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See Page 47

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Radio World®
The Newspaper for Radio Managers and Engineers
November 25, 1998

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Visit RW Online at www.rwonline.com

FM Technical Changes Draw Heat

Radio Broadcasters Debate Interference Agreements, Class C Reclassification

by Leslie Stimson

WASHINGTON Broadcasters are sharply divided about an FCC proposal that would change several FM technical rules.

Radio owners and consulting engineers responded to the FCC with comments about MM Docket 98-93. Among the biggest areas of concern are the concepts of negotiated interference agreements among stations, a new subclass of Class C stations and a new contour prediction method.

Interference

Although the comment period was extended to Dec. 4, the commission probably will not have new rules finalized until spring. And there are likely to be several changes between now and then in how the rules shape up.

The concept of allowing stations to negotiate interference agreements in some limited cases (**RW**, July 8) arguably is the most controversial proposal.

FCC officials feel the current rules may unnecessarily preclude proposals to introduce new or expanded FM service. Generally, every FM station is protected from interference to its maximum height and power classification. FCC officials have said this policy permits some broadcasters to "warehouse" spectrum, when they have no interest in increasing their power.

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Product Wrap-up
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EAS Still Battles Alert Flubs

by Lynn Meadows

LOS ANGELES "We are facing not only here but in other parts of the country a serious EAS credibility problem, especially when it comes to weather alerts."

Emergency planner Richard Rudman has issued pleas for broadcasters and others to improve the nation's new EAS system. Rudman is the Los Angeles county local emergency communications chairman, California south state SECC vice chairman and FCC EAS national advisory committee appointee.

When the Emergency Alert System was first introduced, many expected it would be an unobtrusive system for getting alerts out to the public quickly — unlike the old Emergency Broadcast System. The idea of an EAS "web" in which every broadcaster monitored two outside sources sounded like a cure for the old daisy-chain EBS system.

Nearly two years after the government mandated that all stations buy an EAS encoder/decoder, the flaws in the new system have become obvious. Now comes the hard part — finding solutions.

The National Weather Service has been targeted as a weak link for EAS

See EAS, page 8 ▶

World Radio History

◆ NEWSWATCH ◆

CBS: Jordan Out, Karmazin Up

NEW YORK CBS Corp. Chairman and Chief Executive Officer Michael Jordan plans to retire at the end of this year. As expected by observers, Company President and Chief Operating Officer Mel Karmazin will succeed Jordan effective Jan. 1 of next year.

Jordan has served as CBS Corp. chairman and CEO — formerly known as Westinghouse Electric Corp. — since June 1993.

Jordan said, "By the end of 1998, with the completion of the last of our industrial divestitures, we will have brought to a close the corporate transformation we began in 1993."

Karmazin joined CBS in January 1997 as chairman and chief executive officer of CBS Radio after he sold Infinity Broadcasting to CBS. He was named chairman and chief executive officer of the CBS Station Group in May 1997.

In his new role, Karmazin will assume responsibility for the strategic direction of the company, including overseeing CBS Television (network), CBS Cable and the CBS Station Group, comprised of CBS Radio, CBS-owned and -operated TV stations and the outdoor division.

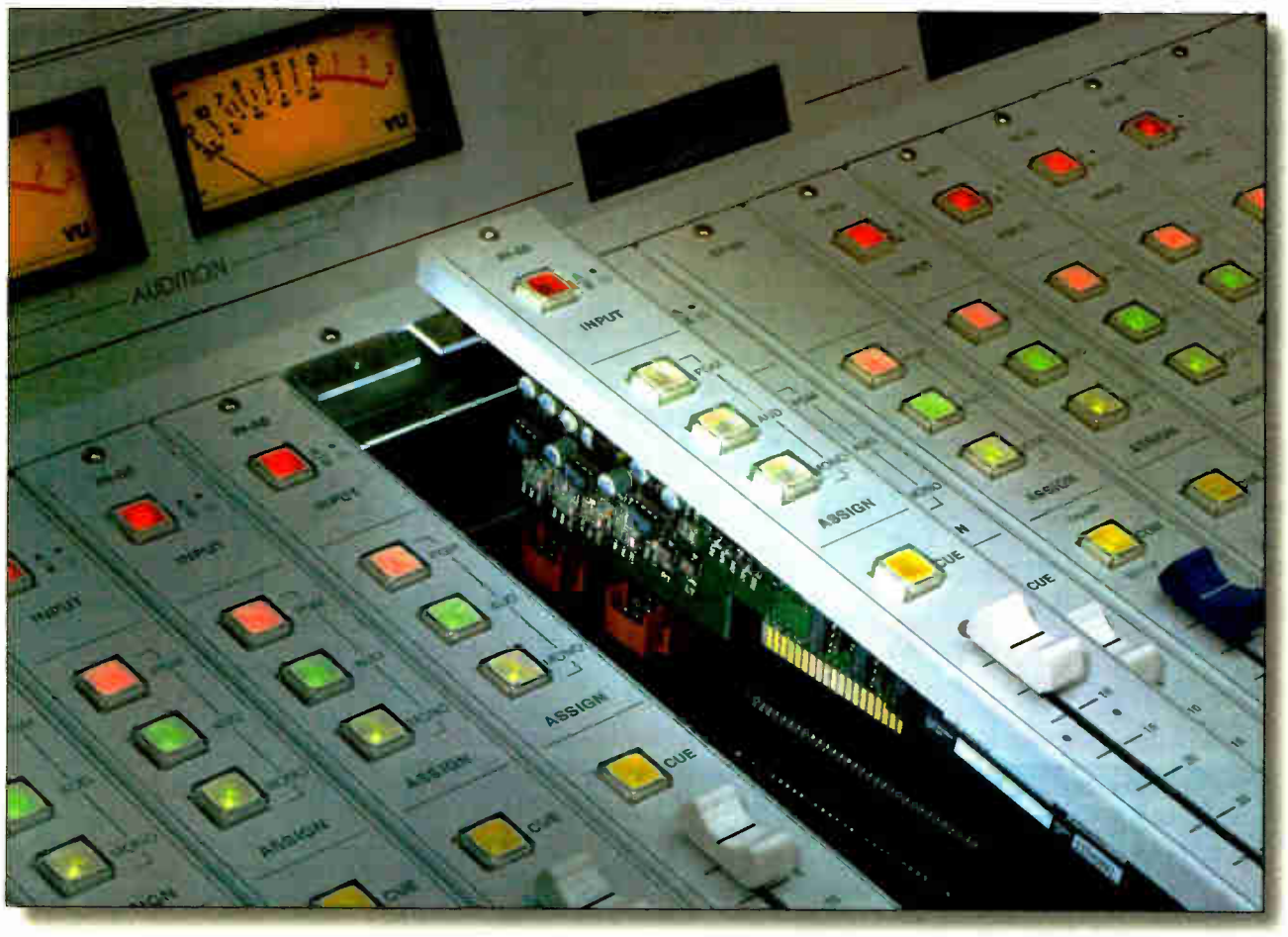
Lotteries for Non-Coms?

WASHINGTON The FCC has tentatively decided to use a lottery or point system to award non-commercial licenses in cases where there is more than one applicant vying for the same license. If adopted, the new system would replace the current comparative hearing process, which the FCC and telecom attorneys both agree is a long, costly process.

Congress authorized the FCC to use auctions to resolve competing applications for commercial licenses (RW, Sept. 2); FCC staffers and telecom attorneys predict the first auctions won't be held until spring. In the meantime, the FCC has to decide how to handle competing non-commercial applications for both non-commercial and in some cases, commercial spectrum, and has asked for public comment on this issue (MM Docket 95-31) by mid-December.

See NEWSWATCH, page 3 ▶

Take a LOOK at THIS:



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FCC Cuts Broadcast Forms

by Leslie Stimson

WASHINGTON In an effort to cut down on the amount of paperwork that broadcasters have to file with the FCC, the commission has revamped filing procedures for 15 key radio and TV forms, including sales contracts, facility modifications and applications for new stations. The earliest the new rules go into effect is January, approximately 60 days after being published in the "Federal Register."

Electronic filing

The commission expects to be able to accept electronically filed applications next spring and make electronic filing mandatory by next fall.

The bottom line is that stations and their attorneys can spend less time compiling paperwork and making multiple copies of required information. By reducing the amount of paperwork it receives, and allowing that paperwork to be filed electronically, the commission hopes to reduce its workload, and speed up the amount of time its employees spend processing paperwork.

In voting on the new procedures in late October, Commissioner Susan Ness said, "We have correctly decided that the FCC should no longer conduct time-consuming reviews of substantial exhibits and appendices and attachments. Instead, we will rely on certification."

Broadcasters, or their attorneys, will answer "yes" or "no" on the new forms with the aid of worksheets to make sure their answers are correct. While the forms themselves will still have to be stored in stations' public files and at the commission, the worksheets do not have to be part of the public record. Commissioners Ness and Gloria Tristani thought the worksheets should be required, as a way to verify the information given on the abbreviated forms.

The Federal Communications Bar Association, which represents some 3,200 communications attorneys before the commission, agreed.

"The worst thing is to be faced with someone at the commission who's in a competitive position with my client, submitting applications we don't believe are true," FCBA member John Garziglia told **RW**.

"The commission's application processing history is replete with examples of the commission moving toward absolute certifications on applications comprised of 'yes' and 'no' answers, only to discover that applicants do not take such certifications seriously," the FCBA wrote in comments filed on this issue.

Stations and their attorneys can spend less time compiling paperwork and making copies of required information.

Random audits

FCC Chairman Bill Kennard said random audits would be conducted to verify information. He said, "We will come down hard" in cases where the FCC believes applicants either lie or misrepresent the facts on their forms.

Another important change is how often ownership reports have to be filed — that figure drops from every year to every two years. For the first time, the commission is requiring individuals or entities having attributable ownership interests to identify their race or ethnicity or gender on ownership forms. Kennard said the FCC cannot advance the cause of diversity of broadcast ownership unless "we have the basic information."

Commissioner Harold Furchtgott-Roth opposed this. "For instance, what is the race of the ABC radio group? The ethnicity of CBS/Westinghouse?"

In the interest of streamlining, the commission had proposed eliminating the requirement that the sales contract be filed with the FCC when a station changed hands. Public interest groups and the FCBA fought that, saying price information serves the public interest (in FCC forms 314 or 315 assignment or transfer applications).

The FCBA also said that financial institutions rely on station pricing information to track station values which fluctuate, depending on how much investors are willing to pay at particular times. Without that information, said the FCBA, many loans particularly to women or minorities, would not be made without sales price information.

The commission also extended the terms of construction permits to three years for both radio and TV (from 18 months for radio and two years for TV stations) and eliminated the ban on profits on the sale of unbuilt CPs.

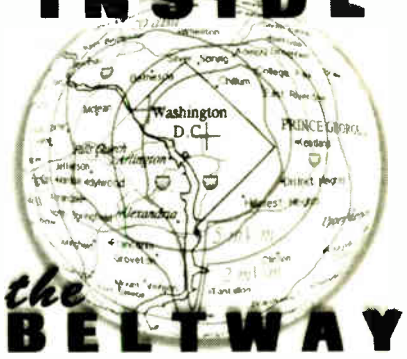
Moving on up

The long-stalled physical move of the FCC has begun. The first offices relocated in late October. The commissioners and their staffs are not expected to move until January; the entire FCC should be consolidated in its new location by April.

Good news for broadcasters: the phone numbers, fax numbers and the FCC zip code will remain the same. For those submitting public comments on any proceedings at the FCC, however, the address change was to take effect by the time this issue of **RW** reaches you.

The new address is Federal Communications Commission, 445 12th St., NW, Washington, DC, 20554.

INSIDE the BELTWAY



A Roundup of News and Comment Affecting Radio From the Nation's Capital

For radio news updates, visit www.rwonline.com

◆ NEWSWATCH ◆

▶ NEWSWATCH, continued from page 2

Proffitt New Citadel Head

TEMPE, Ariz. Citadel Communications Corp. has named D. Robert Proffitt president and chief operating officer of its Citadel Broadcasting subsidiary, a new position. Proffitt had been president of Citadel's central region, overseeing 37 stations.

Pete Benedetti was promoted to Proffitt's former position.

Of the appointments, Citadel Chairman and Chief Executive Officer Larry Wilson said, "Bob Proffitt and our three proven regional presidents provide the management depth we need to ensure Citadel's continuing success in consolidating mid-sized markets."

Citadel will own or operate 80 FM stations and 36 AM stations in 22 mid-sized markets once all pending transactions close.

COMING SOON

Coming in Radio World

- RW talks to Emmis' Jeff Smulyan
- A technical look At DRE's IBOC DAB System
- The hottest stories Of '98
- The Galaxy IV Aftermath

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World Radio History

Will Radio Ever Be All-Digital?

In its DAB filing with the FCC, USA Digital Radio said it wants a 12-year transition period ending in an all-digital radio industry. But some radio folks don't want to go full digital, ever. They see a hybrid system as a *permanent* solution.

The logic: most listeners own multiple radios — in their living room, bedroom, bathroom, workshop, car and office. When we replace radio with a digital-only system, those receivers will be obsolete. Consumers might buy one new digital receiver, but they are unlikely to buy four or five. Once the listener gets accustomed to not having radio in the bathroom or garage, the argument goes, they might not come back. Other media will serve them, and radio loses ground.

Some radio managers expressed just that opinion in their visits to DAB booths at the recent NAB Radio Show.

★ ★ ★

That show drew about 7,000 people, roughly the same as last year's event.

Seattle itself attracted people; many visitors told me they loved the clean, friendly city, a nice change from the Los Angeles/New Orleans rotation of recent years. The weather was spotty, though. The best day to view spectacular Mount Rainier from downtown came after most visitors had left.

Did you attend? What equipment or sessions did you enjoy? You will find our show product wrap-up in this issue.

A note of thanks to the staff of BSW, who took a boatload of clients and colleagues on an evening lake cruise to show off their home town (the supplier is based in Tacoma). Three of us from **RW** ogled the night sights from the water, including Husky Stadium and the lights of Bill Gates' house.

Next year's Radio Show is in Orlando, right before Labor Day. Plan now and you might be able to structure a family vacation around the show.

★ ★ ★

The SBE national meeting and The NAB Radio Show were two weeks apart in the same city last month. What a pain. I can't help wondering how many potential attendees and exhibitors were forced to choose between them.

The old, failed World Media Expo concept didn't pan out for many reasons. But one cost of returning to separate shows is that people simply can't attend all of them.

Industry inquiries

Organizers of industry events don't like to admit it, but the reality is that they compete for the time and money of radio managers, both technical and non-technical. Wondering about this, I recently asked some readers whether they would attend either show, and who paid their tab. I also posted my inquiry on *broadcast.net*

One engineer with a major group lamented that the events are no longer held at the same time. He planned to attend the Radio Show, but not the SBE meetings.

A consulting engineer wrote, "We would like to go to Seattle this fall. Unfortunately, dealing with NAB for the fall show is a tremendous hassle. We reserve that hassle for Las Vegas! We may only get to the SBE show, which I personally have attended since 1988."

Some simply can't afford to go to distant shows. "Neither event is big enough to justify my personal bucks," one wrote. "The spring show, the company pays for."

Suppliers, too, find these conflicts difficult. "Besides myself, three of our district sales managers will attend the Radio Show, and one of the guys whose territory (is there) will go back for the SBE meet," one said. "Having the two events so close together seems a little silly to me, but then I don't know what the mix of management vs. engineering will be at the Radio Show."

Another supplier had a booth at NAB, and shared one at the SBE meeting: "This year I have to travel to both shows. Do not get me wrong, I like Seattle in general and I love those little neck clams. But two weeks apart is bad for my health and my family life. Not to mention the cost."

"I own my own small group of stations," another reader wrote. "But personal bucks or my little company's bucks, either way, I'd rather drop $2-3K on a *fun* vacation in a location of *my* choice. How does Myrtle Beach sound? Our industry needs some more affordable, regional shows. I think Cindy Edwards of ABG in North Carolina has got a good idea with her fall show in Raleigh."

Last, former SBE President Terry Baun wrote to clarify how the SBE views its fall event.

"SBE events held in conjunction with World Media Expo were not only the SBE National Meeting but also an Annual SBE Engineering Conference. When WME ceased to exist, SBE decided to concentrate our national efforts exclusively on the NAB spring show Engineering Conference (which, with NAB, we plan).

"The concept of the yearly national meeting is to simply 'bring the national spotlight' to one of our regional SBE conventions. SBE takes no national role in the planning or execution of papers or exhibits," Baun said.

"It is important to remember that this is *not* an SBE National Show, but rather the SBE National Meeting held in conjunction with the Seattle SBE Regional. The choice of national meeting locations is determined by the SBE Board after review of the invitations received from various regional shows each year."

Some people doubt we will ever see an all-digital radio service. The reason: the penetration into our lives of analog receivers.

From the Editor

Paul J. McLane

★ ★ ★

Masked engineer Guy Wire had this to say in a recent piece about making the switch to digital storage.

"A wise chief in a major market recently claimed that his fleet of cart machines produced 99.9 percent reliability. Except for the rare instance of a defective cart, bad microswitch, stalled motor or sticky capstan solenoid, carts almost always play properly when the green button is pushed. It's hard to argue that any digital system based on hard drives and computer networks can rival the consistency of a well-maintained cart system. He is sticking with carts as long as parts and tape are available. ...

"But in the past two years, conversions have been picking up steam, even in the majors. Some of that has been driven by consolidation, where in some cases corporate managers decide on a common platform for standardization. But many larger groups these days are just too diverse to expect that one system will best fit the operational needs of all its stations. In many cases, the decision of which system to buy is left up to the local station.

"Before deciding on any system ... the station's long-term interests would be best served if you did your homework carefully."

Guy goes on to provide useful questions to help buyers choose digital audio systems, including considerations of bit-rate reduction, redundancy and the importance of actually trying a system before you buy it.

Guy Wire's comments are a regular feature of *www.rwonline.com*

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World Radio History

◆ READERS FORUM ◆

Letters received are the property of **RW**, and may be edited for space considerations.

Kit bag contents

Dear **RW**,

I am responding to your request to tell you what I keep in my "kit" (**RW**, Sept. 30). I have been a reporter with WTOP-AM-FM in Washington for nine years and I have added things to my kit over the years.

In my bag I have a Sony MD and a Sony DAT recorder as a backup. I keep numerous mini-plugs, attenuator, reversible XLR connectors, male-to-female XLR extension cords, a clip-on mic, a regular mic, a back-up mic cord, boxes of batteries, plugs to go into Shure mixers, a mini television set, a flashlight, an AM/FM radio, C-clamps, pens, a dictionary, an electronic organizer and two sets of headphones.

In my take-home car I keep three cellphone batteries, a trunk scanner, a handheld scanner, a rain suit, binoculars, and maps. I had two special lighter plugs installed for juice.

My cellphone is rigged with a push-to-talk button and a mini plug to take sound.

Paul Wagner
Reporter, WTOP-AM-FM
Washington, D.C.

Perfect Paul?

Dear **RW**,

As State Emergency Communications Committee chairperson for Michigan, I have received several complaint calls on the NWS "Perfect Paul" digital voice (**RW**, Oct. 28) now being used by NOAA weather radio stations in the state.

Although admittedly most of the NOAA meteorologists are not professional announcers, they are human. This low-quality, synthesized voice sounds like "Robby the Robot" from the classic '50s sci-fi film "Forbidden Planet."

I have heard a speech-splicing program used by Churchill Weather, that sounds very natural. Surely that program, or others, could be found that provide an acceptable level of quality.

I'm sorry, but 'Perfect Paul' doesn't pass the audition for an entry-level gig in even the smallest market.

We have encouraged broadcasters and cable systems to not only include NOAA radio as an monitored source, but also set their systems to auto-forward the NOAA message for critical weather emergencies such as tornado warnings, rather than taking time to record the warning with local air talent

Quality aside, this digital weather voice is hard to understand.

I'm sorry, but "Perfect Paul" doesn't pass the audition for an entry-level gig in even the smallest market. With the amazing advances daily in digital technology, we surely can do better than this.

Larry Estlack
Chairperson, SECC EAS
Lansing, Mich.

Benefits of low-power radio

Dear **RW**,

Paul McLane's column in the Sept. 30 **RW** ("Few Kind Words for FCC Busts") brought back memories of my pirate radio days.

Twenty-five years ago, I built and operated a pirate AM station along with three of my high school friends. AM was still the main medium for pop music at the time, and we were playing a progressive rock format only found on the FMs. We soon had quite a following with our 120 W AM signal. We got away with this for three summers, since we took the time to read the FCC rules and tried to operate the station by the book (except for the license, of course).

It was quite a thrill to go into the local department store and hear our station playing as background music. We were finally turned in by the top station in the market after they started getting calls asking for the same type of music that we were playing. We received the standard cease-and-desist order two weeks after we took the station off the air to go back to school in September.

So what did we get out of it all? Two of us went on to broadcast engineering careers, one manages media services for school systems and one is a regional sales rep for a communications company. We filled a programming niche when we were on the air, and were inspired to follow the paths that led to our careers. We were also left with fun memories to last a lifetime.

I clearly recognize the chaos that could result with hundreds of pirates taking to the airwaves, so let's do it right and bring back Class D or some form of licensed and regulated low-power broadcasting. Kids are naturally drawn to radio. If we can inspire one young person to do radio instead of drugs, isn't it worth it?

Paul Litwinovich
Director of Engineering
WSHU(FM)-WSUF(FM)-WMMM(AM)
Sacred Heart University
Fairfield, Conn.

Dear **RW**,

I am a regional sales manager for a car rental company, but was in radio in my other life. I still keep up with the trades, and of course **Radio World**.

When it comes to low-power and/or community radio stations, there is really no reason to deny this concept. The NAB wants to stop this from happening just to maintain the status quo. I understand business wanting to protect its own interest. But the low-power stations will not take ad dollars from the big guys. Granted it might be somewhat different in small markets. But I really don't think any existing station will go dark because of LPFM!

It really comes down to interference. I like RM-9242. It's flexible. Allow only the power that will not cause interference with existing stations.

There are many very small communities around metro markets that receive no local news. We have a weekly paper. Why should we wait for a week to find out about storm damage and winter road closures? I think you know in your "heart of hearts" that there is really nothing to lose and much to gain for small communities.

James Henderson
Former Broadcaster
Burlingame, Calif.

The Honorable Profession

The end of the year is almost upon you. What have you done for your radio colleagues lately?

Some months ago in this space, we urged professionals in radio, particularly engineers, to do a better job at helping attract others to the industry. Consolidation in radio, the tough hours and the appeal of better pay elsewhere had drawn some of our best technical talent away.

Now we're looking for your success stories.

We believe in mentoring. The simple act of helping a young person (or a not-so-young person) to learn the ropes of the radio business is a gift you give to those who follow.

A vocal proponent of mentoring is Ed Miller, who was recently re-elected as president of the Society of Broadcast Engineers. The SBE has put its money where Ed's mouth is. Earlier this year we heard that the SBE would create a youth program. It kicked off that program in late summer, providing material and ideas to support chapters in arranging station visits and other programs to expose youth to radio and its engineers.

We salute those efforts. Tell us about yours.

Has your chapter planned a youth night? And on a personal level, have you explored ways to involve young people in your stations, and your career? A good person to call first is the head of the career program at the local technical or high school.

If each of us helps bring along one enthusiastic young person, the pool of talent in this honorable profession of ours will never dry up.

— RW

Write to Us

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Clarifications

The RØDE Broadcaster microphone (**RW**, Oct. 28) now is also available from Audio Broadcast Group at (800) 999-9281. It is listed either as the RØDE Broadcaster or the RØDE NT-3.

In the Oct. 28 issue, on Page 50, a photo of the discontinued Continental Electronics 815B FM tube transmitter was run instead of the desired photo of the solid-state 815C transmitter, pictured above.

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World Radio History

NEWS ANALYSIS

A Closer Look at Lucent DAB

by Thomas R. McGinley

SEATTLE Lucent Digital Radio is one of three companies developing an in-band, on-channel digital audio broadcasting system. Lucent Digital Radio introduced itself formally to the radio industry at The NAB Radio Show last month. The company was announced about six months ago, but its parent company, Lucent Technologies, and its close relatives, AT&T and Bell Laboratories, have been involved with DAB development for a number of years.

Lucent has released little detail on the technical characteristics and design topology of its AM and FM IBOC systems. This is less surprising considering the stakes involved in the show-and-tell process of evaluation by the DAB subcommittee of the National Radio Systems Committee.

Several patents are pending by all three proponents involving their respective DAB systems.

Yet many station managers and engineers would like to understand better what makes the systems different, in terms an average broadcaster can understand. At The NAB Radio Show, **RW** editors had the opportunity to discuss the technical aspects of the Lucent Digital Radio system with members of the Lucent and Bell Labs team, including distinguished Bell Labs researcher Carl-Erik Sundberg, LDR principal engineer; audio coding, Deepen Sinha and spokesman David Bikle.

Photo by Electric Photographers

Lucent's booth drew crowds on the exhibit floor at The NAB Radio Show.

All three DAB proponents are using essentially the same structure for their FM DAB systems (**RW** will detail the other two proponents in subsequent issues.) The stereo audio is first converted to 16-bit digital and source coded with bit-rate reduction from 768 (uncompressed) kilobits per second to about 96 kbps. Lucent uses PAC, developed in-house by Bell Labs, while USADR and DRE use MPEG Advanced Audio Coding, or AAC, which was finalized and "frozen" as an algorithm, according to Sinha in 1996.

Sinha said Bell Labs continues to improve and enhance PAC, calling it "adaptive" as upgrades and improvements are developed. The version now being used for LDR, he said, is "optimized" for radio broadcasting. The algorithms PAC and MPEG AAC are similar, but use slightly different "tricks" in getting compressed audio to sound transparent at very low bit rates, less than 96 kbps.

The MPEG family of algorithms are world standards, licensed and used by dozens of companies. The use of PAC is still quite limited, but Satellite CD Radio employs it for its system and some Internet-oriented firms also use it for their encoder and decoder systems. Sinha believes that PAC is now better than MPEG AAC because of ongoing refinements. He said that the version of PAC which was tested against MPEG AAC in 1996 with results published worldwide was much older than the MPEG version now being used. Lucent is using the MPEG version of AAC.

The channel coding and digital modulation architecture of all three IBOC systems under development share many common elements, widely used in cellular telephone and satellite communications technology. All three proponents add a pair of digitally modulated sidebands around the center channel analog signal, but at a power level reduced below the analog by 20-26 dB.

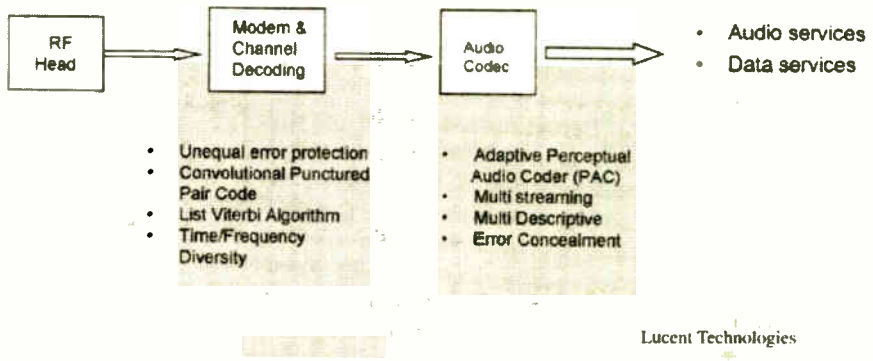
The major differences of the three systems lie in how the resources of the digital bitstream are used. The more bits used for error correction, the fewer bits available to carry the source program as well as ancillary data. Bit-rate reduction of digital audio causes delay in the overall process. All three use a form of COFDM (Coded Orthogonal Frequency Division Modulation) with an interleaver, which introduces an additional time delay in the encoding and decoding process.

The decoder can "look ahead" at data errors and correct or conceal them before they become audible. Both the Lucent and DRE systems exhibit a latency (overall time delay) of about six-tenths to eight-tenths of one second. USADR's system exhibits a total overall delay of between 3 to 5 full seconds, to take more advantage of time diversity.

The lesser-known differences in the systems lie in the intricacies of how the bitstream is coded and decoded to conceal errors and reduce the effects of bit errors caused by interference and signal dropouts. Lucent engineers believe all 3 IBOC systems use a form of cyclical redundancy checking, or CRC, convolutional coding, and the Viterbi algorithm to make the bitstream smarter or more robust in the presence of impairments. The CRC process provides reconstruction data that are used to cover or "splice over" destroyed bits.

Lucent claims to have taken the use of convolutional coding to a more refined level than the other IBOC proponents, employing "Convolutional Punctured Pair Codes" and a "List Viterbi Algorithm." Sundberg said the other two proponents do not use either since Lucent has patents pending on both processes.

The Lucent channel coding scheme starts with the CRC process in what Lucent identifies as the "outer code." The coding is further refined in the "inner code," the first subset being standard convolutional coding. The second subset uses punctured codes (also used in other digital modulation technologies), and a new third subset uses convolutional punctured pair coding, which Lucent said is an innovation. The complementary punctured pair refers to the treatment of both upper and lower digital sidebands of the FM signal.



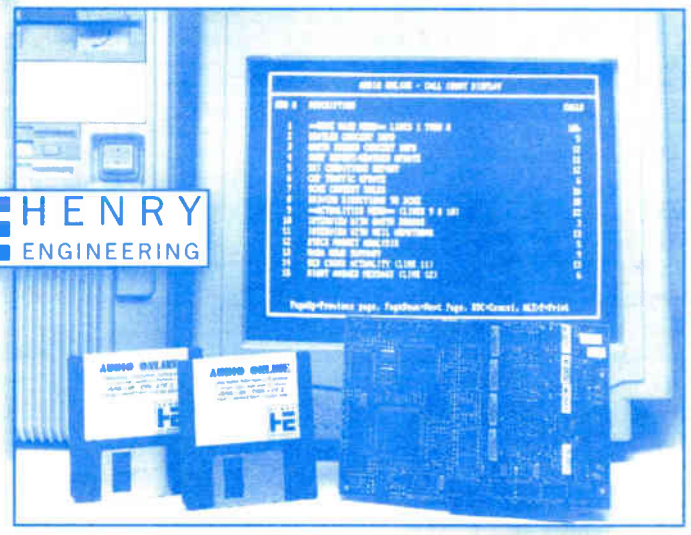
Lucent Digital Radio's FM IBOC DAB System

The use of the Viterbi Algorithm is also common in the other IBOC proponents digital modulation scheme. The "List Viterbi Algorithm" is a pending Lucent patent, involving a process whereby the decoder (receiver end) is presented first with the best bit pattern, then the second-best, then the third-best and so forth, until the decoder has "looked" at multiple bit patterns from which to reconstruct the most error-free result.

The "second-best" overall bit pattern may contain some bits which may be less corrupted than in the "best" pattern. Therefore the decoder has a better

See IBOC, page 7 ▶

Information System Problems?



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World Radio History

No DAB Bus Rides

SEATTLE As in-band, on-channel digital audio broadcasting systems have evolved over the years, visitors to NAB conventions have been treated to everything from small booths, with talk and little hardware, all the way to narrated bus ride tours of complete operating transmission and reception systems, showing off multipath and interference suppression performance.

The 1998 NAB Radio Show was an in-between experience for DAB aficionados, as each of the three proponent systems showed some hardware, along with lots of discussion about how far along each system has evolved.

Booth talk

At the show, Lucent had one of the largest booths on the exhibit floor. It demonstrated a prototype coder and exciter/generator that transmitted a near-field signal to a prototype receiver and spectrum analyzer. Those attending the demonstration could see the resulting channel spectrum and listen to the recovered audio. (See related story on page 6).

Digital Radio Express showed the mobile package it used in the recent KSAN(FM) over-the-air tests in San Francisco (RW, Sept. 30). There, DRE transmitted a separate low-power, on-channel IBOC DAB signal, with simulcast programming running on the analog KSAN host.

DRE used the separate KSAN backup antenna for DAB, mounted immediately below the main KSAN antenna on the same tower. The test vehicle was a Chevrolet van, outfitted with a test receiver, spectrum analyzer and recording equipment. A low-power test generator used for the KSAN tests transmitted a demonstration DRE DAB signal next to the van. The recovered signal was then displayed inside the stationary van.

No sense of how the signal responded in a real environment with a moving vehicle could be gained with this demonstration, but DRE Vice President of Engineering Derek Kumar said he was pleased with the tests. "We have the modulation nailed down. We're essentially done with DRE FM," he said.

USADR put limited demonstration hardware in its booth. Vice President of Engineering Glynn Walden said, "We demonstrated complete AM and FM DAB IBOC systems in 1995. We are now in the implementation phase."

USADR unveiled a rack-mounted prototype IBOC AM and FM DAB receiver which it plans to use in upcoming station tests. USADR also showed a prototype IBOC exciter, which fits in a three-unit rack space, for either AM or FM. Neither the receiver nor the exciter was plugged in and operating.

USADR engineers conducted an audio comparison demonstration of the MPEG AAC compression coding algorithm, showing off its transparency at 96 kbps. Walden said the version of MPEG AAC which USADR is using is being improved under a contract with Franhaufer, the principle developer.

— Thomas R. McGinley

▶ IBOC, continued from page 6

chance of reconstructing a more error-free overall pattern if it can look at more possible patterns in a given snapshot of time. The goal of this process is error concealment, so that minor errors which could contribute to a "click" or "pop" in the final decoded audio are eliminated. The List Viterbi process requires more processing power, which will probably not be available in all digital receivers. Therefore, Lucent plans to offer it to receiver manufacturers as an option for premium performance in higher-end models.

The Lucent system uses "unequal error protection," which also is employed in cellular technology. In the channel coding process, bits are classified according to their level of significance in the accurate reproduction of the decoded audio. The more significant bits then are accorded more error protection treatment than less-significant bits.

The overall source and channel coding process is integrated and takes advantage of what Lucent calls "multi-streaming," which helps reconstruct damaged audio channel information and more graceful degradation when the digital signal is overtaken by fading and interference.

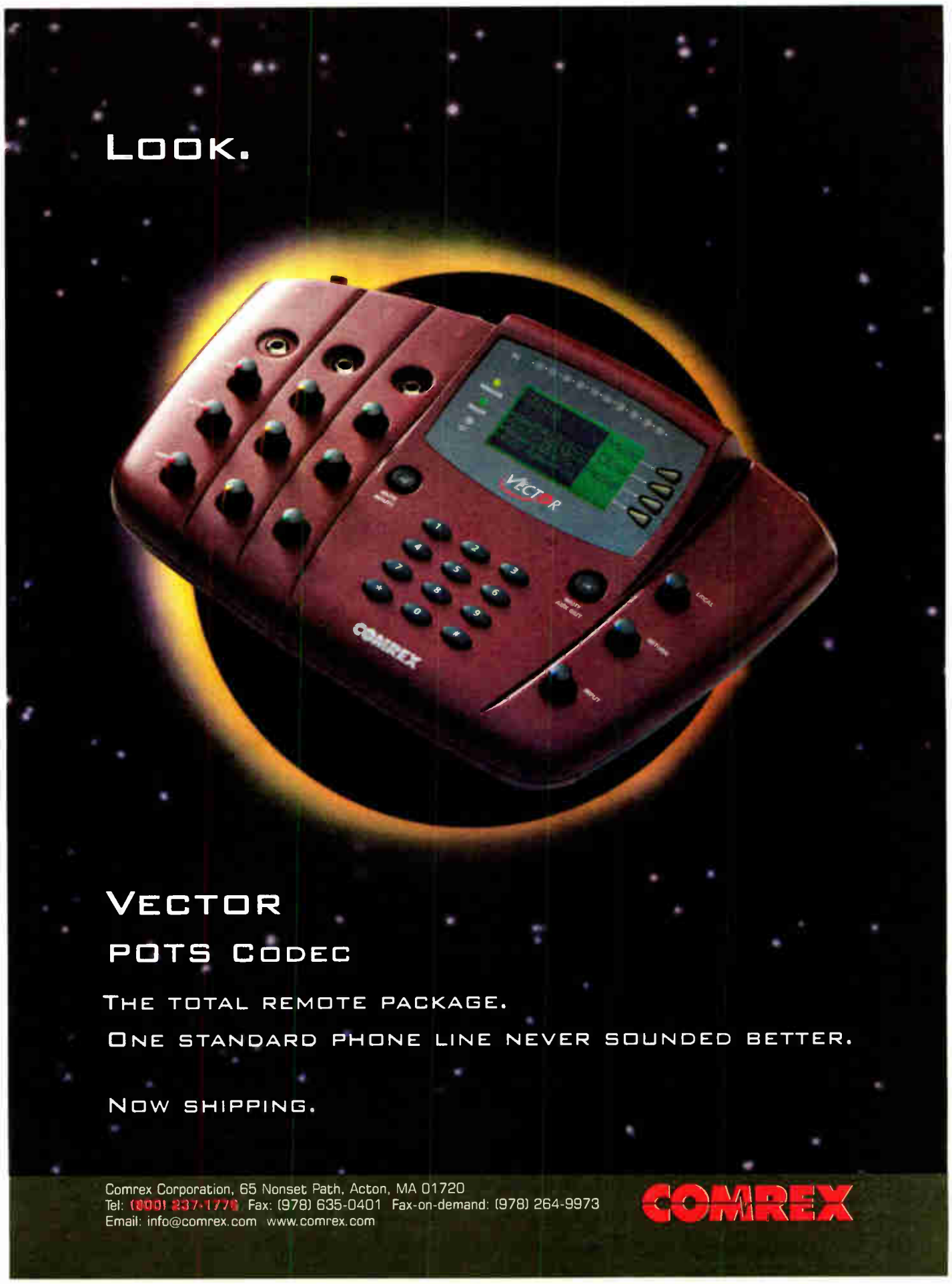
All The Lucent spokesmen believed that their system is the strongest in the area of error concealment, because of the proprietary techniques employed within PAC, plus the use of Convolutional punctured pair coding, List Viterbi, and CRC in the channel coding process.

Lucent Digital Radio President Suren Pai said that Lucent is now identifying five to 15 existing FM stations which will be used to field-test Lucent's FM system, starting early next year. He said the system "is not quite there yet and is perhaps a year away from commercial viability." Lucent is still at the research and design level for its AM system. Executives said Lucent hoped to start testing it in mid-to-late 1999.

At the show, Lucent had one of the largest booths on the exhibit floor. It demonstrated a prototype coder and exciter/generator which transmitted a near-field signal to a prototype receiver and spectrum analyzer. Those attending the demonstration could see the resulting channel spectrum and listen to the recovered audio.

■■■

Tom McGinley is chief engineer at WPGC-AM-FM, WARW(FM) and is technical advisor to ***RW****.*



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World Radio History

NOAA 'Over-Alerting' on NWS Messages

▶ EAS, continued from page 1

in many areas. Local NOAA Weather Radio stations have been accused of "over-alerting" by sending too many messages when one or two would do. Missing end-of-message codes in some NWS alerts have also frustrated stations. Early on, some broadcasters badgered the Weather Service for adding unnecessary details to their warnings, which chewed up more time on radio stations.

Most recently, broadcasters balked when the NWS announced that as part of its new Console Replacement System (CRS), it would eventually use a synthesized voice to send out warnings (**RW**, Nov. 11). Rudman has worked closely with the Oxnard NWS office to improve the quality of its weather alerts.

"If what they supply is wrong, confusing or exhibits poor audio quality, broadcasters have every right to ask NWS as our 'Alert Supplier' to do a better job. If they do not, since local EAS is still a voluntary program, NWS/NWR runs the risk of our industry sending them a cancellation notice," Rudman said.

Transmitters

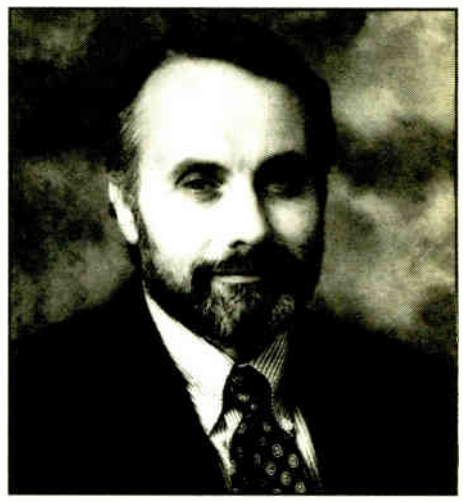
Not everyone has a complaint about the quality of NOAA Weather Radio. The other major complaint against the NWS is that it does not have enough transmitters to cover the country and get weather warnings out to more people.

"All in all, the EAS here in the Midwest functions decently. It hangs on the competence of the NWS, which is also quite high," said Jeff Johnson, network engineer for WVXU(FM), Cincinnati and the X-Star Radio Network (and an occasional free-lance contributor to **RW**).

Johnson said the weak link is the "spotty and rather ratty network of NWS transmitters."

A solution to the NWR coverage issue is coming. In 1994, after a tornado in Alabama devastated a church, Vice President Al Gore said the goal of the NWS should be to get 95 percent of the people within range of a NOAA Weather Radio station.

The NWS recently chose Crown International to build its NWR transmitters. Congress has appropriated $1.6 million for new NWR transmitters in the 1999 appropriations. Of that, $400,000 is earmarked for South Dakota and the rest will go to build transmitters in Illinois, Georgia and Kentucky. Public/private partnerships with other interested parties will likely result in many more transmitters being purchased.



Richard Rudman

Another major flaw found in some EAS areas is the relay system. In many cases, the LP1 (primary) stations are not forwarding as many messages as those monitoring them might like. Some LP1s have — unwittingly or not — sent station jingles or advertising at the end of EAS tests, which are then played by unsuspecting stations throughout the market.

Ben Green

New York

In New York, WEOS(FM) General Manager Michael Black expressed his frustration at the local LP1 stations which did not pass through a single warning about the severe thunderstorms that created a damage path over 100 miles long and 10 miles wide on Labor Day weekend. That storm killed two people and knocked out power to about 400,000. His station monitors NOAA Weather Radio and passed on the alert. Since then, he has learned that other stations in the area monitor his station to get weather alerts.

"I am reading about more and more stations that are turning off the EAS Warning automatic relay feature either because of LP1 problems or ... defective warnings from NWS," Rudman stated.

