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The Newspaper for Radio Managers and Engineers
December 23, 1998

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www.rwonline.com

DAB: Leaping or Inching Forward?

by Leslie Stimson

WASHINGTON What progress did digital radio make in 1998?

The year certainly saw dramatic changes in the digital audio broadcasting landscape for both in-band, on-channel and satellite-delivered technologies; and 1999 promises more change, as proponents of both technologies push toward their goal of broadcasting digitally around the year 2000.

As we move into 1999, many of the IBOC and satellite-delivered DAB system (S-DARS) proponents are preparing for the Consumer Electronics Show in Las Vegas. That event provides a chance for them to meet with receiver manufacturers and keep them up to date on technology and regulatory developments.

Satellite DAB proponent XM Satellite, formerly American Mobile Radio Corp., recently announced agreements to license its technology for the manufacture of receivers to Alpine Electronics, Pioneer Electronic Corp. and Sharp Corp. XM Satellite also signed an agreement with STMicroelectronics to make computer chips to process the digital signal for the receivers.

The other proponent of satellite-delivered DAB, CD Radio, previously signed such a deal with Lucent Technologies. CD Radio Chairman and Chief Executive Officer David Margolese said he hoped to announce receiver agreements by the end of 1998.

The three IBOC proponents plan to concentrate on field testing their prototype FM and AM IBOC systems this year. USA Digital Radio and Lucent Digital Radio hope to complete their field tests by the end of 1999, while Digital Radio Express has said it plans to be done with field tests earlier, by next summer.

USADR plans to begin hiring engineers and other employees starting next month to build the necessary infrastructure to begin field testing. The new employees would help build prototype units for testing and putting equipment in place to run the tests.

Company executives are still choosing

See DAB, page 7 ▶

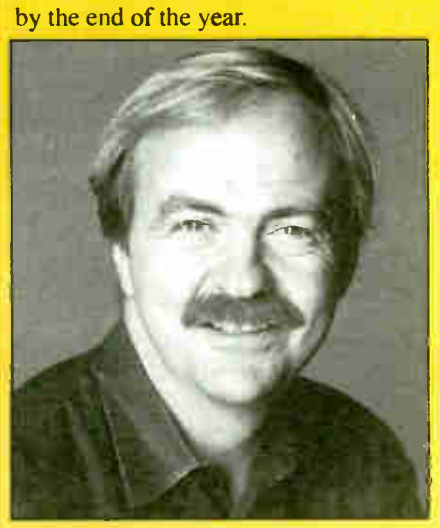
Circle (104) On Reader Service Card

New Leader For UPI Seen Soon?

James Adams Served Only 14 Months as CEO. What's Next?

by Randy Stine

WASHINGTON The board of directors for United Press International hoped to name a successor to former Chief Executive Officer James Adams by the end of the year.



James Adams

Adams resigned in August after 14 months in the position. Adams remains a member of the executive

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World Radio History

◆ NEWSWATCH ◆

Digital Confab In March

ARLINGTON, Va. The 10th annual Digital Engineering Conference — Consumer Electronics Future — has been slated for March 23 and 24, in New Jersey.

The Consumer Electronics Manufacturers Association and the Institute of Electrical and Electronics Engineers Consumer Electronics Society are co-sponsoring the event. Topics to be discussed include the IEEE "FireWire" Standard 1394 for digital audio and video interchange, copy protection, digital recording and multichannel audio. Speakers and presenters are slated from the Walt Disney Co., Dolby Laboratories, NBC Cable and Sony U.S. Research Labs.

The conference is to be held at the Crown Plaza Hotel in Hasbrouk Heights, N.J. For more information, visit Web site *www.eia.org*

Clear Channel, Jacor Spin-Offs

Clear Channel Communications and Jacor Communications have proposed divesting 20 stations in five markets to satisfy ownership rules, once the companies combine. If approved by regulatory bodies, the merger is expected to close by September of 1999.

Based on ownership as of Oct. 7, and assuming the divestitures go through as planned, the combined entity would own, program or sell airtime for 432 radio stations, 21 TV stations and more than 274,000 outdoor display faces.

Fourteen of the 20 radio stations to be divested are owned by Clear Channel; six stations are owned by Jacor. The largest number of stations being divested are in the Tampa/St. Petersburg market.

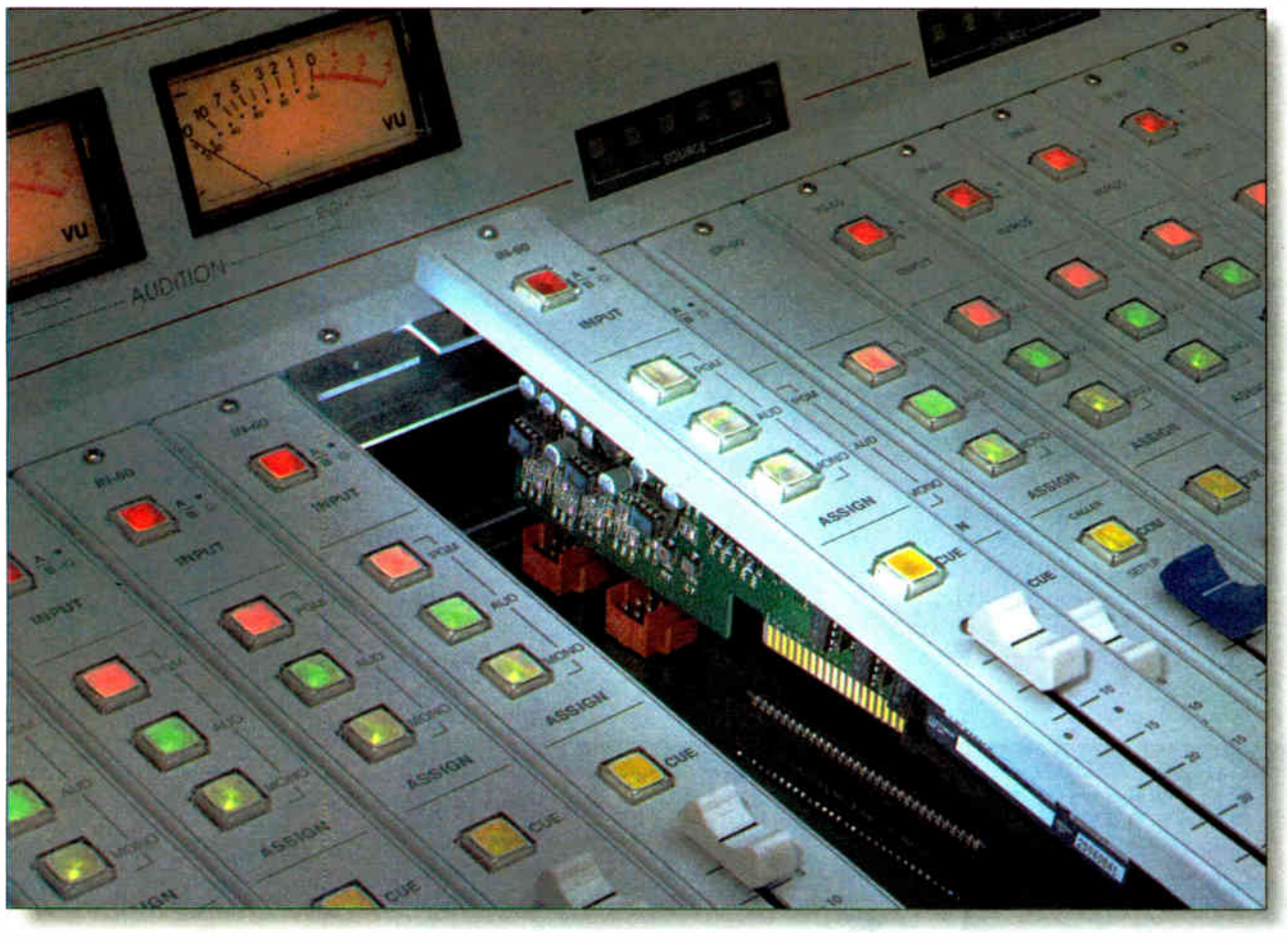
HF Operators Shut Down

The FCC shut down four high-frequency unauthorized radio stations in late October. The commission said the four were operating on 6955 kHz in the shortwave band. The FCC withheld the names of the operators pending official further action.

One of the four told **RW** he was in the

See NEWSWATCH, page 3 ▶

Take a LOOK at THIS:



Then look at our competition.

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DIM	
Mic & Line, +16dBu	.005%
DYNAMIC RANGE	
Line	114dB
Mic	98dB
HEADROOM	
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Who's on Top: The Big Deals of '98

Ownership Consolidation Accelerates as Impact of Telecom Act Is Felt in Earnest

by Lynn Meadows

CHANTILLY, Va. The radio ownership picture continues to shift as 1999 approaches. While it is hard to foresee what deals will be brokered next year and at what prices, 1998 marked the first time a pure radio transaction was valued in the billions.

Here are the top 10 deals announced in 1998, as ranked by BIA Research MEDIA Access Pro.

Top of the Charts

Radio's revenue leaders have changed in the past 12 months, thanks in part to acquisitions and mergers. Radio's billion-dollar club is now up to three companies. Here's how they stack up, according to BIA Research Inc.

1997			1998		
Company	Estimated Revenue (millions)	No. of Stations	Company	Estimated Revenue (millions)	No. of Stations
CBS Corp.	$1,384.32	170	Chancellor	$1,604.02	474
Chancellor	$816.20	99	CBS Radio	1,495.63	161
Capstar	$579.05	325	Clear Channel	1,107.03	462
Jacor	$557.85	186	ABC Radio	327.10	38
Clear Channel	$408.35	169	Cox Radio	248.55	58
ABC Radio	$306.25	27	Entercom	180.85	42
Cox Radio	$216.52	49	Heftel	163.90	39
Emmis	$140.25	14	Emmis	156.73	16
Heftel	$137.65	37	Citadel	155.27	134
Sinclair	$129.15	58	Susquehanna	141.40	23

Source: BIA Research Inc.

Estimated revenue reflects announced deals. Estimates are based on 1997 pro-forma estimated revenue as of Nov. 24, 1998. In this chart, BIA gives companies credit for owning stations for 12 months in 1998, regardless of when a purchase was announced, based on the companies' 1997 estimated revenues.

Deals

• Clear Channel will buy Jacor Communications for $4.4 billion. Completion of the purchase is anticipated before the end of third quarter in 1999. At that time, Clear Channel will own over 450 stations and become the third-ranked group in the United States behind Chancellor Media and CBS Corp.

• Chancellor Media Corp. and Capstar Broadcasting Partners will merge in a $4.1 billion stock-for-stock transaction. When combined, according to press releases issued by Chancellor, the company will be valued at more than $17 billion. The new group will oust CBS Corp. from first place among radio groups in terms of both revenue and station count.

• Capstar announced it would buy Triathlon Broadcasting for $190 million. Triathlon owned 32 stations in six markets in addition to a Muzak franchise in Nebraska and a regional sports network with rights to University of Nebraska football. Triathlon's 14 stations in Washington are Capstar's first in the Northwest.

• Entercom, the Philadelphia-based Entertainment Communications Inc., announced its plans to buy five stations from CBS Corp. for $140 million. The privately held radio company moved up with its purchase of the five Boston-area radio stations. The deal was announced in August.

• In January, Entercom announced its plans to buy seven stations from Sinclair Communications Inc. for $126.5 million. The transaction includes four stations in Rochester, N.Y., and three in Portland, Ore. The move boosted the Entercom station count in Portland to six.

• In November, Heftel said it would purchase KSCA(AM) in Los Angeles from Golden West Broadcasters. Total dollar value: $102 million.

• In August in an assets-for-cash deal, Chancellor Media announced it would buy WDOK(FM) and WRMR(AM) in Cleveland from Independent Group Limited Partnership for $95 million.

• At the same time Chancellor announced plans to purchase three more Cleveland stations — WZAK(FM), WZJM(FM) and WJMO(AM) — from Zapis Communications for $93.75 million. According to a Chancellor press release, the Cleveland stations are being bought for roughly 13.3 times projected 1999 broadcast cash flow.

• Chancellor Media made plans to purchase KASE(FM) and KVET(AM) in Austin, Texas. The duopoly purchase from KVET Broadcasting is valued at $90.25 million.

• Last, but by no means paltry, in September, Chancellor Media said it will buy KFYI(AM), Phoenix and KKFR(FM), Glendale, Ariz. from Broadcast Group Inc. for $90 million.

Clear Channel will buy Jacor Communications for $4.4 billion and will own more than 450 stations.

◆ NEWSWATCH ◆

▶ NEWSWATCH, continued from page 2

room when a one-hour program was aired on that frequency, but said his own equipment was not used for the broadcast, which he called "a Halloween prank that backfired." He said FCC officials did not seize equipment, but instead gave the group a verbal warning.

The FCC said the four unauthorized broadcasts were in Tewksbury, Mass., Glendale Heights, Ill., Katy, Texas and Sierra Madre, Calif.

Tower Marriage

American Tower Corp. (NYSE: AMT) and OmniAmerica (NASDAQ: XMIT) plan to merge in a stock swap.

Under an agreement approved by the boards of both companies, OmniAmerica shareholders would receive 1.1 shares of American Tower Class A common stock for each OmniAmerica share.

American Tower would exchange nearly 18 million shares of its stock for about 16 million shares of OmniAmerica stock, and assume OmniAmerica's debt.

If the deal receives regulatory approval, the combined company would own or operate more than 3,000 towers, with plans to build 800 more.

Jack Furst, chairman of OmniAmerica and partner of Hicks, Muse, Tate, & Furst Inc., will join the American Tower board. Hicks Muse is OmniAmerica's largest stockholder.

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World Radio History

What Went Wrong in Ohio?

At the risk of playing Scrooge, I have an anecdote to pass along. A frustrated radio person in Ohio writes to me that his former "powerhouse station of news" has lost three senior reporters within a week and is likely to lose more, because the group owner has decided to use the staff to prepare and deliver "local" news for a sister station 100 miles away.

The owner, which took over the station two years ago, also wants the staff to provide headlines for another station down the hall, and to create newscasts at yet another station in a third, nearby market.

Two experienced reporters left to work for the cross-town competitor. A third resigned. Most of the station's remaining employees, our reader writes, are struggling to cover the nearly 90 hours of shifts left vacant by the departures, and many are looking for work elsewhere.

'Yes, these big companies have to make money, but must it be at the expense of talent and listeners alike?'

— A Reader Lament

The writer wished to remain anonymous while he still has a job. But the lament in his letter is obvious: "Yes, these big companies have to make money, but must it be at the expense of talent and listeners alike?"

I have written about the importance of finding a balance between good technology and good use of people. This reader feels his employer has lost that perspective.

We don't know the realities of this group's financial situation. It may have good reasons for trying to find more productivity in its existing assets. But I would agree that, if the managers of the cross-town station are wise, they may be able to sculpt out an advantage, positioning that station as the preferred provider of local content. In the long run, the strategy of our reader's employer may be self-defeating.

My wish for the New Year is that radio owners rediscover that productive balance between staying competitive and retaining the special atmosphere that has always set radio apart from other industries and careers — an atmosphere that also plays to radio's strength in localism.

Alas, for many people who love radio that atmosphere is already gone. What do you think?

★ ★ ★

If you are like me, you keep an eye out for interesting developments in other media that might affect radio later.

One such item was a recent action by the FCC. It established "a program for assessing and collecting fees for the provision of ancillary or supplementary services by commercial digital television licensees as required by the Telecommunications Act of 1996."

The rules establish a fee of 5 percent of gross revenues received from "certain ancillary or supplementary uses of the DTV bitstream." The fee will be assessed on revenues from ancillary or supplementary services, for which the licensee receives compensation other than ad revenues used to support broadcasting.

Long-range thinkers in radio, pondering how the FCC might implement a digital radio system, should keep in mind the government's increasing tendency to find ways to generate revenue from the spectrum. The TV industry may indeed have avoided an expensive bill from Uncle Sam when it won spectrum for digital services. But the final invoice has yet to be mailed.

★ ★ ★

A reminder from our circulation manager: Please do not use the Reader Service Card included in your copy of **Radio World** to renew your subscription. Use the separate card provided for that purpose. This will speed our replies to both.

★ ★ ★

Radio Computing Services Inc. is putting on the swank in the Big Apple next month.

The company is planning an exclusive Selector for Windows demo on Jan. 6 for stations in the New York City metro, as well as top consultants and other non-radio users like MTV. We hear that RCS is providing limos for all the GM and PD types to bring them to the RCS plant in White Plains for food, drinks and tours. As one RCS official put it, it is news in itself when you get more than two New York stations together in a room.

The event also marks Selector's birthday; the music scheduling system is 20 years old in 1999.

★ ★ ★

In this issue, *Buyer's Guide* Editor Brian Galante has put together an overview of new products available in the categories of STL, RPU and EAS.

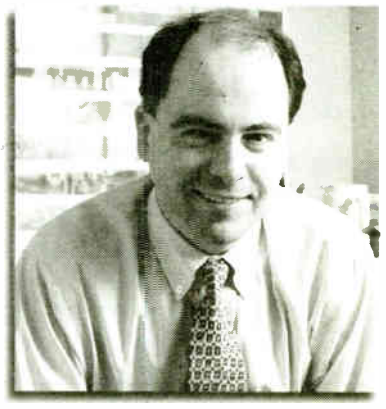
I'm interested to hear from you about how evolving technology has changed your use of equipment in these areas of your station. Have you switched to a digital wireless STL? Is it uncompressed? How about the bigger pipeline offered by T1; are you putting that to use? Will radio stations someday rely instead on the Internet for mission-critical program transmission, as one supplier suggests in Jeff Johnson's overview story?

Certainly the remote pickup marketplace has changed drastically, thanks to the widespread availability and reasonable cost of digital phone services like ISDN, and the onset of codecs that work over simple POTS lines. Do you still use a wireless RPU system? Why?

And then there's EAS. **RW** certainly has spilled a lot of ink in the past two years on the successes and problems radio has had in implementing the Emergency Alert System. Your comments suggest that our attention to EAS has been justified. Few topics seem to rile up radio folks like EAS.

On that and all topics, you know how to reach me: *radioworld@imaspub.com*

From the Editor



Paul J. McLane

★ ★ ★

In this, our final issue of 1998, it's a particular pleasure for me to include an interview with Russ Mundschenk, chief engineer of WBEB(FM) in Philadelphia.

During my days in the Delaware Valley as a radio equipment salesman, I had the good fortune to visit or work with some really fine radio engineers, folks like Ben Hill, Dick Bagge, Joyce Lieberman, Mike Guidotti, Larry Paulausky, Chris Sarris, Chuck Benner, Frank Grundstein, Ken Tankel and Ron Simpson. Some of those engineers have since moved on to positions with suppliers or other stations. But Philly remains blessed with an active and friendly coterie of engineers, and Russ Mundschenk is one. For me, it's a nice way to end the year.

Happy holidays to you from all of us at **Radio World**.

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World Radio History

◆READERS FORUM◆

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

Identification appreciation

Dear **RW**,

I enjoyed your article on radio call letters, "A Pause for Station Identification" (**RW**, Oct. 28).

One of my favorite call signs is WDKX(FM) in Rochester, N.Y. It was a station founded and owned by African-Americans. The call sign pays tribute to Frederick Douglas, who lived in Rochester at one time, Dr. Martin Luther King Jr. and Malcolm X.

When I teach broadcasting history I often use articles I have clipped from your newspaper.

Keep up the good work!

Greg Adamo
General Manager
WSIA(FM)
College of Staten Island
Staten Island, N.Y.

Muddy monitors?

Dear **RW**,

The Oct. 28 issue contains a review of the KRK RoKit Nearfield monitors. In the product capsule, the speakers are given a Thumbs Down for having a "flat sound when used with no EQ."

Shouldn't that be a Thumbs Up? Maybe the reviewer was suggesting the monitors sound muddy when no EQ is applied.

I consider a "flat" speaker to be one that reproduces sound close to original source without colorization. And that's what I look for in a monitor.

Dave Stewart
Disc Jockey
WPLJ(FM)
New York

Public file failings

Dear **RW**,

Thanks for Kelly Orchard's willingness to uncover the nasty truth about stations failing to comply with public inspection rules (**RW**, Oct. 14).

After 16 years of sending my college students on the same mission, our results have mirrored hers. About one-third of the students who ask to see the public file are met with negative responses such as, "The person with the key is on vacation." "You need to make an appointment a week in advance to see it." Even, "Do you think you can just walk in off the street and expect to see it?"

At other times station personnel are ignorant, such as when the station employee admits not knowing what a public file is or when calls are made to a variety of staff members before one is found who knows where the file is located.

Believe it or not, we even had one general manager who did not know what the public file was.

But most distressing are the stupid things stations do, such as not letting the student see the file without first asking if he is from a competing radio station, or claiming the file is at the lawyer's office when previous students were already shown the file at the studio. Worse are the stations that leave my students alone with the public file for 20 minutes, trusting that they will find everything in place after the student has gone through it.

When dealing with the public inspection file, stations naturally are suspicious of those who want to see it. But if a station has everything in order and nothing to hide, there is no need to mistreat or discourage those who take advantage of their legal right to view the materials.

Stephen Winzenburg
Communication Professor
Grand View College
Des Moines, Iowa

Perfect Paul Prejudice

Dear **RW**,

I downloaded the sample sound tracks from the National Weather Service ("Perfect Paul: NOAA Voice Not so Ideal," Oct. 28). They were terrible.

NWS could do better. At present there is no substitute for a human who speaks the local mother tongue. Half the words in English are borrowed from other languages.

Ask a local in Peabody, Mass., or Kissimmee, Fla., how to pronounce their city names. And what about all those Indian and Spanish place names?

American English never was, and never will be, phonetic.

No information is better than bad information.

Eric V. Berger
Engineer
Merritt Island, Fla.

Dear **RW**,

Several months back I had the opportunity to attend a local National Weather Service day for the media. At that meeting a number of topics were touched upon, including NOAA's console replacement system (CRS). A demonstration of the new voice system to be used in the CRS was given. Most of those present, myself included, had difficulty understanding the pre-recorded message. The demonstration was on a stereo "boom box" which I assume has full 50-15 kHz capability. My first thought was, if I could only understand bits and pieces of the cassette message, how would this sound on a narrow-band FM signal over NOAA Weather Radio?

The consensus of the broadcasters present agreed, expressing the same concerns your article brought out. Marginal audio quality, the inability to pronounce local city and town names, and the sounds of a human voice vs. an artificial one during an emergency are causing some broadcasters in New Jersey to rethink their use of NOAA Weather Radio for EAS.

In my discussions with weather service personnel, the feeling amongst some is, "Once you get use to it, you will like it." The question this statement raises is, "At what cost?" How many messages will go unheeded while the public learns how to listen? If NOAA is going to spend taxpayer dollars putting in a faster, more-efficient alerting system (which I believe is needed), then they need to go the extra mile and give broadcasters a product they can use. We're not asking for a baritone voice, just something which the average person on the street will hear and understand.

Rich Archut
SECC Chair, New Jersey
Chief Engineer, WKDN-FM
Camden, N.J.

EAS Crackdown Coming

The Federal Communications Commission plans to increase enforcement of Emergency Alert System regulations.

While we agree that stations should be held accountable for meeting the FCC rules, we also urge the commission to admit that the system is not yet reliable or satisfactory.

The FCC has urged broadcasters to come into compliance with EAS. It released the results of a survey of 653 radio and TV stations. Among its findings: Thirteen percent did not have EAS equipment installed and operating; 17 percent were not monitoring the correct station; 23 percent did not maintain EAS logs properly; and 15 percent did not have an EAS handbook readily available.

On the important question of sending and receiving EAS tests, 24 percent of the stations surveyed were out of compliance.

As the FCC stated, EAS provides the president a means to communicate with the public in the event of a national emergency. To that end, EAS is not all that complicated. But when not in use by the president — i.e., most of the time — EAS can be used by local officials to send out information about local emergencies. And it has done so; this year alone, the FCC has 500 reports from broadcasters who activated EAS locally for events like evacuations, tornadoes and floods.

Now the FCC is stepping up enforcement.

"Because EAS compliance is not at 100 percent, the FCC's field offices will conduct inspections ... and may issue forfeitures to stations which do not meet the EAS requirements," the FCC stated. "To give stations a chance to improve their EAS compliance, the FCC will not begin its inspection program until Feb. 1, 1999."

But many radio managers continue to have deep misgivings about EAS, for various reasons: state plans took too long to implement; activations and source station feeds have been unreliable; the National Weather Service, a source of much emergency information, has complicated matters with its new computerized voice system, abhorrent to radio professionals.

It's all well and good for the FCC to enforce its rules, and we encourage stations to take steps to comply. But the industry could use a little more productive leadership from the commission in working through these EAS growing pains.

— RW

Write to Us

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World Radio History

GUEST COMMENTARY

A Micro-Radio Micro-Guide

A Proponent of Low-Power Radio Assesses The Politics of the Micro Movement

by Don Schellhardt

"I am not a member of any organized political party," Will Rogers once said. "I'm a Democrat."

In his time during the Great Depression, Democrats were less "civilized." They usually nominated candidates by the "barroom-brawl" method — loud, rowdy, personal, contentious and emotional. Meanwhile, the stately Republicans usually nominated candidates by coronation (with preference for seniority) and hid, or smothered, internal conflicts.

By election day, of course, the Democrats would typically make up, pull together and entertain the public much more effectively than the "respectable" Republicans. After that, they'd win.

This isn't just a history lesson. It's a forecast, too.

The three major factions in the radio diversity movement sometimes scratch and howl like alley cats in a rumble. But alley cats also scratch and howl when they're making love.

After issuance of a proposed rule, when the focus shifts from *several* competing proposals *within* the movement to *one* proposal out of the FCC, most of the feuding forces will make up, pull together and reach out to everyday Americans. After that, we'll win.

In 1978, when the FCC stopped licensing stations under 100 W, a tiny "resistance movement" of unlicensed broadcasters surfaced almost immediately. Resisters naturally tended to be people who didn't mind defying authority — mostly "radicals" and/or rebellious adolescents.

Slowly, networking grew and startup costs receded, nurturing hundreds of predominantly hard-left "pirates." These became the movement's radical/confrontational (R/C) faction. For a time, it was almost the whole movement.

Then hard-right activists and/or evangelists entered the fray, adding diversity. Still, the real boost in movement membership came courtesy of the NAB, which, in 1996, pushed Congress to enact so-called reforms, such as mandatory auctions and removal of many restrictions.

It was an unbelievable power grab, even by special-interest standards, but Congress and the president said yes. Thereafter, concentrations of corporate power — already high in radio — became truly enormous.

Predictably, herd instinct took over. Lowest-common-denominator programming decimated what was left of programming diversity. As happened with airline deregulation, rural areas and small cities were cut to fourth-rate service or nothing.

Equally predictable was the reaction: a burst of new unlicensed broadcasting, including an influx of rural and small city conservatives who suddenly found common cause with Berkeley radicals.

By now, the movement had as many conservatives as radicals, greatly increasing its ability to generate political pressure. Further, by leaving many people in the licensed radio industry discontented and/or displaced, the new law handed radio rebels a new pool of experienced talent — plus more secret sympathizers within "The Establishment."

This second wave of conservative, sometimes entrepreneurial people contained the seeds of two additional factions.

One group might be called Class A refugees — people who, before 1996, would have sought Class A licenses but were now frozen out by out-of-town mega-corporations. The second, larger group occupied the ground left open by others. Seeking neither a ban on commercial micro-stations or power levels above 250 W, they were moderates.

'Wild cards'

Then, two wild cards were thrown into the game.

Chronologically, the first was the team made up of Nick and Judith Leggett, of Virginia, and myself in Connecticut. Acting as concerned citizens, with no ties to micro-radio but a commitment to opening up the business and political system, we drafted the July 1997 petition for rulemaking that became Docket RM-9208.

The next, more important wild card was William Kennard, the new FCC chairman. Concerned about the post-"reform" decline in minority-owned radio stations, he saw this as part of a pattern of exclusion caused by over-concentrations of corporate control. When his thoughts turned to micro-radio, the only petition then on file was Leggett/Schellhardt: RM-9208.

It became the trigger for action.

Spotting the players

When the FCC opened up the debate in February of this year, other petitions were being drafted, but had not yet been filed. Because the one petition available as a vehicle had been drafted by unaffiliated newcomers to the micro-radio movement, the starting point for debate gave no single micro-radio faction an edge. There was a level playing field.

As of mid-November, R/C leaders included Pete TriDish in Pennsylvania, Stephen Dunifer in California and The Committee for Democratic Communications, or CDC. R/C activists advocate "micro-radio" and support "pirates." They tend toward harsh rhetoric, demonstrations, public civil disobedience and phrases like "anti-profit, all-volunteer radio collective."

The most visible spokesperson for Class A Refugees is Rodger Skinner of Florida, who filed his RM-9242 petition after the FCC sought comments on RM-9208. Refugees advocate "low-power FM" (LPFM), regarding "micro-radio" as an R/C term, and reference "unlicensed broadcasters" rather than "pirates."

Giveaways of refugee orientation include stressing "professionalism" and "broadcasting experience," discouraging or excluding part-timers and proposing strict local ownership requirements without proposing size or income limits.

Don Schellhardt

The moderates are roughly as numerous as R/Cs. Leaders include me, Bill Doerner of Texas, Maryjane "Mj" Honner in Michigan, Claude Stevens in Missouri, Americans For Radio Diversity and the new Amherst Alliance.

Moderates reference "micro-radio," or use a new inclusive term: low-power broadcasting, or LPBC. They agree to disagree on private unlicensed broadcasting. Many signed the Sept. 17 Amherst Declaration, which favors licensing a wide range of stations and giving the FCC a chance to prove its good faith.

There also are free agents. Notably, Nick and Judith Leggett prioritize licenses for neighborhood stations, under 10 W. The Community Radio Coalition (CRC) is a mixture of moderates and refugees.

Looking ahead

None of these differences are irreconcilable. Refugees, the smallest faction, may fade away if micro-stations are capped below 250 W. Otherwise, a cap of 100 W, perhaps higher for rural and small city stations, would produce almost universal delight.

R/Cs probably can accept a protected share of the micro-market for commercial-free radio — and moderate stations probably can accept "non-profit" status *if* they can air commercials to cover reasonable costs. The upcoming debate over one FCC proposal, instead of unlimited policy possibilities, will foster a common focus.

Heed this lesson: Human energy needs outlets. Denied them, it makes its own.

If radio had not become the private preserve of large institutions, most unlicensed broadcasters would be off the air. If America's energy industry were working to displace foreign oil, through natural gas or electric vehicles and/or affordable solar energy, I would still be in that industry. If the Leggetts, who win awards for scientific papers on space colonization, could find work in the space industry, they might be focusing on Mars instead of micro-radio.

Closing doors of opportunity to talented, under-challenged people is a recipe for disruption. Let's re-legalize micro-radio and open some doors!

■■■

The author is a co-petitioner in Docket RM-9208 and co-founder of The Amherst Alliance, a group representing self-described micro-radio moderates.

A writer and former lawyer, he has held positions with Rep. Matthew Rinaldo (R-N.J., retired), a congressional committee, the Environmental Protection Agency, the Overseas Private Investment Corporation and the American (Natural) Gas Association.

RW welcomes other points of view.

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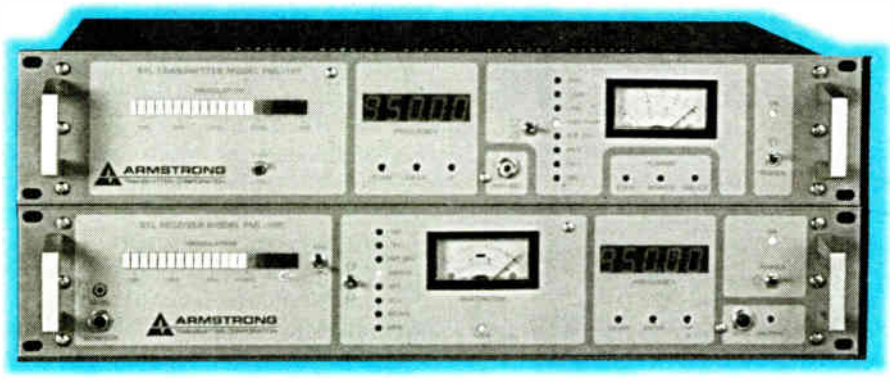

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World Radio History

DAB Status Report

▶ DAB, continued from page 1

the cities where they will conduct tests, although they have a good idea now under what conditions they want to measure the performance of their IBOC systems. USADR Director of Engineering Glynn Walden said the company is interested in testing its systems on different types of stations, whether CBS-owned or not. USADR is funded by CBS Corp.

"We're testing for a situation, not just companies," Walden told **RW** at The NAB Radio Show.

For the first time, USADR displayed an integrated analog AM and FM, and digital AM and FM receiver, although the unit was not operational. Previously, USADR exhibited separate prototype IBOC AM and FM systems. Walden said those were not "an integrated IBOC solution."

Walden said, "If you just demonstrate that you can receive FM (for example) and not change stations, you really haven't proven anything. We have to demonstrate something people can use and turn into a radio for a car."

