state FM radio transmitter; 200 W DAB L-band transmitter; remote control and supervisory system PC-based for Itelco equipment.

Also 1 kW solid-state FM radio transmitter; 30 W VHF transposer; microwave radiolink with 2Mbps multiplexer.

High-quality audio transmission •



But low ISDN transmission

costs • Interface to all existing equipment • And networks • IRT approved

• Supports all six sampling frequencies



• G.722 capability •

No need to reconfigure the decoder • Ever • Wherever •



Save time • And money • Easy-to-read displays • Ideal for

reporters in the field



• No need for trained technicians •

No audio delay when monitoring over headphones

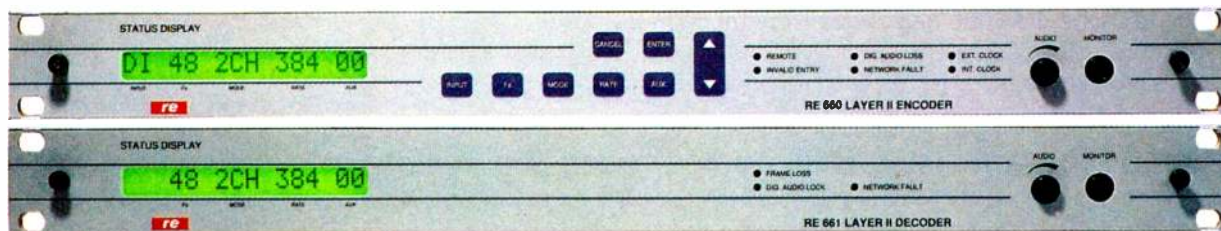


• It's the

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J.N.S. Electronic Industries Pty. 1300
Intro: DRFL-700 series digital microwave link with superior spectrum efficiency and BER performance, according to the company, which also claims it boasts two-thirds less channel space than current digital systems.
Also 8000 System, "Frame," a modular system with the new RFM-8323 FM receiver module, DTM-8552 FM composite monitoring module and 8310B 10 x 1 matrix switcher.
John Stannard, Mgr. Dir.
P.O. Box 85, Rosanna
Melbourne, VIC. AUSTRALIA
+61-3-9852-2100
FAX: +61-3-9852-0977

Jampro Antennas Inc. 5308
Intro: Dual-mode UHF/VHF antennas.
Also JUHD-UHF panel antenna, JTW slot antenna, Frequency matched tower sections, waveguide, rigid transmission line, filters and combiners.

JBL Professional 7126
On Display: Full line of speakers and sound reinforcement equipment.

JK Audio S1026
Intro: QuickTap for remote broadcast audio products. It is designed for recording from a telephone handset or connecting an amplifier for sales presentations; Pureformer stereo isolation transformer for reducing noise on PC audio cards.
Also RemoteMix professional mixer for quick remote broadcasts; RemoteMix C+ small telephone hybrid with two mic inputs, battery operated for live remotes; That-1 Telephone Handset Audio Tap for quick remotes and sales presentations.

JVC Professional Products 8505
Kathrein-Werke KG 8362
On Display: Professional antennas and accessories for FM broadcasting.

KD Kanopy Inc. 005
Intro: KD Majestic canopy, 48 pounds (10-foot by 10-foot frame) and 40 percent stronger than steel framed unit, one-piece, scissor-like design, no loose parts or ropes, water resistant, fire retardant, UV guarded, free heavy-duty carry bags and stakes, comes in array of colors and can be customized. KD Sand Bag, to secure station canopies on outside hard surfaces where stakes cannot be used.

Killer Tracks 4556
Intro: Tunebuilder self-editing music software system, which allows the user to specify the exact length of music required; Atmosphere Music Library, with 70 diverse CDs for use in broadcast or non-broadcast productions.
Also The 85 CD Killer Tracks Music Library; the 21 CD Killer Tracks Classics Classical Library; the 25 CD NJJ Library and the 33 CD BMG Scoring Library. Clients can license any of the five libraries individually, or create a custom package by choosing CDs from the various libraries.
Ben Trust, Dir. Spec. Prod.
6534 Sunset Blvd.
Hollywood, CA 90028
800-877-0078
FAX: 800-787-2257

Kintronic Laboratories Inc. 1220
Intro: Weatherproof medium-wave dummy loads for quick installation for outside new high-power RF contacts; rack mountable main/aux/dummy switch iso-couplers for high power paging.
Also Directional antenna phasor cabinet; AM multiplexer; folded monopole; convection-cooled dummy loads; standard equipment rack; antenna tuning unit; RF patch panel; and rigid transmission line.

Klark-Teknik 8026
Intro: 300 series graphic and parametric equalizers; 400 series parametric equalizers; 500 series compressors and gates; 700 series digital delays; 800 series crossover; DN 3600 stereo programmable graphic equalizer, digitally controlled, with 66 memories; DN 3696 handheld remote control of the DN 3600 equalizer; DN 3600 Computer Control, which provides up to 66 stereo DN 3600 programmable graphic equalizers via Windows-based software; DN 6000 new digital one-third octave or one-sixth octave RTA with RT 60, LET or LEQ and built-in printer port; DN 728 RM remote control option for DN 728 to digitally delay, allowing access to any of 64 memories via simple switch matrix.

Kline Towers 7877
Intro: A prototypical transmitter facility design, developed and copyrighted by Thomas G. Crowder AIA of Architektur. The design uses the latest advances in ice protection and component-style construction, allowing Kline Towers to now provide a complete turnkey transmitter site.
Also Guyed and self-supporting towers for broadcasting and communications.

Korg USA Inc. 3461
Intro: SoundLink Digital Recording Systems: the 168RC Recording Console, a fully digital 16 by 8 by 2 device equipped with two ADAT optical inputs, eight analog inputs featuring 18-bit A-to-D converters, two internal effects processors and full console automation; the DRS 1212 I/O PCI Multichannel Audio Interface with DECK II, featuring software designed for audio applications plus 12 I/O configured as two analog I/Os, an S/PDIF I/O and an eight-channel

ADAT optical I/O; the RM 8 Reference Monitors and RMA 240 Monitor Amplifier.

Larcant-TTC Inc. 9844, 3311
On Display: FMS4000 4 kW solid state FM transmitter; FMS500 500 W solid state FM transmitter; XL10FM FM translator; Model X 1-30 W exciter/transmitter

LDL Communications 9844
On Display: Solid-state VHF transmitters from 250 W to 60 kW; antennas, manufactured by Alan Dick & Co., for HP or CP operation stations; towers for both guyed and self-supporting applications, up to 2,000 feet (610 meters).

Leader Instruments Corp. 8369
Intro: LV 5100D digital/analog component waveform monitor; LT 425D digital component 525/60, 625/50 generator.
Also Broadcast/CATV level meters, DSO and analog oscilloscopes, frequency counters, RF generators and audio test equipment.

Lectrosonics Inc. 7865
Intro: UDR200 synthesized UHF receiver; QUAD195 and QUADBOX multichannel UHF wireless systems; TH2 telephone hybrid interface for full-duplex teleconferencing over two-wire phone lines.
Also Full range of wireless microphone systems for ENG, EFP and studio production; automatic microphone mixers and audio signal processing.

Leitch 9349
Intro: VIA 32 Series Routing Switchers; XPress Series Monitoring Routers; Smart Panel Controller, a programmable, push-button control panel; Router Works, a PC-based routing switcher control program; DigiBus, allows users to transition between almost any digital and analog standard for both audio and video; video and audio distribution amplifiers and various compatible frames; Routing Scheduler; adaptive comb filter module; X plus 16-by-16 analog video and audio routers; AES digital-to-analog converter; and ADM-6800 audio signal monitor.

Lemo USA Inc. 5560
On Display: High quality, self-latching circular connectors for audio and video applications.

Lexicon 7116
Intro: Lexicon 300L digital effects system that supports the LARC remote controller; a Pitch FX card for the PCM 80 Digital Effects Processor; PCM 90 Digital Reverberator, a companion to the PCM 80 Digital Effects Processor. The PCM 90 features a range of versatile reverb programs that derive their heritage from the company's studio processors.

Lightning Eliminators and Consultants Inc. 8343
On Display: Lightning protection/prevention products and related services, including the Dissipation Array, Chem-Rod Grounding Electrode, Spine Ball Ionizer and AC/DC Power Surge protection. Supplier since 1971.

Lightwave Systems Inc. 10938
Intro: Single-mode converters, allowing transmission distances to 100 kilometers or more utilizing existing product that operates as multimode.
Also Fiber-optic transmission systems for audio, video and data; analog routers for video and audio.

Linear Equipamentos Eletronicos S/A S2264
Intro: Micro Waved Dependable System (MWDS); new line of microwave equipment for ENG and ground links available in frequencies ranging from 1.5 GHz to 18 GHz in 500 MHz bands. The technology is field-proven, smaller and offers several new features.
Also: VHF and UHF solid state transmitters and translators; full line of analog satellite receivers; satellite TV translators; and RF and microwave amplifiers.
Contact: Robinson G. Caputo, Commercial Mgr.
100 - Centro
Santa Rita Do Sapucaí, MG 37.540-000
Brazil
(5535) 631-2000

Location Sound Corp. 3700

Logitek 1802
Intro: VU-TRAX vertical audio meter line. Up to 24 channels fit in a rackmount enclosure and up to 56 channels are available in a meter bridge enclosure. The bargraphs use tri-color LEDs to show VU, peak and phase; BV2MTS dual three-channel meter in a 1U enclosure for use with television MTS systems.
Also Bright-VU, Super-VU and Ultra-VU horizontal bargraph LED meters in rackmount and desktop enclosures; 2VUB and 4VUB dual and quad powered mechanical meters with phase display; MON-10 expanded range meter with 10-input stereo selector.

Loral Microwave Narda S1536

LPB Inc. 2520
Intro: AM-30/AM-60/AM-100 transmitters that serve PSSA/PSRA and backup applications and are also AM stereo-compatible; FMST-1/FMS-2500 transmitters designed for low power FM broadcasting; SALSA (Satellite Automation Live Studio Assist); 7000 Series audio consoles; Signature III series audio consoles; S3 Studio Space Savers, including stereo headphone amplifier, compact power amplifier and two microphone preamp; LPB-Hayes f80B Studio Monitors.

Mackie S1245
Intro: SR40-8 40-channel, eight-bus console;

MS1402-VL2 compact mixer; CR1604-VL2 compact mixer; MS1202-VL2 compact mixer.
Also SR24-4 sound reinforcement/live mixing console with Ultramix automation; SR32-4 sound reinforcement/live mixing console.

Macromedia M4536
Intro: Deck II version 2.5 audio editing software.

Magnum Towers Inc. 2923
On Display: Manufactured communications towers.

Manhattan Productions Music 7977
Intro: Apple Trax music library covering all the latest musical trends, ideal for a younger corporate audience.
Also Distinct libraries, including ageless specialty music, classical and sound effects.

Marti Electronics 3305
Intro: SMARTI telephone frequency extender, sending full broadcast-quality over standard dial-up phone lines. New family of frequency-agile remote pickup transmitters and receivers for all U.S. and export bands.
Also Line of 2, 15 and 30 W remote transmitters and receivers. Discrete and synthesized composite STL systems, including digital coding. FM demodulators, subcarrier generators, 40 W FM exciters, complete line of cables and accessories for Marti products.

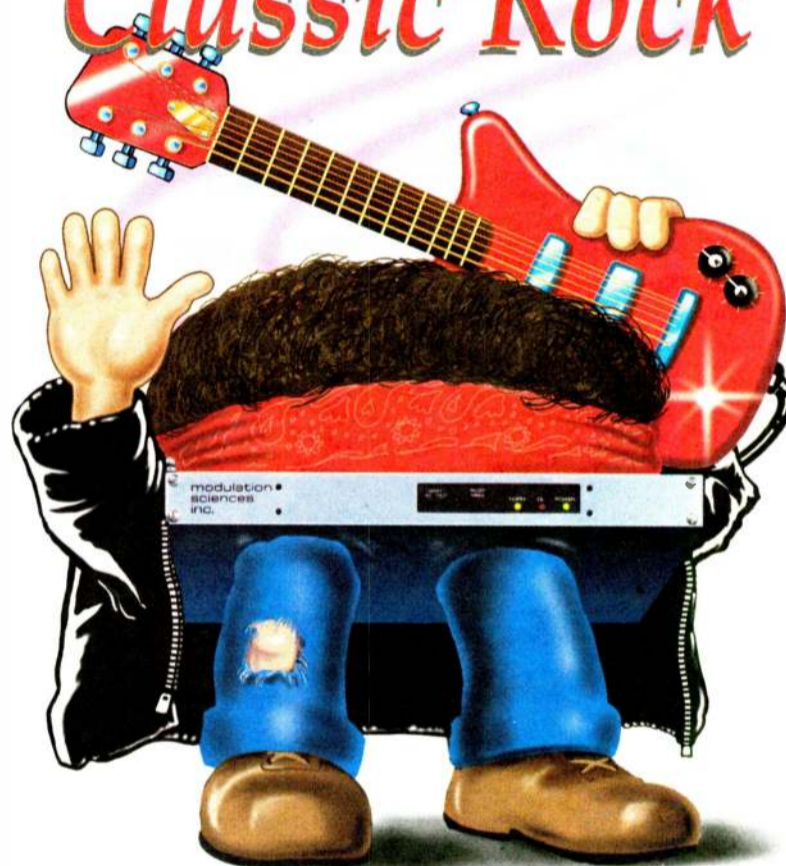
Match Production Music S1458
Intro: Jinglefile Series library, composed in popular advertising lengths; Producer Series multi-purpose, fully interactive CD library; Broadcast Box CD box of more than 1400 cuts; and Power FX sound effects series library.
Also Match Production Music Library.

Measured Marketing Inc. L101
On Display: Radio Diner.

MediaTouch 3714
Intro: Background Record, offering cherry-picking of multiple satellite feeds and automated recording. MediaDisk IV, enabling simultaneous record and play. Improved cut management. Virtual OpLog, multiple studios under complete control, accessing audio files and logs simultaneously.
Also OpLog, with all audio sources accessible through touchscreen. MediaTouch Voicetracking, producing automated dayparts. UltraTools log generation tool, interfaced with any music or traffic software.

Micro Communications Inc. 6801
Intro: High-power FM multiplexers, FM broadband dipole antenna, directional couplers, FM switchless combiner, and coaxial transfer switches.
Also Antennas, coaxial switches and filters.

Rev Up The Roar Of Your Classic Rock



From Jimi to Bruce, your station has it all over those other guys. Now break through the dial clutter with the MSI CP-803.

The CP-803 makes your sound explode with energy and grabs your listeners' attention. The other guys will sound like "wimps".

Your audience will perk up its ears. The engineer won't mind the easy set up. The PD will smile. And the GM won't hassle you about the cost.

The CP-803 won't give you the headaches you get from other processors, either. Energize your winning sound...



Call MSI, the processing authority at (800) 826-2603 and show them who the boss is.

12A World's Fair Drive Somerset, New Jersey 08873
Voice (908) 302-3090 • Fax (908) 302-0206

Micron Audio Products Ltd. 8331
Intro: SQN Series IIIa portable stereo location audio mixers.

Also Micron wireless microphone systems; Tram miniature lavaliers, SQN location audio mixers for ENG/EFP, film, studio and theater.

Microwave Filter Co. 10970
Intro: Model 13000: "The Notebook" micro "Q" series low-power, semi-adjacent channel combiner for wireless cable; CT-1100 super cypher multiter broadband scrambling system for wireless cable.

Also Filters, combiners and accessories for broadcasting; CT-1000 addressable converter system for wireless cable.

Microwave Radio Communications, Broadband Division 6308

On Display: Millennium Series radios and antennas for portable and mobile systems used for high-performance electronic news gathering and outside broadcast; Central Receive Systems for easy to set up and control remote operations, such as the Millennium CR receiver, ProScan, UltraScan and SectorScan antennas; long-haul and short-haul systems.

Midas 8026
Intro: XL-200 console with four-band parametric EQ,

eight aux sends, eight mute groups, eight VCA groups, 12 by 8 matrix section; XL-4 console with four band fully parametric EQ, 16 mono plus four stereo aux sends, eight mute groups, 10 VCA groups, 24 by 8 matrix section and SMPTE-based automation; and XL-42 with two channels of mic or line and four bands of parametric EQ, pan and level control for finished stereo mix.

Modulation Sciences Inc. 1517
Intro: PRO-II Proceiver professional channel receiver for TV news operations. PCG-II Professional channel audio generator.

Also MYB-2 StereoMaxx Spatial Image Enlarger; Fmmm-2 FM modulation monitor; CP-803 composite processor, SCA-186 subcarrier generator; RDS/RBDS generators, receivers and monitor/analyzers. FM modulation monitors, StereoMaxx Spatial Image Enhancer, and the CP-803 Composite Processor.

Moseley Associates Inc. 2316
Intro: Digital studio-to-transmitter links for RF, T1/E1. Remote pickup links, digital remote broadcast equipment, transmitter remote controls, digital encoder and decoder with ISO/MPEG audio.
Jamal Hamdani/Dave Chancy, Pres. & CEO/Mktg.

111 Castilian Drive
Santa Barbara, CA 93117
805-968-9621
FAX: 805-685-9638

Murphy Studio Furniture 2405

MUSICAM USA 3020

Intro: FieldFone, the first of a new product category POTS (Plain Old Telephone Service) codec. FieldFone takes your original audio and converts it from analog to digital, then compresses the digital bit stream to reduce the bit rate and sends the transmission over one analog phone line to your base FieldFone unit. The base FieldFone unit then decodes the digital transmission, eliminating the need for ISDN lines.

Also CDQPrima codecs for radio broadcasters, recording studios, film, voiceover use and satellite operators.

MYAT Inc. 5301

Intro: E-STAR, a compact, fault-tolerant, high-efficiency power combiner.

Also Complete line of rigid coaxial transmission lines, systems, components and accessories, including seven-eighths-inch 50 ohm through 12-inch 100

ohm; patch panels; power dividers; test quality adapters for EIA and DIN standards.

N Systems Inc. (NSI) 10910

Intro: MC5 Version 3 PC-based remote control system for control and monitoring of central ENG receive systems, switchers and other machine control applications. Silhouette LP low-windload central ENG receive antenna system. Super Pod SP3 helicopter ENG antenna system with GPS-controlled transmit antenna.

Also Superquad central ENG receive antenna system and Silhouette transmit antenna for ENG vans.

Nady Systems Inc. 6941

Intro: 950GS UHF 160-channel wireless microphone system. Dual conversion superheterodyne receiver design, true diversity. Transmitter available as handheld mic, bodypack for musical instrument or bodypack for lav or head mic.

Also ENG-12 UHF portable multichannel snap-on wireless transmitter. 661 VR UHF portable multichannel wireless receiver.

Nagra Kudelski SA 6804

Intro: ARES-C solid-state recorder. Records 40 minutes of mono audio on a 20 MB PCMCIA memory card. Editing and card-copy via a double-slot on the ARES-C. G.722 or MUSICAM (ISO/MPEG Layer II) compression techniques. Telephone output and an ISDN option. NAGRA-D four-channel digital audio recorder, uses quarter-inch open reel tape, has SMPTE/EBU timecode option and RS-422 serial remote control. Nagra Lysis hardware and software for sound/news editing, scheduling, broadcast and administration. Allows creation, processing and sharing of all multimedia documents.

Nautel Maine Inc. 1923

Intro: FM10 solid state 10 kW, all-digital FM transmitter and NE50 digital FM exciter with AES/EBU digital interface; XL12 and XL60 12 and 60 kW solid-state AM transmitters.

Also FM4 solid-state 4 kW FM transmitter and ND5 solid-state 5 kW AM transmitter.

Nemal Electronics Int'l 7965

Intro: Composite audio/video cables with extra-flexible jackets. Products are available from stock in 15 versions with no minimum order, or in custom constructions with a 1,000-foot (305-meter) minimum and two-weeks lead time.

Also Serial digital audio and video patch panels.

Network Music Inc. 6031, M4554

Intro: Presentation Audio Spike and Glide Production Elements Library, a 12-CD production library; music volumes 149-152; sound effects volumes 72-73; Presentation Audio, a five CD-ROM audio library for PC-based presentations; and the new Private Label division.

Also Production Music Library (150 CDs); Trakfinder CD-ROM catalogue; Network Sound Effects Library; Network Classical Library; ShockWave for ear-opening production elements; Brainstorm Library; and Primrose Music Library of Italian music.

Neutrik USA Inc. 1600

Intro: NPP-TT-14-PT, Easy Patch panels.
Also Speak-On speaker connectors, "Combo" 1/4" and XLR in one connector; Minicon - 12-pin miniature connector; "XY" Series of IDC connectors; Neutricon, eight-pin modular commercial connectors; Nanocon, three-pin miniature connectors; "Easy Patch" patch panels and accessories; complete line of XLR connectors, accessories, adapters and wall plates; "A" and "B" series - center-to-center connectors; ProFi professional RCA connectors; wide assortment of quarter-inch jacks and plugs for high-end audio applications.

Newswire Information Systems Ltd. S3316

Intro: Latest version of NewsWire-2000 with graphical user interface and video, audio and text editing on the same workstation; Interface to the Quantel Clipbox; interface to the DAVID audio editing software, including audio editing on the journalist workstation and playback from the NewsWire-2000 rundown; new system based on Sun Microsystems technology; and new system running Windows 95.

Nigel B. Furniture S2031

Intro: Product furniture. Monitor display systems including mobile, wall and ceiling mounts.
Also Workstation furniture for audio/video/multimedia production.

Nokia Paging S1048

Intro: FM 10 RDS Data Receiver, which receives RDS messages via commercial FM network and decodes them.

Also Numeric and alphanumeric FM pagers.

Non-Stop Music Library 4843

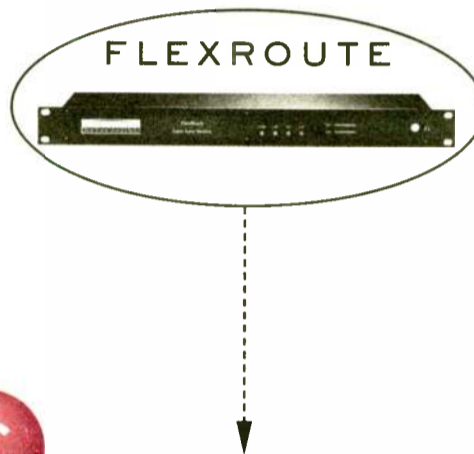
Intro: New categories and more CDs. 1996 "Simply the Best" CD demo available.
Also "Simply the Best" music library.

NPR Satellite Services 3914

NSN Network Services 1513

Intro: SpotBoxx, an all-digital store-and-forward network localization system; NSN Insat, an Internet partnership program.

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Circle (171) On Reader Service Card

NLT Satellite Services S1234
Intro: Joint service platform with Orion, providing digital distribution service to Europe and the United States.

Nucomm Inc. 10366
Intro: 4 GHz portable equipment for the new ENG microwave band and fixed link transmission equipment (Digital Series).
Also TP1 ENG mobile truck package.

OMB America 2626
Intro: 1 kW solid-state FM amplifier and modulation monitor.
Also Radio transmitters up to 15 kW; radio links; and antennas.

Omnimusic 6842

Omnitronix, Inc. 1426
Intro: OMNI-5001 500 W AM broadcast transmitter and OMNI-1000SW 1 kW solid-state tropical-band shortwave transmitter.
Also OMNI-1000A 1 kW AM broadcast transmitter and OMNI-25 25 kW AM broadcast transmitter.

Orban 2011
Intro: Optimod-FM 2200, affordably priced for smaller stations, features eight programmable presets, two-band processing with HF enhancement, protection processing, prevents peak overmodulation, all-digital stereo encoder/generator standard, analog I/O standard, digital AES/EBU I/O optional and remote control.; DSE 7000 major upgrade, with real-time 24-bit internal effects including four-band parametric EQ, Optimod compression, reverb by Lexicon and other multi-effects.

Orion Atlantic, L.P. S3464
On Display: Orion 1 international communications satellite launched on November 29, 1994; voice, audio, data distribution networks and transmission in both digital and analog formats.

Otari Corp. 11029
Intro: UFC 24 universal digital audio format converter.
Also RADAR multitrack hard disk recorder; MR10 MiniDisc recorder/player; CDC-600 dual drive, 360-capacity CD changer; B-10 broadcast production and on-air console; PicMix surround sound monitoring and panning system; Status digitally controlled analog console with console-wide image recall; Concept 1 digitally controlled two-bus analog console with fader, mute and snapshot automation; MX-501I two-track tape recorder; DTR90T time code DAT recorder.

Pacific Research & Engineering (formerly Pacific Recorders & Engineering) 2301
On Display: ADX Ensemble and ADX Eight digital audio workstations; BMX III on-air console; AMX stereo production console; STX stereo television mixer; RMX RadioMixer air console; production mixer, production multitrack console; custom cabinetry; system design and installation; and stereo mixer compact console.

PanAmSat S2241
On Display: Global satellite services aboard PAS-1 and PAS-3 (Atlantic region), PAS-2 (Pacific region), PAS-4 (Indian Ocean region), with planned launches in 1996 and 1997 of PAS-5 and PAS-6 (Americas), PAS-7 (Indian Ocean) and PAS-8 (Pacific).

Panasonic Bcast. & Television Systems Co. 10,000
On Display: MDA-1 R-DAT recorder; SV-3800 DAT recorder; and SX-1 audio console.

Penny & Giles Inc. 2323
On Display: The assignable 16-fader MM16 Digital Controller.

Penta Laboratories S2370
On Display: Electron tubes for radio and TV transmitters.

Phasetek Inc. 4102
Intro: Motor-driven detuning systems and high-power switching systems.
Also Antenna phasing equipment, antenna tuning units, RF components, unipole kits, detuning skirts, dummy loads.
Kurt Gorman, Pres.
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FAX: 215-536-7180

Pioneer New Media Technologies 10457
Intro: CAC-V5000, a 500 compact disc autochanger, has two players, allowing you to constantly switch playback and even cross fade between one disc and another.

Potomac Instruments Inc. 1917
On Display: Field intensity meters; antenna monitors; audio test equipment; transmitter remote control equipment.

Pristine Systems 1413

Production Garden, The 6062
Intro: A new music library, "Tune Ranch," volumes 1-10, is largely acoustic and features Nashville players; also, a new collection of contemporary CDs featuring a variety of music styles: In Your Face tracks, Real Rock, Urban Rave and Worldbeat; and New Manchester Music volumes: Hip Hop and Acid Jazz, Worldbeat and Dance (70 CDs total).
Also Wired and wireless mics; intercoms; IFB; telephone interfaces; digital and analog recorders; walkie talkies; cart machines; speakers; mixers; lavaliers; boompoles; soundcards and expendables; everything for location production sound.

Professional Sound Services S1944
Intro: PSC RF multi, PSC M4A+ mixer; Lectrosonics 195D portable diversity wireless; Tascam DA-P1 portable DAT; Fostex PD-4 portable time code DAT; Sennheiser K6 series and MKH series mics.
Also Wired and wireless mics; intercoms; IFB; telephone interfaces; digital and analog recorders; walkie talkies; cart machines; speakers; mixers; lavaliers; boompoles; soundcards and expendables; everything for location production sound.

Promusic S2816
On Display: Production music and sound effects library with more than 1,300 CDs of music offering diverse musical styles.