Rudman said he favors the idea of an e-chip. The Society of Broadcast Engineers mentioned the e-chip concept to the FCC in April when it filed comments on the portion of the EAS rule making that covered cable implementation of EAS.

The e-chip, as proposed by Rudman

See EAS, page 12 ▶

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At last! A "cart" replacement system that *works like carts*, but with digital audio quality that *sounds like compact discs*.

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The triple-deck digital player has everything you would expect. Big green Play buttons, bright red Stop buttons, VU meters, large countdown timers, flashing End-of-Message signals, and large legible "cart" labels.

You can start each spot manually from the screen, from remote Start buttons (and run lights) on the console, or touch the Auto-Manual button to have Spot Box smoothly start the next deck itself.

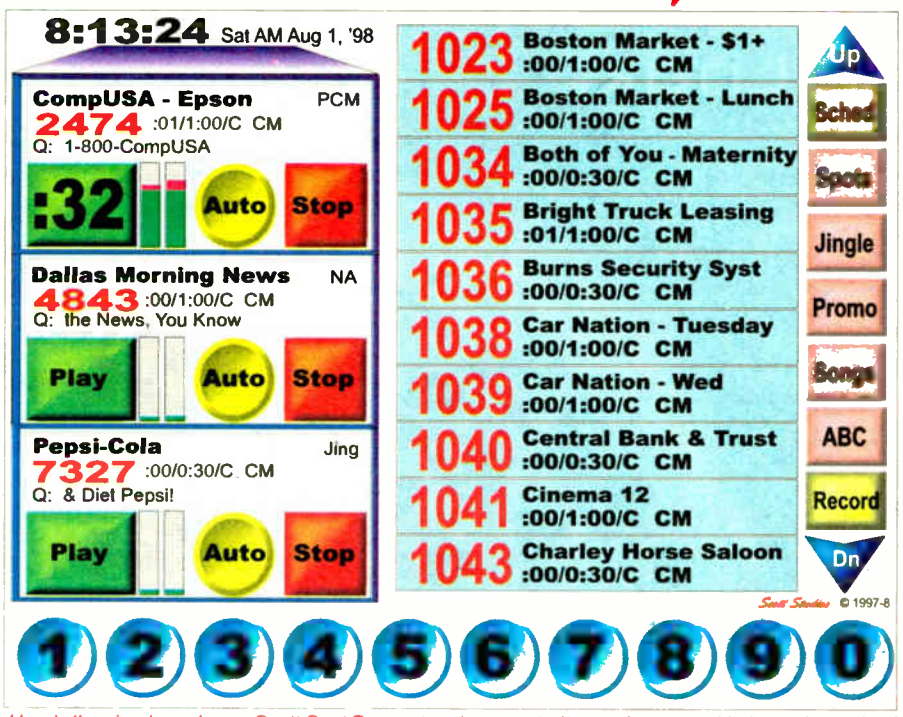
Spot Box is really easy to use. There's only the one screen, so jocks never get confused. Even though Scott Studios uses Windows 98, 95 or NT, Spot Box works like carts, *not* a computer.

If you use a paper log, load any cut quickly with the blue number keys at the bottom of the touchscreen, or type them in with a 10-key pad. Or, pick and play any recording by number or name from the scrolling "Wall of Carts" showing all your spots, promos and jingles in ABC or 123 order.

As an option, Spot Box can import logs from your traffic computer by diskette or Local Area Network.

You get detailed printouts showing exactly which spots played and when. With the traffic import option, you see at a glance the comparison of schedule and air times.

If you have several stations under one roof, record a spot only once. There's no limit to the number of Spot Boxes or hard drives you can connect by LAN for additional studios and redundancy. Every spot can be instantly played in every studios' Spot Box. Recordings can be locked so they only play on designated stations, days and times.



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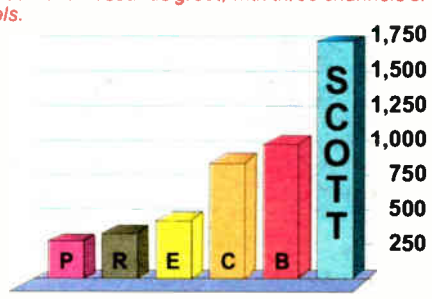

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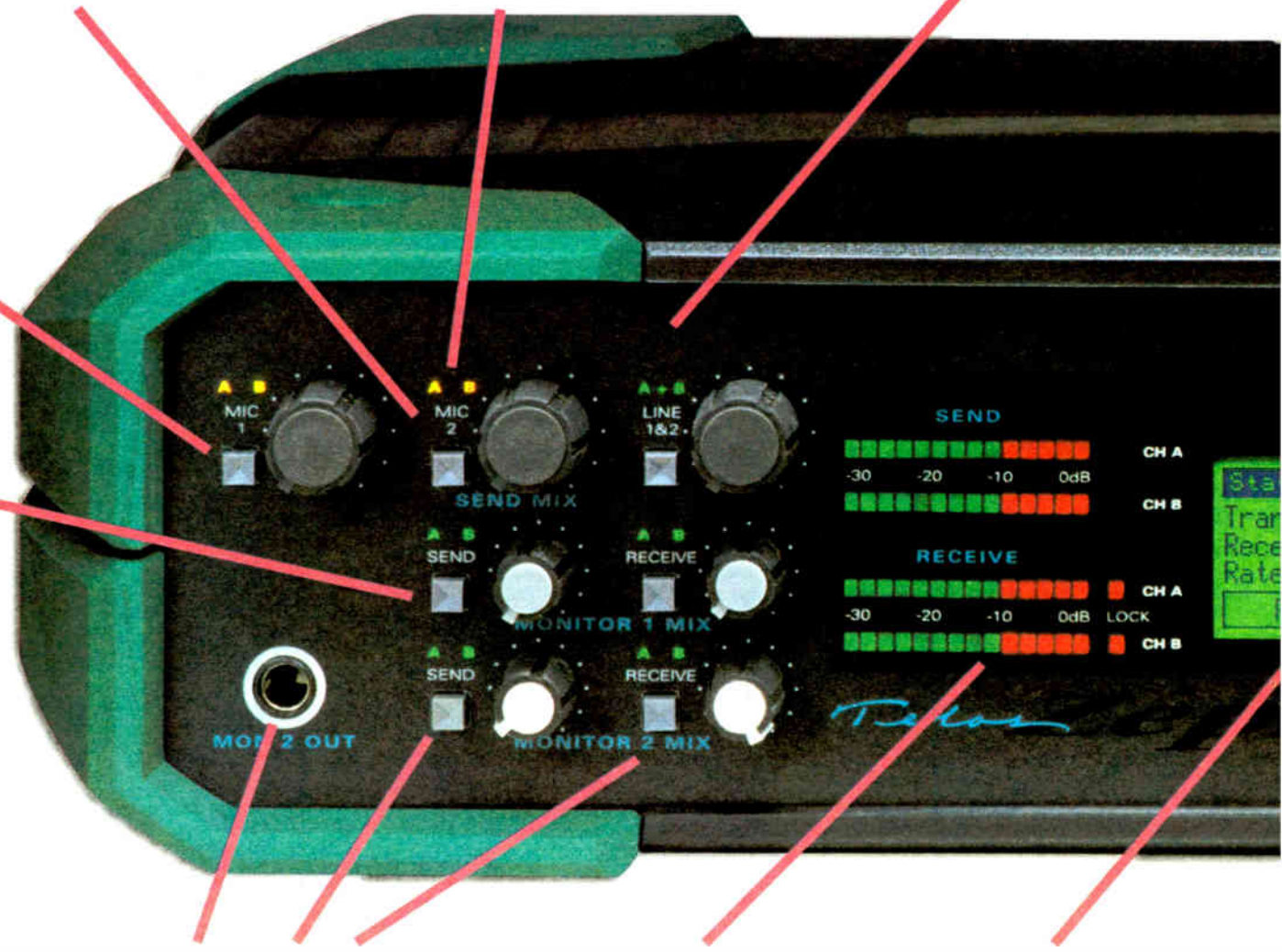

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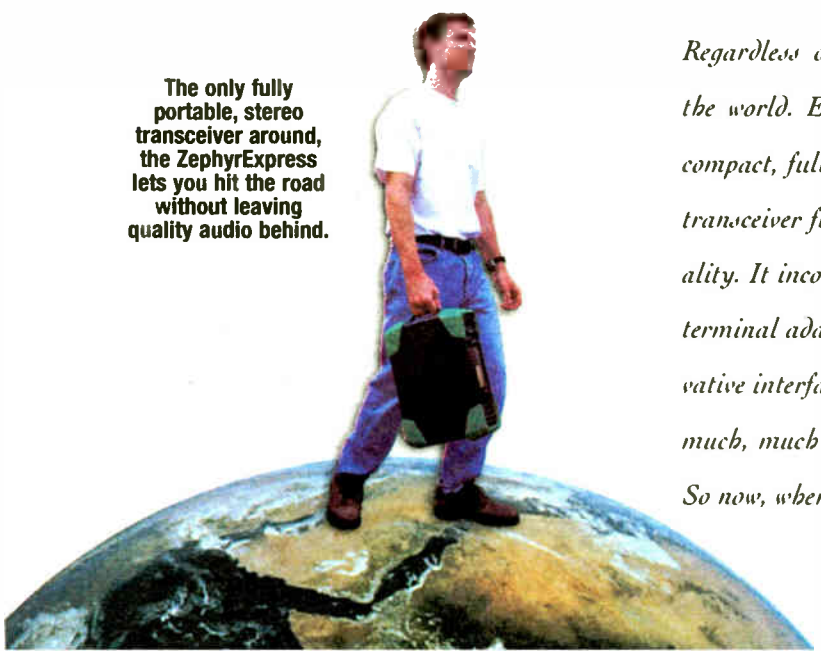
Call out timer.



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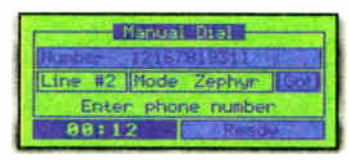

World Radio History

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Full-featured ISDN transceiver including three coding schemes (MPEG Layer 3, Layer 2, G.722) capable of simultaneous transmit and receive. Coding modes can be individually selected for transmit and receive paths.

Front panel has a clean, uncluttered design for simple operation.

Dialing functions include manual dialing and one-button auto-dialing of 40 presets. These 40 user-programmed auto-dial sets include codec section settings, local ISDN line information, and the numbers of the remote location you wish to dial.

shown at actual size

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World Radio History

An EAS 'Call to the Industry'

▶ EAS, continued from page 8

and the SBE, would be an addition to set-top cable boxes and television receivers. It would constantly monitor one channel for EAS information. The channel could be a broadcast channel or a specific emergency channel designated by the cable system.

EAS has generated plenty of discussion in online chat groups. Rudman, for example, posted his "call to the industry" in the *broadcast.net* chat group generating several days of debate.

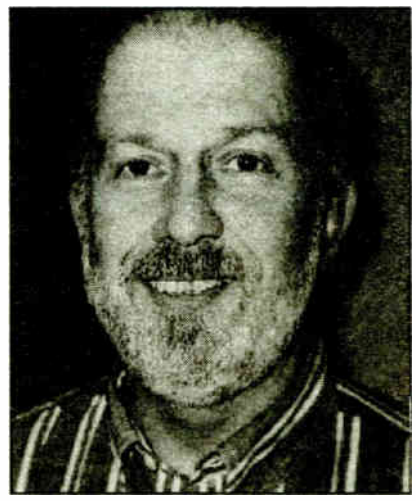
"The current system that depends on far too many broadcasters as originators, and depends on all of us for EAS program interruptions, is a disaster waiting to happen. Relaying state and local EAS activations remains voluntary," wrote Rudman. "Only national level EAS alerts are compulsory."

Many local governments rely on the LPI to originate their emergency alerts. Clay Freinwald, co-chair of the Washington state SECC stressed that this was "wrong, wrong, wrong." Responsibility for emergency alerts must rest with the party responsible for originating the alert and not the broadcasters, he said.

Washington state bought all 39 counties in the state a Sage Endec. The state also purchased Endecs for each of the four NWR offices that serve the state.

In Washington State, Freinwald said, the goal of the plan was to alleviate the relay issue by having every station receive warnings directly from their sources via background channels. The Washington State Relay Network delivers statewide activations while local emergency agencies use background channels to distribute their EAS messages. In Spokane, for example, local emergency planners use a TV SAP channel as a local relay network.

"We need to understand that EAS comes in four flavors — EAN, NOAA, State and Local — and each of these requires its own distribution system that is uniquely configured," said Freinwald.



Clay Freinwald

One point that is "tragically misunderstood" noted Freinwald is the original purpose of EAS. From the point of view of the FCC, he said, the only mandate for state plans is that they be able to handle Emergency Action Notifications (EANs) and Required Monthly Tests.

Beyond that, for weather information, state and local emergency alerts, it is up to broadcasters to work together with their local emergency management and NWS offices to come up with workable plans workable plans that utilize the full potential of the system.

Freinwald said he believes a lot of people are waiting for the state and local emergency offices to put together a plan. But broadcasters are in charge of their plans, he said, and "it is O.K. to revisit the state plan with the goal of making it better" even if it is finished.

Operational chain

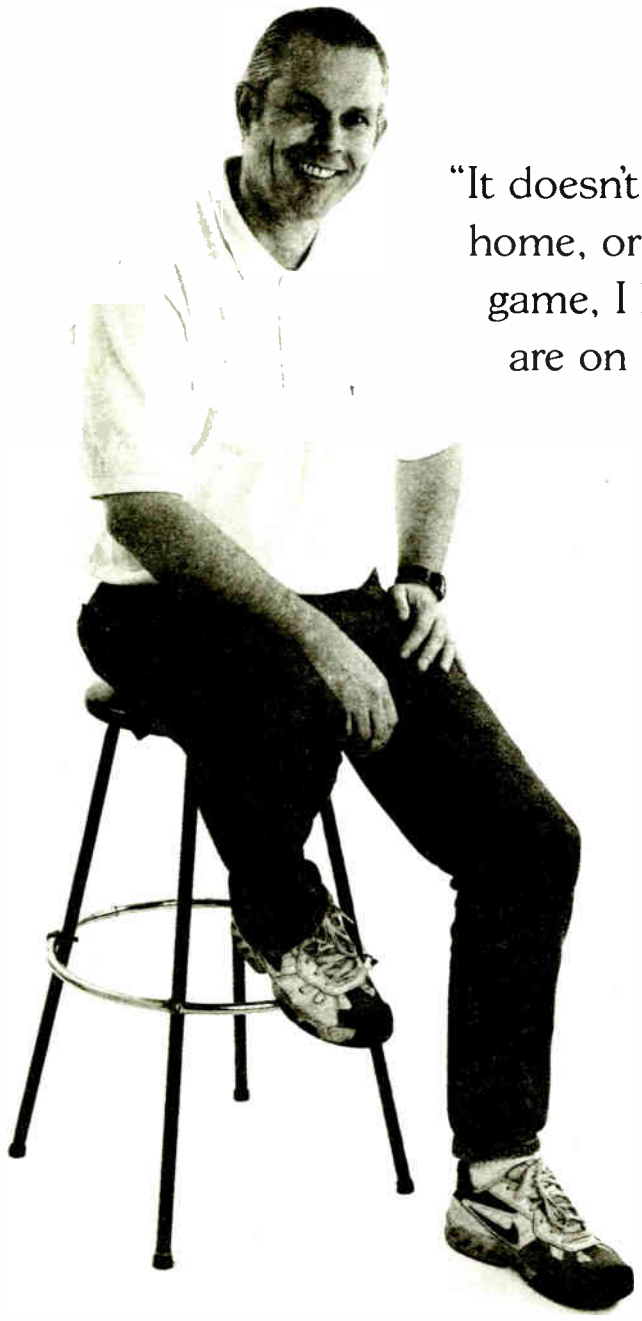
For broadcasters who like the idea of getting their information right from the source, Freinwald suggested looking into using existing resources like state networks, full-time satellite services, cellular telephone companies or other existing communication systems as background distribution channels.

"While EAS fixed the 'Daisy Chain' relay failure mode of EBS, it did not address what I would call the 'Operational Chain' within each station," said Rudman. "While stations using full automatic EAS relay bypass that internal 'Operational Chain,' they leave themselves open to relaying faulty EAS warnings, or to relaying a veritable flood of EAS warnings. As we have seen when severe weather settles in to an area and stays, the public (and stations) both want to turn EAS off."

"If the FCC goofed anywhere, it is in keeping the old CPCS concept alive and not requiring that each broadcast station install receivers for all four flavors of EAS messages and direct the SECC's and LAECC's to create background channel systems to distribute these messages," said Freinwald.

EAS cannot be fixed overnight and what works in Washington state may not work in Iowa. Planners stress that the success of EAS depends on broadcasters keeping the dialogue open and working with local emergency management officials and the NWS on solutions.

"If there was ever a time for diplomacy and patience when it comes to our industry continuing its long tradition of assistance in saving lives and property, it is now. There are many people in the loop in the government who are trying their best to do the right thing. They badly need our support," said Rudman.



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Radio World declared that our MDS-B5 Professional MD Cart Recorder "continues in the tradition of the Sony MDS line and proves itself to be a quality performer."

MDS-B6P Player

The MDS-B6P Professional MD Cart Player is the playback-only version for on-air DJ use.

MZ-B3 Portable Recorder

Our MZ-B3 drew raves: "Not only is it 'bullet proof' reliable and compact, but it is the only portable MD model available with built-in microphone and speaker."

MZ-R30 Portable Recorder

The Sony MZ-R30 Portable Recorder is "excel ent" and "should be considered seriously by audio professionals," according to Radio World.

MDS-JE520 Recorder

The Sony MDS-JE520 is the affordable solution for genera studio recording and playback.

MDW-74 and the PRMD-74

Nothing beats the Sony MiniDisc.

World Radio History

Contour Prediction, New Class C0

▶ FM, continued from page 1

FCC Audio Services Division Chief Linda Blair said of the proposal, "Many Class Cs are not operating at their maximum and are overprotected to the detriment of other broadcasters who might be able to take advantage if they were officially downgraded."

The NAB opposes the concept, saying all FM stations would suffer, even if interference was allowed only between consenting stations.

Engineering consulting firm Communications Technologies Inc. agreed, writing to the FCC that it is "not practical for such an agreement to end when a station is sold or transferred. This is especially true if the transmitter site was made a part of the agreement."

Power increase

Generally, stations that would benefit from a power increase support the concept.

"The opportunity to better serve our listeners by offering a stronger signal makes sense," wrote Robert Wagner, general manager of Hometown Radio Corp. "The signal would be stronger to penetrate buildings and terrain while filling in signal gaps for areas in valleys. In areas where there is interference, we doubt it would affect any listeners since the programming and marketing of the stations is already not targeted to those areas."

The FCC also proposed dividing the existing FM Class C into two subclasses, Class C and Class C0 (or C zero). It would give affected stations three years to meet a new Class C minimum antenna height above average terrain of 450 meters. Now, Class Cs operate with HAAT of between 300 to 600 meters.

Of the approximately 1,000 Class C stations, about 600 would be reclassified to Class C if they do not apply for a change.

Northwestern College, the licensee of KFNW-FM, Fargo, N.D., opposes the new Class Cs. Harv Hendrickson, vice president of broadcast support, wrote that in 1993, the station finally had the money and land to build a new FM tower and be reclassified to a full Class C, up from a C1.

"New Class C frequencies will encroach upon and or damage KFNW's outreach," he stated. The station shares antenna space with seven other stations; it cannot add onto the existing tower, nor tear it down to build a new one.

Stations that believe they would benefit from a reclassification support the change, such as Weigle Broadcasting, licensee of a directional Class A in Pocatalico, W.Va.

Directional antenna

Attorney Lauren Colby wrote, "Weigle has been attempting to eliminate the expensive and troublesome directional antenna, so that the station can operate on an omni-directional basis and make full use of its channel. Weigle has been unable to do this because, in theory, non-directional operation would create interference to another station. ...

Of 1,000 Class C stations, about 600 would be reclassified to Class C if they do not apply for a change.

"There is a mountain range between the WRVZ(FM) transmitter site and the transmitter site of another station. However, because of the arbitrary FCC spacing rules, interference is assumed to exist even though it does not."

The FCC also has proposed using a new contour prediction method, which it believes would be more accurate than the current method. It also wants to allow second and third adjacent stations to move closer to one another.

Contour prediction

Mark Peabody, of the engineering consulting firm Cavell, Mertz and Davis, told **RW** that the commission's current spacing rules and contour prediction method need to be updated.

"Your FM contour may show the station going out 80 miles," he said, but in reality, the signal is stopped, by a mountain range for example.

He and other sources said another problem with the current contour prediction method is that the FCC sometimes allows people to use methods other than the standard prediction method. The results are hard for the commission to check, because the results of other methods may be hard to replicate.

He said the commission is trying to develop a method that would address all circumstances, such as power levels and terrain, and take into account more modern terrain databases used in predicting station contours.

■■■

Tell us your views on the FCC proposals. Write to www.rwonline.com *or the address on page 5.*

Circle (28) On Reader Service Card

World Radio History

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Circle (54) On Reader Service Card

World Radio History

Digital, All the Live-Long Day

Paul J. McLane

Digital audio was the single most common trend cited by visitors and exhibitors at The NAB Radio Show in Seattle last month. Our coverage of the exhibit floor in this special wrap-up section of **RW** reflects that.

There certainly was plenty of other news. Several companies used the show to announce joint ventures, name changes or new business initiatives. Here's a quick summary. You'll also read about some of the more interesting products on the floor in this story and on the pages that follow.

Arbitron NewMedia announced a strategic alliance agreement with RadioWave.com, which is the new, interactive radio subsidiary of Motorola. The pact will let Arbitron provide Internet listener reports for radio stations that stream audio on the Net. RadioWave.com and Enco Systems also announced a cooperative deal to deliver interactive radio via the Net for Enco customers.

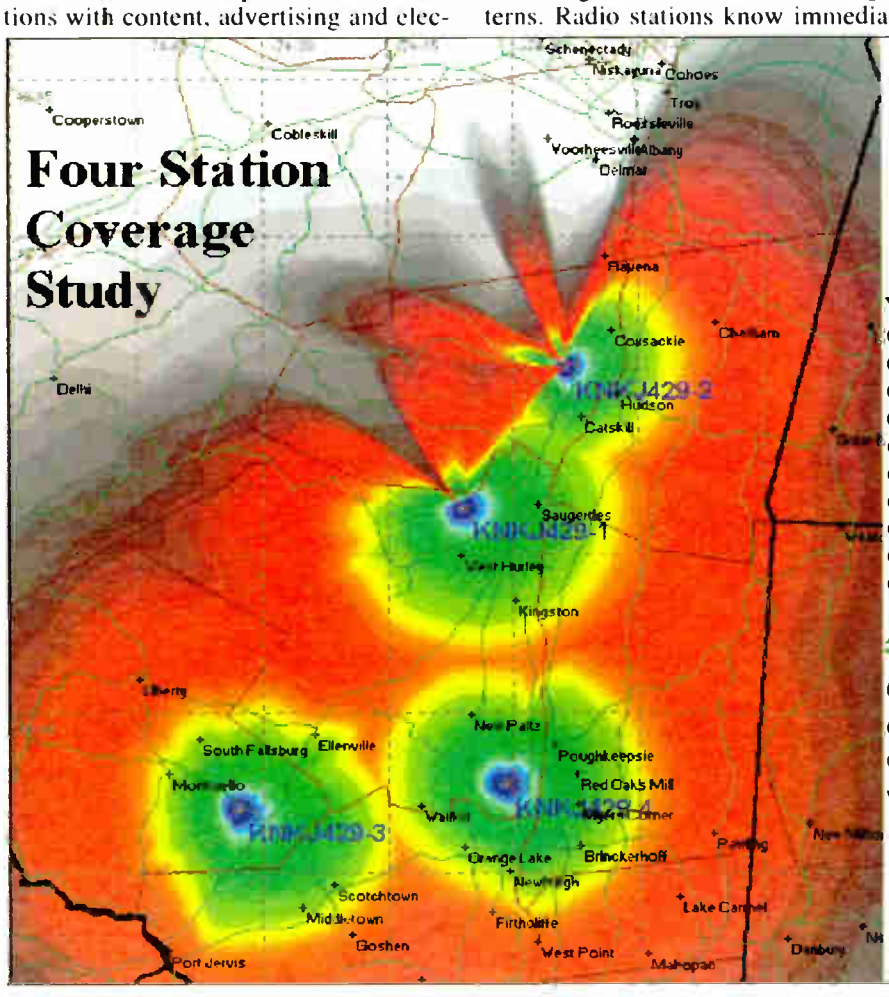
Online service company ElectricVillage said it had changed its name to OnRadio. The company also won agreement with Jacor Communications to provide Jacor stations with content, advertising and electronic commerce solutions, bringing OnRadio's network to 540 stations.

Technicians install a 'retro' AEA ribbon microphone in the PR&E booth, left.

Many exhibitors touted services for radio stations, including TV promotional campaigns like those of IQ Television Group, below.

To monitor listening

You'll be hearing more about MobilTrak, which monitors in-car listening. The company, which was profiled in **RW** last year, is preparing to add service in the Atlanta radio market in the next three months. CEO Jim Christian said MobilTrak is in Los Angeles, Phoenix and Toronto now. Stationary radio detectors along the road monitor listening patterns. Radio stations know immediately whether format adjustments, TV spots and other promotions are effective, without waiting for ratings. "We do hour-by-hour reporting on a day-by-day basis," Christian said.



RadioSoft

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ComQuest Callout introduced an improved Windows 98 research system. The company calls it the world's first Interactive Music Research system for Windows. It features speech recognition, mapping and Palm Pilot connectivity.

One-On-One Sports, the 24-hour sports talk network, recently inked a three-year deal to become the national radio network for the University of Michigan football program.

Digital growth

National Public Radio member stations were interested in what World Radio Network had to offer. The British broadcast organization has entered the U.S. market through a deal with NPR under which WRN is compiling a daily menu of news and features aimed at American listeners, as an "overnight sustaining service" for NPR members.

The buzzword on the floor, though, remained digital. Visitors saw the trend. Gentner, for example, offers a new digital hybrid.

"The DA30 has AES/EBU inputs and outputs, as well as three-band equalization and bass boost," Gary Crowder, who handles sales and marketing for remote facilities management, said. "It includes

See DIGITAL, page 17 ▶

World Radio History

▶ DIGITAL, continued from page 16

an acoustic echo canceller. It's a high-end, digital hybrid telco interface that was really designed to interface to the new digital consoles."

Broadcast Electronics demo'd a recent addition to its line of digital products, a sophisticated switcher called AudioPOINT.

Vector update

A big hit of the spring NAB'98 convention was the Vector POTS codec from Comrex Corp. That anticipated product is now shipping. The Vector delivers 15 kHz two-way audio on one plain telephone line. It includes a three-channel mixer and an extra input for producer cues, plus an additional output for PA feeds.

Manufacturer ATI added digital distribution amplifiers to its line, giving studio engineers an efficient way to route AES/EBU audio. Wire and cable suppliers, too, are serving up products for digital applications. Gepco International has several new cable types, including single-pair, eight-pair and dual-pair with zip configuration, all intended for digital audio.

Telos Systems, known for phone hybrids and ISDN codecs, said it is combining those technologies with the development of an ISDN Hybrid system, which it unveiled at the show. "We will be beta testing the new system in early 1999," Chief Engineer Kevin Nosé said.

Orban said it has been joined by Prophet Systems in an effort to develop new software that will allow finished productions to go directly from workstations like the Orban Audicy to on-air delivery systems like Prophet's Wizard for Windows.

"The idea is to allow our Audicy production workstation to drop a finished 'virtual cart' to a network server," Digital Editing Systems Product Manager Geoff Steadman said.

Plenty to see

Cutting Edge, which makes a successful FM on-air audio processor, is turning its attention to AM. Omnia.am is built on the same hardware platform as its sibling the Omnia.fm, but is optimized for AM radio. The supplier promotes it as the first AM processor to provide flexible expansion of its DSP architecture for optional "plug-in" software for reverb, matrixed AM stereo and other features. The company also released an engineering white paper addressing the current debate about FM digital grunge, peak control and AES/EBU connectivity.

Managers who do a lot of remotes were interested in the Roadcaster from Energy-Onix. This new RPU system handles mobile and fixed location remotes. Frequency-agile duplex design makes it more flexible than traditional fixed-frequency systems.

Insurance was the angle at Warner Electric/Superior Electric, which makes the WHR Series of automatic voltage regulators.

"Let's face it, a transmitter is a costly capital expense," Marketing Manager Ted Gladis said. "This is appropriate technology for remote transmitter sites, which are susceptible to high overloads. A voltage regulator relieves the worry by the station or the chief engineer that low power or high power will have an ill effect on their hardware. An automatic voltage regulator is like medical insurance for the broadcast industry."

Now that the Emergency Alert System has replaced the old EBS, suppliers of EAS gear are fine-tuning their offerings. Gorman Redlich rolled out the EAS1, a system with telephone DTMF interface. It lets the user compose a message, store the audio and send a complete EAS message from a remote location via a telephone line.

On the remote control side, Burk Technology promoted Autopilot for Windows, automatic transmitter control software for use with ARC-16 transmitter remote control systems. The Windows-based system maintains four simultaneous connections and dials more than 500 sites.

On Air Digital rolled out a new music research product, CallOut, a Windows 95/NT-based tool.

"We had a great show," reported General Manager John Schaab. "We also showed our on-air management system, the Ultimate Digital Studio." The audio management and control system interfaces with a variety of professional CD changers, digital audio hard-drive systems, music scheduling and traffic systems.

■■■

Many suppliers use the fall NAB event to tout the availability of products first announced at the spring convention.

Did you see a new product at the Radio Show that we missed in the pages that follow? Suppliers, did your press materials not reach us in time? Tell us at radioworld@imaspub.com *or write to the address on page 5. We'll pass your news along to our readers.*

Mrs ! Braverman
on the new Millenium Console ●

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World Radio History

Audio Tools to Keep You on the Air

Alan R. Peterson

Quite naturally, the name of the game in radio is *audio*. If there is no sound, there is no product, period.

Digital technology provided the fuel for this year's audio products at The NAB Radio Show, including the latest workstations, airchain processors and production music on compact disc.

While digital audio technology made a big splash, it was clear analog audio products are still very much in favor. Full-sized consoles and portable mixers shared floor space. Analog audio processors coexisted with the latest DSP-based skyrockets.

Fidelipac came to Seattle with the MX-A broadcast console, a small-sized analog stereo console that provides up to six mix channels in a 13-inch space. Also seen, the BA1230 digital on-air board and DCR 10 digital recorder/player that uses ZIP disks as recordable media.

Analog and digital

Broadcast Electronics also had a share of consoles to be viewed, including the digital Auditronics NuStar console, the Comet series of analog mixers, the 2500 and 210 series. The AudioPOINT routing switcher, first seen at the NAB spring show, was at the fall Radio Show. The AudioPOINT is a routing matrix capable of up to 1,024 x 1,024 sources and destinations.

In the whispering stage right now is the A-5000 hybrid analog console from Wheatstone. Company representatives described the ongoing project as a combination of analog circuitry with the mainframe from the D-500 digital console. When ready, it will give stations the opportunity to upgrade to a digital board by conversion rather than replacement.

In a slightly smaller package was the ATI MX101 Mono Field Mixer, a single-channel version of the company's Nanoamp Series mixers. The MX101 has three low-noise Mic/Line inputs, phantom power, low-cut filters and internal limiter.

Audio Precision used the exhibit floor to introduce the 96 kHz-capable version of the Portable One Dual Domain audio analyzer.

Product updates

No major product releases from 360 Systems this time, but the significant news was WAV compatibility with the Short/Cut digital audio editor, allowing import and export to computer-based audio devices. And show-goers still enjoyed pushing buttons on the Instant Replay units.

ATI expanded its field mixer line.

Broadcast Software International (BSI) promoted its own instant playback system with Stinger 2.0, placing 280 instant sound effects on a conventional Windows computer.

Another demonstration of the Comrex Vector POTS codec was in order for this show. The Vector is shipping now. It was shown by Comrex as well as several of its dealers.

For the lean-running FM radio station, Cutting Edge debuted the Omnia.fm.jr, a junior member of the popular Omnia processor line. According to Kevinn Tam, director of sales and marketing, the Omnia.fm.jr can be upgraded to a full Omnia unit at anytime.

More processing news came from Orban, highlighting a software upgrade for the Optimod-FM 8200 processor. The unit has 21 new format-specific presets for push-and-play compatibility out of the box. Orban also exhibited the Optimod-DAB 6200, designed specifically for digitally audio broadcasting.

Klotz Digital seems to come up with a new digital console every few months. The newest offering is the Spherion. According to Klotz Vice President Ray Esparolini, "It comes in 12 to 20 inputs and is meant for that middle market, around $28,000 to $42,000 for a console."

The 20-fader Spherion model includes DSP production features such as EQ, limiters, gates and compressors.

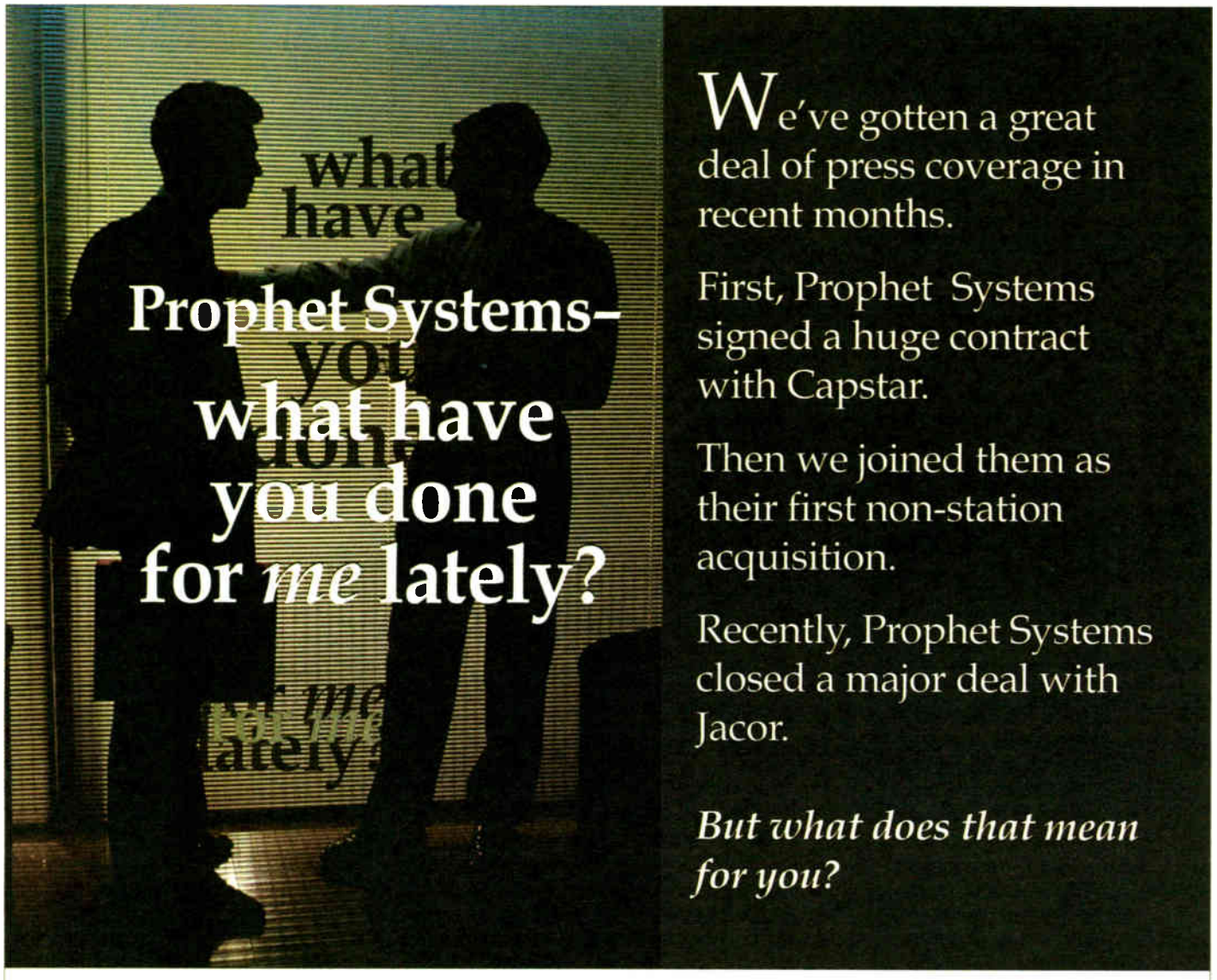
More dgital news

Klotz debuted its Paradigm digital console during the spring NAB Show. The $7,500 digital mixer includes voice processing on mic inputs, machine control on line inputs and an LCD flat-panel screen display.

Radio Systems showed a studio package that included its consoles, studio wiring and specialized cabinetry from Studio Technology.

MUSICAM USA kept audio flowing with the TEAM (T1/E1 Audio Multiplex)

See ON AIR, page 19 ▶



We've gotten a great deal of press coverage in recent months.

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World Radio History

Plenty for Studio Pros to See at NAB

Alan R. Peterson

Audio production for radio is becoming less a matter of how many toys one has, and more of how powerful one's computer system is.

At The NAB Radio Show, numerous radio automation and storage systems featured built-in multitrack production suites. The prices of standalone recording/editing software is improving constantly, and the popularity of personal multitrack systems continues to be fueled by low prices and more elaborate features.

Production music has more urgency than ever before, and innovative new sound effect collections share space with classic favorites.

Roland is hoping radio will embrace the 16-track VS-1680 portable workstation, with self-contained mixer, built-in effects and internal disk drive. Representatives from Roland also demonstrated the AR-100 and AR-2000 audio announcement recorders.

The Roland Boss VT-1 Voice Transformer voice processor continues to be a favorite novelty product for morning shows and production use.

Thompson Creative rolled out an addition to the Metro Music production library: Hot Spots. This is a two-CD "Best Of" collection, with 198 custom-produced 30-second beds.

Digigram was a busy company at the show, even though the company did not have an actual booth. Its X-Track DAW software suite turned up in the Broadcast Electronics AudioVAULT under the name AudioEDIT, was seen as the Lazer Blade editor in the Scott Studios system and inside the ENCO DADpro32 as that company's Strata multichannel editor.

Scott Studios also offers the option of the PARIS digital editor from EMU-Ensoniq.

According to Broadcast Electronics, the SADiE disk editor is also available as the multitrack editor in the AudioVAULT.

Sharing space at the BSI booth was Syntrillium Software, makers of Cool Edit Pro. This is a low-cost, 64-track multitrack recorder/editor with internal effects processing, and can work on a commonly available PC with no special or costly components.

From GMI Media Group came a new twist on a classic idea. The MONEY-DISC is a market exclusive sales production tool on CD. Open-ended vocal jingles set the mood for client-specific copy (restaurants, automobiles, etc.) without the need for custom production.

More production CDs were seen at Network Music, which introduced the Aftershock production element collection on four discs. WHo DId THaT MUSiC updated its offerings with the 15-CD Gravity Music Library, an edgy, youth-oriented collection of production music, and introduced the "Extreme Noise" ID and imaging package under its Groove Addicts label.

Orban offers a new software version for its Audicy workstation.

Sound Ideas is promoting the "Rocky and Bullwinkle and Friends" collection, as well as its "Larger Than Life" box set of heightened-reality effects. OneMusic brought LiquidTrax to the show. This is a CD music library with submixes of the original composition. The submixes are loaded into a DAW, giving the radio producer the option of controlling the overall mix of the production music itself.

Sony Electronics had the DPS-V55 multi-effect processor, a rackmount effects box featuring dial-up access and editing. The preset names alone — Babbler, Doppler and Pitch Roller — were enough to catch the attention of production pros stopping to look.

Ward-Beck Systems used the show to ramp up its R2K Renaissance radio console. The low-set compact frame mixer concealed a number of modern features, including a choice of analog or digital configurations and an interface designed to interact with most popular radio automation systems.

Sony's DPS-V55 Effects Processor

The latest development on the Orban front is version 2.0 software for the Audicy workstation. Networking options allow multiple Audicy units to be linked to each other, or for one unit to tie to an external PC. A new remote control unit allows Transport and Locate functions to be controlled from other devices, such as a switch panel in an announce booth.

In addition to having an Audicy in its booth, Harris Corp. had a number of other products to satisfy the hungry production person. These included the A2D2A digital converter, the DRC2000 digital console, the 360 Systems Instant Replay and Short/cut, and the Audion VoxPro.

Radio Computing Services simplified the delivery of audio tracks with its IVT (Internet Voice Tracking) technology, allowing voice or air talent to deliver high-quality voice parts over the Internet. The intent is for air talent to be able to voice-track an entire music show from a laptop computer, but there are definite applications for delivery of out-of-market commercial and promo voice talent for production use.

For remote recording in the field, the Sonifex Courier digital recorder was hard to ignore. This remote device records digital audio to a plug-in PCMCIA hard disk, edits it via a graphical scrub-wheel interface and offers the option of POTS modem or ISDN to deliver completed audio back to the station.

Dealer Bradley Broadcast and Pro Audio had the Digital Audio Labs V8 editing suite, a PC-based hardware platform configured to the user's specs, built around the user's PC and adding an audio hardware system and software designed for use with the V8. The V8 helps an editing suite stay current without spending tens of thousands of dollars.

▶ ON AIR, continued from page 18

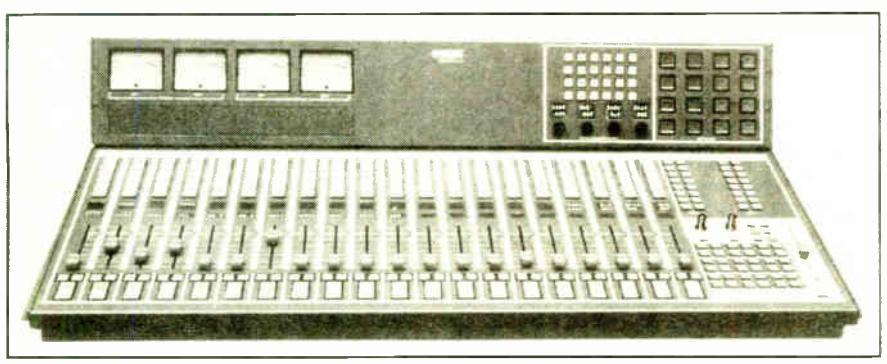
digital transmission system, designed for use over digital T1 and E1 lines.