USADR

USADR passed several IBOC milestones in 1998. The largest milestone was the filing of what USADR called a "historic" petition for rule-making at the FCC that calls for the adoption of IBOC DAB in the United States. In the document, USADR asked the commission to establish interference protection standards and criteria to evaluate IBOC systems, as well as set a timetable for the regulatory rollout of IBOC DAB.

As **RW** went to press, comments on RM-9395 were due Dec. 23, and reply comments on Jan. 25.

USADR also moved its IBOC DAB development team into a new facility in Columbia, Md., between Washington and Baltimore. At approximately 12,000 square feet, the new facility is about four times the size of the previous location.

USADR also acted to trademark several terms it says it invented, including the term "IBOC DAB," so it could use the terms on its prototype exciters and receivers. Another IBOC proponent, Digital Radio Express, said it would fight the move. The third, Lucent Digital Radio, offered no public reaction to the trademark action.

All three IBOC DAB proponents are participating in DAB subcommittee meetings of the National Radio Systems Committee, which has been working to develop evaluation criteria for IBOC DAB technology since the group resumed meeting at the beginning of this year.

NRSC

NRSC Chairman Charlie Morgan, senior vice president, Susquehanna Radio Corp., predicted there would be a renewed worldwide interest in DAB because of the USADR filing.

"IBOC has been put down by proponents of other (DAB) systems internationally," said Morgan. If the FCC institutes a rule-making proceeding, Morgan said, IBOC technology would gain legitimacy internationally.

On the work of the NRSC DAB subcommittee, Morgan said a working group had approved lab testing criteria and that was to be presented to the full subcommittee for approval Dec. 3. The next meeting is set for Jan. 9 at the CES show.

Progress by the subcommittee has been slow, according to all the proponents, who have vowed not to let a committee process interfere with their respective timetables for IBOC rollout.

FCC Chairman Bill Kennard said the commission would follow the committee's activities closely as the FCC determines how to proceed on this issue. Several sources interviewed for this article predicted the FCC would split up the IBOC rulemaking into portions, as it did with the S-DARS proceeding, because of the many separate technical issues involved.

USADR was working with Lucent Technologies in a joint development agreement until Feb. 28, when the pact expired. Both companies said they had different ideas on how to approach IBOC development, which led to the split.

Before the JDA ended, both companies planned to use the Lucent-designed PAC algorithm to compress digital signals and achieve the low bitrate without signal degradation desired by broadcasters. Now, USADR and Digital Radio Express are using MPEG AAC, although USADR says its version of AAC has been especially designed to work with its technology.

Lucent Technologies formed a new venture called Lucent Digital Radio soon after the split. Lucent Digital Radio, wholly owned by Lucent Technologies, has an interest in selling technology on both the transmission and receiving ends of a terrestrial digital radio system, as well as in satellite-delivered DAB system. Lucent has been working on its IBOC technology and gradually hiring more staff.

Asked whether Lucent would submit its own FCC filing on IBOC, LDR President Suren Pai said, "Once we reach a point where we are sufficiently confident that we know a specific design we can go with, we will be pushing that technology as a standard." Pai could not say whether that would result in a specific filing. He said that submitting the filing in October "was not what we would have done."

"Anybody can go file a petition. Filing a petition, at least in our eyes, does not mean that it's going to be accepted and adopted," Pai said.

"LDR's technology is designed to be turned into products for the market and whatever is the right business approach of getting those products out into the

See DAB page 8 ▶

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World Radio History

What's on the Horizon for UPI?

▶ UPI, continued from page 1

board and a director of UPI.

Adams has taken a similar position with Infrastructure Defense Inc., a new company that specializes in protecting corporate clients' computer and business systems from cyber-terrorism and computer hackers. UPI is expected to develop information products for Infrastructure Defense.

The English-born Adams joined UPI in June 1997. The organization touted his arrival and the changes he planned to bring.

He arrived at the often financially strapped organization with an aggressive agenda to streamline operations further and to develop a more savvy approach to multimedia forms of news and information delivery (**RW**, July 23, 1997). Technological improvements to the company's infrastructure also topped his to-do list.

Adams left in August with 10 months remaining on his two-year contract.

In announcing his resignation, Adams said that change has come to the company over the past year, and with it a vision of what UPI will look like in five years. That vision is rolled into a new UPI master plan called "Shaping Knowledge."

The "Knowledge" products are on-line packages of tailored content for multimedia uses by subscribers.

The first program, called NASCAR, was released in September. Subscribers can find driver profiles, statistics and written text covering the car-racing circuit. UPI planned to release more Knowledge programs aimed at sports enthusiasts. Also in the works is an on-line Health Knowledge Channel, developed in conjunction with SRI Consulting.

Finding a replacement

Until there is a new CEO, Garry Meldrum has been named to lead the company as its "Chief Knowledge Officer." Meldrum has led the company's efforts in the development of the Shaping Knowledge products. Meldrum is the former executive director for business development for UPI.

Both UPI management and employees were caught off guard by Adams' resignation, little more than a year after his high-flying start. But Paul Heigl, UPI chief operating officer, said Adams left his imprint on the company.

"We were disappointed that he left.

But we had a strategic plan in place for the company even before James arrived. He certainly helped refine it with his vision of what UPI should be. We will stay the course while we search for a new CEO," Heigl said.

No matter who becomes CEO, radio news apparently will remain an important part of UPI. With offerings such as UPI Net-1, with its four-minute top-of-the-hour newscasts, and UPI Net-2, which carries the UPI Morning News from 6 a.m. to 10 a.m., Heigl believes the company is well-positioned to expand its base.

"We have approximately 1,000 radio stations airing UPI news. In terms of growth we are refocusing on affiliations with music-intensive stations in the top-50 markets," he said.

In this post-consolidation era, the company plans to pursue affiliate deals with major group owners and to continue to refocus its UPI Broadcast services of ready-to-read news and sports scripts. The company has focused this year on "downsizing" copy and delivering more contemporary-style news copy and newscasts.

Money woes almost gone

After filing for bankruptcy protection in both 1985 and 1991, UPI has cut its operating deficits in half from two years ago.

"We have made significant progress along those lines," said Heigl. UPI's parent company is Worldwide News Inc. The companies are privately owned and do not release detailed financial figures. "We've had some major infrastructure expenditures this past year and spent a good deal of investment money on getting some new services off the ground." The 91-year-old company expects to turn a profit within two years.

Another of those new services is UPI MEMO, a database of financial information on nearly 12,000 companies from more than 40 emerging markets. "It's really like a Bloomberg Report for emerging markets like São Paulo, Brazil, and the Korean markets," said Heigl.

UPI MEMO provides news about the markets to investment houses and bankers. The undertaking was launched this year and is a joint venture with Meridian Emerging Markets Ltd.

Diversification seems to be the byword at UPI. "We will remain loyal to our core business partners in audio and print," said Heigl. "At the same time, we are looking to take information to a new level with our new Internet programs."

DAB Status Report

▶ DAB, continued from page 7

market is the one we will follow. And I expect that if we want to make digital radio a reality, any standard that's picked or set will have to have that overarching objective. Otherwise, it's just smoke and mirrors," he said.

DRE comes forward

Digital Radio Express, the smallest of the three companies, revealed itself publicly at the beginning of the year. Officials said they had already been working on IBOC development for a couple of years.

DRE conducted a few hours of field testing of its FM system on San Francisco's KSAN(FM). DRE combined its digital FM signal with the host station's analog signal. Documents describing the van tests filed at the FCC said, "When sufficient IBOC RF field strength was available, the IBOC FM system performed as expected, providing a recovered audio signal with noticeably higher quality than the analog FM receiver. However, there were digital audio failures (i.e. muting) particularly in the stop-and-go traffic in the downtown area."

DRE planned continued field testing of its FM system and development and testing of its AM system in 1999. DRE also plans to continue working with audio coding lab Fraunhofer on development of the AAC hardware/software and plans to start testing with Telos AAC encoders in the new year.

DRE also joined a consortium of Continental Electronics, CRL and Cutting Edge to discuss the technical merits of a digital composite interface for exciters and FM subcarriers.

Meanwhile, digital radio from the sky is much closer to reality. Satellite-delivered DAB services were busy signing multiple programming agreements, and hiring programming and engineering staff. Both CD Radio and XM Satellite increased their channel capacity from the originally proposed 50 to 100 channels of subscription programming.

Margolese said CD managed to raise about $900 million this year, enabling the company to build satellites and terrestrial repeaters, and move to studios in New York. The company began deploying repeaters in 1998 and plans to deploy them in more than 40 cities in 1999. CD claims it is a full year ahead of XM Satellite in satellite construction, and plans to have its service operating by the end of 1999.

CD Radio began deploying terrestrial repeaters in 1998 and plans to locate them in more than 40 cities in 1999.

Several key technical questions remain for S-DARS providers as the new year approaches. The FCC has not yet said how many terrestrial repeaters it will allow the companies to use. Both companies need repeaters to serve customers in urban areas. Sources said the commission is writing rules that would govern how the repeaters are deployed and licensed.

Another technical issue pending is how much technical information both companies have made public. In the fall, the NAB, whose members see new competition from the sky services, claimed that by increasing channel capacity, the satellite companies had made technical modifications of their service, and the details should be made public.

Also, the FCC made receiver interoperability mandatory in the S-DARS licenses. To date, both companies have said they are working on that problem.

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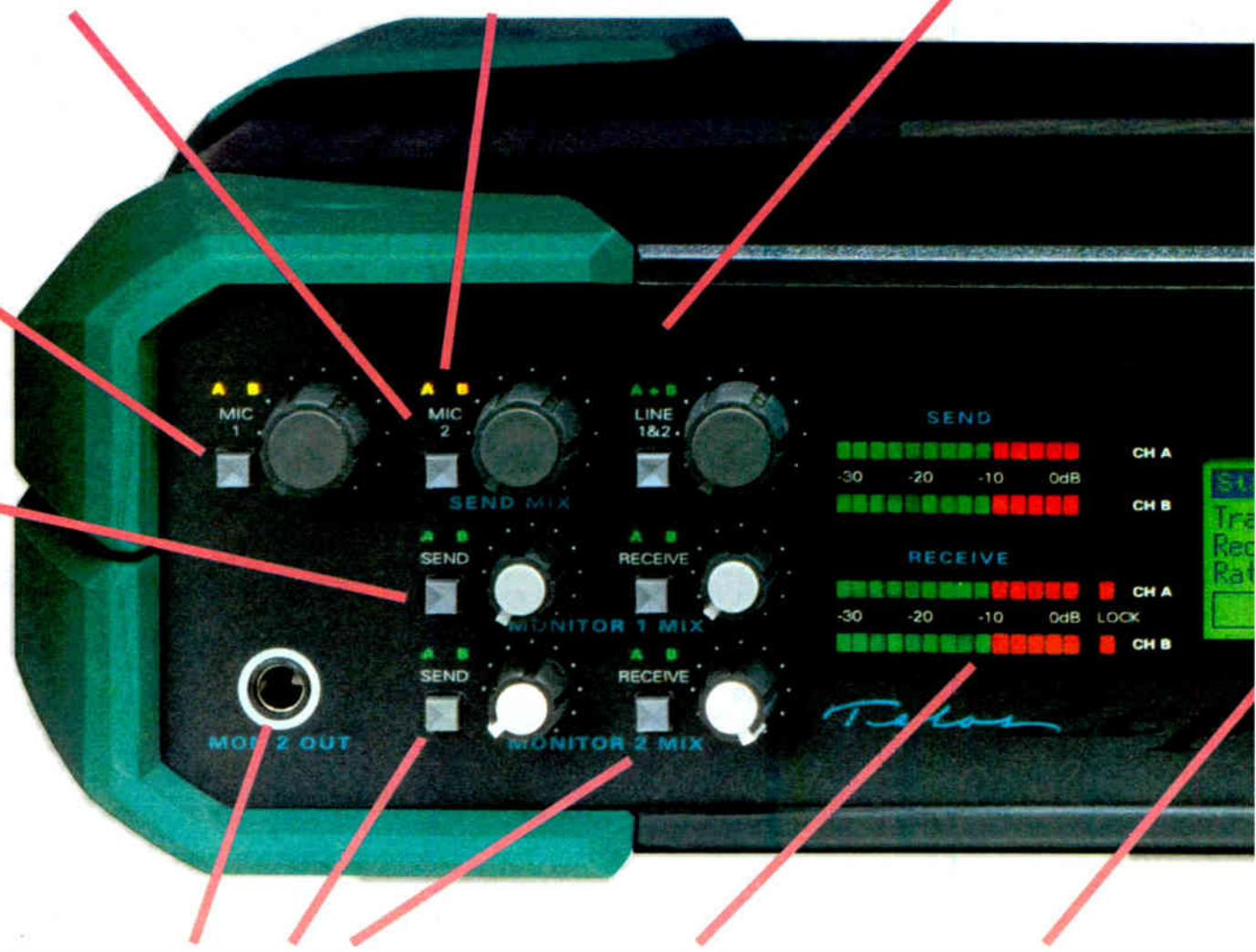

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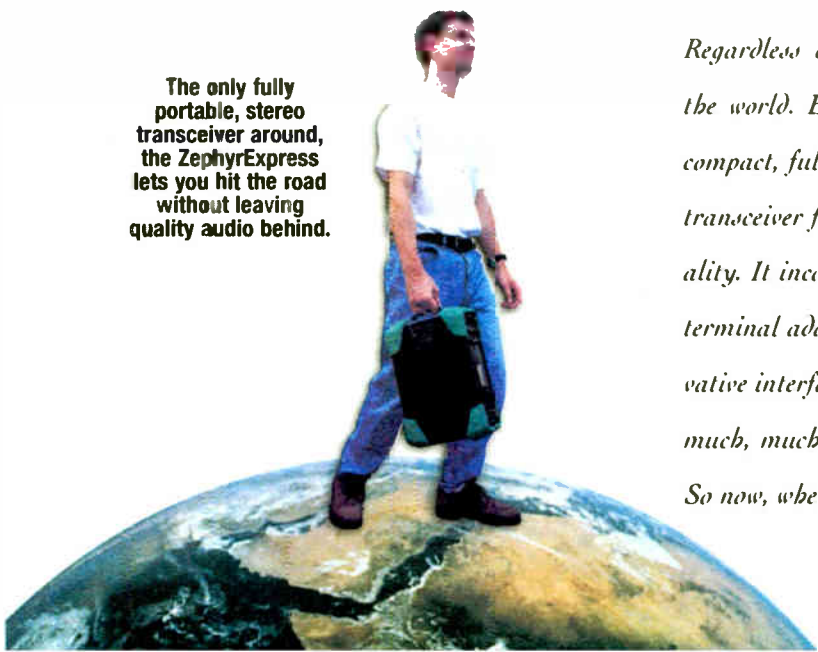

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World Radio History

NEWS ANALYSIS

Y2K May Affect Remote Controls

by James Careless

While the Y2K problem is not likely to affect your transmitter, the same cannot be said for certain about the remote control unit that switches transmission power levels and patterns. Experts disagree on the risk to your remote control.

This discussion mirrors the broader Y2K debate in microcosm. In few areas of station operation do experts agree on how serious the risk of computer failure at the end of next year really is.

Equipment manufacturers have been

Kevin Rodgers

considering the problem, which affects equipment using the older two-digit dating system. In these units, the current year is read simply as 98, rather than 1998. The fear is that, on Jan. 1, 2000, such equipment will interpret 00 as the year 1900, and cease operating properly.

The reason transmitters are relatively immune to the Y2K problem is simple, according to Jim Woods, vice president of the Broadcast Radio Business Unit of Harris Corp. Transmitters rarely have internal year-oriented calendars, he said. "There are very, very few transmitters that know what day it is and care," he said.

Dan Dickie, Continental vice president of engineering, agreed.

"Broadcasters' time-based equipment — as far as the RF chain is concerned — generally operate on an annual clock," Dickie said. "The actual year in which they're operating, for the most part, doesn't matter. Even in cases where regular power and pattern changes are required, as for AM broadcasters, for instance, the transmitters don't do anything different based on one year to the next; they do things based on one month to the next."

Should the worst happen, and the unit fail when the year 2000 begins, the simple answer is to turn back its internal calendar to 1990, he said. According to Dickie, that should be sufficient for restoring operation.

But manufacturers are divided as to how serious the Y2K risk is when it comes to remote controls.

Remote problems?

According to Dickie, remote control units are no more at risk than transmitters. "You almost never do anything in a remote control system based on what year it is," he said. Like transmitters themselves, all the remote controls really want to "know" is what month it is.

Officials at remote control maker Sine Systems agreed with Dickie's assessment. Versions of its RFC-1/B Remote Facilities Controller that do incorporate a two-digit calendar only pay attention to the month and day, not the year, said co-owner Marc Pezzolla. (Earlier versions of the RFC-1/B have neither clock nor calendar.) Because of this, "It will not cause any operating problems on the rollover from 1999 to 2000," he said.

Burk Technology issued a statement listing its remote control products, such as the ARC-16 channel remote control system version 4.6, that are Y2K compliant. Meanwhile, any earlier versions based on a two-digit system are designed to run from 1996 to 2095, so that a Year-2000 crash on these products isn't likely.

As for Gentner? The company's VRC-1000 and VRC-2000 are susceptible to the Y2K problem, said company executive Gary Crowder. However, this glitch won't affect the actual functioning, he said. The time/date stamp on alarm messages simply will show 1900, instead of 2000.

Manufacturers are divided as to how serious the Y2K risk is when it comes to remote controls.

To fix the problem, Gentner users will have to manually reset the calendar of their VRC-1000/VRC-2000 to 2000. Instructions can be found on the Gentner Web site at *www.gentner.com /tech/y2k.html* or within the manuals for the VRC-1000 and VRC-2000.

Power change problem

Not everyone is reassured. Kevin Rodgers, customer service manager at transmitter maker Nautel, said that Y2K-afflicted remote controls may not change power at the correct time.

"I don't think you're going to see transmitters shutting off on Jan. 1, 2000, but later that day they may not switch pattern," he said. Rodgers predicted that many broadcasters will have this problem when 2000 rolls around.

Of course, for radio station managers, their real concern is to stay on-air during the millennium switchover without any glitches. This said, the real question for them is simply what they should do to protect their RF chains.

Mirroring his earlier response, Jim Woods of Harris said, "The first filter is, 'Does the product know what date it is, and does it care?'" He said equipment age is a good way to decide which systems could be at risk. Units three to five years old probably don't have a problem, he said; anything older should be looked at closely.

As for remote controls? Rodgers of Nautel recommended checking now to ensure that these units are truly Y2K compliant.

"For home-grown systems, that means opening up the box and seeing how it works, to going out to the manufacturers of the remote controls and getting Y2K-compliant upgrades from the manufacturer, if it's a purchased unit."

FCC Eases Some Rules in 1998

by Leslie Stimson

WASHINGTON As radio enters the third year since Congress passed the Telecommunications Act, the effects of that legislation still are being felt by the industry and its regulators at the FCC, struggling to implement portions of the act. At the same time, commission employees are working on other proceedings that affect the industry as 1999 begins.

The year saw the effects of the changeover from Reed Hundt's chairmanship to the era of Bill Kennard. A new slate of commissioners was ushered in, with Commissioner Susan Ness as the only holdover from the previous panel.

Kennard, the first African-American chairman of the FCC, has been direct about his goals from the beginning of his chairmanship and has not shied away from telling broadcasters what he intends to accomplish just because it "inconveniences" them. That was his description when he said he was seriously considering instituting a new low-power service for radio as a way to bring more diversity to radio ownership. Meanwhile, the commission has continued its recent crackdown on unlicensed operators.

FCC sources said key items have yet to be hammered out before the commission can proceed on the low-power issue, including whether the stations would be licensed as primary or secondary services, and whether to apply current interference criteria, which would relegate most of the stations to rural areas, or to lessen those standards to allow some low-power stations in urban areas. Kennard has promised not to allow degradation of the FM band should such a service be instituted.

The year saw the effects of the changeover from Reed Hundt's chairmanship to the era of Bill Kennard.

By the end of 1998, the FCC had proposed new equal employment opportunity rules designed to promote minority outreach, after its old rules were thrown out by a circuit court of appeals as unconstitutional.

Still pending at the end of 1998 was how the commission would change ownership rules, tightening some while easing others to preserve diversity in broadcast ownership given the massive consolidation that has followed passage the Telecom Act. It remained unclear as of early December whether the commission would finalize the changes this month.

Also still pending was whether the FCC would consider allowing so-called Little LEOs, or low earth orbiting satellites services, to share spectrum now used by broadcasters for remote pickup and two-way communications, and whether to allow some AM stations to broadcast on FM translators to boost nighttime coverage.

The commission began to spell out how it would auction spectrum in cases where there is more than one applicant for a license. It was not expected to release specifics on when the first auctions would be held or how they would be conducted until after the new year.

Proposed FM technical changes remained pending, including whether to allow so-called negotiated interference agreements between some stations in limited cases, whether to reclassify some Class Cs to allow more stations on the FM band, and how to update the commission's method for predicting station coverage contours.

The commission relaxed the main studio and public file rules and reduced the amount of routine paperwork stations must file. FCC employees hoped to finalize the new forms by January.

World Radio History

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With studio space at a premium and time your most valuable resource, replacing NAB tape cart machines with Denon MD or CD carts is one of the most important upgrades a station can make.

Up to three Denon units can be installed in a standard 19" rack, and since MD discs have up to 255 tracks and can be re-recorded, fewer cart machines are needed. Both the MD and CD systems are equipped with interfaces for automation and systemization. These optical systems are also a much more reliable medium than tape, and the editing and record functions of the MiniDisc allow for individual callouts of track and disc titles. Imagine the time savings not having to switch back and forth between tape carts, as well as the benefits of using a commercial or jingle player that handles like a CD player.

So, if you're running out of real-estate and could use a couple more hours in your day, MiniDisc or CD could be just the ticket. For additional information, contact Jim McGuinness, Denon Broadcast Products Specialist at (973) 575-7810.

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World Radio History

WIRED FOR SOUND

Analog Audio Cables Compared

Steve Lampen

We left the previous column (RW, Nov. 11) with the statement that you could judge and compare the quality of any analog cable by its capacitance. You can also judge a cable by resistance, i.e. gage size. But capacitance is a more signficant indicator of quality.

The distance your signal can travel is related directly to capacitance. For instance, if you have a twisted pair in a common configuration, Figure 1 shows how far a 20 kHz signal could go with a 600 ohm load until you get to a –3 dB (half-power) point. You can quickly see that the lower the capacitance, the farther you can go.

Figure 2 is an identical chart but the impedance has changed to 150 ohms, a more common impedance for microphones.

Note the dramatic difference in distance compared to the previous chart. But, before you rush out to buy some new cable, remember that these charts both show –3 dB at 20 kHz. While this certainly is adequate frequency response (maybe even overkill for paging and background music), and probably acceptable for FM broadcast, which doesn't go past 15 kHz anyway, it may be unacceptable for a church or auditorium — not to mention a recording studio — where high-quality recordings are made. If you want –1 dB numbers, just divide the distances above by 3. Then maybe they won't look quite so spectacular!

System spec

But be aware that we are not matching the impedance *of the cable*. These impedance numbers are system numbers, "source" and "destination" numbers. As mentioned in previous columns, the impedance of the cable would only come into play when it was at least a quarter of a wavelength at the highest frequency. Since a quarter wave at 20 kHz is 12,300 feet (3.75 km), it is unlikely that even multiple runs in a large stadium would even come close.

So the impedance of the cable at analog audio frequency is not important. But the system impedance, source and load, certainly is!

If you have a technical bent, you may notice something else. Before you write a pithy letter to the editor, let me agree with you. While line-level systems of old often had output (and input) impedances of 600 ohms or near, this is rare today. Normally, output impedances of modern professional audio devices are very, very low, perhaps only a few ohms. And input impedances can be very, very high, maybe even tens of thousands of ohms. This, of course, only helps our distance calculations.

High quality systems, when matched to high quality cable, make the cable virtually transparent in performance, even over considerable distances.

Analog Cable Distance (-3 dB at 20 kHz at 600 ohms)			
Capacitance		Distance	
pF/Foot	pF/Meter	Feet	Meters
55	180	243	74
37	120	364	111
24	80	545	166
13	43	1014	309

Analog Cable Distance (-3 dB at 20 kHz at 150 ohms)			
Capacitance		Distance	
pF/Foot	pF/Meter	Feet	Meters
55	180	964	294
37	120	1432	437
24	80	2208	673
13	43	4077	1243

Fig. 1, top, and Fig. 2 show effect of capacitance on cable distance.

Can you still measure the difference? Sure. It's just less than it used to be, so the caveat to "buy the best" would still apply. In fact, in these days of >90 dB noise floor, and razor-flat mic response, cable transparency is just what the doctor ordered!

If you are an installer of paging or background music systems, audio quality may not be as high on your list of important things. More likely, low cost is your No. 1 requirement. But if you have a high-quality broadcast facility, recording studio or other installation where you want the best you can get, you need to check out just what you have in cable.

From the charts shown, one curious fact emerges. If you are looking for the lowest capacitance, you will find such cables, but they will be labeled "digital audio." Being square waves, digital signals demand low capacitance.

So the conclusion is simple: Digital audio cables make the absolute best analog cables. You can go farther with flatter frequency response than any cable designed for analog.

Now you might ask, "But those digital cables are 110 ohms. Is that OK? I thought we were at 600 ohms." Just remember that, with analog audio, you'd have to have a mic cable 12,300 feet long before the impedance makes a difference — no matter what it is. So the fact that the cable is 110 ohms at digital frequencies is meaningless for analog, it's the capacitance that's important!

One thing to consider is that the cost of digital cable is considerably more than analog. But you have a choice: put in analog now and digital later, or put in digital now. Which of those is a cheaper alternative?

With labor charges a major installation expense, it become obvious that it is easier to install anything once, rather than twice. And unless you intend on being the last analog facility on earth, you will eventually go digital. So why not go digital now, even if you intend to stay analog for a while? Put in digital cable now and you're already done. You're future-proofed! And it's very likely that the price of digital audio cables will be going up as time goes on, so it unlikely that the cable (or the install) will get any cheaper if you wait.

Gage size

What about gage size? Doesn't the size of the wire make a difference? Sure it does. And the larger the wire (and lower the resistance) the farther you can go. This is even true for data systems running at 100 Mbps or more. But remember a few facts about resistance.

First, resistance is "linear" over analog frequencies, meaning that resistance doesn't have any frequency curve effects. It reduces the level at all frequencies identically. So, while it may drop the level a bit, and therefore has some effect on signal-to-noise ratio, it has no effect on frequency response (like capacitance).

Second, bigger wires make for bigger cable. If you are talking snake cable, especially with lots of pairs, a single change in gage size can have a dramatic effect on size, flexibility and cost.

This is why the tried-and-true 22 AWG snake cables rapidly are being replaced with 24 AWG. And some are even going to 26 AWG, where snake cables are really small. It then really becomes a question of size and price vs. ruggedness. If this snake will be installed and never touched, small is just fine. If you plan to take it out on the road for a 12-city tour with a heavy-metal band, bigger would be more rugged and more reliable. Your choice!

Figure 3 shows the effect resistance has on cable length. It simply shows where the resistance of any given gage size equals the system impedance for a 3 dB loss.

Effect of Resistance on Distance (3dB loss in a 600 ohm system)		
Gage Size	Distance (Feet)	Distance (meters)
28 AWG	8,486 ft.	2,587 m.
26 AWG	13,514 ft.	4,120 m.
24 AWG	21,661 ft.	6,604 m.
22 AWG	34,286 ft.	10,453 m.
20 AWG	55,046 ft.	16,782 m.
18 AWG	86,705 ft	26,435 m.

Fig. 3

Again, a 1 dB loss would be one-third of those values. You can see that the effect of resistance, even at very small gage sizes, is significantly less than capacitance.

In conclusion, you can determine the overall performance of any audio cable first by capacitance and second by resistance, or gage size.

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World Radio History

MARKETPLACE

Temperature Monitor

Nigel B. manufacturers the Thermal Watchdog, a rackable "plug and play" device with automatic temperature surveillance and automatic fan control. It provides remote warnings for overheated rack equipment.

Originally designed for remote transmitter sites, its fully automatic remote reporting and fan control can be used in other applications where overheating of equipment could go undetected until damage occurs. The unit operates unattended, and once the auxiliary fans are connected, unnecessary noisy fans can be reduced or eliminated.

The Thermal Watchdog can be installed into any rack or equipment enclosure.

When overheating occurs, the auxiliary fans are activated to begin cooling. Additionally, the designated person for station emergencies will be contacted automatically by telephone, pager, cell phone or other signaling devices.

requiring no complicated wiring. Its factory-set at a temperature of 105 degrees F., although it can be adjusted.

For more information, contact Nigel B. in California at (818) 769-9824; fax (818) 769-9965; or circle ***Reader Service 159.***

Free Online Catalog

Equipto Electronics offers a demonstration of its free 300-page PC catalog to engineers and buyers of electronic cabinets.

A new feature of the company's 24-hour "Bulletin Board" allows a caller to download the demonstration to a PC for viewing at any time. Called CAB-NET, the catalog allows a user to design, spec, view, price and order modular electronic cabinets, instrument cabinets and computer furniture from a computer. According to Equipto, this is the industry's first complete online catalog.

The catalog includes 13,500 items in limitless combinations, with technical drawings, accessories, complete text descriptions, color or black and white photographs and prices.

An e-mail function allows viewers to ask questions, send requests, indicate shipping instructions, choose custom colors or specify features not found in the catalog.

For more information, visit www.equiptoelec.com

To try a demonstration or download the catalog, contact Equipto in Illinois at (630) 897-7512 or circle ***Reader Service 56.***

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World Radio History

Broadcast Basics: Understand AM

Ed Montgomery

This is part one in a series about the basics of amplitude modulation. For continuing education credit, see the information at the end of the article.

Amplitude Modulation — AM — is a broadcast system that seems to have been neglected over the past two decades. In recent years it has been tagged "Ancient Modulation," and criticized for being full of noise. Many critics have defined it as "low fidelity" when comparing it to FM, and there is some truth to that.

Yet AM has a lot of things going for it. There are more than 4,700 AM radio stations in the United States. The frequency band in which our AM service is located produces a significant groundwave that permits the transmission of reliable signals over a vast area with relatively little power compared to what must be supplied to an FM signal operating in the VHF band. The AM signal travels up and down over hills — obstacles that give VHF signals trouble.

If a new form of digital radio is successful, the AM broadcaster, operating at a frequency with these attributes, has much in its favor.

The medium-wave frequencies on which AM operates also reflect radio signals radiated skyward back to earth. This often causes interference at night. In the early days of broadcasting, the FCC, and the Federal Radio Commission before it, regulated night power and antenna design to limit interference. Night "skip" was something many people actually listened for, attempting to hear programs hundreds of miles away. Some still do, but with so many syndicated talk programs on the AM band at night, the listener often finds the same programming already available in his or her community. Sporting events still have people tuning in to distant stations at night. Clear-channel stations still provide the nighttime service, but it is far less important than it was a half-century ago.

This series is about the basics of amplitude modulation. It will not eliminate the need for a broadcast engineer. It is intended to help make the current generation of broadcasters aware of the equipment for which it is responsible, and to help those managers inspect that equipment periodically to make sure it is operating properly.

Need to know

If you can tell your technical staff of potential problems in an informative way, you enable them to take preventive or corrective measures before the station is obliged to operate at low power, in mono, or shut down.

Radio broadcasting has changed drastically over the past few years. Individuals who entered this career just five or 10 years ago find it to be much different than the labor-intensive business it once was. Management no longer has to make sure someone is at the studio and transmitter site to keep program continuity. Advancements in computer technology allow an operator to keep a radio station operating for days unattended.

If a new form of digital radio is successful, the AM broadcaster has much in its favor.

While this trend may limit careers for budding DJs and talk-show hosts, it does put more of demand on management. Today's sophisticated broadcast systems require attention, and often they are neglected until the dreaded "dead-air" occurs. Usually, panic ensues, at which point managers usually start calling on anyone who has any knowledge of the system.

Many stations are not prepared to substitute locally originated material. The announcers are not there, and neither is the programming, be it music or talk. The staff managing today's radio stations must know something about how the audio and radio transmission system operates.

Deregulation has added to the responsibilities of management. Owners now can own and operate many broadcast properties in a market or adjacent markets. Reliability of equipment has permitted the centralization of studios and reduction in personnel. For better or worse, the technical staff, or traditional broadcast engineer, has been reduced in importance in the eyes of ownership because of improvements in the equipment in a broadcast facility.

New studio and transmitter equipment using computer technology often is beyond the scope of the old "workbench repair" that took place in the past. Often, it is often not in the interest of the broadcaster to purchase the test equipment necessary to make these repairs; often it is not in management's interest to hire an engineer who understands all these concepts and to keep this person up to date by paying for training when necessary. Engineers don't like to hear that, but in this age it is true. It is easier to call the manufacturer and get advice than try to

See AM, page 17 ▶

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AFRTS Chooses Broadcast Electronics

Armed Forces Radio and Television Service Broadcast Center is replacing its automation system with a **Broadcast Electronics** AudioVAULT digital audio system.