Prophet Systems Inc. 3705
Intro: Version 5 automation system with Live Show Interface, which runs up to 14 stations out of one system, and includes hot standby backup file server. The LSI features drag-and-drop of commercials and songs; audio source management; fully touch-screen compatible; expanded button bar; auto roll of buttons; quick record; holding bin; macro buttons and pause/reposition.
Also Other popular features include digital reel-to-reel; time and temperature announce; and multitrack digital editor.
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PSINet i3475
On Display: All levels of port connection speeds, from 14.4 kbps and 28.8 bps modems to 128 kbps ISDN lines. Services range from direct personal connections to full turnkey integration for corporate connectivity. InterFrame, managed access over full-time dedicated circuits via frame relay transport technology; InterMAN, turnkey high-bandwidth access through a local value-added metropolitan area network; PSIWeb, state-of-the-art Web service that provides a 24-hour interactive presence on the global Internet; LAN-Dial, TCP/IP dial-up packet access via PPP, LAN to WAN integration via telephone line; LAN-ISDN, TCP/IP packet access on a dial-up or switched basis; SecureConnect, a managed security solution provided as a turnkey service for Internet connections; InterRamp, personal access via v.32bis modem or ISDN for a PC, Macintosh or workstation; Pipeline NY/Pipeline USA, on-line Internet services with Internet tools for Windows PCs.

Pulizzi Engineering Inc. 8067
Intro: Micro-processor based IPC 3300 series for monitoring and programming of up to 2,000 ports remotely from one telephone line. Operates as a stand-alone or as a master/slave in a Local Area Network of up to 250 IPC's each having a maximum of eight ports for a total of 2,000 controllable outputs. Also, microprocessor controlled RS-232 remote power on-off intelligent systems, to provide individual outlet control via an RS-232. Features/options include local control, IEC or NEMA receptacles, form C dry contacts, password security, multi-unit addressability, "watchdog" (self-boot), EMI/RFI filter, spike/surge protection and customer specified power-up sequencing.

QEI Corp. 1811
Intro: Quick-Link II spread spectrum digital STL/TSL/RPU system.
Also Cat-Link digital STL/TSL system; Quantum high power solid state FM and Quantum "E" series low power transmitters; FMQ series single tube FM transmitters; 695 and 675B exciters; 691 modulation monitor; 710 digital stereo generator.

R-Columbia Products Co. Inc. 6844
Intro: Model MS/PW-22 single channel, portable intercom main station/control console with a built-in failsafe power supply.

R.F. Technology and Continental Microwave 10869
Intro: Continental Microwave has gained Intelsat approval status for its portable (flyaway) 1.5-meter SNG antenna, reference number IAO30AA.
Also Complementary dual-band flyaway antenna and a full range of microwave equipment.

Radio Systems Inc. 3008
On Display: DDS digital delivery system and RS series consoles.

Radio World 900
On Display: Radio World, Radio World International, Tuned In, Pro Audio Review, Broadcast & Production

Radiomation 1026
Intro: Release 8 of Traffic; updated News systems; and upgraded Management and Information Systems.

RDL Radio Design Labs 3423
Intro: STICK-ON products: ST-CX1S subwoofer crossover, ST-CX1W woofer crossover, ST-CX1F full range crossover, ST-NG1 noise generator, ST-STM2X switched mic preamplifier. RACK-UP products: RU-OSC4A sequencing oscillator, RU-SX4 balanced audio switch, RU-SC1 serial converter, RCS4 remote channel selector, RU-VCA1 digitally controlled attenuator (mono), RU-VCA1D digitally controlled attenuator (stereo), RLC2 remote level control, RU-SQ6 power up/down sequencer. TX Series products: TX-1W music on hold amplifier.
Also Complete line of products marketed under the trade names STICK-ON, RACK-UP and TX Series, the AMX-84 Audio Switcher, ACM-2 amplitude component monitor and a complete grouping of chassis and mounting options for all groups.

RE America Inc. S1627
Intro: RE660 series MPEG Layer II audio codecs; the linear PCM RE8930 audio/data/voice codec; RE532 and RE533 RDS/RBDS encoders for FM broadcasting and paging applications.
Cathy Huth, Sales Secretary
31029 Center Ridge Rd.
Westlake, OH 44145
216-871-7617 x 200
FAX: 216-871-4303

Redding Audio Inc. 1818
Intro: Rycote Softie Windjammers for BVP/BVW camera mount Softies; Rycote Softie for Sony's DVW 700.
Also Rycote Windshield Systems are designed to offer improvement in exterior wind attenuation and to provide microphone support and isolation from movement and vibration. System includes a Windshield, Suspension, Hi Wind Cover and Windjammer. Rycote Softies, slip-on cover with an integral synthetic fur exterior and robust shock mount.

Rees Associates Inc. 8340
On Display: AIE services, including: planning, design, construction administration, design build, and

facility business plans.

Register Data Systems 3300
Intro: PhantomLite digital audio automation system, for use with simple satellite or live-assist operations; RDS Traffic for Windows, a traffic and billing system with a Windows platform.
Also Phantom digital audio automation system; System 6 and 7 traffic and billing systems, DOS based.

RF Plante Ind. E Com. LTDA. 1626

Richardson Electronics 7004
Intro: Inductive output amplifier; spark gaps; the latest audio products from Shure, Sony, Sennheiser, Electrovoice, Marantz, Denon and more.
Also RF power transistors; RF amplifiers; RF connectors; UHF klystrons; power tubes; capacitors; CRTs; camera tubes; studio products.


Rip-Tie Co., The S1933
Intro: Rip-Tie Lite Cablewrap, functions identically as the original Rip-Tie Cablewrap, designed for less demanding use in terms of release cycles, will withstand approximately 300 release cycles.
Also Rip-Tie Cablewrap, used to organize bundles of cables in coils or harnesses, with adhesive back, can organize cables against smooth surfaces.

River City Sound Productions 10485
Intro: Broadcast series of buy out production music. CDs feature song-length music followed by 60-, 30-, 15- and 10-second edits. Categories on each disc include Sports, Mellow, Corp/Ind, Country, Rock, Hi-Tech, Atmospheric, Urban and Miscellaneous. Specialty series features discs dedicated to specific musical styles, including Weddings, Nature, Country, Corp/Ind, Mellow, Christmas, Sports, Classical I (orchestral) and Classical II (solos and duets)

Roland Corp. U.S. 1215
Intro: VS-880 digital studio workstation; SN-700 noise/hum eliminator, with "Threshold," "Release," and "Frequency" settings.


S.W.R. Inc. 5328
Intro: High-power FM antenna; low-power FM antenna.
Also Medium-power antennas; FM antennas; education

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SADiE Inc. 1223
Intro: Octavia modular digital editor, featuring SADiE3 software which combines DSP processing with flexible user interface; The SADiE Mobile editor for recording and direct editing without uploading or digitization; Studio Audios's SASCIA real-time network, using ATM, is capable of transferring multiple channels of digital audio between SADiE and Octavia DAWs; Studio Audio's De-Noise real-time stereo broadband noise reduction device; Synchro Arts VocAlign software for post-production facilities offering ADR.
Also The SADiE Portable hard disk editor with customized PC case and color LCD screen, allowing on-site recording and mix.

Sandar Electronics AS 3324
Intro: 32 by 32, 64 by 64 and many other sizes of

routers for video/audio/34/140/155 Mbps; AES/EBU routers.
Also Analog and digital routers: video, audio, 34, 140, and 155 Mbps.

Sanken Audio Systems 9383
Intro: CSS-5 shotgun stereo microphone; COS-11 lavalier microphone; See Developing Technologies Distributor.

Scala Electronic Corp. 8362
Intro: Broadband antennas for multi-channel systems, super-broadband transmit antenna for wireless cable. See Kathrein-Werke KG and SIRA Sistemi Radio.
Also Professional antennas and accessories for FM.

Schoeps/Posthorn Recordings 11081
Intro: CMBI battery-powered microphone body. Accepts 15 different capsules for use with wireless transmitters or portable DAT recorders. CCM 8 miniature figure-of-eight microphone mounts on existing shotgun microphones for mid-size stereo operation.
Also Line of professional condenser microphones and accessories. Colette series is modular with 17 different capsules.

Scientific-Atlanta 5812

Scott Studios 3500

Seimens Audio Inc. in North America 6819
Intro: See AMS Neve PLC.

Sennheiser Electronic Corp. 6948
Intro: DAS4015 compact antenna distribution system is DC-powered and can be used with up to four EK4015-UHF frequency-agile diversity receivers; MKE104 condenser, cardioid lavalier microphone with removable capsule.

Also HMD25-1 headset combines HD25 monitor headphone with supercardioid microphone.

Shively Labs 5304

Intro: Model 6832 Broadband FM antenna.
Also FM sidemount antennas, panel antennas, related transmission equipment; combiners, dehydrators and isocouplers.

Shure 5312

Intro: SCM810 automatic mixer is equipped with IntelliMix circuitry, an RF resistant chassis and circuitry, LED indicators displaying channel activation and clipping. Also new; LX wireless microphone systems

Also M367 mixer; VP64 broadcast mic; Sm7 and SMB1 studio microphones.

Sierra Automated Systems & Eng. Corp. 4026
Intro: SAS 64000 audio routing switcher; SAS 16000 audio routing switcher.

Also SAS 32000 audio routing switcher and mixing system; SAS 3200I matrix intercom and IFB system; DAS 9600 digitally controlled audio system; MMI 3200 mix-minus/IFB system

Sira Sistemi Radio 8362

On Display: Professional antennas and accessories for FM broadcasting.

SMARTS Broadcast Systems 4002

Intro: Smartcaster True Live mode, allowing independent control of multiple audio cuts played by the system; temperature announce; log manager, interfacing music and traffic logs in an automation system; switcher.

Solid Electronics Laboratories 1127

On Display: FM Composite Processor Model DCP-1 performs functions of instantaneous limiting and composite lowpass filtering in single structure.

Solid State Logic 2311

Also SL 8048 series console; Axiom with 48 channels; Omnimix; Scenaria; and Axiom preparation station.

Solutions Custom Furnishings Inc. S3158

Intro: New components for Crescent product range.
Also Ready-to-assemble furnishings, including Slimline, Diamond and Crescent product lines. Custom design, manufacture and installation available.

Sonic Science 1202

Intro: Sonic Search sound effects and music management system. Enables users to search manufacturers' libraries, select and play effects through control of CD auto changer; control digital audio workstation; and transfer sound digitally to selected position and track.

Also Dynamic Range, 2-CD library; The Works 10-CD collection of recordings of mechanical and electrical sound produced by machinery; Foley Footsteps collection of male and female footsteps digitally recorded; The Sonic Source Music Library 10-CD collection of 500 original compositions; The Sonic Source CD-ROM Music for Multimedia 2-CD collection of royalty-free production music.

Sonic Solutions M3830

Intro: Next generation PCI-based audio processing board, with 264 mflops of DSP power and 30 tracks of simultaneous playback; MediaNet 1.5, including a family of PCI-based client and server nodes that now address NFS and IP encapsulation for audio, video and multimedia networking.

Sony Electronics Inc.-Business & Professional Products Group (BPPG) 5828

Intro: SMS-1P monitor speaker with built-in amplifier.

Soundcraft 7126

On Display: Full line of mixing and recording consoles including the B-800, a compact production console for radio and outside broadcast applications, and Ghost, a professional recording console for under \$4,000. Also, the DC2020 automated post production console, the K3 theater and K1 sound reinforcement consoles, RM100 on-air radio console, LM1 and GP1 location recording mixers, GP1 portable and Series 10 on-air consoles.

Sprague Magnetics Inc. 1721

Intro: DAT head reconditioning.
Also Recording heads, recorder care products, reconditioning services for heads, reel motors, capstan motors, recorder parts for Sony, Tascam, Telex, Panasonic, Fostex, Otari and Ampex gear.

Stainless Inc. 5212

On Display: Tower design, fabrication, erection, modification and maintenance; inspection and structural analysis of existing towers; field operations for antenna installation, repairs and tower maintenance.

Standard Communications Corp. 9983

Intro: Windows-compatible software, used in conjunction with the CAM830 module, designed to give the engineer computer remote control of all features and functions of the Agile Omni Global VU satellite receiver. Software incorporates a graphical user interface allowing the user easy access, control and status monitoring of up to 36 Agile Omni receivers.

Also MT830BR/IBR series satellite receiver, an advanced computer remote controller, RS-250 certified, video/audio receiver; Intercontinental MT900 satellite receiver, a low-profile, RS-250 certified, multi-standard receiver.

Studer 7116

Intro: D940 digital console; D424-2 stereo magneto-optical studio recorder; second-generation D741CD recorder; D19 Series of mic and line preamps.

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260 Multifunction "Utility" Processor

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708 Digital-Synthesis FM Stereo Generator

A basic Stereo-Gen with outstanding specifications. Built-in, adjustable Composite Processing, RDS/SCA combining, and accurate front-panel metering for easy setup.

716 "DAVID-II" FM Processor/Stereo-Gen

A gated-AGC/Compressor/Limiter, plus clean digital synthesis of the multiplex baseband signal. This second-generation design features PWM gain control, an adjustable Composite Processor and RDS/SCA combining. A fantastic performer!

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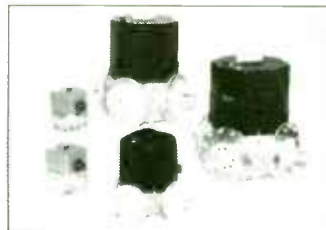


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READER SERVICE NO. 155

Studio Technologies Inc. 3308
Intro: Audio mixer for ENG, SNG and small production vehicles.
Also Line of broadcast equipment including the IFB Plus Series of mobile talent cueing systems; line of professional audio products, including the Studiocomm Series; the Studio Tools Series of digital audio workstation accessories; and distribution amplifiers, stereo simulators and microphone preamplifiers.

Superior Electric 3912
Intro: SP Series STABILINE Standby Power Supplies that instantly switch electronic equipment to battery power when an AC power outage occurs. Utilizes synthesized sine wave (step wave) output technology. Incorporates Advanced Battery Management features to assure prolonged battery life. Power ratings from 250 to 400 VA.
Also Line of STABILINE Voltage Regulators, Uninterruptible Power Supplies, Power Conditioners and Transient Voltage Suppressors/RFI Filters.

Superscope Technologies/Marantz Professional Products 2927
Intro: CDR620 compact disc recorder with SCSI interface; IS5022 and IS5021 digital sound processors; PMD350 combination CD player/cassette deck with pitch control; PAC line portable audio communication systems.
Also Portable analog cassette decks; rackmount cassette decks and CD players; compact disc recorders; and multitrack mixers.

Svetlana Electron Devices 1123
On Display: Power tubes manufactured at Russia's largest power tube factory.

Switchcraft Inc. 3320
Intro: TTP96 audio patch.
Also Audio connectors; jacks; plugs; audio and video patch panels; patch cords; molded cable assemblies; audio accessories; switches; jackfields; jack panels; power cords; EAC power receptacles.

Symetrix 1511
Intro: 610 Broadcast Audio Delay for eliminating profanities and unwanted comments on live or taped conversations.
Also 528E voice processor performs microphone pre-amplification, de-essing, compression/limiting, downward expansion, parametric EQ, and voice symmetry alignment.

Systembase Ltd. 3907
Intro: SystemBase C300xr ISDN audio codec, features ISDN terminal adapter, keypad and VFD display. Housed in 1 unit high rack mount enclosure, the C300xr is based on apt-X 100 coding system, and can provide 7.5 kHz mono link over 64 kbps ISDN channels.
Also C100xs desktop audio codec; C100xr rack mount audio codec; RG two-wire converter.

Systems Wireless Ltd. 7983
Intro: Synthesized UHF Lectrosonics studio wireless microphone system uses surface mount technology; UHF wireless intercom in man-to-man configuration and full-duplex system; updated Matrix Plus II digital intercom system includes Windows-compatible version software; updated versions to Clear-Com's Main Stations and Master Stations including ability to create "super party line" and built-in IFB controls.
Also Broadcast quality wireless microphones for field and studio use; single and multichannel Wireless IFB systems; Clear-Com party line intercom system.

T.E.M. S.p.A. 3419
Intro: 1 kW FM transmitter.
Also Solid-state UHF/VHF amplifiers from 30 W to 1 kW; portable links all frequency bands; Slimline analog links all frequency bands; solid-state FM transmitters from 20 W to 1 kW.

Tactile Technology 1519
On Display: M4000 fully automated mixing system.

TAI Audio Inc. S1943
Intro: PSC RF multi, PSC M4A+ mixer; Lectrosonics

195D portable diversity wireless; Tascam DA-P1 portable DAT; Fostex PD-4 portable time code DAT; Sennheiser K6 series and MKG series mics.
Also Wired and wireless mics; intercoms; IFB; telephone interfaces; digital and analog recorders; walkie talkies; cart machines; speakers; mixers; lavaliers; boompoles; soundcarts and expendables; everything for location production sound.

Tascam 8226
Intro: DA-38 digital multitrack recorder; 564 digital portastudio.
Also M-5000 production console; M-2600MKII recording console.

Technosystem 4645

Tektronix, Inc., Measurement Business Div. 9313
Intro: AM700 audio measurement set, designed to operate in environments where both analog and digital signals abound; TG2000 signal generation platform, a multiformat analog and digital precision signal instrument.
Also 764 digital audio monitor; WFM90/91 handheld monitor. Also on display from Grass Valley Group: Models 4000, 2200 and 1200 digital production switchers; Krystal DVE; 2200i Krystal integrated switcher; range of modular equipment and routing gear.

Telex Communications Inc. 10863
Intro: RTS 803 master station; KP-12 Windows key panel; ENG/UT 500 UHF broadcast wireless receiver; compact RTS ADAM CS Digital Matrix Frame.
Also Wired and wireless intercoms and microphones; wireless video systems; headphones and headsets.

Telos Systems 4023
Intro: Telos products: Zephyr digital audio network transceiver, capable of transmitting bidirectional 20 kHz stereo audio over a single ISDN line using MPEG audio Layers III and II; 100 Delta digital hybrid with dynamic digital equalization; the Link, for connecting phone lines to intercoms; the ONE plus ONE dual hybrid; Call Screen Manager software for talk show production. Cutting Edge Technologies products: Unity 2000i FM and Unity AM broadcast transmission processors, both with Unity Remote Software for processor control from anywhere by modem.

TFT Inc. 3002
Intro: Emergency Alert System (EAS) 911 encoder/decoder; EAS 930 multimodule receiver; EAS 940 program/transmitter interrupt unit; EAS 941 remote control/status module for EAS 911.
Also Model 850 BTSC TV stereo aural modulation monitor, model 855 SAP/Pro channel monitor, model DSS93 digital subcarrier system.
Darryl Parker, Dir. of Mktg.
3090 Oakmead Village Dr.
Santa Clara, CA 95051-0862
408-727-7272
FAX: 408-727-5942

Thomcast 7109
Intro: See Comark Communications Inc. Also RCA solid state AM transmitter line; from 5 to 50 kW in 5 kW steps.

Thomson Components and Tubes Corp. 5331
Intro: TH680 Diacode: ATV/UHF 80 kW vision, 60 kW common amplification; TH760 IOT: ATV/UHF 60 kW vision, 40 kW common amplification; TH610 Diacode: ATV/UHF air-cooled 10 kW common amplification.
Also ATV/UHF Tetrodes from 1 to 30 kW common amplification.

Tiessecci 1623
Intro: Digimod broadcast audio processor; MX77 stereo enhancer; RDS.
Also TS35 digital radio automation; Digimod broadcast audio processor; D6 multichannel digital audio board.
Luca Zanetti, Mgr.

Viale Europa 15
Varese, I-21100 ITALY
+39-332-288164
FAX: +39-332-831281

TimeLine Inc. 1226
Intro: MMR-8 modular multitrack recorder can use either magneto-optical or hard disk storage and is equipped with all the features necessary for a professional sound studio; software upgrade for Studioframe version 6.20 digital audio workstation, including fast waveform display, OMF, SDII, AIFF and WAV file transfer, new data sort functions, and enhanced user-configurable editing interface; Micro Lynx MC-1.34 software upgrade; Lynx-2 V700-11 software upgrade.

TM Century 1800
Intro: EDS CoSTAR digital audio storage system; A-Ware Music Master music scheduling software; Country House Band promotion library.
Also GoldDisc, music format on CD; HitDisc, weekly updates by CD; jingles; production libraries; and Ultimate Digital Studio digital audio management system.

Torpey Controls & Eng. Ltd. 10952
Intro: Large-digit SMPTE time code reader, featuring 2.3-inch digits with ability to read from one-tenth speed to 10-times speed; NPR code compatible time displays, developed to offer NPR stations an alternative, operating from their OS2 computers.
Also A wide range of digital or analog clocks, running from SMPTE, DQS, ESE or NPR codes.

TRF Production Music Libraries 6462
Intro: Music library containing instrumental combinations ranging from full symphony orchestra to small groups and single instruments. All discs will be recorded, mixed and mastered digitally.
Also Large collection of production music libraries for broadcast purposes.

TV Technology ???
On Display: TV Technology, TV Technology International, Computer Video Production, Broadcast & Production

TWR Lighting Inc. 3903
On Display: FAA-approved and ETL-certified manufacturer of aviation obstruction lighting.

United Ad Label Co. Inc. 7975
Intro: Labels for automatic labeling equipment; Proportions single shipping label; corrugated mailers for audio cassettes and CDs; CD packaging, including polyboxes and safety sleeve mailers; audio cassette presentation cases; photomailers in several sizes.
Also Presentation, promotional and packaging solutions for audio production.

V-Soft Communications/Doug Vernier Telecommunication Consultants 4001
Intro: INTERDLG for Windows: coverage mapping for AM and FM utilizing digital line graphing with access to 3 or 30 second terrain data, FAA/FCC tower data, 1990 census data and national geodetic information; SEARCH FM for Windows: FCC minimum spacings channel search program with FCC data station filler.
Also Contour (for DTC tables and more); FM Cont (for NCE, directionals, and translator work); Tower Draw (for vertical tower sketching) and PlotPath (for STL and other pt. to pt. studies); RFAZ (for RF hazard info on FCC applications); Search AM (for AM channel searches); Pattern (for directional pattern designs); INTERCHK (contour coverage mapping at the entry level); and QCHANNEL (channel allocation searching tool at the entry level). Plus 25 years of broadcast engineering consulting experience.

Valentino Production Music Library 6832
Intro: Ten new music CDs and four new sound effects CDs, added to the hundreds of CDs that are now available in both the Valentino Music and Sound Effects libraries. Also, a CD-ROM catalog of all company products.
Also Valentino Production Music Library and Valentino Sound Effects Library.

Videoquip Research Limited 3823
Intro: MX-G audio mixer; HDST-1 headset interface; S-103 AV 10 x 1 low-cost audio/video switcher
Also DAVE-2000 news capture and editing; Phase 3 broadcast products.

Vyvx Inc. 10157
Intro: Satellite transmission services; audioconferencing and enhanced fax service; multipoint videoconferencing.
Also AtlanticVision transatlantic video service.

Ward-Beck Systems Ltd. 10300
Intro: AES/EBU digital audio distribution amplifiers; "PODS," low-cost audio problem solvers.
Also Renaissance radio consoles, metering, distribu-

tion amplifiers.

Wegener Communications 11033
Intro: Advanced network control system, with time-based, rotational and event-based scheduling, a graphical user interface, drag and drop group/site management, and UNIX operating system.

Wenger Corp. 3923
On Display: V-Room, sound-isolating, modular broadcast booth; computer/synthesizer workstation; quadratic diffuser panel; highlights from recent Radio Free Europe/Radio Liberty broadcast booth installation in Prague, Czech Republic.

Wheatstone Corp. 1211
Intro: D-500 digital audio console, the first fully digital audio console capable of handling analog, digital, or mixed format signal sources for on-air radio use.
Also A-6000 Master Control Console for radio; A-300 and A-500 radio on-air consoles; SP-4 stereo production console along with rackmounted signal processing gear and the line of modular studio furniture. The company will also showcase its Audioarts line through Bradley Audio (booth #1611).

Whirlwind 5541
Intro: Concert Series Active Splitter system, which provides up to 56 channels of 1x4 active splitting for audio distribution. Active inputs avoid loading mics, and active or transformer isolated outputs provide isolated feeds. Front panel level display, output #2 gain control, outputs #3 and #4 ground lift switches on each channel. Dual redundant power supplies.
Also Free \$89 cable testers will be given away to booth visitors throughout the show. Also
On Display: mixers, amplifiers, splitters, cable, connectors. Complete custom design/manufacture services available.

Will-Burt 8580
Intro: Night Scan Chief ENG lighting unit, for directing a powerful wattage of light in under 20 seconds.
Also Pneumatic telescoping masts from 20 feet to 134 feet to elevate antennas and cameras.

Winsted Corp. M4027, 6825
Intro: An expanded line of Digital Desks for linear and non-linear editing systems, including corner consoles and low boy racks under the work surface; Plexiglass doors for the economy racks; 22 inch wide System/85 rack bays (for large 20 inch non-rack mount monitors); fabric side panels and tops to dress up your production console.
Also A wide variety of modular consoles, integrated multimedia workstations, vertical equipment racks and cabinets; wood trimmed decorator panels for a custom designed look; a full line of console accessories.

Wireworks Corp. 8443
On Display: Multimedia (mixed audio/video) cabling assemblies, control cables, coaxial cables, broadcast quality sound and communication cables, custom broadcast panels and cable testers for every application.

Wohler Technologies 8566, Q101
Intro: Alarm systems to identify audio error conditions and location; horizontal level meters, from 1 to 8 full range (analog or digital) in 1RU; AMP-2VTR+ 2U version of the self-powered speaker system for VTR audio monitoring; Digi-2 D-to-A converter; AES/EBU 1U (50 dB) or 2U (90 dB) digital level meters; digital audio routing switchers; serial digital audio extractor; phase flipper; digital source selection switch DSS-8.
Also Self-powered speaker systems; level meters and phase indicators; audio routing switchers/source selectors.

Yamaha Corp. of America 1805
Intro: O2R digital recording console, featuring 40 analog and digital inputs, digital bus outputs, eight digital direct outputs, and 8 aux sends; ProR3 digital reverb unit, for the professional studio market, incorporates the new Yamaha DSP chip. 32-bit digital signal processing power coupled with 20-bit A-to-D and D-to-A converters; EMX3500 mixer, available in 12 and 16 channels, provides 350 W per channel into 4 ohms. Two sets of stereo power amp outputs are provided.
Also PM4000 and PM3500 live mixing consoles; RM800 8-bus analog recording console; ProMix 01 digitally programmable mixer.

Zaxcom Inc. 8482
Intro: Deva, a four channel portable digital audio mixer and removable hard disk recorder for field audio work requiring high-quality 20-bit digital recording.
Also Arria and DMX1000 digital audio consoles; full line of TBC control systems and machine control systems.

Zero Stantron 6336
Intro: Stantron Design console.
Also Modular electronic cabinets: vertical racks, low profile and slope front consoles and instrument cabinets.