Other ways to get signals from here to there were provided by Telos Systems, formally introducing the ZephyrExpress portable ISDN audio codec, with a built-in digitally controlled mixer and ISDN line connection.

On-air processing does not get any easier than the Inovonics Model 235, a new AM audio processor with three-band compression, an AGC circuit, limiting and AMAX and NRSC compliance.

The digital ROC-10 ten-channel broadcast mixer from Logitek was represented at the Scott Studios display. Digital was also the byword at Pacific Research & Engineering: the all-digital Integrity console was the centerpiece of the PR&E booth, which also featured an eye-catching, all-granite countertop on one of its furniture arrangements.

Ward-Beck took the wraps off plans for a new console. The Renaissance R2K Series ships in January, but a module could be seen at the Ward-Beck booth.



The New Klotz Spherion

ARMSTRONG
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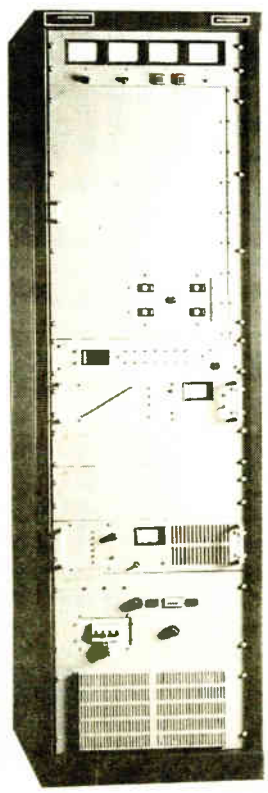

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World Radio History

Radio Learns to Put Web to Use

Brian Galante

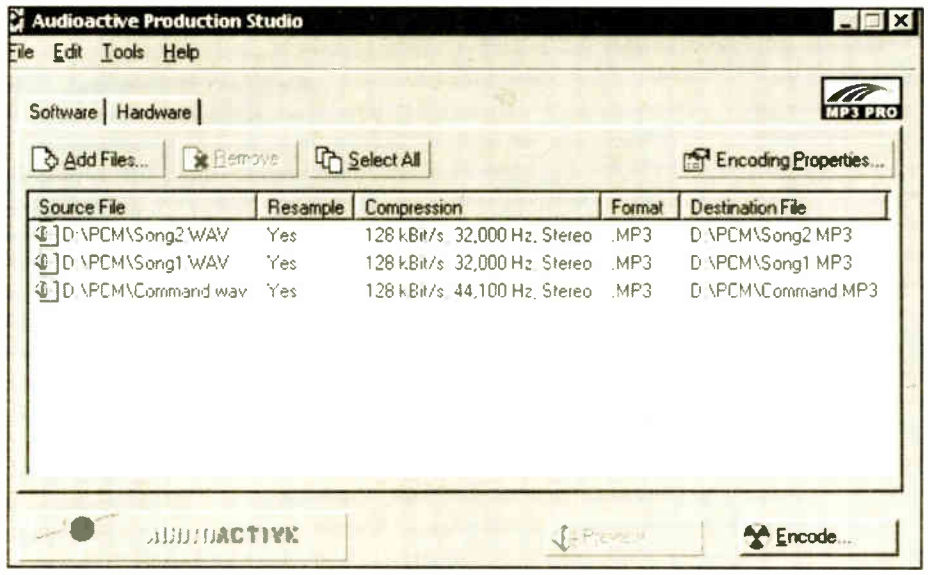
In radio, as in real life, we live in a world thoroughly intertwined with computers, and, specifically, the Internet.

It makes sense, then, that more online services and Internet strategies are being incorporated into the radio industry with each passing year. The trend was apparent among companies offering a variety of services and products to help radio stations take advantage of the technology.

Radio Computing Services garnered much interest with its Internet VoiceTracking system. With this service, no hardware, installation, local audio storage or universal numbering system is necessary. As long as the user has Web access, VoiceTracking can be done from almost any computer in a matter of seconds. As part of the Master Control NT digital on-air system, air talent can connect to the station system quickly to create VoiceTracks. The service can be utilized from a laptop as well: Web access, a soundcard and a mic are all that is needed.

Telos Systems was on hand to demonstrate the new Version 1.5 software for its Audioactive MP3 Production Studio Software Encoder. The upgrade offers broadcast professionals high-quality MPEG Layer-3 digital audio compression for transmission and storage of audio files. "This is exciting for the U.S. market," said Cornelius Gold of Telos. Gold said digital audio software has been successful in France and other international markets, so Telos "decided to move into the U.S. market for bigger business."

This service converts PCM files and stores them in compressed MP3, SWA, ASF and WAV audio formats. All bit rates between 8 and 256 kbps are supported.



Telos demonstrated its Audioactive Production Studio Software.

"It's the next generation of digital audio for the radio industry," Gold said. He said the software works over multiple locations from a central location.

Some suppliers offer hardware to make use of the Net; others pitch software; yet others sell services or content.

Radio Data Group showed the RDG WebMaster, a service offering dozens of ways for a station to achieve its Web site ambitions, with fresh music, entertainment, news, sports and weather. The user can select a mix of content sources and commerce deals from WebMaster to suit the needs of the station. Services include *RockDaily.com*, which offers interviews with bands and other music news, updated six times a week; *CountryNow.com*, which cover the daily country music news scene; *www.earwig.com*, offering CD reviews, interviews, games and other news for Modern/Alternative Rock stations, and *www.pollstar.com* for concert information, tour dates and venue information. Other services include weather forecasts, celebrity news and current events.

According to JAMTV, Internet-based promotional efforts require the support of a traditional marketing resource such as radio to create the "reach," "frequency" and "top-of-mind" placement necessary for an effective promotion. Each individual station has its own needs just like individual formats. With that in mind, the company was in Seattle to promote several services, including its Customized Affiliate Strategy, a program designed to provide JAMTV affiliates with a menu of Web site programs and services.

Custom services

Virtual Radio Programming offers a turnkey, custom, broadcasting package which is delivered to a computer control room system. Music is custom scheduled, and major-market jocks are provided for local, customized breaks.

Jingles, liners, and custom promos can also be provided. The VRP system supports Prophet, DCS, ENCO and AudioVAULT automation systems. The service is delivered to a radio station through a high-speed digital link.

DG Systems, following its acquisition of Digital Courier International, showcased its services, designed for fast electronic delivery services of radio advertisements. The company offers five distribution services: DG Priority, for one-hour delivery; DG Express, for delivery within four hours; DG Late Night, for delivery the next business morning for late-spot production; DG Standard, for delivery the next business morning, and DG Economy, for delivery by the second business day.

The company also offers DG Online, an Internet-based order entry and tracking system for the advertising industry. A simple, browser-based interface accessible from any PC/Windows or MAC with Internet access, DG Online supports creation and distribution of traffic instructions, instant delivery status, built-in error checking, efficient order tracking, and 24-hour worldwide access to the DG Network.

Radiowave.com highlighted the Net-based Radiowave.com Player, which combines the familiarity of live radio with the information and transaction capabilities of the Internet. Motorola created this service as part of a strategy to develop opportunities for Internet broadcasting. The Radiowave.com Player offers visual information, such as song titles, artists, and album titles and covers with live radio programming that is broadcast on the Internet.

Suppliers Push the Stream

Craig Johnston

Audio streaming exhibitors saw brisk traffic in their booths at the 1998 NAB Radio Show, and reported increased interest in how radio can make money using the Internet.

Streaming technology suppliers RealNetworks and Microsoft continued their respective pitches to convince radio stations to use their exclusive technologies. And Telos Systems unveiled its Audioactive MP3 Production Studio encoding software and MPEG Realtime Encoder.

Real clients

RealNetworks was riding the wave of two announcements that further expand its dominant market share in this fast-growing segment of the computer industry. America Online will include the RealSystem G2 player software in its new Internet user software, and Lotus will include the same capability in its Lotus Notes workplace collaboration software.

Showcased in its demonstration was RealNetworks' new RealSystem G2 media delivery system, which the company says represents a substantial improvement in sound quality from earlier products. Seattle classical music station KING-FM conducted live broadcasts over the airwaves and the Internet from the RealNetworks booth.

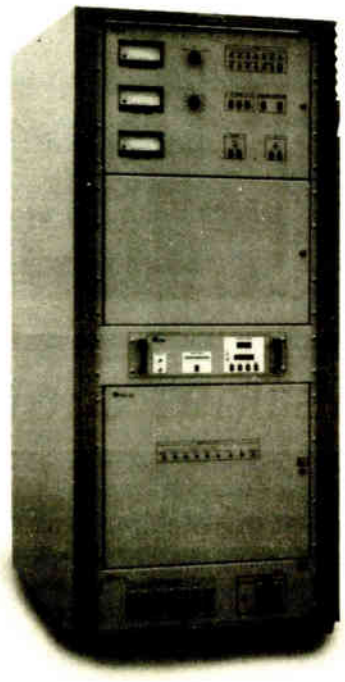
Microsoft demonstrated how the features of Windows and Windows NT operating systems make it easy for radio stations to use the Internet to stream audio. Its Windows Media Player allows the user online to listen (and view) material in a variety of file formats, including earlier versions material encoded using the RealNetworks system.

Microsoft demonstrated several varieties of streaming from its booth and steered customers to two integrators of the Microsoft technology, RadioWave.com and OnRadio. Both offer turnkey solutions to broadcasters

See STREAMING, page 21 ▶

Powerful Efficient Digital

SOLID STATE
FM TRANSMITTERS
FROM 4kW to 10kW
COMBINED 20kW



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Model FM10

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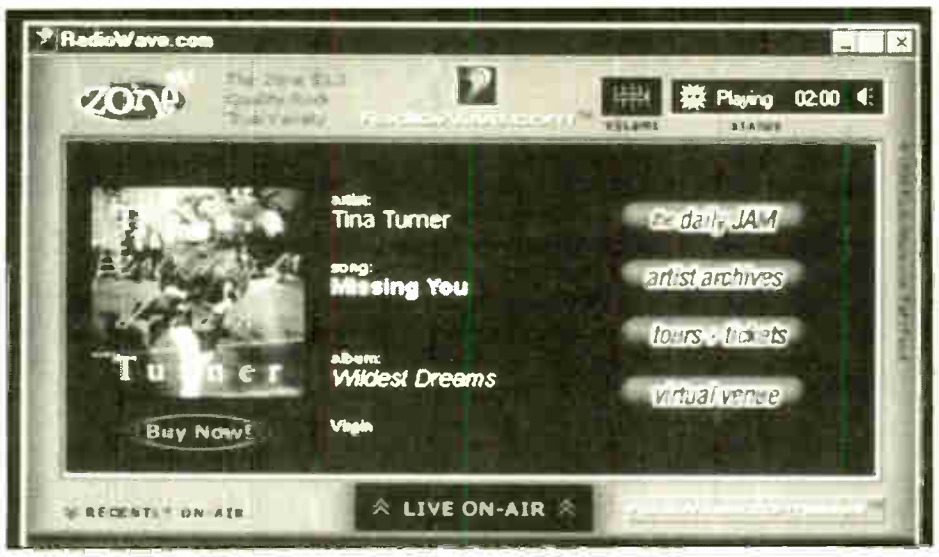
World Radio History

▶ STREAMING, continued from page 20

as well as those who might choose to run a "radio station" that could be heard only over the Internet.

RadioWave.com, a subsidiary of Motorola, demonstrated its RadioWave.com Player, which combines interactive visual information coordinated with live radio programming, streamed over the Internet. The player can be downloaded free by an Internet user from either a station's own Web site, or from the RadioWave.com site.

The company demonstrated how the listening experience over the Internet can be enhanced by supplying information about the song, artist, album and album art through the player. Advertisers can supply visual images coordinated with their online radio advertising, along with direct links to the advertiser's Web site.



RadioWave.com is a new subsidiary of Motorola.

Name change

OnRadio promoted its name change from ElectricVillage and showed its end-to-end solution for bringing a radio station online. The company claims the largest integrated Internet media network, following a recent agreement with Jacor Communications that increases the number of radio stations under its umbrella to 540.

Another recent OnRadio partnership announcement is a deal with Amazon.com that allows radio stations to share in revenue generated by sales of music CDs from their playlists. The company offers Web site, e-commerce, advertising and station programming services. Like RadioWave.com, OnRadio's player can be downloaded from either a radio station's or OnRadio's Web site.

OnRadio changed its name from ElectricVillage, and showed a turnkey service for bringing a station online.

Visitors to the Telos Systems booth saw three streaming demonstrations highlighting MP3 encoding. The Audioactive MP3 Production Studio encoding software and Audioactive MPEG Realtime Encoder are compatible with Microsoft's NetShow streaming technology as well as Telos' own Audioactive technology. (To listen to an audio stream using the latter method of encoding, users must download the Audioactive player, available free.)

The Audioactive MPEG Realtime Encoder is rack-mounted hardware that takes the place of the PC normally needed to encode audio for streaming. The company points out this is particularly useful for webcasters that are streaming a number of sources.

With the coming of Internet streaming of audio has risen a need for audio processors that optimize a station signal prior to encoding for streaming. Orban showed the Optimod-DAB 6200 audio processor for digital audio broadcasting. The unit offers a range of processing styles expressly designed for the unique characteristics of digital audio broadcasting, two-channel stereo digital television broadcasting and webcasting.

The company says the multi-band processing supplied by the 6200 has been shown to increase the intelligibility of the compressed material used in webcasting.

Cutting Edge offered its Omnia.net multiband processor, a webcasting tool designed to optimize a station's signal for the streaming process. The unit joins Cutting Edge's Omnia line of audio processors.

The Omnia.net features a variety of presets for optimizing various radio formats as well as matching the bitrate of the webcast. Cutting Edge touts the Omnia.net as offering sound that is as smooth and fluid as its FM counterpart, with consistent loudness and spectral balance.

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. . .we've created a Monster broadcast solution!

Our Design Engineers have created a second generation, high-performance FM exciter with significantly improved specifications. Fear no one—this monster solution fends off the competition by ensuring clean, accurate audio quality and includes:

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World Radio History

Radio Plants Come Together

Mario Hieb

The 1998 NAB Radio Show was not the purview of programmers alone. The healthy numbers of audio management system suppliers and syndicators on the exhibit floor were complemented by quite a few transmitter and STL suppliers.

Asked about trends in their industry, these suppliers pointed to the popularity of solid-state and fault-tolerant AM and FM transmitters. Also, station consolidation, digital television and tougher community zoning ordinances have created a great deal of interest in combiners and community transmission systems.

Suppliers disagree whether the interest in combined systems is really all that new.

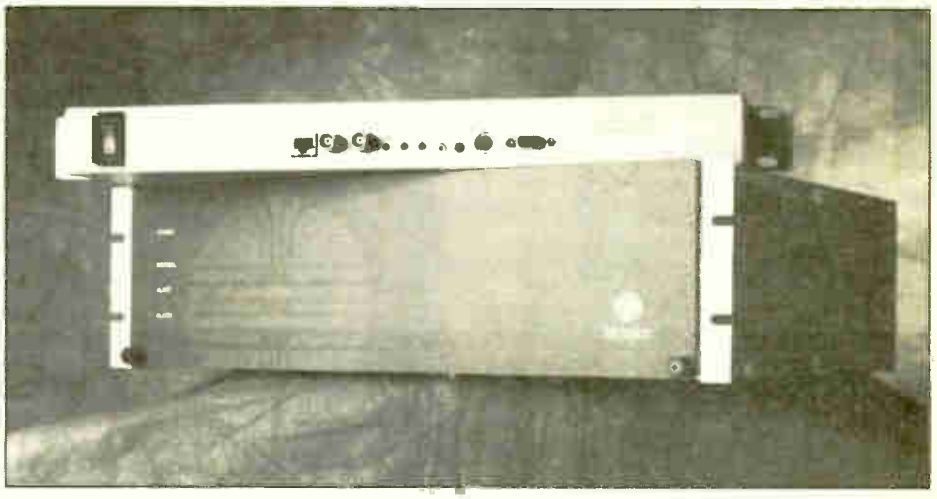
"We have supplied many combined or multiplexed transmitter systems. It's only becoming the vogue in the United States to think that way because of all the consolidation," Daryl Buechting, FM product line manager for Harris Corp., said.

"Multiple systems abroad are the norm, as opposed to single-channel systems here," Alex Perchevitch of Jampro Antennas said. "There's more interest domestically than we've seen in the past."

The major impetus for the construction of multiplexed systems seems to be displacement due to DTV. "You will see more multistation installations with multistation antennas and combiner systems," said Paul Wescott, CEO of Shively Labs. "With consolidation and the advent of digital TV, you've got increased demand for multistation installation. ... Digital TV has caused a musical-chairs thing."

Radio futures

Transmitter makers must monitor the ongoing research into digital audio broadcasting, even as they go about their normal routine of building products to meet the needs of the current radio market.



Harris and Intraplex teamed up to support spread-spectrum users.

USA Digital Radio and Shively Labs signed a cooperative agreement to develop a low-loss combiner to work with the proposed USA Digital Radio in-band, on-channel DAB system. This low-loss combiner, USADR says, will mean that transmitters with lower power can broadcast the digital portion of the IBOC waveform, resulting in lower conversion costs for stations.

"We are working with Shively because of their extensive experience in providing transmission-based products," said Glynn Walden, vice president of broadcast engineering for USA Digital Radio.

The combiner merges the outputs of the analog and digital transmitters together, at high power, before the signals are transmitted. Currently, the designers said, combiners are high-loss, "roughly 8 to 12 dB, requiring higher output power from transmitters to compensate for combiner losses. Shively says the combiner uses new technology to reduce losses to less than 1 dB.

Solid state

Despite a higher price tag, solid-state transmitters continue to increase in popularity.

"In FM we're moving ahead ... to a completely solid-state line of transmitters," Buechting of Harris said. "It's going to take a while because we still need to be able to get more power out of a transistor or have the cost come down on the transistors."

So what's the future of the vacuum tube? "The only tubes in the entire division (of Harris) are the klystrons used in the high-power UHF TV, and then the high-power FM," said Jim Woods, vice president of radio broadcast for Harris Corp. "I think the success of our Z line transmitter is a testament to how hungry the market is for solid-state solutions."

Crown Broadcast was on the floor

See RF, page 23 ▶

Arrakis Studio Furniture systems are #1 with over 1,000 sold !

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

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World Radio History

▶ RF, continued from page 22

showing its solid-state FM100 transmitter and FM2000 power amplifier. "We're demonstrating our hot-pluggability feature, meaning that you can replace the amplifier modules while the system is running," said Edd Forke of Crown Broadcast. Crown makes FM exciters, translators and transmitters from 30 W to 500 W, and RF amplifiers for 1 kW and 2 kW.

Nautel exhibited its FM-8, an 8 kW solid-state FM stereo transmitter with digital AES/EBU or composite interface and modular design, and the XL-12 12 kW AM solid-state transmitter, promoted as "digital transmission ready."

The Continental 314D 1 kW AM and 815C 5 kW FM solid-state transmitters were on the floor, represented by Dave Chenowith of Continental Electronics, which also offers a new digital exciter, the Model 802D.

Broadcast Electronics showed the company's FM-10T 10 kW high-power transmitter with advanced controller; AM-6A solid-state AM with redundant PA amplifiers/power supply; and a new Remote Transmitter Diagnostic System for its high-power FM-T Series transmitters. The RTDS allows those transmitters to be monitored, trouble-shot, queried and controlled through one of three serial ports on the controller, replacing the MVDS system. A Windows-based approach provides screens that show meter readings and status indications.

Armstrong Transmitters rolled out the new line of Ultrasound solid-state FM transmitters, available with output power of 1 kW to 10 kW.

Energy-Onix introduced a solid-state, modular 1 kW AM broadcast transmitter, with five preset power output levels and three hot pluggable 400 W modules, called the PULSAR 1000.

Radio workhorses

Reliability is an ongoing concern for transmitter buyers, and the suppliers know it.

"One of the advantages of solid-state is that you have a distributed architecture in the amplifier stage, and then with some intelligence in the design you can distribute your control system," Woods of Harris said, "so the probability of a Z transmitter, at just about any power level, going off the air, is extremely low."

Community transmission systems also open the door for some elegant backup systems. Instead of each station having an auxiliary transmitter, the multiplexed group shares a single backup transmitter.

"We have been supplying 'N-plus-one' equipment, where you have, say, four channels and four transmitters, and then a fifth channel that would be the 'plus-one' that one is capable of broadcasting on any of the frequencies of the other four," Buechting said.

Also at the show, LPB said its AM-30P transmitter was used by Cutting Edge as the latter company debuted its new AM audio processor.

Uncompressed digital, spread-spectrum and T1 were among the buzzwords used by STL manufacturers showing in Seattle.

"Two-Megabit and two linear stereo pairs in 475 kHz of spectrum, AES/EBU in and out," Dave Chancey of Moseley said about its new digital Starlink STL. "We're just ramping up to go into full manufacturing. We actually have a radio that's capable of doing 2 MB, is field programmable, between 16 and 64 QAM, which has advantages in spectral efficiency vs. robustness."

More T1

Competition is stiff among companies offering ways for radio stations to move digital audio around.

"We have various T1 solutions, T1 STL and ISDN solutions," said Chris Singleton of Intraplex, which promoted its STL Plus system. "It (transmits) compressed or uncompressed audio, telephone circuits, data circuits, LAN connections over T1 1.5 Megabit data service from the phone company or private network."

Intraplex announced a new, integrated channel service to its STL Plus. The company said the enhancement eliminates the need for broadcasters to spend $700 or more for an external CSU, and provides loopback testing, long-term statistics, performance monitoring capability and added surge protection.

A new Windows management interface for the STL Plus, SynchroCast, IntraLink and DCS product lines allows users to determine status, check system alarms and change configuration settings for these systems. Engineers can remotely configure and inspect the status display for all systems, poll systems for alarms and display them on-screen.

Also new: the Intraplex DCS-9500 Digital Cross-Connect System and the DCS-9560 Cross-Connect Access Server now allow traffic from up to six T1 or E1 lines to be combined onto a single T1/E1 without demultiplexing. These products were designed to help broadcast groups lower T1 leasing costs.

Harris promoted its CD Link, the first uncompressed 950 MHz STL system. TFT, Broadcast Electronics and Armstrong Transmitter were on hand with STL offerings.

Harris and Intraplex also joined forces, and displayed the Harris Aurora spread-spectrum transceiver married with the Intraplex STL Plus T1 transmission system. Spread spectrum technology is finding uses in radio because it allows point-to-point wireless links without an FCC user license as an alternative to congested analog STL frequencies, conventional analog leased lines or public T1 circuits. The Intraplex/Harris combination offers an integrated digital system with bi-directional capacity for transmission and backhaul of program audio, voice and data.

New Compact TOOLS Perfect for BROADCAST

Symetrix

Symetrix introduces a new series of flexible half-rack audio tools. The Symetrix 300 Series offers broadcasters and other audio professionals precise solutions for a wide range of audio applications. These affordable building-blocks deliver exactly what you need for jobs (and budgets) of any size.

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A mono comp/limiter with unique circuitry that eliminates secondary causes of distortion during compression.

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An update of the classic Symetrix SX202 design. Like its predecessor, it delivers solid stereo imaging, excellent transient response, very low noise and almost undetectable distortion.

303 Interface Amplifier (Bi-directional):
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304 Headphone Amplifier:
A stereo in/four output amp that drives headphones of any impedance. Its compact design is ideal for translation service installations and control rooms.

305 Distribution Amplifier (1x4):
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Audio at the Heart of the Station

Brian Galante

Live-assist and automation products were in abundance on the floor and arguably drew the most attention of the many products on display.

The ability to control multiple stations from one location was a major topic in supplier booths this year.

According to Dave Burns, studio product manager for Harris Corp., network ability is one of the primary areas that automation products are gathering strength. However, Burns saw other areas of growth too.

"Another important ability is for automation systems to serve as a true conduit for various types of hard drive and other digital equipment for communication through WAV files," said Burns. He said stations must be able to communicate on these various platforms.

Harris is active in the audio management arena through its relationship with suppliers like Orban, maker of the AirTime system. Harris, which distributes AirTime, is "focusing on this as one of our key products," Burns said.

Broadcast Electronics has enjoyed strong attention in the automation arena with its popular AudioVAULT system. The system now can be extended for wide-area networking via an ISDN link, a T1 line or the Internet, making it more flexible.

Its new version 6.6, featuring the AVExplorer module, is designed to assist in managing multisite requirements. Music, news and actualities are integrated easily, and traffic and billing can be centralized.

The new Broadcast Software International WaveStation 3.0 contains features including VoiceTrack, Time Shift Record and Digital Effects. According to Ron Burley, president of BSI, the upgraded WaveStation is "MP3 native," using standard or MPEG-compressed WAV files. The system boasts a simple drag-and-drop operation, and can interface with external equipment via contact closure or serial connection.

Netia Digital Audio came to Seattle to launch the newest version of Radio Assist, its real-time newsroom integration system. The system now can interface to ENPS, the news processing system from The Associated Press. The upgrade allows the system to associate audio and text files for editing on a single screen.

The new Playlist Software for the Radio Assist program uses a two-screen solution: one shows the day's playlist, while the other displays hot-keys for jingles and carts, or a cart-stack to suit differing user preferences as well as useful text information. Additionally, Playlist Software offers possibilities for console integration with its configurable GPI I/Os.

The DADpro32 digital audio delivery system from ENCO Systems continues to grow. The STRATA Multichannel Editor is an option providing a multitrack editor with direct access to the DADpro32 Master Library. It may be operated as a multitasking application on any DADpro32 workstation, or as a dedicated application on any Windows NT or Windows 98-based PC with direct network access to the DADpro32 File Server.

The NewsDAD32 provides automated capture of wire copy from multiple wire and data services. This feature is based on the NewsReady32 product from WireReady NSI, and provides identical text features and functionality. The company offers several EZ Modules, various components of the DADpro32 that can now be purchased separately.

25 linear channels

After teasing attendees at NAB98, CBSI debuted Digital Universe, an audio management system that promises "unprecedented" channel capacities and a non-proprietary platform for expansion. The base system delivers as many as 25 uncompressed stereo channels simultaneously and in real time from one server.

"We've heard some very skeptical responses to this claim," said Stuart McRae, new product manager, Digital Universe, "my own included, before I actually saw the system in action." The platform is Windows NT.

Scott Studios was on hand with several of its automation and live support products. The Spot Box hard-drive digital system has CD audio quality, but looks and works like a system of carts.

The Voice Trax feature allows jocks to pre-record a show in a brief period of time. Song and spot starts and ends are audible to the jocks to ensure their shows air smoothly and correctly. Another popular item on display from the company was its WinNews program, which allows any number of news workstations to record and edit audio and text on one screen.

On Air Digital USA showed its Ultimate Digital Studio (UDS II) audio management and control system. The system acts as a machine controller integrating the operation of audio hard drive systems, professional multidisc CD changers, network and remote feeds with music and traffic scheduling systems.

Liners can be recorded for walkaway operation. When run times are keyed into the playlist, the Time Update feature shows the schedule of the remaining hours of the day. Additionally, paper logs are no longer a necessity, and a pop-up countdown timer is available.

The Maestro digital audio hard disk system is from Computer Concepts Corp. Chairman Greg Dean said a strong point of the system is the linking of stations through wide-area networking. The system, he said, also works well with the

See AUTOMATION, page 25 ▶

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PMD370

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World Radio History

Suppliers See Multi-User Demand

Mario Hieb

The community antenna concept has gained in popularity in the United States in recent months, judging from comments on the floor of The NAB Radio Show.

"There's more interest domestically than we've seen in the past," Alex Perchevitch of Jampro Antennas said. "With a lot of the restructuring of stations, people moving around, stations needing to find a new place to transmit from because of DTV and are being displaced from towers, that's creating some real interest."

The move to the community antenna system has been fueled by station consolidation, displacement for DTV and tougher community zoning laws.

"Cost, common ownership, the fact that people are having a lot of problems building towers — they just don't have the ability to go and put up a tower anywhere anymore," Perchevitch said. Other vendors at the show agreed.

Doug MacCabe, president of Jampro RF Systems, said, "I think digital television is driving it to happen. There's a push in the last eight months domestically for combining systems. ... We're probably putting three (combiners) out a month." Among other products, Jampro displayed its medium-power rototiller antenna, which it says is ideal for multi-user applications.

David Davies of ERI also sees a greater push towards combined systems. But, he said, ERI has dedicated an engineering team to do structural analysis and tower reinforcement. He said the company has been "very successful" in the past six months at keeping customers who had expected to move on their towers, by using them more efficiently.

Shively Labs told visitors about an unusual installation. Several Minneapolis FMs recently were displaced due to DTV. Space was available on the IDS Tower in downtown Minneapolis, but a conventional panel antenna would have produced unacceptable windload. Shively turned to a Lindenblad antenna.

"Lindenblad was a scientist who invented the style of antenna and patented it back in 1917," CEO Paul Wescott said. "People have built them in low power levels, but no one, until this antenna was shipped, has done them at full, grownup radio station power."

The Lindenblad essentially is a panel antenna without the panel, hence its low windload.

"This antenna in its full size will handle 8 kW per bay. ... The windload of the bay, the four radiators around, is approximately the

See ANTENNAS, page 26 ▶

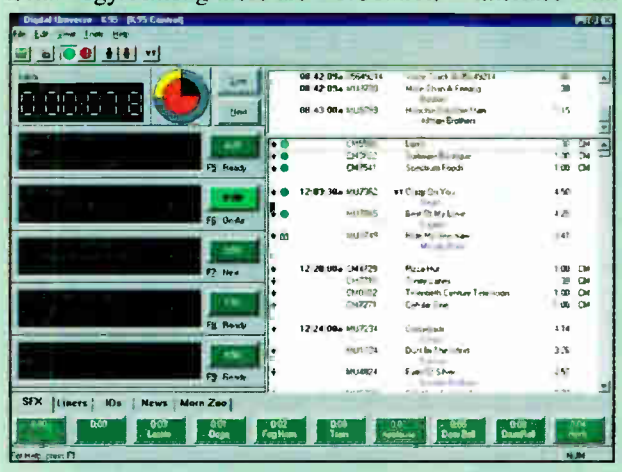
▶ AUTOMATION, continued from page 24

Internet.

"Our automation equipment merges voice tracking with the music. It sounds like the jock is right there," said Dean.

The company also said Digigram will provide the sound cards to power Maestro in the future. "Digigram sound cards have become popular, so we've embraced them," he said.

German supplier Mediatron displayed its AirControl NT live-assist and 24-hour automation system. According to Markus Stein of Mediatron, the newest developments to AirControl NT involves plug-in technology. Among these are HotControl,



The On-Air Screen of CBSI Digital Universe

a playback module used in live broadcasting to fire off sound and jingle elements; CuePlayer, designed to audition sound elements and adjust them to the hundredth of a second; and VoiceTrack, for pre-production of voice elements. Other plug-ins are available.

MediaTouch demonstrated its $995 QuicPix system, which John Davis, vice president of radio operations, USA, called "our first entry-level product." With QuicPix, a user can simply "put it in the computer, pop in a cart, and you have a radio station."

Davis said the system has a modular design that makes upgrading to the company's OpLog2000 system — also on display — a simple procedure.

According to Boyce Williams, president of Pristine Systems, the company's RapidFire system is compatible with all major audio formats. The system features live assist, walkaway and satellite operations, and features the company's RF-EDIT on-air waveform recorder and editor. Williams said the system makes the "integration of radio station functions and scheduling as user-friendly and seamless as possible." The Quick Picks feature makes it easy to add or alter music, commercials, promos and last-minute insertions by a point-and- shoot method.

Dalet had two new Internet applications for its Dalet5 digital audio system on display: Interweb and DWP. The former is a communication tool for remote sites or reporters; the latter, a web-publishing application.

The DWP application converts data in the Dalet5 audio database into attractive Web sites which are easy to maintain. Sophisticated templates automatically query the database for relevant material to be converted into HTML. This can include lists, schedules or breaking news items.

Prophet Systems added new features to its AudioWizard CFS32 system. Within the log format, the user can now create his or her own cue points. There also is a clean interface with Orban editing products for fast, seamless processing.

Other new features include dual monitors; drag-and-drop of all log events; auto roll cart deck; a button bar with 24 buttons; a 96-button wall of carts; full Windows graphics; user-defined colors and placement, and user password options. Audio-Wizard CFS32 also interfaces with the Burli News system, and can support 12 playback devices per workstation.

Radio Computing Services showed its Master Control on-air system, including several useful features: Sequencer, Hot Keys, Log Editor, Internet VoiceTracking, Segue Editor, Audio Editor and The Browser. The "real feel" VoiceTracking feature creates voice tracks in real time. The user can hear all elements surrounding his or her voice, and can control when each plays.

The Sequencer plays whatever is next on the log in satellite or automated mode, or waits for a person to press "Go" in live assist mode. The Segue Editor allows the user to actually see a segue and then adjust it as necessary.

Register Data Systems had The Phantom Control Room on display. A powerful new log feature, Multi-Cut Carts, simplifies how a traffic department handles multicut orders for the Phantom. Also new is a Music on Hard Drive feature, which features special format clock codes and audio overlap to make hard drive music transitions sound smooth.

Additionally, a new music schedule import routine allows the system to accept play lists from most major scheduling packages on the market. Other notable additions include Free-Form Cart Rotations, ideal for live-assisted sporting events; and Local Area Network Remote control, for situations where multiple LAN-interconnected Phantoms can be remotely controlled from other LAN-connected PCs.

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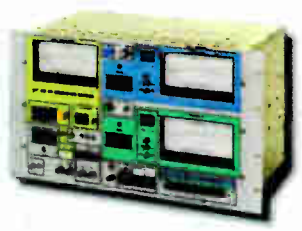

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Circle (81) On Reader Service Card

World Radio History

Workbench

Radio World, November 25, 1998

Boom Bungees and Tricky Tones

John Bisset

What a great convention. The NAB Radio Show is what I'm referring to — not only lots of exhibits, but lots of engineers! And so what if engineering trade show budgets have been cut? I know several engineers who paid their own way, just to be brought up-to-date through the exhibitors and the sessions.

If you could not arrange to go, give some consideration to an early holiday gift for yourself: Order the tapes of the sessions. More on that later in the column.

One of the keynote speakers for the all-day digital workshop was Russ Mundschenk, a Philadelphia radio engineer. Russ took the digital bull by the horns a few years back, and built a digital facility that is considered a model for other engineers to follow. What one appreciates in Russ, is that amid this cutting-edge studio design, he takes a grass roots approach to problems — like the boingy-boings that the mic arm springs added in his digital studios.

I've used shrink tubing, shrunk down on the coil springs , which dampens the noise somewhat. But Russ has done one better. He obtained several of those thin rubber bungee-type straps that typically are used to hold trash can lids in place. They are black, like the booms, so they blend in. They also don't "boing" when the arm is hit.

So simple, so cheap, so effective! Thanks, Russ, for sharing the idea with our readers.

★ ★ ★

R. Sparks Scott from Eugene, Ore., sent some thoughts regarding the false tone firing on the ABC netcue box. He suggests checking that RF or other transient spikes are not getting into the automation via the external cue input wiring. Obvious solutions include using shielded, grounded wire between the satellite tone decoder and the local automation, ferrite cores or beads to block RF, and, in extreme cases, small electrolytic capacitors across the automation cue input terminals. Start with 0.22 uF, so as not to miss valid cue contact closures.

Proper grounding on the AC side also is important, whether by the AC line cords or dedicated station grounding system. Make sure that the satellite equipment is at the same ground potential as the automation equipment, or as close as possible.

This guide has some great solutions in guaranteeing clean audio.

★ ★ ★

Last issue, we talked about routine generator maintenance that you could do. Even if you don't care to get your hands dirty working on engines, keep a log of typical meter indications. This can be a good first step to having a reliable generator.

As Figure 1 shows, generators can give you plenty of information. In addition to monitoring the line voltages and currents, keeping tabs on oil pressure and water temperature, and occasionally hitting the warning lamp test switch — just

Figure 1: Take periodic meter readings of your generator, as well as your transmitter.

Static electricity in the studio can cause false cues. Fabric softener diluted in a spray bottle always worked for Sparks.

Winter brings dry air. A humidifier or static spray on the studio carpeting not only can save static damage to components, but prevent you from chasing intermittent problems caused by static discharges.

★ ★ ★

I was on the phone helping an engineer diagnose an RFI problem, and explained a slick diagnosing technique that *Workbench* readers may find helpful.

This engineer has two AMs in his back yard, and was getting RF from the other station on his console. He tried grounding, ungrounding, lifting leads, you know the routine!

The next step answered the question. While listening to the RF in the monitor, he pulled the AC cord to the console power supply. The RF went away immediately, and there was clean audio for the second or two it took the amplifier output to decay. This pointed him in the direction of the AC — similar to the suggestion Sparks made above. If, when the AC plug is pulled, the RFI noise continues in the background as the audio decays to nothing, you know the RF is getting into the audio circuitry, most likely through the audio wiring.

If, however, the RF immediately goes away when the plug is pulled, you know the RF is getting in on the power supply leads, and filtering is in order.

Looking for sources of clean audio? Start with *www.benchmarkmedia.com* When you get to the Web site, click on the "Clean Audio Installation Guide," to make sure no bulbs are burned out — a log can help you spot trouble before it snowballs into a catastrophe.

★ ★ ★

An advantage to living near water is that marine hardware is at your disposal.

Contract engineer Joe Wetherbee of Winner Broadcasting near Norfolk, Va., offers an inexpensive way to hang speakers. He found a metal ring with mounting hardware that fits perfectly at the top rear of a speaker. A separate metal anchoring eyelet is screwed into a stud in the ceiling. The two are connected with a metal "S" hook.

All the parts are standard inventory at a marine shop. Cost is about $10 per speaker.

★ ★ ★

I mentioned the tapes of the three all-day engineering sessions at The NAB Radio Show in Seattle, which included our own AM/FM Transmitter Workshop. You can order tapes by phone with a credit card at (800) 369-5718. If you prefer mail or fax, call Mobiltape for an order form at (805) 295-0504 or go to Web site *www.mobiltape.com*

Package prices are available.

I'll offer more background on the topics discussed next issue.

■ ■ ■

John Bisset has worked as a chief engineer and contract engineer for more than 20 years. He is a district sales manager for Harris Corp.

Submissions for this column are encouraged, and qualify for SBE recertification credit. Fax your submission to (703) 323-8044, or send e-mail to jbisset@harris.com

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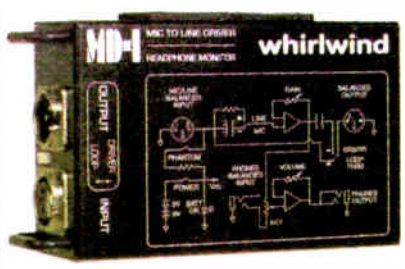

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World Radio History

Suppliers See Multi-User Demand

Mario Hieb

The community antenna concept has gained in popularity in the United States in recent months, judging from comments on the floor of The NAB Radio Show.

"There's more interest domestically than we've seen in the past," Alex Perchevitch of Jampro Antennas said. "With a lot of the restructuring of stations, people moving around, stations needing to find a new place to transmit from because of DTV and are being displaced from towers, that's creating some real interest."

The move to the community antenna system has been fueled by station consolidation, displacement for DTV and tougher community zoning laws.

"Cost, common ownership, the fact that people are having a lot of problems building towers — they just don't have the ability to go and put up a tower anywhere anymore," Perchevitch said. Other vendors at the show agreed.

Doug MacCabe, president of Jampro RF Systems, said, "I think digital television is driving it to happen. There's a push in the last eight months domestically for combining systems. ... We're probably putting three (combiners) out a month." Among other products, Jampro displayed its medium-power rototiller antenna, which it says is ideal for multi-user applications.

David Davies of ERI also sees a greater push towards combined systems. But, he said, ERI has dedicated an engineering team to do structural analysis and tower reinforcement. He said the company has been "very successful" in the past six months at keeping customers who had expected to move on their towers, by using them more efficiently.

Shively Labs told visitors about an unusual installation. Several Minneapolis FMs recently were displaced due to DTV. Space was available on the IDS Tower in downtown Minneapolis, but a conventional panel antenna would have produced unacceptable windload. Shively turned to a Lindenblad antenna.

"Lindenblad was a scientist who invented the style of antenna and patented it back in 1917," CEO Paul Wescott said. "People have built them in low power levels, but no one, until this antenna was shipped, has done them at full, grownup radio station power."

The Lindenblad essentially is a panel antenna without the panel, hence its low windload.

"This antenna in its full size will handle 8 kW per bay. ... The windload of the bay, the four radiators around, is approximately the

See ANTENNAS, page 26 ▶

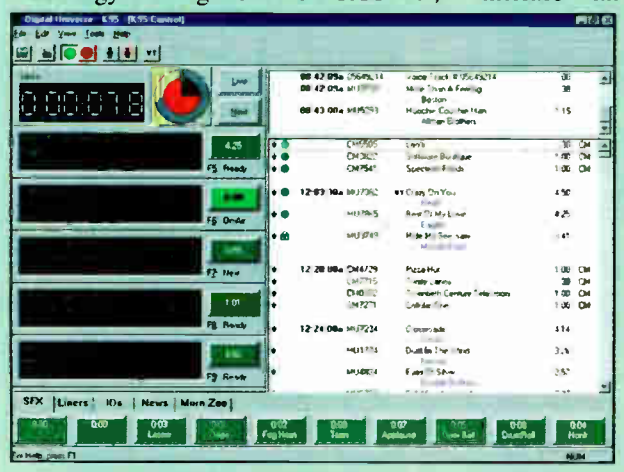
▶ AUTOMATION, continued from page 24

Internet.

"Our automation equipment merges voice tracking with the music. It sounds like the jock is right there," said Dean.

The company also said Digigram will provide the sound cards to power Maestro in the future. "Digigram sound cards have become popular, so we've embraced them," he said.

German supplier Mediatron displayed its AirControl NT live-assist and 24-hour automation system. According to Markus Stein of Mediatron, the newest developments to AirControl NT involves plug-in technology. Among these are HotControl,



The On-Air Screen of CBSI Digital Universe

a playback module used in live broadcasting to fire off sound and jingle elements; CuePlayer, designed to audition sound elements and adjust them to the hundredth of a second; and VoiceTrack, for pre-production of voice elements. Other plug-ins are available.

