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Radio World®

The Newspaper for Radio Managers and Engineers

February 16, 2000

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SPECIAL REPORT

Radio and The Net: No Toy Story

by Tom Foty

In 1900, Guglielmo Marconi was trying to move an elementary form of digital communications, telegraphy, into a new wireless world.

A century later, the radio industry spawned by that success searches for a new niche in a wired, and wireless, digital world.

The intersection of radio and the Internet is a cyber world where the ghostly echoes of "The Shadow" and Jack Benny and Robert W. Morgan digitally cross the router paths of Rush Limbaugh and Howard Stern and thousands of audio streams.

It is a radio marketplace where 1913 stock certificates from Marconi's Wireless Telegraph Company and 1932 Atwater Kent cathedral classic radios are as easy to find as MP3 players or station coffee mugs. It is a virtual junction where radio's past intersects its rapidly changing present.

Gone are the days of the Internet as simply a high-tech billboard for radio.

See NET, page 6 ▶

NEWS ANALYSIS

LPFM Raises Hopes, Questions and Threats

by Leslie Stimson

WASHINGTON As details about the FCC's decision to create a new class of low-power FM stations have emerged, reaction has been swift, and in some cases, volatile.

The Consumer Electronics Association joined NAB in opposing elimination of certain interference protections in order to create the new service.

LPFM supporters, as expected, are pleased with the FCC ruling. Some supporters have tempered their enthusiasm as they expect opposition to the service to grow and delay, or possibly, halt its implementation.

Placed in the middle of this political and technical debate are equipment suppliers, who see a potential new source of low-end but high-volume business.

Within days of the FCC vote, several RF manufacturers announced products suitable for low-power FM.

Broadcast Electronics said it would demonstrate two versions of low-power transmitters at NAB 2000, the Plug-N-

See LPFM, page 8 ▶

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CONTINENTAL ELECTRONICS CORPORATION

World Radio History

◆ NEWSWATCH ◆

Neutrik Sues Switchcraft

NEW YORK Neutrik USA Inc. and its parent company, Neutrik AG, have filed a patent infringement lawsuit against Switchcraft Inc. over the Neutrik Speakon product line. The litigation seeks to prevent Switchcraft from selling its High Power Connector line as well as monetary relief. Neutrik also has charged Switchcraft with trademark infringement and unfair competition over how Switchcraft promotes its HPC line.

Switchcraft had no comment on the lawsuit, filed in the United States District Court, Southern District of New York.

NAB Announces New Programs

WASHINGTON NAB has developed two programs valued at more than $1 million for women and minorities underrepresented in broadcasting. The half-million-dollar Gateway Fund will provide matching training grants for entry-level employees in areas such as news, sales and engineering.

The other program, the Leadership Program, is for senior executives who have the potential to own and/or manage stations and groups. These individuals would attend classes once a month for a year to learn about topics such as broadcast law, management and organizational issues and technology.

The Leadership Program is budgeted at $725,000 for three years, with half underwritten by NAB and the other half from LIN Television, A.H. Belo, Benedek Broadcasting, the Morgan Murphy Stations, CBS Corp. and the New City Foundation.

These programs complement the Prism Fund announced last November, which provides capital to minorities and women interested in owning stations.

FCC Names Technologist

WASHINGTON University of Pennsylvania telecommuications professor David Farber has been named chief technologist for the FCC.

FCC Chairman Bill Kennard said the FCC was fortunate to bring Farber to the commission as it "continues to tackle the complicated and increasingly technical issues involved in ensuring universal broadband access."

Farber is director of the Center for Communications & Information Science

See NEWSWATCH, page 3 ▶

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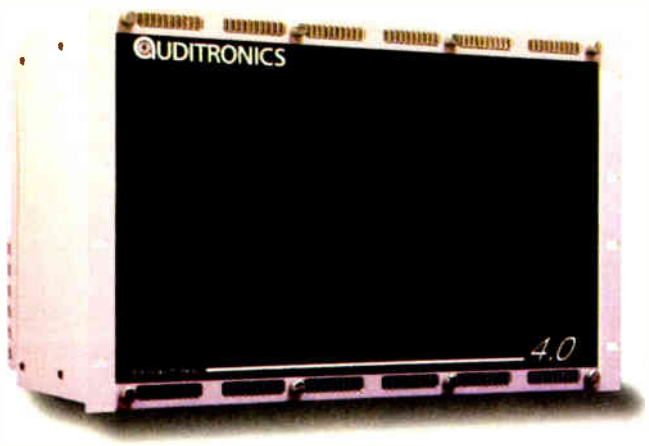

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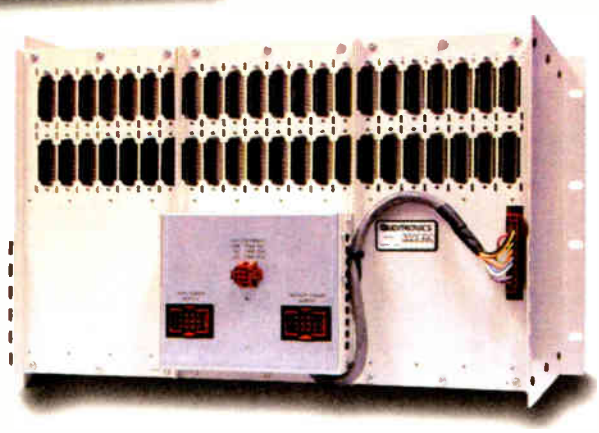

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AUDITRONICS

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World Radio History

FCC Adopts New Station EEO Rules

by Leslie Stimson

WASHINGTON While broadcasters say they agree with the spirit of the FCC's new equal employment opportunity rules, they are not so happy with the final outcome and criticize the amount of paperwork obligations they say the new rules will generate.

The rules, which prohibit discrimination based on gender, race, religion or national origin, replace the previous rules struck down by the D.C. Circuit Court of Appeals in 1998. In that case, the court said certain aspects of the previous outreach requirements were unconstitutional.

New rules

After the FCC vote, David Honig, executive director of the Minority Media and Telecommunications Council, praised the new rules, and said he was confident they could stand up to any court challenge. Honig represented the NAACP in the case that led to the 1998 court decision that struck down the old rules.

In that case, brought by the Lutheran Church-Missouri Synod, the commission had ruled that two radio stations licensed by the church were not doing enough to hire minorities. The appeals court agreed with the church that the FCC rules did not adequately define diverse programming.

Stations are required to disseminate information widely about job openings, under the new rules, to ensure all qualified applicants have an opportunity to compete for openings. Stations may send announcements to groups that request them and select from non-vacancy specific outreach approaches, such as job fairs, internships and community meetings.

Stations may also design their own outreach programs; but they must keep records including race, ethnicity and gender of applicants.

We do not want licensees to make token efforts.

— Commissioner Susan Ness

Commissioner Susan Ness said stations need to be aware of what works for their recruitment efforts and not just rely on one type of notification.

"We do not want licensees to make token efforts," she said of the EEO rules.

Some stations want to rely on e-mail and the Internet for postings, and reduce mailing costs.

Ness said limited notification would only reinforce the so-called "digital divide" between those who have Internet access and those who do not.

FCC Chairman Bill Kennard believed the rules should have gone further, and had stations track race and gender information for interviewees as well as applicants.

"Simply tracking who *applies* for a job only gives you part of the picture, because it does not show whether the outreach program is producing qualified applicants from all segments of the community. Obviously it is up to the broadcaster to determine who is qualified, but it is only after the applicant pool is whittled down to a *qualified applicant* pool can the effectiveness of the outreach be determined."

Commissioner Harold Furchtgott-Roth voted against the rules and found the race and gender record-keeping requirement troubling.

"The commission's continued insistence on requiring broadcasters to classify applicants and employees based on their race and gender, factors that should be irrelevant to a person's job qualifications, is legally troublesome," he wrote.

Religious broadcasters may continue to establish religious belief or affiliation as a job qualification under the new rules.

Stations are required under the new rules to place an annual EEO report in their public file detailing their outreach efforts and must file a Statement of Compliance every second, fourth and sixth year of the license term certifying compliance with the EEO rules.

Stations with fewer than five full-time employees are still exempt from the EEO paperwork requirements only. Broadcasters had hoped to increase that to stations with at least 10 employees.

The FCC also reinstated the requirement that stations file annual employment reports, which was suspended by the FCC in 1998, and said the information would only be used to monitor industry employment trends and prepare reports to Congress.

Correction

Due to a printer error in the Jan. 19 issue, the last two lines of the story "VOA Installs Digital Platform" were missing. The last paragraph reads:

If Dalet continues to perform up to VOA's expectations, the company will win change orders for the additional tasks in the IDAPS system. That is at the government's prerogative.

◆ NEWSWATCH ◆

▶ NEWSWATCH, continued from page 2

& Policy and the Laboratory for Distributed Systems at the university, heading up research in high-speed networking.

Farber replaces Stagg Newman, who completed his two-year appointment in the post and planned to leave Jan. 14. Newman will join McKinsey and Company as senior telecom practice expert.

Lamoray Retires From Enco

FARMINGTON HILLS, Mich. Larry Lamoray, executive vice president of sales and marketing at digital audio delivery system supplier Enco Systems Inc., has retired. Lamoray joined Enco in 1993.

Eugene Novacek, president and chief executive officer of Enco said of Lamoray, "From his years with MCI to Auditronics to ITC to Enco Systems, Larry Lamoray has been a savvy, intelligent fixture in the broadcast industry. He did wonderful things at Enco and we'll miss him. He has left us in a wonderful position to capitalize on his efforts and continue to be a leader in the industry. For that, we are grateful."

Lamoray will act as a consultant to Enco and Don Backus will assume Lamoray's duties. Backus previously was digital systems manager at Audio Broadcast Group in Grand Rapids, Mich.

Asked by **RW** if Lamoray's departure will have any affect on Enco's close working relationship with Harris Corp., Backus said it would not.

Harris has an exclusive distribution deal with Enco, which has led some in the industry to speculate that Harris might purchase Enco as it has several other suppliers. But, Backus said, "We both are quite happy with the way things are right now."

Harman to Buy Most of Crown

ELKHART, Ind. Crown International Inc. intends to sell what it calls "substantially all" of its assets to Harman International Industries Inc.

Crown Broadcast, the part of the company that makes transmission products, is not part of the sale.

Harman plans to continue operating Crown as a separate business unit and retain Crown's management team and the approximately 700 employees in Indiana.

Crown makes amplifiers, mics and computer-controlled sound systems for professional audio markets. Harman manufactures audio and video products for the professional and consumer markets.

"The opportunity to join forces with Harman is an extraordinary one," said Richard Newberry, Crown CEO. "The synergies available to us as a combined company are significant. This is the right move at the right time for Crown, its employees, its customers and its shareholders."

Harman CEO Bernard Girod said that when the acquisition is completed, Richard Newberry will report to Mark Terry, president of Harman's Professional Group North America.

Terms of the transaction were not disclosed.

The deal, announced Jan. 25, was expected to close in about 30 days.

WHAT COMES AFTER DIGITAL?

In the beginning, there were stone axes. Then came fire, the wheel, and the steam engine. Then came analog audio and then digital audio. What comes next?

Certainly the stone wheel must have looked to the caveman to be the greatest discovery that ever could be. And to the simple farmer of the 1800's, the steam engine was the most modern contrivance that his mind could imagine. But neither was a terminal technology. Both have been replaced as time marches on.

Digital audio is also not a terminal technology. It is simply where we are now.

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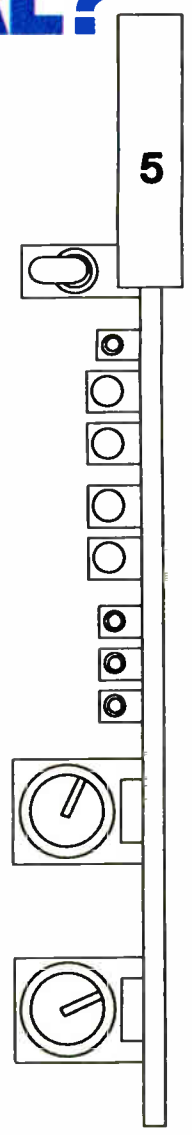

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World Radio History

A Digital Radio Status Report

The coming wave of low-power FM stations surely will change the face of the dial in some markets. But those new broadcasters, vilified by many in radio, may seem almost warm and fuzzy compared to the companies I saw at the CES show in Las Vegas.

Among the exhibitors was a pack of snapping, snarling wanna-be media giants chasing traditional radio with the vengeance of starving tigers. These guys want your listeners where they work, where they live and even where you assume the audience is safest: in their cars.

Audio on demand? It's here. Web audio delivered through empty channels on your home FM radio? It's here. Satellite radio? It's here.

CES drew a record 126,818 people, up 30 percent, and the floor was loaded. For a rundown see page 10.

★ ★ ★

One question at the show: Is digital radio ready for prime time? Satellite radio certainly is. Look for the two licensees to begin commercial rollout late this year or early in 2001, with a monthly charge of $9.95 and receivers starting at $199.

Satellite is the first new radio band in 60 years, said Lee Abrams, a programming guru who is now senior vice president of content and programming for XM Satellite Radio. Its investors include Clear Channel, General Motors and DirecTV.

Will consumers accept satellite radios? Abrams, whose company will launch two birds supplemented by about 1,800 terrestrial repeaters, said yes.

"In 1970, most radios were AM," he said. "Then FM started getting some decent programming on it, with rock formats and beautiful music, and by 1974 you couldn't find an AM radio. Everything was AM and FM. I see the same pattern happening now."

By 2004, he predicted, every new radio could be AM/FM/Satellite.

But will listeners pay for radio?

"They absolutely will *not* pay for radio — if it is radio as it is defined today," said Ira Bahr, senior vice president of marketing for Sirius Satellite Radio, formerly CD Radio.

"People dislike radio today," Bahr said. "If you sit someone in the car and you say, 'Try to envision how you would like to be entertained in this vehicle,' the answer he would give would have little or no resemblance to conventional radio."

Sirius plans three satellites with high elevation angles, promising seamless coverage, and fourth as an in-orbit spare. The company will use about 100 terrestrial repeaters.

XM and Sirius aim to put service into cars first, with home service to follow. Both companies are looking at the portable boombox market, too.

"It won't be there in the first generation," Bahr said, "because the product's just not going to be small enough, light enough or stingy enough on power consumption."

Eventually, satellite radios will be able to receive both services. Bahr said the companies could even create complementary programming. (I didn't get a chance to ask him what the Justice Department might have to say about that.) But interoperability won't happen in the first generation.

Bahr says satellite will succeed.

"There will be tens of millions of people in this category within five years. In the early years, the governor on-ramp is simply going to be the availability of radios," he told retailers. "People want this product and they're going to beat a path to your doorsteps to get it."

FCC action

What about IBOC? If the FCC acts on it in the second half of this year, as some project, how fast could terrestrial in-band radio roll out?