AFRTS-BC signed a contract with BE, under which the supplier's **Turnkey Services Division would plan, document, test and install the new system**, which also includes an AudioPOINT routing switcher. Under the contract, there will be no disruption to ongoing operations during the project, which is essentially an analog-to-digital transition.

The AFRTS-BC is located at March Air Reserve Base in Riverside, Calif., and serves more than 800,000 Department of Defense members and their families overseas in more than 155 countries and aboard U.S. Navy ships at sea.

For more information, contact Broadcast Electronics in Illinois at (217) 224-9600; fax (217) 224-9607; or circle ***Reader Service 53.***

WNYC Chooses Tascam and Sony

Public radio stations **WNYC-AM-FM** in New York City purchased several pieces of **Tascam and Sony** equipment from **Dale Pro Audio**.

Tascam MD-801R

For live broadcasts, the station acquired a Tascam MD-801 MiniDisc system, while the news department bought three Tascam MD-501 and three Sony MZ-B3 MiniDisc machines.

The MD-801 has served as a playback source for a Central Park Summer Stage Concert. "The Tascam 801 is being used essentially for playback of certain items that would be very convenient on MiniDisc, such as interview materials used during live broadcasts," said Edward Haber, technical director of live recordings and broadcasts for WYNC.

Steve Shultis, director of engineering for WNYC, was responsible for purchasing the MD-501 and MZ-B3 units. He said the 501 is an ideal MiniDisc recorder for radio news. "The 501's editing functions are ideal for our three news edit booths," Shultis said.

For remote applications, Shultis decided on the MZ-B3. "After researching three Sony models, we decided the MZ-B3 was the way we wanted to go."

For more information, contact Dale Pro Audio in New York at (212) 475-1124; fax (212) 475-1169; or circle ***Reader Service 105.***

CBC Installs G+ Special Edition Console

Canadian Broadcasting Corp. installed the first **Solid State Logic** G+ Special Edition console with Ultimation in Halifax, Nova Scotia.

The 48-channel console was installed in CBC's Studio H in Halifax and is being used for music, drama, production and TV post. According to Karl Falkenheim, senior recording engineer/producer for CBC, the G+ offered sonic performance and a comfortable work surface.

"The G+ Special Edition allows us to get to the parameters of the console with ease, grab, turn, and EQ on the fly."

Studio H reports the console has increased productivity at the facility, and being able to recall parameters on the console saves time. "The moving faders and Ultimation are simple to operate, have easy learning curves and high quality resolution," Falkenheim said.

For more information on Solid State Logic, contact D. Pagan Communications in New York at (516) 784-7865; fax (516) 784-7866; or circle ***Reader Service 131.***

"Who's Buying What" is printed as a service to our readers who are interested in how their peers choose equipment and services. Information is provided by suppliers.

Companies with news of unusual or prominent sales should send information and photos to: Radio World Managing Editor, P.O. Box 1214, Falls Church, VA 22041.

▶ AM, continued from page 16

troubleshoot on your own.

Normally a transmitter will run unattended for long periods of time without trouble. New components today have incredibly long lives. However, when no engineer is on site, management should inspect the transmitter and antenna site periodically. Management should check how the studio system is functioning as well. An individual need not have experience in electronics to detect problems. A person with a good ear and an ability to read meters correctly is an important asset to make sure the station is running without problems. Such an employee may be able to detect problems before they become a serious threat to station operation.

Communicating

Telephone conversations with the engineer or company contracted to perform maintenance are more informative if they include essential information about audio levels, antenna currents, phase angles and modulation. This will allow the person on the other end of the phone to offer some valid suggestions before making a trip to your station. Often the problem can be solved by phone. The engineer may be able to determine that the equipment must be sent back to the manufacturer for repair. These conversations can also help determine whether the station must notify the FCC about the problem.

In short, even non-technical staff should be aware of the fundamentals of AM radio station operation. We will begin our closer look next time.

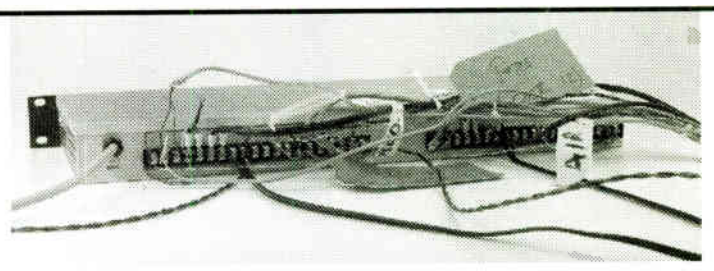
You can receive continuing education credit from Northern Virginia Community College as part of this series of articles. All information for this course (BCST504.01N) will be published in this series in **RW**. For a faxed copy of the registration form, send e-mail to *radioworld@imaspub.com* or call (703) 998-7600, ext. 117.

It is easier to call the manufacturer for advice than try to troubleshoot on your own.

Neither Northern Virginia Community College nor **Radio World** will have back issues or other information regarding this course. You can contact the author for assistance via e-mail at *emontgom@lan.tjhsst.edu* or write to him, c/o **RW**, at the address on page 5.

■■■

Ed Montgomery is the video technology and communications lab director at Thomas Jefferson High School for Science and Technology, Fairfax County, Va. He has worked as a broadcast engineer and has taught college-level broadcast engineering technology and written educational columns for ***RW.***



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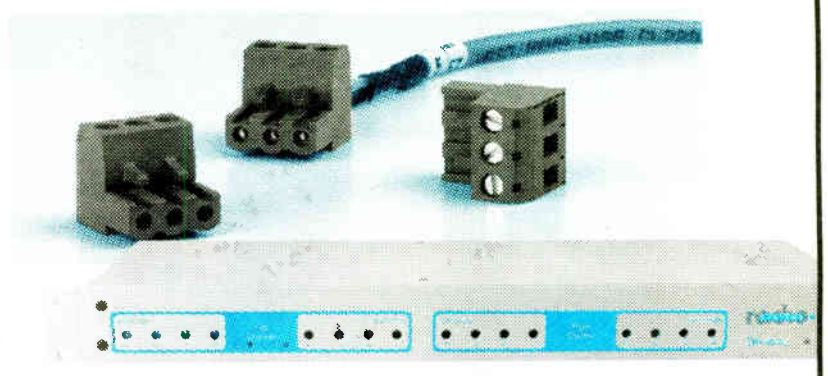

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World Radio History

Workbench

Radio World, December 23, 1998

Update Your Tower Checklist

John Bisset

There's no end to comments about our "what's wrong with the tower" photo a few issues back. Jim Appleton, an engineer at WENY Inc. in Elmira, N.Y., sent some additional thoughts with respect to proper tower maintenance.

Guy Wire Preforms: Take some time and a small paint brush, and paint a line around the guy wire where it comes out of the lower end of the preform. If the preform is not holding, you will notice it during your next quarterly tower inspection. The line around the guy wire will be up inside the preform. This "paint trick" serves as an early warning alert to preform failure.

Mice and Snakes: Jim has used moth balls inside his phasor and transmitter buildings, as well as inside the Antenna Coupling Unit. The hanging "No-Pest" strips work well, too. Once every other month, Jim replaces the hanging strips and adds more moth balls. After 15 years of use, he reports no problems to components.

Jim also reports an end to snakes, mice and other varmints. He adds that before the moth balls, a snake made a home inside his Continental Power Rock, snuggling up to that 15 kV supply and causing a nice mess on the walls of the transmitter.

Isocoupler: Twice a year, while doing work with the system turned off, shake the isocoupler a bit and listen for water sloshing inside. A tube type transmitter may tolerate the impedance shift that the water may cause, however a solid-state transmitter will not behave properly. If you're using an isocoupler, and the transmitter is acting funny, check for water.

Spark Gaps: Look for critters in the spark gaps of towers. A house fly can knock a solid-state transmitter off quickly. Also check for fur — a mouse scurrying over the gap can have the same result as the house fly. (Jim says that in upstate New York, they add a little hot sauce, and savor the snack!)

Tower Paint: Walk around the tower and pay particular attention to its sides. Is there a noticeable difference in paint color? The face of the tower that gets all the weather will fade before the other faces.

Beacons and Lightning Rods: From a quarter mile back, look at the tower beacon. Is the lightning rod really over the top of the beacon? It may look that way from the base of the tower, but back up and use a pair of field glasses for a closer look.

At night, check that both the top and bottom beacons are illuminating. If the top half is darker than the bottom and the blowing of the top beacon lamp didn't take out the lower lamp, you got lucky.

If bulbs keep blowing, have a rigger check the beacon lens for cracks; cold rain and hot bulbs don't get along!

Ground System: Walk the entire ground system at least once a year. Last spring, when the ground was moist, did the guy with his million-horsepower 4x4 drive over the system, showing off for his girlfriend and chewing up your radials? Are there woodchuck holes? These animals love to chew transmission line, control cables, electrical lines, etc.

Thanks, Jim, for some great suggestions to keep our tower sites trouble-free.

Figure 1: Keep vines and growth away from guy anchors to reduce maintenance headaches.

★★★

Speaking of towers, Figure 1 shows the hassle that vines can cause. To reduce rust, animal nesting and potential problems, keep the anchor points free of vegetation.

Figure 2 shows a guy anchor ground wire that has been marked with colored tape in an attempt to keep the lawn service from ripping it loose when the field is mowed.

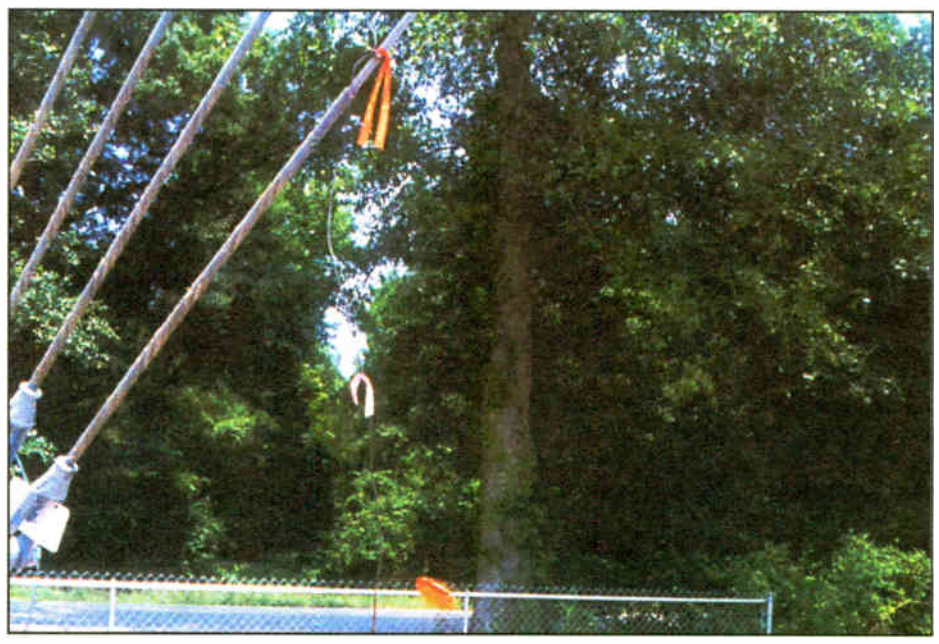

Figure 2 : Colored tape marks a ground wire.

■■■

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

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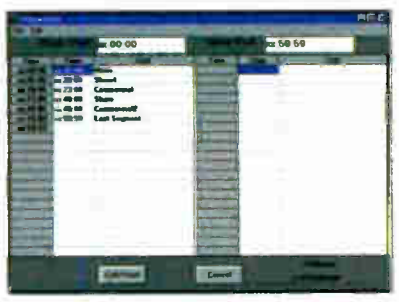
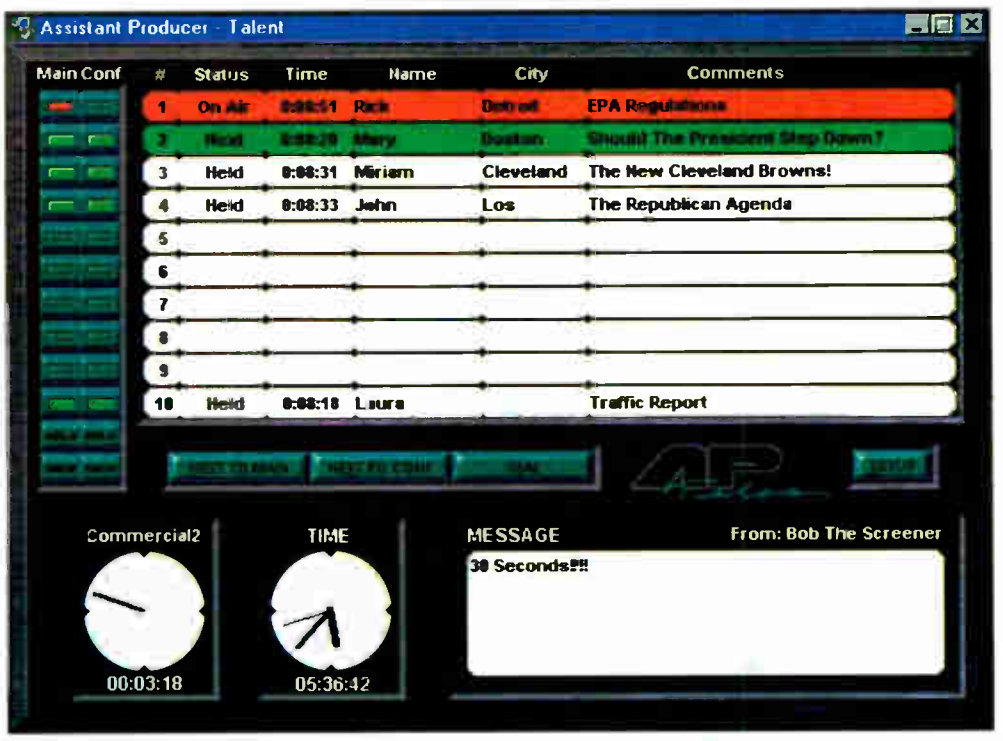
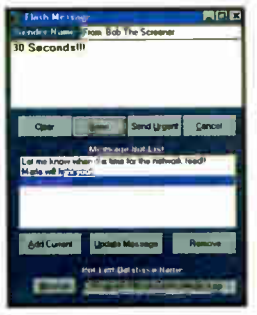
Main and Conference buttons indicate easy-view call status at all times, and provide remote control of a Telos interface. Point-and-click on Conference buttons to pick up calls. The live call will be highlighted as indicated.



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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Assistant Producer

TALKSHOW MANAGEMENT SOFTWARE FOR WINDOWS

Assistant Producer for Windows™ now allows producers and talent to manage callers while maintaining constant communication with each other, all in an easy-to-use, attractively-displayed Windows environment. It is perfect for virtually any studio environment, enabling producers to provide talent with information on each caller, send instant messages, and control the status of multiple telephone lines. Since the entire system is Windows-based, it can even be networked through an ethernet or intranet network. In addition, Assistant Producer is designed to work effortlessly with all Telos interface products to create a complete, integrated system that is perfect for any studio setting.

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- **Contains robust color-coded line status indicators for easy recognition**
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- **Houses a flexible database which allows configuration of desired listener demographic fields and talk show statistics**
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Assistant Producer controls any Telos telephone interface and hybrid combination, such as those pictured here.

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Circle (100) On Reader Service Card

World Radio History

A New Home for Audio Precision

Alan R. Peterson

Audio Precision of Beaverton, Ore., has come a long way from its founding days in offices between a restaurant and a skating rink.

The manufacturer of high-resolution digital audio analyzers recently completed a move into a new 27,000-square-foot facility a handful of miles from Portland, Ore., complete with state-of-the-art test chamber and a mini-museum of classic audio measurement equipment.

Photo by Alan R. Peterson

Shown is the new home of Audio Precision in Beaverton, Ore.

A considerable change and a far cry from the days of XT computers and Tonya Harding.

Tonya Harding?

"Back in the old days," recounted Bruce Hofer, "Audio Precision worked out of back offices behind a restaurant, only yards away from the rink where Tonya Harding used to practice."

Hofer is vice president and principal engineer with Audio Precision, as well as a co-founder of the company. Hofer, along with Rich Cabot, Bob Wright and Bob Metzler founded Audio Precision after a tenure with equipment manufacturer Tektronix. Hofer designed plug-in modules for Tektronix oscilloscopes.

"Audio Precision incorporated in 1984," said Hofer. "Our first AP product, the System One, was shown for the first time at the NAB show in 1985. Back then, it connected to an IBM XT computer."

The product drew interest because of its precision and versatility. Not only that, one user commented it was the best "graph paper designer" he had ever seen.

The unprecedented accuracy needed in early AP products underscored the lack of precision electronic components available at the time. Hofer fished around in a desk drawer for a moment and pulled out a hand-wound transformer, built in-house due to the lack of such components on the market.

"We needed high-frequency flatness," said Hofer. "With this, we got it flat from 7 Hz to 200 kHz."

With technical advances and new business came growth. AP eventually outgrew its back offices and leased new office space — about 3,000 square feet.

"Over an 11-year period," Hofer said, "we grew to 14,000 square feet. And then on June 15, we made the move to here. The Friday before, we turned the phones off in the old place, then turned them on in the new plant on Monday."

The new two-story facility was built in an industrial park, formerly occupied by a railroad switchyard. The first floor is occupied by production and storage, while the top floor handles administration, conference, testing and research offices. In the center, a sunny atrium floods both levels with light.

Much thought was given to the comfort and productivity of the employees. Most second-floor occupants have window offices that look out over protected wetlands. Mysterious green single-hole outlets on walls are tied to 8-gage wire sunk into the foundation rebar, forming a discrete ground connection separate from the electrical service panel: a necessity when designing and breadboarding ultra-low-noise circuitry.

In the lobby is a museum of classic audio test gear.

Audio Precision is located in an area dense with technological and manufacturing companies known as "Silicon Forest." Because of this, the company leaders realized AP did not require a full manufacturing operation.

According to Tom Mintner, director of marketing for AP, "Mechanical design and layout is done here, as is quality control. We don't stuff boards (assemble printed circuit boards) here."

Completed boards are shipped from an outside jobber, and entire analyzers are assembled inside the AP facility. The units are then placed in a thermal test cycle room.

"The room is for aging the PC boards and completed units," said Mintner. "We maintain the room at a constant 120 degrees Fahrenheit."

The Quiet Room

Further testing is conducted in an RF test room that resembles an anechoic chamber. A small log periodic antenna is directed at a unit under test, while the unit is slowly turned on a pedestal. Any RF energy emanating from a unit under test is detected by the antenna and displayed on monitoring equipment outside the room.

Mintner was quick to point out that the chamber, in spite of its appearance, was designed for RF immunity rather than as an acoustically quiet place. "There are two layers of galvanized sheet metal over a wood fiber composite," he said. "Lights and AC power for the room are filtered for 100 dB isolation."

The wall-mounted wedges seen in the photograph are made of foamed plastic, doped with a carbon-based compound to attenuate RF energy from 30 MHz to 1 GHz.

The isolation achieved by the room is impressive. When the door to the chamber is slowly closed, a frequency monitor displaying local stray RF energy dips appreciably. Cellular telephones cease working only three paces into the room.

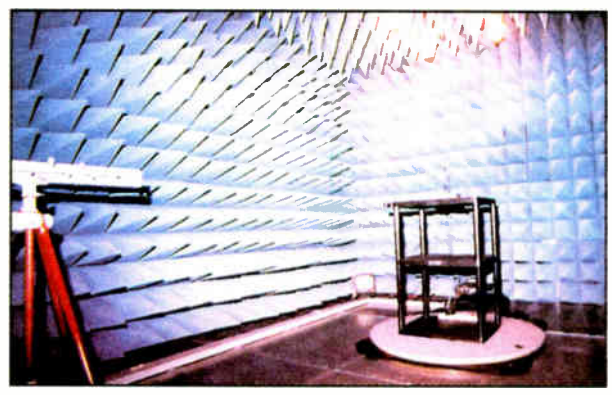
Visible in the photo are several explosion-proof electric lights in the ceiling. When asked if the safety feature was meant for further RF immunity or due to possible flammability of the foam, Mintner said, "No, you just never know when someone might get careless with a ladder."

With the new digs comes a new challenge for Audio Precision: being ready for the new 96 kHz digital audio standard. The engineers realize that DVD and professional audio concerns have forced the issue of 96 kHz and are now creating test and measurement equipment for the new standard.

The Audio Precision System Two analyzer is available as the System Two Cascade, with the capability to test 96 kHz audio circuits. The Portable One Dual Domain analyzer is likewise available with an option called 96K-P1DD.

But with a look toward the future comes a nod back at the past. The first and last thing seen by visitors to the new headquarters of Audio Precision is the mini-museum of classic audio test equipment in the lobby.

Four large glassed-in cabinets contain pristine specimens of the science of audio analysis, including signal generators from Heathkit, Hewlett-Packard and Eico, and analyzers from Crown and Tektronix.



Inside the RF test chamber, not even a cell phone can get out.

You Must Remember This

Here's a look at the 1939 Emerson Model CV-296, affectionately known as the "Strad," for Stradivarius.

The beautiful veneers, formed into the shape of a violin, with top cutouts and five horizontal bars, made for a stunning cabinet. The Ingraham Cabinet Company, a maker of clock cabinets, made many cabinets for Emerson. This model is a fine example of its creations.

Variations of the "Strad" had a D shaped window. The radio was equipped with a basic AM-only chassis similar to less expensive sets.

This is one in a series of photos featuring classic and less well-known radios. The pictures and descriptions are by collector Bill Overbeck, president of the Delaware Valley Historic Radio Club, who has made every effort to ensure accuracy. To contact him, send a self-addressed, stamped envelope to P.O. Box 847, Havertown, PA 19083.

World Radio History

WBEB: Philly's Digital Pioneer

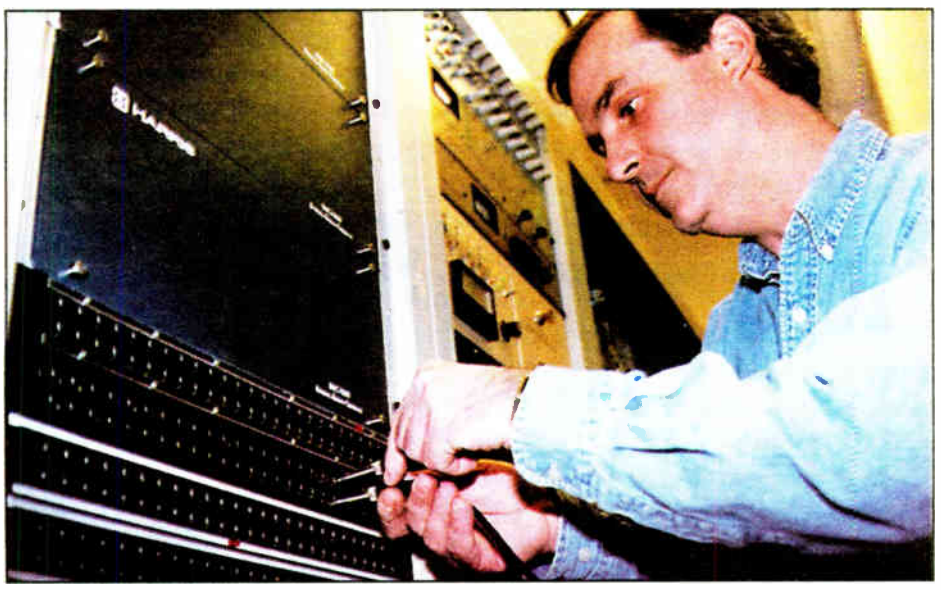
Paul J. McLane

As radio makes its transition to digital, one of the leaders is WBEB(FM) in Philadelphia.

The soft rock station celebrates 35 years as an independently owned station — unusual if not unique in the top five markets.

Co-owner Jerry Lee is a legend, thanks to decades of innovation and service to organizations like the Broadcast Industry Council. The Philadelphia Inquirer reported that the station owners turned down a $100 million offer two years ago. And in the spring Arbitron ratings, the station climbed to the top of Philly's competitive FM pile.

Chief Engineer Russ Mundschenk has achieved his own share of national recognition. Colleagues seek his expertise on digital matters, because WBEB was among the first radio stations to install digital consoles and to explore the new world of digital switching and synchronization.



Russ Mundschenk in the WBEB Equipment Room

Mundschenk spoke to **RW** Editor Paul J. McLane about the station's recent $375,000 studio upgrade project.

RW: Describe this facility.
Mundschenk: We have three full studios: one air studio and two full production rooms, and a voice booth off the main production room. There are two full-time production people, who stagger their shifts so we can cover weekends and after-hours. We have about six full-time announcers and five or six part-timers.

RW: When did you begin the project?
Mundschenk: We've been talking about rebuilding studios since the day I came here in 1983. ... The studios had been built for beautiful music. It just wasn't set up.

About 1994 I gave Frank Grundstein at Harris a call. He's a good friend of mind, and I said, "I want to rebuild my studios, but I think it would be ludicrous for me to rebuild them with analog equipment. After all, the equipment we have in our studios is digital, it only makes sense to keep it in that realm."

He said, "We are in fact talking to somebody about building a digital console for Harris." ... I went up to Zaxcom in New Jersey, and they showed me their proposed product. It pretty much had all the things that I had requested.

The thing I wanted most was programmability and versatility. You certainly can make an analog console that sounds as good as a digital one, but to be able to get the kind of versatility out of it that you can using DSP technology is what really makes it shine.

RW: When was the project completed?
Mundschenk: The production and air studios were completed in the fall of 1997.

RW: How is your on-air audio delivered?
Mundschenk: It's a live assist format. We run two Computer Concepts Maestro II systems. We operate them in such a way that the left machine runs the commercials, and the right machine runs the music. Either is capable of running the entire format, but that's the way we get our redundancy. Each is in a peer-to-peer configuration, so if one went down, we could go to the other one immediately.

Everything is on hard disk.

RW: How are you storing that? Are you happy with your algorithm?
Mundschenk: We're using the apt-X algorithm, which is what Computer Concepts started out with. In the past four or five years, they've made MPEG available, but we're using the apt-X format.

It's a 4:1 compression system. Each of the machines has 18 GB of storage; that translates to about 150 hours in stereo.

I really like the way it sounds, and that's the bottom line. Yes, it only does 4:1, but in my opinion, high compression ratios are really only important where you have an absolute need to do it, like limited bandwidth on an RF signal.

RW: Your consoles are the Harris DRC-1000s. What lessons did you learn in installing some of the first digital consoles to be used in the radio environment?
Mundschenk: If a console says it's digital, make sure it's *totally* digital.

I can think of one prominent model out there that is not totally digital. There are only effects on the mic channels; all the auxiliary channels are still analog. They mount their audio processing unit directly underneath the console, instead of in an environmentally controlled equipment room.

The way Zaxcom does it, with a separate control surface and a number-crunching audio processing unit in an equipment room, is a much better way to handle it. You want to keep everything centralized, in an environment that you have control over.

RW: What else does the console do that allows you more flexibility over a traditional analog design?
Mundschenk: It is infinitely programmable. Every channel has multiple effects. Compression, limiting, gating, AGC — which is a *separate* compressor, a gain rider, great for on-air. It's got equalization, five bands. Five *types* of equalization, available on each five bands, and all of this per channel!

RW: Any unexpected problems or complications in using the console, by nature of its digital approach?
Mundschenk: It's been relatively bullet-proof. ... It would be nice if the console had the ability to download a file from a computer, to be able to configure it, rather than sitting there for hours putting in individual letters.

When they introduce software, the new version is on a PROM that you have to pop out and put in. They didn't give me ZIF (Zero Insertion Force) sockets to do it. And some new versions wipe out all our presets, so we have to redo the whole thing from the beginning.

You *can* save setups to a PCMCIA card on the console, so you can go from one console to another.

RW: What percentage of your day is satellite fed?
Mundschenk: At 8 o'clock at night on weekdays, we take the "Delilah" show from Broadcast Programming. That is delivered via a StarGuide system, on Satcom C5. It's MPEG compressed, Musicam.

I'm not really happy with the audio quality on satellite, but it could be the compression algorithm, or multiple A-D conversions. The satellite receiver does not have a digital output. I've tried to get them to provide me with one, but they haven't gotten enough requests for that yet.

Station: WBEB(FM)
Market: Philadelphia, No. 4
Owners: David Kurtz and Jerry Lee
Founded: 1963
Frequency: 101.1 MHz
Information: (610) 667-8400 or Web site *www.b101radio.com*

ID vs. 1992

RW: How do your devices talk to each other?
Mundschenk: It's the AES/EBU format. That's pretty much standard.

But there are two types of AES/EBU. There's AES3-ID format, which is the same data protocol but with a different impedance

See DIGITAL, page 22 ▶

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Lucent Digital Radio

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World Radio History

Philadelphia Digital

▶ DIGITAL continued from page 21

and voltage than the AES3-1992.

AES3-1992 uses a voltage of between 3 and 7 volts peak to peak, at 110 ohms balanced.

AES3-ID is a voltage of 1 volt, like video, and it's 75 ohms, like video. As a result, you can lose a lot of video stuff: DAs, switchers, equipment of that sort.

We use the ID format. It's really easy to put on BNC connectors; the wiring is simple.

As far as trying to maintain the integrity of the impedance along your entire transmission path, it's much better. Coaxial line is meant to carry RF. And it *is* RF. It's 6 MHz. You've got to start thinking RF when you're talking about AES/EBU. At 48 kHz, if you sent all "ones," you'd have a signal that occupies 6 MHz worth of bandwidth.

Look at some of these balanced 110 ohm systems, and the connectors that they use going in and out of the pieces of equipment. You realize that, every time you make a transition, you have the potential of introducing capacitive rolloff, for reflections and all the other problems that a bump in the path, impedance-wise, will cause.

That's why I like the coaxial system. It's clean. And you can transmit AES3-ID up to 1,000 feet, whereas AES3-1992 balanced can only go a few hundred without some type of equalization.

RW: What would I see if I looked between your Computer Concepts system and your mixer, or your airchain?

Mundschenk: Computer Concepts is another one of those companies that has not developed a digital output for all audio channels using their standard cards. They announced at the Seattle NAB show that they will soon be supporting Digigram audio cards, which use MPEG compression and also have digital I/Os. I only wish that the standard apt-X cards supported digital I/Os on all channels.

Anyway, we took the analog output of the Computer Concepts, and fed it directly into the best A/D converter that I could find at the time, Benchmark's AD2004. We have Serial No. 1 of those.

Benchmark knew how to preprocess the analog audio so that it would exhibit the least amount of artifacts after A/D conversion. It's a great box.

RW: What about routing digital audio, beyond the console?

Mundschenk: For studio switching we've made interesting use of a Leitch, video switcher called the Xpress Series, a 12x1 stereo analog, 12x1 video switcher.

We have the ability to individually or separately switch either the analog or the video channel. We put the digital through the video side, we put the analog through the other side. Our analog output goes to our analog audio processing, which is used as a backup, and the digital goes to our digital audio processing.

We've built our own custom drivers for remote control panels, and we're able to have a remote control panel in each studio. I put in a little enable switch, so you have to hold down two switches at the same time to switch the on-air switcher, deciding which room goes to the audio processing.

Bandwidth concerns

RW: Let's follow that air chain. From there, the main signal is fed out of the Leitch switcher in digital...

Mundschenk: To an Omnia processor, from Cutting Edge Technologies, which then feeds an analog STL.

RW: After all this digital here?

Mundschenk: Just recently I've been made aware that the Moseley Starlink units have been out in the field for a while. They use 48 kHz sampling, which equates to a 24 kHz bandwidth, versus some competitive units, which operate with 32 kHz sampling and a 16 kHz bandwidth.

Why worry about 24 kHz bandwidth, when 15 kHz is the cutoff in FM?

I want to avoid as many rate conversions as I can. I want to keep the signal as clean as possible. If we have a 48 kHz sampling/24 kHz bandwidth system in this facility, I want to *keep* it 48 kHz. This is fast becoming the adopted standard in broadcast. As I buy new equipment, I want to try to get the most bandwidth that I can, within reason — certainly something that would support DAB in the future.

I'm thinking seriously about the Moseley Starlink, for that capacity. Right now we're using the PCL606. That goes to the transmitter, into a Harris Digit exciter, which we like a lot. The transmitter itself is a CSI transmitter.

RW: How much of a factor did digital audio broadcasting play in the design of your studios?

Mundschenk: Only in that I wanted to be able to deliver the quality of signal necessary for DAB when the time comes. I didn't want any critical part of my chain to be limited to 32 kHz.

RW: House synch is a new phrase for a lot of people in radio.

Mundschenk: House synch is very important. You want a house synchronization system that is very reliable, and very stable. If you lost your house synch, and you had a device that doesn't automatically switch over to internal synch — which the Zaxcom consoles do not, but the Benchmark A/Ds do, smoothly — there's a very good chance that your console is going to start free-running at whatever frequency it will synch to. The final product may end up sounding pitch changed. If you have devices that lose house synch, you're going to get errors.

It's important that you maintain a standard. And if you can do that, independent of the equipment, with a piece of equipment you know to be extremely precise and reliable, there's nothing like it. We're talking about a DARS digital audio reference signal generator that has a jitter spec of 10 picoseconds, or less. Preferably something around 2 would be nice.