MediaTouch demonstrated its $995 QuicPix system, which John Davis, vice president of radio operations, USA, called "our first entry-level product." With QuicPix, a user can simply "put it in the computer, pop in a cart, and you have a radio station."

Davis said the system has a modular design that makes upgrading to the company's OpLog2000 system — also on display — a simple procedure.

According to Boyce Williams, president of Pristine Systems, the company's RapidFire system is compatible with all major audio formats. The system features live assist, walkaway and satellite operations, and features the company's RF-EDIT on-air waveform recorder and editor. Williams said the system makes the "integration of radio station functions and scheduling as user-friendly and seamless as possible." The Quick Picks feature makes it easy to add or alter music, commercials, promos and last-minute insertions by a point-and- shoot method.

Dalet had two new Internet applications for its Dalet5 digital audio system on display: Interweb and DWP. The former is a communication tool for remote sites or reporters; the latter, a web-publishing application.

The DWP application converts data in the Dalet5 audio database into attractive Web sites which are easy to maintain. Sophisticated templates automatically query the database for relevant material to be converted into HTML. This can include lists, schedules or breaking news items.

Prophet Systems added new features to its AudioWizard CFS32 system. Within the log format, the user can now create his or her own cue points. There also is a clean interface with Orban editing products for fast, seamless processing.

Other new features include dual monitors; drag-and-drop of all log events; auto roll cart deck; a button bar with 24 buttons; a 96-button wall of carts; full Windows graphics; user-defined colors and placement, and user password options. Audio-Wizard CFS32 also interfaces with the Burli News system, and can support 12 playback devices per workstation.

Radio Computing Services showed its Master Control on-air system, including several useful features: Sequencer, Hot Keys, Log Editor, Internet VoiceTracking, Segue Editor, Audio Editor and The Browser. The "real feel" VoiceTracking feature creates voice tracks in real time. The user can hear all elements surrounding his or her voice, and can control when each plays.

The Sequencer plays whatever is next on the log in satellite or automated mode, or waits for a person to press "Go" in live assist mode. The Segue Editor allows the user to actually see a segue and then adjust it as necessary.

Register Data Systems had The Phantom Control Room on display. A powerful new log feature, Multi-Cut Carts, simplifies how a traffic department handles multicut orders for the Phantom. Also new is a Music on Hard Drive feature, which features special format clock codes and audio overlap to make hard drive music transitions sound smooth.

Additionally, a new music schedule import routine allows the system to accept play lists from most major scheduling packages on the market. Other notable additions include Free-Form Cart Rotations, ideal for live-assisted sporting events; and Local Area Network Remote control, for situations where multiple LAN-interconnected Phantoms can be remotely controlled from other LAN-connected PCs.

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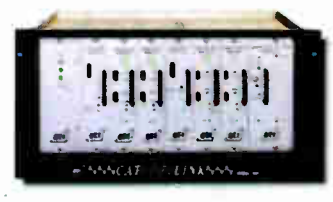

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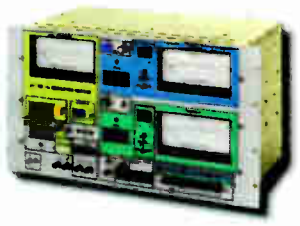

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World Radio History

Docs, Guitars and NTR

Don Elliot

Syndicators and show producers were out in strength in Seattle.

AM/FM Radio Networks was on hand to promote its growing stable, which includes "The Guitar Show With Kevin Bacon," "Rockline" and "American Top 40 With Casey Kasem."

Actor Bacon is also a guitarist. He hosts top names in rock guitar like Eddie Van Halen, Carlos Santana and Bonnie Raitt. The show is two hours each week.

Radio's top doc was at the show as a featured speaker. Premiere Radio syndicates "The Dr. Laura Schlessinger Show," which it touts as the fastest growing talk radio program ever.

But Schlessinger wasn't the only "Dr." in attendance. "The Dr. Toni Grant Show" was on the air from the show, Grant said, to "let everybody know that I'm back!" Radio Shows of Irving, Texas, offers the three-hour show Monday to Friday from 3 to 6 p.m. ET.

Grant said she promotes her home and family as a model.

Doctors and health in general are hot. The Health Media Network was on hand promoting its show, "America Talks Health With Dr. Keith Robinson."

Taking a different tack, "Dead Doctors Don't Lie" is from the ZBS Radio Network. It is a live, daily, syndicated call-in talk show that claims almost 100 affiliates. Dr. Joel Wallich argues that doctors receive virtually no training in nutrition, and that physicians as a group tend to not live as long as the general public.

General Mills is now a radio program supplier. It offers four free short-form (approximately 90 seconds) radio shows via satellite, on a market-exclusive basis. For example, "Ask Betty" features lifestyles, trends and news from the kitchen.

Syndicators use the Radio Show to round up new affiliates and reinforce relations with existing ones. Their strategies vary by their size, business aims and slice of market.

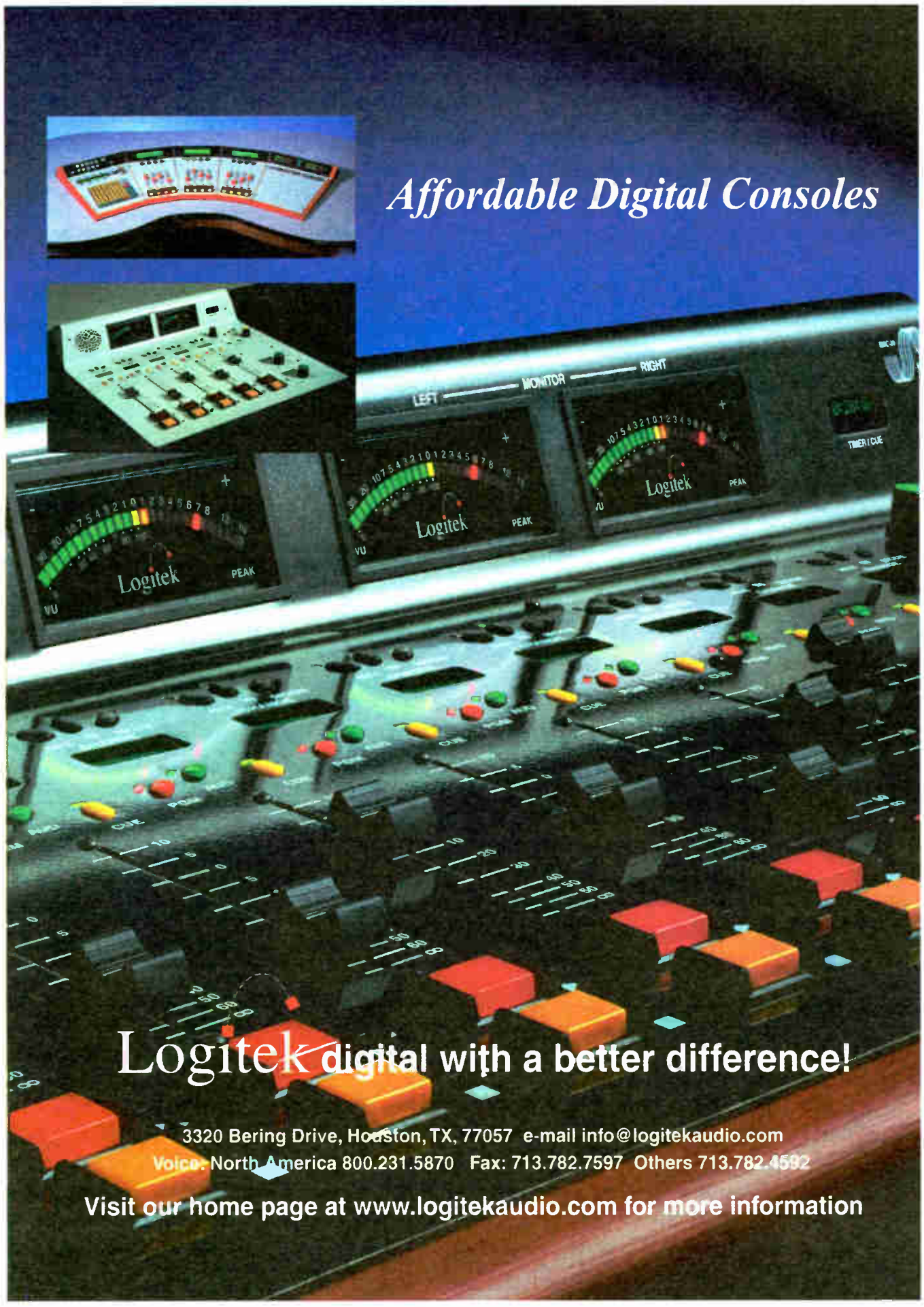
ABC Radio Networks, for instance, used the "brand" concept in an effort to position itself as a leading program supplier. Its theme was "The Best Brands in the Business." Among those assets are "The Tom Joyner Morning Show," "Rick Dees Weekly Top 40" and the new Radio Disney format.

The "John Boy & Billy Big Show" is now a staple at the convention. It debuted in 1986 and began syndication in 1993. The southern-based morning drive show is promoted as irreverent but not mean, adult but not crude.

Jones Radio Networks is positioning itself as a radio consultant. Managing Director Tom Watson called his company "the Swiss Army Knife of radio consulting" because of its full-service orientation in providing satellite music formats.

Jones will offer "top-caliber" consulting, for barter or cash. Each format is guided by a major-market music consultant. Jones also supplies jingles, sweeper/image voicing, research projects and specialized off-air services.

See PROGRAM TOOLS, page 28 ▶



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Antennas

▶ ANTENNAS, continued from page 25

windload of a side-mount antenna."

Canadian antenna manufacturer Valcom Ltd. was on hand to display an AM antenna product.

"It's a free-standing, 74-foot AM antenna built to military specifications. It is unique in the fact that it is coil-loaded; each turn of the coil represents so many linear feet," Paul Macpherson of Valcom said. "So this antenna can replace guyed towers."

Suppliers seek improvements in traditional antenna designs. Mark Cunningham of Antenna Concepts said, "The Ultra Tracker is a sidelobe-free FM antenna. It suppresses the sidelobes that typically occur when elements are stacked one above the other. It also has a side effect of creating less min-to-max ratio at the receive site, thereby causing an increased power level. The RMS value is much closer to the peak values, and radios pick it up better."

Antenna Concepts Inc. also makes the AnTek Design Line and a high-power, broadband, tower-isolated antenna called the FM1 Ultra.

Asked about community antennas, Peter Hayes of Dielectric said, "We usually recommend a branch-fed VCRM. You can get 10 to 16 MHz bandwidth on a side mount. It's very economical, a lot cheaper, a third of the price roughly of a panel antenna."

Propagation Systems introduced a circularly polarized FM broadcast antenna, available in power levels of up to 60 kW, and promoted its line of FM antennas with input power from 500 W to 120 kW.

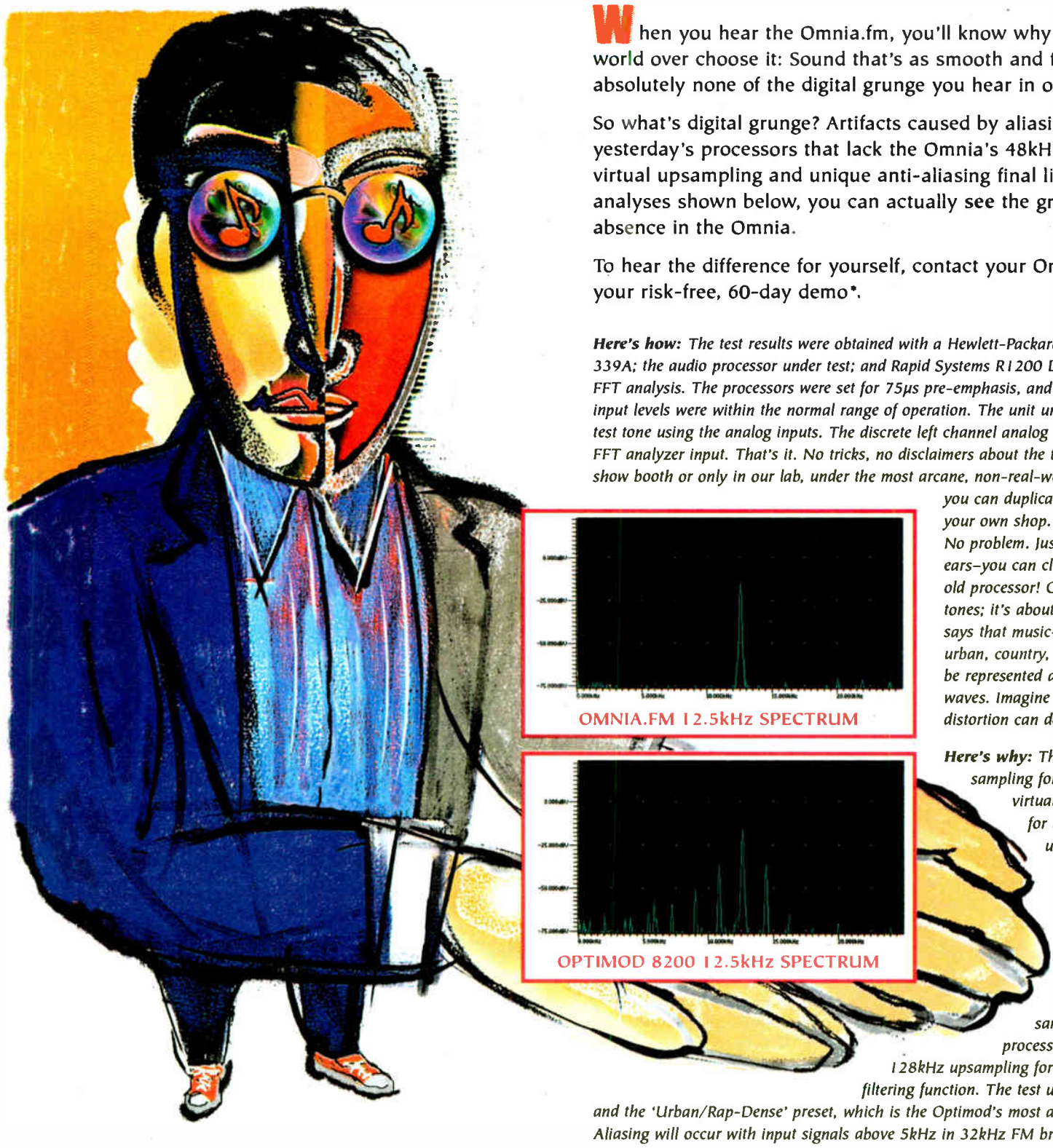
Central Tower pushed its guyed and self-supporting towers, turnkey projects, engineering analysis and frequency matched tower sections in the area of FM for pattern optimization.

RFS Broadcast promoted its FM panel antenna arrays, broadband sidemount antennas and combining capability.

"With consolidation of FM ownership and displacement of FM stations by DTV, we see these high-power broadband antennas being used more for multiple station, community FM antennas," Sales and Marketing Manager Ernie Belanger said.

World Radio History

LISTEN



When you hear the Omnia.fm, you'll know why broadcasters the world over choose it: Sound that's as smooth and fluid as analog, with absolutely none of the digital grunge you hear in other digital processors.

So what's digital grunge? Artifacts caused by aliasing distortion in yesterday's processors that lack the Omnia's 48kHz sampling, 192kHz virtual upsampling and unique anti-aliasing final limiter. In the FFT analyses shown below, you can actually see the grunge as well as its absence in the Omnia.

To hear the difference for yourself, contact your Omnia dealer and get your risk-free, 60-day demo*.

OMNIA.FM 12.5kHz SPECTRUM

OPTIMOD 8200 12.5kHz SPECTRUM

Here's how: *The test results were obtained with a Hewlett-Packard Audio Test Set, Model 339A; the audio processor under test; and Rapid Systems R1200 Data Acquisition System for FFT analysis. The processors were set for 75µs pre-emphasis, and were carefully adjusted so the input levels were within the normal range of operation. The unit under test was fed a 12.5kHz test tone using the analog inputs. The discrete left channel analog output was connected to the FFT analyzer input. That's it. No tricks, no disclaimers about the test working only in our trade show booth or only in our lab, under the most arcane, non-real-world test conditions. In fact, you can duplicate the test results yourself in your own shop. Don't have an FFT analyzer? No problem. Just use an oscillator and your ears–you can clearly hear the birdies in the old processor! Of course, this isn't about test tones; it's about music. And Fourier theory says that music–whether it's rap, oldies, urban, country, and yes, even grunge–can be represented as a combination of sine waves. Imagine what this kind of aliasing distortion can do to complex musical signals!*

Here's why: *The Omnia.fm utilizes 48kHz sampling for dynamics processing and virtual upsampling at 192kHz for the final limiter, which is a unique, anti-aliasing design. The test used version 1.02 software and the 'Cranked' preset, which is the Omnia's most aggressive stock setting. The Orban® Optimod® 8200 used for testing operates at 32kHz sampling for the dynamics processing and incorporates (4x) 128kHz upsampling for the clipping/low-pass filtering function. The test used version 3.0 software and the 'Urban/Rap-Dense' preset, which is the Optimod's most aggressive stock setting. Aliasing will occur with input signals above 5kHz in 32kHz FM broadcast audio processors unless mechanisms that cause aliasing are eliminated.*

For a complete technical report, call us for a copy of our paper entitled "Omnia.fm: An Engineering Study." Or visit our web site at: www.nogrunge.com.

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World Radio History

Dates, Docs and Delilah

▶ PROGRAM TOOLS, continued from p. 26

New from Broadcast Programming is country-oriented "Neon Nights," hosted by Lia Knight. The night show blends music, personality interviews and listener calls. BP said it also continues to do well with "Delilah," which is music-intensive and features listener conversations involving support and advice from the host. The company also offers satellite music syndication through "Total Radio," a voice-tracked and localized music service, available in most music formats.

Westwood One says it now serves more than 5,000 stations globally. It promoted Shadow Broadcast Services, including traffic, news, sports, weather and entertainment content. Westwood has approximately 150 news, sports, music, talk and entertainment programs, features, live events and 24-hour formats.

International syndicator Radio Express is getting more active in the United States. Tom Rounds, vice president and general manager, expressed pleasure with the Radio Show itself.

No poor cousin

"The NAB has successfully recaptured the spirit of the old radio programming conferences of the '70s and '80s," he said. "The composite conventions were beginning to give us a feeling like we so frequently got at the MIDEM shows in Europe, that radio was a poor cousin to the other organizations that co-sponsored the event.

Airing 'Think Radio With Clark Garen'

"Our customers and friends from afar really turned out, and that has probably saved us $50,000 in travel expenses in 1999," he said. "Now that we are getting more active in the USA, I could only wish for more attention paid to the exhibit hall by the American PDs."

Sports is the concept at One-on-One Sports. It came to the show to tout its live 24-hour sports talk, reaching 11 million listeners each week. Offerings include weekday personality shows; weekend game-day coverage; interviews with coaches, players and experts; and "Sportsflash" updates three times an hour.

Sony's SW Networks promoted its entertainment news network, featuring music news, show prep, audio clips, movie drops and interviews for a variety of formats.

Specialized elements to help PDs customize their offerings were at the show.

The "Lifestyle Tips" Radio Series from Lifetime Television is 60-second topical vignettes appealing to young females, syndicated by Winstar to top 50 markets. Some 260 features are in the initial series.

American Airlines rolled out a nationally syndicated 90-second radio feature hosted by successful men and women talking about business success stories.

The Associated Press wants to make its packages more flexible and useful, to appeal to all formats. Among its offerings in Seattle was PrimeCuts, with more than 250 sound bites per day to help stations customize coverage of current events.

Special content

The Weather Channel was in Seattle to market its regularly scheduled weather information, customized to fit a station's personality and locale.

Wisdom Radio, through its programming, tries to promote love, harmony, wholeness and a body-mind-spirit connection. Husband and wife Judith Sherven and James Sniechowski air live from Los Angeles.

A number of exhibitors offered services other than programs. Non-traditional revenue continues to attract stations to specialized suppliers.

AirDate, a voice personals company with more than 1,000 clients, offers stations a method to build non-traditional revenue as well as listenership.

Promotions are critical to any commercial radio station. American Media Director of Marketing Scott Meach said its promotions are designed to increase listenership and revenue, drive traffic to client locations, and generate excitement among listeners and advertisers.

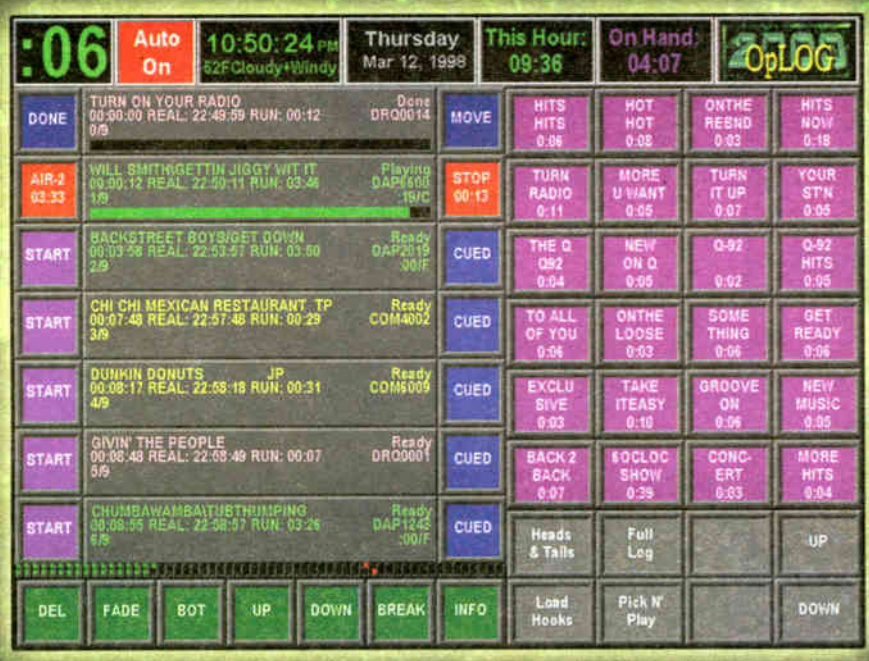
"The NAB was an excellent forum to discuss promotions that use insurance to limit the station's liability in the event of a huge grand prize winner, such as the Million Dollar Birthday Game," he said.

NBG Radio Network touted its Preferred Listener Program, which turns audience members into card-carrying station ambassadors. The promotion is intended for use during station events and remotes. Swiping the card through a reader registers them for prize giveaways.

Flow Communications announced a strategic alliance with Information Network Radio to produce and create original programming. They will develop programming for CD Radio's new satellite-based service.

Not All Digital Systems Are Created Equal.

(AT MEDIATOUCH WE JUST HAPPEN TO MAKE THE BEST.)



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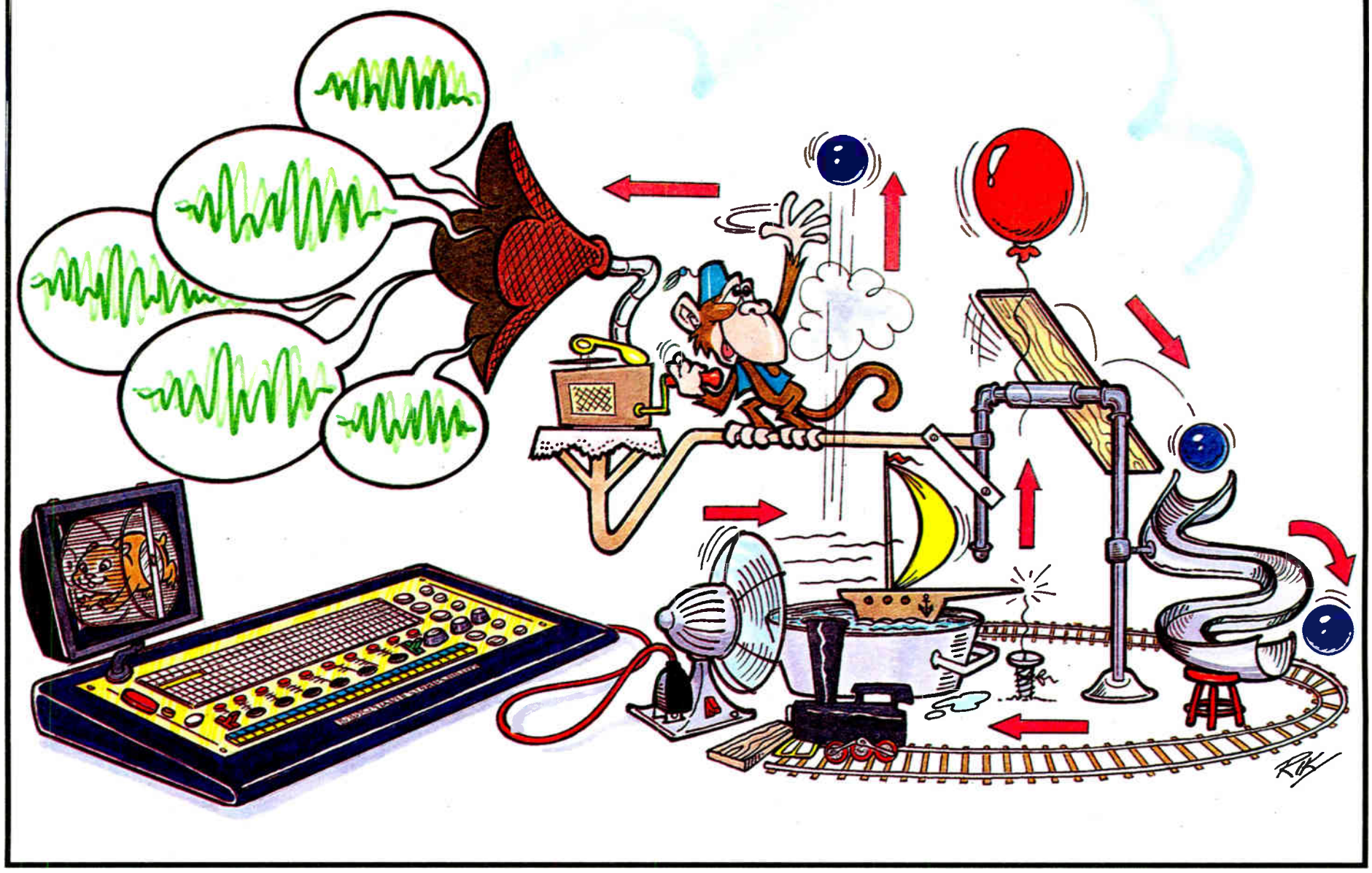
Your digital console should meet your specifications.



You expect more out of a digital console than simple operation, analog feel, or a hybrid analog/digital design. Hybrid consoles that depend on analog are brought to market by manufacturers who have no faith in the integrity of their digital abilities.

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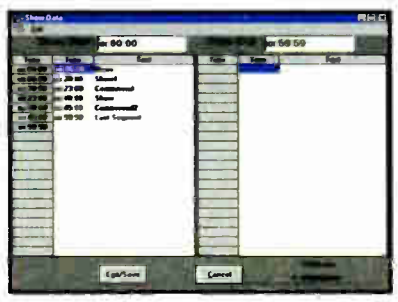
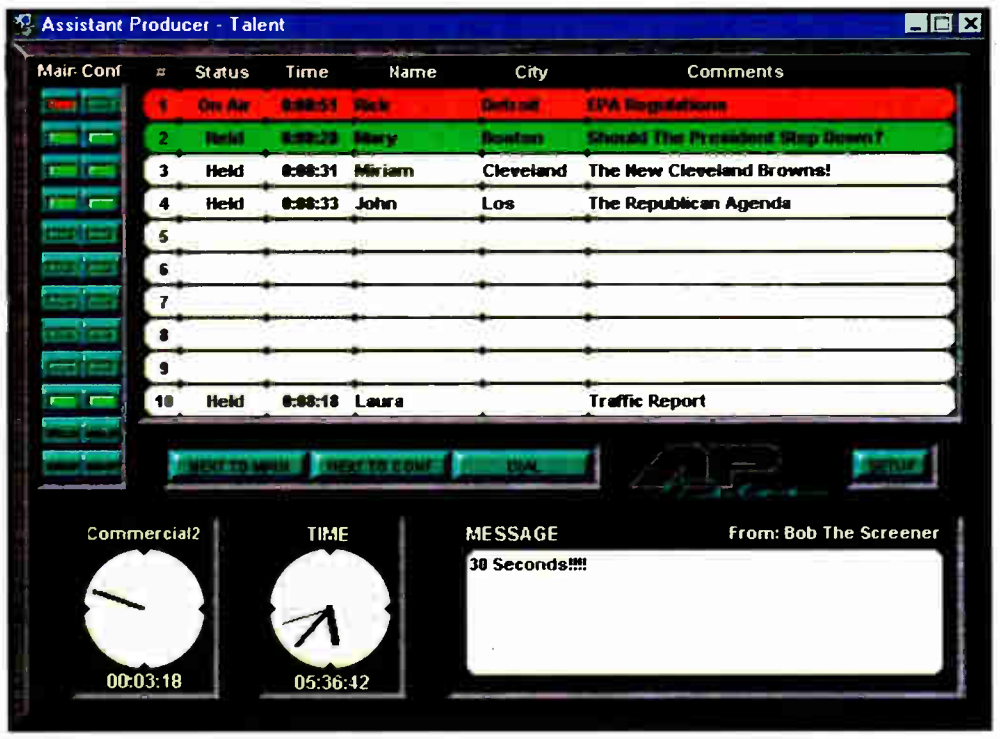
Main and Conference buttons indicate easy-view call status at all times, and provide remote control of a Telos interface. Point-and-click on Conference buttons to pick up calls. The live call will be highlighted as indicated.



The Show Data window is used for scheduling events that occur within a pre-determined time interval—for example, 3:00PM–5:00PM. When an "x" is entered in the hour field, Show Data runs as a generic hourly clock, as shown in the above display.



The Message Window is a helpful tool for communications throughout the Assistant Producer network. To send a message, double-click inside the message box for the Message Entry pop-up box. Type in a message and press "send" to post it. "Send urgent" makes the message background area bright red. A message "hotbox" allows you to store and send frequently-used messages.

The caller menu bar displays lines in use and caller information for each line. To enter caller information, simply double-click on the desired line for the caller pop-up box. Enter Caller Name, City, and Comments, then press "exit" to post information on the screen.

The dialer feature allows you to choose a dailout line, and automatically dial outside calls from the Assistant Producer pop-up dial menu.

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- **Supports Windows 95/NT or higher**
- **Serves as either a talent or producer workstation on a PC**
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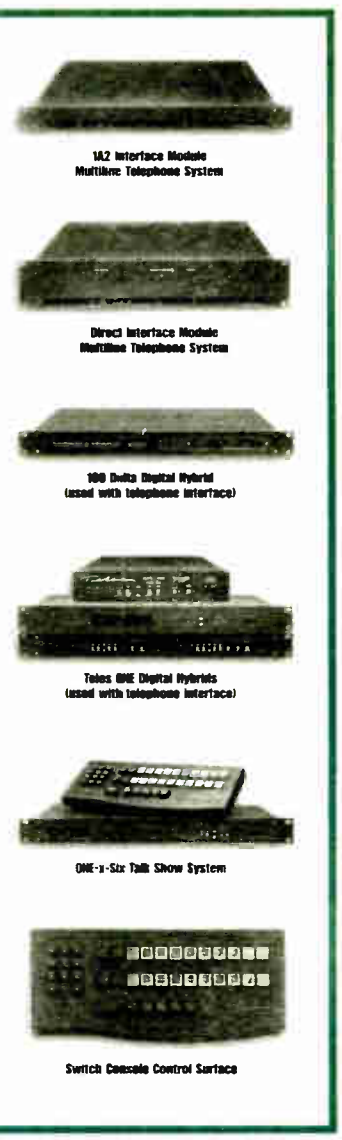
- **Contains robust color-coded line status indicators for easy recognition**
- **Manages your time with clock and call timers and a unique countdown timer for indication of time-to-break, etc.**
- **Houses a flexible database which allows configuration of desired listener demographic fields and talk show statistics**
- **Writes database files using Microsoft Access files for easy analysis and conversion to other formats**
- **Designed for use with a Telos Direct Interface Module (DIM) or 1A2 Interface Module, combined with any Telos hybrid**



Assistant Producer controls any Telos telephone interface and hybrid combination, such as those pictured here.

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TRANSITION TO DIGITAL

ABC Turns Up the Power of Digital

Radio Network Completes $2 Million Upgrade Built Around Digital Audio Management System

Carl Lindemann

This is one in a series of articles about how radio facilities are making the transition to digital.

By early 1999, ABC Radio Networks will finish a $2 million upgrade at its Technical Operations Center in New York City. The work includes four new air studios, two production studios and one large special-events studio. This follows a $500,000 upgrade at its Washington, D.C., facility.

The changes in the New York physical plant revolve around the installation of a new digital audio infrastructure, with approximately 20 Dalet workstations working in tandem with an existing D-Cart system.

Starting with D-Cart

The present upgrade is built on top of the Australian-made D-Cart, installed in 1990 to replace audio carts. The D-Cart's computer interface imitates two triple-deck cart machines. That makes operation easier for the users; their task is the same as before, but without physical carts to handle. But because the audio files reside on servers, these "virtual" carts are available across the entire operation, linked together through ABC's two T-1 lines.

"That sound is available not just here, but worldwide, in Washington, Los Angeles and London," said John Rosso, ABC Radio Networks vice president of operations. In that regard, the simple concept of cart replacement helped ABC think about new directions in audio management.

Rosso remains a fan of D-Cart.

"Best of all, D-Cart is very stable, and runs on a simple $400 terminal. It may be ugly, and the interface has no graphics, but it works beautifully." (For more on D-Cart, see "MPR Goes Digital," **RW**, Sept. 2).

From that digital base, ABC moved toward making its audio handling more flexible and efficient. Rosso said the studio upgrade project was in keeping with the organization's philosophy.

"We're progressive and pragmatic at the same time," he said.

Whatever the benefits of a new audio system, he said, the nature of the network meant that the process of implementing change had to be seamless.

"At stations, you can experiment more. Here, we proceed only when there's an identifiable business. We also have to be very sensitive about reliability," Rosso said.

The search for a digital solution became the task of George Matassov. As project manager in the ABC Radio Network Engineering Department, he must keep current in technology and seek options and opportunities to make his operation better.

In the Newsroom at ABC Radio

The recent project began two years ago in response to a similar, real-world problem. ABC Radio Networks needed to repair or replace its fleet of aging Otari MTR-10 reel-to-reel machines, which were used to record audio feeds. These workhorses had been in place, running almost constantly, since the early 1980s.

With 80 machines in New York and 40 in Washington, the replacement cost, estimated at $11,000 each, would have been significant. These units had been fitted with SMPTE decoding hardware, and the time code was recorded on the right channel of audio feeds. To find an audio location on a tape, a user would index using the code, or mark locations on the reel with paper.

This method may have been reliable, but collecting and disseminating audio this way had serious drawbacks. It introduced complications and delays when covering urgent stories. To break to a bulletin, or even cover a presidential speech in progress, the user had to operate a second machine to continue the recording while the first reel was taken for editing. Also, audio on the reel had to be played back in real time. These factors caused delays in getting a story on the air.

Given his 10-year experience at ABC, Matassov had clear ideas as to what the basic requirements of the new system should be.

It would have to be an "open" system that could easily integrate with third-party hardware and software. It also had to handle WAV files, MPEG Layer 2 and RealAudio. The interface had to be simple enough so that occasional users could find his or her way around without having to relearn and remember basic operations.

Matassov mapped out the market and visited trade shows to familiarize himself with suppliers. Dalet eventually won the lucrative ABC prize.

"At our initial inquiry, many vendors said, 'Sure, we can do whatever you need.' The Dalet people asked a lot of intelligent questions before saying they could or couldn't," Matassov said.

Any system ABC chose would likely do more than what the old reel-to-reel machines had done. But ABC knew that the transition gave it the opportunity to network its recording workstations together into an enterprise-wide solution.

The right kind

"For us, it wasn't just about building a (computer) network; it was about building the right kind of network," Matassov said. Unlike analog solutions, the Dalet system offers immediate access to sound as it is recorded. As multiple feeds are stored in a central server, reporters and editors can pull up the sound files at any workstation.

In theory, this approach is attractive. But how these capabilities actually translate in daily practice depends on the network infrastructure. Dalet was

See ABC, page 32 ▶

What: ABC Radio Networks

Where: The Technical Operations Center is at 125 West End Avenue in New York. Headquarters is in Dallas.

Employees: 500 total; 175 in NYC.

Parent Company: ABC Inc./Disney

Business: ABC Radio Networks is the largest radio network in the United States with an estimated audience of 149 million listeners weekly. ABC Radio broadcasts five full-service networks; talent including Paul Harvey, Tom Joyner, Doug Banks, Bob Kingsley, Rick Dees and The Fabulous Sports Babe; the ESPN Radio Network; 24-hour formats; ABC News, sports, and daily and weekly features. ABC Radio Networks' affiliate lineup consists of more than 7,600 program affiliations on almost 2,900 radio stations.

Matassov wanted an 'open' system that could integrate with third-party hardware and software, and handle WAV files, MPEG Layer 2 and RealAudio.

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ABC Tech Ops Upgrade in N.Y.

▶ ABC, continued from page 31

attractive to Matassov because the company had extensive experience in building networks and carrying out systems integration in a variety of industries. Matassov also was impressed by his site visit to the Canadian Broadcast Corp. At the CBC, he put a Dalet system to the test. It was similar to what he was considering for ABC.

"I wanted to see how their network would survive under fault conditions," he said. With 15 machines playing and recording simultaneously on a Novell, he pulled the plug on one of the systems.

"There was a brief glitch in the audio, but the network didn't crash," Matassov said.

Dalet is a French company with offices in the United States. Matassov visited its headquarters in Paris. This convinced him that the supplier possessed the technical and service capabilities needed.

"They have a software engineer whose full-time job is duplicating reported bugs," he said, obviously impressed.

After choosing a system supplier, the implementation plan called for an initial installation in ABC's Washington bureau. This would help managers understand better how to outfit New York properly. The six-month, $500,000 pilot project began in February of 1997, and was finished this spring. The experience refined and defined what would be needed in New York, both in terms of physical plan as well as modifications to the Dalet system.

The Virtual Studio

Retrofitting the studios on the West Side of Manhattan took more than installing the networked workstations. "Initially, we had a choice of building many new studios or moving production into the workstation concept with Dalet and select pieces of equipment," Rosso said.

The workstation concept creates what Rosso calls the "Virtual Studio." Instead of confining production to the recording studios, the workstation architecture allows production functions to be distributed throughout the newsroom. This approach allows better use of studio space, and better access for reporters and editors to build stories and features around sound files in the system.

The layout of the workstation cubicles vary. Some allow for group projects, others for individual assignments.

One piece of equipment notably absent

See ABC, page 33 ▶

The Human Factor

The ultimate success of any systems implementation depends on how users take to it. The challenge is how to introduce staff to a new way of doing their work without incurring animosity.

That certainly was true during the digital conversion process at ABC. According to Dalet's Anna Mae Sokusky, "The most important fact to know about the way Dalet was introduced to ABC users is that nothing was forced on anyone. The management recognized that some users may feel more comfortable with a tape backup. The most computer-literate users were launched very quickly on the Dalet, while those who felt intimidated were allowed to continue on tape for a while. So for a while, they ran the Dalet system in parallel with tape, until most users felt comfortable on the new system."

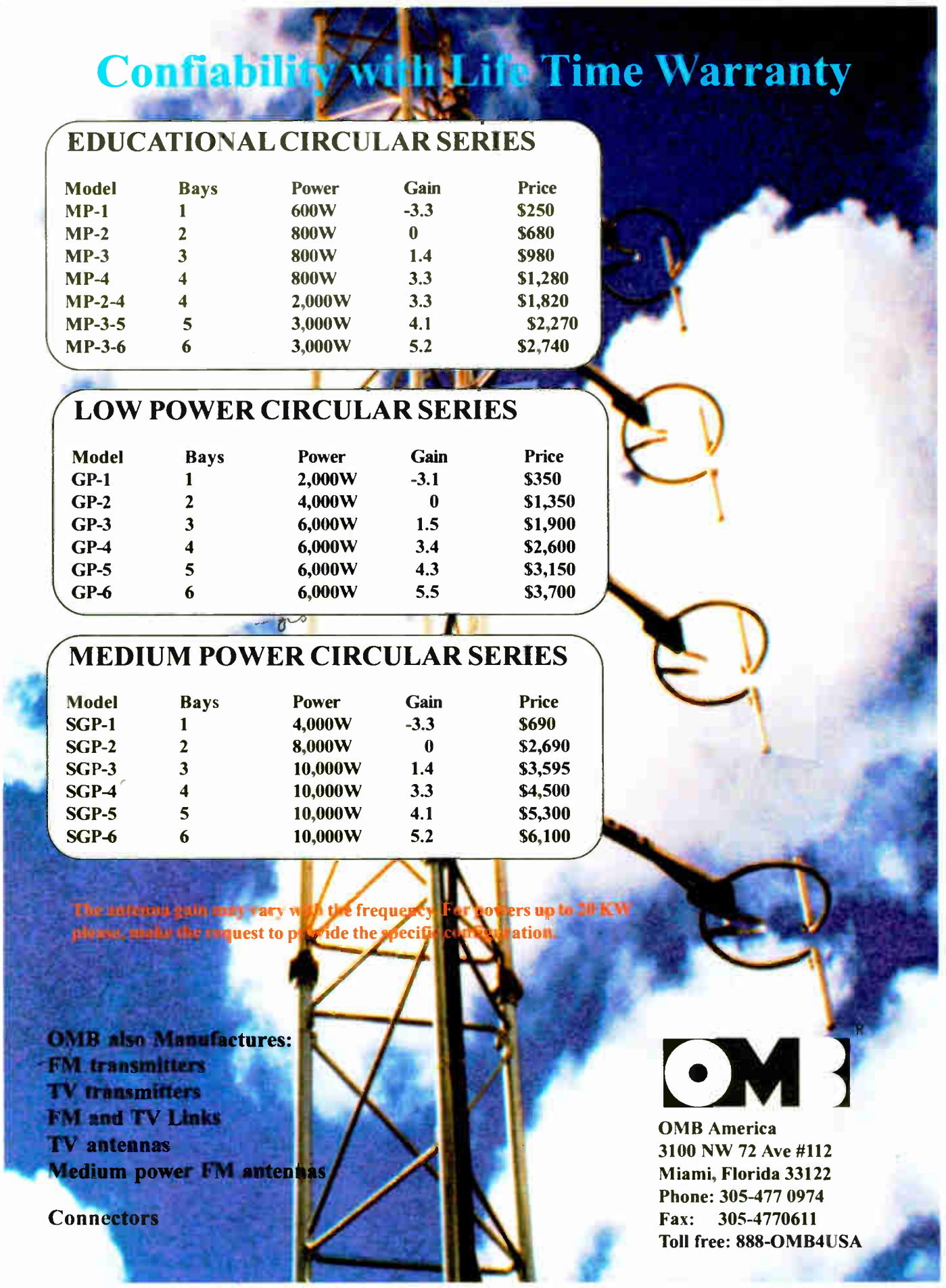
However gentle the phase-in, some resistance from users is inevitable. ABC's George Matassov headed off trouble by co-opting a likely holdout, a highly visible assignment editor with a reputation for being a "typewriter guy." Before long, this potential protester became a beta tester for the system. With the worst Luddite converted, the rest were easy.