Walkaway:

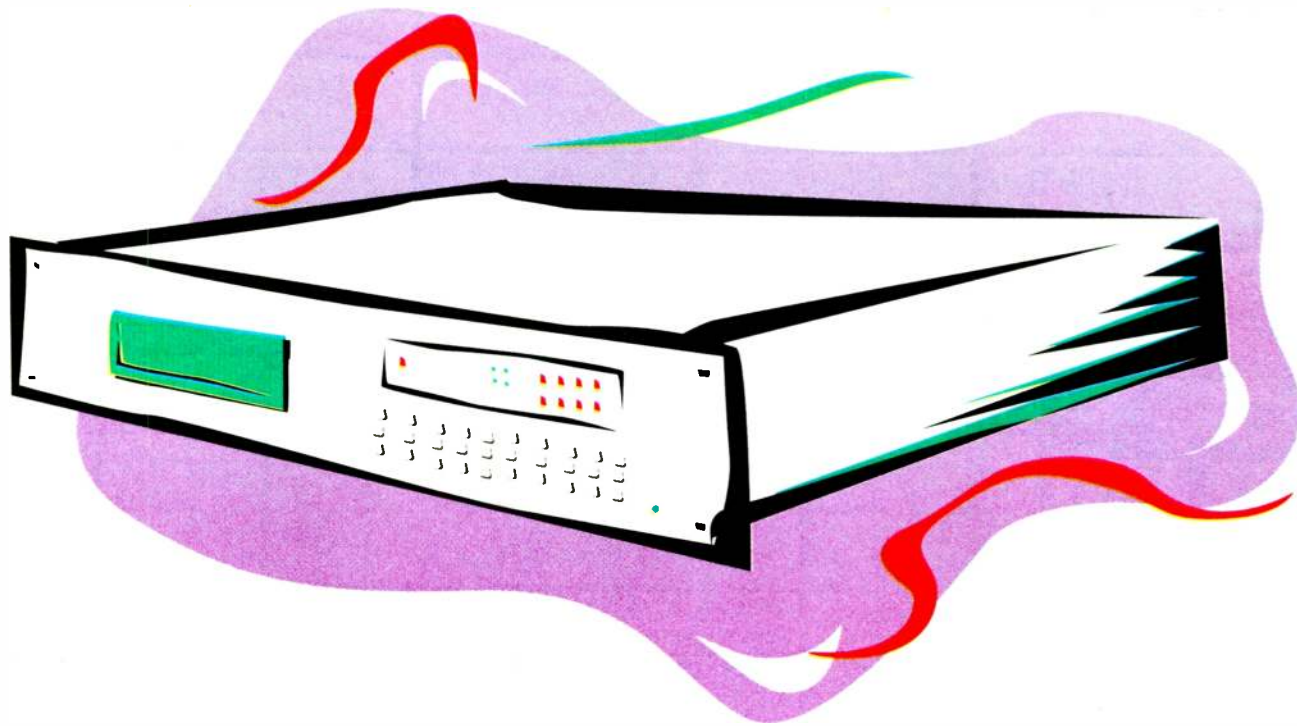
Turn off the lights; lock the doors; go home. A few short years ago this level of automation at radio stations was impossible. But thanks to rapid advances in technology it's now an everyday occurrence. Anyone can go home, but to go home legally it takes specialized equipment. If you're contemplating a walkaway, you need to call about our RFC-1 Dial-Up Remote Control and our DAI-1 Dial-Up Audio Interface. For instant information 24-hours-a-day call our "Fax-On-Demand" from your fax machine and request documents 101 and 110.



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[solutions]

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Elvis In 1959: From West Germany, Sgt. E. Presley could have remotely cut a hit without leaving the base and sent it to an empty studio in Nashville. At 0900 hours in West Germany, Elvis could have automatically started a tape recorder at the closed RCA Victor Studio B and had it ready for final mixing the next morning.



Walt Disney in 1937: From three different remote locations, Snow White's Director David Hand could have received voice-overs in stereo from Roy Atwell, Adriana Caselotti and Lucille LaVerne using a CDQPrima™. David Hand's Prima would have received each talent's voice-over, even though each incoming call came from a codec of a different configuration.

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Prophet Systems Inc. announces

PAGE #1	Record	Autoroll	Cuts List	Swap		Option Menu		
POT 1 (A/S)	POT 2 (A/S)	POT 3 (A/S)	POT 3 (LOCAL)	POT 4 (LOCAL)	POT 4 (LOCAL)			
A APRIL BLOSSOM 00:15 1	B WAGON WHEEL 00:19	C KARLS APPLIA 00:59	D BAKERY CAFE 00:19	E CINNAMON 00:02	F JACKS PLACE 00:08			
G LARRYS RV 00:31	H HDA 00:03 2	I VoiceTRAC fo 00:15 3	J DUDDENS 00:45	K EBS 00:50	L HIRSHFELDS 00:03			
M RADIO SONG 04:08	N DAYBREAK 03:41	O NOTHING'S NE 02:59	P MANDY 03:14	Q WALKIN' AWAY 02:47	R NOBODY'S HOM 03:26			
S LINER A	T LINER B	U LINER C	V LINER D	W LINER E	X LEGAL ID			
1	2	3	4	5	6	7		
Sat Mar 2, 1996						▲	⏪	⏩
55° High: 58° Low: 32°						▼	⏪	⏩
06:36:32 PM								
23:28								
KOGA FM # 2								
SHIFT #04		MANUAL						
BILL SMITH		MODE						
Block Fill	Default	Resync						
ON	Source 01	Mode ON						
Run	Special	Play						
UDE	Menu	F9						
?	Station	Stop						
	Data	F10						
EXIT	Reports	End	Skip					
		F11	F12					
Clipboard-0		Last Delete-0		Hold Bin-27		-02:31	Play - Pause	

Version 5

Live Show Interface (LSI)

The centerpiece of Version 5 is the new Live Show Interface (LSI). This new interface allows the D-J to run even the most high energy shows smoothly. Fully utilizing the power of Windows, the Live Show Interface features:

- ◆ **Drag and Drop Commercials and Songs**
Audio events can be easily moved around in the log using the mouse or touch screen. They can also be moved to the button bar and the holding bin.
- ◆ **Audio Source Management**
Version 5 allows the D-J to specify which audio card a commercial or song will play out of ahead of time. It is easy to pre-position sliders and to crossfade items. Plus, Version 5 actually allows six stereo audio events to play simultaneously for each control room!
- ◆ **Fully Touch Screen Compatible**
The Live Show Interface was designed from the ground up to be totally touch screen compatible.
- ◆ **Expanded Button Bar**
Forty-two pages of buttons for immediate access to 1008 liner, jingles, laugh-tracks, etc.—PER SHIFT! And you can have up to 99 shifts!
- ◆ **Auto Roll of Buttons**
Auto roll allows the D-J to mark buttons that will playback one after the other automatically. Mark up to 24 buttons which will all play back in order.
- ◆ **Quick Record**
Take phone calls, edit them with our wave form editor, and place the event on log...all in just seconds.
- ◆ **Holding Bin**
The holding bin is temporary storage for items that the D-J can't get to immediately. He can move them to the holding bin for easy retrieval later in the shift.
- ◆ **Macro Buttons**
Accomplish complex tasks in one click of the mouse with macro buttons. Tasks such as changing from manual to satellite or auto control, changing the active station, turning on and off sources or relays, etc. become effortless with Version 5.
- ◆ **Pause/Reposition**
Pause a spot or song, fast forward or rewind to a new point, begin play from a designated point using the pause/reposition button.

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Markets of all sizes are taking advantage of the new FCC ruling that allows multiple station ownership within a market. This means groupings of stations—2, 3, 4, 6, 8 even up to 14 or more— can share all of their audio and data out of ONE system that was **built** to handle multiple stations. Plus, with our new Version 5 with the Live Show Interface even the biggest, high-dollar market will sound better and run smoother than ever! Prophet Systems has Windows-based systems ranging from a single workstation system to a 100 workstation Goliath running 14 radio stations all out of a one system. There is absolutely no system better suited to running multiple stations than Audio Wizard CFS for Windows.

control room interface for

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So we did! The new Version 5

“ We had another DOS digital system that didn't fit our needs. It was clunky and couldn't handle even basic functions well. Now we have purchased four systems from Prophet. We have not found any limitations of the Audio Wizard for Windows system. The Audio Wizard for Windows is the most live sounding system I have ever heard. ”

- Jeff Hutton, KLTJ/KWMQ, Southwest City, MO, KTLQ/KEOK, Tahlequah, OK

Live Show Interface.

“ We're proud to show people our system. Everyone who has seen the system is impressed. Audio Wizard for Windows is extremely easy to use. It's unlike any other system that is out there. It will handle any format, even news. The Windows platform is easy to operate. It has been extremely stable which is important for a walk-away station. We're very pleased with the system and would definitely buy it again if we had to do it all over. This is the only system I've heard that sounds live. ”

- Norm Laramee, KKPT/KSYG/SRN, Little Rock Arkansas

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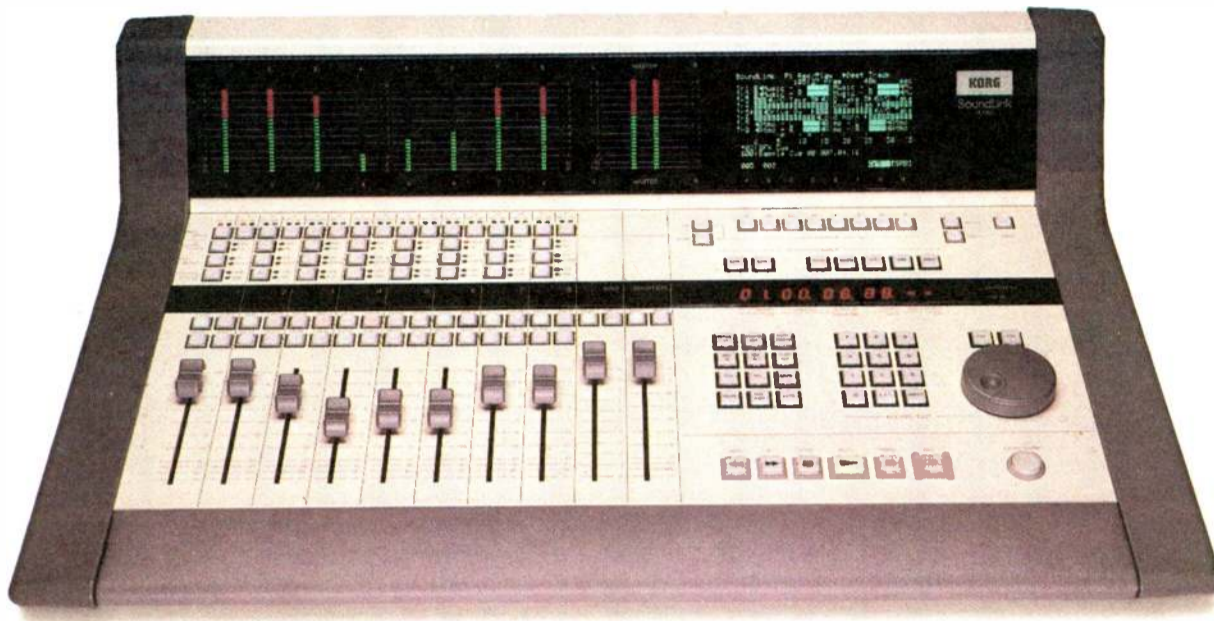
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— Rick Wiggins, Creative Director
WJR-AM, Detroit
Capital Cities/ABC, Inc.

"It's one of the few pieces of equipment at the station I don't have to worry about."

— Fred Holub, Chief Engineer
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— Roy Pressman, Tech. Director
WLVE-FM/WZTA-FM/WINZ-AM
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Studio Sessions

Audio Software for
Mac Users
See page 93.

Equipment and Applications for Radio Production and Recording

PRODUCER'S FILE

Darwin: An Emu-tional Experience

by Ty Ford

BALTIMORE When I pulled E-mu's Darwin 4001 out of its box, I noticed it was about the same size as the toaster oven I just retired. Both also weighed about 17 pounds each.

There was definitely something a little spooky about that, but instead of trying to figure it out, I plunged headlong into the Darwin.

The Darwin 4001 (\$3,795) is an eight-track hard disk recorder with random-access editing. A 1GB internal drive (Conner CPP1080S) records at 44.1 or 48 kHz, providing about 200 minutes of recording.

Darwin is also available for \$3,195 with-

The front panel is laid out simply. Eight columnar 10-segment LEDs show input and output levels from 0 to -44 dB. A record-ready button below each track blinks when activated and stays on solid when recording.

The Darwin manual suggests using the record-ready buttons as mutes. I was a little hesitant to try this at first for fear of recording over a track, but I found there are a number of fail-safes built in.

Those between record-ready and the actual recording process are numerous enough to keep you from making this sort of mistake, except on those days when you really should not be in the studio at all.

Darwin uses familiar "transport controls" (RTZ, REW, FFWD, STOP, PLAY, REC),

six soft keys with an Exit key, a four-button selector assembly, an alphanumeric pad, separate decrement/increment buttons and a shuttle/jog wheel.

The headphone jack and volume control on the front panel are

connected to the output of the internal 8x2 mixer. Headphone volume is fair, but just a bit low for my power-hungry AKG K240 phones.

There are two input modes: Auto and Normal. In Auto, tracks are monitored until punch-in. Once recording begins, the recording inputs are passed to the outputs.

In Normal mode, the record-enabled inputs are always passed through. A Rehearse Mode lets you hear recorded tracks before and after punch-in without going into record mode.

My initial response to the Darwin's front panel was mildly claustrophobic. There is really nothing wrong with it. In fact, I give E-mu high marks for intuitive design. It's just that I like bigger work surfaces.

The backlit LCD panel is 1.5x5 inches, which shows a lot of what is going on. But it displays only 15 seconds of any part of a production. At present, there is no way to view an entire production from start to finish.

Part of my discomfort is based on the fact that I have become accustomed to seeing a complete session overview and more than a 15-second "window" on a production.

Darwin generates MIDI Time Code (MTC), but does not receive it. It does send and receive MIDI Machine Control (MMC).

According to E-mu, this allows devices like J. L. Cooper's Cue Point and most computer-based sequencers that support MMC to be used as a remote control for track record enable, transport controls and shuttling.

Darwin's internal router handles which

jacks get routed to which tracks and also allows for -10 or +4 dB selection of inputs and outputs. A user-configured routing scheme or one of four presets can be used. The 1 Bus mode sends analog input 1 to all eight tracks.

Choosing which track you want the incoming audio to be recorded on is determined by which track you enable and record. There are also 2 Bus, 4 Bus and 8 Bus (only with the optional analog input expander) presets.

The Darwin supports all of the usual

editing features; cut, copy, insert, replace, extend and move. The four-way Audition feature lets you hear the contents of the Clipboard, the selection between the In/Out points, 2 seconds before the inpoint or two seconds after the outpoint.

The In/Out audition playback feature was ragged at both ends and made judgments of dialog editing very difficult.

The Darwin uses the Jog/Shuttle wheel for locating edit points. Resolution in the Jog/Shuttle wheel was also not tight enough to do consistent dialog editing, causing me to spend too much time in the Undo/Redo process.

Undoing also erased the In/Out points, continued on page 118 ▶



The E-mu Darwin Digital Recorder

out hard drive or (soon to ship) at \$3,995 with an Iomega Jaz 1GB removable drive installed.

The stock version I tested has four analog inputs and eight outputs via balanced TRS jacks, a set of RCAs for S/PDIF I/Os, MIDI In/Out/Thru jacks and a connection for a momentary footswitch. The manual shows how the S/PDIF signal might be converted to AES/EBU, but fails to mention what value resistor must be used and does not guarantee success.

A small, rear-mounted exhaust fan and the internal drive make enough noise to prevent the Darwin from being used in situations where such ambient noise cannot be tolerated.

I peeked under the Darwin's hood to find the box mostly empty. There appears to be plenty of room for optional cards. Add-on cards provide four additional analog inputs, the SCSI host computer option and there are three other slots for various unnamed purposes.

The manual stipulates that a hard drive with greater than 5400 RPM, no thermal calibration or embedded servo design and an access time of 12ms or less be used. Still, I found my 100MB (Iomega) Zip drive with 25ms access time worked almost flawlessly with four tracks of audio when attached via the external SCSI bus.

There were a few stoppages with messages about too many edits within a section. That actually happened as I was putting the Darwin into play after it was stopped long enough for the Zip drive to spin down.

I do not suggest you try to "get by" with Zip drives, especially for edit-intensive productions; but the fact is, they worked.

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Serafine Slices and Dices Sound

by Alan R. Peterson

HOLLYWOOD What do you do when the station sound effects collection becomes a little threadbare and clients complain about "their" effects turning up on competing spots?

Fix it the way Hollywood sound designer Frank Serafine would and begin rolling your own.

Frank Serafine's ear for unusual sounds and artistic manipulation of recorded audio have made him a highly in-demand technician and an inspiration to studio rats everywhere. Radio production people sit through movie credits to wait for his name to go by.

Pow! Zoom!

Serafine designs movie sound but talks like a radio guy. He describes a Doppler transform done to a sample by going *woh-shh-eeeww*, and mimics sped-up recordings with a tongue-fluttered *bl-bl-bl-bl-bl*. The man obviously relishes his work.

Serafine works for the movie industry, but radio production professionals would be wise to adopt his methods and techniques to enhance in-house and agency production work.

Serafine's involvement in sound design began on the first "Star Trek" movie when he was only 23 years old; right around the age radio DJs are seeking first jobs. Since then, Serafine Studios has created sound effects for "Star Trek III," "The Addams Family" and "Field of Dreams," among many others.

He recorded Disney World's enormous air conditioner to create the submarine motors heard in "Hunt for Red October," hung mics over the side of the Goodyear blimp for the movie "Tron" and sampled a cougar in heat to concoct a terror effect for "Poltergeist."

Serafine Studios and L² Communications have packaged and released "Platinum Sounds for the 21st Century," which contain sound effects engineered by Serafine (see related story, page 91).

Equipment

One normally associates movie sound with costly Nagra analog reel machines. Serafine has done that, but prefers the purity of digital recording.

"I've been collecting digital sounds since 1982," says Serafine. "Sony gave me one of the first PCM-F1s (digital recorder). It had a giant battery because I would be out all day long doing stuff; it was a backpack, really."

Serafine's typical rig now is a Sony TCD-10 deck and a beyerdynamic 833 stereo MS/XY mic normally used for motion picture audio.

"I'm looking right now at a Millenia mic pre(amp) that goes digital out right into the DAT machine," says Serafine.

Back in the studio, raw tracks go through a battery of high-tech processing. An E-mu Emulator II sampling keyboard is teamed up with Eventide DSP-4000 and Lexicon PCM-80 processors, then sweetened with SPL Labs' Optimizer and Vitalizer.

According to Serafine, "I use electronic musical instruments to bend the sounds, perform the sounds and cluster the sounds so they're diminished and weird-sounding. This creates more emotion than just the normal sound."

A recent synthesizer from Yamaha — the VL-1 — is used to alter sounds through physical modeling. Serafine uses this with a "wind controller," which resembles an electronic clarinet.

This controller allows the producer to alter the qualities of sound by "playing" the changes via this electronic musical instrument.

Serafine is experimenting right now with HyperPrism, which he likens to an audio Etch-A-Sketch. "It's a major sound effects tool," he says. "You can sit there and watch the sound, take the mouse and draw effects on the screen as you are listening to the sound. You can sculpt stuff right there on a MacIntosh."

Serafine explains the creation of some favorite and now-classic effects. Some are possible with equipment common to the typical radio production environment.

The "Poltergeist" effect mentioned earlier (the cougar in heat) was recorded at the Wildlife Waystation in California. This can be approximated at a well-stocked zoo with a DAT, a highly directional mic and a delicately posed question to the zoo director.

The larger-than-life sounds of the earth cracking open in "Poltergeist" were performed by Foley artist John Post. Small amounts of rocks and gravel were moved around and crunched while being recorded.

continued on page 91 ▶



Sound Designer Frank Serafine

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PRODUCT EVALUATION

The Evolution of the CardD Plus

by Read G. Burgan

LAKE LINDEN, Mich. My first sound card cost \$89. I was captivated by my newfound ability to record and play sound on my computer. I could edit, I could equalize, add reverb and do mixes all on a computer.

Then the novelty wore off and I began to listen closely to the sound. More noise was coming out then going in. It was in the background, but it was there. Whistling noises and hum. No matter what I tried, the noise would not go away.

"What value is all this ease if the final product is noisier than the original?", I

fumed. "And what about all the promises of super digital sound?"

Pay the man

I learned the first rule of digital audio the hard way: sound cards are not created equal. More than in any other area of life, you get what you pay for.

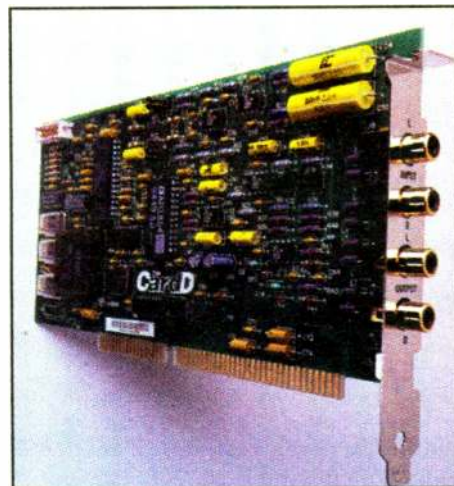
A sound card allows you to input audio into your computer and to output it back out so that you can archive your material in a form more permanent than your hard drive. Chances are if you purchased your computer in the last few months, it came already equipped with a sound card.

If you intend to do serious digital audio

work, like mastering a compact disc or your favorite client's spot, you will need more than your common garden variety of sound card. Digital Audio Labs' CardD Plus is a top-of-the line card that offers excellent performance.

CardD Plus was designed by Jeff Wilson and Al Pickard as a high-quality digitizing and playback board for the IBM PC. As sound cards go, this is not a new card; There are now more than 7,000 systems worldwide using it.

Digital Audio's very first product was called the Desktop Recording Board that was a precursor to the CardD. It did essentially the same things its successor



CardD Plus

would do, but was larger, had more components and cost a lot more.

Jeff Wilson believes it was the very first CD-quality recording card designed exclusively for an IBM PC.

"We were back there at the beginning before everyone wanted a beginning," Wilson notes. The first CardD Plus shipped in November of 1990. Improvements along the way included bus interface logic which enabled the card to do simultaneous record and playback.

Another change decreased the response time required by the DMA channel reducing the likelihood of dropouts.

Bytes and pieces

The CardD Plus is a one-slot 16-bit audio card. The card supports sample rates of 48, 32 and 22.05 kHz. It boasts a dynamic range of 92 dB and a THD of .003 percent.

Dual 16-bit Delta-Sigma A/D converters with 64x oversampling are used for recording and dual 18-bit D/A converters with 8x oversampling handle playback. CardD has a phase linearity of ± 5 degrees, and a frequency response of 20 Hz to 20 kHz, ± 25 dB at a sample rate of 44.1 kHz.

CardD Plus is no ordinary sound card. All of its connectors are gold-plated. While most sound cards use eighth-inch stereo jacks, the CardD Plus uses four individual unbalanced RCA phono jacks. If your system uses balanced lines, an adapter will be needed.

My experiences with small stereo jacks have been mixed at best. I am never sure both channels are making contact. All it takes is a slight twist of the cable to degrade quality or make one channel intermittent.

Digital Audio Labs recommends a minimum of a 386-40 computer, DOS 5.0 or higher and Windows 3.1. Your disk controller must be a 16- or 32-bit bus type and you should not be using any compression programs like Stacker or Microsoft DoubleSpace. They slow disk access to the point that it will not be able to keep pace with the audio card's demands.

Shuffling the cards

Theoretically you can place the card in any 16-bit slot. In practice, placement may affect performance.

The manual warns against placing the card next to a video or disk controller, which may result in whistling or other noise. I had no trouble at all with my Pentium, but the card was plagued with background noise in my 486.

In my particular case, I had a video card on one side of the CardD and an enhanced IDE controller on the other. Relocating the IDE controller card was an exercise in frustration. Moving it to any

continued on next page ►

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other local bus slot — and there are only so many of them — placed the 5.25-inch floppy drive beyond the reach of the ribbon cable. I ended up remounting the drive in another bay.

When the problem was resolved, the sound card was quiet as a winter night in Michigan. And in all fairness, I had a similar problem when I installed a Turtle Beach Monterey card in the 486.

If you are short of slots in your computer, you may have a difficult time getting a sound card to perform up to specs. There are lots of potential noise sources inside your computer, and most of the old stand-by tricks that worked in analog audio equipment do not work here.

Set the jumpers before installing the CardD Plus. There are six sets, but you will probably be concerned with only four: L record level, R record level, L playback level and R playback level.

There are three level choices: +4 dB for pro levels, consumer CD line level and -10 dB. Set the jumpers to match your equipment.

The card comes set for flat response from 20 Hz to 20 kHz, but can be jumpered to record down to DC. Most of us do not need this response but it is available.

The manual suggests installing the board with the factory Hex setting. If this does not work, pull the board and change the setting later. I used the factory setting with no trouble.

Install the Windows driver to allow your audio applications to use the sound card. Digital Audio Labs supplies the required Windows 95-compatible driver on floppies. The manual suggests you accept the defaults for Port Address, Interrupt and DMA unless there is a conflict with a scanner, modem or other

device in your computer.

You also have Record Source and Digital I/O options. The RCA plugs on CardD Plus are set up as two inputs and two outputs. Digital Audio Labs offers an accessory card (the I/O CardD) which requires another slot in your computer and interconnects with the CardD Plus. This provides direct SPDIF ins and outs and connects to the CardD Plus via an internal ribbon cable.

If you have this additional card, you would select whether to use the analog or digital outputs here.

I learned the first rule of digital audio the hard way; sound cards are not created equal.

The Digital I/O feature offers Copy Protect. This engages the copy protect bit when transferring to DAT, preventing others from making copies of your work on consumer DAT equipment.

Up and running

For the past few months, I have used the CardD Plus with Software Audio Workshop (SAW), Sound Forge, Fast Eddie and Digital Audio Restoration Technology (DART) on the Pentium and the 486. The card is extremely quiet and has been exhibiting no detectable noise. Its sonic quality is terrific, demonstrating the kind of clarity and purity that digital audio is renown for.

Two things make this sound card exceptional. The first is sound quality. Jeff Wilson considers this one of its defining features.

Wilson says, "We put all of our efforts

into sound quality five-and-a-half years ago, and that's what people buy it for now. We use premium grade converters. And we did a lot of work with the grounding layout and the power supply filtering."

Another feature is the ability to record and play simultaneously. Software Audio Workshop (SAW) is one of several PC-based audio programs that allow true multitrack recording; you can listen to a previous digital recording on your hard drive while simultaneously recording a new one.

You can mix the two sources, in effect creating a sound-on-sound recording that combines the original with an additional recording, all through the same audio console without any attendant feedback.

You can do this only if the sound card supports this mode. CardD Plus is one of a very small selection of cards that do. Using CardD Plus in this mode was a delight, providing the true kind of versatility that digital audio should provide, but seldom does.

Wilson is also proud of the fact that the CardD Plus has had a digital option from the very beginning. Only a small percentage of manufacturers offer this option even today.

If I have any criticism, it is that Digital Audio Labs does not include any Windows-based software with the CardD Plus. It does come with a bare bones DOS

program that provides only the most rudimentary recording and playback capabilities.

I would really like the ability to set the incoming and outgoing levels through a Windows software display. Most audio software packages assume your sound-card software will provide the means to set levels. Sound Blaster and Turtle Beach provide this.

More flexibility in setting levels than the three jumper choices would be desirable. But considering the high performance quality of this card and its intended use, that is being pretty picky.

This is a high quality card, reflecting great design, fine workmanship and top-quality components. If you are used to generic hobby-style sound cards, get ready for a little sticker shock. The CardD Plus has a suggested retail price of \$795. Add another \$295 if you want the I/O CardD.

Digital Audio Labs also has the basic CardD, which provides direct digital access without the A/D converters. It has a suggested list price of \$495 and is a good one-card solution for users who already have outboard A/Ds or want to run directly to a DAT, ADAT, etc.