"We believe products will hit the shelves as soon as a standard is set," said Nick Karter, vice president of product development and management at Lucent Digital Radio. LDR is both an IBOC proponent and a supplier of coding technology to XM Satellite.

Receiver makers, Karter said, think it will take about a year to deploy a radio once a standard is set.

"However, in our partnerships with various receiver manufacturers, we're looking to collapse that time by defining many of the interfaces and functionality," he said. "So it could be six to 12 months."

At USA Digital Radio, Jeffrey P. Jury, senior vice president of business development and operations, hopes for a standard by the end of this year.

"We're actually going to be putting stations on the air now throughout the rest of this year and into next year, and have all the equipment integrated for sale on a mass-production basis by next year," Jury said.

"The first receivers we expect to start hitting the market late next year, coinciding with the rollout of transmission systems."

The first target for radios, he said, is after-market auto and high-end home stereos.

Jury said the presence of the top broadcast groups among the owners of USADR is important.

"We're converting 12,000 radio stations out there, and we want to convert them as quickly as possible to give consumers that digital sound," he said. "So our owners will start there. Ultimately our intent is to convert all radio stations to digital."

Will digital satellite make IBOC unnecessary? Karter of Lucent said no.

"There is value to being local in radio. Something like 80 percent of the advertising that supports radio today is local. And it's free."

Karter said IBOC requires a relatively minor upgrade to the existing infrastructure and uses many of the functions and components already in receivers.

Jury said listeners do want better radio. According to a USADR survey of audio enthusiasts, 66 percent indicated a desire to receive enhanced FM. Forty-five percent said they would be willing to spend up to 30 percent more for a radio that gets advanced data services.

Both Jury and Karter pointed to the data opportunities, such as traffic, news and other broadcast uses, as well as program-associated data and e-commerce applications such as enhanced advertising and electronic currency.

Dwight Taylor, managing director of Digital Radio Express, which recently entered an alliance with USADR, is interested in the idea of delivering data in a wireless mobile environment, to the car and to the listener walking around.

Proponents should cooperate, he said. He envisions receivers as "multi-tiered platforms" that will deliver combinations of all these services.

"It could range from a really super-duper receiver with this great audio and all of these many different data services, down to the opposite end of the spectrum (where) you may have very simple devices that are becoming intelligent — previously dumb instruments that become smart, that will have a cheap, simple chip in it," he said.

"It will be talking to another device perhaps, and those could be very cheap. In very large volumes, you could have chips going into devices that would give you these services that might be in the $5 to $10 range."

He said related technologies will work together to provide the greatest permutation of services.

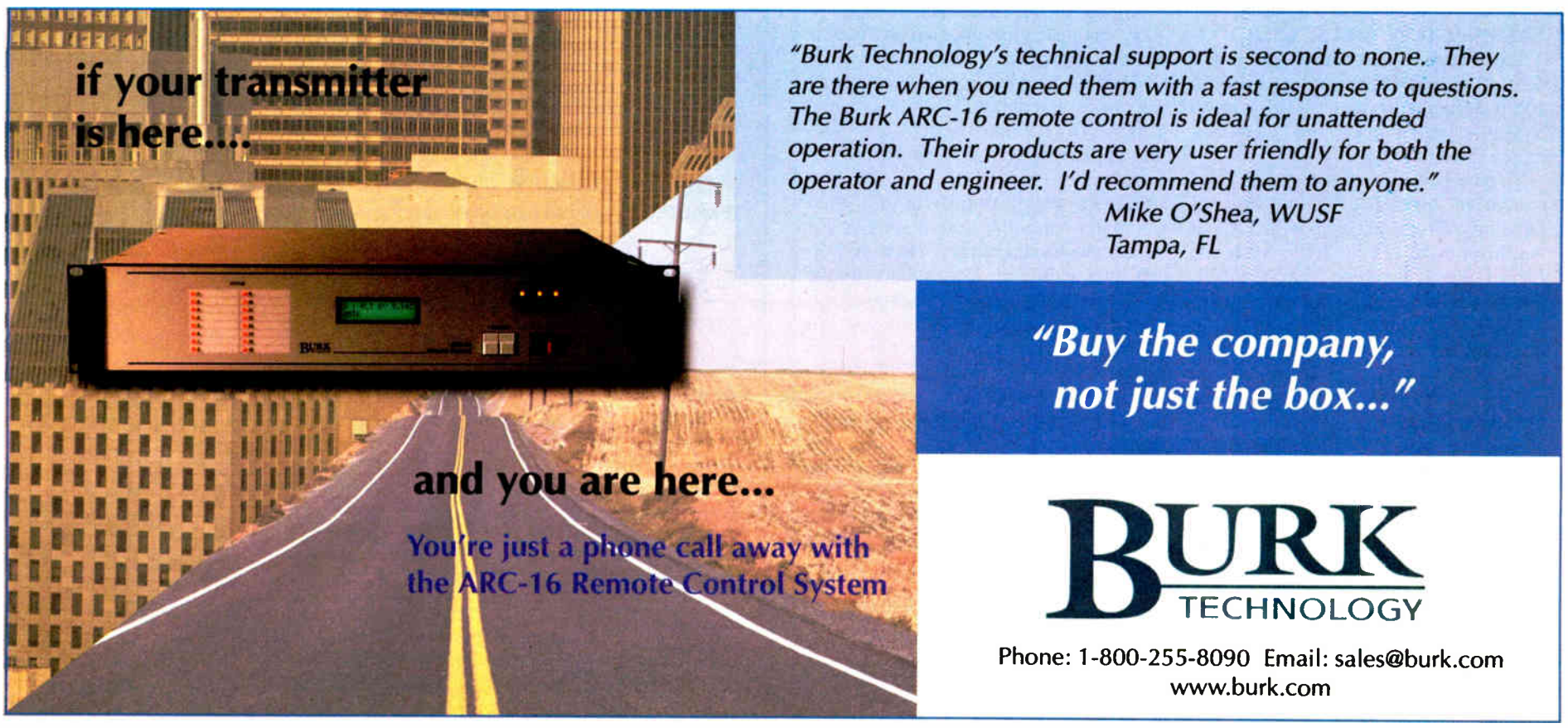
"People following the development of DAB have become somewhat cynical, because it seems to have taken a long time, and it has. But ... it really is coming up to prime time. It's going to come on very quickly, and it will develop into things that no one here can imagine."

From the Editor

Paul J. McLane

Is Low-Power Upon Us?

Who are the winners and losers in the wake of the FCC's vote on low-power? See our opinion, page 70.



World Radio History

Y2K Okay, Problem Dates Remain

by Randy J. Stine

Although the New Year has been uneventful so far, the Y2K bug might affect broadcasters yet. Experts say there are 30 to 40 dates this year that have significance.

Despite some predictions from doomsayers to the contrary, months of preparation paid off for U.S. radio broadcasters with a smooth transition into the New Year.

With generators topped off and equipment checked, most radio station engineers contacted by **RW** welcomed 2000 with a yawn and a sigh of relief. But, experts say, don't throw away that Y2K binder yet.

"Most broadcasters have anticipated Feb. 29, leap-year day. But some computers, like IBM mainframes and DOS systems, have some date assumptions that may cause problems," said Rick Ducey, NAB senior vice president of research and information.

Dates noted by Ducey include March 1, the day after leap-year day, and March 31, the end of the first business quarter. "The majority of the work and worry is behind broadcasters. These are just a few more dates to guard against."

Overall, Y2K evaluation occupied many engineers throughout 1999. Testing of hard-drive automation and audio delivery systems consumed enormous amounts of manpower and resources. Remote controls, phones and traffic and billing systems were also tested for Y2K compliance.

Engineers for radio groups reported a variety of small glitches, from trouble with music scheduling systems to problems with log merging, but no major failures.

"There was no mega-crash of anything like some had predicted," said Steve Davis, corporate engineer for Clear Channel Communications Inc. "It was pretty much a non-event for all of our stations."

John Ehde, vice president of engineering for Salem Communications Corp., said its engineers went home shortly after midnight on Jan. 1 when it became apparent "no mission-critical failures would occur."

DJ Mark Christopher shows off the new studio for KBSG-AM-FM, Seattle.

"We had a few stations have some trouble with traffic systems loading logs on New Year's Eve. Those problems were easily fixed," he said.

It was a happy New Year for Susquehanna Radio Corp. and Senior Vice President Charles Morgan. He said the feedback he received from stations "indicated no Y2K problems."

One of its 23 stations did go off the air New Year's Eve for nearly a half-hour because of what Morgan called "an overly cautious television general manager."

"One of our East Coast FMs is located at a TV site. The GM had ordered the engineers to run the television station on a generator for two hours before and two hours after midnight just to be safe. The generator quit about 10:30 p.m. and they popped a couple of circuit breakers trying to get back on and knocked us off," Morgan said. "You know what they say about all good plans." He declined to identify the TV station.

Millennium-activated computer viruses were another worry for radio stations. "We put state-of-the-art computer virus scanners on nearly every desktop chain-wide," said Dave Marchette, corporate information systems director for Citadel Communications Corp.

Milford Smith, vice president of radio engineering for Greater Media Inc., said a few stations experienced minor date-related issues with Columbine traffic systems.

"The systems had been run through Y2K compliance, but this was missed somehow," he said. "All things considered, it was very minor."

Engineers at the 14 Greater Media stations were required to report any Y2K trouble to Smith within an hour of midnight. "Not a single problem," he said.

"I think all of the Y2K hype had us doubting our own common sense about this stuff. I think there was some over-reaction when it came to deployment of people, but rather safe than sorry."

At midnight New Year's Day, Hispanic Broadcasting Corp. chief engineers were on a conference call with the company's director of engineering, David Stewart.

"We had a PC-based audio storage system at a few of our stations we were wondering about, but even those didn't create a problem," Stewart said. "It was far quieter than I expected.

"The compliance inspections took many hours and cost money, but in the end, we were just happy we avoided the problems."

Sterling Davis, vice president of engineering for Cox Broadcasting, had a theory on why Y2K did not affect his stations. "If you prepare for something, nothing will happen. If you don't prepare for it, all heck will break loose. We were ready."

WLW Rings in New Year

by Randy J. Stine

CINCINNATI The saying goes "out with the old, in with the new," but at WLW(AM) in Cincinnati, the opposite was true on New Year's Eve.

The Clear Channel Communications Inc. station entered the new year broadcasting on its 1927 model Western Electric 7A transmitter — the original transmitter the station signed on with in 1928 and the first 50 kW transmitter operated in the United States.

Photo by Jim Hawkins

The 1927 model Western Electric 7A transmitter was used by WLW(AM), Cincinnati.

"I just thought it would be a nice way to bring a bit of history to the occasion," said Paul Jellison, regional engineering manager for Clear Channel.

WLW used the transmitter until 1975, when a Continental 317-C1 AM transmitter replaced it. The station now has a Harris solid-state DX-50 AM transmitter. The Western Electric transmitter still serves as a backup.

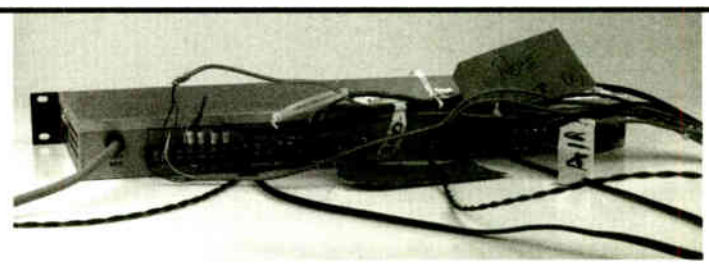
Jellison put the original transmitter on the air at 10:45 p.m. on New Year's Eve and operated it until 12:15 a.m. on Jan. 1.

"At the last minute I had to replace a tube in the RF exciter, but it sounded fine. There was some loss of modulation," Jellison said. He used an Orban Optimod 9100 audio processor to help boost modulation.

The Western Electric 7A is water-cooled by a series of water pumps. Jellison said it is much quieter than today's transmitters with blowers.

"The thing is still in great shape. Credit is owed to the top-notch engineers who maintained it over the years."

WLW's transmitter site is located in Mason, Ohio, about 20 miles north of Cincinnati.



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World Radio History

Radio Groups Form Net Strategies

▶ NET, continued from page 1

BRS Media, which tracks Internet trends, listed more than 4,200 U.S. and Canadian radio stations with a Web presence in late 1999, and close to 3,000 programmers streaming audio onto the Internet, up about 50 percent from late 1998.

About half those Webcasters were radio stations; about 250 were "Internet-only" programmers.

Former sportscaster Steve Dolge now concentrates on Web content as managing editor of *wtopnews.com* for Bonneville's WTOP-AM-FM.

One, Clear Channel's KIIS-FM, Los Angeles, is a hybrid. The station streams both its air product and Web-only programming on multimedia-rich KIISFMi.com, aimed at the first generation to grow up with the Internet: "Generation Y," made up of 12- to 25-year-olds.

Almost all Webcasters came to the Net as a new transmission medium in the last three and a half years. The Arbitron Company now has started to measure such stream listening.

Speaking of the oldest broadcast medium's use of its hip, cool offspring, Gary Fries, president and chief executive officer of the Radio Advertising Bureau, said, "It's way beyond the toy stage, whether a person receives their radio over the dashboard of their car or over a computer. It's very obvious there's a whole new brand of radio receivers out there, and it's a reality."

In tune with that reality, the RAB has set up a Web-based "eCom Solution" for online sales. Fries reports an enthusiastic reception, with several hundred RAB member stations using the service.

But neither RAB nor NAB has figures correlating radio Web presence with increased earnings. In that sense, the Web landscape remains a developing resource, not yet close to being exploited.

Magnitude Networks, owned by major Internet investor CMGi, is an Internet "turnkey" vendor, also offering e-commerce services, along with Web site construction and streaming.

Magnitude Vice President Richard Rieman, a long-time veteran of local and network radio, offered this prescription for Internet revenues: "The stations most successful in making money from the Internet are the ones devoting the most time and sales staff effort to it."

He suggested a formula of adding 10 percent to on-air sales contracts. In exchange, advertisers would receive rotating banner ads and pages for the duration of the buy.

Rick Ducey, senior vice president of the NAB research and information group, said one visible recent effect of the Internet on the industry is "the huge influx of 'dot-com' ad dollars" as dot-com businesses try to make themselves known to the world by advertising on radio.

In that robust dot-com economy, radio's Internet goals have gone way beyond promotional afterthoughts. Major radio groups are centralizing their online efforts with major investments of staff and resources.

Supergroup Clear Channel Communications Inc., which is in the process of purchasing AMFM Inc., has announced a complex promotional and distribution deal with NBC's new Internet spinoff.

Search and other Web services from NBCi will be integrated into Clear Channel's own Web sites and will be promoted on Clear Channel stations.

The move also represents NBC's first tentative, if indirect, involvement with radio since abandoning it shortly after the 1986 acquisition of its pioneer parent, the Radio Corporation of America, by General Electric.