"People familiar with cutting and pasting text could see this was just the same — except instead of words, it's audio," Matassov said.

Still, change comes hard, and some will accept it only grudgingly despite whatever advantages it brings. "One user in particular was fairly hostile to the system, and would only communicate with the Dalet project manager to point out problems," Sokusky said. Even the system's benefits have not changed this attitude. "Now, if an upgrade has to be performed, and the system has to be taken down temporarily, he is the first to complain, because he relies on the Dalet so much," she said.

As stories of the reel-to-reel days fade in institutional memory, perhaps some will wonder how anyone could have been hesitant about bringing digital to bear here. Sokusky related an incident during the installation that may indicate things to come.

"Dalet support staff walking into the ABC studios saw a large pile of reel-to-reel machines being thrown out. The sheer volume taken up by these machines was representative of the efficiency of the computer system, which takes up a fraction of the space required for tape machines."



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World Radio History

▶ ABC, continued from page 32

from either are the usual studio monitors. Taking editing out from the studios and into the newsroom raises sound isolation issues.

"You need quality sound, but can't be bothering your neighbors," Rosso said. Standard nearfield monitoring didn't work. ABC solved the problem with a Wohler Technologies AMP-1A Audio Monitor panel. The unit occupies a single rack space and provides needed volume and sound quality without being obtrusive.

In Washington, the Dalet system resides in a single computer along with other software. For New York, the Dalet components are in their own separate, dedicated computer. So each workstation actually is a dual-computer setup controlled by a single monitor and keyboard.

Keyboard commands toggle between the CPUs. This increases stability. The user sees a Windows 95 interface, which actually is a layer on top of the Novell Network.

CD-ROMs, floppy disks and any other means to load outside data into the system have been disabled, to protect and isolate the network from possible contamination. To ensure reliability, the system uses mirrored SFTIII servers with redundant network switches. If one server goes down, the second one takes over seamlessly.

"We're not a NASA, with enormous redundancy," Matassov said, "but this is a happy medium."

Custom screens

While the studios were designed around the Dalet system, the Dalet system also had to be modified to suit the setting.

Anna Mae Sokusky, president of Dalet USA, said customizing the screens was important.

"ABC management spent of a lot of time with Dalet defining the user interface, in particular the use of color," Sokusky said. "The interface was challenging because 24 different recording machines had to be represented, and the user had to be given meaningful visual cues about the status of each one of them. Red, green, blue and yellow flashing lights each carry a different meaning, i.e. the recorder is recording, scheduled to record, paused, or is reporting a problem," she said.

Sokusky's understanding of network radio is considerable, and her hiring was a coup for the supplier. Prior to joining

See ABC, page 35 ▶

Approximately 115 feeds converge in 'Mission Control.'

The 'Virtual Studio,' Inside Out

ABC Radio Networks, headquartered in Dallas, is a worldwide operation with more than 500 employees, more than 70 of which are in radio news and 55 in engineering. Its writers, anchors and correspondents produce dozens of programs daily for some 3,000 affiliates including "Paul Harvey News and Commentary," The ESPN Radio Network, and "The Tom Joyner Morning Show."

The Technical Operations Center is located on Manhattan's West Side, at a former newsprint storage facility for The New York Times. ABC Radio Networks has occupied it since 1984.

The 'Virtual Studio' starts here.

The heart of this facility is a central studio with 115 feeds and 50 ISDN lines linking it to the world. Here, a visitor finds rack after rack of switchgear, ISDN, satellite uplinks and downlinks, digital microwave, switchers, automated DAT, digital storage and servers linking this to other ABC facilities.

Down the hall, high-end production takes place in a studio outfitted with Sonic Solution's digital multitrack editor and a Yamaha 02R board. During a recent visit by **RW**, staffers were producing "The Fabulous Sports Babe."

The project includes a complete renovation covering four new air studios equipped with Wheatstone A6000 digital air consoles. Their Bus-Minus feature, for automatic creation of mix-minus, facilitates multiple live shots. Dalet Digital edit stations, situated throughout the newsroom, are equipped with Spirit ProTracker analog mixers.

Other equipment staples include Electro-Voice RE20 mics, Denon DN-M2000R and DN-M1050R MiniDisc recorders, Marantz PMD-350 Cassette/CD decks, JBL 4408A monitors, Panasonic SV-3800 DAT machines and Hafler P1000 Trans Amp power amps.

According to Bill Holder, ABC Radio Networks manager of radio operations, sending analog audio between systems is still faster, easier and cheaper than digital, although a WAN approach is in the works.

"Intraplex gear is currently used for digital transmissions between facilities over T1 lines," he said. "Work that is less time-sensitive, like Web site development and other postproduction, can use a TCP/IP interconnection to transfer MPEG and WAV files. The WAV standard is Broadcast WAV at 32 kHz; MPEG-2 files are compressed 7:1," Holder said.

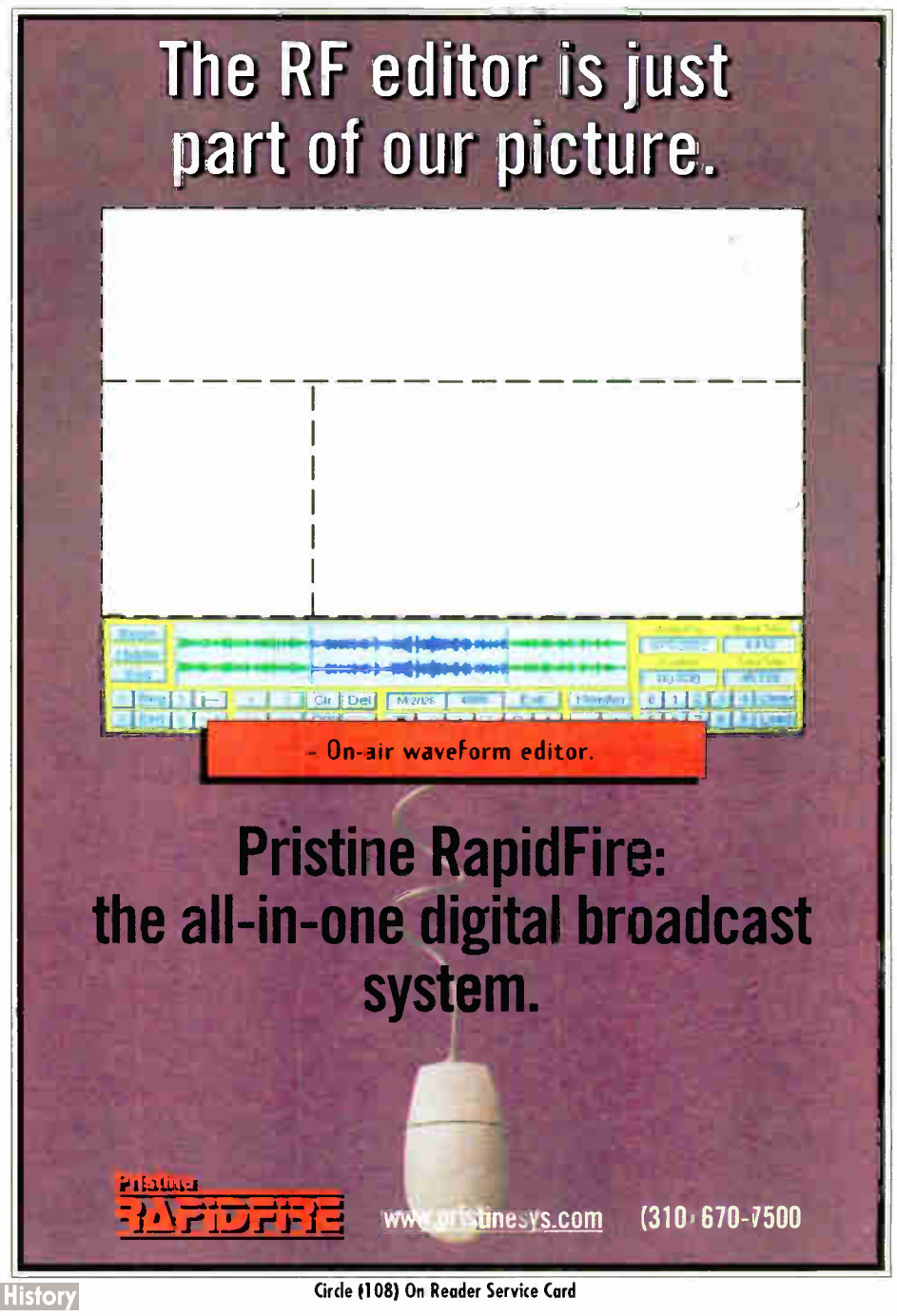
Other improvements on Holder's wish list include standard interchange between digital systems. Currently, the FTP protocol is used between digital systems in-house, and may be adopted for use on the T1 lines.

As in other industries, increases in the limits in the bandwidth of POTS lines would be a boon in delivering audio from laptops in the field to their servers. Also on the horizon is the challenge of integrating a new digital satellite system.

The "Virtual Studio" extends beyond the confines of the production facilities. ABC Radio Networks pioneered the use of MiniDisc for field recording, and now depends on INMARSAT portable satellite uplinks to bring the audio back from the field.

At the studio, an INMARSAT transmission appears as just another ISDN feed. The system is capable of bi-directional 64 kbps data transmission. The latest generation of this suitcase-sized unit uses a flat panel array — a distinct improvement over earlier versions with a parabolic antenna. With the array, maintaining exact orientation to the satellite isn't critical. This was put to the test in the middle of coverage of the TWA Flight 800 disaster on Long Island in 1996.

For Holder, the real test came during a live feed. "A passerby inadvertently snagged the unit, twisting it out of alignment. Dead air? The audio didn't drop out at all," he said. The downside is that INMARSAT is expensive to operate, at $20 per minute.



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World Radio History

Workbench

Radio World, November 25, 1998

Boom Bungees and Tricky Tones

John Bisset

What a great convention. The NAB Radio Show is what I'm referring to — not only lots of exhibits, but lots of engineers! And so what if engineering trade show budgets have been cut? I know several engineers who paid their own way, just to be brought up-to-date through the exhibitors and the sessions.

If you could not arrange to go, give some consideration to an early holiday gift for yourself: Order the tapes of the sessions. More on that later in the column.

One of the keynote speakers for the all-day digital workshop was Russ Mundschenk, a Philadelphia radio engineer. Russ took the digital bull by the horns a few years back, and built a digital facility that is considered a model for other engineers to follow. What one appreciates in Russ, is that amid this cutting-edge studio design, he takes a grass roots approach to problems — like the boingy-boings that the mic arm springs added in his digital studios.

I've used shrink tubing, shrunk down on the coil springs , which dampens the noise somewhat. But Russ has done one better. He obtained several of those thin rubber bungee-type straps that typically are used to hold trash can lids in place. They are black, like the booms, so they blend in. They also don't "boing" when the arm is hit.

So simple, so cheap, so effective! Thanks, Russ, for sharing the idea with our readers.

★ ★ ★

R. Sparks Scott from Eugene, Ore., sent some thoughts regarding the false tone firing on the ABC netcue box. He suggests checking that RF or other transient spikes are not getting into the automation via the external cue input wiring. Obvious solutions include using shielded, grounded wire between the satellite tone decoder and the local automation, ferrite cores or beads to block RF, and, in extreme cases, small electrolytic capacitors across the automation cue input terminals. Start with 0.22 uF, so as not to miss valid cue contact closures.

Proper grounding on the AC side also is important, whether by the AC line cords or dedicated station grounding system. Make sure that the satellite equipment is at the same ground potential as the automation equipment, or as close as possible.

Figure 1: Take periodic meter readings of your generator, as well as your transmitter.

Static electricity in the studio can cause false cues. Fabric softener diluted in a spray bottle always worked for Sparks.

Winter brings dry air. A humidifier or static spray on the studio carpeting not only can save static damage to components, but prevent you from chasing intermittent problems caused by static discharges.

★ ★ ★

I was on the phone helping an engineer diagnose an RFI problem, and explained a slick diagnosing technique that *Workbench* readers may find helpful.

This engineer has two AMs in his back yard, and was getting RF from the other station on his console. He tried grounding, ungrounding, lifting leads, you know the routine!

The next step answered the question. While listening to the RF in the monitor, he pulled the AC cord to the console power supply. The RF went away immediately, and there was clean audio for the second or two it took the amplifier output to decay. This pointed him in the direction of the AC — similar to the suggestion Sparks made above. If, when the AC plug is pulled, the RFI noise continues in the background as the audio decays to nothing, you know the RF is getting into the audio circuitry, most likely through the audio wiring.

If, however, the RF immediately goes away when the plug is pulled, you know the RF is getting in on the power supply leads, and filtering is in order.

Looking for sources of clean audio? Start with *www.benchmarkmedia.com* When you get to the Web site, click on the "Clean Audio Installation Guide." This guide has some great solutions in guaranteeing clean audio.

★ ★ ★

Last issue, we talked about routine generator maintenance that you could do. Even if you don't care to get your hands dirty working on engines, keep a log of typical meter indications. This can be a good first step to having a reliable generator.

As Figure 1 shows, generators can give you plenty of information. In addition to monitoring the line voltages and currents, keeping tabs on oil pressure and water temperature, and occasionally hitting the warning lamp test switch — just to make sure no bulbs are burned out — a log can help you spot trouble before it snowballs into a catastrophe.

★ ★ ★

An advantage to living near water is that marine hardware is at your disposal.

Contract engineer Joe Wetherbee of Winner Broadcasting near Norfolk, Va., offers an inexpensive way to hang speakers. He found a metal ring with mounting hardware that fits perfectly at the top rear of a speaker. A separate metal anchoring eyelet is screwed into a stud in the ceiling. The two are connected with a metal "S" hook.

All the parts are standard inventory at a marine shop. Cost is about $10 per speaker.

★ ★ ★

I mentioned the tapes of the three all-day engineering sessions at The NAB Radio Show in Seattle, which included our own AM/FM Transmitter Workshop. You can order tapes by phone with a credit card at (800) 369-5718. If you prefer mail or fax, call Mobiltape for an order form at (805) 295-0504 or go to Web site *www.mobiltape.com*

Package prices are available.

I'll offer more background on the topics discussed next issue.

■ ■ ■

John Bisset has worked as a chief engineer and contract engineer for more than 20 years. He is a district sales manager for Harris Corp.

Submissions for this column are encouraged, and qualify for SBE recertification credit. Fax your submission to (703) 323-8044, or send e-mail to jbisset@harris.com

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World Radio History

ABC Turns to Digital, Dalet

▶ ABC, continued from page 33

Dalet in July, she spent 26 years at CBS Radio, concluding her tenure there as vice president of the AM radio group.

Integrating the new ABC gear properly meant creating an interface to the existing systems. According to Sokusky, the Dalet System is "synchronized to the house clock via a wire, which is connected to a (Clark and Associates) card in the server, which speaks to a TSR program on the workstations, that poll the server at random intervals. The system also interfaces to a Sierra SAS 64000 audio switcher."

At Work on the New Studios

Distributed access to the system does not make for anarchy. The human operator, typically an assignment editor, controls the recording workstations by TCP/IP protocol, up to 24 simultaneous feeds. The assignment editor also controls the audio switcher to assign any of 256 sources to any recording channel. The unit can start recordings immediately, or be programmed to make recordings at a later time.

One challenge switching over to the digital domain has been storage. The Dalet systems in Washington and New York each have three 4.3 GB hard drives that hold a total of 212 hours of mono audio. But given the production output, that is just a buffer for daily archiving on CD-R.

The old analog reels were indexed by SMPTE and pulsing codes linked to automation systems. Archiving digital sound data on CD-R required developing a special system to record both the digital audio and the pulsing codes to trigger these automation controls. Now, several CDs' worth of data are "burned" daily. But optical storage hasn't taken over completely. Some long-format shows continue to be taped and archived.

How does life with the new system compare with the reel-to-reel era?

"Literally seconds after something happens, I can have a finished, polished sound bite ready to be on the air," said Mike Silverstein, ABC Radio Networks assignment editor. The result is that ABC Radio newscasts are able to incorporate more sound bites faster and better. Matassov also points to other improvements and their significance.

"It used to be that putting together three live feeds (into a newscast) was hard. Now we can do seven perfectly," he said. "This impacts staff at the grass-roots level. The way people think about their jobs change. They can throw in three times as many cuts, more highly produced — it's faster, better and less of a hassle." Quantitative assessments of how the changes in workflow translate to efficiency and bottom-line savings are hard to gauge.

Workstation architecture allows production functions to be distributed throughout the newsroom.

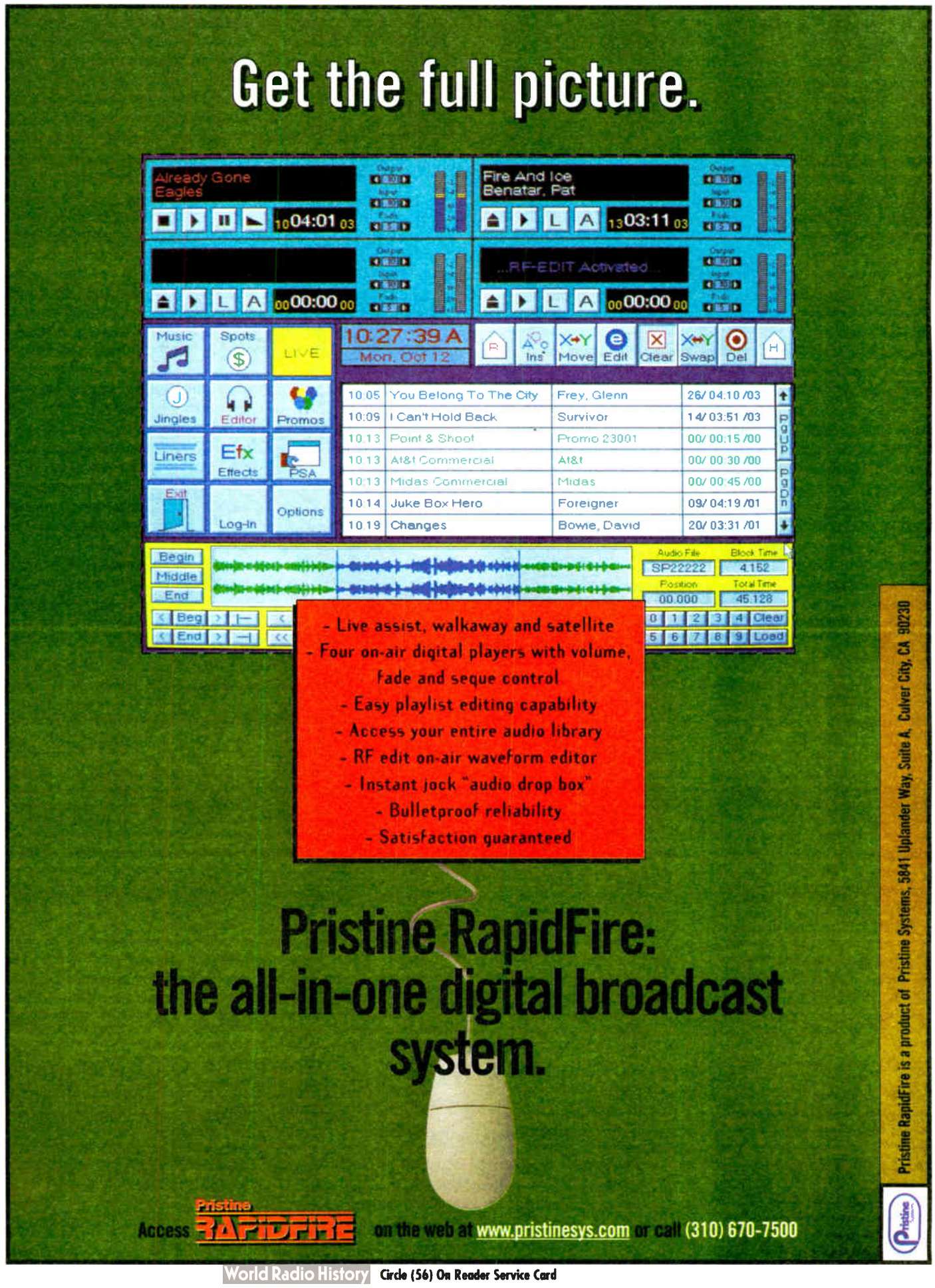
"Is it more efficient? It's certainly more effective," Matassov said.

The digital conversion also lets ABC Radio adapt content for its online projects. Rick Mandler, general manager for new media, sees this as allowing for better convergence between the Web and the airwaves.

"We are really excited about the possibilities opened up by digital systems like Dalet. It may make it very, very simple to grab news audio almost automatically, encode it and post it to our Web site," he said.

■■■

Earlier articles in the Transition to Digital series reported on projects at Minnesota Public Radio and Radio Free Asia.



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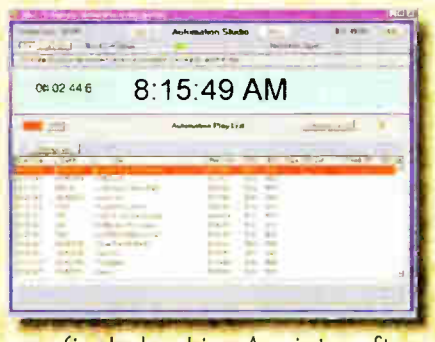
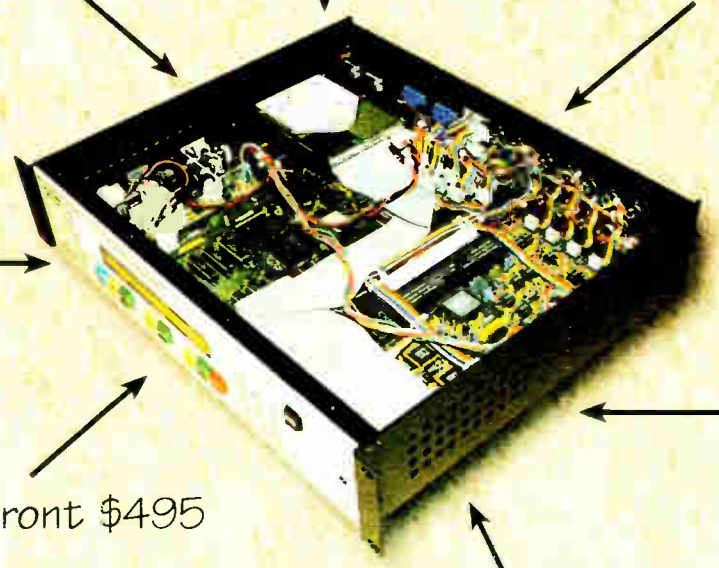


(includes Live Assist software)

Cart Machine Control
$750



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Circle (134) On Reader Service Card

GM Journal

Radio World — Resource for Business, Programming & Sales — November 25, 1998

Computer Radios
Page 38

MARKET WATCH

San Fran Radio's Offbeat Appeal

Bill Mann

San Francisco draws more tourists than any other city in large part because of its offbeat appeal.

Cable cars? In most cities, they would have been replaced by buses decades ago. When Ronald Reagan was winning landslide victories, guess which city voted against him both times?

And when it sizzles in the rest of the country, the average July high temperature in foggy San Francisco is a mere 65 degrees.

The scenic "City by the Bay" is unquestionably an odd duck, so it shouldn't surprise anyone that the No. 4 radio market in the country is much the same.

San Francisco Radio Snapshot

Market Rank: 4
Revenue Rank: 4
Number of FMs: 24
Number of AMs: 20

Estimated Revenue:
1994: $197,200,000
1995: $214,200,000
1996: $238,100,000
1997: $265,000,000
1998: $286,200,000

Revenue Growth:
'91-'96: 6.7%
'97-'01: 7.7% (est.)

Local Revenue: 71%
National Revenue: 29%

1996 Population: 3,349,400
Per Capita Income: $19,296
Median Income: $44,173
Average Household Income: $53,003

BIA RESEARCH *Source: BIA Research*

Radio managers can throw out many of the rules because they simply don't apply here.

The oddity that stands out most is the dominance of AM radio here in an era in which FM rules virtually every market.

"This is the most dominant AM large market in the country," said all-news KCBS(AM) News Director Ed Cavagnaro.

K101 101.3 FM

In the summer Arbitron ratings, five of the top 10 rated stations were stand-alone AMs.

One station, Chancellor-owned KABL(AM), is a music operation. Three 50,000-watt AMs — KGO, KCBS, and KNBR — controlled a whopping 30 percent of the market which BIA estimated at $265 million in revenue last year.

Embedded metro

The reason is largely, but not only, the terrain. There are mountains surrounding San Francisco on three sides. In this "embedded metro" that includes three major cities (San Francisco, Oakland and San Jose), the hilly topography plays havoc with most FM signals.

It was south of the city that cable TV first appeared in the early 1950s — again, because of signal problems, in the Santa Cruz Mountains.

"Even if you have your stick on top of a mountain," said Ron Castro, general manager of country station KRPQ(FM) (Q-105) north of San Francisco, "the next big mountain stops you."

Underlining AM's dominance is the fact that the top-rated station for the past 20 years here has been ABC/Disney-owned news/talk giant KGO(AM). That's 80 straight books, an unprecedented winning streak for a top 10 market station.

"After Disney came in, they replaced their major-market general managers save one," said Chester Coleman, a spokesman for San Francisco-based American Radio Brokers. "The lone survivor was Mickey Luckoff."

San Francisco Skyline by Night

Luckoff, a Detroit native, has run the

KCBS ALL NEWS 74

large news/talk station (which carries the 49ers games) for over two decades and said of his remarkable winning streak, "We have the right format for the right area. We have the most highly educated listeners in the country. They're very news-oriented. They want to talk about the issues of the day."

San Francisco radio sales are expected to grow a whopping 20 percent this year. "Radio is flourishing here," Luckoff said. But the KGO general manager adds that "it's much harder to match that 20 percent growth when you're the top-billing station in the market." (BIA estimates revenues at KGO last year were $32 million with Giants' flagship station/Rush Limbaugh carrier KNBR(AM) second at $28 million.)

Add to the typography the eclectic tastes and ethnic diversity of Bay Area listeners to further confuse things.

San Francisco's National Public Radio affiliate, KQED-FM, gets decent ratings, the highest of any public radio station in the country.

Leftist Pacifica non-commercial KPFA(FM) in Berkeley has such a powerful signal that General Manager Pat Scott said she's been offered $65 million by commercial operators for it and has refused.

Over in the "People's Republic of Berkeley," a pirate station, Free Radio Berkeley, is off the air while its operator, Stephen Dunifer, battles the FCC in court.

Forty miles north of San Francisco in Santa Rosa, a pirate jazz station still operates freely.

It's all rather nonconformist.

Even trying to figure out the market's ethnic breakdown is complicated. Arbitron said African-Americans constitute 10.8 percent of listeners and Hispanics 16.9 percent, but, as Castro, himself Hispanic, said, "Within that

See MARKET WATCH, page 44 ▶

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Circle (160) On Reader Service Card

World Radio History

ONLINE RADIO

Getting the Signals on Your PC

Kim Komando

"Radio is radio, and computers are computers, and never the twain shall meet."

Thanks to the Internet, that statement is no longer true. Technologies like RealAudio now allow Internet users to listen to radio content from around the world.

However, you can't really listen to radio on the Internet — only the content from stations that opt to put their programming online.

If you really want to hear whatever is on the radio on your personal computer — no matter if the source is shortwave, AM, FM, local police, fire, marine, aircraft or emergency signals — you're going to have to invest a few dollars in some additional hardware.

One device that literally puts a wideband communications receiver right into your personal computer is the WiNRADiO WR-1000 receiver, from Rosetta Laboratories.

The WiNRADiO receiver is available as an external device, the WR-1000e, which connects to your computer through one of its communications ports, or as a 16-bit ISA expansion card, the WR-1000I, which sits inside your computer.

Both models sell for about $400.

If you are comfortable installing expansion cards in your computer, setting up the internal WiNRADiO receiver is relatively simple.

You install the card, run a wire from the audio output on the card to the input port on your sound card, run the provided antenna wire from the card's antenna port up the wall or out the window or wherever, and install the software.

The software runs on Windows 3.1, Windows 95/98 or Windows NT. You can be enjoying radio on your personal computer within 15 to 20 minutes.

The WiNRADiO can pull in frequencies ranging from 500 kHz to 1.3 GHz in four modes: AM wideband FM, narrowband FM and SSB (single side band). The U.S. version locks out cellular frequencies.

Of course, there are freestanding radios designed that serve the same purpose. The question is: Why bother trying to adapt your personal computer to be a wide-band communications receiver? The basic answer is ease of use.

First of all, controlling the WiNRADiO from within the supplied software is mostly a point-and-click proposition. You click to change sensitivity, squelch, volume, mute, memory, etc. You can also point and drag to turn an on-screen tuning dial.

The ICF-SC1PC Radio Frequency Scanner by Sony

However, if you already know the frequency you want, you can just start typing it in on your keyboard's numeric keypad.

The software is smart enough to know that you're typing a frequency and changes it to whatever you typed when you press the "enter" key.

Suppose, though, that you don't know what frequency you want. You have a couple of options.

First, you can use the frequency scanner, which works much like the scan button on any digital radio. One difference here is that you can specify the size of each step in the scan.

Your second option — one that can be lots of fun — is to use the software's built-in spectrum scope.

The first step is to specify a starting frequency, an ending frequency and a step size. Then click the Sweep button and the spectrum scope starts scanning the range you specified, charting the entire range right before your eyes.

Click on one of the spikes on the chart and the receiver automatically switches to that frequency.

You can save each sweep as a separate file that you can reopen later. You can save settings into files for easy recall. If you ever get confused, an online help system is a mouse-click away.

The printed manual provides basic instructions for writing your own application programs to interface with the WinRADiO.

After you find the station or signal desired, you can minimize the application and listen to the radio while you are doing other computing.

If computer memory is tight, you can quit the application. As long as you don't turn off the radio first, it will continue to play through your speakers.

The only real drawback to the WiNRADiO is that it relies entirely on your personal computer for operation.

The external version connects to your computer through a PC Card interface, meaning it's easy to take on the road with your laptop. However, there may be times that you want to fire up the radio without firing up your computer.

For those occasions, consider Sony's ICF-SC1PC radio frequency scanner. This is essentially the same unit as Sony's ICF-SC1 scanner, with one important difference. The "PC" in the product name (as you may have guessed) stands for personal computer.

That means in addition to all the functions of the non-PC unit, this one has a port that lets you connect the scanner to your personal computer and control and program it through software provided by Sony.

In addition to its portability, the ICF-SC1PC offers a few advantages over the WiNRADiO. For example, the unit itself offers one-button access to police, air, fire and other emergency frequencies.

The CD-ROM that comes with the Sony also includes a database of over 3 million frequencies that can be received in the United States.

However, the software as a whole is not as robust as that of WinRADiO, and it would not be a stretch to flat-out call the software lame.

For example, say you want to find the emergency frequency in your hometown. The database window pops up and highlights the listing. But then it's up to you to go back to the original window and type that frequency in.

In addition, using the software to program the ICF unit is more difficult that it needs to be. While the Sony unit can receive AM and both types of FM signals, there's no option for SSB.

Like the WiNRADiO, the Sony unit will set you back about $400. That's about $100 more than the non-PC Sony version.

At about $400, if all you want to do is listen to rock and roll while you're banging away in Microsoft Word, you're better off spending $20 on a cheap radio and propping it up next to your computer.

However, if you are a serious radio hobbyist or need instant access to the latest news from numerous sources, either one of these devices can open up a new world of flexibility and ease of use.

For More Info

For information on the WiNRADiO WR-1000 receiver from Rosetta Laboratories, call (800) 438-8155 or visit *www.winradio.com*

For information on Sony's ICF-SC1PC, call (800) 883-6817 or visit *www.sony.com*

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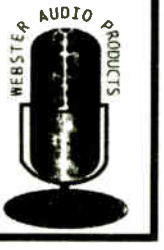

Circle (212) On Reader Service Card

World Radio History

How much are eight miles worth ?

Plenty, if you are a AM broadcaster. What if your station could get out another eight miles of coverage? What would it be worth to you? The audio processing that you use plays a big part in the coverage of your station. Are you getting all the coverage area that you can ?

New audio processing from CRL can maximize the coverage area of your station. Our tri-band Limiter design delivers extra sideband and modulation energy to your listeners' radios. Our patented NRSC-1 filtering gives you the tightest peak control of any processor on the market. The result is an average of eight miles of additional coverage area compared to older processing equipment (average at 1200 kHz with 1 Kw power).

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New Coverage Area

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Old Coverage Area

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Is the Net Making You Money?

Craig Johnston

Radio should do a better job at producing revenue from its Internet presence.

That was one of the themes of a session at The NAB Radio Show devoted to making money from the Internet. The panel drew a standing-room crowd.

The most repeated piece of advice about radio's Net component: "Don't give it away."

When combining an Internet angle with a solicitation for an air buy, Intervox Communications President Peggy Miles said, "make the Internet part value-added."

To prove the Internet is worth something, Miles cited several examples. One radio station sent e-mail to members of its Cyberclub reminding them of an over-the-air promotion at a local car dealer. The dealer sold twice as many cars as during previous such promotions that lacked an Internet component.

Miles detailed three ways of making money on the Internet: advertising, database marketing and electronic commerce.

Advertising uses the banner ads on a station Web site. A click on the banner ad sends the visitor to more information about the advertiser and their products.

Internet business

Database marketing is the practice of e-mailing special offers and information to a list of station site visitors. E-mail addresses can be gathered by forming clubs or through contests. Audio commercials can be attached to the e-mail for downloading by recipients.

E-commerce means completing transactions over the Internet. As an example, Miles cited the sale of music, of either physical media, in the form of CDs, or of downloads to a customer who has paid for them.

Miles sees a growing Internet business for radio stations. She cited e-commerce research that predicts the current $64 million of annual Internet transactions will grow to $750 million by 2002.

Dave Casper of the Radio Advertising Bureau recalled telling the general manager of his station five years ago that the Internet "is kinda complicated. I don't think it's going to go anywhere."

Casper sees the on-line presence of adults increasing fourfold by 2002, to more than 100 million. The demographics are rich, with more than half of those adults between the ages of 25 to 44. And household income for those online is 131 percent more likely to be more than $100,000 than for the population in total.

"Selling Internet and radio are two entirely different things," Casper noted. "Sales staffs must be able to establish a comfort level talking about the terminology, the reasons to use the Internet and marketing approaches that can work for the client."

Toward that end, RAB places Internet sales training materials on its site (*www.rab.org*). In order to help salespeople understand the Internet, it put training tips, news about the Internet and examples of Internet radio sales packages and promotions.

Peggy Miles looks at the Internet as a station's bet on the future.

"Younger people who didn't have dial phones growing up, who may not have fax machines in a few years, they want something when they want it. And the Internet allows them to get the radio — or maybe they hear it in regular terrestrial broadcasting, but it allows them to get information (from the Internet) at the same time."

An Online Radio User Profile

Craig Johnston

A surprising number of radio listeners are tuning in on the Internet, according to new research. That's one of the findings of a study about radio and the Net done by Arbitron and Edison Media Research.

Arbitron also said it will begin to measure Internet audio listening.

Pierre Bouvard, executive vice president of Arbitron, and Larry Rosin, president of Edison Media, presented "The Impact of the Internet on Radio" at The NAB Radio Show in Seattle.

Bouvard and Rosin said they had expected to find that 1 or 2 percent of Americans who use the Net would have tried listening to radio online. Instead, The Arbitron Internet Listening Study registered an impressive 19 percent figure.

Among several other important findings: Visual images that accompany online radio present a new marketing portal for radio.

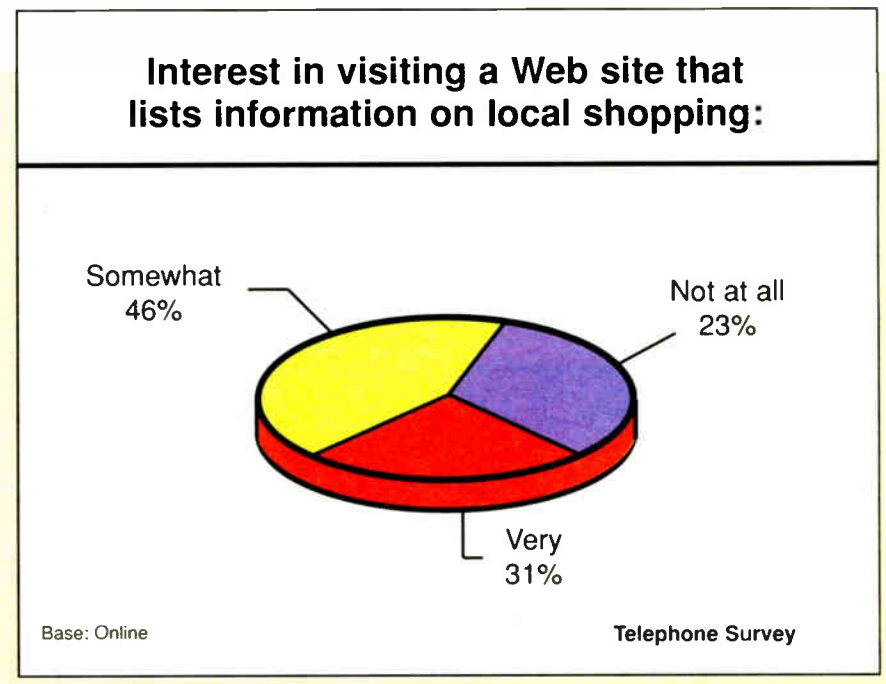
Rosin and Bouvard said the Internet allows stations to supply advertiser coupons, display the products and provide more details about them. Even better than television, they said, the Net lets advertisers sell directly through interactive multimedia techniques.

Adjusted to include those who have never gone online, the study found that 6 percent of all Americans have listened to radio over the Internet.

The sponsors expect this figure to grow rapidly. As reasons, they pointed to the ever-growing universe of PC owners and users, technological developments to make Internet radio listening easier, and recent news from America Online.

AOL announced it will include the

See INTERNET, page 42 ▶



The Arbitron Internet Listening Study shows level of interest in local shopping online.

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Steve Densmore
Manager of Operations for ABC Radio Networks
Washington DC

"It's mature technology. It's stable. We like the software functionality."

Steve Densmore
Manager of Operations for
ABC Radio Networks, Washington DC.

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Mike Silverstein, Assignement Editor,
ABC News Radio, Washington D.C.

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Finally, with Dalet's easy-to-use interface your staff will be operational in no time.

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Consolidation can generate huge productivity gains, provided groups have the right tools. Dalet is continuously developing new solutions to meet the evolving needs of our clients. With TeamRadio – Dalet's traffic and billing software – the business of over 1000 radio stations can be linked together. Intranet applications allow stations within a group to access each other's orders and audio remotely.
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Dalet is a service-driven company. With more than 70 engineers, we assure that your station stays on the air.
Dalet's support experts are on call, 24 hours a day.
Clients have on-line support over the Internet.
We can also provide on-site visits to upgrade an existing system.

"It's almost like the Maytag repairman, we don't really call them that much. But when we do have problems, they respond right away." Steve Densmore

THE WORLD STANDARD

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Circle (83) On Reader Service Card

World Radio History

Net Radio Listeners Receptive

▶ INTERNET, continued from page 40

RealNetworks audio and video streaming technology with its standard package, adding up to 13 million potential new Internet radio listeners.

Encouraging news

While the ability of Internet listeners to access stations from around the world might seem to spell the doom of local stations, the survey turned up an encouraging statistic.

"First and foremost," it stated, "listeners report that they would be interested in listening to their P1 (the one they listen to the most) station online, a figure of 60 percent."

That was eight percentage points ahead of the second most favored preference, which was listening to other local stations.

Answering the question of who is most likely to go online, the survey found a wide variance by format. Most likely to go online were alternative or oldies station listeners, least likely were Spanish or country listeners.

One in four online Americans reported visiting at least one radio station Web site. Topping the list of what they wanted from station Web sites was community event and concert information, at 60 percent. Trailing all responses was DJ information and photographs, at 23 percent.

Between those extremes were responses that could translate into new revenue streams for radio stations. The report states, "Half said they would be interested in being able to actually see the products and services of the radio station's advertisers. About 40 percent express interest in being able to print out coupons from the radio station's advertisers."

Visual radio ads

"Over the years, one of the perceived drawbacks of radio station advertising has been its lack of visuals. Perceptual studies conducted by Arbitron of agency media planners and major advertisers have confirmed this perception," the study found.

"Half of all online Americans are interested in visiting a radio station Web site to see and visualize the products and services of station advertisers.

"Thus, the Web provides an opportunity for radio to overcome one of its biggest perceived weaknesses: not being able to see the products and services of its advertisers."

The danger to radio stations, the report stated, is to ignore the Internet. Greg Verdino, vice president and general manager of Arbitron Internet Information Services, announced that Arbitron will begin to measure Internet audio listening. He also reported the formation of a streaming industry measurement coalition.

The Net survey will be repeated next year.