The card has performed flawlessly and given me the quietest and cleanest sound of anything I have used to date. This is truly a professional quality audio card, and the sound quality will meet the most demanding application.

□ □ □

For information, contact Digital Audio Labs, Inc., by e-mail at dalinfo@digitalaudio.com or by phone at 612-559-9098.

Read Burgan is a free-lance writer and a former public radio station manager who can be reached at 906-296-0652 or through e-mail at rgb@up.net

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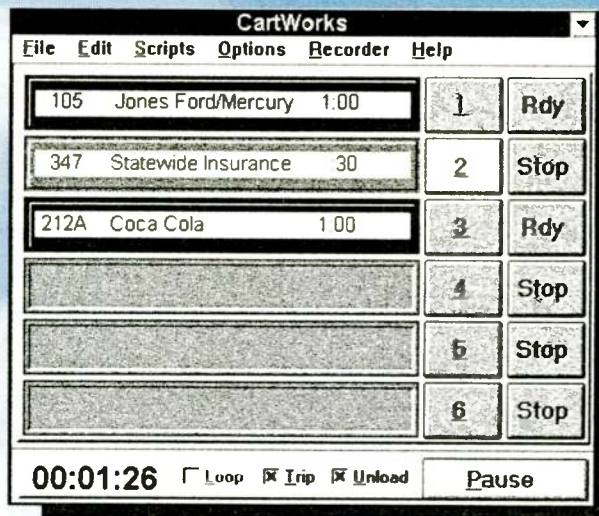
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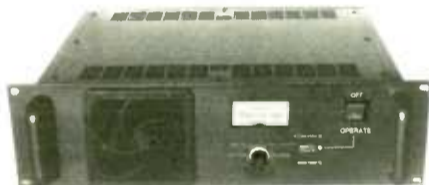
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READER SERVICE NO. 103

PRODUCT EVALUATION

L² Movie Sound Effects for Radio

by Alan R. Peterson

HOLLYWOOD Platinum Sounds for the 21st Century has been collected, designed and modified by Frank Serafine over his two decades "in the biz." L2 Communications sent Studio Sessions the Platinum Sounds demo disc and three CDs from the library: Science Fiction 1 and 2 and Supernatural.

This collection is not an "out of the box" effect library with ready-made montages to be plugged into a production as desired. It must be thought of as a group of individual elements that you combine to create a whole.

Just as a fine painting does not pour forth from a single tube of paint, an effective audio sequence can only be realized when a dab of this and a dash of that are combined by a talented production engineer.

Colorful palette

When thought of in that respect, the Platinum Sounds collection is a remarkably colorful palette of audio, cleanly recorded and stunning in detail. This collection will separate the radio production rats from the genuine radio pro-

duction designers.

Science Fiction 1 is an impressive collection, but depends heavily on effects from an earlier time. There are many laser blasts and video game sound zaps and pops. All are still useful, but are showing their age a little.

You know that noise inside your head when you have a very bad fever? That's it.

On the other hand, Science Fiction 2 has many interesting texture beds and individual effects. When layered, these can create some remarkably nightmarish montages. Some may sound surrealistically familiar; one effect is a European telephone's double-ring, flopped to play in reverse.

Another takes slowed-down speech and time-scrames it through a Harmonizer. A robotic voice intones a popular euphemism for "no (kidding), Sherlock," which will obviously keep it from making it to the air.

The Supernatural CD gets pretty

spooky: Labored breathing, guttural growls, screams and animal noises fill out the disc. Texture pads are also provided here as a sonic backdrop to hang the discrete horror sound on. These sounds are a galactic leap ahead of the old BBC library noises we are compelled to pull out every Halloween.

There are magnificently splatty sound effects in the higher bands, obviously used as torture effects in the movies. All are wonderfully wet and very visceral; ironically, most are probably the sound of various fruits being squashed. It is all in your interpretation of how you want the sound to be used.

What is it like to hear a montage created from any of these three discs? You know that noise inside your head when you have a very bad fever and cannot wake up from a nightmare? That's it.

More sounds

Other discs in the Platinum Sounds collection include Water, Metal, Industrial Machinery, Transportation and more. I wish I had a chance to hear the Animals CD — its respective montage on the demo CD was admirably done and is miles beyond that 1940s vintage kook-aburra bird we have all endured since our first year in radio.

The demo disc contains samples of the effects edited together into montages to

give an idea of the flexibility of the package. Ask for it by calling L2 Communications at the number shown in the product capsule.

Platinum Sounds for the 21st Century is a high-quality compilation but carries a steep price: ten CDs for \$1,395. It is not

Product Capsule:
Platinum Sounds for the 21st Century

 Thumbs Up ✓ high quality digital recordings ✓ variety of sound ✓ endless mixing possibilities	 Thumbs Down ✓ very expensive
--	---

For more information, call L2 Communications at 1-800-779-5239 or circle **Reader Service 157**.

a likely purchase for many radio stations, but is ideal for audio/video production houses, multimedia producers and major-market radio groups looking for elements to create a heightened sense of reality in their work.

The only way to get this collection any cheaper is to book a ride on the Goodyear blimp and record the motors yourself. But Frank Serafine has already done it for you.

Serafine Cinema Sound

► continued from page 87

This was sent into the Emulator which dropped the pitch four octaves.

Serafine explains, "The anti-aliasing feature of the Emulator keeps the sound from getting gritty. It's still a rock, but now it's a huge, gigantic rock."

The movie "Virtuosity" had a fascinating montage consisting of the voices of Adolph Hitler, Charles Manson and Jeffrey Dahmer; the latter two performed by voice actor Frank Welker.

All three voices were loaded into the Emulator and pitched up several octaves, which accelerated the playback speed as well. The pitch was returned to normal with the Eventide while playback stayed at the higher rate.

According to Serafine, "It brought it right down to an almost intelligible range to where you really knew it was Hitler, but it was 30 times faster."

Some samplers allow the user to reverse the playback of a sample, which could add greater texture to an audio effect.

Serafine cites another scene from "Virtuosity" — an enormous virtual reality machine — and how he located the perfect effect at a local Home Depot home improvement chain store.

"They have these 35-foot hydraulic actuators that load those huge bags of concrete on the high racks ... those things make an incredible sound! I had a guy take it out back to a quiet place and he ran it to the ground to get that malfunctioning sound; that grr-rr-rr (mimics machine grinding) sound. So I got all these elements of a hydraulic actuator in distress."

Don't lose heart

The equipment at Serafine's disposal is enough to make even the strongest radio production person weep, but he advises those who want more to use what is already on hand.

"Before I have what I have now ... when I did 'Star Trek,' I had nothing. The sounds on my science fiction and industrial CDs are things I created in 1979. That's getting on 20 years now and it still sounds incredible."

Serafine suggests it is possible to create superb work with whatever one has, no matter how limiting it may seem. "Remember, it's all ears. That's all it is," he said.

"Every day I'm hearing sounds. I constantly hear things and make notes to go back and record them. I live a few blocks from a steam cleaner and someday I'm going to go there and record some incredible steam sounds."

The notes Serafine keeps sometimes net as many as 30 to 50 sounds in one day.

Following advice

Say for a moment this all makes sense and you follow it to the letter. You begin to assemble a personal collection of high-quality field-recorded sounds, cut to DAT or MD with a clean, high-end condenser mic. How do you know a sound effect is going to be successful in the context it will be used?

There is no cosmic constant, nor are there any mystical associations to be concerned about. In Serafine's own words:

"If it's not good, it's like 'ugh' (sound of disgust), but if it's great, I'm like, 'Whoa!' (sound of amazement)."

In radio production as well as film, truer words do not exist.

□ □ □

In addition to his CD collection, Frank Serafine has written custom programs for the Eventide and Lexicon processors mentioned above. These programs are available as data cards for each respective device. For information, contact Eventide at 201-641-1200 and Lexicon at 617-736-0300.

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FIELD IMPRESSIONS

Create Your Studio Space Wisely

by Keith Spencer-Allen

LONDON "Hi, let me show you around."

I have no idea how many times I have been on the receiving end of those words as a prelude to opened studio doors intruding on creative people and the tools of their profession.

Coming from a production background, I automatically tend to judge a studio by imagining myself working in it for a length of time. Sometimes the experience can be stimulating, while other occasions it can leave one sadly underwhelmed.

There are consultants capable of design-

ing the studios we work in, but they are preoccupied with acoustics and noise levels. Equipment choice may fall to other advisors who also are expert at ergonomics and where the gear should be placed.

Getting it together

If you are lucky, all the design contributors to the studio may talk meaningfully to each other, but once the project is finished they move on. As the studio becomes increasingly automated and offers more control, the operation of the equipment is increasingly a singular, more cerebral role rather than a manual one. Comfort and concentration over

long periods of time are essential.

Responsibility for the finer points of the operator's environment often falls between the roles of the designer and equipment specifier, even though an unsympathetic environment may be restrictive on creativity, productivity and efficiency. In a commercial production environment you may even lose clients, despite your choices of the "perfect" equipment.

Not-so-obvious

So what are some considerations that may contribute to an ideal environment? Aside from the obvious, consider these:

•**HVAC:** There are many arguments about the best way to implement heating, ventilation and air conditioning (HVAC).

You need to make sure there will be no detectable air movement above or below the operating position, unless you want your engineer to freeze. Also, there should be no rising or falling air movement between the engineer and the monitor speakers as this will degrade monitoring integrity.

•**Odors:** Electronic devices always emit that smell of hot plastic and fiberglass. Air conditioning may remove some of it, but not before the equipment's internal fans have exhausted their hot air into the room. Move some of the equipment out of the operational area into a "machine room."

Perhaps a powered ducting system can be put in to remove hot air from the rack to the outside without it even entering the room.

•**Ionizers:** They definitely return a sparkle to the air that has a refreshing effect on the occupants. The down side to ionizers is that they cause impurities in the air to settle onto surfaces in the form of a fine penetrating dust, requiring increased cleaning.

•**Acoustics:** Techniques are available to allow greater control over sound than previously possible. Diffusing sound, rather than excessively absorbing it, can remove troublesome direct reflections and create a better and less tiring situation to talk or monitor in.

When applied in talent areas, a minor alteration in mic technique leads to no perceived change in sound.

Safety concerns

•**Safety:** The major change in the production environment is the increasing use of computer-based equipment. With the possibility of long hours in restricted positions, ergonomically correct seating and desk height are major factors.

The concern of radiation emission from screens is another area of much debate; one that most manufacturers are now addressing.

Emissions from the sides and rear are greater than the small amount that emanates from the screen front. Distances of about four-and-a-half to five feet are recommended as a precaution for operators normally off to the side or behind a batch of monitors.

•**Lighting:** European electrical service frequency is 50 Hz AC, compared to the domestic U.S. standard of 60 Hz.

Living with 50 Hz here, I have problems working with fluorescent lights over a period of hours. When I factor in a monitor screen with its own refresh rate (and associated flicker), my eyes fatigue and I lose concentration. My productivity declines within 30 minutes.

A switch to incandescent lighting made for a rapid recovery. It took me months to realize this and I am probably not the only one.

These are by no means the only factors that create a good working environment, but I have found them to be among the most positive. It is worth remembering that large sums are spent on equipment, but small changes can often have a big effect.

□□□

Keith Spencer-Allen writes for *RW International*, is a free-lance consultant, writer and recording engineer based near London.

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DIGITAL DOMAIN

Software Packs to Feed Your Macs

by Mel Lambert

LOS ANGELES Responding to favorable reactions from my recent column item on Macintosh and PC-based editing and DSP facilities, I make no excuse for spotlighting a couple of particularly interesting examples of the genre.

Despite the fact that the majority of the radio broadcast market is heavily PC-based, a number of you are looking across the fence at what the competition has to offer. Which, given the rapid convergence of these two paradigms through the newer-generation of PowerPCs, may not be a bad idea.

Reaching the Peak

One firm that might not be too familiar to RW readers is Berkley Integrated Audio Software, which recently unveiled Peak; a new editor/processor program for the Macintosh family of PowerPC, PowerBooks and 680X0-based systems.

points while a file is playing. Having located the desired loop, its position can be captured as either a defined region or new file.

In addition to supporting Mac-standard .AIFF and .SDII formats, Peak handles .AIF and Red Book formats in both 8- and 16-bit resolutions. I understand that version 1.1 of the program will also accommodate .WAV files.

The program's functionality is extended through the availability of several Peak "Accessory Paks." The Composer/Audio Designer Pak adds several effects and DSP options while the Sampler Pak allows sampler owners to edit and modify files. The Audio Pro Pak supplies extra editing tools for declipping, gain changing, normalizing, sample-rate conversion, plus time compression/expansion.

The program's Librarian Pak can be used to keep track of large numbers of sound effects and other audio files, as well as batch-file processing. This includes mono to stereo;

real-time indications of the degree, type and spatial location of processing effects.

Floating circles

In the multitap delay algorithm, for example, up to eight circles represent the left-to-right placement for each tap. Circle size indicates each tap's relative gain, while an inner concentric circle displays the effect depth for that tap.

DSP*FX can be expanded in two-channel increments. Systems begin with two channels of analog inputs and outputs; the turnkey DSP*FX PowerPack system includes AES/EBU and SPDIF format digital I/Os. The control screen also features

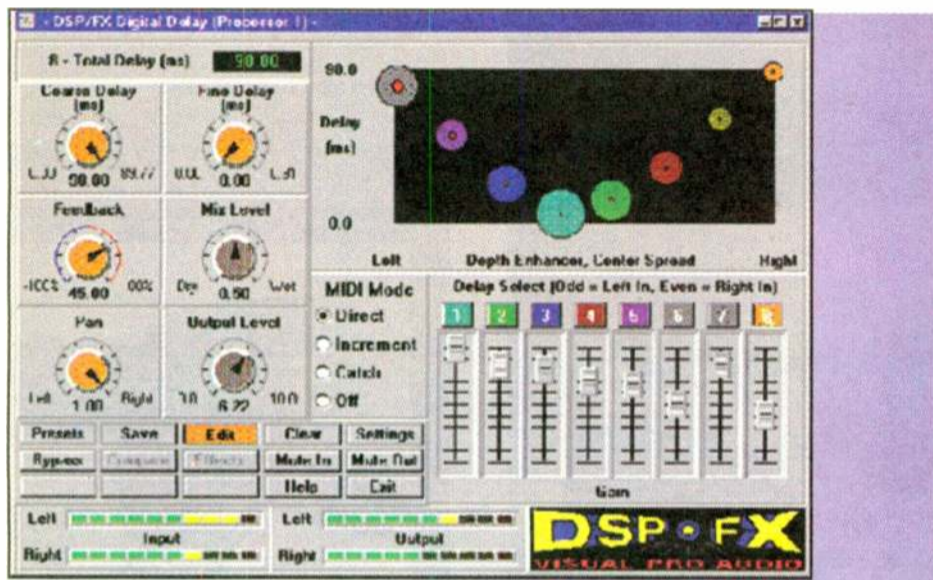
console-like knobs and faders.

Parameters can be controlled in real time by mouse, any MIDI fader system, or by the DSP*FX Controller. Events can also be automated using a PC MIDI sequencer such as Twelve Tone Systems' CakeWalk.

DSP*FX system prices begin at \$1,295. DSP*FX PowerPack systems start at \$3,995 and include the DSP*FX Controller.

□ □ □

For product information, contact Berkley Integrated Audio Software at 415-331-2446, and Power Technology at 415-467-7886. Mel Lambert is principal of Media & Marketing, a West Coast-based consulting service for the professional audio industry and has been involved with the production and broadcast industries on both sides of the Atlantic for 20 years. He can be reached via mediapr@earthlink.net or 1-818-753-9510.



Screenshot of the DSP*FX Delay Algorithm

Peak is described as an amalgam of the functions of a nondestructive digital audio editing and processing system with sound design and compositional tools, plus full support for MIDI-based samplers. It is also said to be the first audio program to work in native mode with all PowerPC-equipped Macs in addition to almost all 68030/40 units with or without a sound card or A/V circuits.

Equally dramatic is the fact that Peak's processing functionality can work in tandem with existing Mac-based applications. These include Digidesign's Pro Tools, AudioMedia II, Session and Sound Designer II, Macromedia's SoundEdit 16 and Deck II, Opcode's DigiTrax, Passport Design's Alchemy and Sonic Solutions' Sonic System.

Incidentally, the program was used extensively for sound design of the recent Pixar/Disney Interactive CD-ROM "Toy Story Animated Storybook."

One Mac, three programs

"Peak is a real Swiss Army Knife," says Alex Stahl, who developed the soundtrack. "Its integrated features used to require two or three different programs, none of which were native PowerPC. Plus, I love being able to copy a CD effect directly to my sampler."

In the nuts and bolts department, Peak provides an unlimited number of undo/redos, unlimited zoom levels, as well as waveform redrawing in the background. The Loop Surfer feature lets you adjust start and end

16- to 8-bit conversion, sample rate conversion and more.

Peak lists for \$299. The various Composer/Audio Designer, Sampler, Audio Pro, and Audio Librarian Paks each list for \$129.

New Windows program

Just when you thought it was safe to go back in the water, Power Technology announced a 32-bit effects processing system for any Windows-equipped PC.

Through a combination of proprietary DSP hardware and software, DSP*FX is said to offer the familiarity and ease-of-integration of a rackmount signal processor, with the flexibility and control of a computer-based system.

The technology is available either as a self-contained turnkey system — referred to as the DSP*FX PowerPack — or as an array of plug-in cards and software for a PC.

Compared to ordinary 24-bit, fixed-point processors, DSP*FX is described as offering "superior resolution, especially at low levels." Effects are said to be free from glitches, graininess, and unwanted artifacts, even during complex effects such as pitch-shifting and reverb. Available effects include stereo pitch-shifting, reverb, chorus/flanging, EQ and multitap stereo delay; other algorithms are already in development.

DSP*FX offers a number of user presets, and a high degree of user interface feedback and control via the on-screen Visual Pro Audio display. Multicolored icons provide

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Connect Camera Cables to Kooky Comedy

by Alan R. Peterson

WASHINGTON Someday soon a television news crew will be at your station to do a profile on your wacky morning show, your acerbic talk show host or your evening Love Songs hostess.

Perhaps some rising music artist will be visiting your station soon, bringing his/her latest hit recorded on an old Uher ENG reel machine with some DIN output configuration from another galaxy.

Either way, be ready with easy interconnectivity to jack your signal directly into the camera or take a feed from an unusual or foreign machine.

Provide a breakout box under the

console with balanced XLR +4, unbalanced RCA -10 and both balanced and unbalanced mic level outputs.

For the main studio, tap a signal off the

station's sound when passing through that little three-inch TV speaker.

Prepare some cables that will connect to a television camera's audio inputs.

Plan ahead for any possible kind of connection to be made to a video camera, especially the fancier consumer units.

processor outputs if an AM broadcast, or right off the air monitor for FM. This maintains the faithfulness of your

You could call the engineer at the TV station and ask what their cameras require, but it is safe to assume the fol-

lowing:

The big 3-chip news cameras require conventional XLR-to-XLR mic cables to work. Prepare one stock cable and one with a floating ground (pin 1 and shell lifted at one end) to avoid ground loops. Cameras are switchable between mic and line level, but be ready to connect to the mic level output on the breakout box if need be.

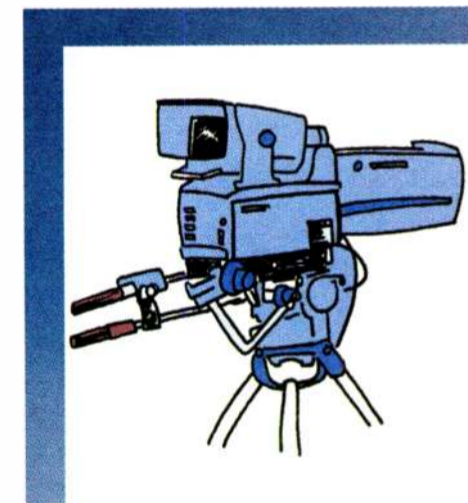
If taping is to be done with a consumer Hi-8 or VHS camcorder, you will likely be connecting to a mic input. Make a cable that terminates in an eighth-inch plug for the camcorder's mic jack. And remember to feed the camera from the mic-level output.

Be aware of ground loops here as well. A cable with an isolation transformer is adequate insurance for a clean signal.

Plan ahead for any possible kind of connection to be made to a video camera. Some even record in stereo, especially the fancier consumer units. On TV, your station's sound should be as good as the picture.

Machines from Mars

Now about that Uher, or any other unconventional device you may encounter.



Inside the production room, provide connections to and from the Audition, Program and Utility busses, if applicable. If you are using a patch bay, signals can be injected and grabbed directly from there. Keep an assortment of cables with XLR, banana, quarter-inch and eighth-inch connectors handy.

Usually only speaker cabinets and test equipment use banana connectors, but these plugs and jacks come in handy when having to tack several cords together to create something unique.

For a foreign machine such as the Uher deck, use a conventional DIN plug normally used for MIDI connections. Terminate in a domestic-style connector as necessary if you know the configuration; otherwise, run each lead out to a banana plug and start experimenting.

In a pinch, you can always take audio from a headphone jack and pad it down, but only as a last resort.

Never assume a camera crew or artist will show up with everything necessary to pull off the performance. If jocks decide to tape their shows with camcorders, it is certain they will not have the proper cables to patch in.

If you want to get it right the first time and your station has a serious stake in the success of the presentation, be ready with everything. Especially the right cables and a place to put them.



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Soundcraft Disco Mixer

Soundcraft recently introduced the new D-Mix 500 high-performance disco mixer. The D-Mix 500 features five stereo and



two mono inputs, three RIAA-equalized phono inputs and a switchable effects insert for the mic channel.

There is 3-band EQ on all channels, a Super-Bass control that boosts +12 dB @ 63 Hz and outputs for recording and monitoring. The crossfade control is field-replaceable.

Soundcraft consoles are manufactured in the UK and distributed in the United States by Harman Pro North America.

For more information, contact Harman Pro at 916-888-0488 or circle Reader Service 164.

Ampex Recordable Media

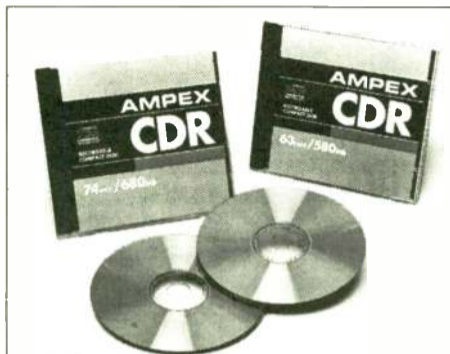
Ampex is marketing the CDR series of recordable compact discs.

The discs are fully compatible with the Orange Book Standard for recordable CDs, as well as ISO 9660 technical specifications. This assures compatibility with nearly all CD formats, including CD-Audio, CD-ROM, CD-I interactive discs

PRODUCT GUIDE

Companies with new product announcements for Studio Sessions Product Guide should send them to Radio World, c/o Studio Sessions Editor, 5827 Columbia Pike, 3rd floor, Falls Church, Va. 22041

and extended architecture CD-ROMXA. Ampex CDR discs are available in both



63 minute/580MB and 74 minute/680MB configurations.

For more information, contact Ampex Media Corporation at 415-367-3889 or circle Reader Service 174.

Audio-Technica Mic

Audio-Technica adds to the 40 Series microphone line with the AT4041 cardioid capacitor mic.

The case is turned brass with a low-reflectance black finish. An integral 80 Hz high-pass filter switches in to perform low-end rolloff.

Frequency range is 20 Hz to 20 kHz and the mic has a transformerless output. The AT4041 can accept 145 dB SPL before producing one percent of THD.

The mic has been designed for professional recording and critical broadcast applications.



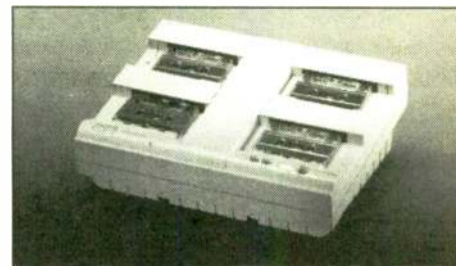
For more information, contact Audio-Technica at 216-686-2600 or circle Reader Service 158.

Telex Cassette Duplicator

Telex Communications has the Copyette line of self-contained cassette duplication machines.

Shown is the Copyette EH 1•2•3 Mono, which copies both sides of three cassettes at once. A stereo version is also available. One-button operation copies cassettes at nearly 16 times normal speed; both sides

of a C-60 tape can be reproduced in around two minutes.



The companion Copyette EH 1•2•1, a stereo two-bay machine, is also available.

For more information, contact Telex Communications at 612-884-4051 or circle Reader Service 146.

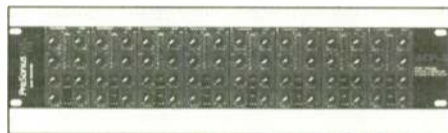
PreSonus Dynamics Processor

PreSonus debuts the ACP-8 eight-channel compressor/gate for multitrack recording and studio mic control.

The ACP-8 has eight independent compressor/limiters and noise gates, each with gain-reduction LED metering. Channels can be linked or bypassed at the operator's discretion. Compressor attack and release times are fully adjustable.

Surface mount technology keeps the price down on the ACP-8; the all-analog unit is priced at less than \$88 per channel.

For more information, contact PreSonus at 504-344-8881 or circle Reader Service 163.



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Radio Veterans Help Scouts Build Station

by Lee Harris

NEW YORK In this age of mega-mergers, downsized duopolies and digital audio platforms, what can big-time broadcasters do to recapture the magic they felt when they were first drawn to the radio business decades ago?

A couple of New York newsmen are reliving that excitement by helping to introduce Boy Scouts to the essentials of radio with their own flea-power FM station.

The Scouts have offered a merit badge in broadcasting for many years, but Scouts at Camp Alpine, N.J., have not had a practical way of earning it, until now. A mile up the road from the tower Maj. Edwin Armstrong built for his experimental FM station, W2XMN, broadcasters of tomorrow will be conducting some experiments of their own.

Devising a plan

The Scout station was the idea of ABC Radio Network correspondent Bob Hardt and WINS(AM) New York, News Anchor John Meagher. They are both members of the Chestnut Ridge Amateur Radio Club, which leases antenna space for its repeaters on a water tower belonging to the Scout camp. Because community service is one of the purposes of the club, the broadcasters asked what they could do to help the Scouts.

With Scout officials, they devised a plan to serve the sprawling camp with a series of six or seven 100 mW transmitters that would be fed by phone lines from a central studio in the camp's administration office.

Like the proverbial kids in the candy store, Hardt and Meagher rifled (with permission) through the storage rooms of their generous employers. At WINS, Meagher found three Sculley reel-to-reel recorders, all suffering from dead power supplies. He also scored a couple of ITC single-play cart machines that were in working order.

In a soon to be vacated storeroom at the ABC Radio Network, there was even more treasure to be found. Hardt says it contained "every discarded piece of equipment since the Blue Network." He came away with two ITC triple-deck cart machines with record amplifiers, Revox cassette recorders, miles of Belden cable and about 500 brand-new carts, freed up by ABC's conver-

sion to the D-Cart digital audio system.

The console for the operation was found sitting in the garage of one of the radio club members. It's an old Collins dual-channel rotary-pot job of late '70s vintage, which allegedly came out of the late WHN in New York. Another member kicked in a couple of Electro-Voice microphones, and the Scouts popped for some con-

dozen remote camp sites. A transmitter will be located at each, probably atop the small buildings that serve as headquarters for each site. A couple of transmitter models are being tested now for frequency stability and audio quality, and to make sure they comply with part 15 of the FCC rules and regulations regarding unlicensed operations.