Let's go another level. You've got your DARS synch, and you're feeding it to all these pieces of equipment that have synchronization, but how are you going to do that? If you split it with a DA, there's another piece of equipment that could fail.

Really the most ideal way is to have some type of switching arrangement that will switch over to a backup unit, if you lose your main source of synch.

See DIGITAL, page 23 ▶

A Passion for Radio

Russ Mundschenk, 43, grew up in Sherman, Conn., where he was aware of audio as early as age four.

"My father built some of the first hi-fi systems in the world, he built the cabinetry for them. It's been my life," he said.

Mundschenk at The NAB Radio Show

His first exposure to radio was a visit to WGHF(FM) in Danbury, Conn., when he was five.

"I saw their big transmitter with big glowing tubes, and that was it, man. That was *it*."

His first radio job was on the air at WLAD in Danbury. Mundschenk worked as a radio engineer at several stations and groups in Connecticut and Florida before joining WBEB, which was then WEAZ, in 1983.

His co-workers have good things to say about him. Production Director Tom Richards praised his approach to engineering: "He's always looking for the best way to do things — a real out-of-the-box thinker."

Mundschenk, his wife Becky and young sons Eric and David live in Havertown, Pa.

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World Radio History

▶ DIGITAL, continued from page 22

RW: Are your fellow engineers educated about digital in general?
Mundschenk: Nobody knows. I didn't know. It's all new.

We need to have more awareness of the digital environment, to really understand what's going on.

RW: Digital product manufacturers reading this article might ask what they could do to make your life easier as a user of digital products.
Mundschenk: Just give me a digital input and output, that's all. AES3. I'd like the ID format, but that's a matter of personal preference. You come out AES3-1992 with a 3 to 7 voltage range and a 110 ohm impedance, balanced, and you can convert that with a transformer.

But just give me a digital output. I bought a digital satellite receiver. It does not have a digital output. I've got a digital commercial system. It doesn't have a digital output. I've got all this stuff that is digital, but they all don't have digital inputs and outputs on every channel!

This is the way things are heading, folks, and you're going to have to do it eventually. Put your money into it now, so you can say that you are digital-ready.

RW: Who did your studio wiring?
Mundschenk: My assistant Kevin Kilbourne and I. He is intuitive and does a great job of sorting stuff out for me.

We also have a full-time MIS director. This is unusual, for a station of this size to have three technical people. But if you take a look at our usage of computers, there is no way two people can handle it.

RW: What observations can you offer to engineers thinking about these digital audio questions?
Mundschenk: The big "if" is how we tie it all together. Routing. You can use a video router; there are now AES3 routers available to do the same thing.

We're not doing too much splitting; where we've had to, we use these little block DAs from Video Accessory Corp. They're flat to 200 MHz, and we've done tests to take a look at their square wave performance. They're infinitely better than a lot of others in that price range, about $180 each. One in, four out.

For switching, the switcher we have is a nonsychronous switcher; that means a switch could happen at any point in the format, in the middle of a digital word, whatever. This means that whatever is downstream requires longer to synch up.

It doesn't sound too bad, really. They make a big stink about wanting to do nonsynchronous switching, but in our case, with the stuff that's downstream, you really don't notice any objectionable noise, big pops or anything like that.

RW: What's in your equipment room?
Mundschenk: We use video patch bays. Everything in the facility, every single audio source is available in the equipment room. You can patch anything to anything there. They all run through patch panels. It gives you total versatility. You can do anything you want, and frankly we've used it.

RW: You're serious about radio.
Mundschenk: Radio has been a life-long passion of mine.When I was in Florida, I did a lot of work in TV, helped install a transmitter, did some repair and things like that. TV wasn't the same to me as radio. Radio has the warm fuzzies that TV doesn't. Not to put down TV, but there is a warmth in radio that doesn't exist there.

RW: Is that changing now, post-consolidation?
Mundschenk: I don't see it here, because I work for a mom-and-pop station — or a *pop*-and-pop station.

I think it is, though; I'm sorry to see it. There are a lot of people out there who are trying to pinch every penny.

This is not one of those radio stations. We spend money to make money here. And they must be doing something right because they're the No. 1 FM radio station in the city right now.

■■■

The full text of RW's interview with Russ Mundschenk is at www.rwonline.com

This is one in a series of articles about how radio facilities are implementing digital technology.

Gear at the B

A sampling of WBEB equipment:

On-Air Studio
Computer Concepts Maestro System
Harris DRC-1000 Digital Console
Logitek PRE-10 Input Expander
AKG 414 Mics
360 Systems Short/cut
Sage Endec EAS
Leitch 12X1SBA Video Switcher
Computer for Internet access for jock
Studio Technology Furniture

Production Studios
Harris DRC-1000 Digital Console
Orban DSE7000
Sonic Foundry System (Sound Forge 4.5 & Acid 1.0)
Denon DN-951FA CD Players
Tascam 122 Mk III Cassette
Otari MX-5050 RR
Gentner TS612 Phone System
Roland Effects Processor and Voice Synth
Eventide H3000B UltraHarmonizer
Technics CD and Cassette Players
Studio Technology Furniture

Air Chain
Cutting Edge Omnia Processor
Moseley PCL-606C STL
Harris Digit Exciter
CSI T20-F Transmitter
ERI Two-Bay Panel

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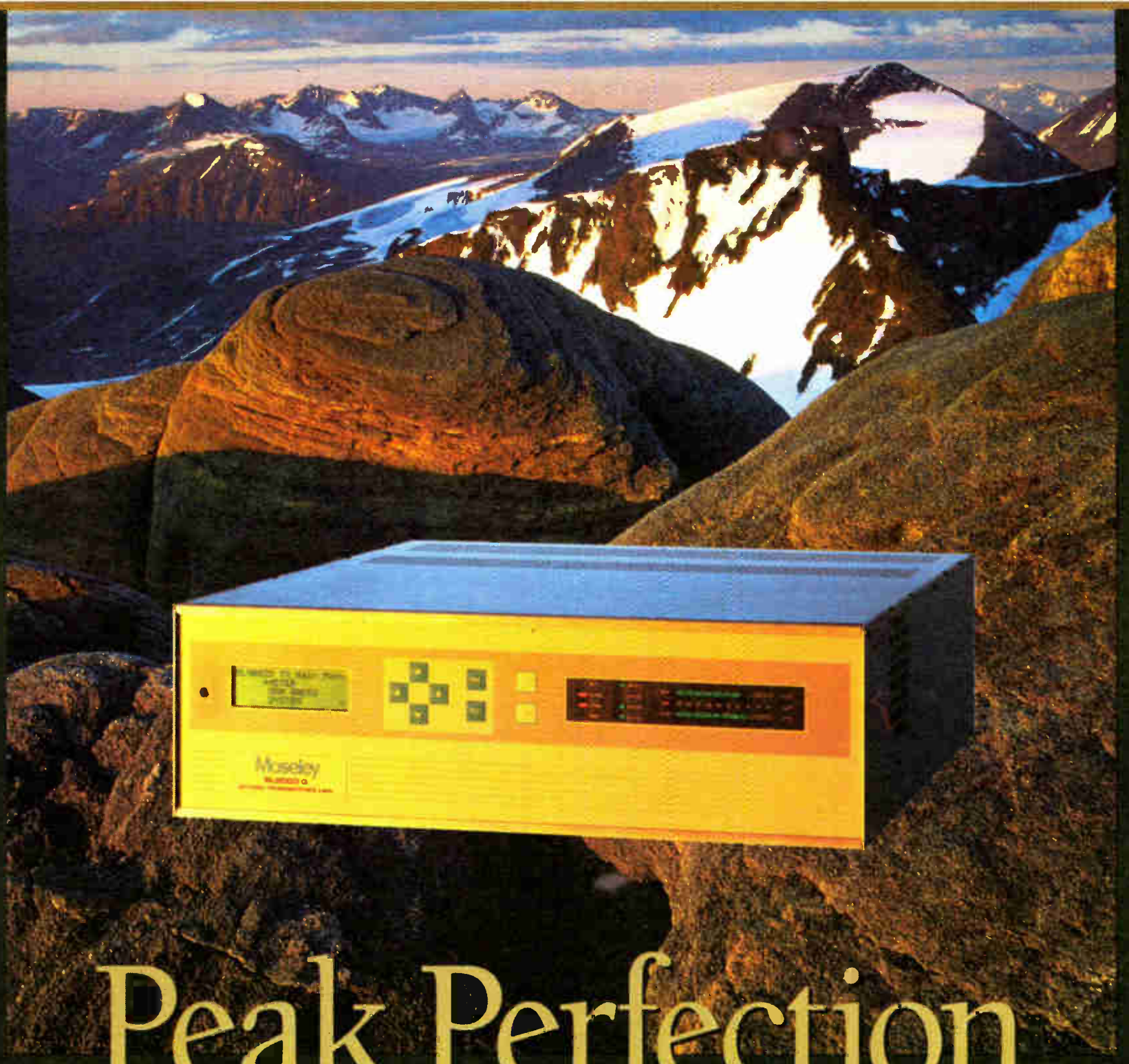
World Radio History



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World Radio History

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GM Journal

Radio World — Resource for Business, Programming & Sales — December 23, 1998

Mark Lapidus Examines Station Special Events
Page 26

Smulyan Looks Beyond Radio

Laurie Cebula

Emmis Communications tends not to make the big headlines. Yet the Indianapolis-based media group quietly is running one of the most lucrative radio groups in the nation.

Founded in 1980 as Emmis Broadcasting Corp., the group owns only 16 radio stations in the country, yet it ranks among the top 10 owners in estimated station revenues, as ranked by BIA Research.

The New Broadcast Studio at Emmis World Headquarters in Indianapolis

Of the 1,129 parent companies tracked by BIA, Emmis, in the No. 8 spot on the company's 1997 pro-forma revenues chart, registered nearly $157 million. Its revenue is just under that of No. 7 Heftel Broadcasting, which had revenue of $164 million but which owns 39 stations.

Emmis is celebrating the completion of new corporate headquarters in downtown Indianapolis. In an interview with **RW** Business Editor Laurie Cebula, Jeffrey Smulyan, president and CEO, said the new facility will unite the diversified media segments the company now operates. Its move to include other media prompted the name change to Emmis Communications in June.

Smulyan spoke with **RW**'s Laurie Cebula.

RW: *Does this new move to a larger facility mean you're making room for new departments and new employees?*

Smulyan: We have gotten into the television business so there will be some new departments as a result. Our primary expansion will be in our human services department. We really think the major point of departure for Emmis is the relationship we have with our people. We are a much more people-focused company than most, so we want to make sure we don't lose that as we get larger.

RW: *What is the philosophy that encompasses all the media under the Emmis Communications umbrella?*

Smulyan: This has always been a company that bought companies it could turn around. We were always more turnaround, idea-type people than we are just interested in buying a lot of stations. Just about everything we bought either needs something fixed or we thought there was something we could add to it to take it in a new direction.

RW: *As Emmis has grown from a primary radio group owner to include television and print media, will your organization implement cross-promotional campaigns within the various media?*

Jeff Smulyan

See SMULYAN, page 30 ▶

Houston Radio Station Promotes Housing Project

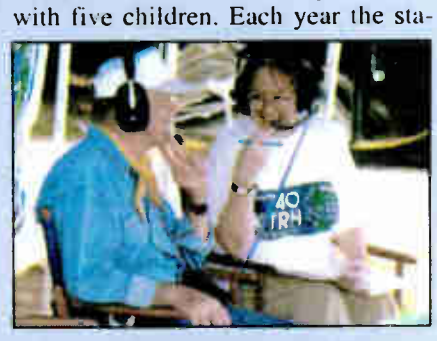
Houston station KTRH(AM) made the most of community involvement with live daily broadcasts from a site where 100 homes were built in one week during the Houston Habitat for Humanity and the 1998 Jimmy Carter Work Project.

Former President Carter was on site during the broadcast and throughout the project.

"Our listeners believed in this project. The response to our special events associated with Houston Habitat for Humanity was spectacular," Pam Kehoe, general manager of KTRH, said.

NewsRadio 740 began promoting the 1998 Jimmy Carter Work Project in February, raising awareness of the need for volunteers and airing a special series focusing on Habitat. The staff of the Chancellor Media station also held a golf tournament and silent auction to help raise money for the project.

KTRH also sponsored a Habitat home that is now owned by a family with five children. Each year the station selects a specific need in the community and directs its efforts to make a difference in the community.



At a live broadcast of 'KTRH Houston Hotline' from the Jimmy Carter Work Project, anchor Lana Hughes, right, shares a moment with former President Carter.

— Laurie Cebula

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PROMO POWER

Who Owns Station Special Events?

Mark Lapidus

With cash-flow demands growing universally around the United States, it has become increasingly clear that radio station event marketing must becoming a more profitable enterprise. This means breaking established rules and, in many cases, redefining success.

In the old school, promotion directors would seek out well-organized nonprofits to help create, staff and execute concerts, races, golf tournaments and holiday activities.

What was the definition of success back then? With little or even no revenue being generated, stations have long considered an event successful if attended by tens of thousands of people.

It was generally felt that this type of exposure greatly benefited the station because it could increase top-of-mind awareness and create goodwill in the community, especially when a charity was involved.

Goodwill goals

For good or ill, times have changed for broadcasters. While it takes a good bit more planning and, to a large degree, an experienced event marketer to pull it off, there is no question that a station can accomplish the exposure and goodwill goals, while generating revenue in doing so.

If great events that fortify awareness, benefit a charity and generate non-traditional revenue are among your goals, I suggest you begin by reviewing which events your station really controls.

You may be shocked to discover that you don't really own but a few of "your" biggest events. In many cases, nonprofit foundations have been more intelligent than broadcasters.

Frequently, when well-organized nonprofit organizations produced events, they would take care of key elements which stations typically found to be a burden.

This may have included obtaining city permits and liquor licenses, cutting deals with venues, hiring security — the list goes on. In the past, most stations loved nonprofits for taking care of these details.

But these very details can give an organization ownership of the event.

Experienced nonprofits sometimes file service marks for events, gaining the upper hand to the degree of being able to conduct the event without you or to take an event to a competing station. Slowly but surely, many nonprofits have even tapped into corporate and local sponsors.

Don't misunderstand me; I'm not attempting to paint nonprofit groups in a negative light. Most serve exceptionally worthwhile causes, and radio should continue to help charities raise funds.

It's a fact, however, that with radio's renewed hunger for event dollars, revenue-sharing must become a reality.

Just a few years ago, as I recall, in an attempt to a hit a revenue goal set for a promotion department, we discovered that we didn't really "own" the station Santa who had been making appearances for a nonprofit all over town for years.

When we explained that the time had arrived for the station to begin making dollars on this enterprise, we received the cold shoulder.

Stations are accustomed to bragging about raising $50,000 for charity. Now we must think of ways of raising that same 50 grand for those charities and another 50 grand for the bottom line.

This will happen only with events you own and control. It's neither fair nor appropriate to expect somebody else to do most of the work and then pass over the sponsorship opportunities to you!

After you've reviewed what events you really do own and control, review your annual plan and make necessary adjustments.

Create new events by brainstorming with every department in your station. Programming, promotion and sales must agree on what's worth committing to and what isn't.

Start events small and grow them every year. From now on, when you create events to benefit charities, first make it clear to your nonprofit partner that you will always own this event.

Next, obtain a service mark for the event. This generally runs less than $600.

The final part of the plan depends on the size of your staff and your ability to handle the legwork. If you are unable to execute everything yourself, consider hiring an external event group.

Paying that group a flat fee is a small price for maintaining full control. Those who control, rule. And it's good to be king!

■■■

Mark Lapidus is president, Lapidus Media. For marketing and programming consultation, call (703) 383-1805 or e-mail lapidus@erols.com

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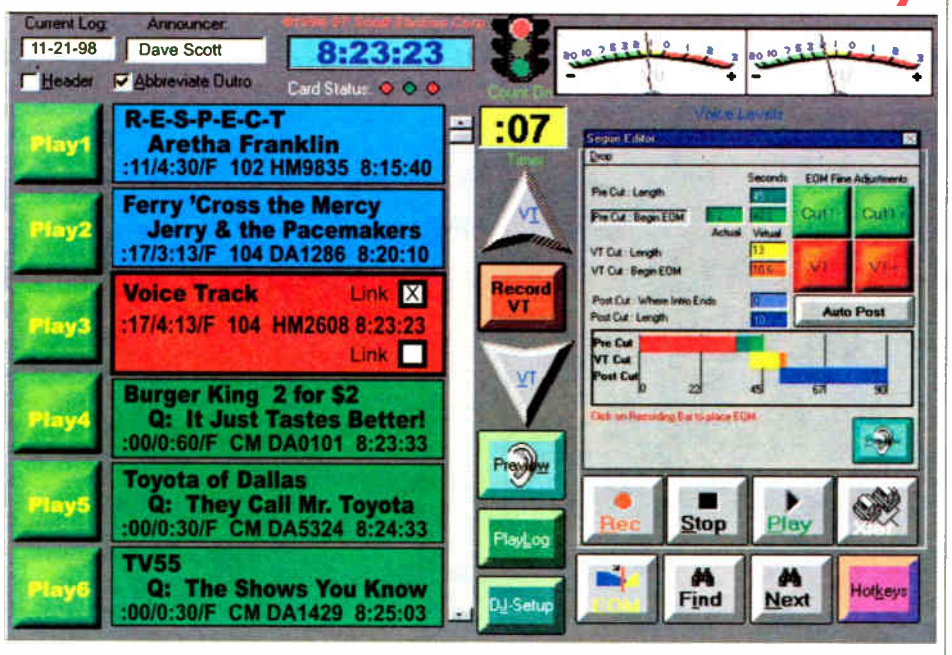
Scott's Voice Trax Via Internet software is ***very*** easy for your announcers to use. Scheduled live tags, trivia and copy display automatically on the right side of the screen. There's no fumbling with a copy book or even a mouse. When you're recording a song ending, simply press the space bar on the VTVI keyboard to start the next song or spot. Release the space bar after you stop talking. VTVI then moves ahead to the next place to talk.

All Voice Trax are recorded with the computer's ordinary sound card with impressive digital fidelity. Depending on your format, a microphone processor may be helpful to punch up the announcer's voice, but no console is needed.

If all the station's spots have been produced when the log is sent, Scott's Voice Trax software automatically computes and displays accurate time checks the announcer can include if desired in any Voice Trax.

After recording, any or all of the show can be reviewed and changed. Scott's VTVI Segue Editor even lets your jock fine-tune timing without any need to re-record any thing.

When done, a click on the VTVI Auto-Send button dials the Internet and moves the entire show to the distant Scott digital audio system automatically. Transfer speeds vary based on your Internet Service Provider, but with a dial-up phone line a shift can upload to the Internet in 40-50 minutes. With ISDN, transfer time can be 20-25 minutes.



Here's Scott 's Voice Trax Via Internet (VTVI) software, shown with the optional Segue Editor. VTVI allows a distant announcer to pre-record a 4 hour show in about 15-20 minutes with nothing more than a Windows computer, an Internet connection and a good microphone.

Scott Studios VTVI also includes our exclusive Voice/Music Synchronizer. When any Voice Trax mentions song titles or artists, your jock turns on the link so the Trax plays only with the correct song. No operator attention is needed at the station for Voice Trax to play seamlessly. If the announcer forgets to record something, or songs or spots get changed at the last minute the Scott Voice/Music Synchronizer automatically substitutes generic Voice Trax for each day and hour for each announcer.

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We also offer a $500 VTVI Deluxe that lets the announcer download telescoped song intros and endings from the Internet, then fine-tune timing of talk-ups and backsells in the context of the music and spots with little or no need for re-recording. With the VTVI Deluxe, a telescoped aircheck can be previewed with the beginnings and ends of the songs and spots.

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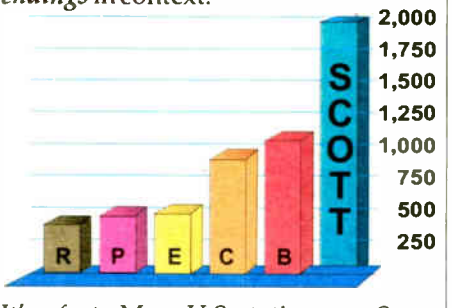

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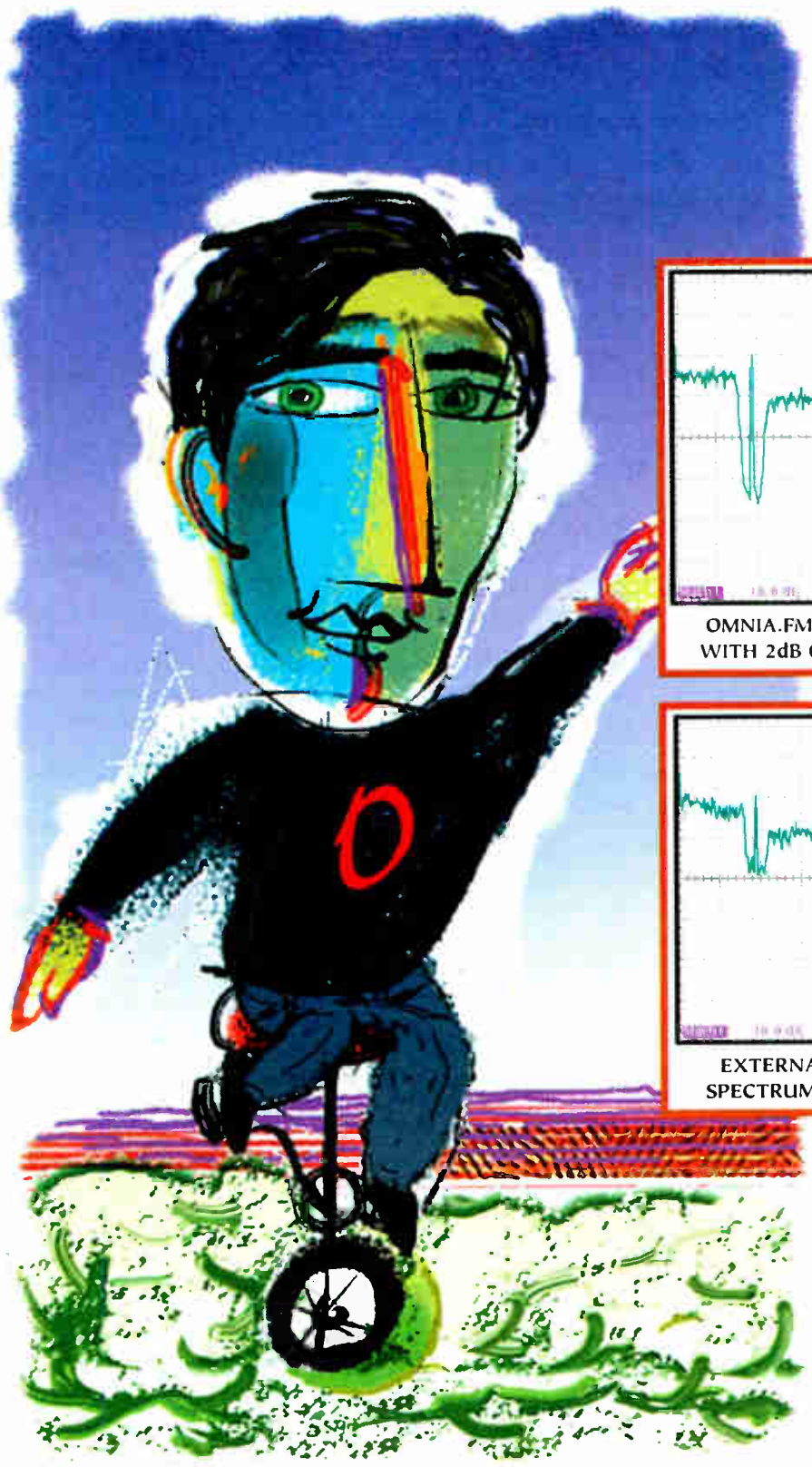

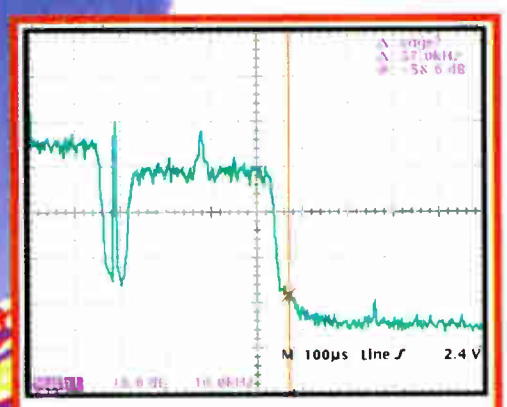

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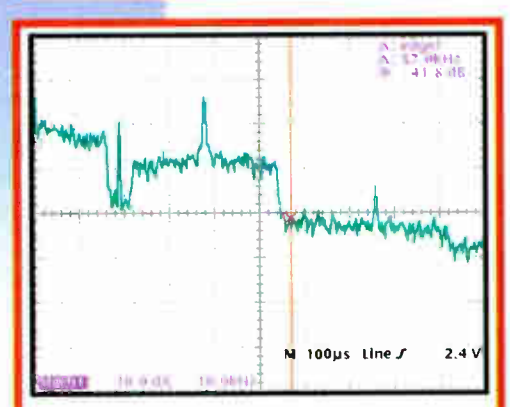

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Here's how: *The test signals were generated by a Delta Electronics SNG-1 (Stereo Noise Generator); spectrum analysis was performed with a Tektronix TDS-744A Digital Scope in the FFT mode. The top graph shows the spectrum out to 100kHz of the Omnia.fm with its built-in, all-digital composite clipper and composite low-pass filter. The bottom graph shows a different processor combined with an external composite clipper. Both composite clippers were set for 2dB of clipping. Notice in the bottom graph the significant harmonic energy in the SCA region as a result of composite clipping.*

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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ONLINE RADIO

Protecting Copyrights in Cyberspace

Kim Komando

It doesn't seem all that long ago that copyrights were a pretty straightforward subject.

If you copied someone else's words or images for commercial gain without obtaining their permission, you were violating their copyrights.

If they wanted to, they could sue you.

Today, with information flowing back and forth across the Internet faster than you can say lawsuit, the waters of copyright law have become a little muddied.

All this raises the question: What can you do to protect your own online content from scavengers and even seemingly well-meaning fans?

One area of potential confusion is defining what actually constitutes illegal copying. A couple of years ago, a clever fellow developed a Web page to display images from the Playboy magazine Web site.

Image rules

This gentleman, however, did not actually copy any images from the Playboy site. Instead, he went to the Playboy site and figured out what the exact URLs, or Web addresses, were for the images he wanted to display.

He then wrote the HTML code for his page in such a way that each time a visitor loaded the page, the desired images would be pulled directly from the Playboy site into the visitor's Web browser.

By doing this, the perpetrator was able to give the visitor the appearance that the images were stored on his site when in fact they weren't.

The man argued that since he never actually copied the images to his computer, he wasn't breaking any copyright laws.

The Internet has given rise to the notion among many so-called Netizens that all information, copyrighted or not, should be freely distributed throughout cyberspace.

When Playboy pressed the issue, the man wisely backed down. In the last couple of years, there have been a number of cases involving this questionable embedding of remote images and the courts have consistently sided with the copyright owners.

The most recent case to make headlines involved the so-called "dirty dozen" nude photographs of Dr. Laura Schlessinger taken by her ex-lover, former radio personality Bill Ballance.

The pictures feature Dr. Laura before her famous radio days.

When Ballance first announced his intention to sell the photographs to the highest bidder, Schlessinger herself tried to block the sale. She claimed that she had some right to the photographs in question. However, since long before the Internet came into existence, the law has been upheld to protect the copyrights for any photograph. The general rule says the rights belong to the person who took the photograph.

In other words, Schlessinger didn't have a leg to stand on — regardless of whether that leg was naked.

Consequently, the dirty dozen were sold to a company called Internet Entertainment Group, or IEG.

IEG is the owner and operator of several of the Internet's most popular and profitable porno sites. IEG posted the pictures to one of its for-pay porno sites and ended the legal wrangling over the pictures — or so IEG thought.

Cease and desist

In what strikes me as an offbeat turn of events, this porno operator has now become the victim of copyright infringement.

I'd guess that the dirty dozen wasn't online on IEG's site a full day before a person or several people had copied them and posted them on Web sites and Usenet newsgroups around the world.

As such, IEG sent cease and desist orders to more than 50 companies and individuals for displaying nude photos on the Internet, obtained through their company Web site, without the company's permission.

In the order, IEG claims that anyone who displays them without permission could face fines up to $100,000 and a prison sentence of up to five years.

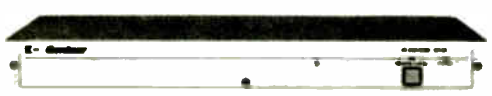
In the days following the issuance of the order, many sites removed their Dr. Laura images, but a few off-shore sites remained.

What, if anything, IEG would do about these off-shore sites remains to be seen.

However, it's pretty clear that the

See KOMANDO, page 36 ▶

Remote Facilities Management for Transmitters



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World Radio History

Jeff Smulyan's Global Vision

▶ SMULYAN, continued from page 25

Smulyan: We're a little more skeptical on that. We sort of started this whole synergistic idea before anyone else because we had radio and magazines in the same city. And what we learned was that there wasn't as much synergistic selling as we had hoped, but there was and is some cross-promotionally.

If we like a market, we would like to own more in that market rather than less, but we don't think it's critical. The hottest radio station we have in the company right now is a stand-alone in Chicago.

We feel if we do our job, it doesn't really matter how many properties we own in a market.

RW: What key things do you look for in a potential acquisition?
Smulyan: The condition of the technical facilities is the first thing. We just don't like to buy secondary facilities. We look at the market, then at the facility and how well it fills its niche. And then we ask: "Is there something about that property where we can add value?"

Not 'dying to merge'

RW: What is it like to operate among the top owners in this consolidated group ownership landscape? Are you being pursued or have plans to merge?
Smulyan: We have looked at a lot of things. We're always thinking.

You know, I love this business and we have been an independent company that has been able to grow pretty nicely. We have been private, really, since the day we started the company. We've never thought we had to be the biggest to be successful.

We have a different philosophy here from the way we do business — so from that standpoint, we probably aren't dying to merge in with somebody else that has a totally different philosophy, unless we see something unique.

RW: Does consolidation affect your business strategy?
Smulyan: It does to an extent, we really think it makes the business more professional. We have never felt that if we don't pair up with somebody or acquire everything in sight that our future is jeopardized.

That was, of course, the first question when the consolidation started. We thought, "God, do we have to go out and buy everything?" What we learned was that we like being a little bit more agile and that we compete nicely against some of the bigger companies. So, we kind of like our position.

RW: One of the reasons you cited for the success of Emmis Communications is the people who make the executive decisions at the organization. Who are some of these people?
Smulyan: Rick (Cummings), the chief programmer, has been here since I started the company. I don't think there is anybody in radio, in the world, who understands this medium as well as Rick does. He has always been a key player. He understands programming and strategy as well as anybody alive. Ours has been a great partnership.

Doyle Rose has been head of our radio group since the second year we were in business, that's nearly 17 years. Again, he's one of a kind in that nobody understands radio operations like Doyle. Ours is another great partnership and friendship.

And there's Randy Bongarten, who we brought in to run our international group. He had been president of NBC Radio and has done a brilliant job in getting our first venture in Hungary off the ground.

RW: Are you planning to expand radio operations in Hungary and in Europe?
Smulyan: Yes, both in Europe and elsewhere in the world. Very clearly.

RW: What are some elements of the strategies that have helped you in that market?
Smulyan: The point is, with all of the markets, what has made it work is that you get good people and you don't take anything for granted. Research the market. Understand the consumers. And as Rick says, all cultures are different but human behavior is largely the same. So, first you understand how people respond to this medium. This seems to work pretty well.

Global Vision

RW: Does the global vision that Emmis has added to its marketing plans include exploring Internet broadcasting?
Smulyan: Well, we're looking at it.

Internet, we think, is an adjunct. We

See SMULYAN, page 34 ▶

A Man, a Company

In 1973, Jeff Smulyan first entered the world of radio. He attended law school in southern California while working part-time as a programmer in Los Angeles.

"I am, in fact, a lawyer, although I am particularly proud of the fact that I never practiced. I am a broadcaster and very proud of it," he said.

In addition to owning 16 radio stations, including outlets in the nation's three largest radio markets — New York, Los Angeles and Chicago — Emmis has two Indiana radio networks, five television stations, four regional monthly magazines and a broadcast sales consulting company, Revenue Development Systems.

Emmis International is the majority investor and manager of operations of Slager Radio network, based in Hungary.

Smulyan also has served as ambassador to the U.S. delegation to the Plenipotentiary Conference of the International Telecommunications Union, appointed by President Clinton in 1994.

Citing the value of hiring the right people, Smulyan credits much of the success of Emmis to its employees, some of whom have been with him for more than 15 years. Emmis has a good track record; among its alumni, for example, is Joel Hollander, recently appointed to succeed Mel Karmazin as president of Westwood One radio networks.

— Laurie Cebula

Emmis, Seeking to Diversify

In 1980, Jeff Smulyan founded Emmis Broadcasting Corp. In 1988 the company purchased Indianapolis Monthly, marking the beginning of Emmis' diversification. Five years later, the company purchased the monthly business magazine, Atlanta, followed by the purchase of Cincinnati Monthly in November 1997 and Texas Monthly in early 1998.