Prior to its merger with Clear Channel, AMFM has set up a separate business, AMFM Interactive, to coordinate its Internet strategy. Executive Vice President and Chief Financial Officer Jim Burtson said, "We turned around and said, as a radio company, 'We will treat the Internet as an incremental business opportunity, that will both make money on a standalone basis and make our core radio business better.'"

Burtson said the process was not easy, but AMFM felt it had to be done because the company recognized that it "had basically left its best brands, meaning the radio stations, in the hands of others."

WTOP generates content for both its all-news radio format and its Web site from the same newsroom.

Burtson said AMFM is getting away from "legacy" barter deals, which ended up using AMFM station "brands" to make money for others. Burtson said the resulting centralization would meet the needs of the group's individual radio stations.

Looking in the opposite direction, AMFM is joining with San Francisco-based CNET in launching a new high-tech talk format on AMFM station KNEW(AM).

"CNET Radio" will blanket its potential Silicon Valley audience with news and features about the Net and related technologies. In mid-January launch, however, was delayed; its Web site stated that due to the transition, CNET would be back on the air and online "shortly."

CBS Corp. also has formed the CBS Internet Group. Headed by newly hired Russ Pillar, a former executive with Prodigy, it is the latest Internet move for a company that has aggressively traded promotion, advertising time and branding in exchange for equity stakes in new media companies.

One of Pillar's mandates will be to coordinate the Internet strategies of the CBS/Infinity radio stations. A key issue is program streaming. CBS/Infinity remains one of the few major holdouts against Internet transmission.

Dana McClintock, CBS vice president of corporate communications said, "Because so much of radio advertising is local, it hasn't seemed to make any business sense to stream our content over the Internet for everyone to get for free." But McClintock said CBS would examine new streaming business models.

More enthusiastic about streaming is Bonneville's WTOP-AM-FM in Washington, D.C.

Scott Levy is director of business development for Bonneville D.C., comprising all-news WTOP and its sister stations, classical WGMS-FM and top 40 WWZZ-FM. He said streaming increases WTOP's local audience in downtown Washington, where signals often fail to penetrate office buildings.

Levy has hopes for new technologies he feels will add revenue streams to the station's bottom line — the insertion of commercials into the "buffer time" Web listeners encounter when first clicking on to a

See NET, page 7 ▶

World Radio History

Radio Financing in the Internet Era

by Sharon Rae Pettigrew

Broadcast financing — a phrase that means different things to different people. Will the Internet generate revenue for radio? Is there funding out there for station acquisitions in this Internet era?

A radio station's reach has been extended, thanks to the Internet. New advertising opportunities abound.

"People are very focused on the Internet and its potential," said Lewis J. Paper, co-chief of the communications practice of Dickstein Shapiro Morin & Oshinsky LLP.

He said Internet potential and Internet actuality are not the same. "There are people who passionately believe in the Net's future. However, the Net hasn't yet had any impact on the financing of transactions."

According to Paper, who moderated a session on broadcast financing at last fall's NAB Radio Show, many lenders and investors think the Internet will eventually play a big part in the financing of transactions.

"But it probably won't get to that point until a borrower or somebody seeking an investment can show that it has or will generate some revenue," he said.

Laurence Norjean, president of BuySellBid.com, said the Internet is made for radio.

"It provides the greatest opportunity that radio ever had to think outside of the box and create non-traditional revenue," he said.

"Sixty-eight thousand new Internet people come on every day and almost two thirds of them index very heavily as radio listeners."

Norjean also said that radio, as a loyalty and lifestyle representative medium, not only has the opportunity but also the responsibility to extend and superserve its listeners.

"Radio has an incredible opportunity to generate new revenue by delivering products and services to its listeners — classified advertising, auctions, personals, e-commerce, shopping — all of which they don't have to produce. They can partner with a company like BuySellBid.com. Radio is selling space on the air. Now they can sell space on the Web."

Jeff Kilrea is the senior vice president of Finova Group Inc., a Phoenix-based lender.

"We are committed to the broadcast and Internet business industries," he said. "Major problems when it comes to financing include unreal expectations. Expectations from prospects are often much greater than the levels that bankers and commercial finance companies are able to provide."

Lisa Gallagher, managing director and group head of media and communications for BancBoston Robertson Stephens, said that the Internet is a natural extension of radio.

"Everybody feels that there's a need to get into the Internet," she said. "And everybody is working on different models on how to make money doing it."

Session attendee Gerro Vonk found the discussion helpful.

"I think everybody sees this as an unstoppable event," he said.

▶ NET, continued from page 6

stream and the substitution of national commercials for local ones in the station's stream.

Levy also hopes to make use of "E-Mail Director," a database program from Radio Data Group, partially owned by CBS/Infinity and Clear Channel.

"E-Mail Director" collects detailed listener data from a Web site and uses it to generate tightly focused e-mail to listeners, adding advertiser messages and links. RDG Chief Executive Officer Michael Rau said about 150 stations are using the technology, generating about 800 to 1,000 monthly e-mails.

In December 1999, Arbitron released its first Webcast ratings report on streaming media.

The highest Web-rated station was KFAN-FM, of Johnson City, Texas, with about 84,000 cumulative listeners, the total number of listeners for the one-month measurement period. Next was adult alternative KPIG-FM of Monterey, Calif., with about 70,000 cumulative listeners.

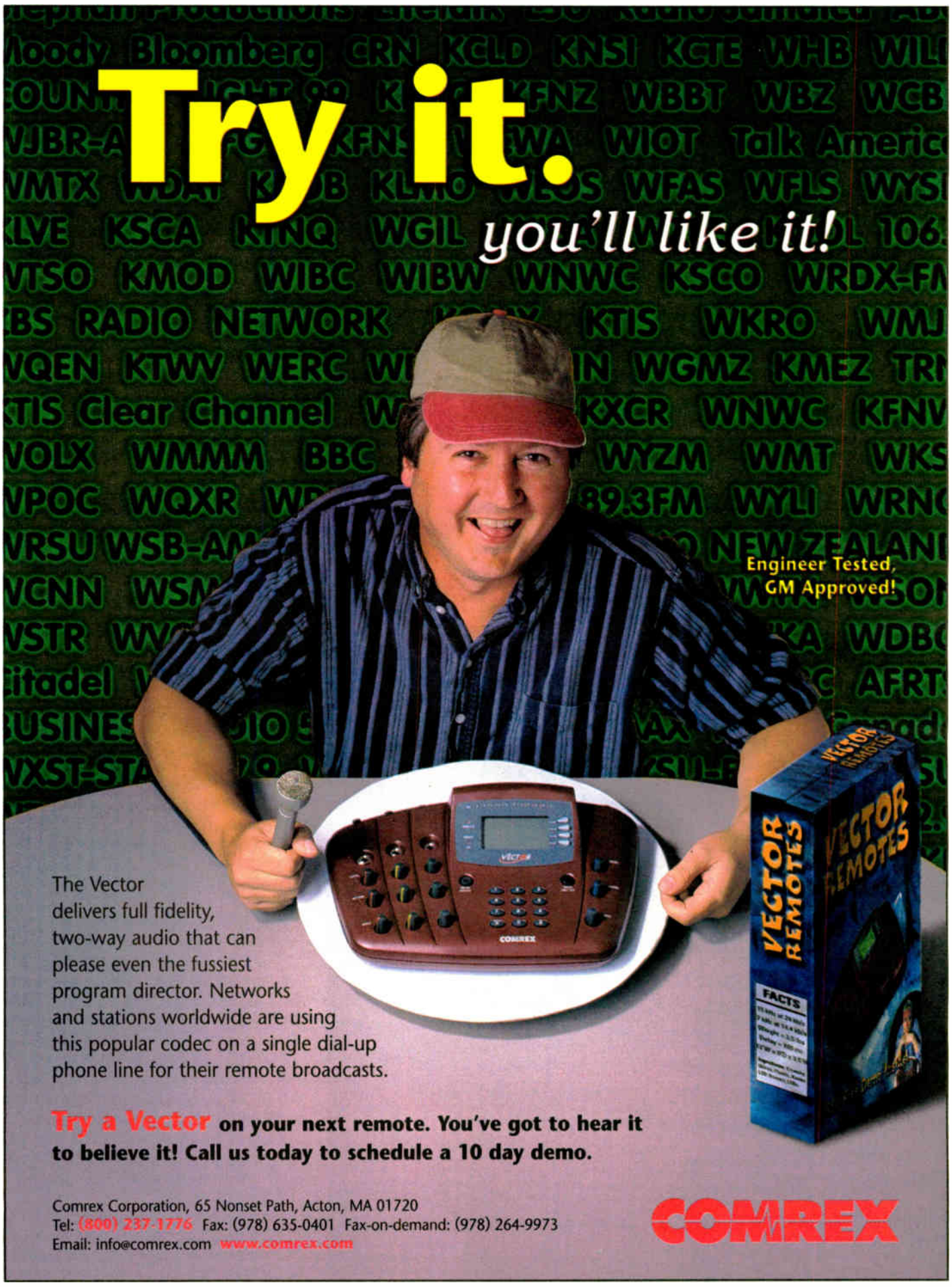
KPIG Web consultant Bill Goldsmith said the Arbitron stream rating has not translated into direct revenue yet, but he expects the substitution of online commercials to change that.

He cited "tremendous secondary benefits" of combined on-air/Internet sales packages and "moderately successful" e-commerce. Goldsmith said the Webcast "has given us a 'larger than life' image in the eyes of our listeners," many of whom, he said, live and work in Silicon Valley.

If there's a cloud over the stream, it's the threat of a "browser"-style format battle between early leader RealMedia and Microsoft's competing Windows Media Player technology.

Disputes involving Real and Yahoo's broadcast.com subsidiary threatened the Real format for many stations until a late December 1999 deal temporarily resolved the issue. To use an Internet version of old advice: Stay clicked.

*This issue of **RW** includes extensive coverage of radio and the Internet. See GM Journal and Studio Sessions sections for more stories.*



World Radio History

LPFM Spawns Questions

▶ LPFM, continued from page 1

Play 150 for the new LP100 stations, and the Plug-N-Play FM20, for LP10s.

Armstrong Transmitter Corp. said its FMX transmitter line and 707 antennas would be suitable for LPFMs.

LPB Communications Inc. has developed LPFM packages that include licensing, equipment and installation for under $10,000. LPB President Tom Spadea said the company was taking inquiries and was prepared to walk potential buyers through the application process.

"It opens up a new market for us," said Spadea, whose firm has focused on non-traditional station installations such as AM carrier current and radiating cable installations under Part 15 of the FCC rules.

And if LPFM does not happen?

"This has brought to the forefront the need for small stations, on a budget. Whether or not LPFM goes through as it is, people can do (this) legally now," said Spadea.

The commission's Report and Order was released several days after its vote to create stations at power levels of 50 to 100 W and 1 to 10 W (**RW**, Feb. 2). Following the vote, most observers and participants were still studying the details.

An NAB spokesman said the association was considering all options to the ruling, including possible court action. The association also again urged members to support a bill sponsored by Rep. Mike Oxley, R-Ohio, (H.R.3439), which, if passed, would prevent the commission from implementing the service.

One industry source lamented the bill has no "legs" because members of Congress will be faced with how to offend the least number of constituents. Considering the number of broadcasters in each district vs. the number of churches, minority groups and other LPFM supporters, elected officials, the observer said, would likely choose to please the latter, larger group.

NAB's recourse?

A source close to NAB said the group was leaning toward appealing the decision in court, rather than filing a Petition for Reconsideration to get the FCC to change or reverse its decision. The source said NAB would need to prove the decision was arbitrary and capricious to win a court case.

That debate hinges on potential interference to existing stations from LPFMs. The FCC has concluded that "any risk of interference from LPFM stations of 100 watts or less is small, and, on balance, is outweighed by the benefits of this new service." That is why the FCC chose to eliminate third-adjacent protection requirements to or from LPFMs.

The FCC also said it does not believe LPFMs at 100 watts "are likely to have an adverse effect on digital IBOC signals."

NAB and CEA disagree. CEA President/CEO Gary Shapiro stated, "We share the FCC's worthy commitment to promoting greater access to the airwaves. Unfortunately, we have found that the method chosen by the commission — specifically, the removal of third-adjacent channel protection — may result in interference to existing FM radio service and would adversely affect consumers' investment in the 710 million FM receivers currently in use in the U.S."

Of four studies considering the ability of stationary and mobile receivers to reject interference, the FCC said all of them, including its own, used different measurements to determine when interference occurs and the quality of service to be protected, making a direct comparison difficult.

One thing the studies had in common, said the FCC, is they concluded auto receivers and home units were better able to reject interference than portable, personal and clock radios.

"We find that automobile radios and home stereo/component receivers generally are better able to provide -40 dB rejection of third-adjacent channel signals and therefore generally will provide acceptable service in the absence of third-adjacent channel protection."

Under the new rules, a low-power FM station must protect full-power stations on co-channel, first- and second-adjacent channels, but does not have to protect a full-power on a third-adjacent channel.

"A full-power doesn't have to protect an LPFM at all," said Peter Doyle of the Audio Services Division of the FCC Mass Media Bureau.

An LPFM has to meet minimum separation distances to protect the service contours of authorized commercial, noncommercial FM stations for all classes, including Class D, and translators, boosters and LP100 stations, the FCC ruled.

The 1 to 10 W stations would be a secondary service, not a primary one as the LP100s are.

In addition to normal separation requirements, LPFMs would need to factor in an additional 20 kilometer "buffer zone" between them and a full-power station.

To illustrate, Mass Media Assistant Bureau Chief, Engineering, Keith Larson said, "The smallest full-power class (for FM) is Class A. Ordinarily, to protect that station against co-channel interference, you would have to be spaced 47 kilometers from that station. To provide extra protection, we have said you need to be spaced 67 kilometers from that station. It allows that full-service station to move 20 kilometers toward the LP station."

The FCC said current Class As that are 100 W, the same as the LP100s, would not be re-classified as LPFMs.

The new stations would be required to adhere to many of the requirements of Part 73 of the FCC Rules, which addresses technical operations. The commission said it would not authorize directional antennas for LP stations as it is relying on minimum-distance channel separation methodology, rather than a contour-based approach to provide interference protection.

LPFMs will have to adhere to the 200 kHz channel bandwidth of other FMs and protect the radiation antenna patterns of AM stations.

Because of their small service areas, the FCC expects most to co-locate their studios and transmission facilities, and not need STLs. But the commission did not rule such use out. It said LPFMs may use broadcast auxiliary frequencies and remote pickup frequencies governed by Part 74 on a secondary basis to full-service stations and other primary users.

LPFMs will be required to use transmitters that have been type-certified by the commission. And the stations must install and operate emergency alert system decoders, to pass along national emergency messages to listeners. They would not be required to install encoders.