Hardt and Meagher, along with Scout officials, plan to work out a radio curriculum, which will not only qualify the Scouts for their broadcasting merit badges, but also teach them the realities of small market radio operations. The kids will also get enough theory to develop a general idea of how equipment operates. This should give them a real jump on many of the young people entering the business today, because most either have no interest in such matters or just assume that everything works by magic.

Regular schedule

Hardt says it is possible that during the summer, the station may operate on a regular schedule, allowing Scouts camping out at the remote sites to listen in on their Walkmans. No word yet on the format of the station, but given the age of the air-staff, you can bet on at least a minor struggle between the teenaged DJs and camp management.

Unlike many major air talents, Bob Hardt has a true love for the nuts and bolts

of radio. The 32-year veteran of ABC Radio (in Detroit and New York, local and national) holds a general phone license, plus an Extra Class ham license. He says his idea of a great job (if he didn't already have one) would be designing directional antenna systems.

For Meagher, another ABC Network and WABC(AM) vet, the Scout station is a reminder of his early radio days, which, like Hardt's, were spent in Michigan.

Away from the hectic New York pace of their regular workdays, these two accomplished broadcasters have been able to relive the magic of the past, while helping to prepare another generation of broadcasters for the challenges of the next century.

□ □ □

Lee Harris, former station owner/manager, is currently morning anchor at all-news WINS (AM) in New York.



The Boy Scout Air Studio

sumer-grade CD players and headphones.

In what Hardt calls a labor of love, he spent about six months refurbishing the board and the other equipment, while Meagher concentrated on cabinetry for the studio. So far only one of the three Sculleys is working, but there is hope for the rest.

Ready by spring

As the photo shows, the Scout operation is the rival of many small market control rooms.

Working several mornings each week before his 3 to 11 p.m. shift at ABC, Hardt has been busy wiring up the studio in the hope of having everything ready by spring. He says the facility is about 95-percent complete. The only major remaining project is an output switcher.

The local phone company is now laying lines to half a

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Reprinted from Radio World (June 11, 1932).

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.

CROOKS LISTEN, POLICE LAMENT

Washington. The effectiveness of police radio is being hampered by criminals who listen in, and profit by what they hear, police of six large cities complained to the Federal Radio Commission. The criminals use the information to their own advantage, and thus the system is turned to a detriment to the police departments in their work of crime detection and catching offenders.

The Commission let it be known that more and more persons listen to police broadcasts, including principally honest citizens with short-wave sets, adapters or converters, but that the greatest growth of the listening audience is among criminals.

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Diplexing AM Is a Valid Option

by Jerry Westberg

QUINCY, III. Many AM radio stations are considering diplexed systems because the cost of constructing a new site is higher than the cost of diplexing. In the past, it was assumed that the filters used in the diplex system would degrade the bandwidth and thus the sound quality of the station. Today, with the aid of the microcomputer and design software, this is not true (software demo available free from author).

Systems can be designed with little negative effect on the bandwidth of the system. In this series of articles, design techniques and equations will be given that will aid in the optimization of a diplex system.

A diplexer is a set of filters that will allow the operation of two frequencies on the same antenna. Figure 1 shows a schematic representation of the parts of a diplexer. Although all parts are not necessary in every case, there are basically five parts to a diplexer.

The prematcher, usually consisting of a coil or capacitor in series with the tower, is extremely important to the bandwidth of the system. The prematcher adjusts

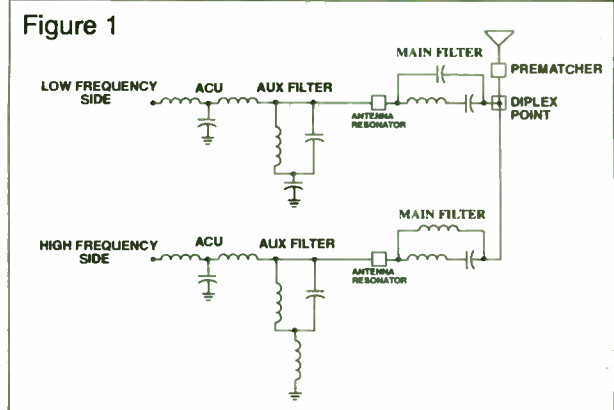
be too high at the reject frequency.

To demonstrate the use of a prematcher, consider the following example. Each station is assumed to be 1000 W of power.

Frequency	Impedance	R ²	Voltage	Minimum Main Filter Q
800kHz	90 + j 150	339	582	6.6
1000kHz	381 + j 310	633	796	2.3

R² is the parallel resistance of the impedance calculated by $R^2 = (R^2 + X^2)/R$

These would be typical numbers found in a diplex system. The voltage at the diplex point is important because this is the voltage that needs to be attenuated by the filter design. Ideally, the voltage will be zero at the trans-



mitter. This, of course, is impossible, but it is good to have the voltage as low as possible. The minimum Q values represent the stored energy in the main filters. The higher the Qs, the more narrow the bandwidth of the system. The total minimum Q for this system is 8.9.

continued on page 99 ▶

This near-resonant condition will cause the auxiliary filters to improve the bandwidth of the system.

the impedance at the diplex point at both frequencies. The diplex point is where the two signals first come together. The impedances at this point are used to calculate the stresses and Qs for the filter circuits.

The main filter is used to attenuate the reject frequency. It provides a high impedance at the reject frequency (on the order of 10 k) and a low impedance at the pass frequency (on the order of 1 ohm).

There are two main filters in a diplexer, one for each frequency. The antenna resonator is a coil if the impedance at that point is capacitive, and a capacitor if the impedance is inductive. It is used to bring the impedance, at the point where the auxiliary filter will be connected, to nearly zero. This near-resonant condition will cause the auxiliary filters to improve the bandwidth of the system. This technique is known as Q-matching.

The auxiliary filter is used to further attenuate the reject frequency. It provides a high impedance to ground at the pass frequency and a low impedance to ground at the reject frequency.

The antenna coupling unit (ACU) is used to match the impedance of the diplex system to the Zo of the transmission line.

In this article, the prematcher circuitry will be discussed. It is desirable to have the diplex point impedance at each frequency to be close to resonance. Also, it is helpful for the parallel resistance to be somewhere between 50 and 200 ohms. Each main filter stores energy at the pass and the reject frequencies. These criteria will provide enough series resistance so the Q of the main filter will not be too high at the pass frequency. Also, a parallel resistance of 50 to 200 ohms is not too high so the Q of the main filter will

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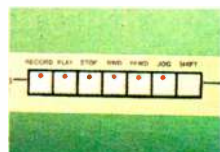
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Reduce Interference on SCA Transmissions

Part II
by Jim Somich

BROADVIEW HEIGHTS, Ohio

When we discussed SCA transmission in the Jan. 24 *RW*, we addressed some of the difficulties encountered when a station's stereo information gets into the SCA channel.

Here, we continue that topic and also tackle composite processing. You may wish to reread the last article to get up to speed on this installment.

Stereo transmissions place equal signal levels on both left and right channels. When SCA is added, 90 percent of the total information is transmitted on the main and

stereo channel, with only 10 percent of baseband modulation used for the SCA channel.

Achieving 45 dB separation between left and right audio channels of a stereo transmission at all frequencies would be considered excellent, although difficult. However, this degree of crosstalk would be unusable for SCA programming.

Poor separation between main and stereo channels would be more attributed to phase error, time delay or amplitude error than non-linear transfer characteristics.

Composite processing

Composite processing can be the enemy of superb main-to-SCA dynamic crosstalk

figures. All composite processors generate spurious frequencies that can fall on the 67 or 92 kHz subchannel frequency.

It is important to realize that some composite processors are inherently dirtier than others and the amount of spurious frequencies generated is highly dependent on the degree of processing. A clean composite processor that is used only to catch overshoots will interfere little with a 67 kHz SCA and not at all with a 92 kHz SCA.

The problems begin when competitive concerns require aggressive composite processing. Even the cleanest processors will punch through into the SCA, especially on high frequencies.

Much of this interference can be reduced

or eliminated by using a processor incorporating filters to reduce spurious frequencies, or a standalone filter designed for this purpose. Selecting a processor that is clean by nature can reduce this problem substantially.

To preserve reasonably good phase linearity in an FM exciter, the actual cutoff frequency of the 53 kHz lowpass filter following the modulator in stereo generators may be 60 kHz or greater, and stereo sidebands can extend well into the SCA channel.

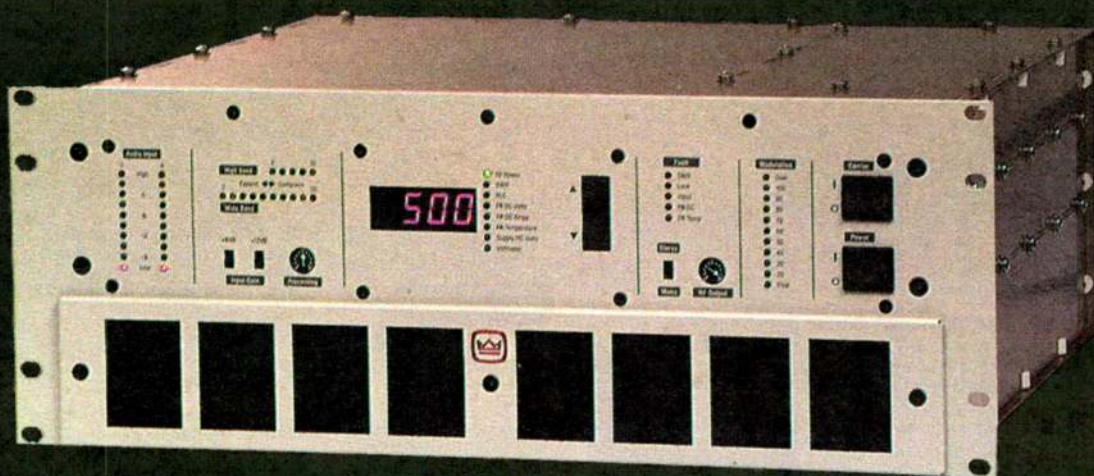
Thus, linear crosstalk from the stereo subchannel (23 to 53 kHz) can become transmitted into the SCA channel. This is characterized as a "monkey chatter."

This is not due to non-linearities but is created by upper stereo AM sidebands exceeding the 53 kHz design limit and appearing in the 67 kHz SCA channel.

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content can also produce AM sidebands of the stereo information that extend into the SCA channel. When these are bandpass-filtered, they create a form of phase modulation that will be detected as noise in the recovered SCA audio.

This type of transmitted interference is easily corrected by inserting sharp 15 kHz low-pass filters in the left and right audio channels of the stereo generator. The filters prevent any stereo upper sideband components from exceeding 53 kHz.

Most generators have these filters in place already, but many broadcast engineers disconnect them to reduced overshoots. The absence or malfunction of 15 kHz low-pass filters may be detected by fluctuating readings of the pilot injection level on the stereo monitor.

This fluctuation is produced by harmonics of the program audio frequencies falling into the passband of a highly selective 19 kHz filter used in the pilot injection level measuring circuitry of the monitor.

History

The original FCC authorization included programs of a broadcast nature such as background music, store-casting, detailed weather forecasting, special time signals or other material. These elements would be expressly designed and intended for business, professional, educational, trade, labor, agricultural or other groups.

Within this extremely broad area of acceptability, the greatest utilization of SCA by far has been in background music.

In 1975, the commission implemented

continued on next page ►

Improvements to Diplex Systems

► continued from page 97

If a .001mF capacitor is placed in series with the antenna, all the numbers improve.

Frequency	Impedance	R'	Voltage	Minimum Main Filter Q
800kHz	90 - j49	117	342	5.5
1000kHz	381 + j151	441	664	1.4

Now the filter system on the low frequency side will only have to attenuate 342 V instead of 582 V. This is a 4.6 dB difference. The filter system on the high frequency side will only have to attenuate 664 V instead of 796 V. This is a 1.6 dB improvement. The total minimum Q for this system is 6.9. Other benefits of using this capacitor in series with the antenna is that the stress on the main filter components will be reduced.

If both the high and low frequency impedances are capacitive, it becomes clear that an inductor would be used to make up the prematch circuit. What if the impedance at one frequency is inductive, and the impedance at the other frequency is capacitive? If a capacitor is used for the prematch, the frequency with the inductive impedance will have an improved diplex point impedance, but the other frequency's diplex point will be changed for the worse. If an inductor is used, the frequency with the capacitive impedance

will be made better but the frequency with the inductive impedance will become worse.

Some have tried to use both a coil and a capacitor. As we will see, this is not a good way to adjust the diplex point impedances. Although it successfully adjusts both impedances, it will detract from the bandwidth of the system. Consider the following example:

Frequency	Impedance	R'	Voltage	Minimum Main Filter Q
800kHz	130 + j200	437	662	3.5
1200kHz	300 - j370	756	869	1.8

If a 120.2mH coil is placed in series with the a 247pF capacitor, the diplex point impedance for both frequencies will be resonant. This gives the following data:

Frequency	Impedance	R'	Voltage	Minimum Main Filter Q
800kHz	130 + j0	130	361	6.8
1200kHz	300 - j0	300	548	2.8

This has improved the diplex point considerably but the 120.2mH inductor at the low frequency has added additional Q of 4.6. The 247pF capacitor at the high frequency has added an additional Q of 1.8 to its system. The following data should be compared to the unmodified impedances which include the nega-

tive effects of the series L-C circuit.

Although there may be advantages on

Frequency	Impedance	R'	Voltage	Minimum Main Filter Q
800kHz	130 + j0	130	361	2.2
1200kHz	300 - j0	300	548	.96

the filter design, the bandwidth of the overall system is poorer than the system without any prematching circuit. These

components would also add cost to the system. How should a prematch be designed for this system? In this case, the best prematch is no prematch at all. Any prematch will degrade the performance of one of the systems.

In the next article, the main filter will be discussed. Design equations and criteria for optimizing the system will be given.

□ □ □

Jerry Westberg designs AM transmitters at Broadcast Electronics, Inc. and also writes Phasor and Diplex software. He can be reached evenings at 217-223-5702.

Adjust Your SCA for Reduced Interference

► continued from page 98

rulemaking to expand the permissible transmission to include slow-scan TV, teletype, fax and other non-aural electronic services identified as visual services.

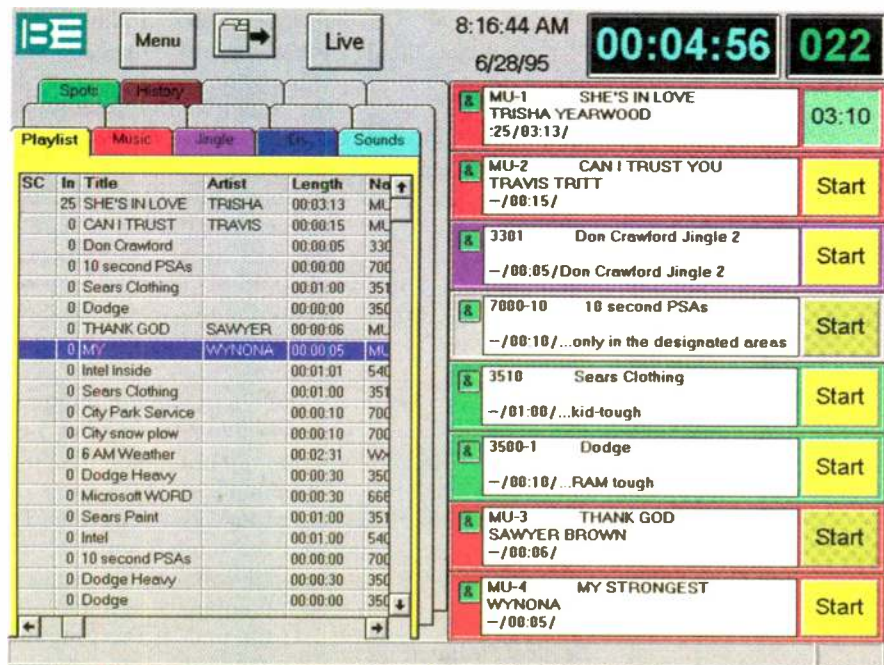
Typical SCA use in the category of signal transmission was directly related to the operation of the FM broadcast station. Use included coded telemetry data for remote control operations and relaying of sports and specialized types of programming on a regional network basis.

Careful attention to equipment tuning and adjustment can reduce interference to the subcarrier to a point where complaints are negligible. In situations where heavy composite processing must be employed for competitive reasons, it is possible to transmit subcarriers with very little main channel crosstalk if careful attention is paid to processor selection and setup.

□ □ □

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.

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FEEDLINE

Design, Tune AM Directional Arrays

Several New Design and Tune-Up Techniques Have Been Developed and Applied to a Project in Denver

by **W.C. Alexander**

DALLAS A little over a year ago, Crawford Broadcasting Company started down a road that would require me to construct a brand-spanking-new 50 kW AM directional on 670 kHz in Denver.

New techniques

As we have been expanding over the past few years, we have had to overhaul a few of the stations we purchased. We

built a new AM directional station a few years ago on 770 kHz in Dallas, so we had somewhat recent experience in AM directional site design and construction.

Since then, some new design and tune-up techniques have been developed that a few consulting engineers swear by. This Denver project looked like the perfect opportunity to put some of these new techniques to the test.

I had considered writing about this work-in-progress in some of my features

last fall, but it seemed like a better idea to wait and see how it all turned out and then give you the whole story. Well, I'm through with the Denver project and here's how it went.

I began, on the recommendation of some friends, with a package of moment-method computer programs that includes a matrix inversion routine — necessary for making an NEC-type program work with a conventional AM directional array. With this software, I was able to model the day and night arrays and determine the driving point impedances, mutual coupling (Z-matrix) and the characteristics of the arrays at carrier ± 10 kHz.

The program also gave me the base current ratios and phases, not to be confused with the loop values, sometimes called theoretical parameters, which are used to design an array. The base ratios and phases are what one can reasonably expect to see at the tower bases or driving points with the system properly adjusted. With this information in hand, I set out to design a phasing and coupling system.

The first step in that process was to accurately survey the new transmitter site and determine the exact location of the towers and transmitter building. Transmission line lengths are central to phasing/coupling system design, so it is very important to have an accurate picture of what the installed lengths of line will be. In this case, it was a little more difficult than normal to make this determination, because a rather large and deep irrigation canal bisects the site. While the canal operator consented to allow us to plow our ground system a few feet under the canal invert, we had to encase our transmission, sample, power and control cables crossing the canal, in a steel pipe. This pipe had to be buried five feet below the canal invert and collared in concrete on each end. That made determining transmission line lengths a three-dimensional problem.

With the transmission line lengths in hand, the next step was to look at the power distribution and determine the size and type line to be used at all the towers. Because of the long underground runs and power involved, I elected to use air-dielectric lines. Two were 7/8-inch, one was 1-5/8-inch and one was a 3-inch line. The manufacturer's specification for the velocity factor of each line was then used to determine the electrical length of each line, and that was the length used to determine system phasing.

Optimize

There is something of an art in setting system phasing in an AM directional array, something I am not sure I have mastered. Usually there are several different routes by which you can arrive at the same current/phase relationships at the elements. You can choose to have leading or lagging phase shifts in both the phasor and antenna tuning units (but not the transmission lines!), and the designer had a wide range of phase shifts to choose from. In this case, I chose the phasing scheme that looked the best to me, with all phase shifts as close to 90 degrees as possible and as many lagging networks as possible (to cut down on the use of capacitors in the system).

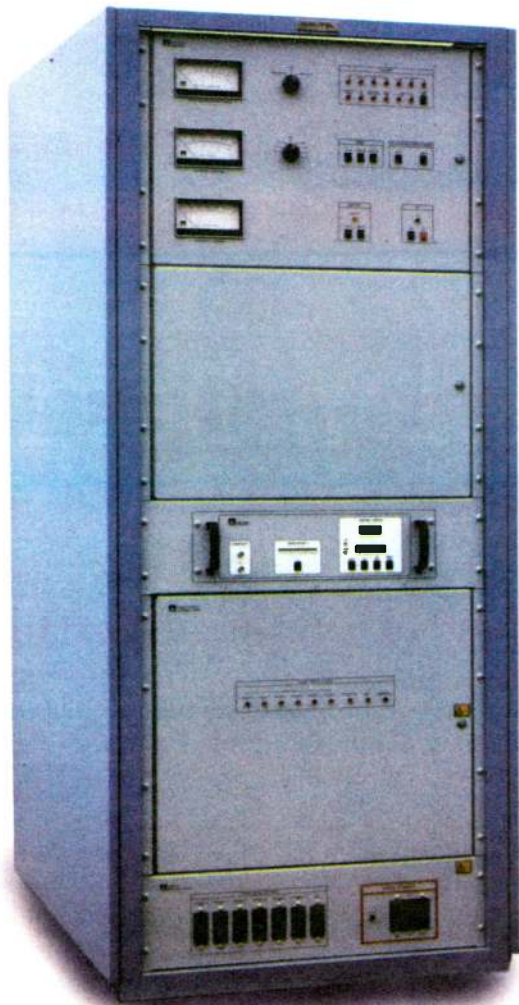
With the system phasing and transmission line lengths in hand, I plugged these values, along with the driving point impedances, phases and ratios, into a nodal analysis program. This program uses the moment-method to analyze the current, voltage, impedance and phase at each point in the system.

At the end of the program run, I had determined the value of each component in the phasor and all the antenna tuning unit networks for both patterns. The nodal analysis program was able to use the carrier ± 10 kHz data table from the array moment-method analysis to determine the common point bandwidth and pattern bandwidth of the arrays. I was then able to optimize the system by playing with the phase shifts of the common point networks.

I use another program that Charlie continued on next page ►

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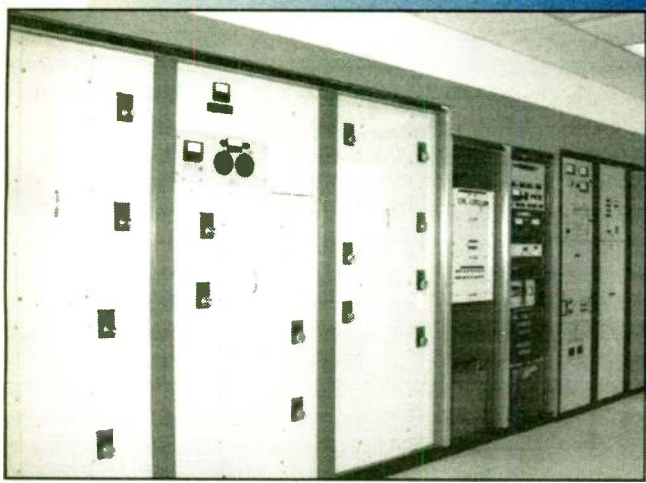
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Phasor and transmitter at the Denver station

Gallagher and I wrote to determine component values (minimum and maximum) and ratings (voltage and current) in all the networks. This program gives the needed values and ratings of all components in a network for 0.5R, 1.5R, nominal ± 20 degrees phase shift, 1.5 times nominal power and all of the above taking into account 125-percent positive modulation. By choosing all the components to accommodate this range of variables, I can have some margin of safety.

A parts list was compiled and, along with the phasor RF schematic and list of specifications, it was sent off to the manufacturer to be built. While that was under way, the towers and transmitter building were going up. Transmitters

There is an art to setting system phasing in an AM directional array.

were installed, as was all the rack equipment. Transmission lines were installed underground (and under the canal) in conduit and connectors were installed. Antenna tuning units in their weather-proof cabinets were air-shipped in and we set those in place on their stands and concrete pads. We did everything we could while waiting for the phasor itself to arrive.

As there was still some time until the phasor would ship, I elected to patch the output of the nighttime transmitter directly into tower #4, which was the tower to be used for nondirectional testing.

With this done and the power set, I was able to get crews in the field and get almost all the nondirectional field strength measurements done while waiting on the phasor — including the walk-in (or in the case of one radial, boat-in) measurements.

The phasor finally arrived and was installed. All the component values in the phasor and antenna tuning networks were preset to the nodal analysis program values. I held my breath and turned on the nighttime transmitter on the nighttime pattern.

Amazingly, the match into the common point was good, and the base ratios and phases indicated on the antenna monitor were pretty close to design values. With very little tuning, I had the design values nailed on the monitor and we were ready to start checking field strengths on the null radials.

I wish I could say that we sent our meter readers out and they called in with the very field strengths I would have

expected to see, but of course it wasn't that way. We spent three very frustrating days tuning on the nighttime pattern. I could get the pattern adjusted just right and then something would change of its own volition and everything would again be out.

I spent hours looking for this anomaly, which seemed to be concentrated in tower #4, to no

avail. Finally, on the sixth day of tuning, the Good Lord led me to the source of the trouble. It was a broken outer jacket on the #4 sample line. This break was beneath the heat shrink around the body of the type-N connector. When the sample line was repaired, the system was readjusted to the design values and we took another look at the field strengths at the tune points. Within a few hours, we had the nighttime pattern — which is quite tight and has three nulls — properly adjusted.

That same afternoon, I decided I would try to apply the now-known sampling system phase errors to the daytime pattern and see what happened. We ended up with a +3 degree error on tower #2 and a +6 degree error on tower #3, so I set the

daytime parameters to compensate for these known errors and fired up the daytime transmitter at 10 kW.

Proper match

Again, the match was good and I had to do very little to make the transmitter happy. I sent our people back into the field and had them look at the entire backside of the daytime pattern. Ratioing up the values to 50 kW from 10 kW, with only a very minor adjustment (less than one degree) to one of the phases, it was evident that the daytime pattern was in adjustment.

The next morning, we measured driving point impedances and reset the antenna tuning network values for a proper impedance match. It was interesting that the measured driving point impedances were very close to the moment-method predicted values.

With the networks set for the proper match, I fired up the daytime system at full power (52.65 kW). Our meter readers in the field all reported the field strength values that we should be seeing at the tune points, so we went ahead and ran the day and night directional proofs. Both the day and night patterns were in good shape, with good RMS and all the nulls pulled in properly.

Now that all is said and done, I am sold on moment-method. Had it not been for the problem with the sample line, the entire tune-up and directional proof would have taken less than five days (which has got to be some kind of a record). As one of the engineers assisting me on the project put it, our success was

90 percent grace and 10 percent skill.

One other item I should mention is that to adjust networks, I was using a Hewlett Packard 4815A Vector Impedance Meter rather than my usual General Radio bridge and detector. This sped the network adjustment many times over. There was none of the seemingly endless initial balancing and rebalancing that goes with bridge measurement, not to mention having to haul the bridge, synthesizer/detector and all the requisite cables out to the towers time and again. I highly recommend using a Vector Impedance Meter to anyone making wholesale adjustments to AM networks.

I should also mention that some of the consulting engineers who have been using moment-method for some time now use conventional sample loops mounted at one-third the height of the

tower. By sampling this way they eliminate the kinds of errors that we experienced in the sampling system, which are presumably caused by capacitance to ground in the vicinity of the tower base.

The trouble with using tower-mounted loops is that the loops, their sample lines and iso-coils become a part of the overall system and must forever remain on the tower. There is talk of development of a fiber-optic-coupled temporary loop that could be removed from the tower after tune-up without disturbing the impedance of the radiator. I'll buy some of those when they become available.

In the meantime, I am almost looking forward to the next DA project.

□ □ □

Cris Alexander is director of engineering for Crawford Broadcasting in Dallas. Reach him at 214-445-1713.