A summary of the Arbitron/Edison Research survey is available online at *www.edisonresearch.com.*

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Marilyn Parker, Traffic Manager, KZTR FM, Bryan, TX

"It's easy to operate and all of the operations are done so quickly. It saves so much time."
Bob Woodman, General Manager, KVIC/KPLV/KAMG Radio, Victoria, TX

"We like the Windows® application. It's much more user-friendly."
Jerry Rogers, General Manager, WRHQ, Richmond Hill, GA

"I've done traffic for about six years and this is my fourth software for traffic. V.T. is just unbelievable. It's a phenomenon."
Dayna Perry, Traffic Director, KXKC/KNIR, New Iberia, LA

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Circle (109) On Reader Service Card

Jones Promotes Tharp, Trainor

Jones Radio Network has announced a pair of promotions.

Michele Tharp has been named marketing manager, while Shelly Trainor has been named to the position of special events planner.

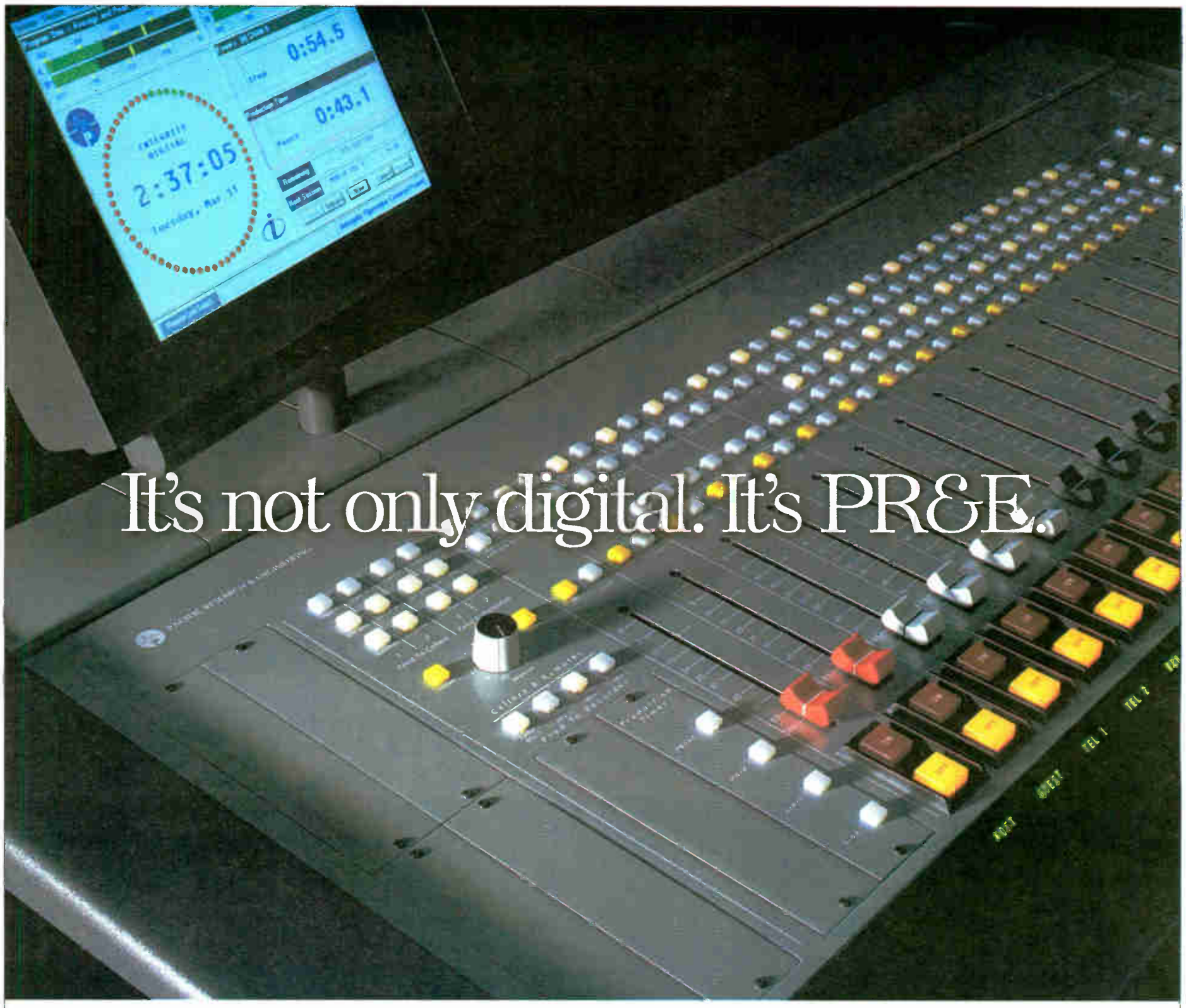
Michele Tharp

In her new position, Tharp is responsible for guiding the marketing and promotional efforts for JRN.

Trainor, who has worked for the company for more than seven years, is now responsible for the coordination of all aspects of the company's convention presence. Trainor also implements JRN promotional efforts and plans special events and company meetings.

Shelly Trainor

World Radio History



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PACIFIC RESEARCH & ENGINEERING

Circle (135) On Reader Service Card

World Radio History

Frisco Features Free-Spirited Radio

▶ MARKET WATCH, continued from page 37

group you have Mexicans, you have Nicaraguans, and so on." He speculates that around the country a generalization is applied to ethnic groups. "In New York, 'Hispanic' means pretty much one thing — Puerto Rican," he said.

The Asian market — Arbitron doesn't break out its figures — is larger in the San Francisco market than anywhere else

Rosie Allen is the afternoon news anchor at KGO(AM).

in the nation and managers agree it's even harder to pinpoint.

Brent Osborne, veteran general manager of Chancellor-owned AC station KIOI(FM) (K-101), said, "We have a high Asian population which we want to serve. But you have Japanese, Filipinos, Pacific Islanders, Vietnamese, Mandarin-speaking Chinese, and Cantonese-speaking Chinese.

"The Asian market is large, you have to be sensitive to it. It also has a high median income."

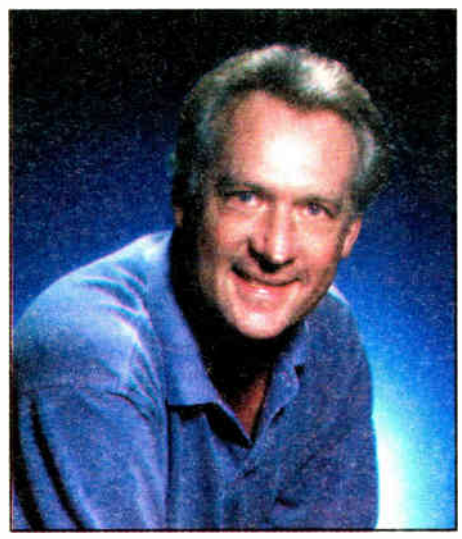
There has been some call-letter confusion recently. The historic call letters, KSAN, were established when it became the first album-rock station in the country during the Haight-Ashbury heydays.

In the past year the call letters KSAN have gone from being used on a Chancellor-owned country station at 94.9 to Susquehanna's classic-rock station at 107.7 as part of the ownership/frequency switch.

Urban/dance, KSAN(FM) (Wild 107.7) has become Chancellor's Wild 94.9, now the top-rated music station in the market. (Country hasn't done well in this market recently, another anomaly).

KIOI(FM)'s Osborne pays the highest salary in the market, $500,000 a year, to veteran morning man Don Bleu, calling him "a unique performer."

KCBS' Cavagnaro said CBS's recent



Don Bleu is the highest-paid personality in the San Francisco market.

decision to move Howard Stern into the market is already having a major impact on morning drive. Previously, it had only aired on CBS-owned KOME(FM) down south in San Jose, but now Stern is also on San Francisco's KUFX(FM) (Live-105).

"Before, on KOME, Howard could barely get into San Francisco and north. In the summer book, he was No. 2 in morning drive in key demos," Cavagnaro said.

Liberal Bay Area

Four big groups are the major players in the market: CBS, Chancellor, Susquehanna (which owns KNBR and KFOG(FM), among others), and Bonneville, whose KOIT-AM-FM is the dominant AC in San Francisco, beating out K-101. Bonneville's classical KDFC-FM is also a top 10 station, another oddity.

Figure this one out: When Disney took over the hugely successful KGO two years ago, it also acquired the only other major talk station in the market, conservative sister station

See MARKET WATCH, page 45 ▶

San Francisco
Radio Market Overview

Stations	Owner	1998 Est. Station Revenue in $mil	Format	Spring 1998 12+
KGO(AM)	ABC Radio	32.0	News/Talk	6.6
KYLD(FM)	Chancellor Media	10.0	CHR/Dance	4.7
KCBS(AM)	Infinity Broadcasting	20.0	News	4.5
KOIT-FM	Bonneville International	15.0	Soft AC	4.5
KNBR(AM)	Susquehanna Radio	28.0	Sports	4.4
KMEL(FM)	Chancellor Media	15.0	CHR/Dance	3.5
KIOI(FM)	Chancellor Media	17.0	AC	3.1
KSFO(AM)	ABC Radio	5.5	Talk	3.1
KZQZ(FM)	Bonneville International	1.6	CHR	3.0
KISQ(FM)	Chancellor Media	5.6	Adult Hits	2.9
KABL(AM)	Chancellor Media	2.7	Nostalgia	2.8
KKSF(FM)	Chancellor Media	1.3	NAC	2.8
KFRC-FM	Infinity Broadcasting	1.3	Oldies	2.8
KDFC-FM	Bonneville International	4.0	Classical	2.7
KBLX-FM	Inner City Broadcasting	11.9	AC	2.6
KFOG(FM)	Susquehanna Radio	17.5	Alternative	2.4
KITS(FM)	Infinity Broadcasting	9.3	Modern Rock	1.9
KSAN(FM)	Susquehanna Radio	3.0	Clsc Rock	1.6
KYCY-FM	Infinity Broadcasting	5.0	Country	1.6
KBRG(FM)	EXCL Communications	3.1	Spanish	1.1
KSOL(FM)	Heftel Broadcasting	4.2	Spanish	1.1
KNEW(AM)	Chancellor Media	1.4	AC	0.8
KLLC(FM)	Infinity Broadcasting	9.0	AC	0.8
KFRC(AM)	Infinity Broadcasting	3.0	Oldies	0.7
KIQI(AM)	Radio Unica	1.8	Spanish	0.6
KKIQ(FM)	Alta Broadcasting	2.6	AC	0.6
KFAX(AM)	Salem Communications	N/A	Religion	0.5
KZSF(FM)	Jacor Communications	1.0	AOR	0.5
KMK(AM)	ABC Radio	1.4	R&B Oldies	0.4
KTCT(AM)	Susquehanna Radio	3.5	Sports	0.4
KKHI-FM	Mt Wilson FM Broadcasters	.9	Classical	0.4
KDIA(AM)	Baybridge Communications	N/A	Urban/Olds	0.4
KZOL(FM)	Heftel Broadcasting	.8	Span/Urban	0.3
KOIT(AM)	Bonneville International	.5	Soft AC	0.2

Stations are ranked in order of Arbitron Spring '98 12+ ratings. *Copyright 1998 The Arbitron Company. May not be quoted or reproduced without the prior written permission of Arbitron.* *Other information provided by BIA Research through its MasterAccess Radio Analyzer Database software.*

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World Radio History

▶ MARKET WATCH, continued from page 44

KSFO(AM), now a top 10-rated outlet.

KSFO's steady climb in the ratings in the politically liberal Bay Area (some here only semi-jokingly call it "Reichstag Radio" and "Seig Heil on Your Dial") is another indicator of the unpredictability of local radio audiences.

Few programmers had predicted a conservative station would thrive in heavily Democratic San Francisco.

KCBS Morning Team: Susan Leigh Taylor, Al Hart, Steve Bitker and Ron Lyons

Cross-promotion

Jack Swanson, operations manager of both KGO and KSFO, said, "I want these two stations to be direct competitors, to hate each other's guts. I don't want a sham competition."

KGO/KSFO General Manager, Luckoff confirmed, "We do very little cross-promotion on the two stations."

While cross-promotion may not occur between the two stations, it does occur in other areas of the organization.

Peter O'Brien, general sales manager of CBS' oldies station, KFRC-AM-FM, said KGO has benefited for years from having cross-promotional opportunities with ABC's large KGO-TV in the Bay Area, but KFRC and KCBS now cross-promote on CBS-owned KPIX-TV in San Francisco — plus, KFRC and all-news KCBS cross-promote on each other's air.

O'Brien said the fractionalization of TV has helped radio. "There are a lot more cable stations now, but the number of radio stations here has stayed the same. Charles Schwab, among others, is now buying radio for the first time."

O'Brien said that the San Francisco sales market is booming. "We get a lot of computer accounts, since Silicon Valley is so close," he said.

KCBS General Sales Manager, David Bramnick said his acclaimed, Peabody-winning station which is often No. 2 in 12-plus to KGO, is also getting lots of computer-related business.

KCBS is also doing cross-promotion with CBS Marketwatch and Bloomberg Financial in this high-tech mecca.

"This business has changed radically in the last five years," said Bramnick. "You have to do more than manage people. You have to have creative ideas and products for your people to sell.

"Consolidation has made the stations here better competitors. We have better operators, and that's led to greater rate pressure in the market."

KGO's Luckoff said, "Years ago, I predicted one day we'll all have twos in Arbitron. We're getting closer to that. We're getting more strong competition. Radio has really come into its own, thanks in part to the fractionalization of TV. Plus, we don't have to compete with the high Internet use here as much as TV does."

Luckoff said that when Disney took over the market's dominant station, "They did not exert any editorial interference. But they asked a lot of questions" about his successful operation — "just like I would have done."

Taking chances and not staying static is one of the keys to his remarkable 20-year success run.

After deftly snatching Dr. Laura Schlessinger away from a now-defunct competitor two years ago, Luckoff penciled her in for only one hour a day.

"I agonized over that," he said. "KGO has ingrained the newstalk format in its large listener base."

He and KGO had always eschewed syndicated shows in favor of local talk hosts. The only syndicated show he did run was Dr. Dean Edell—"but Dean does his show here at KGO and it's more like a local show," he said.

When Luckoff shuffled his lineup to use all three daily hours of Dr. Laura last year, he admits, "I agonized even more. But she's the 500-pound gorilla right now."

And over a 20-year stretch, few of Luckoff's major calls have been bad ones. San Francisco is a tough market to figure in many ways and Luckoff has had better success at it than anyone.

■ ■ ■

Bill Mann is a syndicated radio/TV/newspaper columnist and has been covering Bay Area radio for 15 years. Reach him c/o RW.

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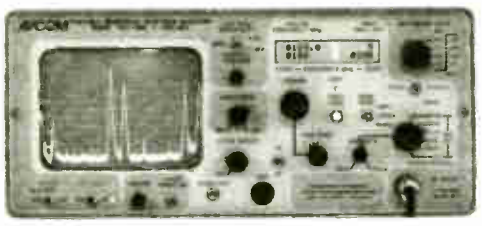

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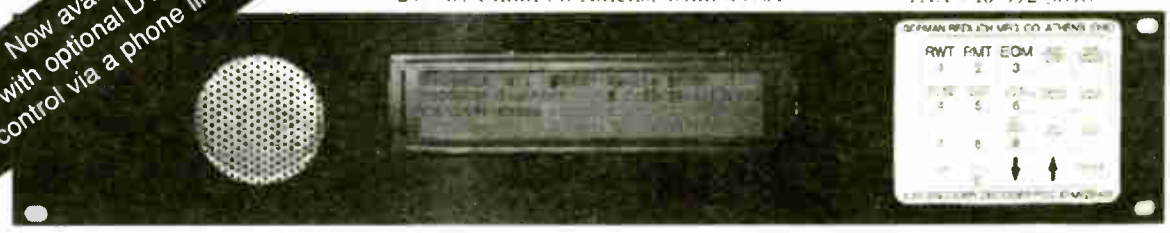

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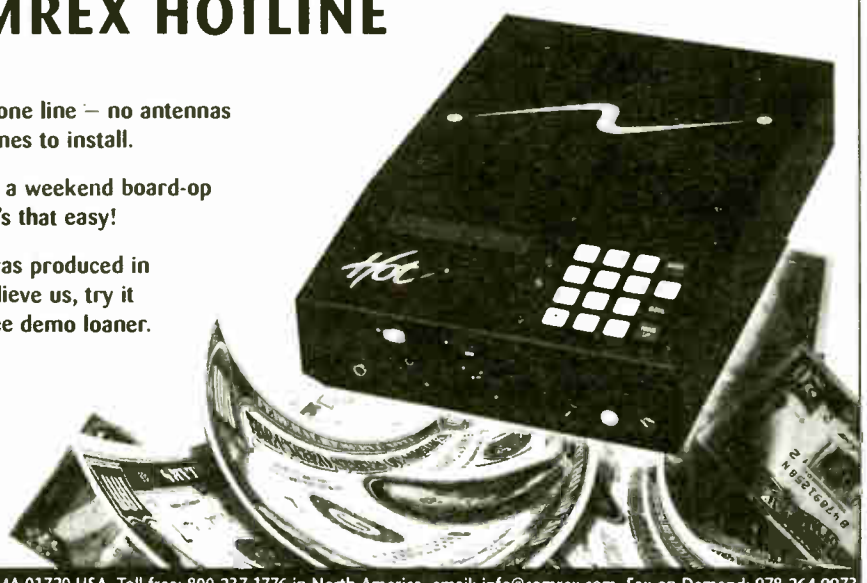

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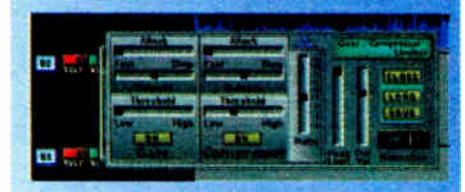
World Radio History

Studio Sessions



Processing Tips II
Page 49

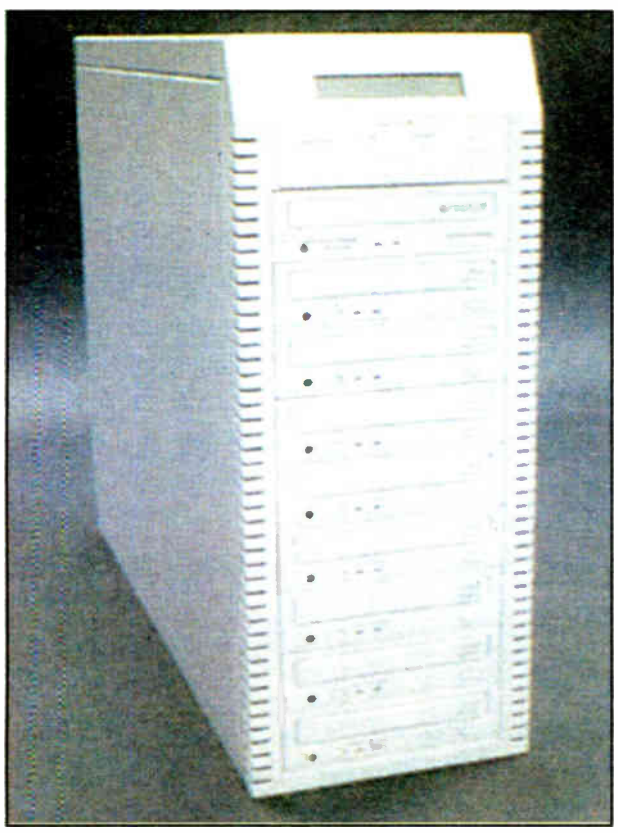
PRODUCT EVALUATION

MediaFORM: CD Burner for Radio

Bruce Bartlett

Stations are enjoying the advantages of recording CDs in-house for archiving spots and authoring discs for sales demos. For desktop CD production in volume, the Media-FORM CD-5900 PowerPro standalone CD duplicator is worth considering.

Load some blank media, hit a few buttons and the CD-5900 will duplicate up to eight CD-Rs at once in less than 18 minutes. By slaving additional units, the system can burn up to 64 CD-Rs in the same time.



MediaFORM CD-5900 CD Duplicator

The PowerPro requires no host computer, as it is a standalone device. Still, with its PC tower case full of CD-ROM drives, it *looks* as if it is a computer. In its single chassis are eight 4x CD-R drive bays, an LCD display and a keypad.

On the back panel, AC power connectors, an On/Off switch and connectors for an optional autoloader, slave unit and SCSI output can be found.

What's on the disc?

The unit can perform an at-once burn to multiple CD-Rs or transfer incoming audio or other data to an internal hard disk drive. If a CD is the program source, there is no need to wait for the program to copy an image to a hard drive. An image file can be copied to the built-in hard drive while copying the first set of discs.

The CD-5900 automatically detects the format of the program source. Press a few buttons, and the unit immediately copies from the master to the slave drives.

The PowerPro can do a byte-for-byte comparison of two CDs, but only CD-ROM Mode 1 and CD-ROM XA Form 1 discs. Other formats lack the error control needed for full verification.

If a station's needs require a standalone CD burner more than a mass duplicator, there is the optional Easi-DAT add-on. This lets a user copy a DAT tape to the internal hard drive, then duplicate CDs from that soundfile.

Start IDs on the DAT tape are automatically converted to program numbers on the finished CDs. A three-second countdown pre-gap is added before each CD cut. Note this gap is not a blank space, but is a countdown that can be viewed on the CD player counter.

For flexibility with other studio equipment, the Easi-DAT module comes with S/PDIF and AES/EBU connectors, and TOSLINK optical connectors. If you absolutely need to transfer DAT start IDs, only the S/PDIF protocol will do so.

With the Easi-DAT option, it is possible to add or remove start IDs and shift them in time, delete or fade out selected tracks and trim out silent passages at the end of tracks.

Jaz, Zip and Syquest removable media are becoming more popular with digital audio equipment. The CD-5900 provides an open bay for internal or external drives or a Plextor CD-ROM drive.

Need more than eight discs burned in a

See CD, page 52 ▶

PRODUCT EVALUATION

Alesis LX-20: ADAT Production for Less

Rick Barnes

The LX-20 is a new spin on the now-classic Alesis digital recorder and you will have a lot of fun with it.

This is an eight-track digital audio recorder that records and reproduces crystal-clear sound. In a 3-RU space, the LX-20 provides the recording capabilities that a professional multi-track production room or home studio would need.

Alesis LX-20: ADAT production just became a lot more affordable.

As with earlier ADAT models, the LX-20 records on VHS videotape, the reason for its compact size. More specifically, Alesis recommends using S-VHS tape for the best audio results. S-VHS tape has the necessary bandwidth for eight-track recording. S-VHS cassettes also are more durable than standard VHS tapes so they can handle shuttling and threading with greater ease.

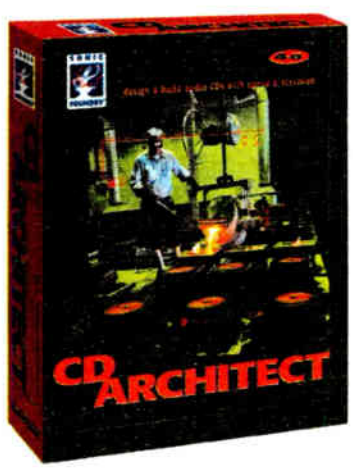
The medium

An S-VHS 120 tape will provide about 40 minutes of record time on the LX-20. ADAT-specific tapes are available from numerous companies, including BASF, Quantegy and others.

The testing site for the LX-20 was the home studio of Mike Richardson, assistant production director for WKYS(FM), WMMJ(FM), WOL(AM) and WYCB(AM).

Mike has a full professional studio at his house where he produces commercials for several Washington-area agencies and has helped on other **RW** product evaluations. He has a Tascam eight-track reel machine

See ADAT, page 50 ▶



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SONIC FOUNDRY

Circle (213) On Reader Service Card

World Radio History

The Anatomy of a Product Review

Rich Rarey

As regular **RW** readers know, contributors are called upon at one time or another to take temporary possession of professional broadcast equipment and write a review based on their experience using it.

We are no exception here at *Public Domain*. Equipment has regularly crossed our desk over the last four years, and we have exercised it to reveal its strengths and weaknesses.

In reading reviews in this newspaper, one may wonder why there are no out-and-out bad reviews. Truth be known, we have wondered that ourselves, until we realized that known shoddy or poorly made equipment is never passed to a reviewer.

Junk alert! Junk alert!

When the occasional piece of junk makes it to our desk, we rail and complain bitterly to our editors, who in turn ask the manufacturer if they are really sure that they would want such close scrutiny on their inadequate equipment. A sensible manufacturer will actually ask for private constructive criticism to improve their product. Other manufacturers quietly withdraw their equipment from consideration.

By definition, the equipment we receive for review has some merit for some user. Sometimes the user most suited to the equipment might not be a broadcaster, but rather community theater groups, amateur musicians, church groups, extremely small production houses or other people wanting to reproduce sound. The demands of professionals are of course more stringent than the "others," and this is taken into account when a manufacturer promotes a product for the professional audio community.

In the past, **RW** readers have clamored for us to tell them what we *really* thought about a piece of equipment. These e-mails are confounding because there is absolutely no profit in pulling punches when writing about products, and all the experiences, good and bad, are in every review.

It is hardly constructive to slam the equipment, because a feature considered by one person to be "lame-o" is invaluable to another. Review writing should plainly say, without undue excitement, the flaws and troubles one experienced with the product — however, you may have to read the review carefully because those flaws generally are not pointed out *in slanted italic words with **stars** around them.*

Here then, as a public service of *Public Domain*, we present an actual equipment review, annotated for your reading convenience. By the way, don't rush out to buy this product, even if your application is suited for it. It has not been manufactured for nearly 60 years.

The great review

The RCA Victor Division of the Radio Corporation of America has introduced a mid-price line of AM/Public Band/Short-

How does one write a fair product review about a 60-year-old radio?

wave radios that will be welcomed by the city-dwelling radio listener who needs only simple, not-loud, performance in his wireless.

The first clue that the product is not for everybody. Further reading will reveal why we think this radio is for city people.

We set up the review with a quick overview, then tell you the features, then how we used those features in practice.

The Model 86 and Model 87 series comprise both table radios and floor models, all with the same basic seven-tube complement and all AC powered using superheterodyne regeneration in their front end. Our evaluation model, the 86T, is a table radio with a handsome wood case that makes an arc, rather than a sharp turn, on the speaker side.

"Our" and "we" refers to the lonely reviewer, who yearns for a large office staff. Some editors drop the "we" in favour of "I." These editors are the same people who strike out the "u" in "favour."

Tuning in

The tuning dial is framed in bakelite, and is clearly labeled with the three frequencies. The dial is rear-illuminated by a single lamp. Three controls greet the Model 86T user: a power-off/EQ control, a volume control and a band selector with a concentric tuning knob. Simply turn the power knob to either "bass" setting or "treble" setting, allow the tubes to warm up, and you are ready to listen to radio.

Huh? Do you have the equipment visualized in your mind's eye after this description? Neither did we. If a front panel from old equipment takes this much time to explain, imagine what must be done for modern equipment. Let's hear it for accompanying photos!

The rear panel of the 86T has the standard screw posts for ground, antenna and a third post with metal jumper that shunts an attenuating 150 pF capacitor across the antenna input when the 86T is set for standard broadcast. The service manual says this is to reduce interference from a strong local broadcasting station.

We couldn't figure out what this thing was for, and finally had to open the manual.

A second set of three screw posts presents the output of the second-stage detector/AVC tube, the input to the audio voltage amplifier tube, and chassis ground.

If desired, the metal jumper connecting the radio portions may be slid away, and a suitable high impedance source — such as the RCA B67 record player — may be connected to the audio tube's input.

We could not believe a radio this old would have a feature like this, but a placard on the back chassis told us it did.

The 86T volume control is just after this input. When inserting audio in this way, the metal jumper is designed to be slid to the ground post, effectively terminating the second stage output to minimize crosstalk.

By the book

For this review, we had the benefit of the service manual. Most equipment is supplied with operating instructions only, and some are sketchy at best.

The bass and treble control is nothing more than switching a .017 µF from one side of the speaker primary transformer to ground. The published specs call for a maximum output of 4.5 watts, and an "undistorted" (nominal) output of 2.5 watts into the electrodynamic loudspeaker.

One for the old-timers: The speaker is not a permanent magnet type. Power is needed to magnetize the field around the coil. Isn't it difficult not to smirk at the specs from a 1998 vantage point?

In actual use, we found the Model 86T easy to use and understand.

Or in other words, we are trying to say what we liked about the equipment first. Then *we will trash it if need be. We try out every feature we mention, unless we say otherwise.*

We connected an exterior wire to the antenna terminal for our tests. The 86T's performance though, compared to any radio built by the Zenith corporation, was poor.

You don't see this every day: a comparison of performance to other devices we knew from experience, and speaking

See REVIEW, page 52 ▶

World Radio History

Apply Vocal Touch-Up Techniques

Keith Spencer-Allen

Part II of III

When it comes to vocals — such as liners, station announcements, commercials and voice-overs — some broadcasters prefer a larger-than-life sound that "fills" the radio.

But if certain vocal characteristics are to be emphasized, they must be present in the original vocal signal to begin with. As of yet, we cannot add something to a voice that is not there; however, vocal balance can be altered to a great extent.

Also, because it is unlikely that someone will be looking for too much "lightening and shading" of their voice, the dynamic range will have to be tightly defined.

Compression

First, there is the matter of compression. I favor maintaining movement within the dynamics of the vocals, but restricting that range of movement.

I recommend a medium-low threshold setting, leaving only low-level signals unprocessed, and a low compression ratio.

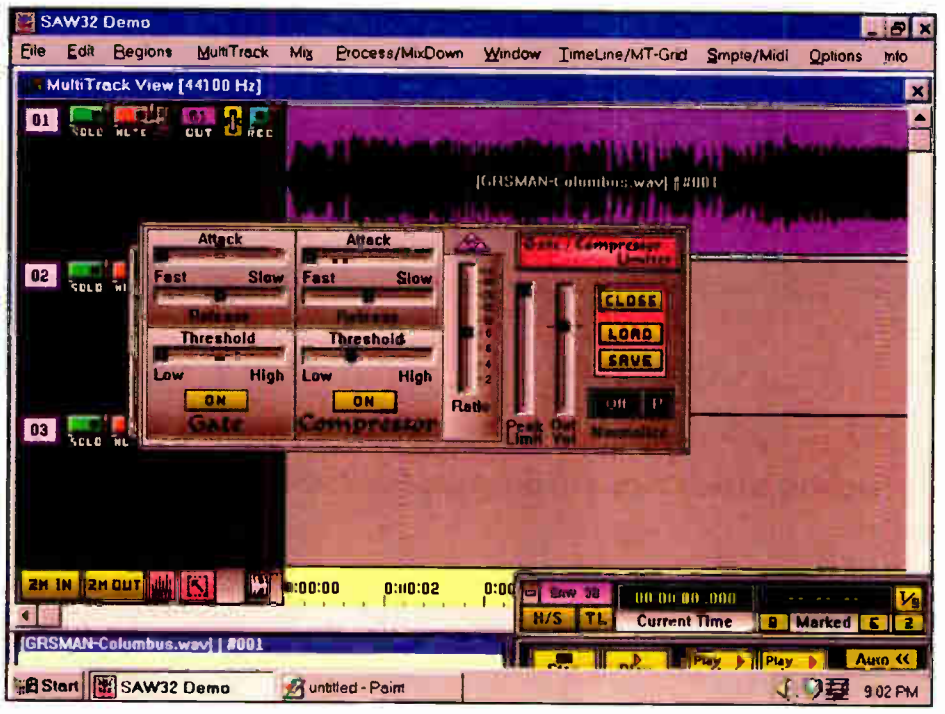
Heavy compression means very little natural attack or any peaks. While many announcers love hearing this kind of severe squashing in their headphones, it renders a voice uninteresting to listen to.

Next comes equalization (EQ). Male voices tend to benefit from careful low-frequency boost to emphasize fullness — perhaps a mid-frequency dip — and 6.5 kHz-type rise to return brightness to the voice. There may be a need to dial in a specific small mid-frequency boost to add "urgency."

These are subjective decisions, but they are influenced by other factors. For example, vocals recorded close to a cardioid polar-pattern response microphone would produce low-frequency energy from the proximity bass boost effect. Another favorite of the contemporary radio talent: "eating" the mic.

One caveat: Be careful when applying EQ to the lower frequencies of the voice. There may be a need to roll off some very low frequencies (where air-conditioning motor rumble lives) while adding EQ at a slightly higher frequency for a more natural and controllable sound.

With some microphones, the difficulty is that the proximity effect varies considerably with small movements of the subject. Therefore, EQ adjustments must be adjusted carefully or else this effect may be exaggerated.



DAW programs such as the IQS SAWPlus include both compression and EQ. Voice processing can take place following the actual recording.

Practical voice

An alternative approach to voice processing is far less invasive.

Try applying the compressor first to smooth the dynamics. A gentle roll-off of the bass would follow, with a slight tweak of high frequencies and a little mid-frequency shaping, if desired.

Depending on other aspects of the mix, other modifications could be added as needed. In order to cut through or contrast with background sounds, tailor low frequencies to suit the occasion. There is little point having low-frequency energy in the vocals because it typically will be masked by the background sound. The same applies to other vocal characteristics in other frequency bands.

Such processing decisions, however, are tricky to apply in real time and are probably best suited to radio production work. The best solution is automated ducking of the background track, where a sidechain output of the compressor rides gain on the background music track. When the talent speaks, the ducker circuit would drop the background level to accommodate the voice track.

For radio this is fine, but will not be acceptable in more demanding situations where the background would "disappear" when someone speaks.

These are not the only examples of vocal processing, but they illustrate different approaches.

Processing applied to vocals is further complicated by any signal processing further down the airchain.

Compressors and dynamics processors do not react predictably with all signals. The internal balance in a signal can be upset as compression adds prominence to the loudest component in the signal while partially masking others. This may mean emphasizing low-frequency components in a voice signal or high-frequency components such as excess sibilance.

The order in which dynamics and EQ processing are applied produces different results, even if the settings are the same.

Sidechain equalization

Often, adding small amounts of EQ both before and after a compressor makes sense when dynamics controllers are creating problems. Conversely, using an equalizer in the sidechain of the compressor would control compressor side effects.

By adjusting sidechain EQ, it is possible to focus or desensitize the compressor to certain characteristics in the signal. Almost all modern outboard compressors have sidechain controls; while they may be tricky to adjust in real time, the effects can be worthwhile.

The de-esser is a very specific example of a frequency-sensitive dynamics processor set to reduce the energy in the sibilance frequency area.

Digital signal processing adds many possibilities for subtle enhancement. Mixing pitch-shifted copies of the vocal signal with the original at low levels can be very effective in adding depth.

Some of the short, small room-ambiance programs found on reverb processors can also be used to great effect, creating a totally different acoustic situation.

Even adding a low-level single, double or triple delay at short time intervals can create a different voice character without the listener aware of an effect being present.

Such techniques are particularly useful for a female voice where there may be fewer creative options available in the low-frequency ranges.

■ ■ ■

Keith Spencer-Allen is a free-lance consultant, writer and recording engineer, based near London.

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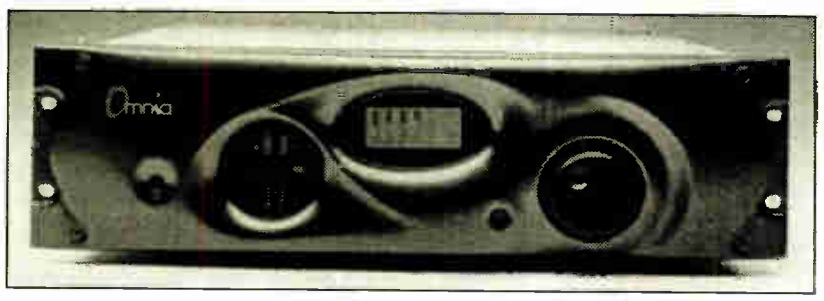

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World Radio History

Newest ADAT Family Member

▶ ADAT, continued from page 47

in his studio, so setting up the Alesis LX-20 was simple. We used the input and output cables going to and from his reel machine and reconnected them directly to the rear panel of the LX-20.

As we did this, I marveled at the compact size of the LX-20 compared to Richardson's reel tape machine and its roll-around stand. What a space saver for a home studio or radio project room. We set the LX-20 atop his cassette player between his monitor speakers and *viola*, we were ready for action. Almost.

Roll tape before rolling tape

The first step in using the LX-20 is formatting the S-VHS tape. This was a long, drawn-out process for Mike and me. Formatting provides header information about the tape and drops time markers every 1/48,000 second at the 48 kHz sample rate.

Tapes can be formatted for ADAT Type I 16-bit processing, compatible with older ADAT products and ADAT-XT; or ADAT Type II 20-bit processing, which provides enhanced fidelity.

Selecting a format type is especially important if you are planning on using the tape in other ADAT machines as well as the LX-20. Tape formatted as Type I can play in either Type I or Type II machines. However, Type II formatted tapes will not play in Type I machines.

A tape can have only one format for its entire duration. A portion of a tape cannot be formatted to Type I and another portion to Type II. The LX-20 also assumes an S-VHS 120 tape is being formatted. If the tape is a different length — such as an S-VHS 60, 160 or 180 — the tape length must be set prior to formatting.

Sampling rates can be set for 44.1 or 48 kHz. Formatting the S-VHS 120 tape that Richardson and I had to ADAT Type II took about 40 minutes. It is definitely not plug-n-play (see sidebar below).

Once the tape was formatted, Mike was ready to go. His first project using the Alesis LX-20 was a concert commercial for urban artist Brian McKnight. Following that, he used it to produce a commercial for a local men's retail clothing store.

Sound and features

Richardson agreed with me on the clarity of sound produced by the LX-20 which he described as "wonderful, far superior to the reel-to-reel machine." He also found the operation of the LX-20 to be quite user-friendly during the two projects.

The front panel of the Alesis LX-20 was straightforward and easy to understand. The display with metering, time counting and other information to the left of the front panel was easy to view at a glance with the activation buttons for each of the eight tracks located directly beneath the metering. Tape loading to the right of the front panel was identical to loading one into a home VCR.

I marveled at the compact size of the LX-20. What a space saver for a home studio or radio project room.

Beneath the tape slot were a series of 20 buttons used to select Digital/Analog Inputs, Pitch Change, Locate Points, Clock, Format, Digital Output, Rehearse and Auto Play, Record and Return. The large transport control buttons for tape motion were conventional and familiar, with Rewind, Fast Forward, Stop, Play, Record and Eject selections.

The rear panel presented RCA jacks for the eight channel inputs and outputs, ADAT optical I/O jacks, sync I/O jacks (to operate two machines in master/slave tandem) and a punch-in foot pedal jack, which can also be used for the remote control, were also located on the rear panel.

Mike said that he did have a problem with this recorder finding the cue point as he was overdubbing. The Autolocation feature allows the tape transport to search for a point that was previously marked.

Four points on the tape can be marked and stored at one time. Two are for a Loop Start and End, while two are for punching in and out. This can be done while the tape is in motion or when the transport is stopped.

During overdubbing, the Alesis LX-20 overshot these cue points, causing Richardson to spend extra time trying to find the point where he wanted an overdub to start. He found this process time-consuming.

He commented that it was much quicker to locate a cue point on his analog reel-to-reel machine than with this ADAT machine's Autolocate feature.

Punch-ins, however, were another story. Richardson described this process on the Alesis LX-20 as "magnificent." While trying to correct a mistake or change a word, the LX-20 found punch-in points with extreme accuracy.

Although footswitch activation is one method of triggering the punch-in process, Alesis did not supply a footswitch with the LX-20. Stepping on the footswitch is the equivalent of simultaneously hitting the Record and Play buttons. Richardson seemed to get the results he wanted by using the remote control panel to operate the LX-20.

A number of the LX-20 features include looping, pitch control, rehearsing and adjusting crossfade time. All can be easily controlled by manipulating the buttons on the front panel.

Multiple machines may be synched together by the DB-9 connectors on the rear panel. In fact, as many as 16 machines may be interconnected to create 128 total tracks.

The numbers

Prices for the LX-20 varied as I checked with my usual sources of broadcast equipment distributors and music outlets in the Washington area. With a retail price of $1,900, I found purchase prices from as low as $1,350 to $1,799.

As usual, thanks and appreciation to Mike Richardson for his assistance in this evaluation and the use of his home studio as we investigated the capabilities of the Alesis LX-20.

If you construct or upgrade a commercial broadcast facility, put together a commercial project room or perhaps build a home studio, you will find the Alesis LX-20 eight-track ADAT recorder a definite asset to your inventory. It is a tool that will make your job much more enjoyable.

■ ■ ■

Rick Barnes, CBRE, is a contract engineer with Radio One of Maryland and secretary for SBE Chapter 46, Baltimore. He holds degrees in broadcasting and music from Ithaca College and Catholic University. Reach him via e-mail at KE3QJ@msn.com

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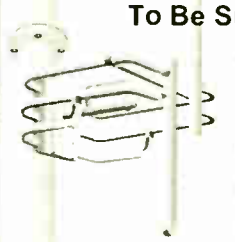

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READER SERVICE NO. 75

World Radio History

Using the CD-5900 for Radio

▶ CD, continued from page 47

single pass? An optional network card straps up to four PowerPros together to increase production.

Even though PowerPro does not require a host computer to function, there is no reason not to use one for added flexibility.

A PC can be connected to a PowerPro via SCSI and can control the duplicator as though it were an external CD recorder. Use your favorite digital audio editing and mastering software in your computer to create your CD program, then run the data off the hard drive directly into the PowerPro.

Radio people do not bury their heads in manuals as a rule; they want a simple box that is easy to plug in and run. By following little more than the quick-start instructions in the PowerPro manual, I was able to produce CDs minutes after unpacking the device.

I placed the PowerPro on a table and plugged in the power cord. When I opened the manual to see what to do next, the words, "We are almost ready to copy or burn that first CD" greeted me. It actually was just that easy to do.

After the unit was powered up, the LCD screen indicated PowerPro was performing a system check. Afterwards I inserted a music CD and some blanks. Four button-presses and a few minutes later, I had flawless CD copies.

Radio people want a simple box that is easy to plug in and run.

Next came a copy session of a master DAT of a band I had just finished recording. My DAT machine was connected to the PowerPro, the device was set to record-ready mode, and I cued up the DAT just before the first start ID.