Potential pirate owners

Former pirates who stopped broadcasting illegally when told to by the FCC may be eligible to apply for an LPFM. A supporter group called the Prometheus Radio Project said it would "assist stations in making the transition from their campaign of civil disobedience" to help members understand "the essentials of good radio practice."

A Prometheus member and former pirate operator who goes by the pseudonym Pete triDish said the rules are a good start and he would like the commission to make sure LPFMs have an opportunity to go digital.

"The current IBOC proposals are designed to protect incumbents and don't allow for new entrants," he said. The FCC's order did not specify how or whether LPFMs can make a digital transition. When asked about this, FCC officials said the potential cost of digital equipment might be a concern to LPFM supporters.

One of the original low-power petitioners agreed. Nick Leggett said low-power supporters most likely will insist on having a voice in the digital transition in the future. For now, he's pleased with the ruling.

Asked if he would he join NAB if it created a new membership category for LPFMs, Leggett said yes.

"Some of the LP people are former employees of high-power stations. ... Some are former NAB members and some are current members. One pre-condition, they'd have to drop the Oxley bill."

DIGITAL NEWS

NRSC Seeks Formal DAB Process

LAS VEGAS The National Radio Systems Committee has decided to go ahead with a formal standards-setting process for in-band, on-channel digital audio broadcasting.

The step would save time later this year for the body of industry volunteers should there be at least one IBOC DAB system submitted to the group that performs noticeably better than analog.

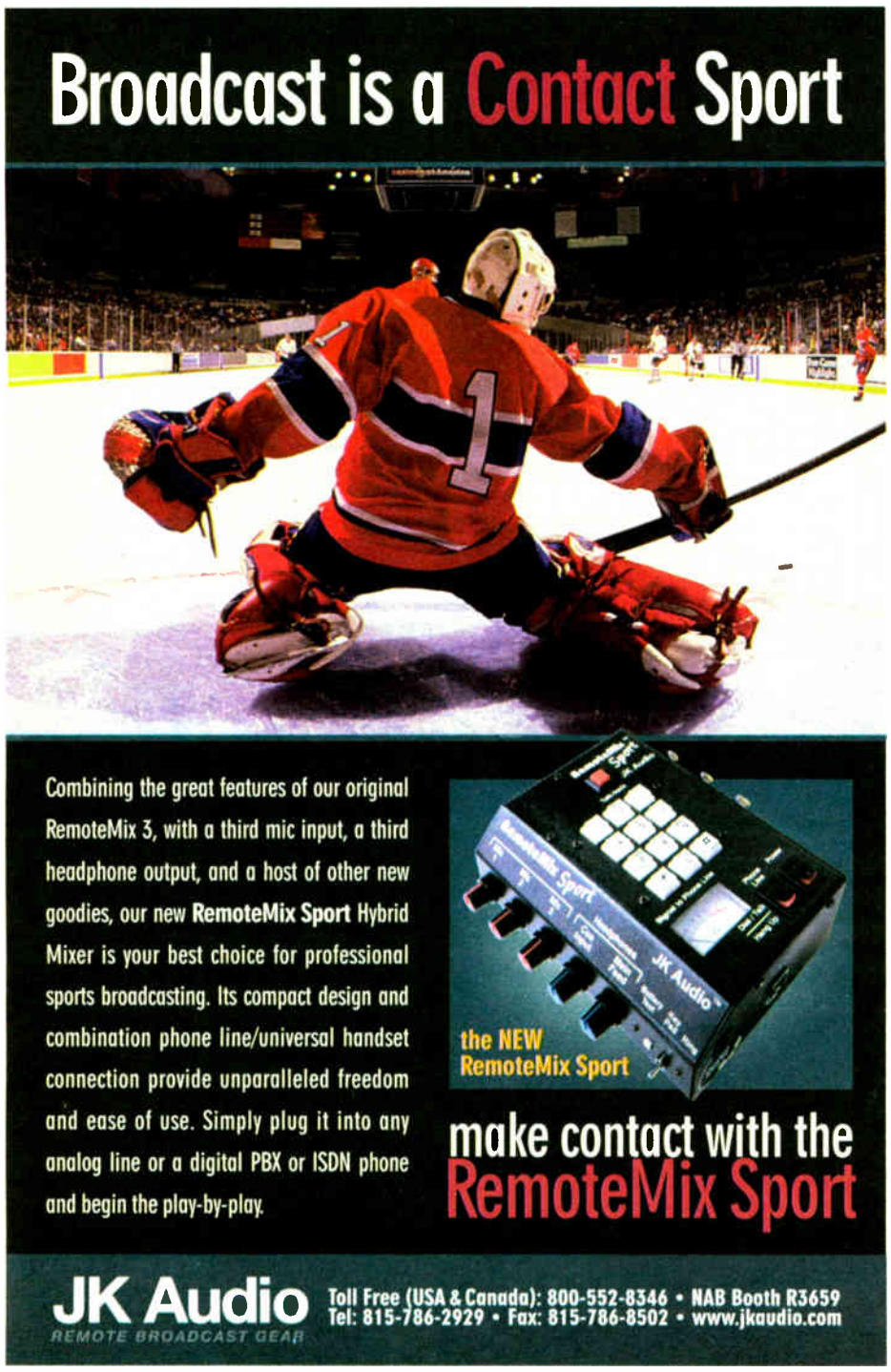
An evaluation working group is reviewing the USA Digital Radio system, submitted on Dec. 15, 1999. The group expects to complete its review of the system in March.

Lucent Digital Radio submitted its data on Jan. 24, the same date public comments were due to the FCC on its DAB proceeding.

If both systems perform noticeably better than analog, the next likely step is comparison lab and field-testing conducted by a third party.

IBOC proponents are eager to have a single standard chosen by the end of this year.

— Leslie Stimson



World Radio History

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The advantages of ISDN are clear: Faster set-up, intelligent call handling and the superior performance of digital audio. And now Telos Systems brings the benefits of ISDN to the talk show environment.

The TWOx12 digital talk show system plugs right into ISDN BRI phone lines. Your callers sound louder and cleaner with the isolation performance that only a true four-wire system can deliver. And if you don't have ISDN in your studio yet, the TWOx12 lets you start with POTS and upgrade to ISDN whenever you're ready.

As easy as picking up the phone. Call management is fast and easy with our new Desktop Director, a fully integrated telephone and switch console. Intuitive operation is enhanced by the exclusive Status Symbols,™ graphical icons that convey line and caller status at a glance.

Finally, a breakthrough in telephone technology. Up to 12 callers can be routed to the two all-digital hybrids. Self-contained, easy-to-install and maintain, the TWOx12 simplifies even the most complex talk shows.

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World Radio History

New Services Chase Listeners

We're buying more and more consumer electronics — and some of those new products are gunning for radio's traditional audiences.

Total sales of consumer electronics products will hit a record $85 billion this year, according to projections by the Consumer Electronics Association. That will be eight years of consecutive growth for the industry.

CEA said sales for last year would reach $81 billion, up by 7 percent from a year earlier.

"The consumer electronics industry is on a roll," Gary Shapiro, president and CEO of the association, said during its 2000 International Consumer Electronics Show in Las Vegas last month.

Digital, digital, digital

Sales of home and portable audio products overall are expected to decline 3 percent but still reach $5.6 billion. CEA expects that one in five households will buy a home radio this year; it estimates sales of 19 million home units, roughly the same as last year, generating $324 million in sales.

In the car, unit sales of aftermarket head units were $9.4 million in 1998 and projected to be $11.2 million for 1999.

Meanwhile, CEA predicts 27 million portable headset audio products, including radios, tape players, radio/tape combos and CD players will be sold in 2000. Tape and radio/tape decks have been declining in popularity in favor of other devices.

Mobile electronics and auto sound are expected to enjoy increases of 8 and 6 percent respectively.

CEA also inducted the first 50 members of its Consumer Electronics Hall of Fame. Among them were familiar names such as Alexander Graham Bell and Thomas Edison, Edwin Armstrong, Reginald Fessenden and Lee DeForest, as well as such innovators as William Balderston, former president of Philco Corp. and a leader in development of car radio; Carl Eilers, pioneer in stereo FM; and Paul Galvin, founder of Motorola, for his role in mass-producing car radios.

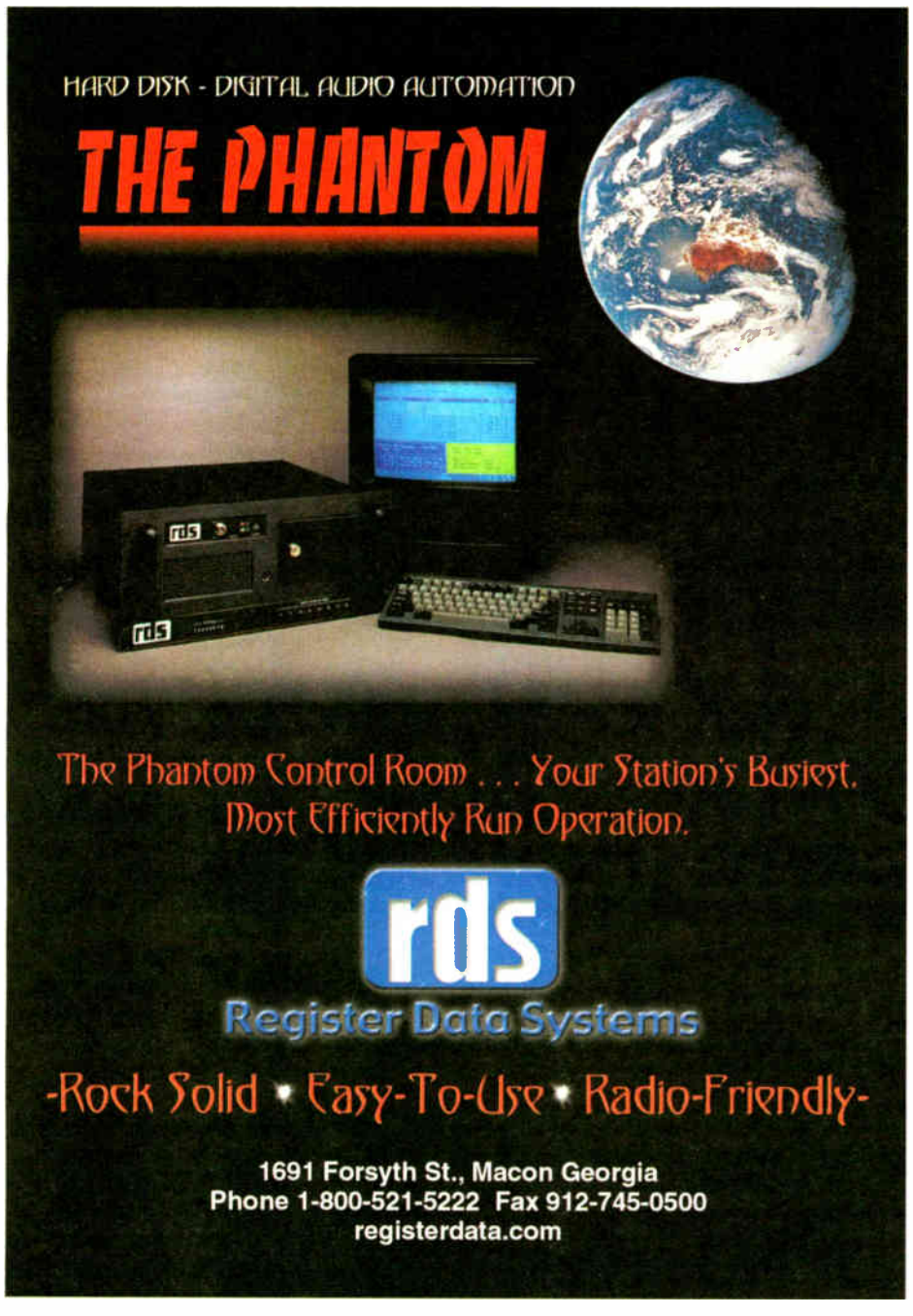
RW will report on the Hall of Fame inductees in an upcoming issue.

More than 2,200 exhibitors filled four venues at CES, in what FCC Chairman Bill Kennard called "an outpouring of American entrepreneurship."

Digital products and the convergence of media were dominant themes, as seen in video multimedia systems that seek to serve Americans behind the wheel — radio's traditional turf — with information, navigation, Net access and, of course, audio.

One service promises on-demand audio, anywhere. Another lets the listener browse through online Web radio stations using any home radio.

Here is a sampling of products at CES of particular interest to **RW** readers.



Command Audio Hits Phoenix, Denver

Command Audio is trying to give your listeners many more choices than are available on the radio dial.

Command is a new wireless audio-on-demand subscription service rolling out in major markets now, and due to be available nationwide in 2001. It will let subscribers pick programs they want to hear — and listen when they want.

Consumers in Denver and Phoenix were the first to hear about the service.

The service offers hundreds of programs on dozens of topics, including selected local traffic, news, sports, weather, business, gardening, religion and home improvement. Content includes local radio and original content, spoken-word versions of popular publications like Time, People and The Wall Street Journal, and programs such as NPR News. ABC News and "Car Talk."

Command Audio updates the stored information automatically via a network of FM subcarriers and satellites. No recording or connection to the Web is necessary.

The service will start at $11.95 per month and will reach consumers at first through a hand-held wireless receiver, the CA1000 by Thomson multimedia, sold under the RCA brand. It retails for $199.

Eventually Command Audio will be available on other platforms such as in-car audio systems and personal information devices, like Motorola's iRadio, described at right. Motorola has made what it calls a "substantial" investment in Command Audio.

Listener selections are stored in a solid-state memory that holds up to eight hours of programs, through a variety of proprietary compression systems.

When the subscription service is activated, consumers can choose which programs they like, browsing through an electronic program guide on the receiver's LCD or by looking at a printed guide shipped with the receiver.

The RCA receiver controls allow users to skip between programs and scan by segment, such as story-by-story through a new program. Users can also pause or save programs for later listening.

Programs can be heard through the receiver's built-in speaker, or by connecting the receiver to the car speakers, a home system or headphones. A cassette deck is required to play through the car.

Command Audio says it will focus on spoken word programming, not music. It says diversity transmission and rebroadcasts will reduce any coverage problems.

To learn more, visit the Web site at www.commandaudio.com

Motorola Unveils iRadio

Motorola Inc. announced its Internet radio prototype iRadio at CES. iRadio is an in-vehicle information and entertainment that works via wireless Web.

iRadio will let drivers capture music on demand, listen to real-time traffic reports, download audio books, access voicemail, e-mail, receive news, and

weather reports, and get updated stock portfolio information.

The hands-free, voice-navigated features will be delivered via Web access, satellite, digital cellular and FM sideband.

"All iRadio communications can be done hands-free, which means drivers can keep their hands on the wheel and eyes on the road," said Mario Zenios, general manager and corporate vice president, Motorola Telematics Communications Group.

The company said iRadio will provide a range of service levels, from basic to premium packages, like ordering cable TV.