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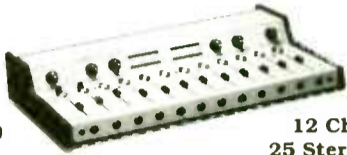
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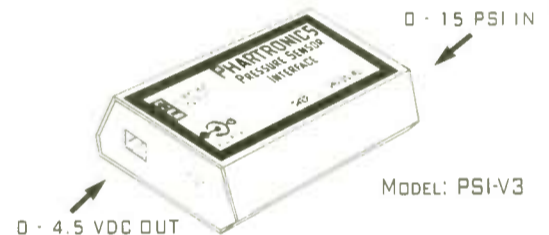
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PRODUCT EVALUATION

Narda Meter Safely Measures RF Radiation

Part I

by John Bisset

SPRINGFIELD, Va. According to the NAB's License Renewal Seminar, one of the primary areas where renewal applications are delayed by the FCC processing staff is RF radiation compliance. Any chief engineer preparing for license renewal understands the impact of RFR. Station management, however, may not have as keen an understanding.

Human exposure

Simply put, as a part of your station's license renewal, applicants must certify compliance with FCC guidelines with respect to human exposure to RF radiation. The FCC guidelines define acceptable levels of RF radiation around broadcast sites. Not all FCC-regulated operations are covered by the guidelines.

For example, RPU (remote pick-up) or STL (studio-transmitter links) are not subject to the RF radiation exposure rules. However, the rules do apply to facilities operating under Part 74, such as FM booster stations or FM translators with over 10 W ERP, as well as experimental broadcast stations.

The NAB recommends a periodic assessment of the station's transmission facilities, to check the RF radiation levels. A determination of compliance can be achieved by interpreting the tables and figures in OST Bulletin number 65; predicting RF levels through calculations, again, outlined in OST Bulletin Number 65; or by measurements made using specialized instruments.

Perhaps the most accurate means of determining compliance is through actual measurements. The portable 8718 Electromagnetic Radiation Survey Meter, manufactured by Narda, was recently evaluated for the purpose of determining RF compliance for several stations.

Using a microprocessor-based instrument like the 8718 to perform an RF survey is the only means of truly understanding your RF environment. It also offers a number of advantages. Calculations can only provide an estimate of the field strengths involved and are really just a starting point. A survey instrument enables the engineer to know the actual RF levels. With that knowledge, the engineer can develop the most cost-effective strategy to assure compliance.

Broadest coverage

Narda's 8718 Survey Meter was chosen for evaluation because it provides the broadest frequency coverage of both electric and magnetic fields. The instrument is also the most accurate, in this reviewer's opinion, because it operates in the square law region of its detector. This provides an "RMS average" detection of the RFR. Simple linear diode instruments can indicate higher than actual levels when used with modulated signals or in a multisignal site. I mentioned developing a cost-effective strategy to assure compliance. Because linear diode instruments can give higher than actual readings, fencing costs may skyrocket as you attempt to reach what you think will be a "safe" zone.

The effect of modulation increasing the error, another common problem with simple diode detectors, is just as much of a concern. Few Program directors will permit a station to go silent — even for RFR measurements. The more accurate readings make a square law instrument such as the 8718 worthy of consideration.

Making measurements with the 8718 became second nature in short order. This instrument is designed to strap to your arm or your hand. The hook-and-loop strap easily adjusts for a snug fit. (Translation: the meter won't slip out of your hand.)

The RF sensing probe can be screwed into the end of the measuring instrument.

A shaped probe is ideal for making measurements in a multiple RF source environment. The shaped probe corrects the measured RF level for frequency, because some of the energy may fall in the band of frequencies where 100 mW/cm² is the limit, while other energy may fall in the range of frequencies where 1 mW/cm² is the limit. Because a shaped probe was used for this evaluation, the measured field shown on the readout is only displayed in percent of the maximum exposure standard.

Hot spots

The moving bar graph, which indicates relative level, makes it easy to zero-in on hot spots or reradiating structures. For

to such conveniences as a one-touch auto zero, the Survey Meter will log the measured RF level with a time and date stamp. Continuous logging is also possible, with the data easily retrieved using the RS-232 port and Narda's interface software.

Performing an RF survey is serious business, and Narda insured optimum operation of the 8718 by including dual RF sources for a system check, as well as a self-diagnostic program that begins at turn-on.

What was it like to measure RFR levels using the 8718? In the next issue of RW, we will report some interesting findings from our field tests.

Making measurements with the 8718 became second nature in short order.

However, we found it easier to connect the 4-foot extension cable so the probe was more flexible. Using the instrument with two hands meant the probe could be easily rotated around, while the other hand held the meter close enough to read the display.

One of the biggest concerns in measuring RFR levels is the uncertainty of interpreting the measured data. Narda simplifies this process using a four-line, backlit LCD display.

In addition to displaying the RF radiation level in percent of the international exposure standard, the LCD display also includes a bar graph, as well as the maximum RF level measured. Because the 8718 is microprocessor-based, the measured field can also be displayed in Mw/cm², V/m, A/m, or four other units.

Our evaluation meter utilized one of Narda's patented shaped probes. A

example, it is possible for a conductive object, such as a metal fence surrounding a radiating tower, to reradiate energy. The same fence can also provide a highly localized area of intense radio-frequency radiation, though it is immersed in a lower intensity ambient field. Such conditions could cause contact burns that might not be exposed through simple calculation of RFR levels using the OST Bulletin 65.

When making electromagnetic field measurements, the potential to expose yourself to excessive levels always exists. Using the soft-key pushbuttons on the face of the instrument, a built-in audio alarm can be set to sound when a specific level of radiation is measured.

We all know what wonders the microprocessor has brought to broadcasting. Narda took full advantage of the microprocessor's power in the 8718. In addition

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WORKBENCH

Prevent Static from Clinging to the Studio

by John Bisset

SPRINGFIELD, Va. Many engineers have included computer management services as a means of being seen in a "productive" light by management. With many computer service companies charging in excess of \$100 an hour, to have in-house services certainly makes

sense. If you are handling your station's computers, you know that the market has been flooded with fax/modem cards for PCs. You may have also discovered the hard way that you get what you pay for. The cheaper fax/modem boards, especially at 28.8kB, are "hit or miss" when connecting at this speed, and they don't always stay connected.

Another bad habit they have is not being able to ramp back and successfully connect with lower-speed modems, especially those operating at 1200 or 2400 baud, which are still commonly used for text data transmission.

The rule of thumb generally has been to go with the more expensive designs and chipsets, like US Robotics and Creative Labs, in order to be sure that you were getting a reliable unit. This was true until Tom McGinley at WPGC-AM-FM here in Washington discovered the Monterrey modem.

Available in both 14.4 and 28.8kB, this modem uses the UMC chip set, and has proven to be the most reliable modem Tom has found yet. It connects to everything on the very first try. The local street price for the Monterrey

14.4 is only \$49. That's about half the price of a comparable US Robotics, Practical Peripherals, or Creative Labs units.

Because we are constantly being pressured to cut costs, finding something reliable at a low price should be music to the general manager's ears. Thanks to Tom McGinley for passing on this information. Tom can be reached at WPGC, 301-441-3500.

If you are planning a new studio, which includes a new console, while you are shopping, ask for a print of the output board.

Several manufacturers, in an attempt to cut costs we guess, have eliminated output buffering from the audio output of their console. Short lines don't usually pose a problem; however, if you are driving a long line — say from the control room down the hall to a rack room — you must terminate the line in 600 ohms at the far end.

In two cases, this information was not in the instruction manual, though the console customer service reps admitted that the terminator should be used. The effect is really obvious, and can have you scratching your head. The result of running long lines unterminated manifests itself through sluggish meter dynamics, loss of high end response and a consistently low audio level.

In this day of cutting costs, don't automatically assume that a console has a build-out to buffer the output. Ask before you buy, or at the very least, use that terminator to minimize your problems. Thanks to my associate, Ed Bukont, for passing this tip on to Workbench readers.

The winter weather always brings dry air to studios. Before long, jocks are drawing half-inch arcs off their computer touch screens, which then need rebooting. Sound familiar?

Before you encounter a static jolt that deep-sixes your hard drive, you need to make two inexpensive purchases. First, go to the local supermarket for a bottle of liquid Downey fabric softener. The supermarket will also sell a plastic spray bottle. Pour maybe a half inch of the Downey in the bottom of the sprayer, and fill the bottle with water. Shake it well, then spray your control room carpet. Not only will the studio smell nice, probably for the first time in years, the fabric softener "stops static cling." Your next stop is a discount housewares store to buy a humidifier. It doesn't have to be anything fancy, just something to raise the humidity in the room.

Between the humidifier and the spray on the carpet, the static problem, and resultant computer and microprocessor failures disappear. You may need to experiment with concentrations of the Downey — too much will make the carpet slippery. I called the help line listed on the bottle, to see if they could give me the proper measurements for diluting Downey in a spray bottle. I was informed that the company can take no responsibility for "mis-using" the product in this way. The product is supposed to be used in washing machines as a fabric softener for clothes.

I guess in this day and age of litigation, they're afraid of a law suit. Though neither RW nor myself can be held responsible for the "misuse" of the product in this manner, it does work, folks, and it beats the expensive carpet treatment sprays that commercial firms will apply to your carpet.

One last thing — if you have computer or other television monitors in your studios, you may want to misuse another product. Bounce manufactures these cloth sheets that you tear off and throw into your dryer to combat static. After using one in your dryer, don't throw it away. Instead, take it to the station and use it to wipe the monitor screens. If you don't run the sheet through a dryer full of wet clothes first, however, the sheet will leave a messy sheen on the screen. There is just enough "static guard" chemical on a sheet that has run through a dryer to clean your screen and prevent static build up at the same time.

□□□

John Bisset is a principal with Multiphase, a broadcast engineering service company based in Washington, D.C. He can be reached at 703-323-7180. Published tips and suggestions qualify for SBE recertification credit. Fax them to 703-764-0751, or via America Online at wrwbench@aol.com

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Part VIII of
Ty Ford's
Spot Series
See page 108.

Sports Station Tackles Super Bowl

by Dee McVicker

PHOENIX Fred Flores coated himself in peanut butter from head to toe, rolled around in pillowcase feathers, donned a pair of oversized chicken feet and strutted on stage, clucking like a chicken. He then jumped headfirst into the bed of a Ford pickup truck loaded to the rails with 1,200 pounds of cow manure. Not once, but twice.

Whatever possessed this man from Gilbert, Ariz., to do such a thing? Two Super Bowl tickets, which, at the peak of Super Bowl week, went for a street price of around \$4,000 each.

The game plan

Needless to say, Flores won the tickets, beating out the human dart board and the guy who kissed a rattle snake smack on the lips, courtesy of KGME(AM)'s much-publicized "Dumb Human Tricks for Super Bowl Tickets" contest held two days before the big game. One local newspaper columnist commented that had he been the judge, he would have

declared the guy the winner just to get him out of the range of smell.

"That someone would go to the length he went to win Super Bowl tickets kind of gives you a sense of the mania that takes over a city during

Super Bowl week," said Chris Visser, program director for KGME "The Game" licensed to Glendale, Ariz.



Covered in cow manure and feathers, Fred Flores takes a dive

Community Stations Provide Lifeline

by Alan Haber

POCAHONTAS COUNTY, W.Va.

The word community took on a whole new meaning earlier this year in the 1,000-square-mile area of Pocahontas County, West Virginia.

Thanks to the virtual party line that was, and is, daytimer WVMR(AM), the 9,000 or so residents of this remote area were able to weather the severe storms that passed through in January.

Because of the mountainous terrain that both surrounds and isolates Pocahontas County and the county's weak economic base, no commercial radio station has ever been attempted there. The 5,000-watt non-commercial WVMR is Pocahontas County's only broadcasting voice, and its lifeline.

Pocahontas County is located on the Virginia-West Virginia state line — Highland and Bath counties are situated to the east. WVMR, on the air since 1982, is owned by the Pocahontas Communications Cooperative Corporation. A nine-person board — six are elected by local residents who donate money to the station — provides guidance for WVMR. No other radio stations, and no television stations, are located in the county.

WVMR broadcasts on the AM, rather than the FM, band, because no FM broadcasting is allowed in the area — the highly sensitive radio telescopes at the National Radio Astronomy Observatory in nearby Green Bank, W.Va., would be greatly affected by a local FM transmitter.

"We're sort of back to the future," said general manager Gibbs Kinderman. "We're like a small-time radio station, maybe in the

1940s." Lost dog announcements live in blissful harmony among the mix of live bluegrass and Gospel music and other handled-with-care programming served up by the mostly volunteer air staff.

The annual budget of around \$100,000, a combination of donations from listeners and support from the Corporation for Public Broadcasting's Sole Service Assistance Grant, keeps WVMR running.

Other than the Pocahontas Times, the local weekly newspaper, and the daily newspaper published in Charleston, W.Va., which is



WVMR's Unique Studios

about 150 miles away, WVMR is "the only daily source of news about local government in Pocahontas County," said Kinderman.

WVMR has been working for the past five years with the people of Highland and Bath counties, who approached Kinderman and his staff about helping them institute radio service in their local areas. As a result of these efforts, WVLS-FM in Monterey, Va. (in Highland County), and WBHA-FM in Hot Springs, Va. (in Bath County), were

born as test stations in late spring 1995 (they currently broadcast on a regular schedule, 16 hours a day). Both stations mirror WVMR's programming during the day, but originate local programming at night and are, like WVMR, the only radio stations in their respective counties.

Community

The three stations' combined dedication to their close-knit communities was put to the test earlier this year when severe winter storms hit. After suffering through what Kinderman called "the snowiest November in 30 years," the "Blizzard of '96" blanketed the areas on January 5.

The three stations ran an emergency-oriented operation during the storm, which dumped four feet of snow in Pocahontas County alone, and during the floods that occurred two weeks later on January 19. Public officials from Bath and Highland counties called in with valuable information that every listener could use to lessen the effect of the storm on his or her family.

During the blizzard, few of WVMR's personnel could make it in to the station (they came in before the storm and slept within the four walls of the earth-sheltered, passive solar building).

"We had a neighbor with a snow plow plow the parking lot out three times in 12 hours," said Kinderman.

The huge snow pack that accumulated in the days following the blizzard practically

continued on page 113 ►

Visser ought to know. His station, the all-sports talk station in the market of the Super Bowl city, had front row seats to the madness during Super Bowl XXX week.

Not surprisingly, the air was buzzing with Super Bowl broadcasts the week of Jan. 21. The NFL Media Center in the Phoenix Civic Plaza played host to broadcasters and reporters from around the country. Over 24 stations reserved space at Radio Row, a section of the NFL Media Center devoted to sports-radio broadcasts from around the country.

Another 24 stations signed on from a downtown hotel to fan the sports frenzy for their listeners back home in Florida, New York and elsewhere. KGME's game plan from the start was to be the "Super Bowl information station." As an ESPN affiliate and as the sports talk station in the Phoenix area, its plans were to cover the Super Bowl events leading up to and after the game.

Even if KGME had broadcast rights of the play-by-play on Super Bowl Sunday, which went to a local CBS affiliated station KTAR(AM), Visser recognized that it probably wouldn't have benefited his station's listeners — most of whom would undoubtedly be watching the game from Sun Devil Stadium in Tempe or their favorite recliner in front of the television set.

Only the recently-returned-to-earth-after-an-alien-abduction would be out driving and listening to the radio shortly before the kickoff between the Dallas Cowboys and the Pittsburgh Steelers on Super Bowl Sunday, the only time when tumbleweeds really did roll down the streets of the Phoenix metropolis.

"You could have shot off a cannon at Interstate 10 (in Phoenix) and not hit a car during those hours," said Visser.

Record attendance

Apparently, the same could be said for elsewhere in the nation. Super Bowl XXX was the most-watched TV program in history, attracting a record 138,488,000 viewers and 72 share nationwide, according to Nielsen Media Research. KGME's share of the Super Bowl wasn't, of course, nearly as ambitious, but its approach to capturing the local Super Bowl interest was.

With at least 75,000 game-goers and thousands of others descending on Tempe earlier in the week, plus locals looking for coverage of the events, KGME made it its business to be the Super Bowl source of information. And there was plenty of Super Bowl information and events to go around.

"The Super Bowl has definitely changed," commented Visser, who has been covering sporting events for broadcast for over 10 years. "Back in '87 or '86 you didn't see all these celebrity parties on Friday and Saturday night."

Among the events setting attendance records was the NFL Players Party, a

continued on page 113 ►

Anatomy of Great Spots No Mystery

Part VIII

by Ty Ford

BALTIMORE You've had your brainstorming session with the client. You came away with a lot more than you really wanted to know about his or her business, but that's part of the process. It's when you don't get enough information that "ad speak" filler phrases start to ooze out of your brain and onto the page.

There is a philosophy that people who create radio spots are different from the rest of us, that they're plugged in to some strange reality that mysteriously instills in them the ability to evoke the spirit of

the god of creativity. Personally, I think that's bunk.

Good spots are the result of creative problem-solving, not divine intervention. Ideas for spots do not just pop into people's heads. OK, maybe one or two parts of a spot may pop into your head, but the rest is about knowing the tools, procedures, language and intent, and using

RADIO spots

them to solve a problem.

Unlike basic math, where there is usually only one correct answer, there are usually a number of correct ways to create a good spot. So, here are the nuts and bolts you will need to assemble the puzzle.

The big five

All spots can be broken down into five parts: concept, copy, performance, production and technical. Under-performance in any of these parts can reduce the effectiveness of the spot and can also result in tune-out.

The concept, sometimes called the approach, is usually the backbone of the spot, and it can be subtle or very direct. By the name of the event, we know, for example, that the concept for the March Midnight Madness Sale spot is March midnight madness.

A concept may be built on sound effects. Comparative advertising (ours is better than theirs) can be aurally demonstrated by using a musical concept: flute or a ukelele to represent the smaller competition and a quartet or orchestra to allude to how much bigger and better the client is.

The concept can be funny interviews, word games or anything that can suspend

the listener for (hopefully) the duration of the spot. It is often cited as the main reason to listen, assuming that the listener is willing to do so.

Concept usually comes first, because once the foundation has been established, placing copy points gets easier. The concept is something like an unadorned Christmas tree. The copy, performance, production and technical aspects are the ornaments.

Once the concept has been chosen, the next step is the application of the attention, interest, desire and action (AIDA) format. This means getting the listeners' attention.

Typical attention-getters are sound effects or any provocative copy lines that will engage listeners long enough for you to get to the points of interest.

After gaining their interest with the copy points, it is very important to

The further off the wall you get, the more you run the risk that the listeners won't get your point.

connect with the listeners' desire for the product or service by making the product or service appeal to them emotionally. And finally, the copy should direct the listeners to take action and buy something.

Usually the action component is couched in phrases that suggest that now, rather than later, is the time to buy.

There are seven styles of copy: direct, indirect, testimonial, problem-solving, narrative, off-the-wall and

humor. A piece of copy may involve one or several styles in the same spot.

Direct copy is simply that. This is what's on sale. Here's why it's a good deal. Here's why you'll like it or need it. Here's what you have to do to get it. Indirect copy spends more time in suggesting why a product or service is a good idea and usually offers several reasons why buying the product is a good idea.

Testimonial copy uses the comments of happy customers or the results of research that indicate that the product or service is worthwhile. The narrative approach usually relies on a story line that proves the value of the product or service.

Off-the-wall copy breaks the rules in any number of ways, relying on the unusual use of words, performance and production to suspend the listeners' belief. The further off the wall you get, the more you run the risk that the listeners won't get your point or will think that the offer is too weird. Humor deserves equal caution, because the listeners may not get the joke or they may get the joke but be offended by it.

Over the years, listeners have built up an increasing resistance to and skepticism of commercials. Your concept and

copy need to dispel that disbelief and give listeners a feeling of confidence so they will seriously consider your offer. In addition to gaining their trust, the spot has to continue to hold their trust.

There's another subtle aspect of the presentation of the spot that has a lot to do with how well it is accepted. I call it the "speak to" quotient. Make sure your copy speaks to, and does not speak at, the listeners. Think about this when choosing words for the copy and deciding how the words are performed.

Ultimate goal

The goal you're shooting for is to get close to the listeners. Again, this is a manifestation of trust. The more they trust you, the closer you'll get. If the listeners sense, by your presentation, that you are speaking at them from a distance, they may conclude that there is a reason you don't want them too close. For example, if they get too close they'll notice that your offer is not all it's cracked up to be.

Empathy is also very important. Position your copy from the listeners' perspective. The copy should enforce how the product or service can help them.

In the next part, I'll get deeper into the specific use of words and other conventions that make the difference between the same old copy and copy that connects with the listener. If you want to jump ahead, get a copy of the NAB's "Guidelines For Radio: Copywriting," which I edited and rewrote several years ago.

□□□

Ty Ford spoke on this topic at the Country Radio Seminar in Nashville, Tenn., on Feb. 29. See his book, "Advanced Audio Production Techniques" at <http://www.bh.com/bh/fp/24080082.htm>

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INTERNATIONAL UPDATE

New Programming Energizes Station

by John F. Mason

SAN JUAN, Puerto Rico How do you jump from 25th in the ratings to number two in less than two months?

"Con mucho trabajo," said Radio Cosmos 94 Programming Director Tony Luna. "Hard work, dedication and making some hard decisions."

First, the station moved from Mayagüez on Puerto Rico's western shore to the capital city of San Juan.

Entire island

Cosmos 94 (WCOM-FM) had been on-air in Mayagüez for 14 years, broadcasting on 94.1 MHz to the western region alone. When the station moved to San Juan, it also moved to 94.7 MHz, which allows its 50 kW to cover the entire island of Puerto Rico, as well as the adjoining islands of Culebra and Vieques, serving a total population of 3.4 million.

Then Cosmos 94 changed its programming. "We chose a specific market niche — ages 12 to 34 — and refocused our programming accordingly eliminating anything that might bore younger listeners. We hired the best people we could find — both performing talent and administrative personnel; people who could keep this large and important audience tuned in 24 hours a day. Our Mayagüez staff was 14; here we are 35."

The success of the station probably has broken records. Radio Cosmos 94 went on air in San Juan Sept. 1, 1995. In the October issue of Radio Audience Estimates it was in second place in the ratings, leaving its 25th place far behind in Mayagüez.

"Advertisers knew us to some extent from our performance in the west, but they waited a while to see how we would make out in San Juan," he said. "Word of mouth, helped by an advertising campaign in the island's principal newspapers, spread the news very quickly that we were a good buy and we have moved up ever since."

"Our programming objective is straightforward: to entertain our 12- to 34-year-old listeners," said Luna, who joined the station nearly nine years ago. "We got rid of everything a young audience might consider heavy or dull and took a lighter approach."

The station eliminated feature programs dedicated to news, sports, health or any single topic. Instead, it divided the day into five segments, each of which is hosted by a talented DJ. Between music spots, the DJs keep up a lively, upbeat dialogue with listeners, who are urged to call in.

Completely interactive

"We talk about sports and news, but as commentaries rather than informative reports. The DJs ask listeners what they think of current hot topics and people in the news. We want each session to be completely interactive," Luna said.

The first DJ hired in San Juan was Raymond Arrieta, one of the most popular TV comedians in Puerto Rico.

Known for his talent for imitating voices as well as a keen sense of humor, Arrieta conducts knowingly funny "interviews" with well-known figures on topics the interviewees would probably never consider discussing.

"Since most of our listeners are young we do try to guide them regarding drugs, alcohol abuse and safe sex," Luna said, "but never in strong doses;

counseling is woven into the DJ's monologue, his talks with people calling in or his interviews with guests — real as well as, in the case of Raymond Arrieta, those he creates."

"Our music section is surefire for our audience."

From 9:30 to 2:30, Cosmos 94 continues with another popular professional, Giovanni Brignoni, known as The Ice

Man; next is Luis Daniel Cruz, whose followers call him Danny The Night Rider, then José Valle, who calls himself Andross, followed by José García, The Candy Man, which brings the broadcast to 5:30, in time for Arrieta and his partner, Eric Valcourt.

Surefire selection

"Our music selection is surefire for our audience," Luna said, "pop, rock, reggae, ballads, rap — English and Spanish — merengue and salsa."

Luna describes the language and humor used on the program as "spicy — a lot of double entendres but nothing offensive.

Some Puerto Rican DJs are pretty outspoken, but none come close to Howard Stern or Jay Diamond."

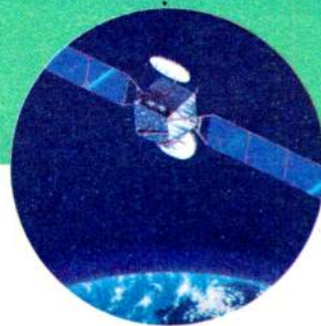
There is a censorship committee in Puerto Rico called Morality in Media. Comprised of local citizens, the group criticizes language or situations it considers borderline improper or beyond but not to the station. They go straight to the purse strings — the advertisers.

"As for equipment," Luna said, "we are as advanced as any radio station in the United States. I will not elaborate because I do not want to give the competition our secrets. I will say, though, that we are almost completely digital and will be 100 percent so by August."

□ □ □

John F. Mason is a free-lance writer based in Sitges, Spain, who reports on the industry for Radio World International.

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Harness the Power of Telemarketing

by Judy Baldwin

CEDAR RAPIDS, Iowa Telemarketing is a powerful marketing tool that can efficiently reach a radio station's target audience and directly deliver a personal one-on-one message to a station's listeners or listeners of a competing station.

It can build a station's image and increase ratings by personally inviting listeners to sample a station. It also strengthens the relationship with a station's core audience.

Since its introduction to the radio industry in the 1980s, telemarketing has gained greater acceptance and is

currently used by hundreds of stations. Though telemarketing is widely used, radio managers often have questions about how to evaluate the services of a telemarketing company.

This article is designed to eliminate confusion about telemarketing and help managers easily compare telemarketing suppliers and consultants.

Telemarketing tips:

The tips included herein also help managers better understand the intricacies of telemarketing programs, obtain maximum return on marketing dollars, increase the quality of a telemarketing campaign, and avoid problems that

could interfere with a program's results or long-term marketing plans.

- Define the terminology a telemarketing company uses to refer to the telemarketing call. Not every telemarketing firm uses the same language. Understand the terms below to make apples-to-apples price comparisons between telemarketing vendors.

A completed *contact* is not the same thing as an *accept*. A contact occurs when a telephone is answered by a consumer — a warm body picked up the phone. However, a contact doesn't mean the consumer heard the entire script. The consumer may have refused to continue the call before a station's call letters were

uttered by the telemarketer.

An *accept*, or an *agreement*, is a listener who has listened to the entire script, and agrees to listen to the station at the designated times, and agrees to have his or her name entered in the contest promoted in the telemarketing script. Only accepts should end up on a station's database.

A *completed call* means different things to different companies. To some companies a completed call is simply a contact. To other companies a completed call is the same thing as an accept.

- Pay for telemarketing services by the number of listeners who accept. A telemarketing company may need to contact 100,000 people (warm bodies picking up the phone), before 30,000 people will accept the invitation to listen and enter the promotion. This is a 30 percent ratio of contacts to accepts.

The more unfavorable the ratio of contacts to accepts the greater the cost of the telemarketing program. Costs increase when a telemarketing company must spend more hours on the phone to find people to accept. Put the responsibility for efficient calling squarely on the shoulders of the telemarketing company by paying for services by the number of accepts.

When a station pays for both contacts and accepts, it offers no incentive for the telemarketing company to use articulate telemarketers, a quality targeted list, or an efficient computerized call management system.

Ratio of contacts

The ratio of contacts to accepts is dependent upon many factors, some of which are beyond the control of the station.

These factors include:

A station's rank in the ratings. Less popular stations may need to contact more people before locating enough listeners to agree to sample the station and participate in the promotion.