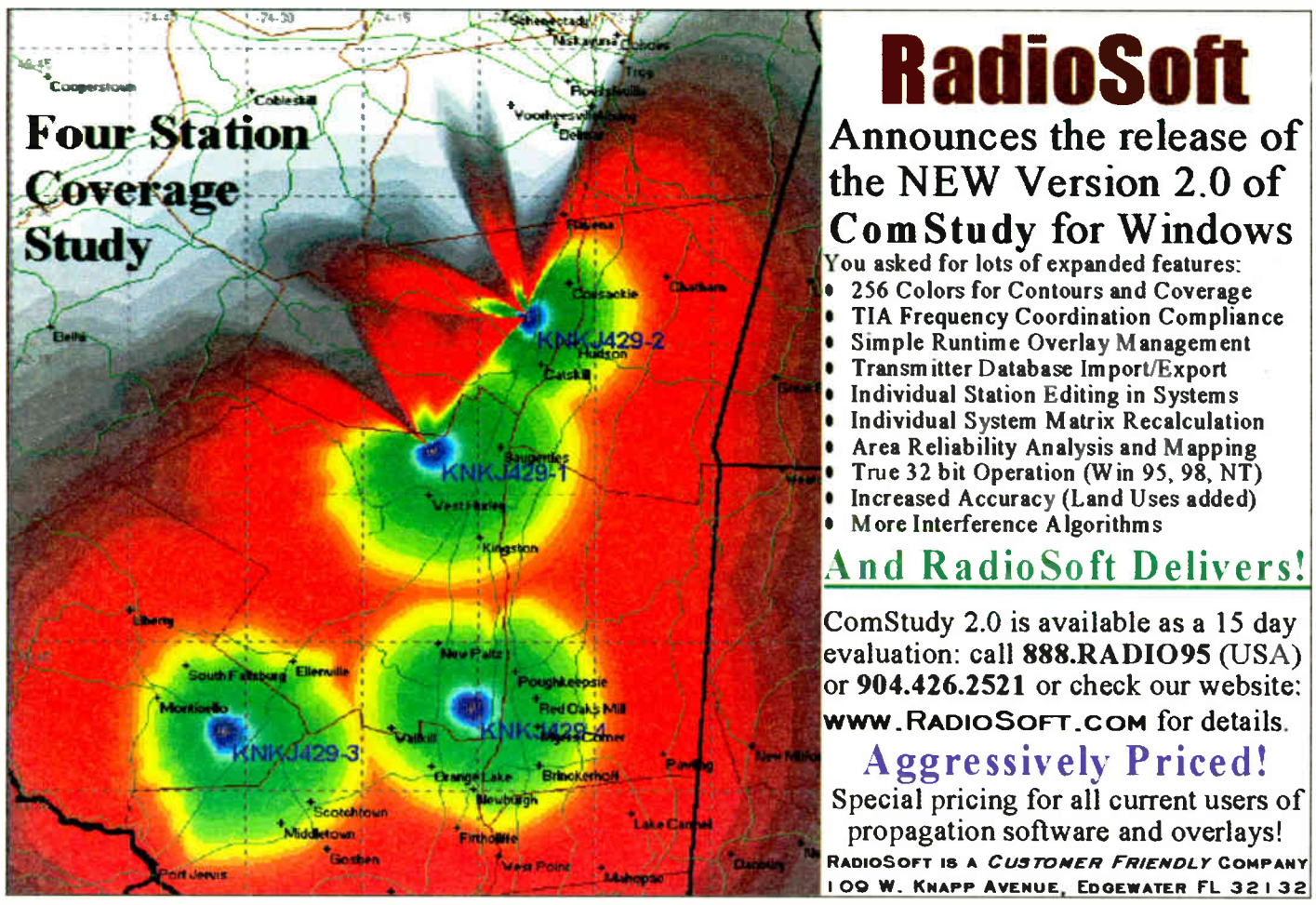
The next move to diversify was the purchase of six television stations from SF Broadcasting and Wabash Valley Broadcasting. Three radio stations in Terre Haute, Ind., one AM and two FM stations were included in the transaction with Wabash Valley. These acquisitions were finalized in October.

When Emmis entered the agreement to purchase the television stations, shareholders and the board of directors approved a name change. In June, the name of the organization changed from Emmis Broadcasting Corp., to Emmis Communications Corp.

The company now owns eight Indiana radio stations, three New York stations, two St. Louis stations and one station each in Los Angeles and Chicago. The television stations are located in New Orleans, Honolulu, Green Bay, Wis., Mobile/Pensacola, Fla., Ft. Myers, Fla., and Terre Haute, Ind.

On Feb. 16, 1997, Slager Radio, a network in Hungary, went on the air. Emmis is the majority investor and manages its operations. The network is the company's first major investment outside the United States. Emmis International, the division in charge of the Hungarian radio network, was created to explore opportunities for commercial radio in international markets.

The company employs 1,593 people.



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"Tom, we bought another radio station last night."

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World Radio History

Wolfman Jack: A Howlin' Good Time

Wolfman Jack Airchecks Shine on a New CD, 'The Legendary Wolfman Jack: Howlin' On The Air.'

Alan Haber

You press Play and you hear the howl. It sends shivers up your spine and you know what's coming, what's on the horizon, what's just around the bend.

You close your eyes and you can just imagine the beast's head moving ever-so-slowly until it locks in with the moon. Its mouth opens just a crack as its full-force, insistent cry fills the night.

Then, the crash, the sound that signals that all is not as it seems. And the voice, slightly echoed, toppling over it all: "X-E-R-B moves up — "

"Nine-thirty in Los Angeles," the Wolfman says, slightly spooky music squishing beneath him.

"This is 50,000-watt clear-channel XERB," the station announcer says. "Radio North America, central studios Los Angeles, 1090 on your dial."

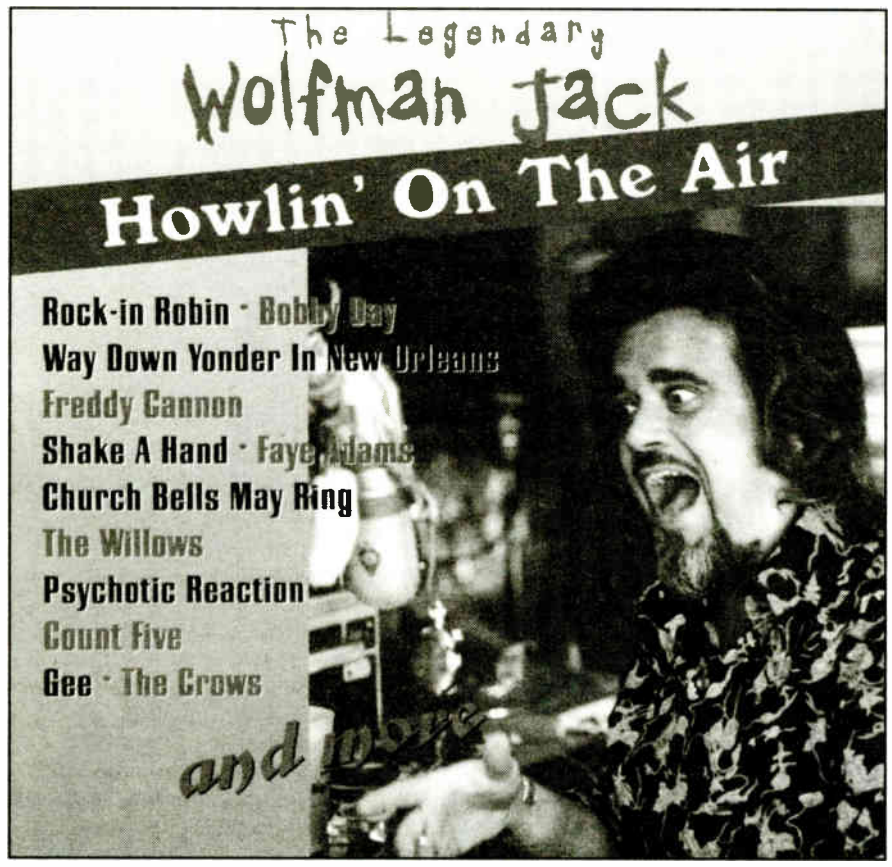
"Awwwww," the Wolfman sings sweetly, and then the birds flutter in and sing along.

"Hey baby, welcome on in here to the Wolfman Jack show for a *Tues*day *night*!", the Lord of *Awwwww* says. "Tweet tweet," sings the chorus, and Bobby Day gets to warbling "Rock-in Robin" as this aircheck of the legendary Wolfman Jack gets going.

Smashingly wonderful

You do the laundry, you take out the garbage, you pack the kids' lunches, and you drive the car pool, and all you can do to keep from drowning in the chores of the day is look forward to flicking the switch on your radio, in the car, in the kitchen, in the living room ...

You listen to the radio today, it might just play in the background as you keep on with those chores. But you listen to "The Legendary Wolfman Jack: Howlin' On The Air,"(big ear music/DCC Compact Classics), a smashingly wonderful new commercially available CD of XERB airchecks from 1968-70, and you drop the laundry, you drop the garbage, you forget to pack that peanut butter and jelly sandwich, and you don't drive the car pool, you just jump in the pool.



If anybody ever asks you to play something for them that proves what you've always said about the power of radio and how it can totally transform a listener and how it can captivate an audience, play them this CD. For just over 60 minutes, the power of radio and its ability to transform a listener and captivate an audience is in the grooves, so to speak, and all the glory of the medium is on display.

The late Wolfman Jack wasn't so much a DJ as he was a performer. Sure, the music on his shows mattered, but Wolf mattered more. He *was* the star of his show, shoving his mane into every nook and cranny and blind spot and crevice, making no apologies and taking no prisoners and having the time of his life and allowing you to have the time of yours in the bargain.

He didn't sing along with the records — he sang *into* them. The microphone was always hot and open when the Wolfman was behind it. On this CD, he injects a wild and woolly, "Awwwwwwwwww, *yeah!*" into an instrumental break in Frankie Lymon and the Teenagers' "I Want You To Be My Girl."

"Aw, shake it baby, let it *all* hang out!" he yelps. "Aw, *yeah!*" he deposits on a downward spiral at roller-coaster speed, talking up Freddy Cannon's "Way Down Yonder In New Orleans."

"Life is but a *dream*, ba-*bee*," he says, as The Harptones' rev up. "Do you remember *this* one?" he wonders aloud and laughs that high-pitched Wolfman laugh. "Oh *yeah!* The *Harp*tones," he says, his hushed voice trailing ever so slowly *down*, the 'tones singing all the while.

American original

Wolfman Jack was a true American original, the music radio performer's performer — a one-and-only if ever there was one. And not only could he sell a bridge to Brooklyn, he could sell an oldies package to his listeners in a way that sent them running straight to their wallets: "Seventy-two of 'em, baby. You got 'em, 72 original golden oldies, all yours for the low, low price of just six dollars 98 cents, cash, check or money *order*," he says, meaning every word, rattling off a litany of artists like it's his *rés*umé, baby.

Truth is, it was *all* his résumé, every last syllable, his mouth wrapped around his microphone as he pushed everything he had out onto the airwaves.

"We got to *close* it out," says the Wolfman, probably teary-eyed for all anybody knows, as Toussaint McCall's "Nothing Takes The Place Of You" rolls out and this CD enters the home stretch. "That's it for the Wolfman Jack show for the night. Be back again tomorrow night, bright-eyed and bushy-tailed. Gonna sock it to you tomorrow, ba-bee."

With this CD, the Wolfman can sock it to everybody night after night after glorious night, his ever-present howl shimmering in the darkened sky.

■■■

Alan Haber writes the column Cyberhouse for RW, and is a regular contributor.

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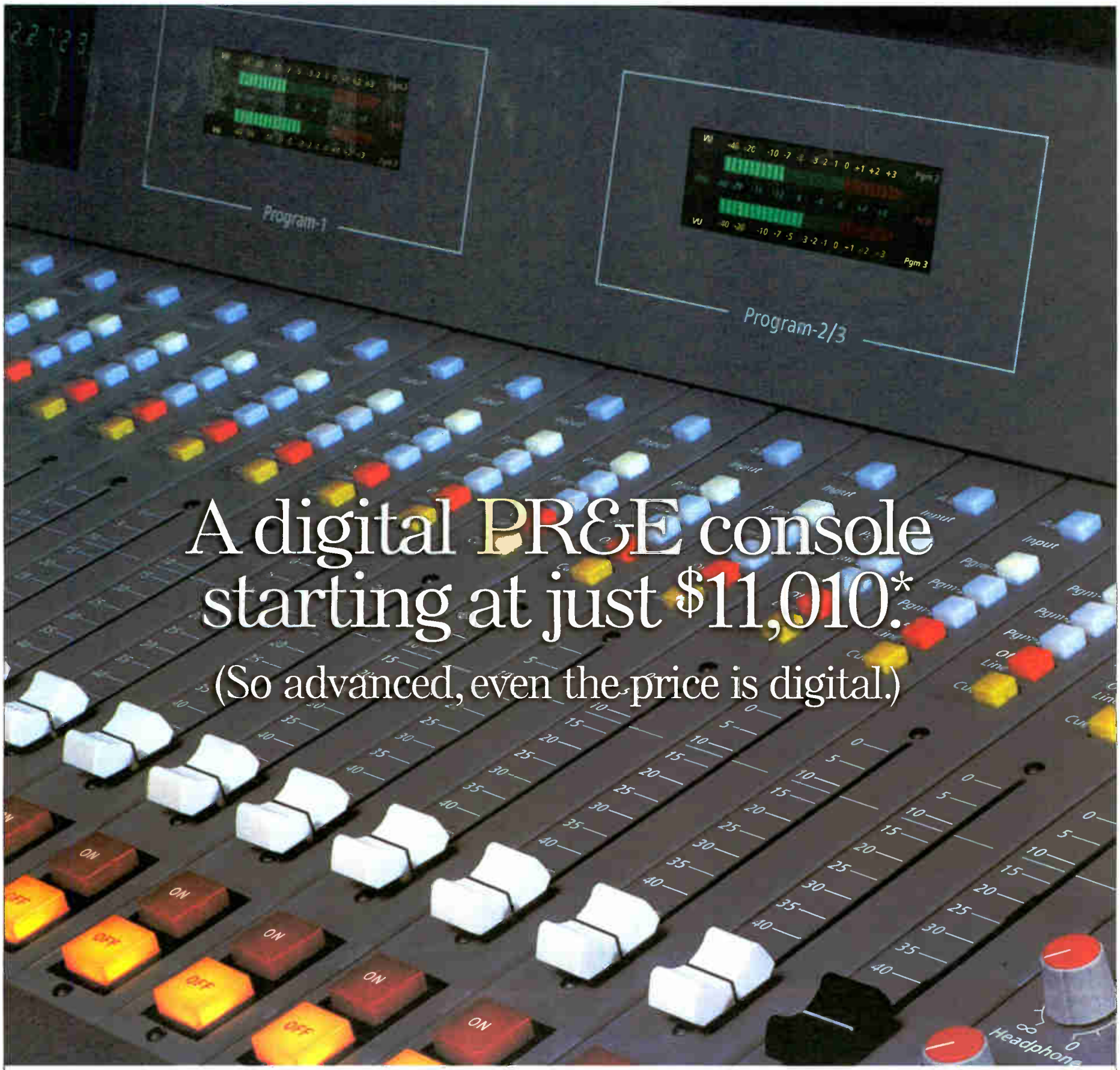

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World Radio History

Expanding Horizons at Emmis

▶ SMULYAN, continued from page 30

are not quite as bullish on the Internet as others, simply because we think that there are no barriers to entry with the Internet. It's an additive. You put your stations out there, but so can 400,000 others. Anyone, in fact, can put a station on the Internet. When that's the case, its hard to get significant advertising revenue. Too many options for listeners exist.

***RW:** Can you elaborate on the success of the stand-alone stations in your group?*

Smulyan: I think the fear in the industry was that if you didn't have a lot of radio stations, you couldn't possibly compete. We learned very quickly that you really could. A property that's performing well, that understands its market, could compete in any environment.

Key to success

***RW:** So then your key to success has been to get in touch with the audience that has been under-served?*

Smulyan: Absolutely. Understand that market. And it doesn't matter if there are nine stations owned by your competitors or if you're a stand-alone, we think good radio stations perform.

***RW:** How do you feel about the possibility of radio industry revenues dropping or changing? Some financial experts say the nation is headed toward an economic slump.*

Smulyan: The concern was that if we head into a recession, what happens? But I think the history shows that radio generally performs pretty well in recessions. Then again, who really knows? But we at Emmis feel pretty comfortable that that (good performance) will continue. In most recessions radio has performed very well.

***RW:** What do you think radio's good performance during recessions is due to?*

Smulyan: I think because it's a cheaper-cost medium.

Most advertisers, I think, realize they can't lose market share in a recession. That is a very dangerous proposition. From that standpoint, advertisers realize that they have to make sure that they don't lose share. Radio seems to be the cheapest way to hold market share.

***RW:** Will the recent move to television affect radio group operations?*

Smulyan: Our radio is group is doing very well. We don't have too many assets where we can't deal effectively with everything we own. It's not like we have gone from 10 radio stations to 500 in the last year. We know the ones we own very well and we have brought in a great TV manager who understands that business very well.

***RW:** Can you give us some idea of your business strategy for the next 12 months?*

Smulyan: We will be looking for opportunistic purchases; whether in radio, international radio, TV or magazines. Each one of our segments is performing very well. As long as each segment is performing well, we want to give them the opportunity to grow.

Local approach

***RW:** We have noticed most of your magazine purchases are regionally based or community-driven. Are local markets important to your business?*

Smulyan: We feel that most of the ad growth in the future will be dominated by strong local outlets, whether it's magazines, or radio and television. We would like to buy strong outlets, whether they be Texas Monthly, which has a tremendous ability to garner advertising in the state of Texas, or radio stations in Indianapolis and New York City.

We feel strongly that local advertising will grow as retailers continue to drift from daily newspapers to other medium.

***RW:** If you could predict the broadcasting industry five years from now, what would you see from a visionary scope?*

Smulyan: We are competing in more of a global world.

As my friends at Anheuser-Busch and Coca-Cola noticed, a lot of the growth is elsewhere. This is a mature market. I think there will always be room for good radio operators in this market, whether you own 10 stations or 500. But we want to shift our focus elsewhere. We want to refine what we do and continue to grow around the globe.

***RW:** Does this mean you will try a different marketing approach?*

Smulyan: No, just expanding our horizons.

***RW:** How did your participation in ITU shape your approach to an international market?*

Smulyan: I was head of the U.S. delegation to the International Telecommunications Union. As U.S. ambassador in charge of that mission, it gave me an opportunity to view telecommunications around the world. It opened my eyes to the fact that there are 270 million people in this country, but there's almost 6 billion elsewhere.

There will always be room for good radio operators in this market, whether you own 10 stations or 500.

— Jeff Smulyan

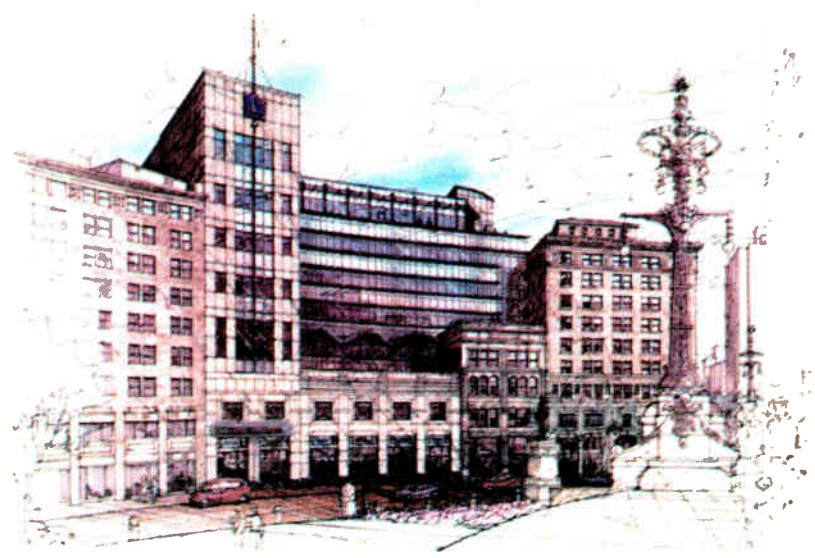
Emmis' New $25 Million HQ

The new Emmis Communications world headquarters is located in the heart of Indianapolis.

At a cost of $25 million to construct, the 142,000-square-foot facility consolidates Emmis' five Indiana radio stations, two news services, corporate offices and its Indianapolis Monthly magazine under one roof.

One of the design objectives was to create a facility that didn't interfere with the historic landscape of Monument Circle, but which offered a distinct identity for Emmis Communications.

In order to serve the entities in the media group, various facades are incorporated into the seven-story building. New digital broadcast facilities are showcased through a custom glass curtain wall. Mullions on the glass wall are spaced to represent FM waves, varied in wave spacing. A custom metal trellis above the outside entry reflects AM radio waves, varying in height. The wave theme is represented in details within the interior of the building.



This is the artist's rendering of the new corporate headquarters of Emmis Communications in Indianapolis.

Listener levels

At street level, two on-air showcase radio studios are visible to people on Monument Circle. A video quality electronic variable message board, located above one of the studios, provides news and information about special events.

Emmis' local radio stations and news services include WENS(FM), WNAP-FM, WTLC-FM, WTLC (AM), WIBC(AM) and Network Indiana and Agri America.

— Laurie Cebula

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World Radio History

Infringement or Free Speech?

▶ KOMANDO, continued from page 28

company is on fairly solid legal ground. The Internet has given rise to the notion among many so-called Netizens that information — all information, whether it's copyrighted or not — should be freely distributed throughout cyberspace.

Free for all

This is bad news for anyone who owns the copyright to any online content, as both the Los Angeles Times and Washington Post recently discovered.

Both publications have filed a copyright infringement suit against the operator of a Web site who, according to allegations outlined in the suit, posted copyrighted articles from the Web sites of both publications on his own site.

Should all information — copyrighted or not — be freely distributed throughout cyberspace?

Furthermore, the suit alleges that this operator encouraged his online visitors to do the same.

Apparently, both companies have attempted to settle the matter out of court, but the operator of the bogus site is trying to portray the action against his site as a free-speech violation.

However, most watchers of this case expect the media giants to prevail.

A recent lawsuit by celebrity photographer Gary Bernstein against JC Penney Inc. really stretches the limits of online copyright protection by asking the question: How much responsibility, if any, does the operator of one Web site bear for the content of sites to which it is linked, but over which it has no direct control?

Passion Web site

Back in 1997, JC Penney and Elizabeth Arden, maker of Elizabeth Taylor's Passion perfume, sponsored an America Online chat session with the actress.

Among other things, those "listening in" on the chat session were invited to a Passion Web site operated by JC Penney.

One of the several links on that site was a link to a Taylor biography Web page operated by Internet Movie Database Ltd.

This bio page included a link to a Taylor site on the Swedish University Network. It was this site that included two copyrighted Bernstein photographs of Taylor.

In other words, the questionable images were two hypertext hops away from the JC Penney site, on a foreign server over which the retailer had no control.

Yet, Bernstein is trying to force JC Penney to pay for the copyright violation.

While most experts predict that Bernstein will not prevail, his lawsuit is testing some previously uncharted waters.

The one to watch

If Bernstein does in fact succeed, the entire nature of the Internet could be threatened. This is one to watch.

The truth is that there's not much you can do to prevent someone from copying text and images from your Web site. Your only real defense is to protect your copyrights aggressively once you suspect they've been infringed upon.

However, you likewise need to make sure that you don't overreact either.

If you appear to come down too hard on the offender, you may discover that the backlash among listeners could cost you more than the copyright infringement itself.

In other words, investigate allegations of copyright violation, but choose wisely the one that you decide to pursue.

■ ■ ■

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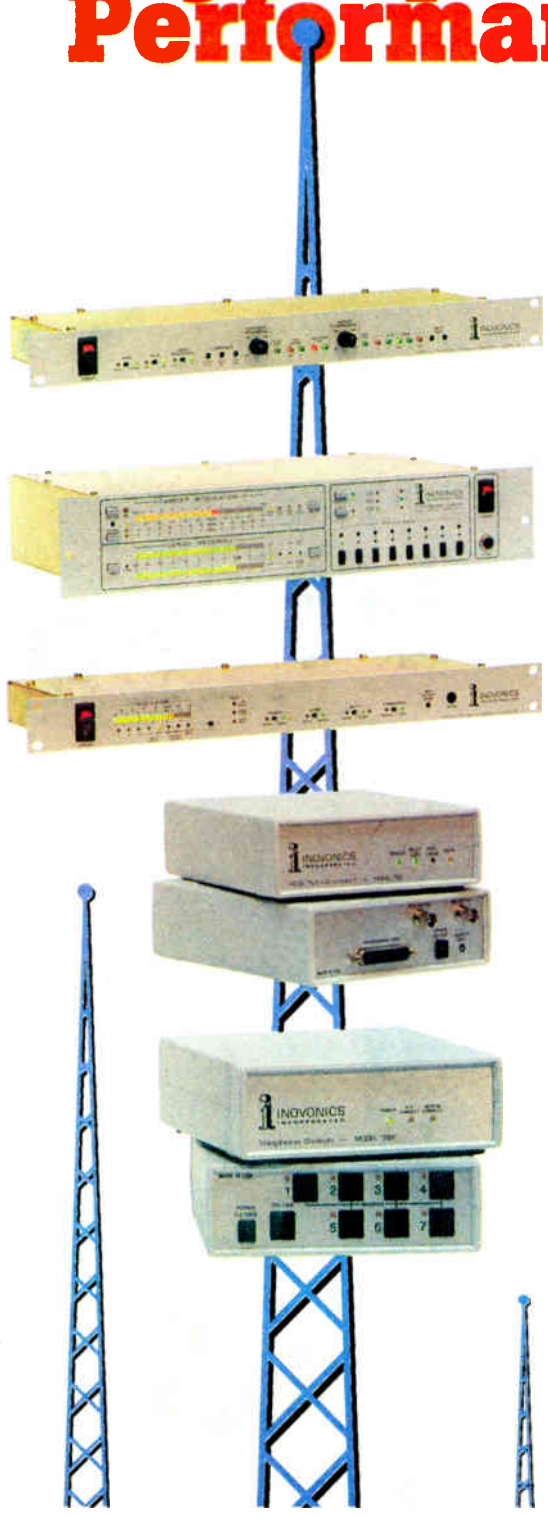

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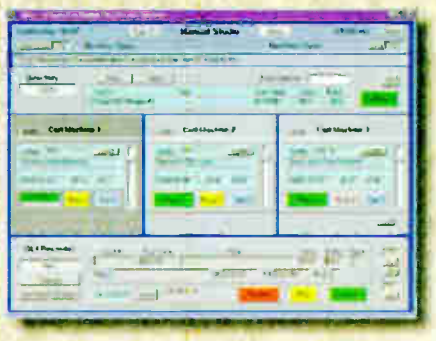

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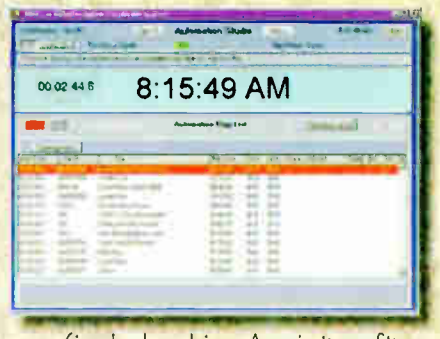

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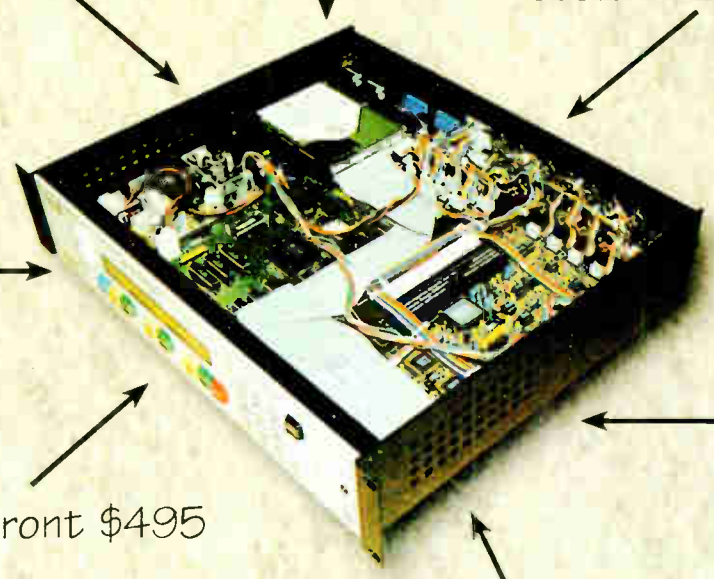

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World Radio History

Radio Reference

What's the difference between AC, soft AC, hot AC, lite AC and mainstream AC? What the heck is AC, anyway?

Did Gabriel Heatter invent the hot clock? Do you know a heterodyne from a Joe Pyne, or a crossover from a crossowner? What's more important, quarter hour maintenance or a maintenance log? What goes in the public file? Whatever happened to quad?

You'll find the answers to these and many more queries in "The Historical Dictionary of American Radio" (see story, page 25). From "ABC" to "Zoo Format," the listings cover programming, business, technology, audiences, regulation and the cast of characters that have made radio what it is today. It's a fun reference tool designed for the general reader and the beginning scholar.

Here are some samples:

"*Duopoly* refers to the common ownership of more than one broadcast station in the same service in a particular community — service referring to AM, FM and television.

"As early as 1938, the FCC adopted a strong presumption against granting licenses that would create these combinations.

"In 1970, the FCC further restricted within-market ownership by prohibiting the licensee of a television station from also holding radio stations in the same community.

"However, the commission began to relax that rule in 1975. ... It wasn't until 1989 that the commission began to relax the restriction on radio duopolies. ... The Telecommunications Act of 1996 further relaxed the duopoly restriction."

"*FM Radio (Frequency Modulation)* provides static-free, full-frequency range reception using a carrier wave modulated to reflect an input signal by varying the frequency of the wave, while the amplitude of the carrier wave remains constant. In the United States, the band of frequencies designated for FM radio is in the very high frequency range, from 88 to 108 megahertz (MHz). ...

"Unlike most radio innovations, FM was largely the invention of one person (see *Armstrong, Edwin*). ... By the late 1920s, Armstrong was convinced that it would be impossible to eliminate radio static without a radically new transmission system, and after two years he achieved excellent frequency response without static using a system based on frequency modulation, a wide 200 Hz band, and relatively low power.

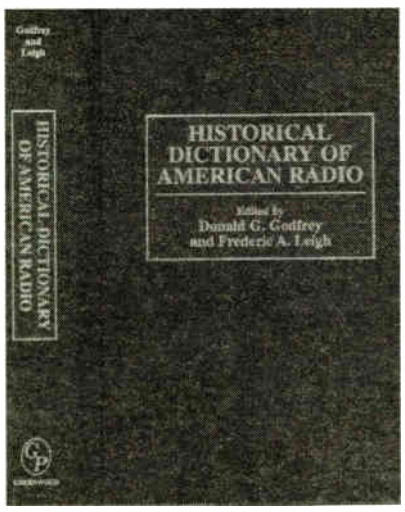
"Armstrong was granted the first four FM patents in 1933. ... In the fall of 1935, the FCC authorized spectrum space for 13 experimental FM channels. ... By 1940, when the FCC hearings on FM were held, more than 20 experimental stations were on the air, and FM service was authorized on 40 channels in the 42-50 MHz band. ...

"When spectrum space became increasingly scarce due to military necessities, a clash developed between FM and TV proponents for allocation of additional VHF channels. ... In 1945, FM was moved to 88-108 MHz.

"While this new allocation provided enough spectrum space for 100 FM channels ... it also rendered as many as 400,000 existing FM receivers obsolete. ... By the mid-1950s, FM was reduced from a potential mass medium to a high-class niche service that attracted only small numbers of hi-fi aficionados, and the exhausted and beaten Edwin Armstrong committed suicide. ...

"FM got a shot in the arm when the FCC selected an FM stereophonic technical standard in 1961, while at the same time rejecting AM stereo. ... FM receivers became available in a wide variety of price ranges and styles, and FM surpassed AM radio in terms of U.S. audience size by the late 1970s.

"As the 1980s came to a close, about



75 percent of the U.S. listening audience was tuned to FM. In the future, digital audio broadcasting (DAB) will likely replace FM and AM analog radio broadcasting."

"*Storz, Todd* (1924-1964) was one of the pioneers of top 40 radio. He first implemented the format at station KOWH(AM) in Omaha, which he purchased in 1949.

"Twenty-five years old at the time, Storz converted the independent station from a polyglot format to one concentrating strictly on popular music.

"Within two years, the station rose from sixth place to first in the market's ratings. Storz's Mid-Continent Broadcasting Company used the Omaha formula at stations it purchased in New Orleans (WTIX), Kansas City (WHB), Minneapolis (WDGY), Miami (WQAM), St. Louis (KXOX) and Oklahoma City (KOMA).