For information, contact Allyson Stinchfield in Illinois at (312) 372-6144 or visit the Web site at www.telematics.motorola.com

Web Audio on Home Radios

Sonicbox wants to bring Web radio to your listeners — and use their existing home radio receivers to do it.

The Web radio appliance supplier promoted its recent agreement with NetRadio.com at CES. NetRadio.com stations will be available on Sonicbox Tuners.

See CES, page 12 ▶

World Radio History

Improve Audio Quality at Any Bit Rate

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World Radio History

▶ CES, continued from page 10

The Tuner (see photo, page 50) is a PC add-on that lets consumers with a broadband Net connection use Web radio programming anywhere in the home. It has a base unit that connects to the PC and transmits Web audio on an unused frequency to any FM radio with 100 feet; a remote tuner controls the system. The company says the design allows the listener to select from hundreds of Web stations with the turn of a knob and purchase CDs with the press of a button.

After a trial deployment to DSL and cable broadband customers, the Tuners are to be made generally available to consumers for less than $50.

For information on Sonicbox tuners, visit www.sonicbox.com *or call Rockie Thomas in California at (650) 967-4842.*

Metro Networks Teams With Etak

Metro Networks and Etak said their real-time traffic service is ahead of its scheduled roll-out, having reached its mark of 50 metropolitan areas three weeks before the target date.

The service is created through an alliance with Etak, a mobile map and information content supplier, and Metro Networks, the supplier of broadcast radio and TV traffic reports owned by Westwood One.

The cooperative effort enables subscribers to receive regional or route-specific traffic information reports on pagers, cell phones, in-car navigation devices, wireless-capable laptop computers, the Internet and TV.

The Etak/Metro Networks service now covers more than 82 percent of the nation's urban population, and the companies expect to increase coverage to 65 metro areas by the end of the first quarter.

One delivery mechanism for the Etak service is Traffic Touch, for Palm VII users.

For information, contact Steve Pluim at Metro Networks in Utah at (801) 685-0565 or visit the Web site at www.metronetworks.com

SpikeRadio Brings the Noise

Spike Networks' SpikeRadio.com joined a growing number of Internet radio broadcasters at CES.

After premiering in August 1999, SpikeRadio.com averaged nearly 1.5 million page impressions for the month of September. By the end of January, SpikeRadio.com hoped to reach 4 million individual page views a month globally. The network hopes to be the global broadcaster to the 14- to 30-year-old demographic with its mix of rock, news and youth culture.

In October, Spike Networks secured an advertising and sponsorship contract for SpikeRadio.com with Toyota worth $2 million.

SpikeRadio.com broadcasts 24/7 from Spike's West Hollywood building and has attracted 35 Los Angeles DJs from traditional radio stations and local clubs. On-air guests have included artists such as Seal, Tricky, Gus Gus and Steve Vai and personalities like actress Milla Jovovich and Edoardo Ponti.

For information, contact Spike Networks in California at (323) 845-1700, fax (323) 845-1750 or visit the Web site at www.spikeradio.com

Delphi Infotainment Radio

This unit, which will be shipped in 2001 in a yet-to-be-announced car model, combines information and entertainment.

Using a cellphone and modem integrated into the car and a cable interface to a personal digital assistant, the user will be able to download e-mail and information from Web sites.

Features will include a 24-character display, 32-pin connector and support for Radio Data Systems (RDS).

For information, contact Delphi Delco Electronics Systems in Indiana at (765) 451-5011 or visit www.delphiauto.com

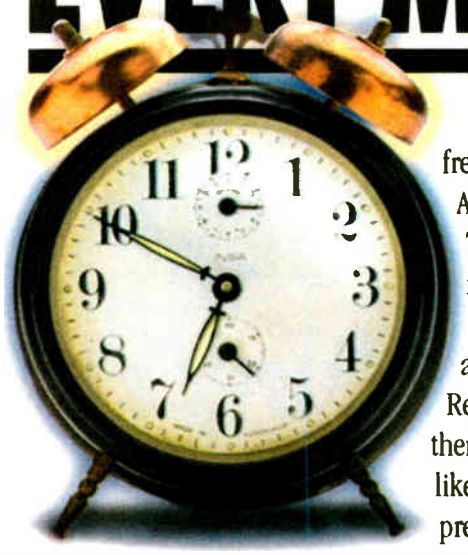
Nexa Cyber Radio

New for the millennium is the Cyber Radio from Nexa Quality Source.

Tune to your favorite station by playing with the knob on the familiar @ symbol. It runs on three AA batteries or the 4.5VDC

See CES, page 14 ▶

WAKE UP TO THE #1 MORNING TEAM IN EVERY MAJOR MARKET.



Morning radio should be fresh, alive and spontaneous. And 360 Systems' Morning Team works with you to make it happen.

Wake up your audience and grab them with Instant Replay. All of your best bits are there when you need them — like having 50 cart machines pre-loaded and ready to fire.

Instant Replay®
24 hours of your best audio clips, quips and sound effects, right at your fingertips.

With the Short/cut Editor, you won't drop a beat when you're editing calls, interviews and promos. It's the fastest, easiest two-track audio editor a jock ever rocked a scrub-wheel on. No tape, no computer hassle and no "learning curve"— anyone can use it, and everyone will.

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Everything you need to get your hottest phone calls edited and on-air in record time.

Timing is everything in live radio and this team helps keep the show moving.

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World Radio History

THE RESULTS ARE IN:

Three out of four of the highest billing radio stations in the U.S. use Omnia.*

Four out of five of the top-rated radio stations in New York City use Omnia.**

Five out of six of the most listened-to radio stations in the U.S. use Omnia.**

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■ *For the name of your Omnia dealer, contact us at 1 (216) 241-3343 or visit our web site at www.nogrunge.com.*

*Source: *Duncan's Radio Market Guide*, 1999 edition

**Source: *The American Radio* by Duncan's American Radio; based on Arbitron Spring 1999 12+ TSA Cume, Mon-Sun, 6:00am-12 midnight.

World Radio History

▶ CES, continued from page 12

Robby Robinette of Nexa Quality Source holds the Cyber Radio.

jack. The radio retails for $30.

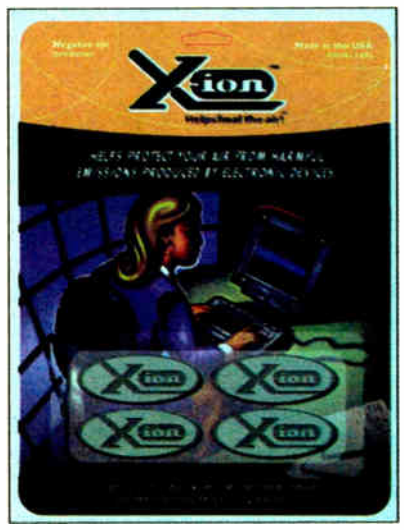
Nexa carries a line of unusual radios, travel clocks, projector alarms and other products that can be branded with your station logo or company name.

For information, contact the company in Texas at (877) 800-NEXA, send e-mail to robby@qualitysource.com *or visit* www.qualitysource.com

Can Radios Kill You?

With reports on the possible health effects of cell phones and computers proliferating, Electro-K offers X-ion, a device that promises to protect against positive ion generators by neutralizing Electro-Magnetic Fields, the alleged cause of brain tumors in cellphone users, leukemia in children and the suppression of immune systems.

The company includes radios as well as washers/dryers, refrigerators and cars in its list of products against which X-ion will protect.



X-ion is a miniature negative ion producer. When placed on electrical appliances, the company says, it forms an invisible barrier to EMF damage and produces negative ions like those found after a rainstorm. Negative ions reportedly are beneficial to our well-being.

X-ion is made from tourmaline, a semi-precious stone that extracts moisture from the atmosphere and converts it into negative ions. List prices begin at $25 for a single pack.

For information, contact Electro-K Inc. in California at (310) 231-7872 or fax (310) 231-9262.

E-Commerce Portal to Car Radio

Interactive Radio Corp. has patented a low-cost technology that enables microprocessor-controlled products, such as a car radio or a vehicle telematics system, both to receive GPS signals and conduct two-way satellite communications in a private national network.

The company says its technology, which uses existing satellite capacity and can be deployed rapidly, creates a portal for interactive services, including e-commerce, to the vehicle via the car radio.

The company also owns patents covering several applications, including enabling radio listeners to respond to ads or purchase music selections as the ads (or songs) are being broadcast on AM, FM or satellite; real-time tracking of a vehicle via a Web site; and sending a distress call, including GPS coordinates, from a mobile unit to a monitoring station via satellite.

The company said its technology, which adds about $100 to the cost of the radio or other device, was developed by scientists at NASA's Jet Propulsion Labs and has other, more robust Web and wireless data applications when used in products operating on the Microsoft Auto PC platform, such the Clarion AutoPC.

IRC conducted real-time demos of its system at CES for potential strategic partners using a vehicle equipped with the IRC transceiver.

For information, contact Stephen Crosby, CEO, in California at (626) 296-6310.

Cobra Launches FRS/AM/FM Radio

Cobra Electronics introduced a family radio service system that incorporates an AM/FM stereo radio.

The microTALK FRS-115 offers two-way communications for up to two miles and access to all 14 communications channels.

When a communication comes through, the FRS signal can override the AM/FM radio, enabling users to clearly hear the message being sent.

For information, visit Cobra at www.cobra-elec.com

See CES, page 16 ▶

"My Two Stations Save $130,000 per Year Using Scott Studios Voice Trax"

Ron Castro, co-owner and GM, KRPQ Q-105 and KMHX MIX 104.1 Santa Rosa, California

A former San Francisco and nationally syndicated Concept Productions air personality, Ron has recorded 300,000 voice tracks for automated stations across three decades. Ron's own stations have used Scott Studios' Voice Trax systems for several years.

Ron Castro says his KRPQ and KMHX, Santa Rosa, California ***save serious money*** because "Scott Studios' Voice Trax automation cuts voice-tracking time to 5 minutes per hour for a 'live-sounding' show. Our Air Personalities are freed up to do other work at the stations, drastically reducing the need for additional management, music, production and promotion staff. That cuts boredom, burn-out and turnover, while increasing productivity.

"Scott Studios' Voice Trax lets the talent hear their music, spots and voice-over, running the show the way they would live, including air-tight talk-ups. Scott's whole recording process is handled with just one button. We hardly ever use a mouse or keyboard. Each voice track takes only seconds."

The Scott System is radio's most user-friendly. You get instant airplay or audition of any song simply by spelling a few letters of its title or artist. You see when songs played last and when they'll play next. You also get voice tracking while listening to music in context, hot keys, automatic recording and graphic waveform editing and scrub of of phone calls, all in one computer!

"Not only am I an owner and GM, but I'm also an Air Personality. I produce 34 hours each week of voice tracked programming using Scott Studios' Voice Trax. I wouldn't ask the staff to use anything I don't use myself. If it didn't work great, it wouldn't be here."

Both Scott on-air systems are "truly 'lock-the-door-and-go-home' reliable."

"Our Scott Studios systems go seamlessly from live-assist to voice tracks to satellite programming, using all three modes during a typical day to give us a tool-box full of budget saving options. Our two station combo saves at least $130,000 per year. When we put our second station on the air three years ago, we were able to operate it with only two people who cover all air-shifts, music, programming and promotions. We debuted with the highest ratings for any sign-on in the history of the market!"

Ron Castro isn't the only smart broadcaster who chooses Scott. More U.S. radio stations use Scott Studios' than any other digital system, with 5,500 digital audio workstations used in 2,250 U.S. radio stations. Nine of the ten top billing groups have Scott Systems because Scott delivers more money-saving and time-saving features for great radio. You get Scott's ripper for your PD's ordinary PC that digitally transfers music CDs to hard drive in ***seconds***, no-dub LAN spot uploads from Sonic Foundry multi-track production, ***uncompressed*** digital audio (at Scott's compressed price), Cart Walls for instant requests, phone recorder with waveform and audible scrub editing, time and temperature announcer, different spot feeds from one computer for a second station or separate webcast, auto-transfer of spots and Voice Trax to distant stations over Internet or WAN and integrated newsrooms. Scott has systems in ***three*** price ranges: Good, Better, Best. One's right for ***you!***

Check our web site (scottstudios.com) for full information now, or call one of our money-saving consultants toll-free at 800-SCOTT-77.

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Dallas, Texas 75234 USA
Internet: www.scottstudios.com
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Great Sounding Telephone Audio

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Lower Price
Gentner DH30

24-bit Processing for Crystal Clear Audio

Gentner's newest digital telephone hybrid provides the highest quality audio interface between your telephone line and audio equipment. With its state-of-the-art 24-bit digital signal processing, it's absolutely the finest hybrid for use with your digital or analog console.

Features:

- Three remote-accessible presets
- Auto mix-minus
- Adjustable compressor and expander
- Acoustic echo cancellation
- Balanced XLR inputs and outputs; AES/EBU inputs and outputs
- 3-band digital EQ DH30 Digital Hybrid

List $1,795.00 **SALE $1,658.00**

Quality Telephone Audio at Low Cost

Interfacing your audio equipment to a telephone line has never been easier and more affordable. Gentner's analog and digital telephone hybrids are reliable and offer excellent audio quality. Choose between the SPH10 analog hybrid and two digital hybrids, the DH20 single and DH22 dual, each with 16-bit digital signal processing.

Features:

- Built-in monitor amp allows monitoring of calls without headset
- Balanced XLR inputs and outputs
- SPH10 auto filtering and equalization makes callers sound great
- DH20/DH22 with auto mix-minus, selectable AGC & caller ducking

SPH10 Analog Hybrid	List $499.00	**SALE $459.00**
DH20 Digital Hybrid	List $995.00	**SALE $899.00**
DH22 Dual Digital Hybrid	List $1,595.00	**SALE $1,469.00**

The Easiest Way to Get Calls on the Air

Telehybrid turns your phone system into a "broadcast-ready" telephone system.

Features:

- Installs to any phone set (analog, digital or multiple line) with a detachable modular plug
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Telehybrid Telephone Hybrid

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World Radio History

▶ CES, continued from page 14

CD Units Accept MP3 Output

New CD head units from Alpine will incorporate Versatile-Link technology, accepting audio from devices such as MP3 players, VHS players, TV tuners and video games.

"As portable devices increase in numbers, Alpine is ensuring consumers that their choice of MP3 player or video game sources can be ... enjoyed in a vehicle," an Alpine executive said. The connection is via an adapter cord.

The CDA-7969 Tuner/CD Player will accept external audio.

The device sound runs through the car system's speakers and amps, and can be processed by the controls in the head unit. Six in-dash units will appear by summer.

For more information, visit the Web site at www.alpine1.com *or to find the nearest dealer call (800) ALPINE1*

Help on the Road

DriveThere.com offers information for motorists for free. Besides turn-by-turn directions, the Web site has ideas for weekend drives, comparison of insurance rates, car rental discounts, road conditions and more.