The optional Easi-DAT detected the Start ID and began recording to the internal hard disk. More blank media was fed into the PowerPro and the unit was programmed to burn CDs from data on the internal drive.

Minutes later, I received CDs that played just like regular CDs, including correct counter times and track numbers.

Many other features have been included that make the job simple. The CD-5900 can scan a master disc for flaws. It is possible to select one or more tracks from a CD and burn it in track-at-once mode. After burning, more tracks can be added or the disc may be closed to further recording.

What if you need to tack together a "best of" collection of spots and promos from several discs? Tracks may be imported from multiple discs. You may also add or append a track to a previously duplicated disc.

The MediaFORM CD-5900 PowerPro is simple to use. With all of its automatic features, a production director can hit a few buttons and roll out multiple CDs after only a few minutes of training.

As a standalone device, it will not tie up existing studio equipment to produce CDs (as opposed to a CD-R drive built into the station's dedicated DAW computer). Via SCSI compatibility, a computer can be connected to the CD-5900, to utilize the best features of both.

The MediaFORM CD-5900 PowerPro is available for $6,995, with slave unit costing $5,595.

■■■

For information, contact MediFORM in Pennsylvania at (610) 458-9200; check the company Web site at www.mediaform.com *or circle* ***Reader Service 141.***

Bruce Bartlett is a microphone engineer for Crown and a contributor to Studio Sessions.

As new formats appear, the PowerPro can be updated with firmware discs. Currently the supported formats are ISO 9660, CD-DA, Hybrid (ISO 9660/HFS), Hybrid (ISO 9660/HFS/Rockridge), Mixed Mode, CD-I Form 1 & Form 2, Native O/Ss (NT, DOS, OS/2, UFS, HFS MAC O/S, SUN, AS/400, AIX, etc.), Video CD, Kodak Photo CD, CD-G, CD-ROM Mode 1 and Mode 2, CD-ROM XA Mode 2 Form 1 & Form 2, Single-Session, Multi-Session, DAO and TAO, Rockridge, CD Extra (First session CD-DA, second session data), Romeo, Joliet and Karaoke-CD.

Between Lines of Product Reviews

▶ REVIEW, continued from page 48

our mind. The text must say why we thought the radio was bad, otherwise it is just empty opinion.

The selectivity, sensitivity, and sound quality are merely adequate to reproduce sound, but not much more. Far-away stations, our main interest, were simply not there, and in trying to DX for distance, we wound up listening intently to faint signals that were actually local broadcast stations. The amplifier section fared much better, and reproduced our disks faithfully.

Okay, something good to say about the device.

Feel like fiddling?

The tuning dial is directly connected to the knob, and not flywheel-weighted, so the tuning feel is inferior. Selecting the right station, if not in the same city, takes a delicate touch.

Some users will actually like *to fiddle with the dial incessantly, but to a broadcast professional, user comfort is important because of repeated and prolonged use of a product's feature or control.*

Our complaint with the Treble/Bass control is that it should be labeled instead "Normal/Muffled." The bass setting only attenuates the high frequencies to produce a muddy, muffled sound.

Now this is a reviewer bias that assumes the reader is interested in high fidelity. You may not know this, but listening studies from this period revealed the public actually was lukewarm to the idea of hearing all frequencies equally from their sound equipment.

In conclusion, those needing a minimal-performing table radio who live near clear and regional channel stations would find the RCA Model 86T an acceptable performer.

Although this line sounds sarcastic, it is not. The limitations of the equipment will suit some people and not others. This product has received a tepid review, indicating a potential buyer should thoroughly investigate how he might use the product in his own shop before buying it.

Go right to the end

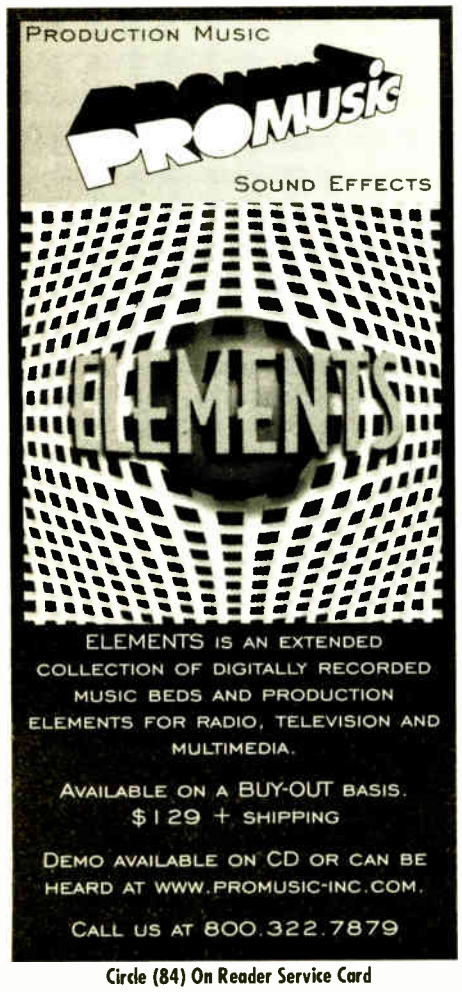
Some readers may simply jump to their own conclusions without wading through the text. We in the reviewing business discourage that — not because our prose is stunning, but because reading the conclusion without the critical explanation does not allow the reader to form her/his own opinion. Sounds simple, doesn't it?

Until next time, I remain,

Your obd'n't eng'r.

■■■

Rich Rarey writes from National Public Radio in Washington. Reach him at rrarey@npr.org



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13 Publication Name: RADIO WORLD	14 Issue Date for Circulation Data Below: OCT '98	
15 Extent and Nature of Circulation	Average No. Copies Each Issue During Preceding 12 Months	Actual No. Copies of Single Issue Published Nearest to Filing Date
a Total No. Copies (Net Press Run)	18,700	16,570
b Paid and/or Requested Circulation (1) Sales Through Dealers and Carriers, Street Vendors, and Counter Sales (Not Mailed)	0	0
(2) Paid or Requested Mail Subscriptions (Include Advertisers' Proof Copies/Exchange Copies)	18,400	0
c Total Paid and/or Requested Circulation (Sum of 15b(1) and 15b(2))	18,400	0
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e Free Distribution Outside the Mail (Carriers or Other Means)	189	0
f Total Free Distribution (Sum of 15d and 15e)	189	16,469
g Total Distribution (Sum of 15c and 15f)	18,589	101
h Copies Not Distributed (1) Office Use, Leftovers, Spoiled	110	0
(2) Return from News Agents	0	0
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16 This Statement of Ownership will be printed in the 11/25/98 issue of this publication ☐ Check box if not required to publish

17 Signature and Title of Editor, Publisher, Business Manager, or Owner: Steven B Dana/Pres — Date: 10/12/98

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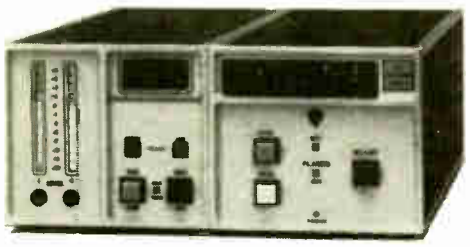

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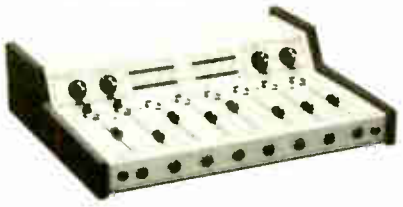

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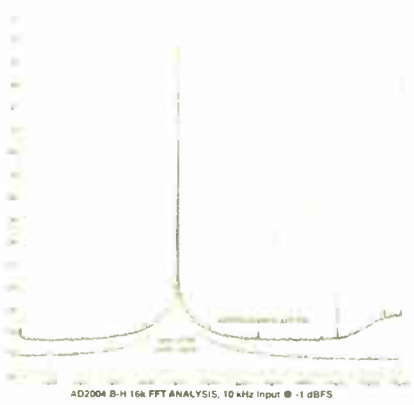

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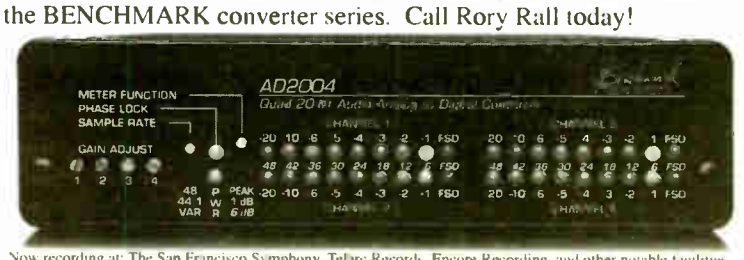

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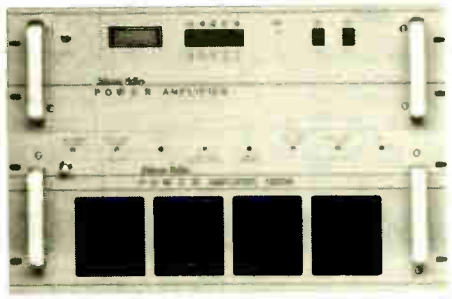

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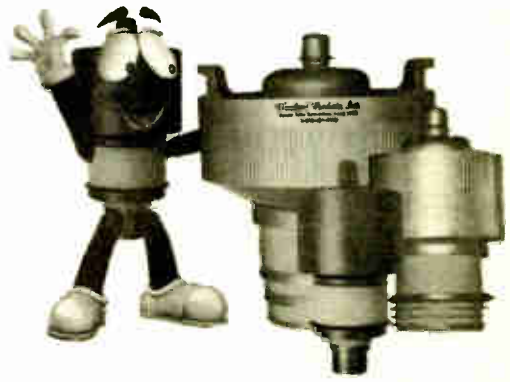

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READER SERVICE NO. 20

World Radio History

Dozens of Products for Your Studio, Inside

Buyer's Guide

USER REPORT

'Can I Get Those by Tomorrow?'

by Larry Wilson
VP of Engineering
Westwood One
Valencia, Calif.

Sometimes you just have to ask the hard questions.

In February, I read an ad for **360 Systems** Short/Cut 2.0 editor. The ad made a bold statement: If I wanted to test-drive a new 360 Systems Short/Cut Editor, all I had to do was call.

I hesitated at first, thinking, "This looks like a cool device, but how would I ever use it in the real world?" Our Vice President of Programming, Charlie Cook, strolled into my office one Thursday morning and reminded me he needed two DAT machines for an upcoming American Country Music awards remote scheduled for Monday morning. It was the kind of remote that triggered panic and feelings of, "How am I going to pull this off?"

Andy Waits uses the Short/Cut 2.0 in the Hot Country studio.

If you have ever used a DAT recorder for interviews, you know how hard it is to edit conversations with the stars. You get a great interview, then spend lots of time editing until it is just right. You might miss another great interview because you have not finished editing the first one.

I had visions of dragging down two $10,000 reel machines to the remote — not because I wanted to but I knew they would work and our announcers knew how to use them. No matter how hard I attempted to convince myself that past tried-and-true methods were the best path for this project, I kept going back to that ad.

I finally contacted Steve Gordoni at 360 Systems, and popped the question. Much to my surprise, he said yes and asked how soon I needed them. With tongue in cheek, I said, "tomorrow." He said that would not be a problem.

Then, it struck me: With only two days notice, how would we learn to operate these units? How would our announcers learn how to edit on them in time?

Gordoni to the rescue once again. He delivered the units the next day and held a training session for our announcers. Maybe 360 Systems cannot offer the same response to all stations, but they sure came through for us.

We concluded that the Short/Cut Editor is really the '90s digital answer to an old, tired analog tape recorder. Within ten minutes of our demo, we were recording and editing audio. Our announcers picked up the concept and we were ready to go.

Disaster struck

The remote was scheduled for Monday at 7 a.m. On Saturday at 4 p.m., we discovered we had a dead Short/Cut. No lights, no audio, no action. What now?

I called 360 Systems, but being Saturday, we got no answer. Desperate, I sent an e-mail to Gordoni, hoping he would review his e-mail and give me a call before Sunday night.

He called me back by 6 p.m. Saturday. We met at the 360 Systems factory at 8 p.m. Saturday night and swapped units for a live one. Problem solved.

Larry Wilson stands in the Master Control Room at Westwood One in Valencia.

On Monday, our remotes ran without a hitch. We had several interviews with various country stars, all recorded and edited with the Short/Cut Editor. We received comments from other stations attending the remote remarking about the quality and execution of our interviews. I also heard mumbles similar to, "We should bring our 360 next time."

Since our remote, we have purchased four units for in-studio editing of phone calls. Our announcers love them. Hot Country morning personality Andy Waits said, "The Short/Cut is so easy to use, you could train a monkey to cut, paste and move pieces around, even replace lines when I thought of something funnier later.

"Because each jock has a password-protected directory, we can keep requests, funny stories and drop-ins available as long as we like," Waits continued. "It is so fast, I can take a series of calls, edit them and have them on the air before a song is over and without missing other calls. The unit lets me continue recording calls while I'm in Edit mode."

Waits said, "The Short/Cut is to reel what an F-15 is to a Zeppelin!"

We feel we cannot beat the Short/Cut Editor as a replacement for reel-to-reel. We love them here and will not be returning to the cut-and-splice method. We look forward to buying more units next year.

And thanks to Steve Gordoni, who went beyond the extra mile to help us.

Don't shy away from that test drive ad or the phone call. You will be pleased by the product and service waiting to help you.

*For more information, contact 360 Systems in California at (818) 991-0360; (818) 991-1360 or circle **Reader Service 37.***

■ ■ ■

Larry Wilson originated engineering for Transtar Radio Networks in 1980, which evolved into Unistar in 1992. Unistar merged into Westwood One Radio Networks in 1994.

Circle (136) On Reader Service Card

World Radio History

USER REPORT

Sony MD Becomes Radio Workhorse

by Bruce Rogow
Assistant Chief Engineer
KPBS-FM
San Diego

The **Sony** MDS-JE520 MiniDisc recorder/player could use a catchier name, but its performance has definitely caught our ears. In its first three months in daily on-air use at KPBS-FM, San Diego, the unit has shown great promise as well as some trepidation.

The MDS-JE520 is a consumer-type MD deck with a rackmount option, and is inexpensive enough to attract many broadcasters. KPBS bought two units from Broadcast Supply Worldwide (BSW) for $288 each, plus $30 for the rack ears.

The MDS-JE520 has many features and some drawbacks. First, the features. The front panel sports the familiar controls found on any tape machine. The most prominent feature is the large search dial, which acts as a menu selector for all the setup items available.

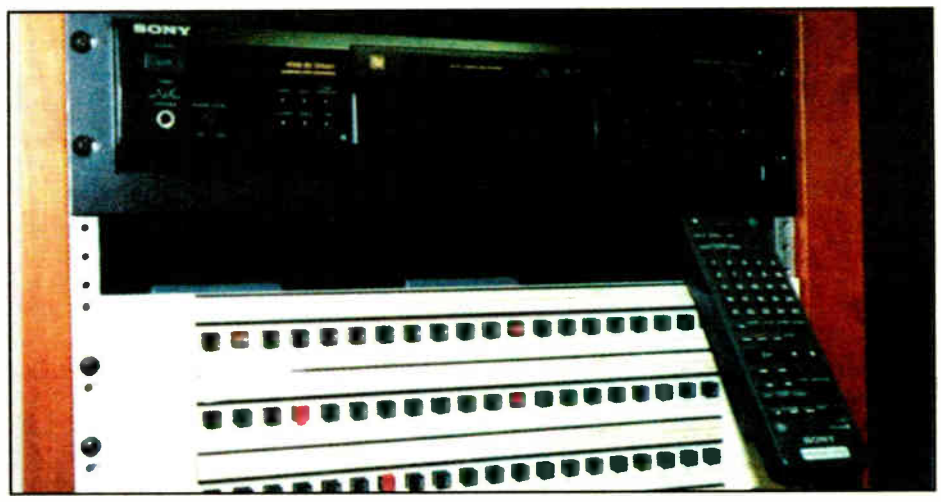
A large fluorescent display gives the user the disc name, access to 15 menu options, stereo VU meters, time information, mode indicators and error codes.

The MDS-JE520 comes equipped with a 65-button wireless remote to operate and program the machine. The remote can raise and lower the volume with a manual control and an automatic fade button. With so many buttons, space does not allow a complete description. What is most important to know is that the remote is the easiest way to program the unit.

RCA jacks are used for analog audio. Digital audio is handled on two optical inputs and one optical output. The transport mechanism is similar to a floppy disk drive with a minimum of moving parts. For anyone who spent time repairing DAT transports, this simple design is a relief.

At KPBS, our experience comes from the daily use the MiniDisc gets in recording and playing back an hour-long program, as well as the cueing involved during breaks.

Cueing can be a challenge with the MDS-JE520. The master-control operator has only a brief window of time to cue up a program. With our DAT machines, the search dial is sensitive, allowing cues to be accurate and fast.



Although the MDS-JE520 is a consumer product, it works well in the studio.

With so many buttons, space does not allow a complete description. The remote is the easiest way to program the unit.

The Sony MDS-JE520 has two push-buttons that shuttle the disc forward and reverse incrementally while displaying the elapsed time. Our operators have found it more difficult to cue than the DAT machines, but still usable.

If you know the time you want to cue up to, you can put the machine in Pause and hit the button until you get to that spot. This way you can accurately select the cue spot without having to play the audio and hit the Pause button on the fly.

Remember, an MD is essentially a data disk. It records the audio on separate "tracks" which are assigned track numbers. These tracks can become fragmented, like files on a hard disk, and have trouble playing audio during the search function. Also, erasing stereo tracks of 12 seconds or less removes the audio, but still uses a small amount of disk space. Eventually, this limits the maximum record time of the disk. This is a problem inherent in the format and not a defect in the machine.

Recording levels

Sound quality is equal to a DAT for spoken word. There is some debate about the reproduction of complex music, though. It is important to watch your record levels, which is true of any recording medium, but the MiniDisc will have a noticeable distortion if overdriven.

At KPBS, we have recorded music and found it so closely matches DAT or CD that we can barely tell the difference. For our daily talk show recording, it does the job seamlessly. The real advantage MiniDisc offers us is that no tapes are eaten, and it exceeds the MTBF (mean time between failures) of our best DATs.

The unit has no rear-panel remote connector for external control, but this is typical in a consumer machine. To use it in the automated recording system at KPBS, we had to design a circuit modification to interface to our control computer.

The modification is simple. We use three small paralleled relays to "press the front panel buttons" from inside the machine. We also used a converter box to make the RCA audio jacks into balanced XLR connectors.

A few menu setups caught us by surprise. "Setup 02" is an automatic track-marking feature that increments the track number if it detects the audio dropping below a specified level for 1.5 seconds or more. This is great if you are recording a record or CD because it will divide up the songs as separate tracks. We had to turn this feature off because we wanted to record our whole program as one track.

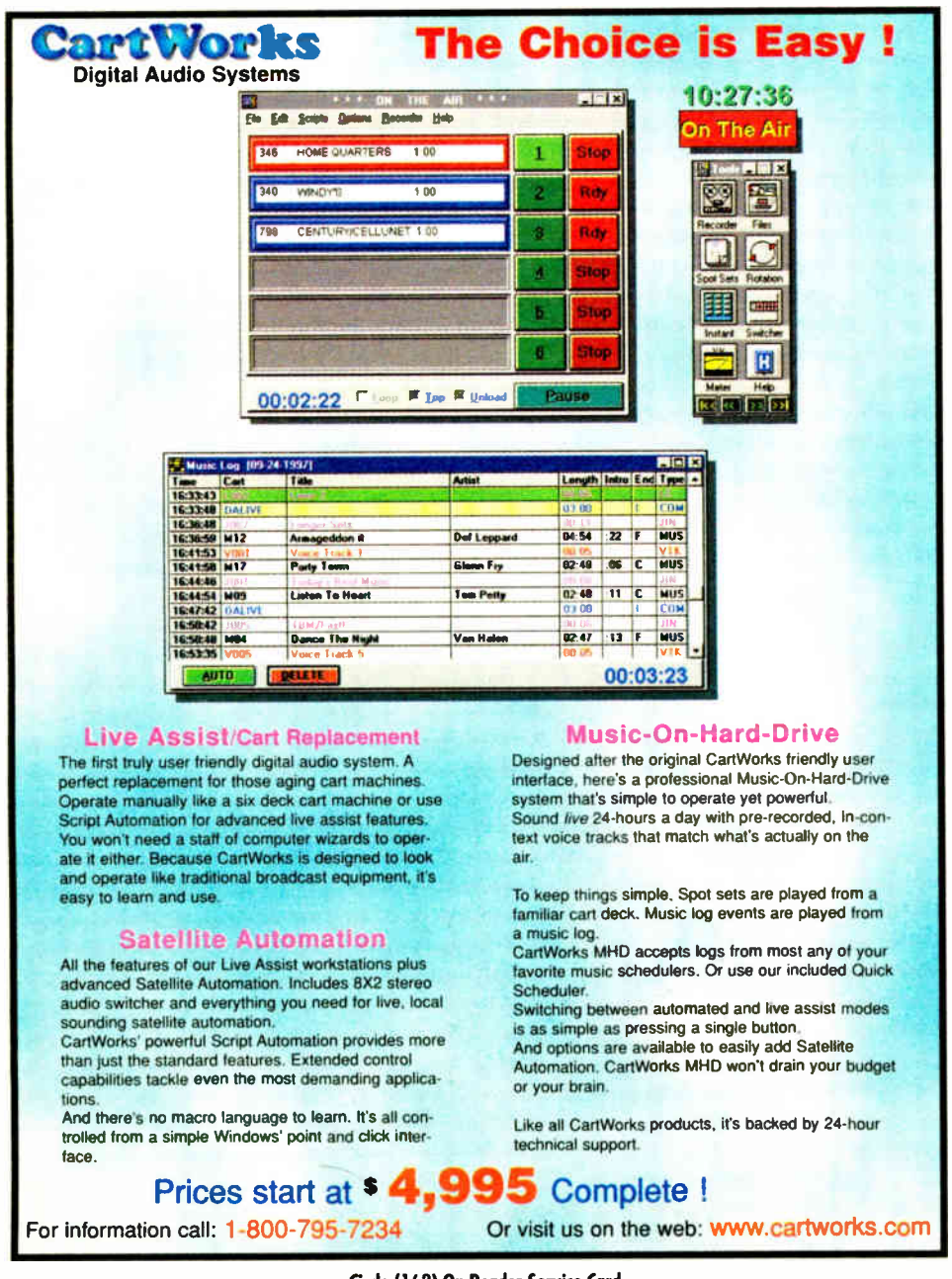
"Setup 05" is called "Smart Space/Auto Cut" and is very important because of our automated recording system. If the deck senses silence for more than 30 seconds, it will automatically change Record to Pause. Because frequently there is silence before a satellite feed, we disabled this feature as well.

Our experience with the MDS-JE520 has encouraged us to delve further into the world of the MiniDisc. For improvements, we suggest fewer fancy features and more ability to interface with the outside world. However, when you consider the MDS-JE520 consumer price and its audio quality, it becomes hard to complain.

If boot camp turns recruits into soldiers, then a few relays and a handful of setups turn the Sony MDS-JE520 into one mean broadcasting machine.

■■■

For more information contact Sony in New Jersey at (201) 930-1000 or circle ***Reader Service 63.***



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World Radio History

USER REPORT

Radio Systems DA 'Designed Right'

by Howard Frost
Broadcast Consultant
Frost Broadcast Associates
Northampton, Mass.

Every so often, a piece of equipment comes along that just seems to have been "designed right," with the right combination of features. Features you always hoped for and at an affordable price.

My company provides contract engineering services to radio stations. Over the years, we have used several different audio distribution amplifiers. While the performances were adequate, we felt the various methods used to attach the input and output cables to the DA were not. Many were difficult and time-consuming to attach, and an easier, more efficient method was in need.

Don't forget to set the output level to -10 dBu when feeding consumer equipment.

We were pleased when we recently discovered the new DA-4x4a from **Radio Systems**. It is an effective balance of performance and features. Radio Systems has been manufacturing its popular DA-16 for over 15 years. The new DA-4x4a represents this product's first major upgrade; worth the wait, as it is packed with many new and useful features.

Speaking of new features, we especially liked the individually removable, three-pin Phoenix-style plug connectors on all inputs and outputs. Wire strippers and a small screwdriver is all that is needed to connect wire to the plugs. Installation, troubleshooting and/or removal of the entire DA from the rack is very simple. Connection designations are clearly silk-screened on the rear panel.

Have you ever wished for RCA jack outputs on a DA to feed consumer level gear? This becomes a simple matter with this DA. Purchase some chassis-mount RCA jacks at your favorite Radio Shack. Solder two short pieces of No. 14 solid wire to the jack and insert into the Phoenix plug. Don't forget to set the output level to -10 dBu when feeding consumer equipment such as your cassette recorder.

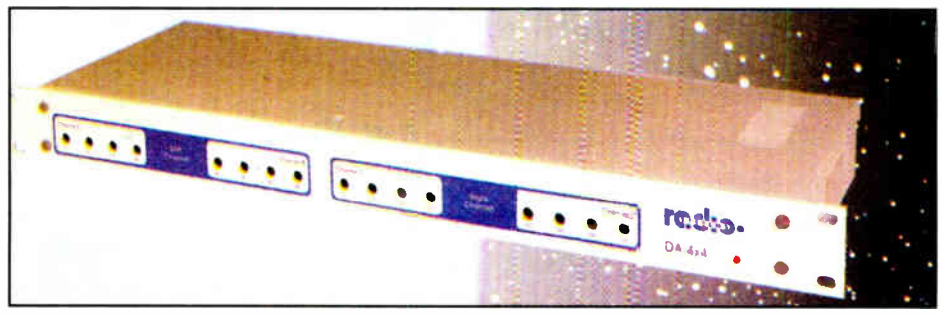
Excellent configuration

Notable among the features of the DA-4x4a is its ability to quickly change configuration. The unit actually houses four separate 1 x 4 DAs. Reconfiguration is accomplished by moving jumpers conveniently accessible on the rear panel, without having to remove the top cover.

The unit can be configured as four inputs by four outputs (mono), one input by eight outputs (stereo), two inputs by four outputs (stereo) or, by wiring the inputs in parallel, one input by 16 outputs (mono).

Based on the popular 5532 op amp, this unit provides impressive performance figures. The electrical specs listed in the manual are very good. We thought they were maybe a little too good, so we checked the published specs using our Audio Precision test set.

Testing was done on the channel closest to the power transformer, as this represents the worst-case channel. Our measurements confirmed the published specs.



The DA-4x4a is a major upgrade of the DA-16 distribution amp.

THD measured .002 percent, while weighted noise measured -103 dB below +4dbm out. Very quiet, very impressive. This DA should be quite invisible in any audio chain.

The front panel contains output level controls for each of the 16 outputs. Levels are continuously adjustable from -60 to +18 dBm. There are audio presence and peak overload LED indicators for each of the four DA sections. One additional LED indicates that the unit is powered on.

We were likewise impressed with the clear and concise documentation contained in the instruction manual. Any way we look at it, we think the DA-4x4a is a great distribution amp.

For more information, contact Radio Systems in New Jersey at (609) 467-8000; fax (609) 467-3044 or circle ***Reader Service 218.***

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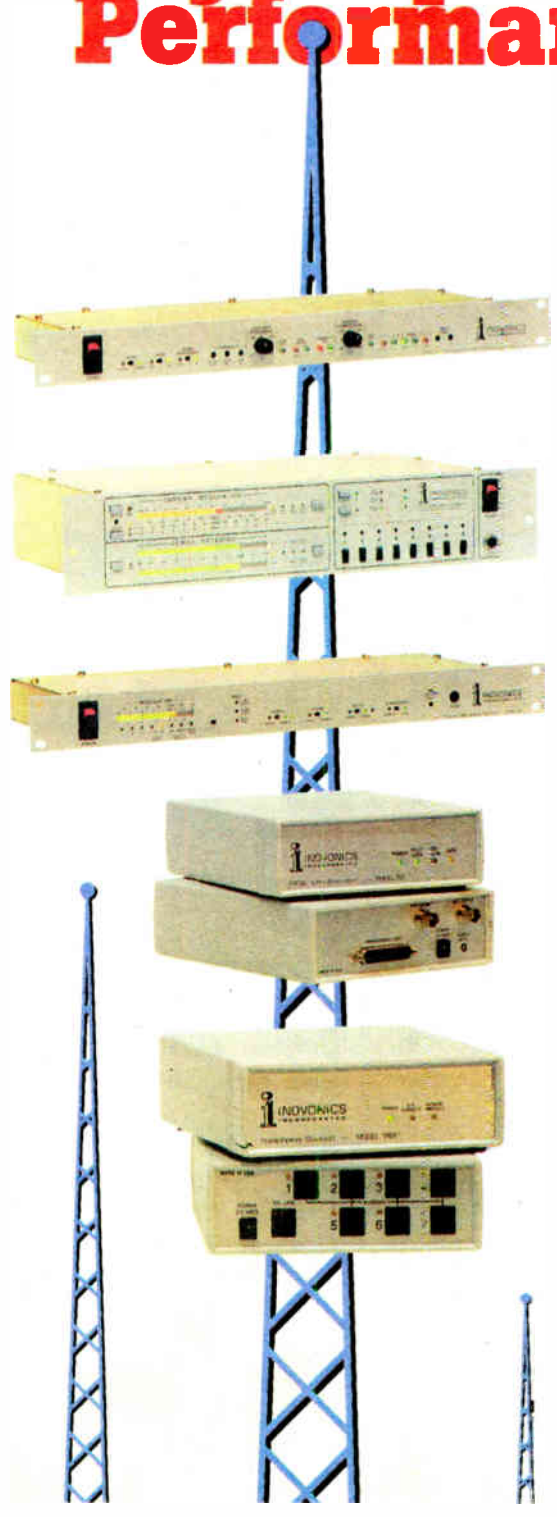
Only Top Performance...



...at a cost savings means real value in any broadcast market. But don't take our word for it or let our 25-plus years in the business cloud the issue. Try these or any of our first-quality products at your station at no risk with our no-fault, 30-day return policy,

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Quickly program it with any PC to transmit station call letters, format and other identifiers, translator frequencies, promos/slogans, phone number, etc.

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Circle (214) On Reader Service Card

World Radio History

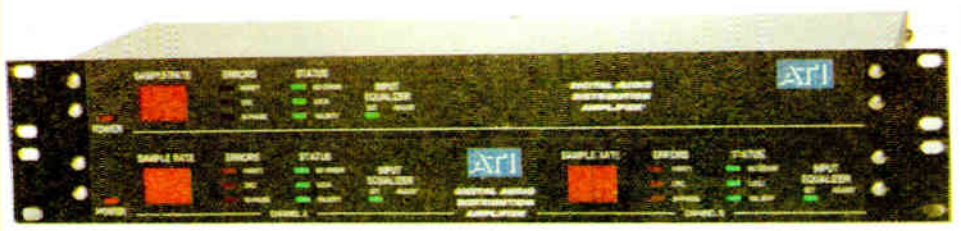
TECHNOLOGY UPDATES

ATI

ATI offers a series of six new distribution amplifiers for the radio broadcast station: DDA106-XLR (1x6); DDA112-XLR; DDA206-XLR; DDA112-BNC; DDA124-BNC and DDA212-BNC.

These AES/EBU digital audio distribution amplifiers are available in single- and dual-input configurations. Levels and connectors are optimized for use with balanced XLR 110-ohm cable or unbalanced BNC 75-ohm coax. Adjustable input cable equalization and multiple regenerated independent AES/EBU low-jitter outputs make these units suitable for any digital audio signal distribution requirements.

Sample rates from 27 to 96 kHz are decoded and cleanly regenerated. Standard sample rates of 32, 44.1, 48, 88.2 and 96 kHz are indicated with front-panel numeric readouts. Signal status and error messages included in the AES/EBU data format are decoded and displayed to provide visual assurance of data integrity and to optimize input cable equalization.



For more information, contact ATI in Pennsylvania at (215) 443-0330; fax (215) 443-0394 or circle ***Reader Service 8.***

Excalibur

Excalibur offers the new DA2-6 and DA2-10 stereo audio distribution amplifiers. The DA2-6 features one input and six outputs, while the latter features one input and ten outputs.

Unlike many distribution amplifiers, these units are designed specifically for stereo use. Each output has both left- and right-level controls together on the front panel. On the rear panel, both left and right outputs for each channel are on the same connector. This allows neater wiring by using the two-pair audio cable common in current broadcast installations. All five wires connect to the same connector.

Modern euro-block connectors are supplied with the units to avoid spending extra money on connectors. Audio quality is assured through low-distortion, low-noise, high-slew operational amplifiers.

Both units are powered by external, UL-approved power transformers. Each distribution amplifier is 1 RU high.

For more information, contact Excalibur in Maryland at (301) 231-7800; fax (703) 222-1940 or circle ***Reader Service 34.***

Acoustical Solutions

Acoustical Solutions offers Alpha Pyramid Acoustical Foam for recording and broadcast studios.

This sound absorption product has a surface pattern that provides a uniform and seamless look. With an NRC of .70 to 1.00, Alpha Pyramid Foam dramatically reduces standing waves, echo and reverberant noise inside all types of spaces. The foam comes in charcoal, blue, beige and brown.

Available in 2 x 2-foot sheets with two-, three- or four-inch thickness, the product is made of open-cell polyurethane foam. It is UPS-shippable and easy to install.

For more information, contact Acoustical Solutions in Virginia at (804) 346-8350; fax (804) 346-8808 or circle ***Reader Service 35.***

Fidelipac

The Dynamax DCR 10 from **Fidelipac** is a digital audio cart machine replacement which can be used with high-density floppy (2 MB), Zip (100 MB) or Magneto-Optical (640 MB) drives.

When a PC keyboard is added, the DCR 10 becomes a recorder. Depending on which drive is selected, the unit is capable of recording from one minute to twelve hours of audio.

Equipped with a standard 2 MB drive operating at a 32 kHz sampling rate for jingles and commercials, this is a suitable choice for operators who prefer using one disk per spot. Zip or MO drives can be used for high-capacity requirements, which can then be configured for linear, uncompressed operation.

The optional Q50 Instant Access keyboard, when used with a high-capacity drive unit, allows instantaneous push-button access of up to 50 cuts on any disk. The small, custom keyboard also permits chains, rotations, or loops of any cuts on the disk.

For more information, contact Fidelipac in Pennsylvania at (215) 464-2000; fax (215) 464-1234 or circle ***Reader Service 89.***

Belden Wire & Cable

Belden Wire & Cable has added the 1800F High Flex AES/EBU digital audio interconnect cable to its Brilliance family of cables.

The 1800F is a 110-ohm, shielded, single twist-pair cable that can be used as a flexible digital audio patch cable, an ultra-high performance analog audio mic cable, or as an interconnect cable for new, state-of-the-art digital audio mics.

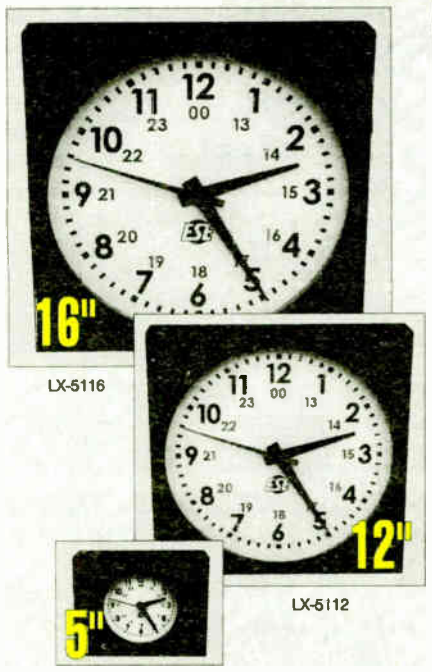
The company says its patented French Braid Shield assures analog audio performance. It is a double spiral shield (tinned copper double serve) in which two spirals are tied together via one weave. The result is 95-percent coverage, with lower levels of microphonic and triboelectric noise than either spiral or conventional braid shields.

The 1800F features one pair of 24 AWG stranded (42 x 40) bare copper conductors with blue and white velocity Datalene insulation, and a drain wire. The bare copper drain wire eliminates "pigtailing" the shield for termination.

For more information, contact Belden Wire & Cable in Indiana at (765) 983-5200 or circle ***Reader Service 38.***

ANALOG CLOCKS

"5100" Series



The LX-"5100" Series can read Time Code (ESE, SMPTE/EBU & ASCII), as well as operate as Stand-Alone or Impulse Clocks. These clocks are loaded with many features, here's just a few...

FEATURES:

- Self-setting time code readers
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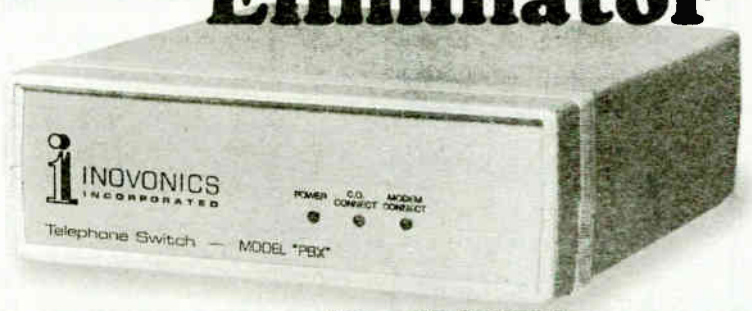

7 DIAL-UP DEVICES CAN SHARE ONE CENTRAL-OFFICE LINE

Inovonics' PBX is a cost-saving alternative to the multiple telephone lines otherwise needed for modems, alarms and other dial-up apparatus installed at remote equipment sites. The PBX allows as many as seven devices to share a single central-office line, for outgoing calls and with selective incoming access as well.

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- Cellular/2-Way Radio Facilities
- Microwave Relays
- Geophysical Monitors
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Circle (7) On Reader Service Card

World Radio History

TECHNOLOGY UPDATES

CircuitWerkes

The DS-8 DTMF Sequence Decoder from **CircuitWerkes** can be bridged across an audio source to achieve eight individually programmable relay outputs.

Controlling playback decks and local spot insertions are two abilities of the DS-8. Each relay can be set to decode a code of one to four digits. Each relay can be independently programmed to operate in one of three modes: momentary, latching or interlocked latching.

Momentary operation provides a brief closure upon reading its programmed code of one to four DTMF digits, while the relay turns on with one code and off with another in the latching mode. Interlocked latching mode is similar to latching mode, but an energized relay is turned off when another interlocked latching relay is energized.

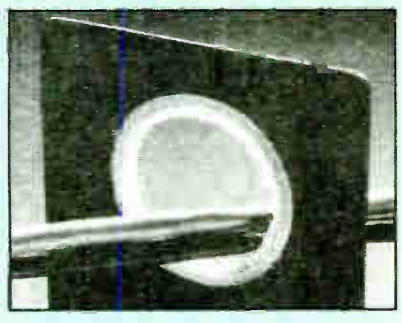
The DS-8 mounts to the wall or can be rack-mounted in a 1RU space with an inexpensive rackmount kit. Optional custom preprogramming of the default relay codes is available. The default relay codes take effect when a user initiates a hardware reset.

For more information, contact CircuitWerkes in Florida at (352) 335-6555; fax (352) 380-0230 or circle ***Reader Service 64.***

Panduit

Panduit offers the Adhesive Lined Grommet Edging, for protection of wire and cable in the radio studio.

This material has pressure-sensitive adhesive extruded into the



trough of the edging to avoid application of a separate adhesive to hold grommet edging in place. This is especially beneficial where panel thickness falls in a range between two product sizes, where grommet edging may fit loosely.

Two types of this material are available: solid wall for use on straight-panel edges and slotted wall for irregular shaped and round-panel edges. Either way, sharp panel-edge abrasion on wire and cable is avoided.

For proper installation, panel cutouts must be clean and dry. Users can append the product in a normal way and then apply thumb pressure to activate the adhesive. The product can be removed and repositioned.

For more information, contact Panduit in Illinois at (630) 990-0220; fax (630) 990-2556 or circle ***Reader Service 114.***

Panasonic

The new SV-3800 DAT recorder from **Panasonic** builds on the performance and reliability of the SV-3700, with the incorporation of new technology to enhance sound quality and functionality.

The unit features new 20-bit resolution DACs, together with the same type of 1-bit, 64x oversampling A/D converter found in the SV-3700. The result is a wider dynamic range, lower noise and greater linearity.

The circuit configuration of the SV-3800 has been redesigned with an improved grounding layout for more effective noise suppression, minimizing RF interference and hum noise from connected equipment. Its front panel selectable features accent its controls and operational processes.

Convenient cueing to desired portions of a tape is possible with the Start-ID function or program number (PNO). The unit can also bypass unwanted parts of the tape with Skip-ID.

The Single Program Play function, ideal for broadcast applications, plays program material up to the next start ID, then stops until the Play key is pressed. If Skip Play Cancel is turned off, the unit will automatically skip unwanted portions of the tape.

For more information, contact Panasonic Pro Audio in California at (323) 436-3500 or circle ***Reader Service 86.***

Robert George, Owner, Robert George Productions, Naples, Florida

"If you can buy only one piece of equipment this year for your studio, make it a CDQPrima digital audio codec from MUSICAM USA."

And Robert George should know—the CDQPrima increased his revenues by about 50%!

George writes and produces radio commercials and masters CDs, audio for video and jingles. "As the owner of a small business, I'm cautious about purchasing new equipment, but buying the CDQPrima was one of the smartest business moves I've ever made," he says. In addition to boosting his revenues, George says the Prima has more than paid for itself and allowed him and his voice-over talents to "live the lifestyle we want to live."

The Prima also helped George expand his pool of voice-over talents almost instantly. The people he works with have ISDN at their home studios, so he needed a codec that was compatible with most of the others on the market. "The Prima was the only one flexible enough to communicate with everyone on my talent roster," he says. The fact that, unlike the competition, the Prima performs well at 128 and 256 kb/s and offers SMPTE time code capability was also a big bonus to George. "When sound quality is key," George says, "the competition is not even close. The noise floor on the competition is simply too high. I've seen the waveform on my computer."