"The basis for Storz's radio programming strategy was repetition of the country's top 40 tunes. Storz used local jukeboxes, sheet music and record sales, and trade journals to determine popularity.

"He explained in a 1957 interview, "The programming of music is completely out of our hands. It is controlled entirely by the choice of the public. If the public suddenly showed a preference for Chinese music, we would play it."

"In 1956, Time magazine dubbed Storz "The King of the Giveaway" because of his aggressive promotions. Storz's stations staged citywide buried treasure hunts, awarding over $100,000 to the winners.

"The FCC criticized Mid-Continent Broadcasting for attempting to purchase the listening audience, but it did not formally regulate the giveaways. ...

"By the time Storz died in 1964, there were hundreds of top 40 stations, modeled on the formula established by Storz, Gordon McLendon, and a handful of other broadcasters."

BOOK REVIEW

Reference Book for Radio Now Available

Bob Lochte

"The Historical Dictionary of American Radio" (1998, Greenwood Press), edited by Donald G. Godfrey and Frederic A. Leigh, is a new volume for the reference shelf in the office.

The contents include a condensed history of radio technology, business, programming, regulation and audience response. Radio milestones are recorded chronologically. An alphabetical listing of topics serves as the meat of the book.

It offers a selected bibliography, including many Web pages and an extensive index. The nearly 100 contributors to the dictionary are given their mention in brief biographies.

Godfrey and Leigh, both professors at the Walter Cronkite School of Journalism and Telecommunication at Arizona State University, are historians of the medium.

Working through Broadcast Education Association and other academic organizations, the editors recruited a panel of experts and constructed a list of topics in a relatively short time frame.

The result is a piece of work which was up to date as of late 1997, a remarkable feat in itself. In addition, the listings have a consistently concise, informative and readable style that implies editorial expertise and diligence were applied to this project.

Although brief, each listing stands on its own as an authoritative precis of the subject.

Even a casual browse through the dictionary will stimulate interest in a variety of topics. The book is particularly strong in definitions and terminology related to programming and audience research.

There are biographies of major figures — de Forest, Sarnoff, McLendon, Drake — and of lesser-known but significant individuals, like Admiral Bullard and Dorothy Thompson.

Although it does not purport to be a history of radio technology *per se*, the text includes a range of topics from Morse's first wireless telegraph, through high-frequency alternators.

The book includes descriptive information on superheterodyne receivers, FM stereo, digital audio broadcasting and satellite-delivered radio. It includes even the most obscure chronicle, Westinghouse's Stratovision.

Most listings end with two or three references for further research, a thoughtful inclusion.

It is easy to quibble with the subjects listed in a dictionary, encyclopedia or similar compendium of knowledge. Any knowledgeable reader might have her or his own favorite topics that were excluded.

Readers may find a particular listing superfluous, or dispute an interpretation of facts. Nevertheless, Godfrey and Leigh have approached the task of compiling a dictionary devoted to radio's history sensibly and professionally.

In the introduction, they claim the book is "a quick, ready reference to a wide variety of topics." It is intended dually "for an interdisciplinary audience in college, university, institutional and public library settings" and "to assist those interested in research."

It appears that the editors have succeeded.

■■■

Bob Lochte is an associate professor in radio/TV at Murray State University.

He specializes in 19th century American wireless inventions. You can reach him at bob.lochte@murraystate.edu

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World Radio History

A-T Tube Mic Page 42

Radio World — Resource for Radio Production and Recording — December 23, 1998

PRODUCT REVIEW

Get Into the DigiTech Quad 4

Alan R. Peterson

I am certain you have seen ads and reviews for mixing boards that come with four to eight Aux busses. Maybe there is now one in your studio, and you are wondering why on earth anyone outside of live concert mixing would need so many sends.

Get yourself a DigiTech Studio Quad 4 multieffect processor for the production room and you will finally know why.

The Quad 4 is a 1 RU, four-in/four-out processor in a neat blue box. It reminds me of both the venerable Yamaha SPX-90 in some respects and the Ensoniq DP4 in others; it is simple and fun to operate like the SPX-90 and has the advantage of four independent processors like the Ensoniq unit.

DigiTech Studio Quad 4 puts four processors in one rack space.

Feeding the Quad 4 with four console Aux sends, it is possible to process four discrete signals simultaneously. Four studio mics can have individual processing in one pass. Of course, conventional stereo processing is also possible, but why limit yourself to two channels when you have more to work with?

Hear and now

I still like rackmount processors because they allow me to hear processing in real time and make tweaks on the fly. In some digital workstations and many DAW software packages, it is often necessary to render an audio file with the applied effect before hearing the result.

If you get it wrong, there is always the Undo key. But when too many Undos begin piling up, work slows down. I, and most production folks I know, want to get it right the first time.

Rack boxes also provide me with a certain tactile satisfaction: twisting a real dial or popping actual buttons is far more rewarding to me than mousing a picture of a knob on a monitor screen.

The design of the Quad 4 struck a decent compromise between the number of physical controls on the panel vs. the depth of the menu to alter and modify settings. The display looks large relative to the entire unit, but its tiny letters and numbers will oblige you to place the Quad 4 in close proximity to your operating position.

Happy dial twisters everywhere will appreciate the Data wheel on the right of the front panel. Nothing is faster or easier for altering a parameter. The wheel has a good detented action that does not feel loose or flabby.

I wish these controls were more widespread during the heyday of the SPX-90, as I prefer knobs to the little square buttons of 1987.

The back panel contains eight quarter-inch TRS jacks for inputs and outputs, a pair of MIDI jacks and a four-pin DIN jack for the power supply. Another reason to have a board with multiple Aux sends: once the Quad 4 is in your rack, the last thing you want to do is climb behind the processor to swap cords.

Juice is provided by a hefty line-lump transformer that lets you mount the power supply anywhere inside studio cabinetry without hogging an outlet strip. I never opened the Quad 4 to look inside, but there must be some heavy duty computational work being done in there. The power supply is rated for 2.1 A — an uncommonly beefy transformer in a world of milliamp-rated boxes — and a heat sink on the back panel is in proximity of where voltage regulator chips would be.

I don't often see heat sinks on a processor, but I am glad they are there. Less heat generally equals less noise, and the Quad 4 is spec'd at 94 dB S/N, referenced at +4 dBu.

MIDI control

In spite of all my wishes, most radio production people have not really embraced MIDI as a useful tool, except for jingle production or similar projects. Rush jobs are standard operating procedure in radio, and when a job has to be

See QUAD, page 45 ▶

SHORT TAKE

The Trakker Compressor: Seems Like Old Times

The quest to "warm up" highly precise audio signals and tame levels has resulted in the creation of the Trakker single-channel discrete Class A compressor/limiter from Crane Song Ltd., of Superior, Wisc.

The Trakker functions as a musically transparent compressor or as a "vintage" limiter with lots of squeeze where it counts. Eight units can be linked together for multitrack use or surround sound creation.

Inputs and outputs are balanced and transformerless. In Link mode, the master unit controls all functions of the deliberately introduce second and third harmonic content into the signal. The resulting output from the Trakker is described as "a fatter, richer sound."

The centerpiece of the Trakker is the 22-segment VU meter with overload indicator. This meter bar tracks gain reduction and allows accurate monitoring of output levels.

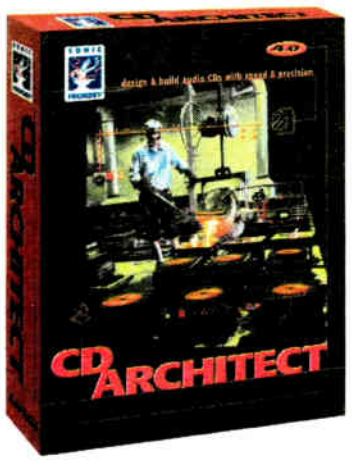
Dial in the harmonic content with the Trakker compressor.

The Trakker contains dials and settings normally found on compressors. Gain, Threshold, Attack, Release and Knee controls are all found on the front panel. It is the rotary Character switch that sets the Trakker apart.

The Character dial switches between four modes: Optical, Air Optical, Hard and Soft. Variations within each mode are referred to as Clean and Vintage. Several settings slave units connected to it, except gain recovery. A Bypass switch compares processed and unprocessed audio.

The Trakker was introduced at the AES convention in San Francisco in late September and is available from the company in Wisconsin. For information, contact Crane Song at (715) 398-3627 or circle **Reader Service 135**.

— Alan R. Peterson



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World Radio History

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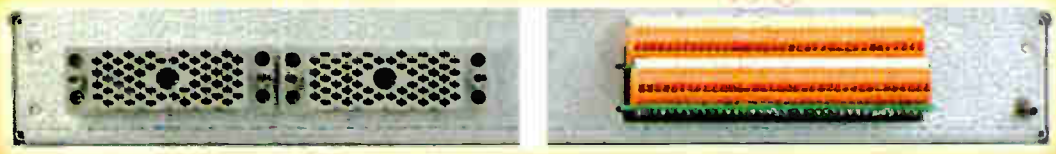

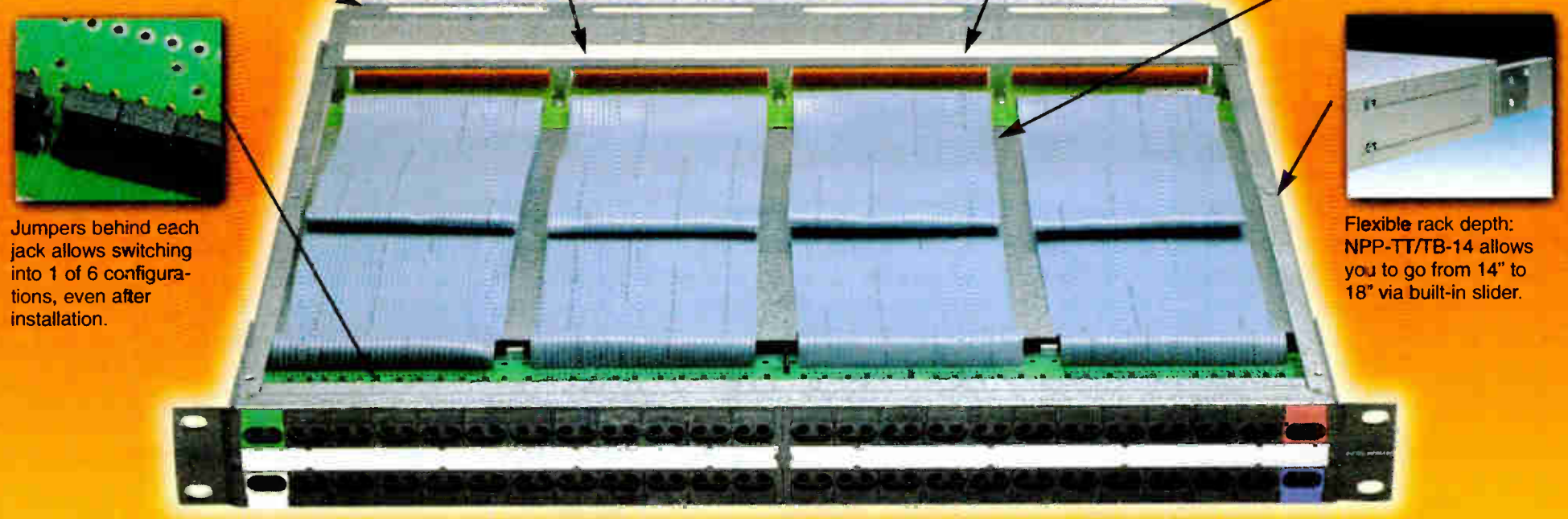

Jumpers behind each jack allows switching into 1 of 6 configurations, even after installation.

Flexible rack depth: NPP-TT/TB-14 allows you to go from 14" to 18" via built-in slider.

The Easy Patch series of easy to use patchbays eliminates signal degradation and offers excellent crosstalk performance required in today's broadcast facilities, mobile trucks, recording studios and audio installations.

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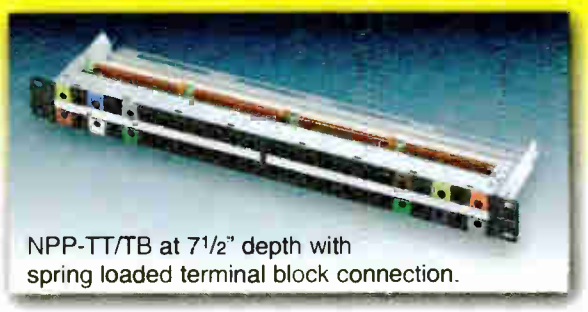

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World Radio History

Circle (185) On Reader Service Card

Ebenezer Travis on Holiday Spots

Travis

To quote radio's most clichéd commercial opener, "The holiday season is upon us."

For many people in the voice-over field, that means some extra work has been coming our way.

Whenever the holiday season approaches, I get excited at the possibilities. Not only is there a considerable amount of commercial production, but I consider my abilities to be especially suited to the kind of commercial work that gets produced for the holidays.

In the first place, I am one of the few adults I know who actually *likes* the season. I like the decorations, I usually enjoy Christmas shopping, I even like the Christmas carols, so long as they're not played until the middle of December.

For whatever reason, I have not been caught up in the cynicism that so many others I know have developed towards the holidays. And if I am to believe what I am often told, I must be a rather cynical person.

Warm and rich

One of the things I have concentrated on in voice training is developing the kind of warm, rich style which is in demand for holiday-type spots. I keep a special holiday demo that has been distributed to production companies and advertising agencies that are likely to need my services.

So, every holiday season, I am always amazed by the fact that I have *never* recorded a Christmas spot!

In my decade-and-a-half career in voice-overs, I have literally recorded thousands of projects. I have sold vacuum cleaners, expounded on the ground-pounding excitement of drag races and enticed people to come to the symphony. I have taught flight attendants how to steer a passenger ramp up to an airplane without causing thousands of dollars in damage.

Surgeons have heard me explain how to operate delicate equipment during life-saving procedures. The variety of topics continues to astound me. So what's the deal with Christmas? I have no idea.

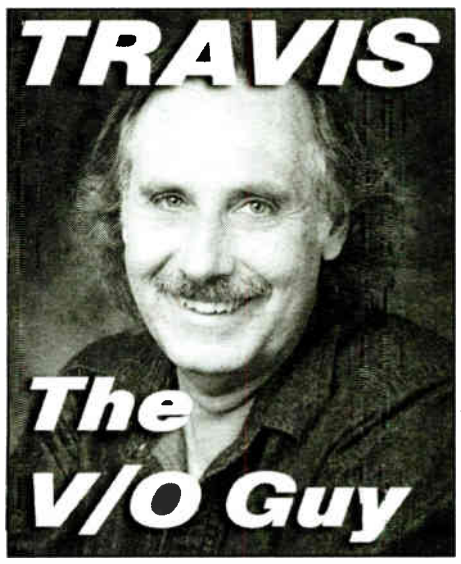
It could be that I don't really understand what kinds of work I am suited for, or it might just be some odd quirk of chance. Whatever the reason, it bugs the heck out of me.

I have to remind myself that, even when things are going well in this business, you can't always get what you want.

So try harder

I am sure if I put more effort into getting some "holiday" work, I would get some. But that is not the point. My attitude is, "Hey, I'm right for this kind of work. If anybody had any kind of sense whatsoever, they would put me on their spots."

Of course, anyone who has worked the voice-over circuit for any serious length of time would tell you this is pure baloney. If I really cared, I would put in still more time and effort until I got the kind of work I wanted. Of course, they would be right



— one of the things I have learned in this business is that taking the time and energy to obtain work pays off. So maybe I just like whining about it.

And that, right there, is one of the truly irritating things about showbiz: you are constantly facing just how ridiculous you can be.

Because you constantly apply for jobs, getting accepted or rejected, you soon become aware of patterns in your behavior. Not that that makes you change anything, but it is amusing to find out about yourself.

As a performer, it is important to learn early on not to take yourself too seriously. The performers I know who have not learned to accept their own imperfections have either become horribly depressed or terribly arrogant.

Every holiday season, I am always amazed by the fact that I have never recorded a Christmas spot!

You are going to get rejected sometimes for the most ridiculous reasons. Your voice might remind a director of another talent who completely ruined a previous project, or it may remind the client of an ex-spouse.

Or someone else may actually do a better job at the audition.

When that happens, I have found it a good idea to decide that the client or casting director simply has no taste. If these same people actually hire me for something later, I am then appreciative of the fact that some people can eventually acquire taste over time.

So, how do I deal with the holiday thing? I can't decide that the entire business has no taste; I tried that and it doesn't work, especially when I get hired for other projects.

Perhaps there is some sort of international "No Travis for Christmas" conspiracy. No, couldn't be. Conspiracy theories always take too much work to justify and maintain. Guess I just have to chalk this one up to dumb luck.

One of the success strategies I have picked up in this business is the old "When life gives you lemons, make lemonade" approach. I used to think this was one of the more inane platitudes, but I have noticed many successful people in this business actually put this policy to good use.

In a business like this, where you face failure everyday, it is important to get something not only positive, but actually useful, from experiences which might otherwise be destructive.

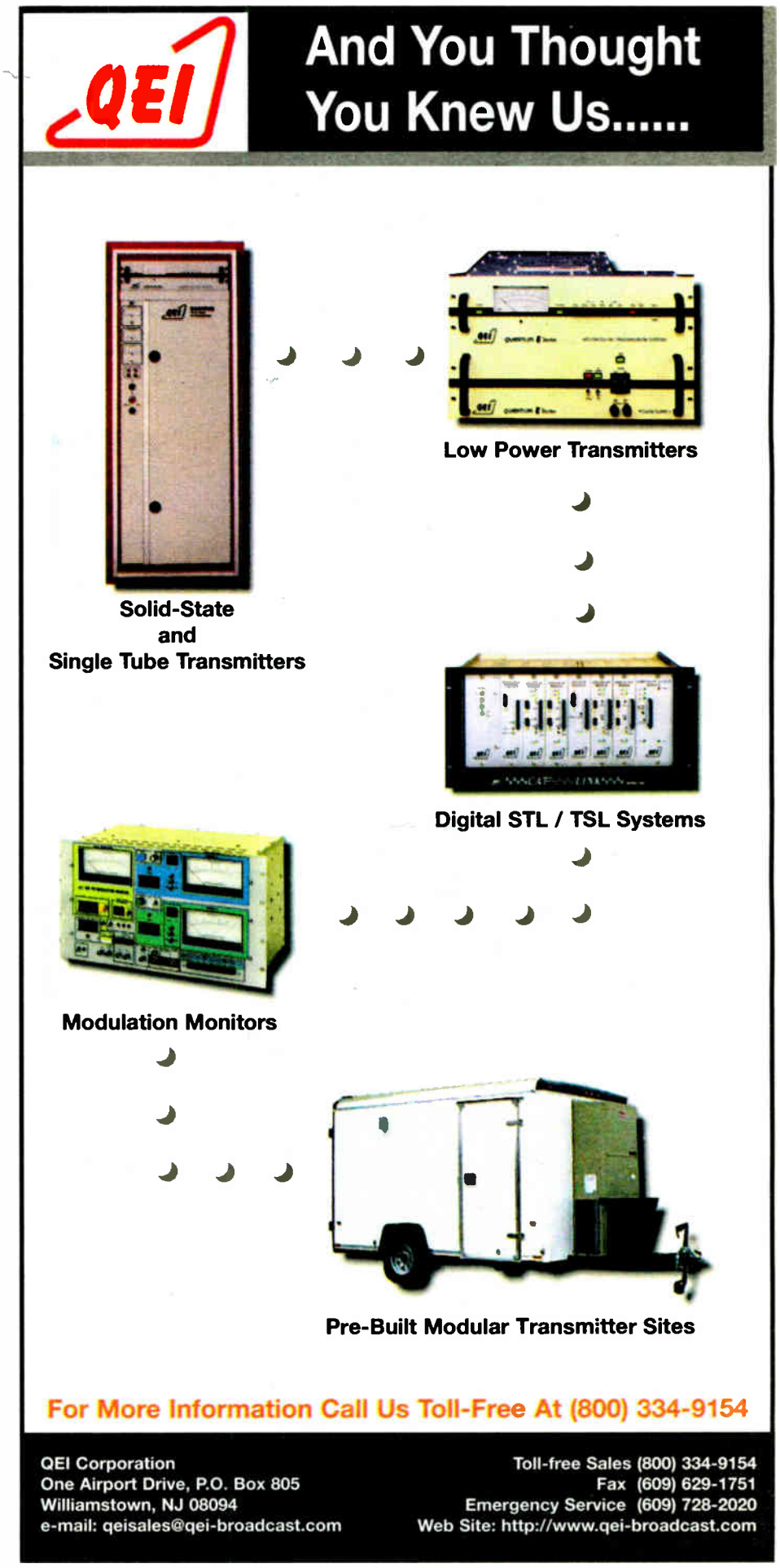
A successful actor I know explains how he used to hate auditions. "You put yourself on the line, give them everything you've got, and if you're lucky, you'll get a part one out of 30 times. It wasn't until I saw those auditions as the best acting class you can get anywhere — and on top of that, they're free — that I began to actually enjoy the experiences. Now I truly enjoy auditions, and I score the gig a lot more often."

So my problem now, is how do I turn my holiday problem into something useful? Maybe a rambling stream-of-consciousness piece for **RW**.

Next time we get together, I will present an important column: The Secret of Success in the Voice-Over Business. But in the meantime, everyone is secure, knowing that once again, they will be safe from hearing my voice on the air this holiday season.

■■■

"Travis the V/O Guy" is a veteran voice-over artist writing from California, where it is sunny and warm even at Christmas.



Circle (85) On Reader Service Card

World Radio History

PRODUCERS FILE

AT4060 New Player in Tube Arena

Ty Ford

The Audio-Technica AT4060 vacuum tube microphone ($1,695) is a transformer output, cardioid-only condenser microphone with an external power supply.

Included in the price are a protective vinyl-coated box for the mic, the sturdy AT8447 all-metal suspension mount, AT8560 power supply with IEC power cord and almost 33 feet of multiconductor cable for connecting the mic to the power supply.

Addition accessory options include a foam screen ($48), and the 8430 clip that also works on the 4033 or 4050 ($168).

The manual suggests that you always turn off the power supply when connecting or disconnecting the mic. I read that after I had done both with the power supply on. I had no problem, but maybe I got lucky.

Tighten up

The AT8447 suspension mount, made specifically for the AT 4060, has two knobs that tighten to hold the mic more securely than earlier mounts that use only elastic bands. The 1U space AT8560 power supply is half-rack size and comes with brackets for mounting in pairs.

The six-pin XLR on the rear of the power supply accommodates a multiconductor cable that provides power to the Sovtek 6922 tube onboard the mic and retrieves the audio from the capsule.

The 4060 capsule is based on the 4050 and contains dual 21.3 mm diaphragms coated with 2 microns of vapor-deposited gold. The diaphragm is polarized at 110 VDC and backplate is at ground. The filaments run at 6.3 VAC.

According to Kelly Statham, development engineer at Audio-Technica, the Sovtek 6922 tube is used as an impedance converter.

"There are no solid-state devices in there except the power supply," he said. "The 6922 was chosen by Audio-Technica-Japan. We tested a bunch of the ones with the same number and narrowed it down to a special version of 6922 based on low noise and having the quiescent current as close to spec as possible before we put our own serial numbers on them."

Audio-Technica has been running accelerated testing on the Sovtek tubes and has yet to see one blow.

Statham says the 4060 requires no additional output circuitry because the higher capsule voltage and tighter (and aged) diaphragm results in a sufficient output. The method for aging of the diaphragm is proprietary information, but Statham says it is done to keep the diaphragm from stretching over time.

A closer look at the capsule reveals it is surrounded by a ring with holes drilled in it. "That helps to extend our low end," said Statham. "It changes the acoustic distance between port A and port B — the backside to the frontside — in a cardioid pattern, or the lines of low frequency phase."

Statham said it also provides better off-axis pattern linearity over frequency and more stable acoustic resistance — or load — on the rear port.

Attached to one side of the internal metal body frame is a rectangular metallic flap to shield the 0.22 Farad filament supply filter capacitors. On the inside of the body shell, a small piece of sheet rubber acts as a shock absorber. This keeps the tube from contacting the shell should the mic be jarred.

Golden

The area around the three screws that hold the shell and head grille to the frame are gold-plated to ensure ground continuity from the body to the shell and head.

The self noise of the AT4060 is 19 dB (A-weighted). While higher than the Neumann FET TLM 103 at 7 dB, the AT4060 surprised me with how quiet it was. It was noticeably quieter than a Neumann U 89, U 87 and Gefell UM70.

Tube mics used to get a bad rap for how much noise the tubes generated The AT4060 is proof that tube mics do not have to be noisy.

On male announcer voice, the AT4060 sent through a GML mic preamp was strong and clear. In fact, there is none of that "warm tubey" sound that I usually only care for when trying to mask irritatingly edgy sound sources. The extra lift on the high end is not as detailed as the Neumann M 149 nor the Manley tube cardioid, but significantly more detailed than the AT4050. This is not the mic to use on sibilant sources.

On acoustic guitar, the brightness of the AT4060 gave the somewhat dead strings of my D28S Martin a lot more sparkle than they appeared to have in free air.

In order to minimize the bass build up due to the proximity effect, I first positioned the mic about four inches above the body so that the capsule faced down across the sound hole. Lots of brights, not too much bottom, but the off-axis sound was a bit strange.

Setting the mic out about 14 inches from the sound hole and twisting it to about a 30 degree angle to keep the bass from building up resulted in a fairly natural and balanced acoustic guitar sound.

I visited Jeff Order Productions to compare his 4050 with the 4060. Jeff used the preamps in his Soundtracs Solo Logic 32x8 console.

We found both the 4050 (in cardioid) and the 4060 had basically equal output levels. The midrange of both mics was very similar, but the 4060 had a larger bottom and more detailed top end. Both mics exhibited the same amount of reach. Pushed inside his baby grand, it did a nice job of presenting a balanced sound, with perhaps a little too much bottom.

At Flite 3 Studios, engineers Louis Mills, Mark Patey and I compared the 4060 with a Neumann U 87. The 4060 was 6 to 8 dB hotter than the U 87. After adjusting the API preamps for equal gain, the 4060 was 4 dB quieter on the meters.

Audio-Technica AT4060 Mic

The meters do not always tell the tale. The self-noise of the U 87 was higher in frequency than the 4060, making the 4060 self-noise much less apparent.

Both mics had similar reach and similar rear rejection characteristics. The proximity effect of each mic was a little different. For voice work, the 4060 worked well at four to five inches. In order to get the same hot spot on the Neumann, I had to move in about an inch closer.

How's your pop?

Both mics exhibited about the same amount of sensitivity to popping. Speaking of hot spots, both 4060 mics I had seemed to have their hot spots slightly off-center. On both mics, I had to move about five to 10 degrees to the right before I found the spot.

The 4060 has a brighter top end than the U 87. Mills liked the broad rise and thought that it was not to the detriment of the bass. Patey commented that the 4060 might not be the mic to use on large bass voices because the mic was obviously sensitive to those frequencies as well.

The 4060 begins a lift at 2 kHz, rises gently to +4 dB by 4 kHz and stays there until 13 kHz. From there it drops sharply to 0 dB at 14 kHz and is at -4 dB by 15 kHz. That broad rise, similar to a shelving EQ boost, adds a lot of sparkle.

My next project was a TV voice track for a local car dealer. The job called for an over-the-top delivery, with everything turned up to 11. I am not sibilant, but it is easy to "fress" when speaking that loud and that quickly and the 4060 did a great job of capturing it. I applied a high-frequency shelf EQ to the final track to remove the excess fress.

In conclusion

Because of its increased high frequency response and low noise, the AT4060 does not comply with the old definition of "tube sound." It is neither murky nor "filmic." I would be interested in hearing some comparisons between pairs of AKG 414 and AT4060 mics on drum overheads.

Regardless of the source, if you regularly boost the 10 kHz shelving EQ, try the AT4060 without reaching for the EQ. For the price point, it's a player.

■ ■ ■

For information, contact Audio-Technica in Ohio at (330) 686-2600 or circle ***Reader Service 209.***

Visit www.jagunet.com/~tford *for Ty Ford's commercial and narration demos. He also maintains an upgraded list of copyrighted mic/mic preamp reviews and new lists of production music and SFX libraries.*

Circle (117) On Reader Service Card

World Radio History

ProTools Cranks up The 'Pro' Bit Level

Ed LaComb

One of the leaders in digital audio workstations has cranked up its product to a new level: a 24-bit level.

Digidesign in Palo Alto, Calif., introduced ProTools 24 MIX, a newer, sleeker, power-packed version of the successful ProTools platform that can answer the call of nearly any audio production application out there.

The most exciting news is that ProTools software now is available for both Macintosh and Windows NT users. Inter-system compatibility with seamless session and audio file interchange is part of the new version. This move is certain to be appreciated by a huge segment of the computing world, as it all but negates the Mac vs. PC debate in this regard. It also undoubtedly will provide a boost for future sales of ProTools.

ProTools 24 MIX now packs up to 64 tracks of simultaneous 24-bit recording and playback on a single ProTools 24 MIX card. This replaces the old system of a Core PCI card along with a DSP Farm card. If you want even more DSP, you can install an extra MIX Farm card if you like.

Representatives from Digidesign suggest you would have to have some pretty outrageous needs before you would find this to be a necessary expense. According to the company, the single card in ProTools 24 MIX has three times the processing power than ProTools 24 did just a few months ago.

Getting better

Along with the latest hardware comes a new and improved off-the-rack set of plug-ins for ProTools called TC MegaReverb — an upgraded model that is much cleaner than previous reverbs — and a retooled dynamics processor to boot. Both are free with the system.

Speaking of software, the latest version of ProTools is version 4.3, which has some time-saving enhancements. These include the new "smart-tool," which is actually four tools in one, depending upon the location of the pointer on the screen.

At one moment it can become a Trimmer tool to tighten up the ends of a region. In another instance, it becomes a Grabber tool to select an entire region of audio. In still another location, it can select specific areas of a region to act upon where you can create and modify fades.

The good news about the product release is that the new system hits the market at the same price as the old system was only a year ago. ProTools 24 MIX lists for $7,995 while its nearest living relative, ProTools 24, moves to the $5,995 shelf. Owners of a ProTools 24 system can upgrade to the new ProTools 24 MIX for $2,495. Users of the older ProTools III system can upgrade to Mix for $3,995.

If you want to super-size your new system, add a Mix Farm PCI Card and Mix Core PCI card to a new ProTools 24 MIX systems for a total cost of $9,995, at least until Jan. 1, 1999.

So what does all this price mumbo-jumbo mean? If you owned an original ProTools system — the one with the old 442 interface — your cost per track was about $1,200. ProTools 24 MIX brings that cost per track down to $124. There is truly something to be said about technology and capitalism.

For those of us in the radio production environment, big news is about to happen. Sometime in the next few weeks, Digidesign will announce their approval of a genuine ProTools "network" system that will provide a central audio storage server which can handle up to six "seats," or workstations.

See PROTOOLS, page 44 ▶

Components of the ProTools 24 MIX System

Confiability with Life Time Warranty

EDUCATIONAL CIRCULAR SERIES

Model	Bays	Power	Gain	Price
MP-1	1	600W	-3.3	$250
MP-2	2	800W	0	$680
MP-3	3	800W	1.4	$980
MP-4	4	800W	3.3	$1,280
MP-2-4	4	2,000W	3.3	$1,820
MP-3-5	5	3,000W	4.1	$2,270
MP-3-6	6	3,000W	5.2	$2,740

LOW POWER CIRCULAR SERIES

Model	Bays	Power	Gain	Price
GP-1	1	2,000W	-3.1	$350
GP-2	2	4,000W	0	$1,350
GP-3	3	6,000W	1.5	$1,900
GP-4	4	6,000W	3.4	$2,600
GP-5	5	6,000W	4.3	$3,150
GP-6	6	6,000W	5.5	$3,700

MEDIUM POWER CIRCULAR SERIES

Model	Bays	Power	Gain	Price
SGP-1	1	4,000W	-3.3	$690
SGP-2	2	8,000W	0	$2,690
SGP-3	3	10,000W	1.4	$3,595
SGP-4	4	10,000W	3.3	$4,500
SGP-5	5	10,000W	4.1	$5,300
SGP-6	6	10,000W	5.2	$6,100

The antenna gain may vary with the frequency. For powers up to 20 KW please, make the request to provide the specific configuration.

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World Radio History

PRODUCT REVIEW

Keep It Short With Far Outlet

Flip Michaels

The Far Outlet Model 250 Personal Power Station from Galaxy Audio is a portable electrical power source capable of 250 W continuous and 400 W peak electrical power.

It is the size of a large lunchbox and is lightweight enough to carry to a remote broadcast in your left hand with your gig bag in the right.

However, make sure it is a short remote, or one that is non-critical: depending on load requirements, the power generated by the Far Outlet may cut out before you are done.

Those fabulous '70s

The arrival of the Far Outlet on today's scene requires a history lesson involving some of your favorite artists.

Galaxy Audio Far Outlet: It's a great idea, but it may run low on juice before you are done.