The station's format. A popular format makes it easier to find more people agreeable to sampling the station.

A good script. A short, well-written script that states its main message up front and offers an attractive, motivating prize will increase the number of accepts and improve the ratio between contacts and accepts.

The quality of the telemarketers. Educated, experienced, articulate telemarketers keep a person interested in the script and increase the likelihood that a person will accept.

The quality of the list. Using a targeted list from a reliable list company reduces the number of meaningless contacts.

An efficient telemarketing management system. Telemarketing centers that use computerized telemarketing management systems increase call efficiency.

The script is displayed on a telemarketer's computer screen and telemarketers computer tally refusals and accepts. A computerized telemarketing system can achieve more accepts per hour and reduce a station's costs.

Indifference growing

In large radio markets some consumers are becoming more indifferent to telemarketing than consumers in smaller cities. More contacts may be required in larger markets before the specified number of accepts can be obtained. In larger markets it's even more important to have experienced,

continued on page 114 ►

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ROOTS OF RADIO

Radio Stars Influenced Early Filmmaking at RKO

by Richard O'Donnell

PORT RICHEY, Fla. Radio played an important role in the success of a major studio during "Hollywood's Golden Era" back in the '30s and '40s.

The studio was RKO. The initials stand for Radio-Keith-Orpheum. The company turned out those great Astaire-Rogers musicals, "King Kong," "Gunga Din," "Citizen Kane," a series of Alfred Hitchcock thrillers and other classics, when tinseltown was the center of the entertainment world.

Radio was an important part of the studio's operation. Prior to the arrival of the RKO logo, the studio, established in 1919, was known as FBO, which stood for the Film Booking Offices of America Inc.

Mostly B movies

FBO turned out mostly what we call B movies, minor productions made on a low budget that were seldom block-



busters. Toward the end of the silent era, radio, which was in its infancy as a national entity, became interested in the film world, and in particular, FBO, which was available for the right price. Some big spenders, among them Joseph Kennedy, came up with the necessary cash, and in 1929, FBO became RKO.

"R" was for Radio. As for Keith and Orpheum, they were a part of the old FBO setup. Mostly, they were theaters and booking offices around the country.

Thus did radio arrive on the scene — in particular David Sarnoff, president of the Radio Corporation of America (RCA) who became the power behind the throne at RKO for several years. Mainly, Sarnoff manufactured the sound paraphernalia needed to make films in those days.

Sarnoff, because he was a radio pioneer, thought his medium could make an important contribution to the success of the old studio with a new set of initials. He believed that the talent on radio, certainly at the voice level, was as good as, if not better than, the talent employed in those old silent flicks, at least, for the "talkies."

Big names

Big names on radio, names strong enough to attract long lines to the box office, were rare in the '30s. Then along came "Amos and Andy," which quickly became the nation's favorite radio show. Two white actors were the stars, and they played two black owners of a taxi company. Amos was played by Freeman Gosden and Charles Correll was Andy in the hit comedy show.

Gosden and Correll were quickly signed by RKO. They put on black makeup and went on to star in "Check and Double Check," which broke box office records in 1930. It was RKO's most successful film that year, and in the normal course of events, there should have been a series of "Amos and Andy" movies.

Not so. RKO, it turns out, did some checking after the film came out. The pollsters discovered that the public enjoyed the pair more on radio and had only showed up at the theater to get a peek at the white performers in black makeup. They were called "freaks of the screen, good for one film only." Calling them "freaks" may have been a little bit harsh, but the latter part was true. Gosden and Correll only made one film during their long

Big names on the radio such as Amos and Andy (above) dabbled in film, the realm of tycoons like Howard Hughes (below).



radio career.

Over the years, RKO signed on an impressive array of radio stars. They included Kay Kyser of radio's "Kollege of Musical Knowledge"; Marian and Jim Jordan, also known as "Fibber McGee and Molly"; Hal Peary of Great Gildersleeve fame; Dennis Day of his own show; Jack Benny's Ralph "Truth or Consequences" Edwards; Joan Davis; and others who achieved big-

name status while on radio.

Eddie Cantor and Burns and Allen also were on the RKO payroll for awhile. But they were stars prior to the airwaves. Jack Benny, Bob Hope and Jimmy Durante were all stars before their long runs on the airwaves. Still, being on radio helped Benny, especially Benny. Benny and Hope were with Paramount and Durante had his great film success at MGM.

At RKO, Kay Kyser made a series of musicals that were great at the box office. Gildersleeve and Fibber McGee and Molly also enjoyed some success, but never came close to the success of their radio shows. Joan Davis, who had appeared in films prior to RKO, had box office potential, but passed away at an early age. Edwards and Day never really made it in the film world.

Edgar Bergen and Charlie McCarthy were also big names at RKO, but there

were limits to what they could do. The problem was Charlie. There wasn't really too much that could be done with



Jack Benny with Carole Lombard

Bergen's dummy. Perhaps if Bergen was a puppeteer he could have worked out an act. Bergen and McCarthy tried films a number of times, but never matched the magic they had on radio.

RKO kept up its friendship with the radio stars into the '50s, when Howard

continued on page 117 ▶



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PRACTICAL TIMING SOLUTIONS SINCE 1971

Use Your Fax Machine for News Gathering

by Gordon Govier

MADISON, Wis. One recent Saturday morning several thrill seekers in a nearby burg decided to open up a few fire hydrants. Before long residents in the area noticed a precipitous drop in their water pressure while the streets department debated whether to mobilize salt trucks or call for a Zamboni and declare open skating.

It was one of those situations tailor-made for broadcast news. A listener called and tipped our weekend announcer to the mini-crisis and he scrambled to get as much information as possible on the air as quickly as possible. Along the way he stumbled upon an interesting discovery:

The police department in that town had a list of media fax numbers and we weren't on it. He made sure that we were quickly added to it.

At our next staff meeting we decided that we needed to check with some of the

on as many lists as we can find.

Although the ubiquitous fax machine can be very handy for getting important information expeditiously and efficiently from public safety agencies to broadcasters, not all of them have caught on to this

A station with a strong desire to serve its listeners would always want to be on a notification list.

other local public safety agencies to a) see how widespread the practice of media fax lists might be and b) make sure we're

seemingly obvious utilization opportunity. Or perhaps their budgets haven't yet permitted the purchase of a fax machine.

Nonetheless, my phone survey turned up several local agencies with lists that lacked our presence. I would recommend this exercise to all other broadcasters. I found no one who wasn't willing to add us to their list without hesitation. Perhaps in other cases I planted the seed of a notion to implement a media notification list in the future.

At one police department I found a list that contained television stations and newspapers, but no other radio stations. Suddenly my sleuthing had gained me an advantage over some of my competitors. Admittedly it wasn't much of an advantage, but it reinforced the importance of the whole exercise.

Radio stations with small or next to non-existent news departments might find this exercise most helpful. I would expect the larger news departments that maintain frequent contact with most local agencies to automatically be included on most media notification lists. However, a station with limited resources but a strong desire to serve its listeners as well as possible would always want to be on a notification list that would allow it to alert its listeners to public safety emergencies.

Any radio station that didn't want to take a chance of missing an opportunity to better serve its listeners would be advised to do what it can to ensure that it is included by all local public safety agencies that maintain media fax directories. In some locations, it may be time for some in the media to inform public safety agencies of the benefits of using the latest fax technology to warn the public about sudden emergencies.

We can't rely on them to get us all the information we want as quickly as we would like, but neither can we afford to miss an opportunity when the possibility exists to better serve our listening public.

□ □ □

Gordon Govier is the editor and publisher of *Scribe*, a newsletter for news directors and station management in Christian broadcasting. He is the news director at WNBC-FM Madison, Wis. Reach him at e-mail: scribe@xc.org

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Covering the Super Bowl Frenzy

► continued from page 107

four-day festivity of volleyball games, autographs and team cheering. It drew 70,000 people. Another Super Bowl amusement, the NFL Experience, a theme park-like extravaganza, drew in about 167,000 people the night before the game. "If you're doing 24-hour sports in the

have the time or opportunity to do," continued Visser. But KGME did, and masterminded plenty of remotes and events to do it.

Earlier in the week, KGME put on what it called the "hottest" Super Bowl party in town, in which one sports enthusiast downed 40 hot pep-

radio is it is truly a fan forum. You're giving them an outlet to make their point and to challenge the opposing team's fans, and we had a lot of that last week," said Visser.

KEDJ-FM and KGME chief engineer Bill Eisenhamer said he rarely sat down during the week. Not only did the Super Bowl keep him hopping, but, unbelievably, the Phoenix Open Golf Tournament also fell on the same week, with another 150,000 potential listeners and more remotes. He remembered one particularly grueling day in which he had four remotes, mostly back to back.

"We did everything, two-line Comrex, Switched 56, ISDN, 5 kHz broadcast loops," he said, adding that he also played host to out-of-town broadcasters.

In addition to affiliate ESPN, almost a dozen stations joined up with KGME to get Super Bowl coverage, some using the station's studios for morning shows and others borrowing remote gear to get closer to the game.

"It was a busy week," summed up an exhausted Eisenhamer.

□□□

Dee McVicker is a free-lance writer who lives in the Phoenix area. She is a survivor of Super Bowl XXX and has a T-shirt to prove it. She can be reached at 602-545-7363 or via e-mail at roots@primenet.com

Flores won the tickets, beating out the human dart board and the guy who kissed a rattle snake.

city where the Super Bowl is being played, you can provide people with information on the NFL Experience, where they can find Joe Montana, Deion Sanders, Mike Ditka. You can tell people where the team hotels are and how they can get an autograph — all the information that TV doesn't

pers in two minutes. Throughout the week, McDuffy's Sports Bar near Sun Devil Stadium became a sort of KGME command post. It proved to be a great place to involve sports fans, many of whom had no qualms about airing their team loyalty.

"The great thing about sports talk

Community Stations

► continued from page 107

exploded as a severe warming trend hit Pocahontas County, where temperatures hovered around the 50-degree mark. The heavy rain that followed made things even worse. Bath County collected 5.11 inches between 11 p.m., Thursday, January 18 and 6 a.m., Friday, January 19.

Kinderman and his staff were ready to go first thing in the morning on January 19. The first call to WVMR's studios, saying that the water was four feet deep in the streets of Hot Springs and that people needed to head for higher ground, came in at 5:25 a.m. All three stations stayed on until 11 p.m. that night, in emergency mode, to keep listeners in all three counties up to date on the latest information.

Road and bridge closings, alternative travel routes, and advisories as to which local areas were safe and which were not safe were the order of the day. Air staff did live, hourly interviews with people trapped in the Bank of Marlinton, located in Pocahontas County's county seat. "They would tell us what was going on there and what the water level was and what was happening," said Kinderman.

A lot of the on-air effort during the floods functioned as remotes to listeners.

"You know," said Kinderman. "We're still alive." One of the corporation's board members called just before her phone went out to say on the air that the water was getting pretty bad and there hadn't been much debris yet. All of a sudden, Kinderman remembered, she exclaimed, "Oh my God, there's a car floating down the street!"

The three stations acted like "the primary information center for the public," said Kinderman. One young girl, he remembered, whose house had been washed away "was just totally brokenhearted. She wanted to call up and go on the air and tell people what it was like. We did a lot of that stuff, helping people get it off their chests."

It's almost impossible to imagine radio stations like WVMR, WVLS and WBHA existing in 1996, yet they do. Kinderman said his ideal is the small town commercial radio station of the 1930s and 1940s.

Kinderman stressed that "one of the things

that community radio is concerned about" is being a listener's friend. "We have personality," he said. "We have local voices and individual voices. We're real company for those people — (we) help them make it through the depression of the winter months."

WVMR was started by Kinderman, who had experience in rural community development yet no experience in radio; Omar Bowyer, who had been a radio engineer for a few years after World War II; and Betty Rae Weiford, who was the county extension home demonstration agent for Pocahontas County's cooperative extension service.

Kinderman, Bowyer and Weiford got together because "communications was really a need in the community," said Kinderman. "That's why we call (the corporation) the Pocahontas Communications Cooperative — (its purpose was) to help pull the community together."

The station's music library "is like the community's archive of music," said Kinderman. The original contents of the music library was donated by listeners who were weeding out their record collections. Now, the station has about 10,000 record albums, including mint-condition platters featuring Arturo Toscanini and the NBC Symphony Orchestra.

Before WVMR came into being, people in the area communicated the old-fashioned way — they spoke to each other. The advent of local radio service changed all that. Kinderman remembered somebody saying to him, before WVMR went up, "When we get the radio stations, the politicians won't be able to say one thing to the people in the upper end of the county and another thing to the people in the lower end of the county, 'cause everybody will hear the same story!"

WVMR, WVLS and WBHA are indeed the mouthpieces for their communities, so much so that Kinderman and his staff came up with alternate, collective call letters during the recent floods.

"One of our jokes is that if we had one name for all three stations, it would be WGPL," he said, "for Giant Party Line."

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Powerful Telemarketing Tips

► continued from page 110

well-trained telemarketers using a high quality targeted list.

- Track why people refuse to participate in the promotion. A call to someone who declines to participate is called a *refusal*. There are several types of refusals. A person can refuse to listen to the script, refuse to listen to the station, or refuse to participate in the promotion.

It's important to track the exact point in the script where a person refuses the telemarketer. The point where people are refusing could indicate that the script lacks power, the promotion isn't motivating listeners, or the station is less popular than other stations.

- Don't pay for telemarketing by the hour. Today few telemarketing companies charge for telemarketing by the hour. Hourly rates don't motivate a telemarketing company to efficiently manage the program and the company can take as long as it wants to finish the job.

Most telemarketing companies will charge stations in one of two ways. One is to charge a flat fee for each accept, plus administrative fees to buy the list, write the script, program telemarketing computers, train telemarketers, and manage the program day-to-day.

The other way is to charge a higher flat rate for each accept that includes

the administrative fees.

- Save money by eliminating inappropriate target businesses from your calling list. List costs are based on cost-per-thousand. The more phone numbers purchased the more a station spends on the list. Drop businesses that aren't likely to listen to the station's format. If it's unlikely that workers at an agriculturally related business will listen to a soft adult contemporary or light jazz station, save money by eliminating businesses in that category from the calling list.

Save money

- Don't call marginal or unproductive ZIP codes for an at-home telemarketing program. Some marginal ZIP codes may be historically unproductive areas for a station. It wastes money to buy a list and telemarket to unproductive ZIP codes.

- Save money by targeting a station's true target age group in at-home telemarketing programs. Rather than call all 25-54 year old households in target ZIP codes it may be more cost effective to focus on a tighter target age group. Call only 24-44 year olds if that's where the station is stronger. However, don't make the age group so narrow that it dilutes the project's effectiveness, such as focusing only on 25-34 year olds.

- Don't ask the script to do double duty

by also attempting to conduct research. This confuses the listener, dilutes the promotion's potency, lengthens the time spent on the phone, and increases costs. There should be only one message in the script.

Adding even simple survey questions about age or gender, will keep listeners on the phone too long. Plus, listeners become confused about the real intent of the call when the script includes both a promotional message and survey questions. Let a research company do the station's research, and have the telemarketing company do only promotional telemarketing.

- Frequently monitor telemarketing calls throughout the project. Take time to listen to every telemarketer. Listen often throughout the project — at the beginning, the middle, and near the end. Schedule each monitoring session at different times of the day. These strategies ensure that quality remains high, the script is always followed, telemarketers are properly trained, and all telemarketers represent the station the way it should be represented.

- Insist that the radio telemarketing consultant personally train telemarketers to be knowledgeable about the station and the radio market. Don't take telemarketing training for granted by leaving it up to the telemarketing center's manager. Supply telemarketers with as much station information as possible, including area maps, sample airchecks and videotapes of TV ads.

Be sure the training session is audio taped so telemarketers added to the project later will receive the same training.

Provide telemarketers with bumper stickers, CDs, station T-shirts, or coffee mugs so they can feel as if they're really part of the station. These small items make a dramatic difference in a telemarketer's enthusiasm.

Phantom listeners

- Double check the final telemarketing database to spot *phantom listeners*. Sadly, there are cases where telemarketing databases have been padded with listeners never reached by telemarketers. It would be easy for a telemarketing company to obtain a phone list that also includes the name of the business's owner or key manager, the business's address and its phone number.

Rather than complete a call to that business a telemarketing company can skip the call and simply transfer this information from the calling list to the station's database.

A station may assume there are 20,000 listeners who accept. However, it's possible that only 15,000 people accepted and the telemarketing company cut corners by transferring information for 5,000 other businesses to the database. These 5,000 people also may not receive the follow-up letter that is typically mailed to listeners after they've received a telemarketing call.

Other phantom listeners may be manufactured when a business is contacted by a telemarketer but refused to participate. The telemarketing company could count this refusal as an accept and add the business's information to the database.

Make follow-up calls to database listeners to spot phantom listeners. Call every 10th name on random pages of

the database list. Ask listeners if they remember receiving the call, agreed to play the contest, and received the follow-up letter. Occasionally a busy listener won't remember the telemarketing call or the letter, even though they may have been a legitimate accept. However, if a high number of database listeners have never heard from the station this may signal that the database is padded.

Call-back monitoring

- Verify any promised call-backs through monitoring. Some telemarketing companies promise to call-back a certain percentage of the accepted listeners a few weeks after the project is completed to make sure accepts are still listening. Verify that these that calls are actually made by monitoring the call backs. Make sure the telemarketing company also supplies a separate database list of listeners who received call-backs. The database record for each call-back listener should include a notation about the outcome of the call-back.

Many telemarketing strategists think that call-backs are a waste of money or a gimmick for a telemarketing company to make more money. If call-backs are part of the project make sure there is a strategically sound reason for spending extra money to re-contact listeners that the station already recruited to listen to the station. If not, that extra money may be better spent on recruiting more new listeners to sample the station.

- Verify mailings to make sure every postage stamp purchased was used. If a station had 20,000 listeners who accepted an offer to listen during the telemarketing call, make sure 20,000 follow-up letters are mailed.

Follow-up letters are mailed using either first class or third class postage. Most stations use first class postage so listeners will quickly receive a written reminder to listen. When using first class postage verify the number mailed by reviewing an invoice from the mailhouse.

When mailing with third class postage, ask for a copy of postal Form No. 3602 to verify the number of third class pieces mailed.

- About fax numbers. It's possible to collect fax numbers through telemarketing. However, listeners often give out inaccurate fax numbers because they aren't sure about their fax number.

Some small offices and retailers don't have fax machines. So, don't expect that every listener will give a telemarketer a fax number or that every fax number will work.

Double check fax advertising laws with the state's attorney general before collecting or using fax numbers to communicate with the database. Many states have passed legislation limiting fax advertising.

Following these tips will save the station money and increase the success of a telemarketing program.

□ □ □

Judy Baldwin is the founder of Baldwin Marketing Services, a full-service, direct marketing consultant. Baldwin is a 19-year broadcast marketing veteran with more than 10 years in direct and telemarketing.

Baldwin Marketing Services advises stations on direct marketing strategies to build ratings and audience loyalty, including the use of telemarketing, direct mail, database management and interactive media. Reach her at 319-363-7997; or e-mail jabhawkfan@aol.com

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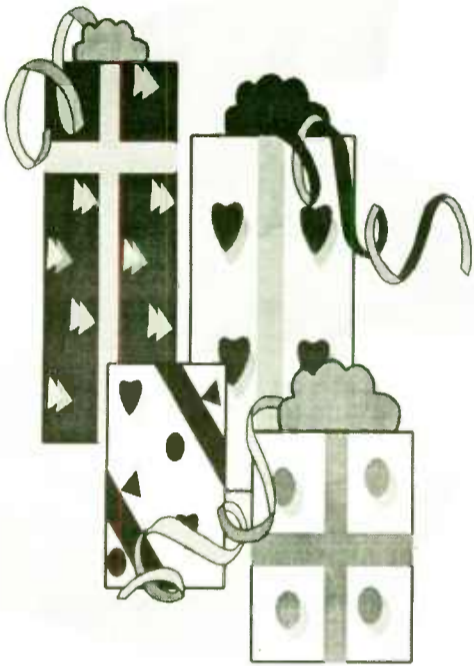
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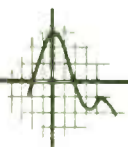
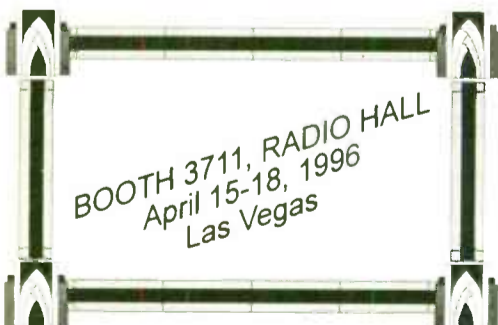
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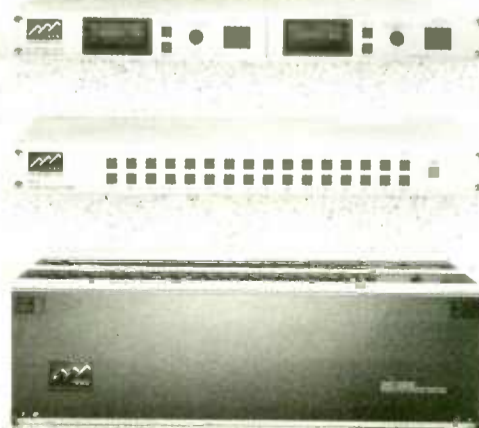
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Radio's Influential Role in Film

► continued from page 111

Hughes took over the studio and made a mess of it. RKO seemed to lose the urge to survive once the multimillionaire took charge, or so it was claimed.

The radio star who made the greatest impact at RKO was, without a doubt, the legendary Orson Welles. The actor's radio show, "The Mercury Theater," was a national sensation, mostly due to its celebrated Halloween performance of "War of the Worlds," the radio program that terrified the nation.

Manufacturing stars

When Welles inked his contract with RKO, he brought some outstanding performers to Hollywood, among them Joseph Cotten, Agnes Moorehead, George Coulouris, Everett Sloane, Ruth Warwick, Ray Collins, Harry Shannon, Fortunio Bonanova and Paul Stewart.

Cotten and Moorehead achieved great fame in the film world. The others became fixtures on the Hollywood scene. Ray Collins, who was rated by Welles as the greatest radio actor ever, appeared on the old Perry Mason TV series for years as Lieutenant Tragg. He was playing the part when he passed away.

Welles' "Citizen Kane," an RKO picture, is rated by many critics as the best film ever made. His "Magnificent Ambersons" was also marvelous and "Journey into Fear," his final RKO flick, was a neat little thriller. But, Welles and the powers at the studio did not hit it off, primarily because they felt he spent too much money making his own films. The actor and the studio headed off in different directions. Ironically, both struggled for years. The actor lasted longer.

In addition to luring favorites of the airwaves into the film world, RKO did attempt to use radio to manufacture a couple of movie stars.

In 1939, the studio became involved with a radio show called "Gateway to Hollywood," hosted by veteran producer Jesse Lasky. Each week, two potential stars were introduced in half-hour dramas. The performances of these talented young men and women were evaluated by a panel of judges. At the end of the season, the two who gave the best performances and were considered physically attractive — in the eyes of the judges, because the listeners could not see them — were awarded contracts by RKO. They were also given key roles in "a major motion picture."

Training ground

The winners were John Archer and Alice Eden. They appeared in a film called "Career," the story of a kindly druggist. It was a good film, but did not do as well at the box office as was expected. Archer and Eden, as a result, never had a chance to hit it big.

If "Gateway to Hollywood" had worked, RKO planned to use the show as a training ground for other future stars. As things turned out, it lasted one season.

Alice Eden disappeared from the silver screen; her Hollywood career ended in a hurry. Archer played second leads and character parts for several years.

Last but not least, there was that "radio movie" made by RKO. It was a murder mystery called the "Phantom of

endless hours trying to come up with projects that would combine both radio and films. Soon they came up with a

When Welles inked his contract with RKO, he brought some outstanding performers to Hollywood, among them Joseph Cotten, Agnes Moorehead, and Paul Stewart.

Crestwood" and was released in 1932. Did you ever hear of it?

At the time, studio executives spent

unique idea. For six weeks, NBC presented a serial called "The Phantom." However, there was no ending to this

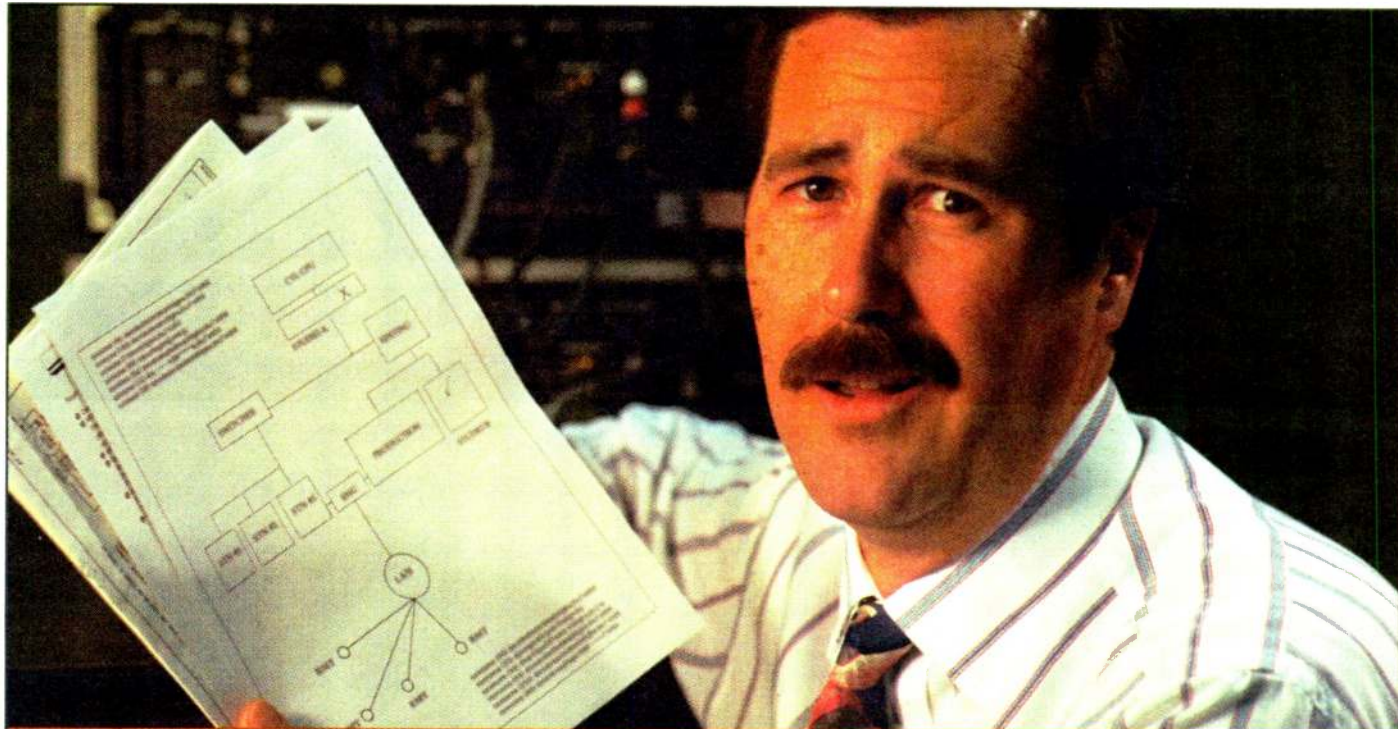
radio mystery. Listeners were invited to send in their own endings to the whodunit. It was up to the radio audience to unmask "The Phantom."