George says the CDQPrima has helped him to "swim with the sharks" and bring in accounts he couldn't have landed without it. When a car dealer with eight dealerships began taking its business to Miami looking for fresh, distinctive voices, George was ready. With the Prima, he was able to bring in big talent and win the account. "It's a great piece of equipment," he says. "No studio should be without it."

Here's Why Audio Professionals Worldwide Choose CDQPrima Over Any Other Codec

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This means you can mix your analog and digital I/O in the same router frame. Go direct analog to analog, or digital to digital. Or mix it up with 24 bit conversion analog to digital and vice versa. Either way, this unique architecture sports flawless signal integrity and non-blocking flexibility.

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Circle (12) On Reader Service Card

World Radio History

TECHNOLOGY UPDATES

Henry Engineering

The MicroMixer from **Henry Engineering** is a four-input, two-output mixer for line-level sources.

The MicroMixer is a utility mixer suitable for combining two stereo

sources to a stereo output, combining up to four mono sources, and mixing mono and stereo sources to a stereo output. Each balanced bridging input will accept a balanced or unbalanced source.

Each input has a level control, providing adjustment from Off to +10 dB of gain. The MicroAssign switches allow input signals to be routed to either the left, right or both outputs. All circuitry is transformerless and direct coupled for sonic integrity. All connections are made through barrier-strip terminals. The unit is constructed with an aluminum enclosure and front panel.

For more information, contact Henry Engineering in California at (818) 355-3656; fax (818) 355-0077 or circle ***Reader Service 216.***

Switchcraft

Switchcraft offers the Front Access TT Patch Panel with IDC terminations, featuring 96 TT jacks with gold-plated switching contacts and nickel-plated frames.

A heavy-duty slide-out tray provides easy access from the front rack for wire terminations. The jacks are paired for simple identification of left and right channels. The single RU panel is available in two configurations with normals brought out, or normaled at jacks.

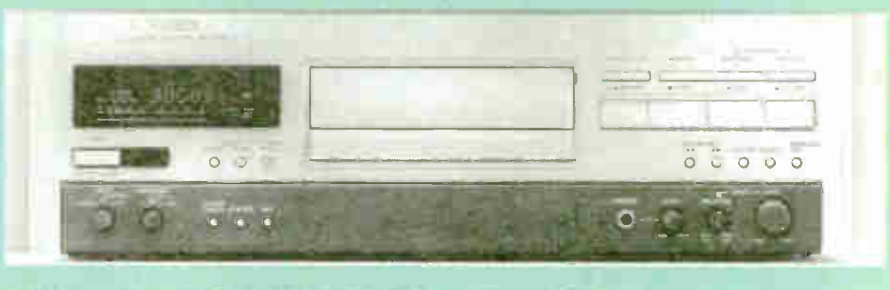
The jack contact resistance is 30 milliohms maximum initially, and 50 milliohms after life. The jack insulation resistance is 10,000 megohms maximum and its dielectric withstanding voltage is 500 VAC at 60 Hz. The wide designation strips are black Polycarbonate 94V-0, and the jack inserts are Thermoplastic 94V-0.

For more information, contact Switchcraft in Illinois at (773) 792-2700; fax (773) 792-2129 or circle ***Reader Service 9.***

Fostex

The D-5 master DAT recorder from **Fostex** can satisfy the basic demands of the radio studio.

Along with the ability to record or play back four hours of music, the unit includes optical S/PDIF inputs



and outputs, and TOC functions that are as easy to use as a CD player. Additionally, the D-5 is equipped with basic pro features such as an ID editing function, 300 times max-speed locate and search functions, AES/EBU digital interface, and GPI and XLR type connectors.

Other features include a clean clock circuit, a PCM error check function, and high-quality A/D to D/A converters for superior linearity, minimum conversion error and ultra-low S/N ratio.

For more information, contact Fostex in California at (310) 921-1112; fax (310) 802-1964 or circle ***Reader Service 112.***

Denon

The DN-C630 from **Denon** is a 2RU single CD player designed for use in radio broadcast facilities and disc jockey applications.

An 18-bit, eight-times oversampling digital filter and Super Linear Converter eliminate both zero-cross distortion components and left-right time differences for ideal sound quality. This approach virtually eliminates D/A conversion errors and allows the CD player to provide pristine sound reproduction.

A long-stroke Pitch Control slider on the far right of the front panel adjusts CD playback speed by up to (9.9 percent in 0.1 percent steps. Playback speed can also be altered using a preset function, which allows the speed to be increased up to (3 percent in 0.2-percent increments.

A large rotary track select knob in the center of the front panel permits

easy track selection, while a dedicated index button provides quick access for index searching. A bright fluorescent tube display provides indication of disc play status, elapsed and remaining times among other pertinent information.

For more information, contact Denon in New Jersey at (973) 575-7810; fax (973) 808-1608 or circle ***Reader Service 164.***

RDS/RBDS "Mini-Encoder"

With this simple, "dirt cheap" encoder, your station can begin transmitting the more important radio-data IDs, service flags and text messages.

Use any PC to quickly and easily enter your station's call letters or "street name," format identifier, translator frequencies and scrolling ads or promos. Menu-driven software transfers this information to the encoder's own non-volatile memory.

This nifty little encoder installs in minutes, locks to any stereo generator and works in to any FM transmitter.

Don't let your station be skipped-over by the new generation of "smart" radios! At just $390 there's no excuse for waiting to put RDS to work for you right now.

MODEL 701 — $390

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World Radio History

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World Radio History

TECHNOLOGY UPDATES

Rane

The SRM 66 from **Rane** is a combined splitter/router/mixer that provides a solution for systems requiring zone distribution room combining and remote level control.

Control consists of a backlit LCD, five buttons and a data wheel. Ten edit pages are used for programming. Six pages control output programming, three are used for group programming and one is for memory functions.

The unit allows independent routing and mix-level adjustment of any input to any output. Each output may have a unique programmable mix of the six inputs, and settings may be copied and pasted between outputs.

The SRM uses groups to "link" attenuation levels and limiter gain reduction of one or more outputs. Outputs may be assigned to any of six groups. Group levels are not affected by memory changes.

A Remote Interface Port (RIP) which supports up to six optional SR 1L "smart" digital remote controls is provided with the SRM 66. Each remote may be assigned to any one of the six possible groups. The remotes control the level of a group but not the output level.

For more information, contact Rane in Washington state at (425) 355-6000; fax (425) 347-7757 or circle ***Reader Service 87.***

Sonifex

New from **Sonifex** is the Redbox, a connection box for use in various radio station projects.

The units are housed in red anodized aluminum boxes which can be screw-mounted to the underside of desks or inside studio furniture. The Redbox can also be rack-mounted for conventional wiring in a central technical area. Units can be either 115 VAC 60 Hz, or 230 VAC 50 Hz, and have a front panel LED power indicator.

According to Sonifex President Marcus Brooke, the company has been building equipment for radio stations for a while and discovered that "we've needed a number of connection boxes for linking professional to domestic equipment and for distributing audio sources."

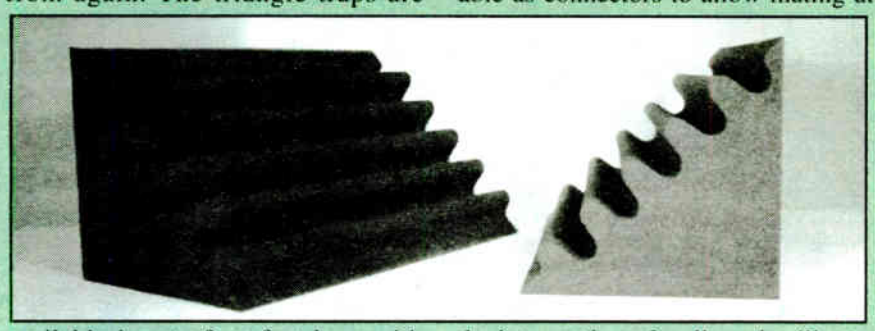
The Redbox series comes in five modules: RB-DA6, a 6-way stereo, 2 x 6-way mono, or 1 x 12-way mono distribution amp; RB-MA2, a dual microphone amplifier; RB-SM2, a dual stereo-to-mono converter; RB-BL2, a balanced-to-unbalanced bidirectional converter, and RB-SL2, a twin mono-to-stereo limiter.

For more information contact Independent Audio in Maine at (207) 773-2424; fax (207) 773-2422; visit the Sonifex Web site at www.sonifex.co.uk *or circle* ***Reader Service 113.***

Acoustics First

The new Bermuda Broadband triangle trap absorber from **Acoustical Foam** is a foam corner trap with a rolling pattern front surface.

The Bermuda name came about because sound entering the corner triangle of the product is never heard from again. The triangle traps are available in sets four feet long with two pair per standard box. Colors may be assorted within the box, allowing a pair of charcoal and a pair of charcoal blue foam traps to be purchased as a package without extra freight.



The triangle traps may also be purchased in two-foot lengths called shorts. These "Bermuda shorts" come packaged in the same carton size as the standard four-foot pieces, only with eight smaller units in each box.

Blocks of matching foam are available as connectors to allow mating at the intersection of walls and ceilings.

For more information, contact Acoustics First in Virginia at (804) 342-2900; fax (804) 342-1107 or circle ***Reader Service 165.***

GEPCO

GEPCO recently unveiled two digital audio cables, models 5524EZ and 5524TS.

Replacing the company's type 5524, the 5524EZ features improved performance and a lower price — suitable for permanent installations and extended runs.

The 110-ohm AES/EBU single-pair cable features two 24-gage conductors and a high-speed foam dielectric with low transmission loss. This allows the cable to be used for runs beyond 650 feet.

The cable, shielded by a bonded 100-percent aluminum/polyester tape with a 24-gage drain wire, features a pressurized outer jacket that keeps the physical spacing between the pairs and the shield consistent. The 110-ohm impedance is maintained even when the cable is stressed and also allows for faster and more reliable transmission.

The 5524TS is a plenum-rated digital audio single-pair cable for permanent installation use in plenum air spaces or high-temperature environments. The cable has two-cellular FEP-insulated, 24-gage tinned copper conductors and a 100-percent foil shield with 24-gage drain wire.

The white plenum PVC master jacket adds flexibility and is UL-listed. The easy-to-strip jacket and insulation enables faster installation.

For more information, contact GEPCO in Illinois at (312) 733-9555; fax (312) 733-6416 or circle ***Reader Service 139.***

Caig

Caig Laboratories offers a series of product cleaners and lubricants for the radio studio, including CaiLube MCL, a moving contact lubricant formulated for conductive plastics and carbon-based controls.

CaiLube MCL is used specifically to lubricate faders, switches, potentiometers and other mechanisms with sliding surfaces. The solution reduces wear and abrasion and maintains a tactile feel on the unit. It can be applied via a metered 100-percent spray, adjustable 5-percent spray and a pocket-sized mini-spray.

The solution is also effective when applied to conductive membrane switches and components. Oil, grease and acids build up on the membrane surfaces due to repeated finger contact, which can lead to device malfunction. CaiLube MCL provides a long-lasting barrier against these types of contamination.

The company also manufactures ProGold, a conditioning solution that improves conductivity and protects gold, base metals and other precious metal contacts and connectors. A protective anti-tarnishing layer provides long-lasting protection for precious metals such as gold, silver, rhodium, copper and nickel.

For more information, contact Caig Laboratories in California at (619) 451-1799; fax (619) 451-2799 or circle ***Reader Service*** **191.**

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World Radio History

TECHNOLOGY UPDATES

Tascam

The Tascam MD-801RMKII MiniDisc recorder combines the technology of preceding models with software and hardware updates to create more speed in random access recording and playback.

The unit's editing and programming capabilities allow the creation and editing of play lists or assigning sound effects on the fly. With digital and analog I/O, as well as other refined operational features, this 3 RU rackmountable MD recorder is suitable for broadcast studios and DJ rigs.

Other refinements include a redesigned rear panel, a logical menu and an intuitive front-panel controls menu for easy integration and operation. 20-bit A/D and D/A converters plus a new input sample rate converter, Sound Sync for auto record start/stop, and an Incremental Play function for automatic cueing of next track playback augment the unit further.

For more information, contact Tascam in California at (213) 726-0303; fax (213) 727-7635 or circle ***Reader Service 217.***

Marantz

Marantz offers the PMD321, a compact disc player with commercial grade quality and features.

The unit's audio quality is achieved through bitstream conversion with 32x oversampling and fourth-order noise shaping to maintain signal clarity. The one-piece 2 RU rackmount chassis ensures stability and professional appearance.

The PMD321 offers defeatable cue-to-music, balanced XLR outputs and XLR digital output, along with independent analog volume output controls.

The PMD321 offers the professional disc jockey all the features necessary for smooth performance, including a fader start input, pitch control, direct track access and an anti-skip mechanism. Remote-control capability is also possible.

For more information, contact Marantz Professional Products in Illinois at (630) 820-4800; fax (630) 820-8103 or circle ***Reader Service 10.***

Technics

Technics offers the SL-PG480A compact disc player, designed specifically for broadcast use.

The unit features a super one-chip LSI featuring MASII 1-bit DAC and an advanced digital servo system to provide crisp sound. Its center disc tray design and centrally-located optical deck mechanisms allows for a balanced weight distribution.

The SL-PG480A has a remote-control unit with 10-key direct access. Twenty selection random-access programming provides flexibility for the disc jockey. The unit also has an optical digital output terminal and a multifunction FL display.

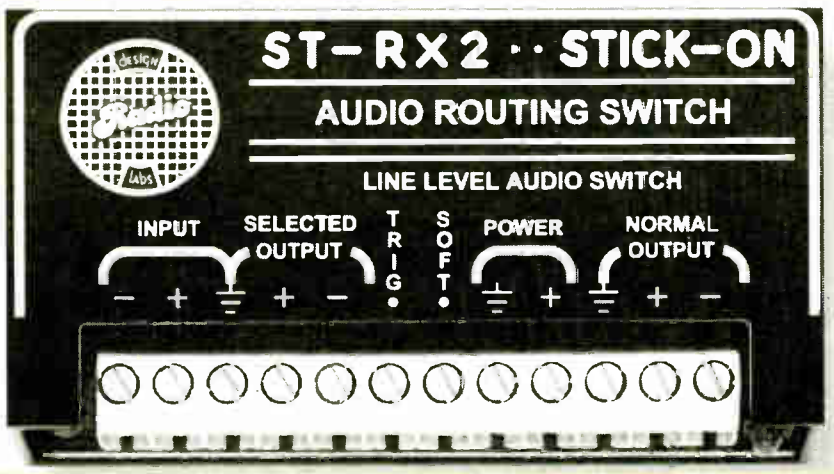
For more information, contact Technics in New Jersey at (201) 348-9090 or circle ***Reader Service 36.***

Radio Design Labs

The ST-RX2 audio routing switcher from **Radio Design Labs** has a single line-level audio input and two line-level audio outputs.

In the absence of a control input, the Normal module output is fed from the audio input. When the Trig control terminal is connected to ground, the input audio is fed to the Select output and the Normal output is switched off. When the Trig terminal is disconnected from the ground again, the Select output is switched off and the Normal output is fed from the input.

The module contains no relays or other mechanical devices. The control circuits use solid-state switching to route the input signal to one of the balanced output line drivers with off attenuation greater than 80 dB at all audio frequencies. Soft switching is used for elimination of clicks and pops.



For more information, contact Radio Design Labs in California at (805) 684-5415; fax (805) 684-9316 or circle ***Reader Service 140.***

RAM Systems

RAM Systems offers two new products for the radio studio: the Model SR201 passive switcher and the PS-M/S monitor/switcher.

The SR201 can be used for automation switching, console or mixer inputs, satellite switching and control room switching to the transmitter. Features include 20 stereo inputs, a parallel port for remote control, relay switching, one stereo output and tally outputs. The model is 1 RU high (1.75 inches).

The Phasescope monitor/switcher (PS-M/S) features six stereo inputs, two VU meters, XLR inputs and outputs and a monitor speaker with volume control. Other features include a variable control with a calibrated setting, phase level control and phase reversal LED alarm.

For more information, contact RAM Systems in Illinois at (847) 487-7575; fax (847) 487-2440 or circle ***Reader Service 166.***

ESE

The ES-101 from **ESE** is an accurate GPS master clock/time code generator which receives time and date information from Global Positioning System satellites.

The data received from this satellite system is presented to the user in the form of three different types of time code: ASCII (RS-232C), ESE-TC89 and ESE-TC90. Two One Pulse Per Second outputs and a GPS "Lock" output are also standard features.

The inclusive eight-channel receiver is able to track up to eight satellites simultaneously, although reception of only one is required for time data to be output.

Several options are available to meet a certain requirement asked from a master clock or time code generator. SMPTE, EBU, IRIG-B or IRIG-E time code outputs are among those available.

For more information, contact ESE in California at (310) 322-2136; fax (310) 322- 8127 or circle ***Reader Service 192.***

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TECHNOLOGY UPDATES

New Frontier Electronics

The SX-15-IR2 and SX-20-IR2 surge suppressors from **New Frontier Electronics** are designed to upgrade and improve surge protection for broadcast equipment.

The two compact standalone units are equipped with optional mounting brackets. The units feature patented Series Mode technology, which provides surge protection for up to 6,000 V and unlimited surge current. Ground contamination is non-existent with these suppressors as well.

Additional features include a magnetic-shielding steel-chassis, two three-prong AC receptacles on the top panel, a self-test circuit with a visual indicator and a six-foot grounded, three-wire line cord (No. 14 cord for SX-15-IR2, No. 12 cord for SX-20-IR2).

For more information, contact New Frontier Electronics in Pennsylvania at (215) 862-9344; fax (215) 862-0270 or circle ***Reader Service 62.***

Ward-Beck

The 8200 Series Audio Distribution System from **Ward-Beck** delivers a strategic, modular solution for audio systems.

The 8200 Series system is based on the MF82 and MF82/4 frames. With harness wiring remaining constant, new or updated equipment can be accommodated with the insertion of digital and/or analog cards. Choice

of terminations include solder, screw, Quick Connect or BNC. The construction of the unit is a functional, rugged aluminum frame.

The system configuration features up to 12 high-performance, plug-in amplifier/accessory cards and dual redundant M8245 switch mode power supplies. The user can address the needs of digital, analog and hybrid systems with this single rack-mount unit.

For more information, contact Ward-Beck in Ontario, Canada at (416) 438-6550; fax (416) 438-3865 or circle ***Reader Service 88.***

AEQ

The DA-16T from **AEQ** is a modular distribution amplifier, associated with the company's 02 Modular Audio Signal Processing System.

The DA-16T hooks into the RA-32 main chassis, a standard 19-inch chassis 3RU high. The DA-16T has one input and six transformer-balanced mono outputs, with independently adjustable control for each output to obtain a gain of up to 14 dB. Its maximum input level is +24 dB and output impedance is <60 Ohms. The absolute output noise of the DA-16T is <-90 dBv.

For more information, contact AEQ in Florida at (954) 424-0203; fax (954) 424-0902 or circle ***Reader Service 61.***

Nemal

The 37-pin 12-channel audio connector from **Nemal** offers ease of termination and durability.

The new audio connectors are compatible with industry standard DT12, Canon FK37, Canare and Litton. They feature extra-strong military spec plating and a heavy-duty, single-piece machined body.

Available with either crimp or solder contacts, these waterproof connectors lock into place to prevent conductor breakage during mating. A wide selection of strain reliefs are available for cables up to .625 inches. Dust caps attach directly to the connectors when not in use.

For more information, contact Nemal in Florida at (305) 899-0900; fax (305) 895-8178 or circle ***Reader Service 138.***

Benchmark Media Systems

The ADA2008 from **Benchmark Media Systems** is a bidirectional, four-channel, 20-bit audio A/D-D/A converter system.

Contained in the heavy-gauge, RF-tight, 1 RU chassis are four channels of digital-to-analog conversion, four channels of analog-to-digital conversion and an internal power supply. The ADA2008 is ideal for multichannel recording/monitoring, VTRs and routing switchers.

Eight nine-segment true-digital meters provide a coarse scale for signal presence monitoring, and a fine scale for precise level monitoring near Full-Scale-Digital. The 1 dB fine scale also has a selectable peak hold function for holding the highest peak until manually reset. FSD detection is exact.

For more information, contact Benchmark Media Systems in New York at (315) 437-6300; fax (315) 437-8119 or circle ***Reader Service 219.***

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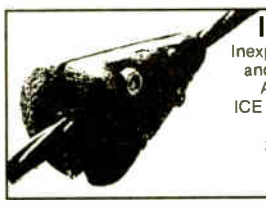

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AMPLIFIERS

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Marantz 2440 vintage quadradial amp, vgc, manuals, $125/BO; Fender twin reverb, 1972 guitar amp, mint cond, $450/BO. J Thornton, 320-634-3213.

McIntosh Mac 1900 stereo rcvr, $300; Heath W5M (pair) mono tube amps w/preamps, $400/all; Harmon-Kardon Citation 12 stereo power amp, $150. C Collins, 414-363-9205.

Datatek 9 input, mono, each input w/4 outputs, rack mount in working order, $100/BO. D Nuechterlein, 517-652-6863.

Want to Buy

Audio dist amp suitable for stereo, each chnl must have level adjustments, needs to be in gd cond. H Kneller, 941-494-4111.

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ERI FML 3E 3 bay rototiller antenna w/DC stub & heaters, vgc on 104.1 MHz, $3500; Shively 6810 2 bay on 99.1, like new, $1000. C Gennaro, 906-932-2411.

Jampro JHCP-4 4-bay circ pol FM antenna, BO. S Perez, 323-882-8000.

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AUDIO PRODUCTION

Want to Sell

Altec 1607A powered Solid State mixer/amp in Altec table top rack, excel cond, $75; dbx 2 chnl compressor/limiter, $175; McMartin LX-10C single chnl mic-pre, $25. J Borden, 414-482-8954.

Dielectric DC 485-431 RF 3-pole 4" patch panel. Mr Fair, 773-784-1558.

Roland SRV330 reverb unit, spacial reverb 32 bit digital, over 300 effects barely used, looks new, manuals, $395/BO; Lexicon LXP1 effects unit, reverb/delay & chorus unit, barely used, manuals, $195/BO; Tascam 2400 dbx unit for Tascam 38 & 32, like new. J Thornton, 320-634-3213.

Sony PCM-501ES PCM digital rcdr processor, $500. B Meuse, 650-969-2433.

Valley People 2x2 interface box, XLR to RCA levels, $100. D Kocher, 610-776-1455.

Audiometrics voice over booth, $950 +shpg. J Baltar, 207-623-1941.

dbx 3BXIII 3 band dynamic range expander w/impact restoration, $75; Furman LC-3A limiter/compressor, $75. 561-832-0171.

ESE digital countdown timer, gd cond, $75; Matchbox 2 chnl stereo line mixer, gd cond, $75; Excalibur dual stereo line amp, gd cond, $75. P Wolf, 941-458-3777.

Koss LV-20 stereo headphones, new in box, will trade for older pair of working AKG K-144 or K-240 headphones; Fostex 3180 stereo reverb w/24 mS pre-delay, rack mountable, vgc, will swap for UREI Cooper Time Cube (920-16); Sennheiser HD 414 light weight, open-ear design headphones, new pair, $50, used pair $30; AKG RR-25 remote control w/33' cable & connector for AKG BX-25 reverb unit, will trade for Teac RC-71, RC-170 or RC-190 remote; Burwen TNE 7000A stereo transient noise eliminator, gd cond, will trade for working UREI Cooper Time Cube (920-16). J Roper, 812-877-2663.

Patchbays, (12) ADC PPA3-18MKIINO, 48pt to Punchblock @ $499 ea, B Stock. Call Redco Audio, 800-572-7280.

Want to Buy

Neve, Api, Gates, Longevin, Collins, Lexicon & other mic preamps, Eqs, reverbs, delays. T Coffman, 619-571-1645.

Sony MU-R201 dedicated rever processor. B Meuse, 650-969-2433.

AUTOMATION EQUIPMENT

Want to Sell

ABC Netcue II, gd cond, $100. P Wolf, 941-458-3777.

Sono Mag ARS-1000, (3) Carousels, (4) PB cart machines, (5) Otari PB r-r, use as full or simi automation, $1000. D Brabandt, 812-738-9622.

Format Sentry FS12C w/CD interfaces for up to 16 CD players, w/3 FS data latch cards, vgc, $1000. C Gennaro, 906-932-2411.

Schafer 800-T controller for use w/r-r equipment, $500 +shpg. J Bahr, 340-719-9336.

Want to Buy

SMC MSP-12 controller & switcher, power supply & keyboard. Rick, 505-762-6200.

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Tapecaster 700 mono cart PB, fair cond, $100. M Fitzner, 706-291-9766.

Audicord mono play decks (3), gd cond, $100 ea. P Wolf, 941-458-3777.

Dynamax CTR100 R/P, splice finder, stereo cart machine, excel cond, $700; (2) BE 2100 Series cart R/P mono, $300 ea; BE Phase Trak 90 player, $225. Danny, 318-445-4843.

ITC 3D triple deck stereo cart player, vgc, $500; Audicord A Series reproducers (2), fair cond; Audicord DL Series mono recorder, great cond, BO . C Gennaro, 906-932-2411.

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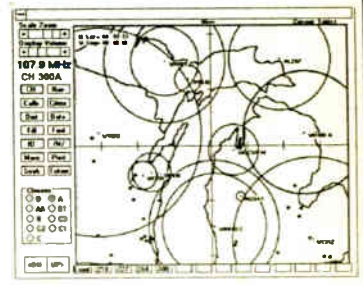

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CD PLAYERS

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Pioneer PD TM 3 triple six pack CD players, like new (14 avail), $125 ea. C Gennaro, 906-932-2411.

CONSOLES

Want to Sell

McMartin B-802 stereo console, gd cond, $800; Harris mono-5 console, gd cond, $350; Peavey CS-X2 crossover, $75. M Fitzner, 706-291-9766.

Soundcraft 400B 16x4x2 mixer, British, EQ, $2000. J Borden, 414-482-8954.

Tascam 1508 8 chnl stereo mixer, like new, manuals, $395/BO. J Thornton, 320-634-3213.

Yamaha Pro Mix-01 in gd cond w/digital out, $750. Mr Fair, 773-784-1558.

Ampex AM10 6x2 mixer, $295; Altec tube mixer 4 mic, 1 line, $695. J Price, 214-321-6576.

Ampex MR70 tape recorder console. J Price, 214-321-6576.

Quantum AM-168 & QM-120 16x8 audio board w/patch bay & console, $2500; Gately 16x8 audio board w/quad monitoring, XLR connectors on all inputs & outputs, in custom console, 4 effects returns, $800. A Baker, 317-925-7371.

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CONSOLES continued...

UREI 1653, missing one fader knob. vgc; Sparta AS-15B in flair cond. H Kneller, 941-494-4111.

MCI/Sony 618. 24x24. $6.5K; Quantum 24x24. $4.5K; Soundcraft 600, 32x16. $5.5K. like new: Model 30. $295: 512. $950: 520. $1450. W Gunn. POB 2902. Palm Springs CA 92263. 760-320-0728.

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Altec 1567A; Gates or RCA "The Yard" or BC6 in stereo or dual mono. M Schackow. 605-374-3424.

Arrakis 500SC console power supply. S Gray, 501-332-6981.

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LIMITERS

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Orban Optimod 8000, recently recapped, gd cond. H Kneller, 941-494-4111.

Symetrix 528E mic processors, new cond, $225: CRL SEP800, SMP-800, SG-800 FM processors, excel cond. $350 ea or $850/complete: Orban Optimod 8100A/ST studio chassis, gd cond, $300. P Wolf, 941-458-3777.

Want to Buy

Altec 436C or 438C: Gates SA-39B. M Schackow. 605-374-3424.

Teletronics or Urei (LA 2, 3, 4, 1176). Gates, RCA, cbx (160-165). Altec, Collins. T Coffman. 619-571-1645.

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RCA 77DX in excel cond, $1200 or will trade for Urei 1176 or 1178. M Schackow. 605-374-3424.

OC White mic arms w/risers, gd cond, also one Luxe arm, gd cond. H Kneller, 941-494-4111.

Neumann U47. $3900: U67. $3300: U87. $1800: KM83 or 84 pairs. $1400; KM88s. $950 ea; RCA 77DX. $1200: BK5. $700: BK1A. $300. W Gunn. POB 2902. Palm Springs CA 92263. 760-320-0728.

Want to Buy

Neumann U-89 in gd cond. will pay up to $1300. Mr Fair, 773-784-1558.

RCA 77 & 44 or other ribbon mics, dynamics & tube mics. T Coffman, 619-571-1645.

EV 666. also need desk stand, mic holder & connector for 666. D Sites. VOA. PSC 74 Box 25, APO, AE 09718.

RCA 77-DX's & 44-BX's, any other RCA ribbon mics, on-air lights. call after 3PM CST. 972-271-7625.

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.

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Hosa 16 chnl multitrack snake, barely used. 10' long. $95/BO. J Thornton. 320-634-3213.

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Motorola consolette 2-way base station w/T1600BM base station controller, gd cond. $300; RCA stereo/dual channel consolette BC-7A, gd cond. $600. M Fitzner, 706-291-9766.

RCA Stereophonic pre-amp Eqs (2) BA-36A, $60/ea: RCA 216160 stepper switch, new. $100. M Fitzner, 706-291-9766.

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Magellan 2000XL, brand new, $100. P Wolf, 941-458-3777.

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Gentner G2500 Super Hybrid, $950. Gentner Tele-Switch $350, both items like new. S Kirsch, 516-763-1776.

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Telos Zephyr 9200 codecs, manual, rarely used, $3700/BO. J Din, 714-775-2340.

Comrex 2-line freq extender. xmtr & rcvr. $1995 for both ends. Steve Kirsch. 90 S Long Beach Rd. Rockville Centre NY 11570. 516-763-1776.

Want to Buy

McKay Dymek DA5, 6 or 9 rcvr directional antenna. J Hartt. 206-282-0720.

Marti 15/C composite STL receiver. J Bahr. 340-719-9336.

RECORDERS

Want to Sell

Ampex 350 & 351 tube audio electr/mic pre's. excel cond. BO. J Borden. 414-482-8954.

Ampex AG-600B r-r. fair cond. $300; Ampex AG-600B electronics only, no transport, $75; Ampex AG-600 tube type r-r, fair cond. $200: (2) ITC 750 Series r-r PB units. $100 ea. M Fitzner. 706-291-9766.

Pioneer PDR-05 CD rcdr w/box. manual. $450. D Kocher. 610-776-1455.

Revox A-77 1/4 trk in cabinet w/speakers, gd cond, $400. Mr Fair, 773-784-1558.

Revox A77 r-r tape rcdrs (2), fair cond, $175/ea; (3) Viking model S r-r PB decks, $26/ea. M Fitzner, 706-291-9766.

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Dokorder 1140 4 trk 1/4" r-r, 10", 7 & 15 ips, excel cond. $150. J Mindy, 716-377-1880.

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Ampex 4 trk tube deck, $2500: stereo 351 (recond), $1800: Akai Adam. new, digital 12 trk, $3500; MM1000-16 w/new heads, $4500: Otari MTR10-4, $3500; Ampex ATR102s. search to cue, $495: Ampex locator for ATR or 1200. $895: MCI 110C-8. $3.5K: Tascam 85-16 recond w/dbx, rc & loc. $3K. W Gunn, POB 2902. Palm Springs CA 92263. 760-320-0728.

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Collins 830-D 1 kW FM w/2 exciters, one is original Collins, the other is McMartin B-910, both working, currently used as backup on 104.9, have spare (new) PA tube (4CX1000A) & manuals, u-haul. BO. D Land, 618-842-2159.

Gates BCP5P2, circa 1962, on 1320 kHz until 8/98, spares, manuals, etc. $2700. C Cook. 931-728-1320.

Harris Gates 1000/250 W tuned to 1550, not working, gd for parts. $500. D Brabandt. 812-738-9622.

Harris MW50-C AM xmtr, excel working cond when removed. $35,000. J Weitzman. 202-682-3536.

Marti M-30BT VHF remote xmtr. $350. M Fitzner. 706-291-9766.

QEI FM1-5000 1991 xmtr w/QEI 695 exciter & spare kit, great cond. BO. G Marshall. 732-224-2470.

RCA BTF-1E 1 kW complete w/original BTE-10C exciter & BTS-1A stereo gen. BO. M Fitzner. 706-291-9766.

Transmitter harmonic filers (2). 40 KW rating ea, super clean. $900/ea or $1500/both. D Kidwell. 512-258-0933.

Collins 310Z2 exciter for parts, no manual. H Kneller. 941-494-4111.

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ARMSTRONG TRANSMITTERS
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Collins 820D-2 1 kW AM on 1310, gd cond. S Gray. 501-777-8423.

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Harris 2.5K, less exciter, needs plate transformer, blower & overload relay card. BO. J Bahr. 340-719-9336.

Harris FM-5CD, less exciter, like new. $16,500. P Wolf. 941-458-3777.

QEI Quantum 300E 300 W solid state xmtr w/synthesized exciter, excel cond. $4800; 100' Cablewave 1/2" foam line w/Type N fittings, excel cond. $200. C Gennaro. 906-932-2411.

Ricks College (KRIC), Rexburg, ID will sell radio xmtr/site including Continental 816R4 FM xmtr, 300' Pi-Rod guyed tower, Orban Optimod, QEI-691 mod mon, STL xmtr & rcvr, Moseley remote control, 12'x20' steel bldg, racks, cables, etc (all or part). B Wilson. 208-356-2309.

Want to Buy

Low pwr FM stereo tube xmtr, cond not important. C King. 860-665-2881.

LPB older tube-type model, AM low pwr xmtr w/power line coupler & instruction manual, 5 W or so. D Sites, VOA, PSC 74 Box 25, APO, AE 09718.

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

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100 W	FM	1985	Harris FM100K	1 KW	AM	1978	Collins 820D1
6KW	FM	1994	Henry 6000D	5 KW	AM	1980	CSI T-5-A
20KW	FM	1976	Collins 831G	5 KW	AM	1978	Collins 828E1
25KW	FM	1981	Harris FM 25K	50 KW	AM	1978	Continental 317C-1
25KW	FM	1981	Harris FM 25K	50 KW	AM	1982	Harris MW-50B
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World Radio History

AMPLIFIERS

Want to Sell

Marantz 2440 vintage quadradial amp, vgc, manuals, $125/BO; Fender twin reverb, 1972 guitar amp, mint cond, $450/BO. J Thornton, 320-634-3213.

McIntosh Mac 1900 stereo rcvr, $300; Heath W5M (pair) mono tube amps w/preamps, $400/all; Harmon-Kardon Citation 12 stereo power amp, $150. C Collins, 414-363-9205.

Datatek 9 input, mono, each input w/4 outputs, rack mount in working order, $100/BO. D Nuechterlein, 517-652-6863.

Want to Buy

Audio dist amp suitable for stereo, each chnl must have level adjustments, needs to be in gd cond. H Kneller, 941-494-4111.

ANTENNAS/ TOWERS/CABLES

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ERI 2 bay FML CP antenna, tuned to 105.5 MHz, mint cond, unity gain, on ground ready to go in Ohio, $1200/BO. D Palmer, 740-593-6651.

ERI FML 3E 3 bay rototiller antenna w/DC stub & heaters, vgc on 104.1 MHz, $3500; Shively 6810 2 bay

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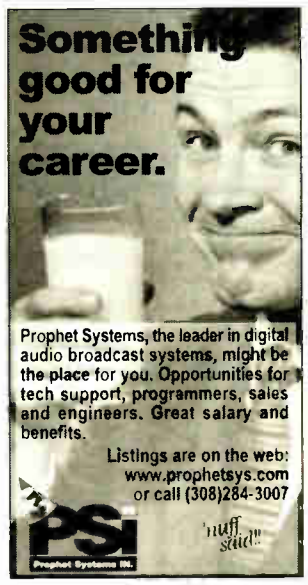
We offer a competitive compensation, benefits package including 401-(k) match & relocation assistance. Contact Custom Business Systems, Inc. HR Manager, PO Box 67 Reedsport, OR 97467, E-mail HR@cbsi.org, Fax 541-271-1401, www.cbsi.org.



RADIO MAINTENANCE ENGINEER: The person's responsibilities include maintenance of radio transmitter and studios facilities within 100-mile radius. The person should have at least five years of experience. some transmitter & Digital systems experience preferred. Should have or be working on SBE certification. Broadcast engineering experience, equivalent technical/military training and comfort with demands of this field is a must. Send Cover letter and resume to Technical Services Group, Inc., 12015 Cloverland Court, Baton Rouge, LA 70809. FAX: 504-753-1726 or email at amh@tsgcom.com.

POSITIONS WANTED

Graduate of broadcasting school ready to get career kicked off, music & sports fan that knows all the basics of a radio station. Chris, 405-282-4508.

Seasoned, dependable AT, production, news anchor like ne, attracts loyal listeners & sponsors. Salary above poverty level appreciated. A McKuen, 513-777-8423.

Baby broadcaster seeking a shot to show off, trained with the basics, just need a chance, prefer Oklahoma. John, 405-630-5091.

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ACTION-GRAM

EQUIPMENT LISTINGS

Radio World's Broadcast Equipment Exchange provides a FREE listing service for radio stations and recording studios only. All other end users will be charged. Simply send your listings to us, following the example below. Please indicate in which category you would like your listing to appear. Mail your listings to the address below. Thank you.

Please print and include all information:

Contact Name _____
Title _____
Company/Station _____
Address _____
City/State _____
Zip Code _____—_____
Telephone _____

Brokers, dealers, manufacturers and other organizations who are not legitimate end users can participate in the Broadcast Equipment Exchange on a **paid** basis. Line ad listings & display advertising are available on a per word or per inch basis.

Are you currently a subscriber to Radio World?
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Signature _____ Date _____

Please check only one entry for each category:

I. Type of Firm

☐ D. Combination AM/FM station ☐ F. Recording Studio
☐ A. Commercial AM station ☐ K. Syndicators/Station Providers
☐ B. Commercial FM station ☐ G. Audio for Video/TV Station
☐ C. Educational FM station ☐ H. Consultant/ind engineer
☐ E. Network/group owner ☐ I.Mfg. distributor or dealer
☐ J.Other _____

II. Job Function

☐ A. Ownership ☐ G. Sales
☐ B. General management ☐ E. News operations
☐ C. Engineering ☐ F. Other (specify)
☐ D. Programming/production _____

WTS ❑ WTB ❑ Category: _____
Make: _____ Model: _____
Brief Description: _____

Price: _____

*Closing for listings is every other Friday for the next month's issue. All listings are run for 2 issues unless pressed for space or otherwise notified by listee.

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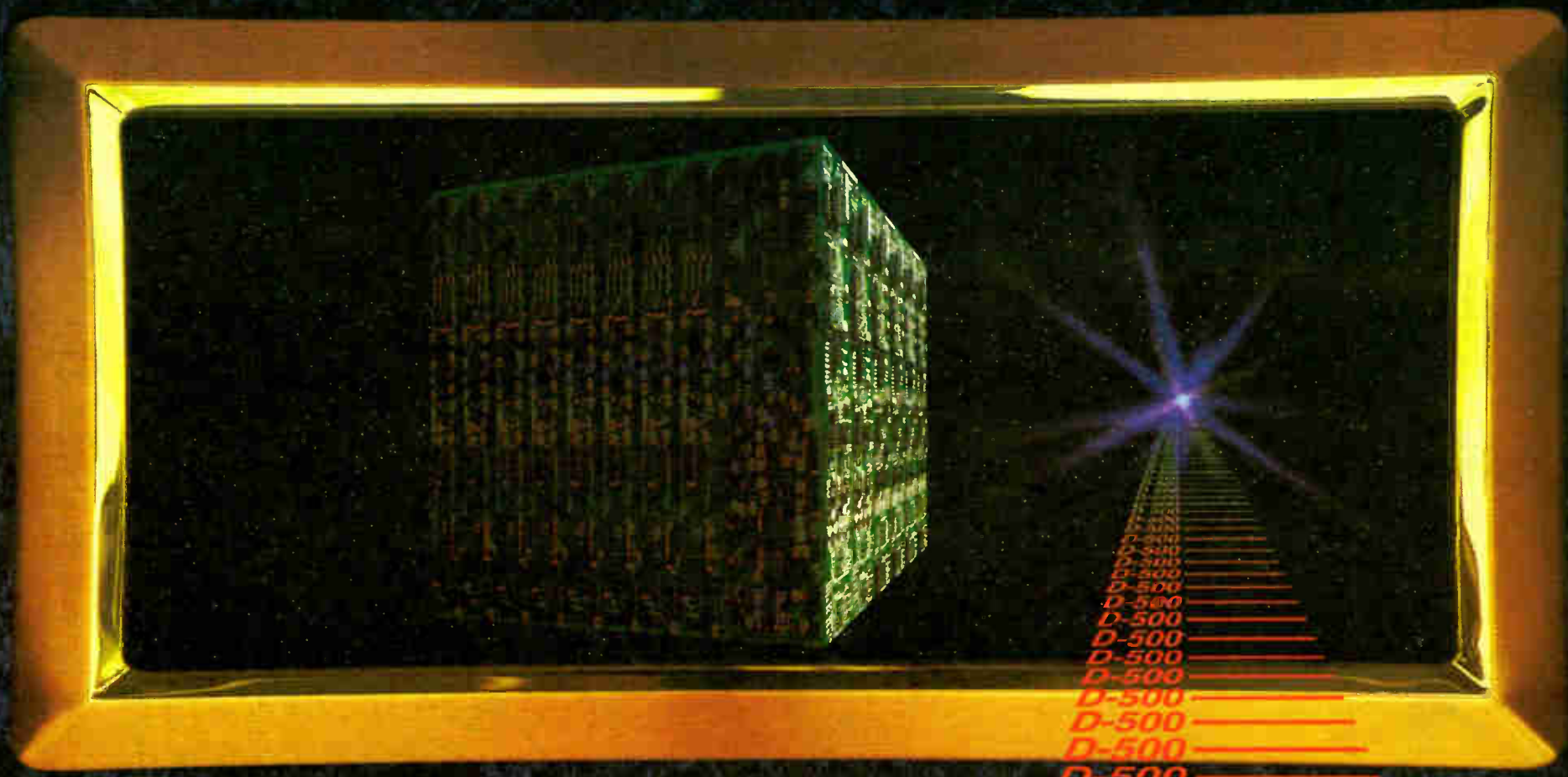
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