Before Galaxy Audio, there was Superior Sound, a concert company headed by pioneers Brock Jabara and Jim Pearce. Together, they outfitted countless numbers of musicians and touring performers throughout the 1970s with equipment and personnel. Among the company's trophy names were Aretha Franklin, the Bee Gees, Sly and the Family Stone and James Brown

Superior Sound also worked with Mike Finnigan, a noted sideman who had worked with Jimi Hendrix and Crosby, Stills and Nash, and was launching his own solo career. Finnigan frequently complained about the levels in the monitors. "I can't hear myself," he would exclaim. "Turn up the monitors!"

This was impossible, as they were already maxxed out, with a full 100 W being pumped into each of the two cavernous black boxes. This challenged Jabara and Pearce to create a monitor that would garner a response more like, "Could you please turn the monitors *down*?"

It was obvious that there could be a high marketable demand for refined audio products. That is how Superior Sound evolved into what is now Galaxy Audio.

Galaxy Audio has again taken a well-known concept — a portable power source — and improved upon it. Unlike a generator, the Far Outlet Model 250 requires no fuel, makes no noise and emits no internal combustion exhaust fumes.

Originally created for public address systems, the Far Outlet can provide hours of power between charges with recharging as easy as plugging into a wall socket or, with the optional cable, into a car's cigarette lighter.

The heavy plastic case features a pair of standard 15 A-type electrical outlets, a rubber-coated power switch, three status LEDs and a conventional IEC power cord socket. If the line cord is lost, another can be obtained at any computer dealer or office supply store.

Off to the islands

Recently, classical station WGMS(FM) in Washington decided to test the unit on a one-week remote from Bermuda. According to Dave Garner, chief engineer for the Bonneville Corp. Washington Division, it would not have been a first choice.

"Our thinking was that it would operate like a UPS battery," he said. "When the battery would drop down on a UPS, it would simply switch back to power or vice versa. But when the Far Outlet battery dies, that's it. You can't leave it plugged in except to recharge, and that put the daily broadcast in jeopardy."

According to the company Web site, the Far Outlet will light a 125-watt incandescent bulb (a continuous load) for two hours. But for a morning show? It turns out that the useful time available is directly proportionate to the type of load.

"We weren't sure how long the load on the battery would last," said Garner. "The Far Outlet was not ideal for what we had in mind. I mean, I like it. Really. It's great for basic PA events. No chemicals, no gas — I even used it in my garage with a circular saw and drill for 15 minutes."

There is no question that Galaxy Audio has come up with an ingenious and handy product.

With an accessory cable, you can even use it as a battery charger for your car or lawn mower. But unless you are working a short public appearance or are experienced with how long you have on the Far Outlet before the battery light starts to blink, you are better off using it to power a portable TV or a camcorder at live events.

The Far Outlet Model 250 comes with a three-year limited warranty and lists at around $399. To find out more, contact Galaxy Audio on the Internet at *www.galaxyaudio.com*

■■■

For information, Contact Galaxy Audio at (316) 263-2852 or circle **Reader Service 20**.

Formerly with WGMS in Washington, Flip Michaels is now multimedia director for WITF-FM-TV, Harrisburg, Pa.

ProTools Goes Windows, Pumps up the Bit Rate

▶ PROTOOLS, continued from page 43

This means you can now begin your work in Studio A and complete it in Studio B, all without running tapes or discs down the hall to the next studio. The solution is a third-party one, which involves fiber channels and other details still to come. In any case, it is welcome news from the folks in Palo Alto.

Night and day

Finally, there is the argument for 24-bit audio. On one hand, you can ask what good is 24 bits when you ultimately will crunch it back down to 16-bit to burn it on a CD? It is a valid point, but there is no argument when the difference is experienced. The 24-bit version of ProTools offers a night-and-day difference in transparency.

This news probably is more important in highly critical applications such as film and music production than it would be in your average radio production room, so the argument stands with each proponent in their own corners.

I would have to give Digidesign a big high-five for this latest product release. But judge for yourself: go to the Digidesign Web site *www.digidesign.com* and download a free, usable version of ProTools software.

You will not have full TDM plug-ins or other functionality, but you will get an introduction to an audio editing environment that is a dominant player on the professional audio scene and is coming on strong in radio production as well.

■■■

*For information, contact Digidesign in California at (650) 842-7900 or circle **Reader Service 69**.*

*The author runs Ed LaComb Audio Imaging, a radio production and voice-over company in Syracuse, N.Y. His most recent **RW** contribution was a review of the Zoom 1201 multieffect processor.*

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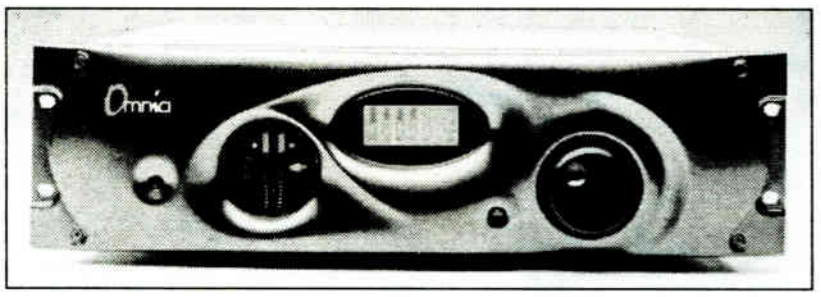

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World Radio History

Production Effects With Quad 4

▶ QUAD, continued from page 39

done *now*, gearing up for a MIDI session can be daunting and time-intensive.

Too bad, because the Quad 4 has some fun MIDI implementation. It can read Program Change numbers and Continuous Controller data, which can be mapped to whatever parameter you wish.

The normal consideration here would be to use the Pitch Bend wheel on a keyboard, but there are more creative options. Some MIDI programs such as Cakewalk allow you to draw curves on a screen with a pencil tool. These drawings are interpreted as Controller numbers. This method literally lets you "doodle" the resonance response of a flanger or the speed of a Leslie rotary speaker simulator.

If your day allows time for experimentation, it is worth linking a Quad 4 to a computer running MIDI software. Effects that change over time open up some interesting creative possibilities.

The effects

The Quad 4 feels and sounds as if it is optimized for music recording. Out of the box, the reverbs and combined delay/reverb settings sounded overdone, with almost a heavy, gummy texture in the speakers. They were not dull or muddy, but did not have the sense of air or reality that comes with, say, the Alesis Wedge.

For radio, this is okay. We are not cutting string quartet recordings here — we are pleasing advertisers and outdoing our competitors. Each effect is tunable, so it is easy to lop off some of the heaviness. Lesson learned: Don't snap to judgment based solely on a unit's presets.

As on other processors, there is a considerable complement of delays, tapped delays, detuners, a flanger or two and a fairly capable compressor. It was the extras that made the Quad 4 worth my time.

Two effects I found especially fun were the internal Vocoder and the "Monster Truck Guy" patch. The former is a multiband vocoder for that "Electric Light Orchestra" sound, the latter is a combined pitch shifter and reverb for those nitro-burning-funny-car commercials.

After recording through "Monster Truck Guy" for a few minutes, you will not want to hit the Bypass button. Being reminded how high and feeble your own voice is in comparison may make you want a Quad 4 surgically implanted to permanently modify your voice.

The Vocoder sounds remarkably good, depending on the source material. I used a thick square wave signal from an old analog synthesizer as the carrier; this is the way most of us expect vocoders to sound in general. There is some carrier leakage through the Quad 4, but it is possible to noise-gate the unit downstream or even trim off the heads and tails when recording into a DAW.

Note that some programs will use up resources on the Quad 4 right when you might need them most. For example, Program 35, the five-second sampler, swallows up the entire complement of memory. The Quad 4 also has a 2.5-second sampler.

Do not expect 16-part multitimbral response here; similar to the "freeze" feature on the old SPX-90, this sampler is a one-shot job than can be retriggered, edited and looped, but that is about it.

For repetitive stabs (the "Headroom Stutter"), this real-time sample playback is more efficient for me than Copying/Pasting in a DAW. Remember, it has to be on the air in an hour.

Two effects I found especially fun were the internal Vocoder and the 'Monster Truck Guy' patch.

The manual can get a little confusing. One page made a comparison between system resources and pies, representing how the unit apportions resources to accomplish a process. I had to move between three different parts of the book to figure out what DigiTech meant by this comparison, but gave up. In the end, I just had to mess with the unit until I "ran out of pie."

Wraps

All told, I had a good time with the DigiTech Quad 4 and got it to do some interesting-sounding audio for radio production, when I was not toying endlessly with the Vocoder patch.

All of us wish for a studio filled with the "big guns," such as an Eventide Harmonizer or a Yamaha SPX-1000, but often must settle for considerably less. You cannot do it all with a Quad 4, but let me tell you there is a lot you can pull off without feeling left out.

■■■

For information, contact DigiTech in Utah at (801) 566-8800 or circle ***Reader Service 119.***

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."

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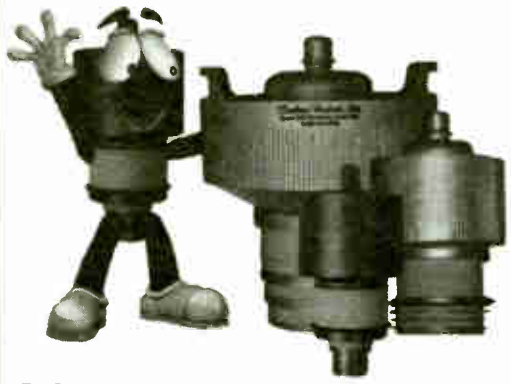

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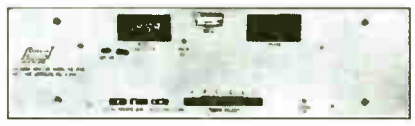

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World Radio History

Buyer's Guide

Radio World | STL, RPU, EAS | December 23, 1998

Keeping up With EAS Page 54

SPECIAL REPORT

STL: From Here to There

Jeff Johnson

In this issue, *Buyer's Guide* brings you new products in STL, RPU and EAS products. The most critical of the three, in terms of keeping your station on the air, is the studio-transmitter link.

With change a constant in the radio industry, it makes sense that STL technology continues to blossom and change.

New technologies and industry consolidation have generated a considerable amount of change, opportunities and challenges in the STL field, and the impact is being felt.

"With multiple station ownership in a single area, command, control and programming backhaul become significant portions of our total plant," Al Kenyon, vice president of engineering for broadcast group Jacor Communications, said.

The once-simple transmission of a single programming stream to a transmitter site has been affected by site consolidation, spectrum crowding and the all-digital movement. But not everyone is giving into these issues.

"Analog systems still have a major place in the market," Ron Pohler, sales manager for Marti, said. "As stations consolidate and co-locate, many want to combine existing systems into fewer antennas, and this can be done with analog STLs." Marti is a division of manufacturer Broadcast Electronics.

Polher said analog and compressed digital systems still offer advantages over uncompressed digital systems, specifically in RF-congested areas.

As with other equipment issues in radio, many engineers find analog products to be consistent and inexpensive, and will stick with that proven equipment as long as possible.

"Analog systems are not only cost effective, but allow the stereo generator/processor to stay located in the studio where a lot of customers want it," said Dave Chancey, national sales manager for Moseley, another maker of STL products.

Trends

While analog remains the choice for many, others are moving firmly toward digital systems.

Daryl Buechting, FM product line manager for Harris Broadcast Systems Division, said new trends are all digital, and the company is continuing its digital focus toward STL. Harris offers digital STLs for 950 MHz, T1/E1 telephone lines and spread-spectrum radio. To strengthen its program transmission product lineup, Harris recently acquired manufacturer Intraplex.

Wireless STL is a preferred method in moving a station's signal to a transmitter. "The latest trend in wireless STL systems is the introduction of uncompressed digital systems," said Jeff Detweiler, sales manager of supplier QEI. "This has been the long-awaited goal of digital STLs — to provide a linear digital transmission and still fit within the bandwidth mask of the STL auxiliary service."

Uncompressed digital avoids the unpredictable consequences of "algorithm stack."

"Stations concerned with perceived problems created by cascading compression algorithms are selecting uncompressed systems," Pohler said.

Forward-looking choices include new uses of existing licensed 950 MHz radio links, T1/E1 telephone lines and spread-spectrum radio, ISDN telco and satellite links certainly are viable — especially with point to multipoint applications with satellites — but they utilize compressed digital technology.

The 950 MHz uncompressed digital STL was pioneered by Harris with its CD Link. The digital STL incorporates AES/EBU stereo in addition to two data channels and two auxiliary audio channels. Other companies are finding the uncompressed digital STL formula to be regarded among engineers.

"Our customer base is really excited about the Starlink," Chancey of Moseley said. "(It) can convey up to four full bandwidth linear uncompressed audio channels over existing licensed 950 MHz STL RF channels."

Several interference issues must be dealt with when using an uncompressed system in an area filled with other STL signals. Chancey said Moseley incorporates powerful interleaving and forward error features to avoid interference problems.

Others feel there are important questions to consider before moving to an uncompressed system. "In moving up to non-compressed audio, we are losing the robust RF path advantages which some of us gained with earlier digital systems," said Kenyon.

Another issue is that groups of stations are being moved into different facilities in the wake of ownership changes, and may have trouble with their new STL demands.

"Consolidation of broadcast properties

See STL, page 49 ▶

USER REPORT

Down on the Farm With Moseley

by Vern Killion
Director of Engineering
Nebraska Rural Radio Association

LEXINGTON, Neb. In 1997, the Nebraska Rural Radio Association purchased KTIC(AM) and KWPN-FM in West Point, Neb., to complete state wide coverage for its live farm service programming.

The stations are located in a small farming community in northeast Nebraska. A common tower is out in a pasture six miles from the studio. Class AAA equalized broadcast loops previously provided AM and stereo FM program feeds.

While planning upgrades and improvement for the new operation, it was obvious that replacement of the equalized loops with some form of digital link would result in a significant audio quality improvement. ISDN links were first explored but discarded due to unacceptable delays for off-air operator monitoring. Unlicensed spread-spectrum was also eliminated for reliability and path margin reasons. Previous experience with a 950 MHz AC-2 digital STL system had proven the quality and robustness of digital UHF STL links.

The Starlink 9003Q uncompressed linear STL from **Moseley Associates** was selected for use at West Point to insure against future obsolescence regardless of which final transmission system was selected for DAB.

The 9003Q is a four-channel uncompressed linear STL, providing the ability to use the same STL transmitter for high-quality stereo program links for both FM and AM. Years of experience with Moseley reliability and support made the choice easy, even for a new generation product.

After weeks of impatient waiting, our Starlink was received July 1998. Ten days were allowed for bench burn-in at corporate engineering headquarters in Lexington; it was then transported 240 miles to West Point for installation.

The balanced 10 kilohm audio inputs were bridged across distribution amplifiers feeding the telco line equalizers. At the transmitter site, DPDT switches were installed on the transmitter audio processor input feeds to allow A/B quality testing.

The results were astounding. We had never noticed how much fine audio detail and transient response was lost in the telco feeds or how a -60 db line noise floor can noticeably color a high-quality stereo transmission.

Several seasons of operation have proven how reliable an RF STL link can be over telco lines. We no longer have to worry about damp pairs, line crosstalk or lightning impulse noise.

We have found that path clearance and bore-sight to bore-sight alignment of the STL antennas is more important with pure digital RF transmission than with old analog FM STL systems. Path clearance also is most important for highest reliability during periods of atmospheric bending when water vapor distributions change. Our HDTV brethren are in for some real surprises when they start using digital transmission to the masses.

A glance at the bit error rate (BER) reading on the extensive metering built into 9003 provides quick assurance of path quality. A data log also is provided to document any prior path outages. Modular construction, with the ability to change QAM modulation rates, interleaving and audio sampling rates, allows for future transmission standard improvements.

KTIC/KWPN GM Charlie Brogan at Studio Terminal Rack

Charlie Brogan, general manager for KWPN/KTIC, best summarizes the performance of the Starlink 9003 as a "sound investment," pun intended.

"It has improved the quality of our sound and the reliability as well," he said. "Anytime we can get a long-term cost reduction to boot, it's a very positive addition to our audio chain."

■■■

For information, contact Moseley Associates in Santa Barbara, Calif., at (805) 968-9621, or circle ***Reader Service 27.***

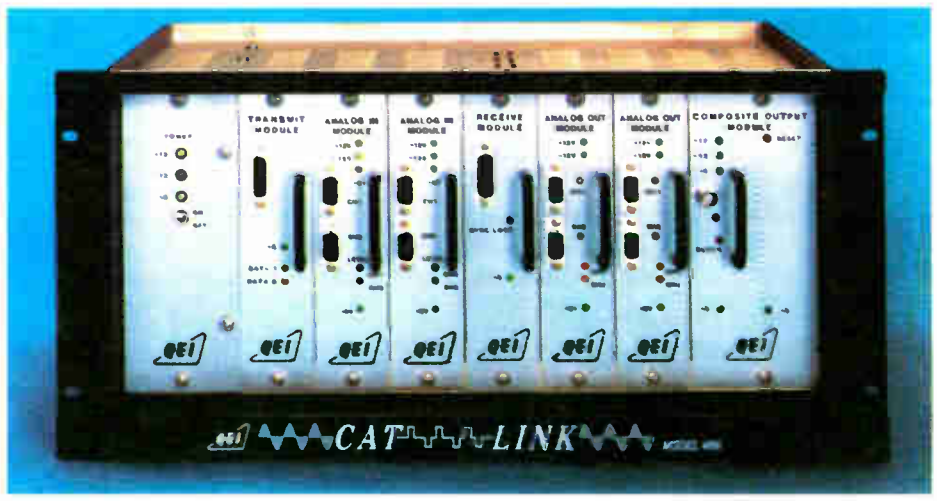
Vern Killion, W5UYF, is chairman of SBE Chapter 87, Holdrege, Neb., with 38 years in broadcast radio and television engineering. He holds an Extra Class ham license. E-mail him at vkillion@kvrn.com

World Radio History

USER REPORT

QEI Provides WZGC 'Missing Link'

by Dick Byrd
Chief Engineer
WZGC(FM)



The Cat-Link from QEI provides a constant STL link for WZGC(FM).

ATLANTA The QEI Cat-Link is perhaps the most neglected piece of equipment at WZGC(FM). Since its installation nearly 10 years ago, it has performed the formidable task of providing a constant link between our studio and transmitter.

WZGC, known locally as Z-93, was the first radio station in Atlanta to implement this type of high-speed digital technology. Since then, many major radio stations here have made the switch.

When the decision was made to augment our analog radio circuit with a T1-based STL, there were not many vendor choices. Rather than use a manufacturer virtually unknown in broadcast circles, we chose QEI, a respected leader in broadcast technology. The price was an added bonus.

QEI was attuned to the needs of the average FM radio station and produced a well-tailored set of options for the CAT-LINK. We soon discovered the CAT-LINK would be the primary STL and the radio link would become the backup.

Configuration

Our unit is configured with analog composite spigots, plus both a 3 kHz and 10 kHz path from studio to transmitter. We use the 3 kHz path for remote control telemetry; the 10 kHz circuit is used to send "auxiliary channel (cue) audio" to the transmitter.

The cue audio is applied to a sub-carrier generator to feed audio to the crew during remote broadcasts. A pair of 15 kHz circuits provides return paths from the transmitter. We use these for RPU backhaul and remote-control data.

This complement of circuits would cost considerably more if each were acquired through conventional means. The BellSouth T1 costs about $600 per month. The only other circuit at the transmitter is a POTS line, which is used for dial-up remote control and to provide standard telephone capability.

We soon discovered the Cat-Link would be the primary STL at WZGC.

When Z-93 takes the leap into the fully digital domain in the near future, the CAT-LINK will be reconfigured as a digital composite link. Several stations in Atlanta have implemented that upgrade.

The companion units have served us well over the years. A few years ago, errors on the return path were traced to a faulty channel service unit (CSU). The original ADC Kentrox unit was replaced with a DNS1000 upon the recommendation of QEI technician Glen Timothy.

The old CSU is still in service at the transmitter site. Timothy and his staff have been very helpful. While troubleshooting the CSU problem, we found that some PC board upgrades were needed. The company furnished loaner boards while ours were being refurbished.

My transmitter site, like many, is a hostile environment for electronic equipment. Lightning, dense fog, elevated temperatures and surges of all types are a few of the rigors the Cat-Link must undergo. It has remained operational through it all.

For more information, contact QEI in New Jersey at (800) 334-9154; fax (609) 629-1751 or circle ***Reader Service 183.***

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World Radio History

USER REPORT

Drop Phone Bills With Armstrong

by Bob Shotwell
Co-Owner/Operator
WPVQ-FM

DEERFIELD, Mass. "I'm mad as @#&* and I'm not taking it any longer!"

You would have heard those words echoing throughout the Berkshire Hills of Massachusetts shortly after the spring 1998 NAB show. Upon my return, I was greeted with yet another telephone bill increase in the rate of our stereo 15 kHz pair.

Actually, the timing could not have been better. While at the show, I studied the **Armstrong** FML-10T and FML-10R STL pair. I was already familiar with Armstrong's FM equipment, having purchased a few exciter/transmitters for use as translators. If ever there was plug-n-play equipment, this was it. But that's another story.

Launching pad

WPQF(FM) went on the air in 1994. We concluded we would have to use telco lines because the STL path was too iffy. Although only five miles long, it is a grazing path along a mountain ridge line.

Immediately next to our studio site is a lot filled with tall trees. Shooting over them was out of the question. Now known as WPVQ(FM), our studios are in a quaint colonial shopping complex just outside an historic district. That 190-foot STL tower of my dreams vanished with each morning's first cup of coffee. Between shooting through the trees and Fresnel clearance that is nil, my head told me to forget it. With each leased line rate increase, my wallet screamed, "Give it a shot!"

In May, I called Sinan Mimaroglu at Armstrong Transmitter and explained the situation. He graciously offered to let me test the STL. If it worked, I would purchase the loaner STL equipment. If not, it would be returned in the same condition in which it was received. With this set-up, and the trees fully leafed, my situation could only get better. I guess you would have to call this "plug and pray."

It worked well. Sometimes, it pays to put down the USGS maps and straight-edge and just give it a shot. In our final configuration, we kept the test yagi antenna for the receive end on the tower and have continued to use RG-8 cable. At the studio, we have a Marti dish but have continued to keep the small yagi on a roof topmast as an alternative plan.

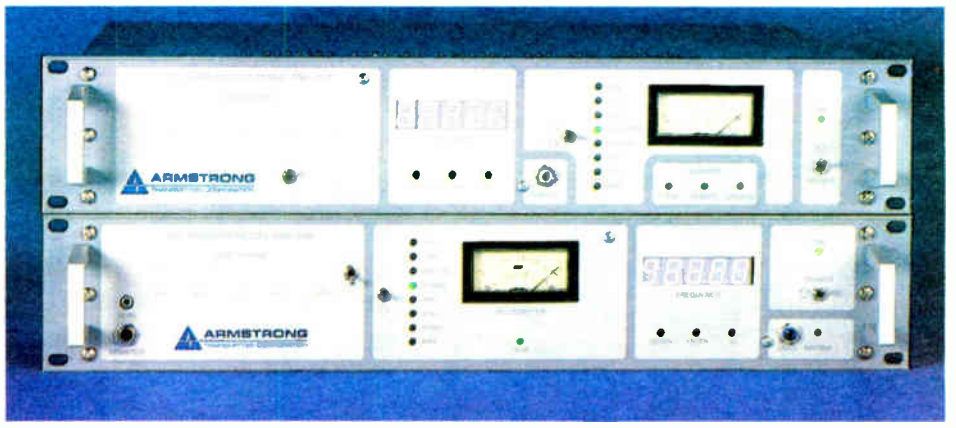
The Armstrong FML-10-R and FMLO-10-T has performed flawlessly. With a transmit power reduced to 2 W, I had a 450 µV signal at the receiver in the summer. Since the leaves have fallen, the power has increased to 750 µV. Full quieting seems to occur between 500 and 600 µV, with 4 W in the summer and 2 W in the winter. That works.

Toggle away

Both the transmitter and receiver are frequency-agile. To Armstrong's credit, the Tap-Up, Tap-Down and Set push buttons are recessed behind the front panel and require a small instrument such as a Greenie screwdriver to operate. Without a doubt, this is a better arrangement than front panel-mounted push buttons that could be accidentally bumped.

This frequency agility was appreciated when selecting an operating frequency. After reviewing the SBE coordinator's 950 MHz users printout, it was simple to toggle through the selected frequencies and insure that they were indeed unused.

Fidelity and transparency to the composite is exceptional, and overshoot is negligible. Our audio is highly processed; the composite we transmit is quite aggressive. Although there is signal strength metering, the antenna could be more finely aimed by watching for composite overshoot. This is probably unique to my situation, given the path compromises. Nevertheless, this would have been impossible with a small VU-type meter.



The combination of the FML-10T and FML-10R STL pair is a money saver.

One additional nicety: The receive signal strength has a remote voltage sample. I have that wired to one of our dial-up remote control channels. All I need is one person and a cell phone to verify the studio antenna air. Very handy!

Finally, and most important for an engineer/owner who signs the checks, is the price. I paid for the STL with my credit card and paid the bill at the same rate as I used to pay the old Bell Atlantic bill. Ten months from purchase, the bill will be fully paid, interest included.

Armstrong Transmitter clearly has chosen to provide the industry with an STL package that is, at once, technically exceptional at an exceptionally affordable price. The company is to be commended.

■■■

Bob Shotwell has been a broadcast engineer since 1976. An SBE Certified Engineer, he has held a Broadcast Engineers Certificate since 1983. When not up a tower, he is in the air as a commercially certified pilot holding instrument privileges.

For more information, contact Armstrong Transmitter Corp. in New York at (315) 673-1269; fax (315) 673-9972; or circle ***Reader Service 28.***

Developments in STL

▶ STL, continued from page 47

has thrown many groups into facilities which no longer will have a feasible STL path," said Detweiler. "(Other technology) must be found for usage in LMA and RPU applications since frequencies are not generally available for use under LMA arrangements due to control of license issues."

A limitation of 950 MHz technology, as used in broadcast, is that it is a one-way path.

Going telco

The availability of two newer data conveyance technologies, T1/E1 telephone lines and spread-spectrum radio, have enabled full duplex, i.e. two-way, high data rate connections.

Reliability and redundancy have always been major considerations in STL applications. Telco lines suffer the possible indignity of "backhoe fade." According to Kenyon, spread-spectrum radio links "often operate in shared spectrum, and cordless residential and business phones may pop up in your RF path at any time."

Interface equipment between your program stream and the T1 is essential. With this equipment, the correct data format is generated. "T1 digital audio transport gear like the QEI Cat-Link, Moseley Starlink and Intraplex STL Plus have become the latest rage due to the availability of the digital telco lines," said Detweiler.

T1 became available to telco customers with the breakup of AT&T in the 1980s. A T1 line conveys your data stream of 1.544 MB/sec over two pairs of twisted copper wires connected to the telephone company's central office. The telco transfers your data stream to another central office, and hence, to a T1 terminating at your transmitter site. There are no licensing or interference issues involved. (E1 is a somewhat higher capacity European standard.)

Unlike radio spectrum, however, a monthly fee is assessed.

"As prices have come down and as service has been offered to more areas of the country, T1s have been put in by many stations in urban areas as the primary STL," Pohler said. "These same stations usually have a wireless system for backup."

Anything can happen between one end and the other, and then radio is necessary to bridge the gap.

It is possible to revert to an existing analog 950 MHz STL if available, but the second new technology discussed here fits nicely into this scenario.

"Spread spectrum is a unique form of digital microwave radio originally developed for use by the military," said Dave Burns, studio product manager at Harris. Burns said users are exempt from licensing requirements due to the low power density of spread-spectrum equipment, and the Harris Aurora spread-spectrum radio fits that description.

"By using special coding techniques and 'spreading' the transmission signal to minimize any possible interference, the Aurora is able to provide reliable links in the 2.4 GHz band without requiring a dedicated frequency," he said.

It can be argued that T1 multiplexing interface equipment is an excellent fit with spread-spectrum radio technology to form a broadband, uncompressed, digital two-way link. According to Pohler, "A band that is unlicensed can quickly become unusable when the band is saturated. The advantage of the spread-spectrum system is also its major disadvantage — it is unlicensed."

Inherent in the discussion of spread-spectrum technology is its non-channelized nature. Redundancy and reliability are important goals of STL systems. Diversifying carriage of program stream to differing channels, be they 950 MHz, T1 or spread-spectrum radio, satisfies this goal.

The Internet seems to be making its way into every aspect of the industry, and STL is not excluded from that list. Designed as the ultimate in diversified, redundant and therefore reliable communication, the Internet has become vital to radio. It is a non-channelized, non-circuit-oriented link that may become a big factor in STL use.

"Ultimately, I feel that we will see an STL that is compressed over the Internet," Detweiler said. "It will not only feed our transmitter sites, but will be a streaming feed for Internet radio."

We now have arrived at another topic — the Studio Internet Link, or SIL. Perhaps our transmitters themselves will soon become merely a heritage service!

■■■

Jeff Johnson is network engineer for WVXU/Cincinnati/X-Star Radio Network. He can be reached at Jeff.Johnson@goodnews.net

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World Radio History

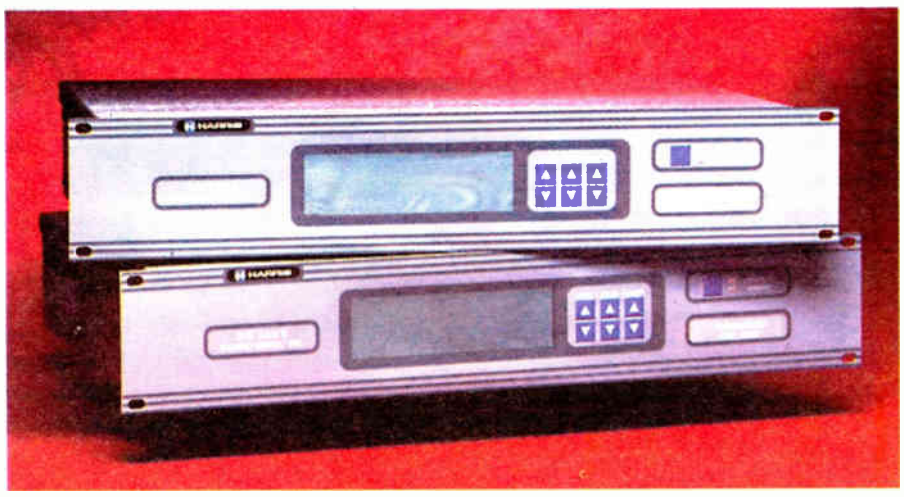
USER REPORT

CD Link a Clear Choice in 'Bama

by Larry Wilkins
Asst. Director of Engineering
Cumulus Broadcasting

MONTGOMERY, Ala. When Cumulus Broadcasting purchased the CP for a Class A FM station in Smiths, Ala., part of the Columbus, Ga., market, two things were decided.

First, we wanted to make a "cookie cutter" type of transmitter site. This way, when the next one was built, a simple call to the vendor would result in us receiving an exact replica of the site: a prefab Rohn building, a solid-state Harris transmitter and an ERI antenna and tower.



The CD Link from Harris can transmit full AES3 with no compression.

Second, we wanted to remain digital for as much of the signal path as possible. This meant having a fully digital processor with AES3 output to a digital STL followed by a digital exciter. The ability to transmit full AES3 with no compression made the **Harris** CD Link a clear choice for the STL.

The ease of installation makes the CD Link rival the computer's "plug and play" hardware. But do not be misled by ease of installation — it is stocked full of options and features.

Frequency agility is a big plus. While constructing the facility, we tried several channels. Being the SBE frequency coordinator for the area made this easier. I had some encounters with other digital STL paths and knew they were more susceptible to interference than their analog cousins.

Agile

Although all of the channels we tried were clear in the database, some had fewer errors than others. We use a low signal level at the beginning as not to mask the interference. This was not planned but came about by a misaligned dish at the studio location. The level at the outset was only 74 µV; the signal quality bounced around a lot, but the audio never dropped out.

Be careful when you change frequencies; double check before you power up, lest you wipe out the competition.

I have seen only one installation of a CD Link that did not work right. I am not sure why, but the unit would work fine for hours before there were errors. It would stop as suddenly as it started. I believe it was some interference from an airport just a few miles away. Analog information on the same frequency was not affected.

The most important part is the sound.

When the station came on, the clarity was attention-grabbing. The station is loud but open, with no masking or cluttering of individual sounds. Program directors always say engineers have tin ears, and that may be true, but when the station went on the air for the program test, even I was amazed at the openness of the sound. We have had no complaints from the operators about delay, which Harris says is less than 8 ms.

The unit can input either AES3 or standard left and right analog. If you use the analog inputs, they are converted with dual 16-bit delta/sigma A/D converters. Along with the one uncompressed AES3 data stream, the unit also will transmit two RS-232 data channels, two 6 kHz auxiliary audio channels or one 12 kHz auxiliary channel.

I/Os for AES3 and analog are on XLR connectors, and auxiliary audio and data is available on DB-type connectors. There are also parallel and serial ports for remote control and metering.

As an option the CD Link can have its own stereo generator. Simultaneous analog L&R outputs provided along with AES3 can be used to feed a backup transmitter.