The endings poured in to NBC, thousands of them, and eventually, four contestants won prizes for their solutions. One of these solutions, it was revealed, would be used as the climax to the new RKO thriller, "The Phantom of Crestwood," which was a film based on the radio serial.

The film was released and the profits were splendid. It netted more than \$100,000, a tidy sum in those depression days. Pennies counted back then.

Alas, RKO never revealed which one of the prize-winning solutions was used. It remains a mystery to this very day.

RKO is gone now. And so are most of those great radio stars of yesteryear.



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Darwin Disk Recorder

► continued from page 85

meaning more time spent searching. If you undo your ins and outs, you have to find them again or remember to set locate points at both ends of an edit.

The three stages of Zoom give you a closer look at a section of audio. However, they do not show waveform and there is no increase in jog ratio.

Even if you zoom in from the standard 15-second view to the three closer views, you cannot see anything that might be helpful in picking an edit point, and the increased resolution does not result in finer jogging ability.

The internal 8x2 digital mixer provides level control and pan position of all eight tracks to the digital output.

You may not be able to do dynamic mixes or pan moves, but you can set levels and pan positions to bounce tracks.

Doing bounce mixes results in a two-sample delay. The manual reminds you of that, and recommends moving the newly bounced tracks back two samples so they remain in phase.

If you do run into problems because of too many edits, bounce-mixing sections with many edits can be used to consolidate tracks. Darwin has no EQ or effects.

In the file-handling department, the Darwin can handle 99 "Projects" and 99 "Versions" of each project on a single hard drive. This will be handy for produc-

tions requiring lots of different versions.

Copying Projects takes disk space while copying Versions uses only enough memory to store the addresses of the audio and any other new audio added to the Version. Material can be moved between Versions without rerecording, as long as the project and Versions are all on the same hard drive.

Dubbing the data

Moving audio to another drive uses disk space on the destination drive. You cannot copy a piece of audio from a project on one drive and paste it into a project on another drive.

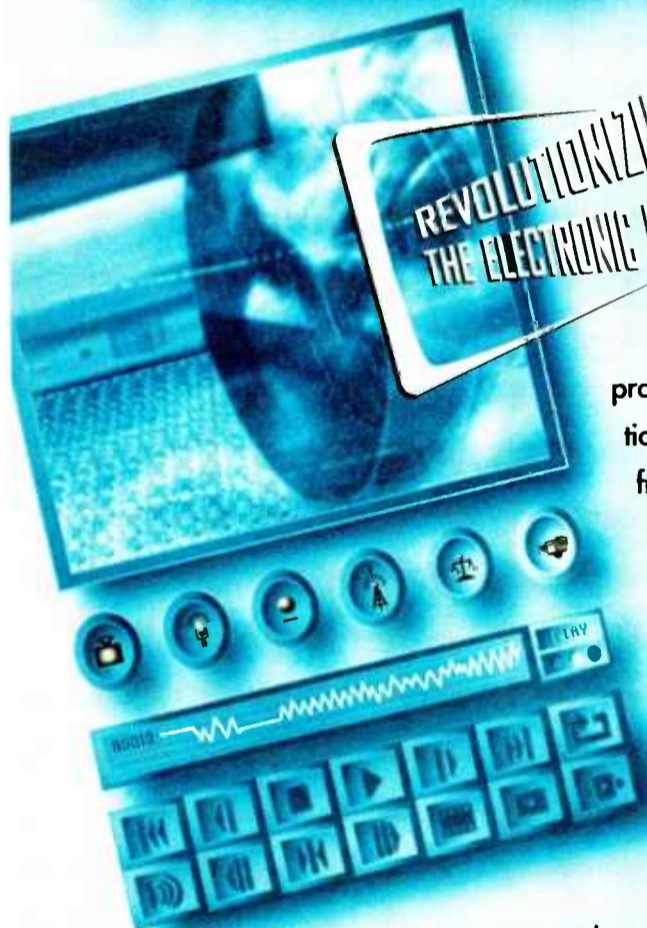
Note there is no sample rate conversion. Once a project has begun, elements from one project cannot be copied into another project with a different sample rate. There are 40 Locate

points per Version, in four banks of 10.

A front panel screen can be called up to view each bank and to change banks. Locate points can't be dropped on the fly in either record or playback. The system will only register them while stopped.

When using the Darwin's digital inputs, the unit needs to see a constant digital source or it responds with lots of noise. This also happens if the incoming sample rate is different than the sample rate set for the project. Even changing DAT tapes in

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Product Capsule: E-mu Darwin Hard Disk Recorder

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For more information, contact E-mu at 1-408-439-1921; or circle **Reader Service 159**.

my SV-255 portable DAT caused full-scale white noise.

The number of Undo levels is user adjustable up to 16. So, with a stacked Undo buffer, you can record over tracks as long as you remember how many levels of Undo you have left.

You can also stop, enter Edit, press Undo, press Exit and go back to the project.

If you fill up a disk before you finish recording a project, you can reclaim memory by blowing out the Undo buffer. This frees up some space but locks you into all edits existing in the Undo buffer. Edit crossfades are also user-adjustable from 0 to 100 ms, with a default of 10 ms.

There are a few other quirks to be aware of. Hitting the Exit button while in Record mode interrupts the entire process.

The same thing happens if you are watching disk space drop while recording, then decide to jump to the edit screen to see where the end of a particular section of audio is.

E-mu's Matt Ward suggests backup via 4mm SCSI DAT or as linear audio files to an ADAT via the optional optical digital link. The ADAT will save the audio but not any edit information.

Ward also revealed that the sound files on the Darwin are .WAV files, which PC-based Win95 systems should be able to open.

Current options for the Darwin include an ADAT digital I/O interface (\$149) that uses the ADAT's optical port; and an ADAT sync card (\$349), due in April, that makes an ADAT BRC remote control see a Darwin as an ADAT.

E-mu is hoping for third-party support to emerge for a host computer and applications to provide graphic waveform display, editing and advanced DSP functions. This would be nice.

The manual is well-written and is easy to understand. The 16-bit in and 18-bit out converters sound good.

While the Darwin has its limitations, they are not out of line with its Price/Value ratio. A few tweaks here and there in the software — I was testing version 1.0.2 — and the value should be even better.

INSIGHT ON RULES

Learn the New Rules for Unattended Operation

New FCC Rules for Unattended Operation Address Operator Licensing and Transmitter Remote Control

by Harold Hallikainen

SAN LUIS OBISPO, Calif. On Oct. 2, 1995, the FCC adopted rules allowing unattended operation of broadcast transmitters. The Report and Order was released on Oct. 23 and the new rules became effective Dec. 1, 1995.

Let's take a close look at the actual changes in the rules and how they may affect your station.

No licensed operator required

73.1860 required all AM, FM and TV stations to have a licensed operator in charge of the transmitter during all periods of broadcast operation. The current rulemaking removed that section (see the Report and Order, Appendix A, paragraph 18). Further, it appears the commission did a text search for the word "operator" and removed or modified any section of the rules containing that word.

For example, 73.1820 used to require that station log entries were made by "a properly licensed operator in actual charge of the transmitting apparatus." Now it requires log entries to be made "by a person designated by the licensee who is in actual charge of the transmitting apparatus." Both the old and new

rules allow for automatic logging, though logging requirements appear minimal.

The "no licensed operator" requirement allows stations to run with an unlicensed operator or with no operator at all, provided various other requirements are met. Stations are immediately start using unlicensed operators (who are properly trained) with no changes in station equipment or procedures.

Unattended operation, however, may require special procedures in order to comply with various FCC requirements, including EBS.

Section 73.1870 was modified to remove the requirement that the station chief operator be licensed, but the chief operator requirement itself remains. A written designation of chief operator is to be posted with the station license. The contract with a chief operator who is not an employee of the station is required to be written and maintained in the station files (it need not be posted).

Note that 73.1870(b) remains unchanged. The chief operator of an AM station with an authorized power greater than 10 kW, an AM station operating with a directional antenna or a TV station is required to be an employee of the

station, as opposed to being a contractor. The chief operator may be employed part or full time, as the station licensee determines is necessary to ensure compliance with FCC requirements. The chief operators of FM or lower-power nondirectional AM stations may serve on a contract basis.

Station logs

Recall the duties of the chief operator as listed in 73.1870(c). The chief operator (or his or her designee) must make inspections of the station's transmission system and monitors. He or she must make required field strength measurements on directional AM stations, as well as AM and FM equipment performance measurements (spurious emissions, occupied bandwidth) yearly for AM and on transmitter, exciter, stereo generator or subcarrier equipment changes on FM.

Finally, and this is a point that seems to be missed in many stations, the chief operator must make a weekly entry in the station log indicating that he or she has reviewed the log and found that it indicates the station has operated in compliance.

If the station was not found to be operating in compliance during that week, a notation of the violation should be made, along with a notation as to what corrective action is being taken to ensure it

does not occur again. At a minimum, these log reviews should verify that EBS tests (soon EAS) have been transmitted and received as required (weekly, on a random basis, 8:30 a.m. to local sunset), that the operating power was within tolerance at all times, that directional parameters were within tolerance, that pattern/power changes were completed at the proper time and that the required daily tower light inspection was completed.

The rulemaking completely rewrote section 73.1400, which used to cover remote control of transmitters. The main paragraph of 73.1400 specifies that station licensees are responsible for assuring that the station operates within tolerance at all times.

The section states that "any method of complying with the applicable tolerances is permissible." The section then goes on to give "typical methods of transmission system operation." These are "attended" and "unattended." Being "typical methods," it appears that they are not the only methods of complying with this part of the rules. Again, "any method of complying with the applicable tolerances is permissible."

Attended operation is what we've been doing for years. A person watches the transmitter or a telemetry system indicating the transmitter parameters, or an automatic system (ATS) watches the

continued on page 120 ►

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Unattended Operation

► continued from page 119

transmitter and "calls for help" should it be unable to maintain parameters within licensed limits.

Note that when the station is "attended," no automatic shutdown is required. A person shuts the station down upon noting an interference-causing condition or being notified of such a condition by an ATS. This is a change from the previous ATS rules (73.1500), which required an automatic shutdown within three minutes. Note that no ATS is required by the rules.

"Unattended operation is either the absence of human supervision or the

substitution of automated supervision of a station's transmission system for human supervision." In the first case, the equipment is "expected" to be stable enough to operate for long periods of time without going out of tolerance.

In the second case, an automatic transmission system (ATS) monitors and adjusts the transmission system to keep it within tolerance. Should the system fail to keep the parameters within tolerance, it would shut the station down in three hours.

However, 73.1350(d)(2) requires AM stations that change power or are directional to shut down within three minutes

should they not change to a required lower power or pattern at the appropriate time.

The shutdown requirement applies only to parameters that would cause interference. For example, overpower would require a shutdown while under-

interesting to see what happens when nobody is home at any of these numbers, or the FCC calls the president of a group owner and asks him or her to shut down a specific transmitter. Can the president do it within three minutes?

Although according to my reading of

Stations can run with an unlicensed operator or with no operator at all.

power would not. Overmodulation would require a shutdown; undermodulation would not. Off-frequency operation would require a shutdown. These examples are listed in section 73.1350(d).

Finally, stations are allowed to continue operation with directional array parameters out of tolerance for up to 24 hours, during which time monitor points are to be checked (see 73.62(b)(5)). Under unattended operation, the ATS alarm requirement of attended operation is replaced with a three-hour shutdown, because there is no operator to notify. As with attended operation, no ATS is required by the rules. It's just one of the options.

My literal interpretation of the new rules indicates that (excluding current EBS compliance requirements), it would be possible to just turn on a single-power AM station or an FM station and leave it running with no control or telemetry system as long as it continued to operate within tolerance.

73.1400(b), which describes unattended operation, indicates the operation is indeed unattended! There is no operator. There is no on-call person for an ATS system to report an alarm to. There are no "transmitter control personnel."

Turn it off

Section 73.1350(b)(2) requires that transmitter control personnel have the capability to turn the transmitter off within three minutes at all times. This might require a control system, such as a dial-up system, if the station has transmitter control personnel, which, to me, makes the station attended.

Correspondence with FCC staff on this issue indicates that the FCC wants to be able to contact a representative of a station licensee and have that person shut the station down within three minutes. The FCC may make such a request if the station is indeed causing interference, or it may request a temporary shutdown in an effort to determine the cause of interference.

Furthermore, paragraph 18 of the Report and Order states that "because cases may arise in which the commission identifies a broadcast station as the source of a harmonic or spurious product or other type of problem causing harmful interference, the commission will retain the requirement that a licensee be able to shut its station down immediately (i.e., within three minutes) upon request by our enforcement personnel."

In the rulemaking, the FCC considered requiring that broadcast station licensees post contact information at the tower (as is required for translators), or establishing an on-call person database. The commission decided against both of these and will continue to rely on existing informal means of contacting people "responsible" for the stations. It will be

this section the rule does not require stations to install a control system to shut down the station should the station be unattended, the discussion in the Report and Order does indicate such a requirement.

Therefore, it is suggested that, as a minimum, stations have a method of shutting down the transmitter from some remote location within three minutes of FCC request. This will typically take the form of a simple dial-up control system.

Stay in touch

To ensure the FCC can find "responsible" personnel, it might be a good idea to have the station's phone answered by an answering service that can shut down the transmitter or can contact someone who can. As an alternative, the station might employ a voicemail system that drives a pager on emergency calls, though it is more difficult for a voicemail system to filter out prank calls (and we know that morning DJs are probably responsible for most of the nation's prank calls).

This rulemaking covers a lot of ground. At this writing, we are still awaiting the release of a notice from the FCC on how stations can operate unattended with EBS. The existing EBS rules require human intervention. While it is technically possible to rebroadcast emergency information without human intervention with some modifications to existing EBS equipment, it appears that any such arrangement would not comply with the existing EBS rules.

Paragraph 15 of the Report and Order mentions the use of firms to monitor EBS and take appropriate action. While this is certainly permissible, and has been for quite a while, it does not appear to be unattended operation (with no human involvement).

The complete text of the Report and Order, the Notice of Proposed Rulemaking and my comments filed on the NPRM are available on the Internet at <http://www.slonet.org/~hhalika/> and via fax at 805-541-0201.

The FCC is expected to release a notice shortly that should describe some methods stations can use to operate unattended with the existing EBS as we await the arrival of EAS. When the FCC releases this notice, it will be available on the abovementioned Web pages and fax server. Meanwhile, we'll continue this discussion next month!

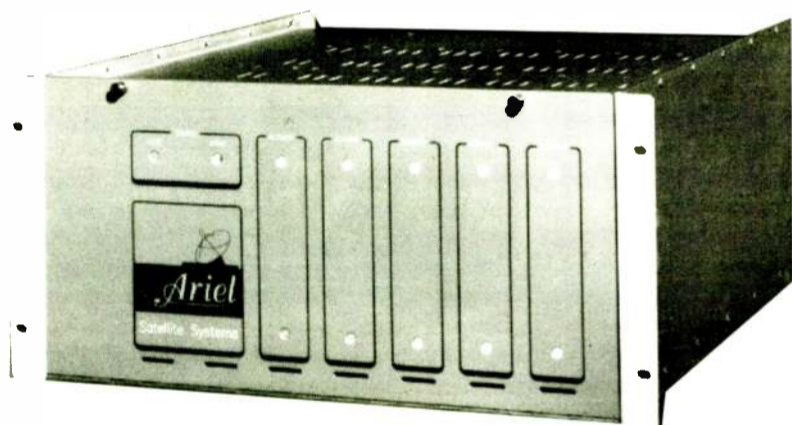
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Harold Hallikainen is president of Hallikainen & Friends, a firm specializing in electronic design and technical writing. He also teaches electronics at Cuesta College and is an avid contra dancer. He can be reached at 805-541-0200 (voice), 805-541-0201 (fax), hhalika@slonet.org (e-mail) and <http://slonet.org/~hhalika/> on the World Wide Web.

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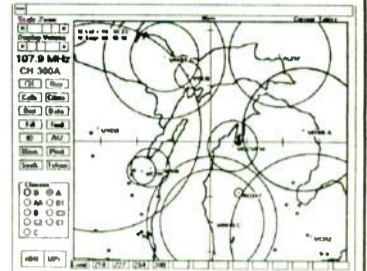
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Modulation Sciences CP-803 composite processor. J Mulhern, KSCB, POB 3125, Liberal KS 67905. 316-624-3891.

Orban 9000AM, 8000, 8100, ST, xfm, DAP, Modulimiter. J Phillips, 414 Washington Ave, Defiance OH 43512. 419-782-8591.

Cutting Edge UNITY-AM Demo digital AM processor \$5200.00/ea. 1 available. Call 1-800-622-0022.

Cutting Edge UNITY2000I Demo digital FM processor \$5500.00/ea. 3 available. Call 1-800-622-0022.

Want To Buy

Gates Sta-Level M-5167 working or not; Gates 39B; Altec 436 or 438 comp/limiter. B Hatcher, Howling Dog Recdng, 1591 Eldonlas Ct, Stone Mtn GA 30087. 770-498-7600, e-mail: Bihatcher@AOL.COM.

UREI LA2A, LA3A, LA4A, 1176, Gates, RCA, Collins, Altec, DBX 160. 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.

MICROPHONES

Want To Sell

Shure Green Bullet harmonica mic, original, BO. T Coffman, 619-571-5031.

Shure M-67 mic mixer, \$100. Rene Hart, WASE, POB 2087, Elizabethtown KY 42702. 502-769-1055.

Sony ECM-30 lavalier mics (2), \$45/ea; Sennheiser 421, gd cond. \$250. D Meyer, 805-962-8273.

AKG 414B TLII w/C-12 capsule, new, \$950. D Miller, Airborne Audio, 12209 W 88th, Lenexa KS 60215. 913-492-8822.

AKG C414B-TL Fet condenser microphone \$900.00. 1 available. Call 1-800-622-0022.

Audio Technica MT830R mini omni condenser microphone \$75.00/ea. 1 available. Call 1-800-622-0022.

Sennheiser K6 Bat Phantom power module \$195.00/ea. 1 available. Call 1-800-622-0022.

Sennheiser MZW816 "Blimp" wind-screen \$225.00/ea. 3 available. Call 1-800-622-0022.

Sennheiser MKE2-60 mini lavalier microphone \$195.00/ea. 1 available. Call 1-800-622-0022.

Sennheiser MD441U supercardioid microphone \$575.00/ea. 1 available. Call 1-800-622-0022.

Sennheiser MZS816 shock mount \$100.00/ea. 1 available. Call 1-800-622-0022.

Want To Buy

Shotgun mic (long), bdct qual, like Audio Technica AT-815a, Sony C-76, Shure SM-89, etc, cash or vintage mics for trade. J Steele, 912-729-6000.

Neumann, RCA, AKG, UREI, Pultec, Fairchild, etc. J Phillips, 414 Washington Ave, Defiance OH 43512. 419-782-8591.

Neumann U-48 or U-67 for studio, must be reasonable, will consider partial trade. B Leslie, Pro Recdng Sr, 13709 Mapleleaf Dr, Cleveland OH 44125. 216-662-1435.

Neumann KM 84 mics. D Miller, Airborne Audio, 12209 W 88th, Lenexa KS 60215. 913-492-8822.

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

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Rotron Blowers for Elcom, Horris, CCA, CSI, McMortin, rebuilt & new. Goodrich Enterprises Inc. 11435 Manderson St Omaha, NE 68164 402 493 1886 FAX 402 493 6821

1964 Rock-O-La stereo juke box, gd cond, \$1500. D Leutz, KKBN, POB 708, Twain Harte CA 95303. 209-586-1988.

Paradyne 4951-03 equip rack, blk, full set of blank covers, \$175; Soundolier equip rack. \$120 +shpg. B Lord, Lord Bldg, 3824 SW Myrtle St, Seattle WA 98126. 206-932-4839.

Tapco 2202 graphic EQ, \$100; Harris phono preamps (2), \$75/pr; Harris automation racks (6), \$200 ea. T Beschta, WAQE, POB 703, Rice Lake WI 54868. 715-234-9059.

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Telex V210 single side dynamic head-phone \$55.00/ea. 1 available. Call 1-800-622-0022.

Telex PH81 single headset with cardioid microphone \$70.00/ea. 2 available. Call 1-800-622-0022.

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Want To Buy

Acrosound TO-350 audio output transformer, or Peerless (Altec) S-268-Q, need only one or the other, must be reasonable. B Leslie, Pro Recording Sr, 13709 Mapleleaf Dr, Cleveland OH 44125. 216-662-1435.

CCA Citadel cart machine replacement motor(s), 115V/60 Hz, 460 rpm hysteresis/synchronous type with or without mount & capacitor. D Bailey, KXGO, 2005 Pleasant Valley Ave #301, Oakland CA 94611. 510-658-9899.

Jazz record collections, 10" LP/12" LP be-bop, swing, dixie, highest prices paid. B Rose, Program Recordings, 228 East 10th, NYNY 10003. 212-674-3060.

MONITORS

Want To Sell

Belar RFA FMM2, FMS2, 2 yrs old, excel cond, BO. Howard, KXGO, 215 Fourth St, Ste A, Eureka CA 95501. 707-445-8104.

McMartin TBM-2500 RF amp on 99.3, \$300; McMartin TBM-3000 FM freq mon, \$200; Collins 900C3 FM mod mon, \$200. T Burns, WXF, 120 Wildwood Cir, Mt Zion IL 62548. 217-864-4141.

Belar RFA-1 FM RF amp, \$200. C Siegenthaler, KSIW, 612 S 14th Ave, Yakima WA 98902. 509-453-5492.

Gates 2639 mod monitor (2) AM, working, \$50 ea; General Radio 731-B, works, \$40; RCA retubed w/octal tubes, \$40. J Crawley, Group Radio, POB 185, Campbellsville KY 42719. 502-465-8884.

McMartin TBM-2200A stereo monitor, bought re-conditioned 7 years ago, never used. JJ, WVKV Radio, 304-765-7373.

McMartin TBM2000A & TBM2000B, \$150 ea or \$250/both; Belar FMS-1, \$500; Belar SCA, \$250. B Pace, KMXQ, POB 30570, Albuquerque NM 87190. 505-881-7002.

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45's from 50's thru 80's, approx 5-6000 in gd cond, sold as collection only, \$4500. D Leutz, KKBN, POB 708, Twain Harte CA 95303. 209-586-1988.

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Sony TC 765-2 1/4" 2 trk, 7.5 & 15 ips, 10.5" reels, excel cond, \$694 +shpg; Ampex AG-440 1/4" 2 trk, 7.5-15 ips, in 3' Bud rack, \$195 +shpg. D Peck, House of Music, 5050 Laguna Blvd #112, Elk Grove CA 95758. 916-684-8000.

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Moseley MRC-1600 in excel cond, \$2150; Gentner VRC-1000 w/VRC-2000 software upgrade, like new, \$2350. D Leutz, KKBN, POB 708, Twain Harte CA 95383. 209-586-1988.

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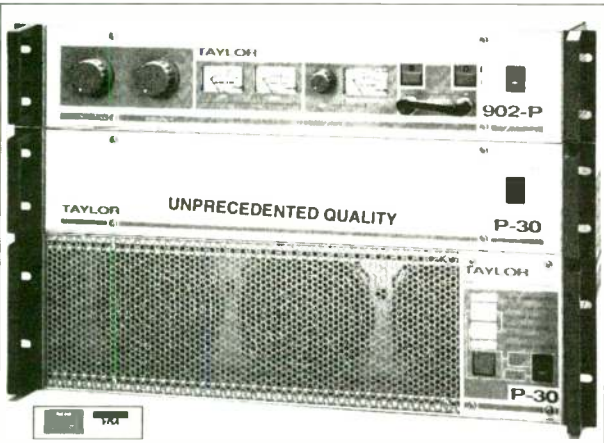
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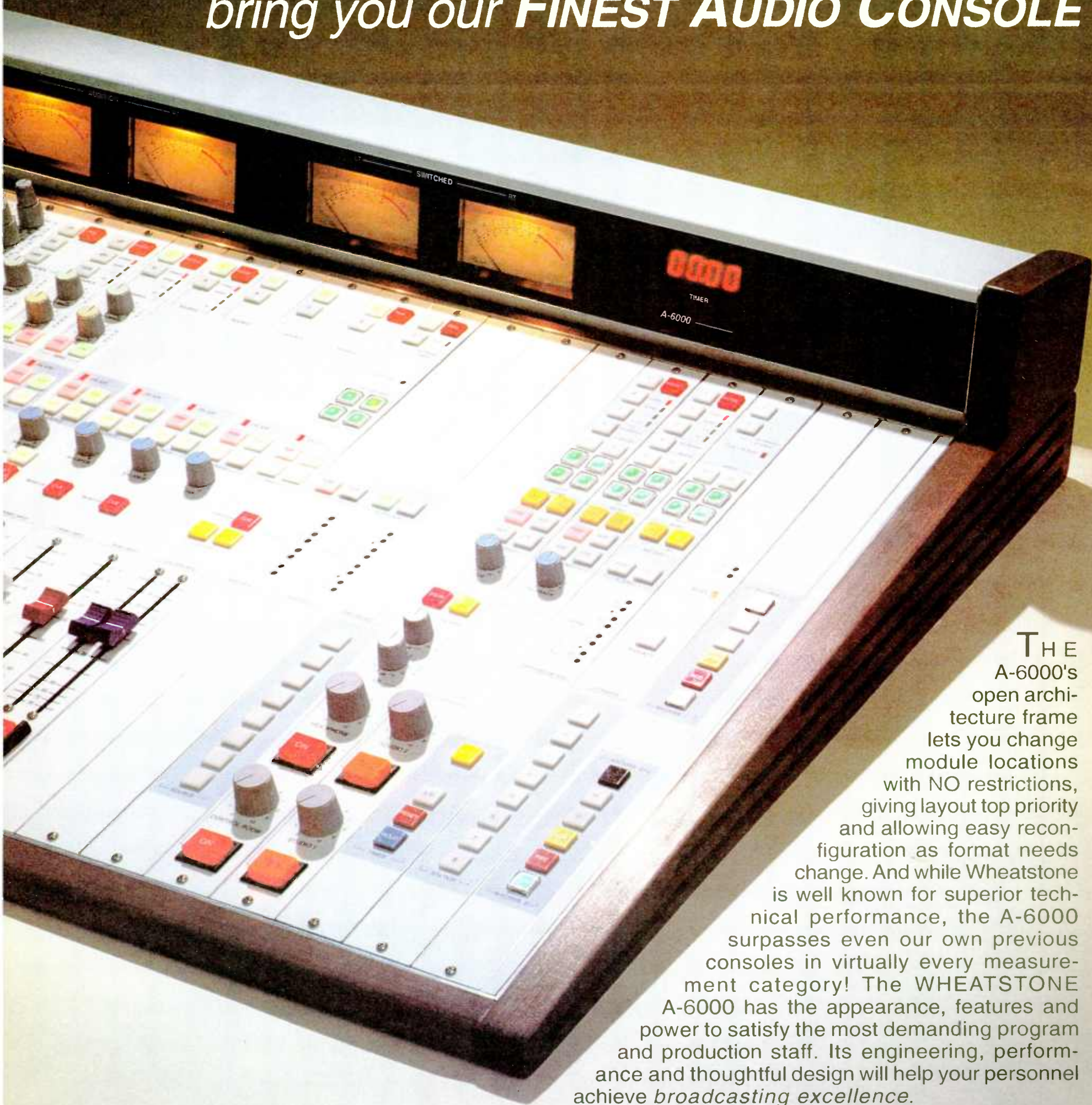
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