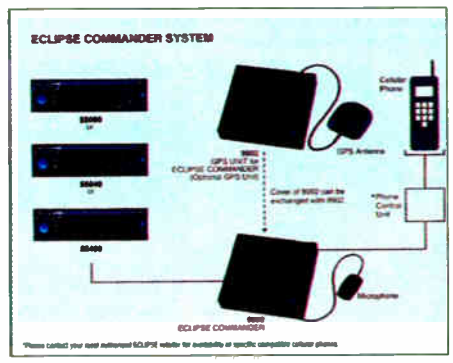
In April, the company will begin offering a preferred members program that will provide more extensive services for an annual fee. The services will include roadside assistance, detailed information about roadside services at every interstate exit in the United States and the ability to pay traffic tickets.

The site caters to users on the road with remote Web access. Soon, the company will offer a text-only version for users with mobile phone Web access and personal digital assistants.

For more information, visit the Web site www.DriveThere.com

Eclipse Commander Car System

The Eclipse Commander from Fujitsu Ten is a car stereo that features a voice-interactive audio and navigation system. By talking to the system, the occupant can change radio stations or tracks on a CD, or roll up a window. The idea is to leave the driver's hands on the steering wheel. Cellular phones can be installed for hands-free operation including storage of phone numbers.



With voice-operated navigation, the system asks where you want to go and offers a list of choices, then verbally provides directions. Optional GPS keeps track of your whereabouts. The system can give turn-by-turn directions to points of interest like the nearest gas station, ATM or police station. It will even warn of road closures and give alternative routes.

For additional information, call Eclipse in California at (800) 223-2216 or visit the Web site at www.eclipse-web.com

Sanyo's Portable Net Audio Unit

Sanyo Fisher debuted its SDMI-compliant SSP-PD7 Solid State Audio Player, and the model SSP-HP7 with the player in the headphones.

Both use a multi-decoder system that can play AAC, MP3 and other audio compression schemes. The postage stamp-size MultiMediaCard flash data storage can hold 60 minutes of AAC or 30 minutes of MP3 audio.

Audio is downloaded from a PC through a USB cable. It comes with CD-ROM software, cable and 32 MB card.

Sanyo Fisher is working on SSAP devices that record audio without a computer.

For more information, call the company in California at (818) 998-7322 or visit the Web site at www.sanyousa.com

Internet Protocol For Mobile Use

Delphi Automotive Systems demonstrated mobile Internet browsing using Wireless Application Protocol as part of the company's Communiport Mobile Multimedia systems. It said the protocol enables convenient Net access from cars and trucks.

WAP is an open, global specification that allows mobile Internet users with wireless devices to access and interact with Web sites instantly.

Because HTML is not convenient for "thin client" wireless mobile uses, the company said, a WAP browser with wireless markup language, or WML, is used. It is designed to accommodate applications with smaller, more limited displays like cellphones and vehicle multimedia systems. Combined with the voice and display capabilities of the company's Communiport systems, Delphi promises fast, hands-free Net access.

"Communiport is capable of becoming an onboard newsreader of Internet information to vehicle passengers," a company official said.

Communiport vehicle applications with WAP browser capabilities should appear by 2002.

For information, call the company in Michigan at (765) 451-0655 or visit the Web site at www.delphiauto.com

Headphone System Wins CES Award

Now Mom and Dad can listen to the local news/talk outlet while Junior jams to Limp Bizkit.

The show was the backdrop for the introduction of Laral Group LLC's

Unwired UAH-S2 wireless two-channel automotive headphone system. The device won "Best of Show" accolades in the mobile electronics product category at CES, plus picked up the title of "Innovations 2000" honoree.

The UAH-S2 consists of a tiltable infrared wireless transmitter that features 16 high-mode LEDs angled to send the selected signal to other occupants in the car.

For more information, contact the company in New York at (631) 293-6900, fax (631) 293-7130 or visit the Web site at www.un-wired.com

SRSWOW Debuts Broadcast Web Hub

SRSWOWcast.com, a supplier of audio and voice-enhancement technologies, announced the debut of its music and entertainment broadcast hub, *www.srswowcast.com*

The audio broadcast technology is the company's own — called WOW — and is based on a combination of patented spatial and spectral enhancement technologies. According to the company, WOW creates a panoramic audio experience with more depth, width, height and bass than is achievable through standard stereo.

For more information, contact the company in California at (949) 442-1070, fax (949) 852-1099 or visit the Web site at www.srswowcast.com

'Real' Teams With Sony, Adaptec

RealNetworks Inc. has partnered with Sony Corp. to enable consumers of RealNetworks RealJukebox to use Sony's electronic music distribution technologies to download and transfer music to Sony portable audio players.

RealNetworks plans to integrate support for Sony Music technologies into RealJukebox. These enhancements are expected to ship this summer.

See CES, page 19 ▶

World Radio History

The **Scoop Reporter II** *Redefines*

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ISDN & POTS

AUTO-"D" CELL BACKUP

Millennium Special

$3,250

PC PROGRAMMABLE

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99 AUTODIAL PRESETS

It's interesting how a single word like "consolidation" can have so many implications.

But, when it comes to the Scoop Reporter II, it means only one thing: Real Savings! That's because the Scoop Reporter II is the world's first codec to combine ISDN, POTS, auto-battery backup, 3 channel mixer, PC programmability, and lots more! As a result, "consolidation" means a cost effective, "all-in-one" solution that inspires confidence when you are out in the field.

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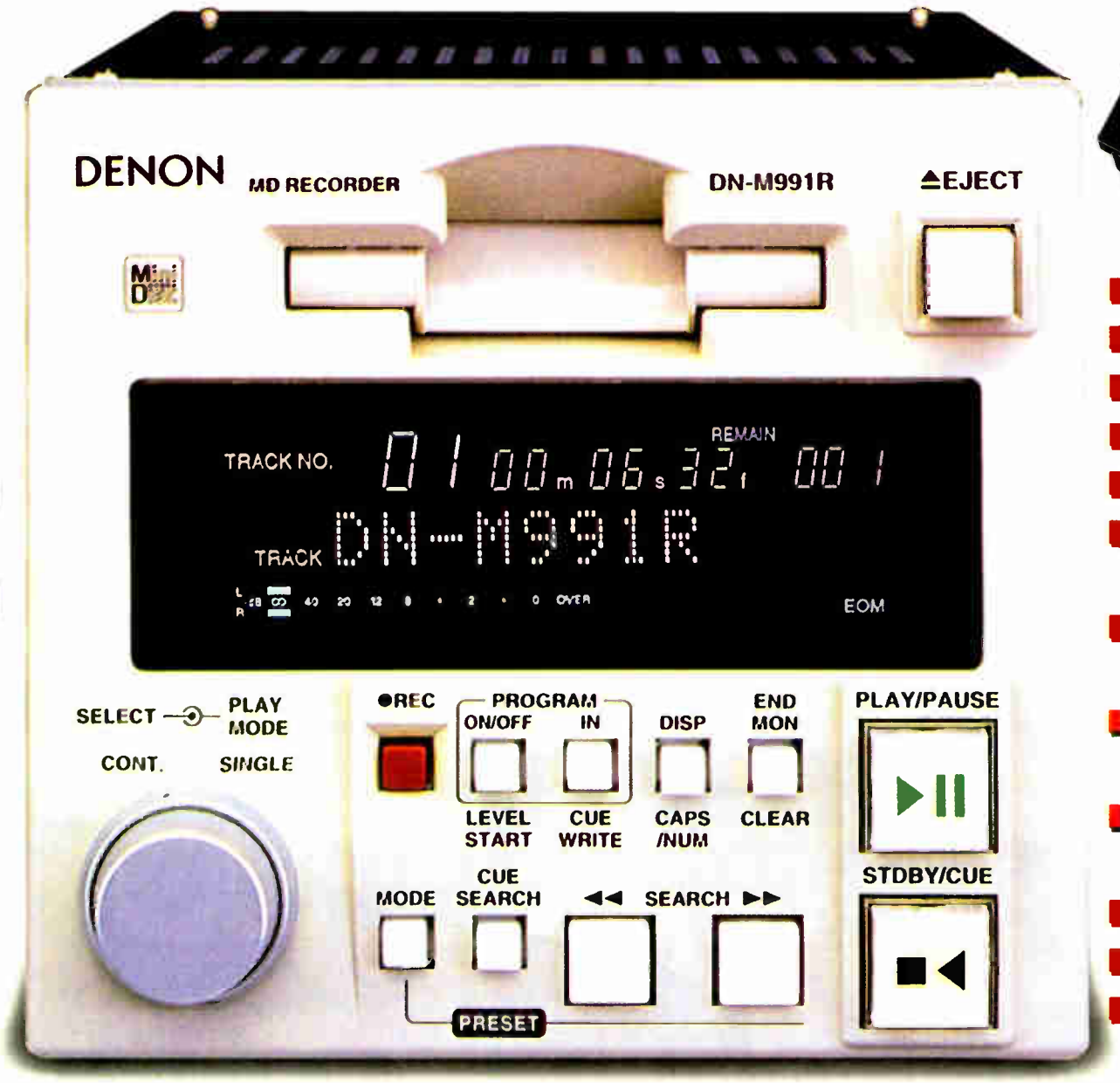
World Radio History

THE TAPE CART KILLER

DN-M991RM



NEW FIRMWARE UPDATE

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- Seamless Sleep Mode
- ±8% Playback Speed Control
- Program Up To 25 Tracks
- Multiple Editing Functions
- Rotary Track Selector
- Relay Recording
- Auto Level Rec Start
- Optional Wired Remote RC-650

Let's face it, tape carts have become the broadcast equivalent to dinosaurs and are headed to extinction. With the advent of MiniDisc, why would anyone still rely on an outdated tape cart that, at best, is undependable and offers limited functionality? Good question.

The highly acclaimed Denon DN-M991R MiniDisc Recorder and Player is the logical solution. It packages all the features, performance and reliability that has already established the DN-M991R as the industry leader.

And now, the DN-M991R offers an optional firmware update specifically designed for the broadcast market that promises to expedite the timely demise of the old tape cart machine. Specify DN-M991RM when ordering. For additional information, contact our broadcast specialist at (973) 396-7492.

BALANCED INPUTS/OUTPUTS · HOT 10 START · KEYBOARD ENTRY Q W E A S · ±8% PITCH · AES/EBU IN/OUT

NEW **Airlock:** This new feature prevents on-air talent from from tampering with recorded material even if the protection tab on the disc is left enabled. Now program directors and engineers can program the DN-M991RM to function as a 'playback only' device.

NEW **Visual EOM:** Broadcasters can store secondary cue information such as vendor names or cue points. The secondary cue is stored as part of the track name in brackets. When playback reaches the designated End of Message (EOM) point, the secondary information will display and flash, signaling that the track is about to end.

NEW **Five Minute Skip Search:** This new function allows the user to jump through long tracks in five minute increments and is particularly useful for news gathering and interview applications.

NEW **Display Improvements:** Characters scroll to the left at a rate of ten characters per second–two times faster than standard–for quicker recognition of disc or track titles. Two other rescroll improvements have also been incorporated to further improve the DN-M991RM's versatility.

Denon Electronics Division of Denon Corporation (USA), 222 New Rd., Parsippany, NJ 07054, (973) 396-0810
Denon Canada, Inc., 17 Denison St., Markham, Ontario, Canada L3R 1B5, (905) 475-4085
Labrador, S.A. de C.V., Zamora No. 154, 06140 Mexico, D.F., (52-5) 286-5509

Visit our web site: www.del.denon.com

DENON
The First Name In Digital Audio

World Radio History

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Meanwhile, RealNetworks has also teamed up with Adaptec Inc. to integrate CD recording capabilities into RealJukebox. This will allow users to record their personal digital music and custom playlists in RealJukebox onto a standard audio CD.

For more information, contact RealNetworks in Seattle at (206) 674-2700, fax (206) 674-2699 or visit the Web site at www.real.com

Emergency Alert Radio Introduced

With weather making news all over the country, Oregon Scientific Inc. rolled out its handheld portable emergency alert radio, model WR-102, at CES. The radio features SAME (Specific Area Message Encoding) technology, which enable

users to program the radio to receive warnings only for their county.

The device receives regional and localized severe weather and other emergency warnings as well as local weather forecasts and weather-related travel conditions.

For more information, contact the company at (503) 639-8883, fax (503) 684-8883 or visit the Web site at www.oregonscientific.com

eGo: MP3 Player For the Car

New car models aren't the only advancements being made in automobiles. i2Go.com, a provider of digital interactive equipment, reintroduced the eGo product at CES.

The eGo is touted as "the world's first

The eGo brings the Internet to your car.

portable digital audio (MP3) player designed for interactive use in the car."

The eGo brings the Internet to the car and allows consumers to tap into selected digital audio content. The eGo also allows the user the ability to convert e-mail messages to voice files for in-car review, and e-mail response capabilities.

For more information, contact the company in Atlanta at (770) 481-0098, fax (770) 481-0441 or visit the Web site at www.i2Go.com

Vetronix Shows Net Access System

Among the companies that want you to send and receive e-mail and check out Web content in the car is Vetronix Corp.

The company featured the WirelessRoad Internet access system for the Clarion AutoPC at CES.

The product enables the AutoPC to access and create e-mail messages and receive selected Web content using wireless communication technology.

The AutoPC is powered by the Windows CE operating system. According to the company, the device is the first product that integrates car audio, computing functions, navigation and wireless communications through hands-free voice activation into a 1-DIN unit in the dash of an automobile.

Vetronix WirelessRoad offers Net access for the Clarion AutoPC.

The product is expected to be available this summer.

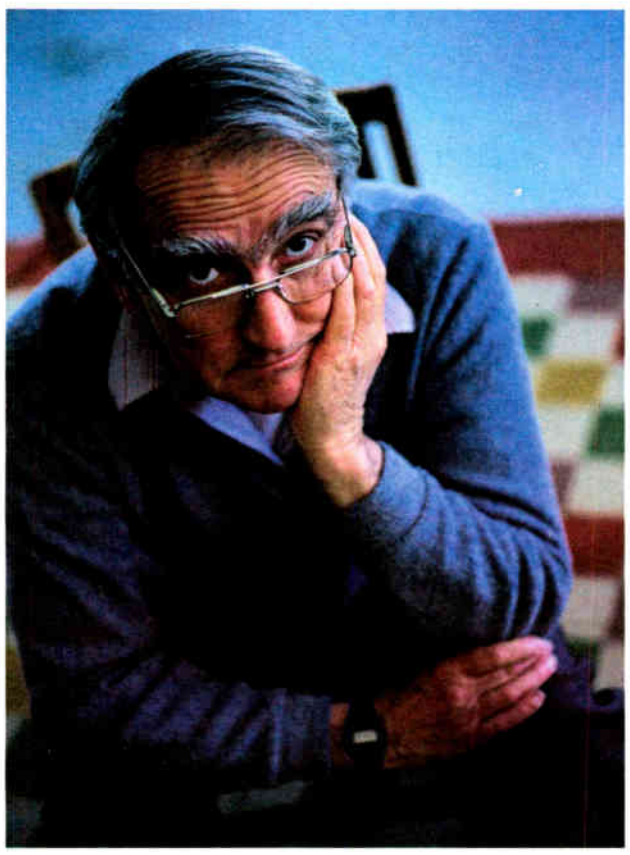
For more information, contact Vetronix Corp. in California at (805) 966-2000 or visit the Clarion Web site at www.clarion-usa.com

SkipDoctor Fixes Scratches

The Audio Product category Best of Show award at the recent CES went to the Digital Innovations SkipDoctor, a CD/DVD scratch repair device.