Harris specs the signal-to-noise plus distortion (S/N+D) at greater than -90 dB. The unit is transparent to program pre-emphasis.

One final noteworthy feature: The settings and adjustments are made with a menu-driven screen on the front panel, using an LCD display. Navigation through the menu is easy to learn and allows for quick installation.

■■■

*For information, contact Harris in Richmond, Ind., at (800) 622-0022 or circle **Reader Service 54**.*

Circle (6) On Reader Service Card

USER REPORT

Intraplex Helps Jacor Bridge Station Gap

by Girard Westerberg
Chief Engineer
Jacor Communications
WBUL(FM)-WKQQ(FM)

LEXINGTON, Ky. The acquisition and consolidation of new stations pose several challenges for many broadcast engineers. When Jacor in Lexington, Ky., added three new stations, an additional studio and another transmitter site to our existing facilities, we knew things were bound to get interesting.

When WBUL(FM) and WKQQ(FM) subsequently swapped frequencies and transmit tower locations, we needed a solution that would let us move a variety of STL and STS (Studio-to-Studio) traffic efficiently.

The STL Plus from Intraplex serves as a digital link for Jacor.

Fortunately, the combination of a spread spectrum RF link and Harris Broadcast Systems' **Intraplex** STL PLUS has provided a plug-and-play answer to seamlessly link these locations together, without disrupting our production, on-air or support staff.

Exploring ideas

Jacor operates six owned stations, one station under a time-brokerage arrangement and two studios with co-located transmitters in the Lexington area. The two studios are roughly five miles apart, but commercial production, remote broadcast feeds and news operations are shared by both locations.

While we ultimately plan to consolidate all operations in one facility, that takes time. Further, we did not want to separate on-air personnel from their support staffs by asking them to change studios.

In the meantime, we needed to move linear program audio, commercials, news content and remotes between various combinations of studios and towers. Some material produced at Location A may actually be transmitted from Location B, and vice versa.

At the suggestion of Al Kenyon, our director of engineering, we explored the combination of a digital link. The Intraplex multiplexers would increase efficiency by allowing these payloads to share transmission facilities. Initially, we explored the idea of using T1 landlines, but wanted an alternative that would allow us to avoid recurring monthly costs and have greater control.

We eventually decided on a combination of spread-spectrum radio and

See INTRAPLEX, page 51 ▶

World Radio History

USER REPORT

STL 10: Good for Small, Medium Markets

by Chris Kelley
Director of Engineering
Cumulus Broadcasting

The STL 10 is one of several STL products from Broadcast Electronics.

SALISBURY, Md. Cumulus Broadcasting owns eight radio stations in the Ocean City/Salisbury marketplace in Maryland. The company utilizes several methods of delivering audio to transmitter sites, including STL and T1 lines.

One station, WLBW(FM), was in need of an STL upgrade. When the station was built in 1994, budget constraints prompted the resurrection of a pair of **Marti** STL 8 units to deliver audio to the site in Bishopville, Md. The STL 8s had seen much better days. They were more than 20 years old, and we had certainly gotten our money's worth out of them.

Independent operation

The best feature of the Marti STL 8 is that the left and right channels are complete and separate units. This holds true in the STL 10 — the latest incarnation of the Marti STL line — making it a suitable choice for any small- or medium-market radio station.

The units are coupled together at the transmitter end by the use of a Marti HRC-10 combiner, and at the receiver end through the use of a simple antenna T-fitting. The units operate independently; if one channel fails, you can still deliver mono audio to the transmitter site.

Several years ago, at a modern rock station for which I worked, we had a Marti STL 10 fail due to a lightning strike. We put the audio in mono through the good unit and sent the broken unit out to be repaired. No one noticed the station was broadcasting in mono.

The Marti STL 10 has a clean sound, and I believe it to have better-than-average separation. The STL 10 also has an LED audio display on both the transmitter and receiver units, which makes setting audio levels a breeze.

One nice feature is the ability to raise and lower the forward power from the front of each unit. Marti also does a good job with metering. All of the standard selections are on a rotary switch, and Marti uses a separate meter and switch for forward and reflected power. This makes it easy to check power levels.

The STL 8s were more then 20 years old, and we certainly got our money's worth from them.

The Marti HRC-10 combiner is a fairly simple unit with connections for the output of each unit, a connector for the antenna, and a small 20 W load. The only thing I did not like was that the load seemed to get very warm when the STL 10 units operated at full power. Using the 100 W load off my Bird wattmeter allowed the unit to run cool and solved this problem.

Installation can be a bit tricky. The units can be rack-mounted as you would expect, but the HRC combiner cannot. I have seen combiners just hung in the rack, placed on top of the units, or on top of the rack. The best way I have seen is to mount the HRC on a blank rack panel between the two STL 10 transmitters.

Having operated Marti STL 10 units for several years, I can recommend them without hesitation. The STL 10 is an ideal choice for small- and medium-market station looking for a clean-sounding, reliable and inexpensive analog STL with built-in backup.

For more information, contact Broadcast Electronics in Illinois at (217) 224-9600; fax (217) 224-9607 or circle ***Reader Service 80.***

▶ INTRAPLEX, continued from page 50

the Intraplex STL PLUS multiplexer with a mix of channel modules. We decided to go with an E1 link, as this gives us additional bandwidth for future expansion. Our current set-up supports the following:

- Uncompressed linear paths for bi-directional studio-to-studio and studio-to transmitter links.
- Use of an uncompressed format ensures that there is no delay to distract the on-air talent.
- 15 kHz bi-directional compressed channels for exchange of commercials produced at either studio facility.
- 7.5 kHz compressed channel paths for remote feeds, pooled at one transmit location to offer superior pickup.
- A 7.5 kHz path for use by feeds from our common news operations located at one studio.
- A 15 kHz path for pickup and distribution of satellite programming.

This set-up still left breathing room for future expansion as our needs change.

Reliable solution

Our experience with the equipment to date has been excellent. The original installation took place in February of this year, and everything was up and running in two or three days.

This solution was a lifesaver in terms of eliminating the need to identify, coordinate and license standard spectrum frequency, and in helping us quickly respond to business situations such as the frequency swap. It has also proven to be extremely reliable — we have had more downtime due to lightning strikes than equipment problems.

In the future, our plans call for us to move ahead with a consolidation of our studio facilities, but we will retain the dual transmitter locations. At that point, we expect to re-deploy the equipment into a more conventional STL configuration, although the need to double-hop some paths may require us to retain use of the equipment for a mid-point link.

Things change rapidly today in radio, and engineers are often required to develop creative solutions to support management and marketing decisions. The Harris Intraplex STL PLUS provides a great deal of transmission flexibility, with a bulletproof plug-and-play track record.

It has worked well for Jacor of Lexington, and is certainly worth a close look by other engineers looking to transparently link multiple studio and/or transmitter locations.

■ ■ ■

Intraplex was acquired by Harris Corp. in November.

For more information, contact Intraplex in Massachusetts at 877-INTRAPLEX or circle ***Reader Service 106.***

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World Radio History

TECHNOLOGY UPDATES

TFT

TFT offers several STL systems, including the 9100 composite aural STL transmitter, as well as the 9107 composite aural STL receiver.

The frequency agile model 9100 provides accurate, stable frequency and has a redundancy provision for hot standby operation. Its reciter and FM-synchronous booster provide a single modulation source. The operating frequency is synthesized and field-programmable in 12.5 kHz steps.

The 9100 allows all audio processing, stereo and subcarrier-generating equipment to be located at the studio. Its rugged, modular construction contributes to easy field servicing and low maintenance costs. The unit also has a digital application, allowing for an upgrade to a digital STL system by adding the DMM92 series digital modems and multiplexers.

High interference immunity is a highlight of the 9107 receiver. Narrowband cavity RF and SAW (surface acoustic wave) IF filters provide selectivity without inducing phase detection. Other features include a triple conversion IF and pulse-counting FM discriminator, as well as an optional built-in stereo decoder, a composite baseband output and a built-in receiver switchover unit.

As is the 9100, the 9107 is frequency agile and user-programmable in the field in 12.5 kHz steps. Frequency selection is achieved by changing internal DIP switches.

For more information, contact TFT in California at (408) 727-7272; fax (408) 727-5942; or circle ***Reader Service 132.***

Knights Communications

The Fibox from **Knights Communications** has the ability to be used as a backup fiber-optic STL solution.

Transparent in operation, the Fibox offers a quality audio fiber link in a modular package, expandable from two to twelve channels on one fiber. Analog or digital audio can be transported as data on the same fiber. Complete systems can be custom designed to the needs of the user.

There is no line loss or ground loops with the Fibox, and the unit is inherently immune to EMI and RFI. Transmission distances of more than sixty miles is possible, and the Fibox features a high common mode rejection ratio (CMRR).

A complete Fibox consists of one or more input modules, one or more output modules, fiber optic cabling, and other power supplies, linking cables and rack mounting hardware.

Some modules to accompany the unit are the FBAI-M two-channel analog master input module, which accepts mic- or line-level signals on balanced XLR inputs, and the FBAO-M two-channel analog master output module, which accepts and demultiplexes optical signals from an FBAI-M transmitter.

For more information, contact Knights Communications in Texas at (817) 877-3037; fax (817) 877-3039; or circle ***Reader Service 184.***

Marti

Marti, a product of Broadcast Electronics, offers several RPU systems for the broadcast industry, including domestic and international versions of the SRPT-40 transmitter and the SR-10 receiver.

The SRPT-40 has the ability to change frequency by utilizing front-panel selector switches, and produces 30 percent more power with 30 percent less weight than previous Marti RPU models.

Additionally, the units run cooler and will operate on any 50/60 Hz AC source between 95 and 250 volts, without changing any jumpers or switches. Its frequency range is 450-451 or 455-456 MHz, with a maximum output of 40 W.

Frequency agility and selectivity are mainstays of the SR-10, helping to maneuver through high-interference levels that are found throughout RPU bands. A backlighted LCD display indicates exact channel frequency, and selection of all channels are done on the front panel. Frequency agile over 450 and 455 MHz RPU bands, six programmable priority channels can be scanned or selected, and remote control selection is possible.

Other features includes subaudible tone decoder, double-balanced mixers, an automatic noise reduction circuit and a built-in monitor speaker with a front-panel headphone jack and level control.

For more information, contact Marti in Texas at (817) 645-9163; fax (817) 641-3869; or contact ***Reader Service 158.***

Energy-Onix

The Roadcaster Series from **Energy-Onix** consists of two frequency agile RPU units with easy mobility for remote broadcast productions.

The Roadcaster 1 is a simple remote-to-studio transmitter for one-way communication, while the Roadcaster 2 offers independent two-way communications. Both are 16-channel units to avoid RF congestion, and they tune as simply as a car radio. An on-board, four-channel mixer mounted on the front panel is featured on both units, and up to four microphones or three mics and one line level can be mixed.

A microprocessor-controlled tuner with 16 channels programmed into the Roadcaster 1 memory offers frequency adjustment with a front panel button. A rear panel RS232 port allows the user to program additional channels into

memory from a computer. An available frequency is assured even in the most crowded RF environments.

Because incoming and outgoing audio are independent in the Roadcaster 2, the station can communicate with remote talent without the fear of cueing going over the air or interrupting a broadcast. Talent can receive updates of breaking news events through "secure" studio-to-remote linking while the broadcast is in process.

For more information, contact Energy-Onix in New York; (518) 758-1690 or circle ***Reader Service 210.***

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READER SERVICE NO. 59

World Radio History

Products & Services Showcase

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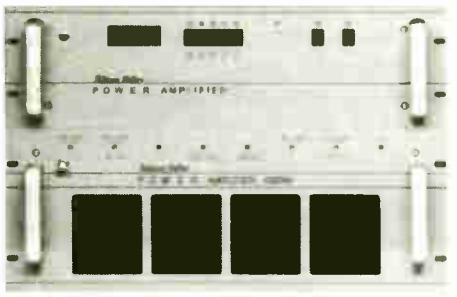

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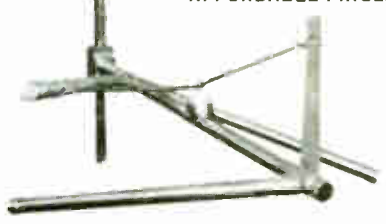

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World Radio History

SPECIAL REPORT

Deadlines, Quality on EAS Table

by Lynn Meadows

the-air television stations have the right

Lucia said the next step is to issue a

at first. Budgetary constraints mean the concatenated voices will not be added until at least 2001.

Another complaint against the NWS is spotty coverage of NOAA Weather Radio stations across the country. Some help is

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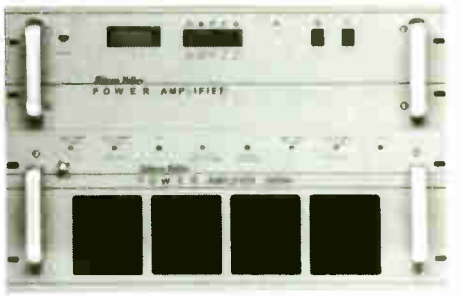

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USER FEATURES: Two PC system base pedestals ... heavy rack rail systems with easy access standard ... passive ventilation systems throughout ... adjustable shelves ... wiring block backplane .. customizing ... quick installation.

DURABILITY BUILT IN: Top counters are two ply 1 1/2 thick with quality name brand laminate with protective 1 1/2" solid wood trim raised on the outside perimeters. Plus ... generous vertical and horizontal solid wood trim and recessed kickboards.

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World Radio History

SPECIAL REPORT

Deadlines, Quality on EAS Table

by Lynn Meadows

WASHINGTON The Emergency Alert System will celebrate its second birthday on Jan. 1.

Frank Lucia, director of emergency communications in the FCC Compliance and Information Bureau, said in terms of the number of finalized state plans, EAS is where the Emergency Broadcast System was after 10 years.

Lucia said 47 state plans had been all but finalized by mid-November. The FCC had working drafts for the rest: Michigan, California, Indiana, Montana, Vermont, Hawaii, Guam, Pacific Islands and American Samoa. Planners in California, Indiana and Montana have submitted several local emergency plans for approval.

The next notable EAS deadline is Jan. 1, when cable systems with 10,000 or more subscribers will have to participate. According to Lucia, there are about 11,000 cable systems in the United States. Roughly 1,200 will be affected by this deadline. Smaller cable systems have until Oct. 1, 2002 to buy EAS equipment and participate.

Decision time

At press time, FCC commissioners were two votes away from issuing an answer to a petition from the National Association of Broadcasters. The NAB petitioned the FCC to ensure that over-the-air television stations have the right not to be overridden by local cable services during emergencies. The original EAS rules allow television and cable companies to enter into an agreement on whether or not the cable system will do selective overrides.

Lucia said the next step is to issue a Further Notice of Proposed Rulemaking on the points raised in those two petitions. He said he did not expect that to happen until early 1999.

The petitions do not address the reservations that some broadcasters have with the quality of National Weather Service alerts or the new computerized voice that the NWS wants to use to distribute warnings.

The FCC has yet to address petitions from the Society of Broadcast Engineers and the National Weather Service regarding technical improvements to EAS.

The FCC decision will affect the kind of equipment that cable operators need to buy for their Jan. 1 deadline.

The FCC has yet to address petitions from the Society of Broadcast Engineers and the National Weather Service regarding technical improvements to EAS. In its petition, the SBE proposed replacing monthly EAS tests with quarterly tests, adding cancellation codes for all event codes and restoring the Emergency Action Notification Network, which previously used the networks and wire services to forward national alerts.

After hearing criticism of its synthesized voice, the NWS earlier this year formed a task team to discuss the voice. The group recommended that the NWS add a concatenated voice to the system, with a limited vocabulary at first. Budgetary constraints mean the concatenated voices will not be added until at least 2001.

Another complaint against the NWS is spotty coverage of NOAA Weather Radio stations across the country. Some help is on the way. Congress appropriated $1.6 million for new NWR transmitters in its 1999 appropriations. Of that, $400,000 is earmarked for South Dakota; the rest will be spent on transmitters for Illinois, Georgia and Kentucky.

EAS implementation continues to be a hot-button issue for broadcasters, many of whom report problems with misclassed watches and warnings, incomplete test messages and other erroneous activations.

Larry Wilkins, co-chairman of the Alabama State Emergency Communications Committee, recently replaced Leonard Charles as the new SBE EAS Committee Chairman. Wilkins said his main goal is to assess what the SBE should do next regarding EAS.

Soon, the SBE EAS Committee will conduct a poll of the area chairs and use the responses as a guideline for what the SBE should do on this contentious topic. Among other information, the committee wants to get an idea of how well EAS is being accepted by the broadcast industry and the extent of participation by local primary stations.

TECHNOLOGY UPDATES

Burk Technology

Burk Technology offers the EAS Encoder/Decoder, featuring a numeric telephone-style keypad for simple and fast input entries.

An 80-character display shows an entire command at one glance. The menus are organized to simplify routine tasks. When performing a weekly test, only one button need be pressed for confirmation the unit is in working order. The self-contained test minimizes interruptions and reduces training periods.

Six input channels and multiple outputs allow the system to be tailored to the user's needs. All connections are designed for simple control room interface. A built-in printer records all activity to simplify record keeping.

The company also offers the RX-4 receiver and the LX-4 EAS audio switch as companions to the main unit. The RX-4 features a standard combination of AM/FM/NOAA reception to accommodate most monitor assignments now and in the future. Precise digital tuning keeps the RX-4 locked on-frequency to avoid missing any alerts. Overload protection is provided in high RF surroundings.

The LX-4, transparent in the user's air chain, protects the on-air sound by keeping program audio where it belongs, and not where it will be exposed to unwanted pickup. The LX-4 can be located up to 300 feet from the main unit.

For more information, contact Burk Technology in Massachusetts at (978) 486-0086; fax (978) 486-0011; or circle ***Reader Service 3.***

Gorman-Redlich

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Alert messages are shown on a four-line, 40-character backlighted LCD display. The message can also be scrolled onto a remote sign board, a computer screen or with a character generator on a video monitor.

A 25-pin parallel port connects the EAS1 to an external printer to keep a running log of EAS events and tests. Diagnostic information can be printed if the unit is malfunctioning. Two minutes of 5 kHz digital audio storage may be expanded to 4.5 minutes.

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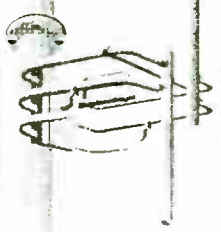

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World Radio History

TECHNOLOGY UPDATES

TFT

The EAS 911 encoder/decoder from **TFT** allows radio broadcasters and emergency managers to decode, store, forward and originate EAS messages.

By using the EAS digital protocol, the EAS 911 responds to user-preselected messages and automatically forwards them with no operator intervention. EAS header codes are generated by the system to initiate both alert and test messages.

Sequentially lighted keys guide the user through encoding and setup processes in seconds. Setup is accomplished with a minimum number of keystrokes. The EAS 911 can be operated manually or automatically. When used in the manual mode, no messages are forwarded unless sent specifically by the user. In automatic mode, the emergency events and locations are "tagged" by management and automatically forwarded.

Incoming EAS headings are recorded, stored and available for review or manual forwarding. The inclusive voice recorder stores up to two minutes of EAS audio messages, and the system interfaces with automation systems.

Auxiliary equipment for the EAS 911 includes the EAS 943 telephone access unit and the EAS 940A program/transmitter interrupt unit.

*For more information, contact TFT in California at (408) 727-7272; fax (408) 727-5942; or circle **Reader Service 81.***

HollyAnne Corp.

HollyAnne Corp. offers the PC-powered HU-961 EAS encoder/decoder, permitting broadcasters to receive, store, retransmit and initiate EAS messages.

Using the new EAS digital protocol, the HU-961 decoder receives and processes incoming EAS messages. It can be operated automatically or manually.

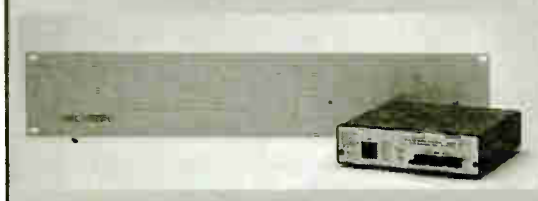
In the automatic mode, the decoder can be programmed to alert the operator only to messages preselected by station management as important to its listeners. The system interfaces with station automation systems with minimal effort.

The encoder generates all the EAS codes necessary to allow the station to initiate emergency and test messages. Station management can select an area as small as one-ninth of a county, or as large as required to serve the station's broadcast region.

When a message is received, the unit generates an internal voice message which can be heard through the front panel-mounted speaker. An external light or other signaling device can be activated to alert station personnel. Additionally, the HU-961 stores incoming digital messages for review by station personnel.

*For more information, contact HollyAnne Corp. in Nebraska at (402) 426-4841 or circle **Reader Service 30.***

DAI-1 **DIAL-UP AUDIO INTERFACE:**



The DAI-1 Dial-Up Audio Interface provides an array of features unparalleled in the industry. It combines an autocoupler, a dial-out alarm, two AGCs, a DTMF operated equipment controller and an audio switcher into one affordably-priced device. Common applications are emergency broadcasts and "dial-up" remote broadcasts when the studios are unmanned.

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Harris/Sage Systems

The Sage ENDEC encoder/decoder from **Sage Alerting Systems** has four self-contained smart buttons for easy programming and ATM-like control.

An optional computer interface, as well as easy-to-use software, is available. The unit features six user-controllable RS-232 ports for connections to RBDS encoders/decoders, character generators, computers, dumb terminals and LED signs. Three user-controllable relays can activate buzzers and strobes, control program automation, or dial directly to an engineer when EAS has been activated.

The ENDEC has stereo program line-switching capability built-in. Also, the RP-2 multistation relay panel (MSRP) allows three additional radio or television stations to be controlled from the unit. With the MSRP, as well as the optional RC-1 remote control, it is possible to originate or retransmit alerts on several stations sequentially or simultaneously.

Event codes and expanded text messages are shown on the front-panel display or a connected PC "dumb terminal" or LED sign. The unit operates without problems in high RF fields typically found in AM and FM facilities.

*For more information, contact Harris in Indiana at (800) 622-0022; fax (317) 966-0623; or circle **Reader Service 55.***

MTS Systems

MTS Systems offers the Model 5200 FM Broadcast EAS Emergency Alert Radio, featuring alarms on specific events in the user's broadcast area.

Model 5200 features a sensitive, stable FM band receiver and an EAS alarm decoder. Up to four counties can be selected for alarm events.

Other features include an internal speaker, a preset volume control, and an external antenna connector. An antenna and a wall power unit are included.

Also from the company is the 3000D EAS a single-box solution featuring five EAS inputs: three for receivers, one for audio and one for an RS-232/EAS serial I/O.

The 3000D is 7 inches high and ready to mount into a standard 19-inch rack. Three internal frequency agile receivers are included for AM, FM and National Weather Service. Other features include a digital audio recorder and player with 15 kHz bandwidth with several hours of available storage time.

The user can operate the 3000D from its front panel keypad or a PC keyboard. No external PC is required, as one is built in to the unit. An internal log records all EAS events for up to one year after they occur.

*For more information, contact MTS Systems in North Carolina at (919) 553-2995 or circle **Reader Service 4.***

Weatheradio

The Digital Weatherman from **Weatheradio** has the ability to create EAS headers that talk directly to the user's ENDEC system.

The system acts like a voice printer to instantly transform weather-related text products into human-voiced weathercasts. Connection to an automation system is straightforward: the system requires only a dry contact closure to start playing, and can provide start or end-of-message confirmations.

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*For more information, contact Weatheradio in Iowa at (319) 556-4000; fax (815) 747-2062; or circle **Reader Service 107.***

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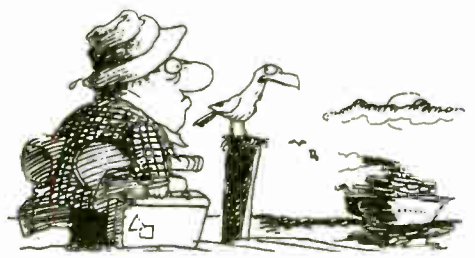

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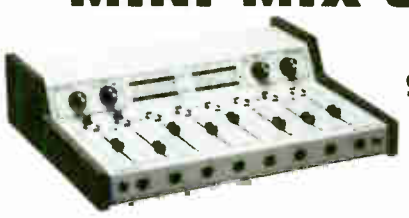

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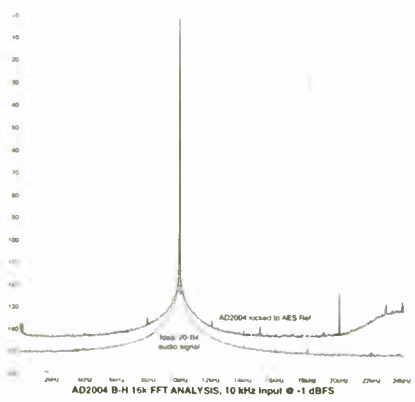

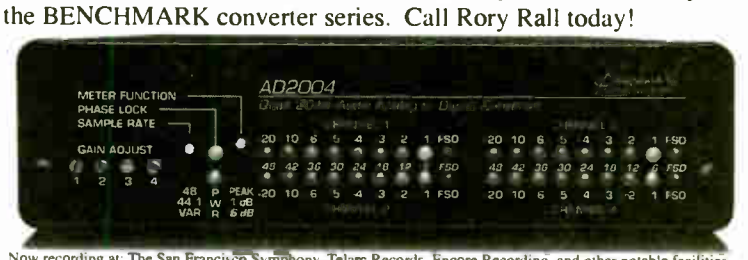

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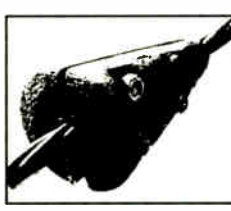

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Yamaha NC 1604II, excel cond, $2200. J Coursolle, 920-236-4242.

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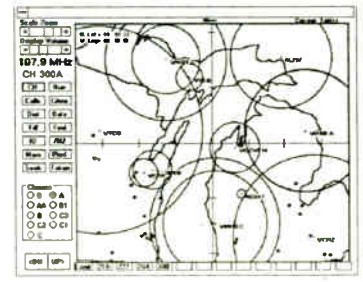

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Radio Shack hand-held dynamic mics, vgc, $25. J Emmel, 717-842-6065.

Sennheiser MD421 (5), $300 ea; EV 666, $100; Realistic 33-922, $30; Audio Technica AT-818II, $50; AKG 2000E, $75; Shure Unidyne, $75; Shure SM82, $150; EV RE-34 (2), $100/ea; Sennheiser HMD-224 headset (3), $100 ea. D Boucher, 418-387-1360.

Telefunken M-221B, M934B capsules, orig PSU & cables, excel working cond, $2200/pr; Neumann CMY563 M-7 capsule, orig PSU & cables, $2200/ea; Neumann UM-57 M-7 capsule, 3 patterns, orig PSU & cables, $2000/ea. F Danner, 781-294-1218.

AKG C60, sound great, slight hum in pwr supply. A Polhemus, 212-302-9010.

Beyer M300 mic, $65; Metronix YCM-1, $15. J Morinelli, 610-715-1720 or 610-789-1968.

Sennheiser 421-U, excel cond, $300. M Schackow, 605-374-3424.

Shure SM5B, excel cond, $600. J Miller, 734-458-2268.

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.

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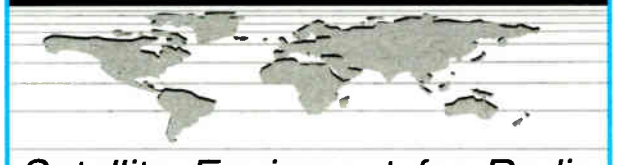
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3CX2500H3	4CX5000R	6D22S	SV6L6GC
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3CX3000F7	4CX10,000D	6N1P	SV811-3A
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1-9 col inch (per inch)	$79	77	75	72
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Professional Card	$84	82	80	76
Station/Studio Services	$175			
Classified Line Ad		$2.00 per word		
Blind Box Ad		$15 additional		

To compute ad costs: Multiply the number of ad inches (columns x inches) by the desired rate schedule for your per unit cost.

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This listing is provided for the convenience of our readers. Radio World assumes no liability for inaccuracy.

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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?
❑ Yes ❑ No

Signature _____ Date _____

Please check only one entry for each category:

I. Type of Firm

- ☐ D. Combination AM/FM station
- ☐ A. Commercial AM station
- ☐ B. Commercial FM station
- ☐ C. Educational FM station
- ☐ E. Network/group owner
- ☐ L. Consultant
- ☐ N. Delivery Service (Internet/Cable/Satellite)
- ☐ F. Recording Studio
- ☐ K. Syndicators/Station Providers
- ☐ M. Ind. Engineer
- ☐ G. Audio for Video/TV Station
- ☐ H. Consultant/ind engineer
- ☐ I. Mfg. distributor or dealer
- ☐ J. Other _____

II. Job Function

- ☐ A. Ownership
- ☐ B. General management
- ☐ C. Engineering
- ☐ J. Promotion
- ☐ H. Programming/production
- ☐ G. Sales
- ☐ E. News operations
- ☐ F. Other (specify)
- ☐ K. Production Mgt or Staff

WTS ❑ WTB ❑ Category: _____
Make: _____ Model: _____
Brief Description: _____
_____
_____
_____
Price: _____

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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PO BOX 1214, Falls Church, VA 22041 • Tel: 800-336-3045 • Fax: 703-998-2966

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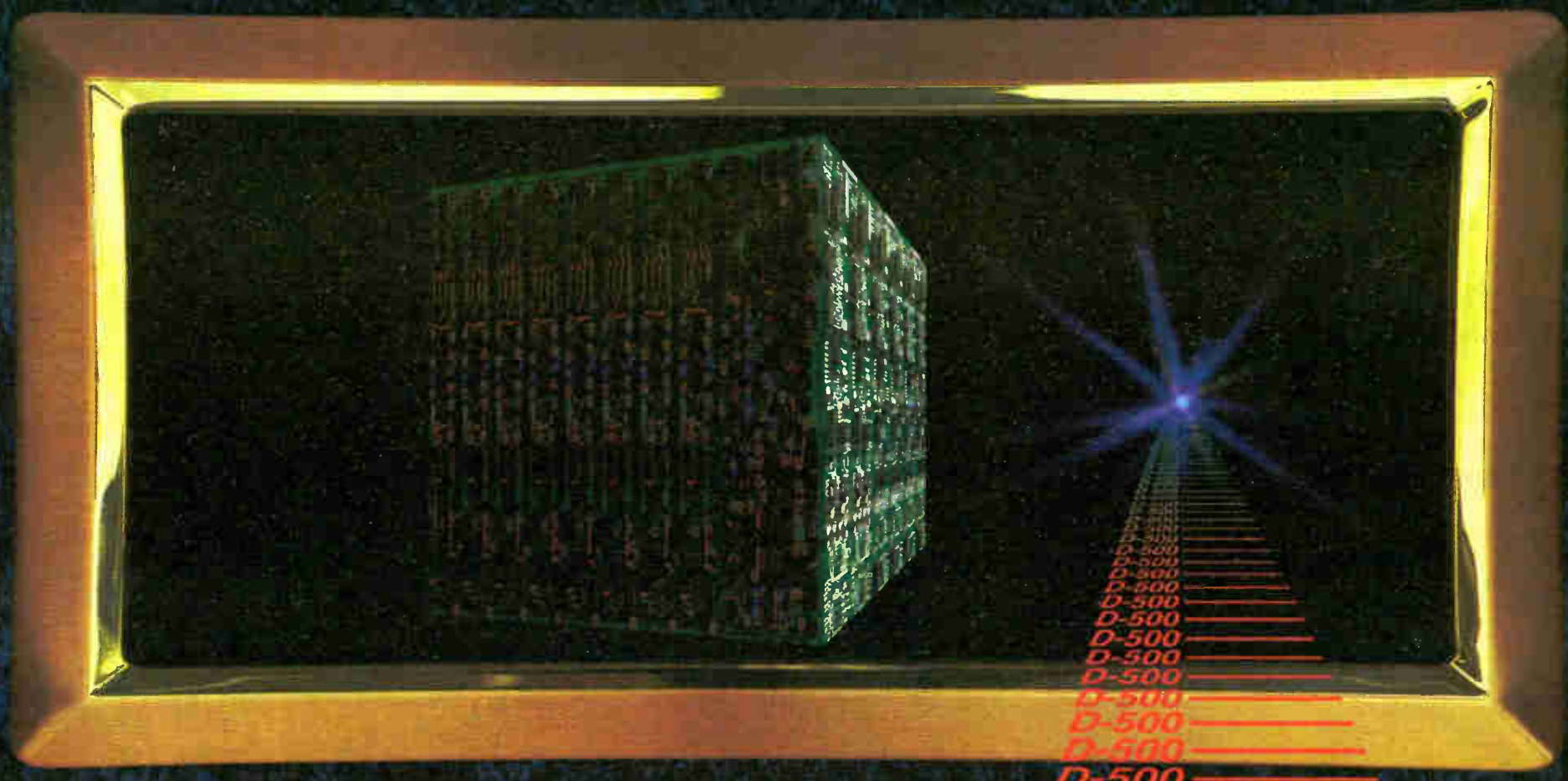

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