According to Digital Innovations, the SkipDoctor is the world's first CD scratch repair device, is easy to use, and at a suggested retail price of $34.99, will cost a

See CES, page 20 ▶



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Face it. The last thing you need from a transmitter is excitement. In fact, what you're looking for are transmitters and exciters that work. No fuss, No muss. Broadcast Electronics Transmitters are known throughout the industry for reliability, stability, and serviceability. And in that rare occasion when one of our units go bump in the night, our 24x7 service department is legendary. Or, if you have recently been visited by Andrew, El Nino or some other nasty mother nature type event, in most emergency situations we can get you a transmitter, on site, the very next day. Just ask the 30 or so customers we rescued last year.

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BE TRANSMITTERS

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World Radio History

▶ CES, continued from page 19

fraction of an industrial repair machine's price. SkipDoctor will remove or repair abrasions, light to medium scratches, dust, fingerprints and other surface imperfections that are the primary causes of playback problems from audio CDs, CD-ROMS, CD-R game disks and DVDs.

For information, contact the company in Illinois at (888) 762-7858 or visit the Web site at www.digitalinnovations.com

Push for Secure Standard

A new industry-wide association to set standards for the Secure Digital Memory Card was announced at CES.

Thirty high-tech and content companies led by Matsushita Electric Industrial Co., SanDisk Corp. and Toshiba Corp. signed on for the first meeting in late January in California. The Secure Digital Association will promote industry-wide acceptance of the memory card in digital applications.

Secure Digital

The postage stamp-sized card prototype supported by the SDA enables users to download music from the Internet to a PC or portable digital music player, store digital camera images or store thousands of telephone numbers that could be carried in a cell phone. The SDA hopes to include consumer electronics, information processing, telecommunications, entertainment and software industries that would agree to make products that fit the SDA's memory card.

For information, contact Jim Reilly at Matsushita in New Jersey at (201) 392-6067 or visit the Web site at www.panasonic.com

Personal Jukebox

Similar in size and weight to a portable CD player, Remote Solution's Personal Jukebox MP3 player allows users to carry more than 1,200 songs in one device.

According to the company, the Personal Jukebox also lets the user compress standard CD tracks to the MP3 format, which can be transferred to the device. More than 100 CDs — 81 hours — can be transferred to the Jukebox.

The Personal Jukebox features 4.86 GB hard-drive storage and uses a

rechargeable Lithium Ion battery with a built-in charger that will provide 10 hours of battery life. According to the company, the palm-sized device provides reliable, skip-free protection that is usually sacrificed in small-sized products. The suggested retail price is $799.99.

For information, contact Marketing Representative John Myers in California at (858) 576-0100 or visit the Web site at www.pjbox.com

Jensen Goes Remote

Jensen Car Audio promoted remote-control features in its new head units. Of the four the company introduced, three provide remote control or RC capability.

One product, the flagship DIN model CD511K, is an AM/FM/CD receiver that features a steering wheel-mounted remote control. Another comes with a credit-card sized remote with the steering wheel feature optional. A third economy model is remote capable. A fourth is a redesigned AM/FM/Cassette receiver with CD or MP3 inputs

Jensen's parent company, Recoton Mobile Electronics, also introduced four new mobile video products which featured the hands-free, infrared remote-control capability.

For information, contact Rob Groner at the company in Florida at (407) 333-8900, ext. 1191 or visit the Web site at www.jensenaudio.com

Blaupunkt Gets Into Navigation

Now at select Blaupunkt dealers is the RNS 149, which combines a car stereo and vehicle navigation onto a single radio chassis.

The unit uses the TravelPilot navigation system. A virtual digital map on a CD-ROM is able to provide turn-by-turn directions. TravelPilot technology uses GPS, an electronic gyroscope and the vehicle's speed sensors to track the

The TravelPilot provides spoken and visual turn-by-turn directions using a CD-ROM map.

direction and distance traveled. TravelPilot knows when the driver has diverted from the suggested route and, when that happens, the RNS 149 calculates a new route.

See CES, page 22 ▶

World Radio History

If your Digital Console will cost more than $3,995 you are paying too much!

There is a REVOLUTION coming from Colorado Digital

Call (970) 224-2248

NAB Booth #R1574

World Radio History

▶ CES, continued from page 20

The RNS 149 retails at $1,799.95 and CD-ROM maps are $225.

Blaupunkt also introduced Dallas, a MiniDisc car stereo receiver with RDS, part of its high-end Skyline series. It has controls for outboard CD changer, DigiCeiver digital AM/FM tuner, a 4x40 watt power amp, high-voltage preamp and subwoofer outputs, a digital parametric EQ and flip-down faceplate. Retail price is $569.95.

For information, call (800) 950-2528 or visit www.blaupunkt.com

Alpine New Auto Receivers

Three car receivers from Alpine Electronics are aimed at those who prefer high-performance audio or are looking for anti-theft features.

The MiniDisc head unit MDM-7741 features Bass Engine technology and retails for less than $450. An Alpine spokesman said this model is "integral to Alpine's position in the emerging MiniDisc market."

Alpine added another unit to its Swing series, the CDM-7861. It includes in-dash CD player/receiver with CD changer controls. The Swing series, aimed at the youth market, includes color display graphics. The retail price is $340.

Finally, Alpine introduced the FantomFace series, two in-dash products designed for maximum theft protection. The face panel shifts to a horizontal position and retracts inside the unit, leaving a blank face panel when the power is turned off. A spot on the panel is pressed to bring the face panel back up. Price was unavailable at press time.

For more information, call (800) Alpine1 or visit the Web site at www.alpine1.com

Philips, Marantz Roll Out SACD

Philips and Marantz will enter the U.S. market with Super Audio CD players in the second quarter. Marantz will market the high-end SA-1 SACD player, while Philips plans introduce an SACD player that will also play DVD Video, aimed at the mass market.

SACD is an "evolution" of the CD format, using a sampling frequency 64 times that of CD and promising better audio reproduction

SACD is a hybrid disc that is backwards compatible with existing CDs and players.

Philips and Sonopress also announced the development of an SACD production line at the Sonopress factory.

For more information, visit the Web site at www.news.philips.com

I-Jam's Player Bridges Platforms

I-Jam MultiMedia announced its newest entry in the market of hand-held MP3 players. The IJ-101, designed to play music and other audio content from the Net or CDs, is now compliant with the Universal Serial Bus standard.

With USB, the I-Jam player is both Windows and Macintosh compatible, ensuring cross-platform capability. The I-Jam MP3 player uses a MultiMediaCard, a memory technology developed by SanDisk Corp. with which player can hold up to 64 MB, or up to two hours of audio. The player uses a storage drive called the Jam Station, which transfers MP3 files onto the MultiMediaCard in a few minutes.

MultiMediaCards are compatible with the Secure Digital Music Initiative (SDMI).

The I-Jam IJ-101 MP3 player, which claims to be the smallest on the market, measures only 3 inches high and less than 2 inches wide. It is available in blue, red, silver, yellow and black and has a suggested retail price of $299.

For information, contact I-Jam MultiMedia Corp. in Illinois at (888) 326-4526, fax (847) 839-0016 or visit the Web site at www.ijamworld.com

'Groovy Grape' Box

In an effort to bring more color to the CES show and prove that not every audio appliance must be black, Emerson Radio displayed its portable PD6620 AM/FM/CD player.

The PD6620 is available in an assortment of "flavorful" colors — Luscious Lime (green), Blazing Blueberry (blue), Radical Raspberry (red) and Groovy Grape (purple). Shelf packaging reflects the unit's colorful style.

For information, contact Emerson Radio Corp. in New Jersey at (800) 898-9020, fax (972) 884-2371 or visit the Web site at www.emersonradio.com

Items in this show wrapup were compiled by Paul J. McLane, Sharon Rae Pettigrew, Leslie Stimson, Bernie Cox, Laura Dely and Paul Cogan.

Multimedia By Alpine

Is this the future face of your dashboard?

Alpine Electronics promoted its visual-based IVA-C800 Mobile Multimedia Station, an expansion of the Mobile Multimedia Station lineup. The unit is a motorized, in-dash control monitor and receiver with a CD player. The 6.5-inch LCD monitor screen is the control center for integrated audio, video, navigation and telematics and has a wide-screen Graphical User Interface.

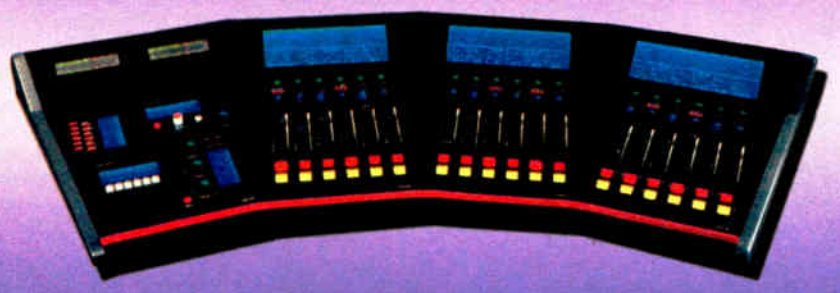
A Digital Art Spectrum Display produces on-screen graphics driven by the music. Users can choose from 10 options to personalize the display.

The station controls Alpine Ai-Net CD changers and audio components and features a telephone mute function and system remote control. The system is equipped with Alpine's MaxTune SQ FM/AM tuner, two auxiliary stereo A/V inputs, a dedicated navigation input with audio mix capability, and output for rear seat video.

The IVA-C800 has Alpine's Versatile-Link technology for easy hook-up of portable MP3 players, sound from portable video sources or video games. It will be available this summer.

For information, contact Alpine in California at (800) 257-4631, fax (310) 533-0369 or visit the Web site at www.alpine1.com

The New Standard for Digital Consoles



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Hey, we've all been there – stuffed up under a countertop in a compromising position because no one ever gave any thought to how the heck you're supposed to wire all that wonderful new equipment together!

But now there's StudioHub – the CAT-5 analog/digital pre-wired solution. Just plug in the connectorised cables and get out from under that mess. **No ifs, ands, or butts.**

StudioHub

The wiring solution from Radio Systems

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Stuck in a Time Warp?

Move into the 21st century with a new console from Arrakis

BSW
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World Radio History

DXing: Not What It Used to Be

Scott Fybush

Internet listeners have learned the excitement — and challenges — of hearing radio broadcasts from thousands of miles away. But another group of listeners has known that same thrill for decades.

Back in the 1930s, when just about everyone scanned the radio dials after dark to hear the big clear-channel stations, the National Radio Club was organized to help DXers share their tips and triumphs.

While such groups thrived at the time — remember the Newark News Radio Club? — most disappeared as the coming of FM and the overcrowding of the AM dial dimmed interest in the hobby.

The NRC survived and counts about 700 members who keep in touch through a newsletter, an audio magazine for sight-impaired DXers and an annual convention.

Attendees gather in front of one of the receiving antennas erected for the National Radio Club convention in West Virginia.

Last fall's gathering drew some 50 DXers to the Holiday Inn in Bridgeport, W. Va., for a weekend of listening and talking about the state of a hobby that members say is still strong, even as Webcasting provides a new way to hear distant broadcasts.

"Radio is supposed to come through the air," said NRC member Jerry Starr, who directs engineering for Connoisseur Communications' Youngstown, Ohio, group and keeps track of changing call letters and formats in the club's newsletter.

Starr said the biggest impact he's seen on the hobby from the Net is the ease with which members can share information with each other. Several reflectors allow hot DX tips to circulate instantly.

"Reflectors can carry as much bad information as good, though," Starr warned.

As a broadcaster, Starr said he appreciates the DX reports he receives from hobbyists, but he acknowledges they have little practical use to today's engineers.

"Maybe for the new X-band stations there's still some gee-whiz factor to seeing how far they get out," he said, "but they're far from a big factor."

Other club members pointed to changes in radio ownership as a reason why stations are less likely these days to send out QSL cards in response to reception reports.

"You have to explain to them what you want," said Pittsburgh DXer John Malicky. "So many people are younger these days ... it's hard for them to respond, because they just don't have the time."

Starr pointed to the rise of contract and cluster engineering in place of the old "one station, one engineer" approach.

"Even if an engineer wants to reply" to a report, Starr said, "he probably doesn't have station letterhead or postage to use."

The QSL cards that stations sent out in response to reception reports are almost a thing of the past. They're now found only at the biggest 50-kW clear-channel stations, where engineers still receive dozens of reports and see the QSL cards as a public-relations tool.

Malicky tries to visit radio stations when he travels, but finds that at many smaller stations there's only one person, often a veteran engineer, who understands what DXers do. "The more you talk to anybody, one thing leads to another," he says. "It's fun to talk to people who have worked for stations for years."

Paul Swearingen, a DXer since 1955 and a former broadcaster, edits the "DX News" newsletter.

"There are two types of owners," he said, "the ones who are bottom-line only — no verifications — and the more traditional broadcasters, who will still respond warmly to DXers."

Like many members, Swearingen isn't yet paying much attention to Webcasting as a means of hearing distant stations.

"The quality of broadcasts is not quite up to even what poor operations can provide for free, and the time and money investments needed for a computer are critical factors," he said.

He sees a positive side to Webcasting. "Listening to London might possibly remind you of what else is out there."

Starr sees a potential danger, though.

"It may be something to siphon off prospective new DXers," he worries. "It depends on whether they want to just hear a program or they want the challenge of building an antenna."

Some DXers have found ways to combine old and new. For Blaine Thompson of Fort Wayne, Ind., "DXing via Webcasting does help identify a station heard via regular radio reception."

Thompson also uses affiliate lists found online to help identify stations carrying sports play-by-play and other network programming, though he finds many of them plagued by outdated information.

DXers also worry about the quality of AM programming they're hearing at night. Some complained about AMs that failed to offer even the mandated top-hour ID.

Members bemoaned the gradual disappearance of interesting local shows in favor of syndicated programming.

"The satellite broadcasts have no real personality," said Malicky.

NRC members are happy to point out counter-examples, including a few favorites in the expanded AM band, which has been a boon to DXing.

Back to the ol' days

For some, new "X-band" stations have represented an opportunity to log California from the East Coast (or vice versa) for the first time in decades.

At the convention, the club added its own offering to the band. Carrier-current "WNRC" on 1610 gave members a chance to return to the days of 1960s radio, complete with PAMS jingles, "20/20 News" and mock commercials.

In a bow to the '90s, station programming came from a voice-tracked automation system using tracks that had been e-mailed to the station "program director."

Some NRC members take their love of radio pretty far. John Bowker, a retired RCA engineer from Florida, travels the country collecting and recording station IDs, which he presents frequency-by-frequency in the "Travellog" section of the "DX Audio Service" cassette magazine.

The project began in 1986, and neared a conclusion on the final morning of the convention with a live taping of the first part of the 1600 kHz segment.

"We've been rolling seven tape recorders at once in our motor home," said Bowker, whose travels include hourly stops to add to the collection.

"The quality of many of today's AM stations is very good," he said, but he senses a sameness to many. "As we drive around, it's getting to the point where all the towns all look alike with their Burger Kings and McDonalds. Radio stations are starting to be that way, too."

Some sound a bit *too* distinctive. "It is remarkable how many mistakes, stupid mistakes, awful mistakes that we hear."

In 1998, Bowker organized a panel, "Is Webcasting Killing DXing?"

"The initial answer was no," he said, "but when we got done, we decided, frankly, yes it is."

He also cites increasing noise on the AM dial. "I used to get up at 1:30 a.m. and there would only be a dozen or so stations on the air and they would all be different stations each night," he said. "That doesn't happen anymore with stations staying on all night."

A further complication is verifying the nature of long-distance reception. Before the Web, faking a DX report was all but impossible. Now it becomes harder to prove that their reception was really thanks to skywaves and not RealAudio. Bowker has suggested the NRC issue its own verifications, with tapes of off-air reception required, but the club has yet to act.

Whatever changes the Web may bring, some hobbyists say they'll never succumb to the lure of typing in a URL in place of stringing a longwire antenna and twisting a dial to pull a signal through the ether.

"It takes the thrill out of it," said Malicky.

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World Radio History

GUEST COMMENTARY

A Call for Software-Based DAB

Dave Hershberger

The author is principal engineer for manufacturer Continental Electronics.

In the past, broadcast systems such as FM stereo, AM stereo, monochrome and color television were standardized by defining the transmitted signal. But now it is possible to standardize the receiver instead, and to broadcast using many different signal types.

The receiver would contain a low-cost, general-purpose programmable digital signal processor, or DSP. Broadcast stations would transmit decoding software to the receiver along with the program, invisible to the user.

As new modulation coding and audio compression algorithms are developed, they may be applied immediately by broadcast stations to improve audio quality or coverage area, or to increase the number of program streams on a single station.

Figure 2

This approach can be applied to any digital broadcasting system, including "digital AM" (meaning digital broadcasting on frequencies below 30 MHz), FM (VHF), and IBOC (in-band, on-channel) systems.

Previously, standardization activities have concentrated on the specification of a broadcast signal, as shown in Figure 1. Once the signal is defined and receivers are built for that particular signal, it is difficult to incorporate improvements. As technology improves, the standard is abandoned or inflexibility limits its usefulness.

Standardization activities often include highly competitive "systems battles," where considerable resources are expended in political as well as technical pursuits, promoting one's own technologies and attacking those belonging to others. The best technology does not necessarily emerge victorious.

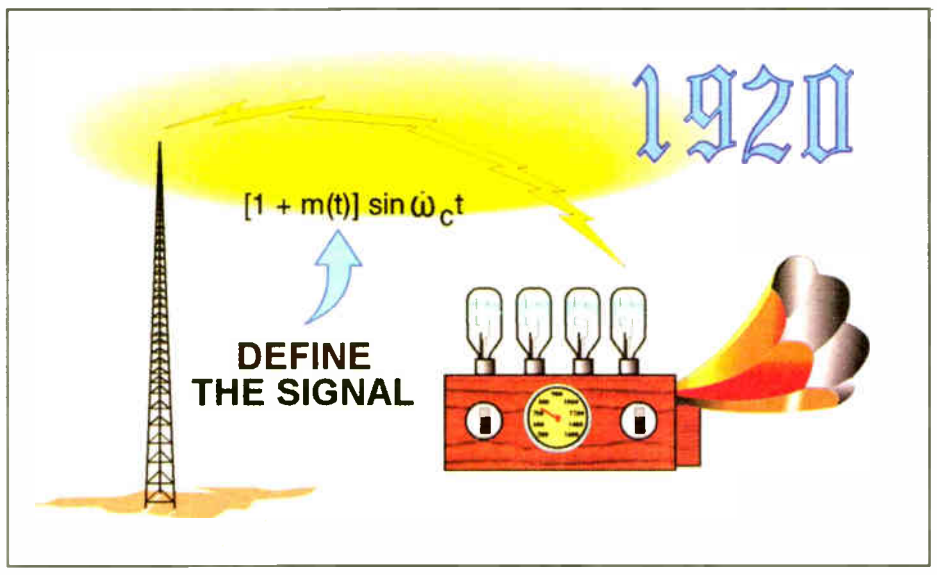


Figure 1

A software-based system would eliminate "systems battles."

Old-style thinking

The old way of specifying the broadcast signal has been called "6SN7 thinking" (Figure 2). This refers to a type of vacuum tube developed more than a half century ago.

When the 6SN7 was in use, the only practical approach to standardization was to specify the transmitted signal.

Now it is possible instead to standardize the receiver, allowing several different transmission methods to be used without requiring any action by the receiver's user (see figure 3, page 38).

Regardless of what kind of digital broadcasting systems eventually are implemented, the decoding will most likely be done with a general-purpose DSP chip or core, as opposed to a dedicated single-function hardware design. General-purpose DSP chips are inexpensive, and allow fast development and easy product improvements.

Most important, they are programmable, and within their speed and size limits can be programmed to do any kind of signal processing.

The standardized digital broadcast receiver would consist of a tuner followed by a general-purpose DSP, with a predefined method of transmitting decoding software to the receivers, as shown in Figure 4.

Digital broadcast receiver operation would be controlled by software, downloaded to the receivers over the air.

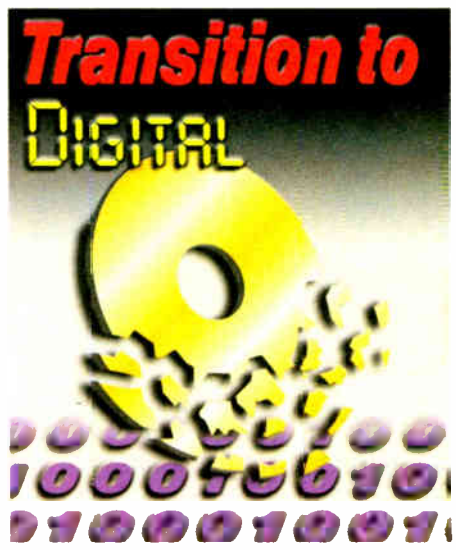
The modulation and compression types could be almost anything. As new modulation coding and audio compression algorithms are developed, they could be coded into the receiver's known machine language and broadcast along with the program material. Importantly, this would allow new techniques to be used almost immediately after they are developed.

Quickened pace

A software-based digital broadcasting system could actually advance the introduction of digital broadcasting by several years. The tasks of receiver design and signal specification could proceed in parallel rather than serially. The digital broadcasting process would not have to be slowed by a long comparative investigation of different modulation types and audio compression methods.

The objectives of broadcasters and receiver users vary widely. Some AM broadcasters only care about their groundwave coverage area. HF broadcasters only care about skywave propagation. Some broadcasters have interference problems while others do not.

Propagation conditions, interference and antenna patterns frequently change with time of day. FM broadcasters, who have the bandwidth to support higher data rates, may want to transmit multiple program streams.



A software-based system would allow broadcasters to tailor the transmitted signal to best serve their listeners.

There are many tradeoffs. Important ones include the following:

Quality vs. quantity — A station may want to transmit multiple program streams, or transmit a single program with the highest possible quality.

Data rate vs. coverage area — A higher data rate generally can be supported if the coverage area is reduced.

Robustness vs. time delay — Generally, error correction and fade immunity are improved if time delay is increased. But, with increased time delay, there will be a time delay from when the station is tuned in until audio output from the receiver begins.

Available audio compression algorithms require approximately 100 kilobits per second to provide audio quality comparable to FM stereo under good reception conditions, and somewhat more to sound similar to a compact disc.

While such 100+ kbps data rates are feasible for FM, VHF, UHF and microwave DAB systems, systems being proposed for "digital AM" will not support such data rates.

This has several implications.

First, unless compression technology improves significantly prior to the introduction of digital AM, at its introduction, "digital AM" will not have audio quality comparable to FM or to compact discs.

Second, it will be highly desirable to have a digital AM system that will allow improvements in audio compression algorithms to be incorporated without changing the receivers.

Third, audio quality improvements through future compression technology advances will be possible only if receivers are easily reprogrammable in the field.

Audio-compression technology seems

See DIGITAL, page 38 ▶

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FEED LINE

Don't Let Readings Get You Down

How to Approach Out-of-Tolerance Monitor Point Field Strengths and Base Currents in DA Systems

W.C. Alexander

In the Jan. 19 issue, we began a series on troubleshooting and repair of AM antenna systems, particularly directional antenna systems.

In the industry's trend toward consolidation, many otherwise qualified and experienced engineers are given charge of complex arrays with which they have no experience.

It is the aim of this series to provide practical information and techniques that they can use to maintain, troubleshoot and fix the AM antennas in their care.

As we go, we will look at the most common scenarios one at a time. If, in the course of the series, we don't deal specifically with a problem that you find yourself faced with, you will find that the rules, procedures and principles used to deal with other AM antenna problems will still apply.

It is my hope that you will be able to reason your way calmly through almost any problem.

We looked at the problem of incorrect antenna monitor indications in the first article. This time, we will explore the problems of out-of-tolerance monitor point field strengths and out-of-tolerance base currents.

Incorrect base currents

In my opinion, directional antenna base currents generally are one of the most useless parameters that broadcasters must, by law, monitor and maintain.

This is particularly true in the case of loop-sampled towers and even more so when towers are electrically tall. The worst case is perhaps a loop-sampled tall tower, where the field ratios as indicated on the antenna monitor may bear no relationship to the base current ratios.

There is a move afoot in the broadcast engineering community and at the FCC to do away with monitoring of directional antenna base currents altogether, but for the moment, the rule is still in effect and we must maintain the licensed values.

In an AM directional array, the FCC licenses base current ratios, not the absolute value of the base current at each tower (although that is the way that we, as engineers, often treat them).

Let's start with an understanding of how the licensed base current ratios are determined. When a directional antenna is tuned up, it is adjusted so that the radiation pattern has the proper shape as determined by radial field strength measurements. Once the engineer setting up the array is satisfied that the shape of the pattern is correct, a full set of directional proof-of-performance measurements is run.

Pattern parameters

The field strength data is submitted to the FCC along with the operating parameters for each pattern, including the antenna monitor indications and base currents. The currents that are read and submitted with the proof and license application are converted to ratios and become the licensed base current ratios.

The most suspect indicating instrument in any radio station is the base current ammeter, and thermocouple meters are the worst. From the moment they leave the factory, their calibration becomes suspect. Vibration, magnetic anomalies, temperature, humidity, insects, moisture — everything — affect their accuracy.

Toroidal current meters can also lie, but they are more reliable than thermocouple meters.

When the engineer reads the base currents and submits the information to the FCC, the absolute values of the base currents are important only for determining the total system power (I^2R determines the power for each tower, and the total system power is the sum of the power at each tower).

Again, it is the ratios that will be licensed. The most accurate and consistent way to read base current ratios is to use one plug-in meter at all the towers. This removes from the equation the calibration errors that will inevitably exist between different meters.

It also removes the meter from the hostile environment of the tower base except when it is actually plugged in and being read.

A plug-in toroidal meter is the best way to go, but a plug-in thermocouple meter is almost as good. The toroidal plug-in has the advantage in cases of widely divergent base currents, as they can be purchased with switchable dual scales.

If a thermocouple plug-in is used in such a case, more than one meter may have to be used to get proper on-scale indications at all towers.

Not too many stations use plug-in meters, however. Many years ago, base currents had to be read regularly, and to make it easier for the engineer to read them, permanent meters were installed in the tuning houses. Many of these arrays are still in use, with base current ammeters that have been in place for many years, or worse, with meters that have been replaced at some point with new meters that do not indicate quite the same as the original ones.

When base current ratios are found to be out of tolerance (within ±5 percent of the licensed values), if everything else is okay (antenna monitor parameters and monitor points), suspect one or more of the meters.

Thermocouple RF ammeters can be calibrated against a standard in the field, and they can be calibrated against a known good meter by wiring them in series with one another in series with an RF load. A calibration chart can be made and posted for each meter if necessary.

If calibration errors cannot be found to account for the out-of-tolerance condition, you may have to run a partial directional proof of performance to relicense the new indicated base current ratios.

Before you do that, however, watch to see what is happening at the FCC with respect to licensed base currents. This requirement may disappear at some point soon anyway.

High monitor point

While a high field strength at a monitor point (above the licensed maximum) could be an indication that the directional pattern is out of adjustment, a likely cause is an anomaly at or in the vicinity of the point itself.

Photo courtesy of Kintronic Laboratories Inc.

This five-tower array belongs to Trans World Radio in Bonaire in the Netherlands Antilles. The 500 kW station broadcasts at 800 kHz.

Reradiators and other factors beyond the station's control can influence the field strength at a monitor point. If you find a point high, don't adjust anything. Measure five or six points on the radial and see how they compare to the last full or partial proof.

If these points are close to the proof field strengths, you can assume the array is in adjustment and the monitor point itself has become unusable. §73.158 specifies the procedure for changing the monitor point on a radial.

If the entire radial is high, the array may be out of adjustment, even though the array operating parameters are all within adjustment. This can easily occur in arrays with very tight nulls.

Before you start cranking, though, it is a good idea to put the array in the non-directional mode and look at five or six points along the radial both ND and DA. Compare the ratios with those in the last full proof. It could be that a conductivity change is responsible for the high readings and the array is in adjustment.

In the next part of this series, we will deal with isolating and replacing faulty components. Sometimes it is apparent which component is faulty and why, but sometimes it is not so obvious.

We will explore some diagnostic techniques you can use to isolate the bad component and get the array back on track.

■■■

Cris Alexander is director of engineering for Crawford Broadcasting. He is based in Denver.

Contact him via e-mail at cbceng@compuserve.com

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World Radio History

Workbench

Radio World, February 16, 2000

Try This Trick With Mult Wiring

John Bisset

Our wire management is on a roll.

Figure 1 shows a great way to handle mult cabling running to equipment racks. AM/FM's Dennis Sloatman used the stiffening plates that came with his Middle Atlantic racks to keep them from warping in shipment, to help organize his mult wiring.

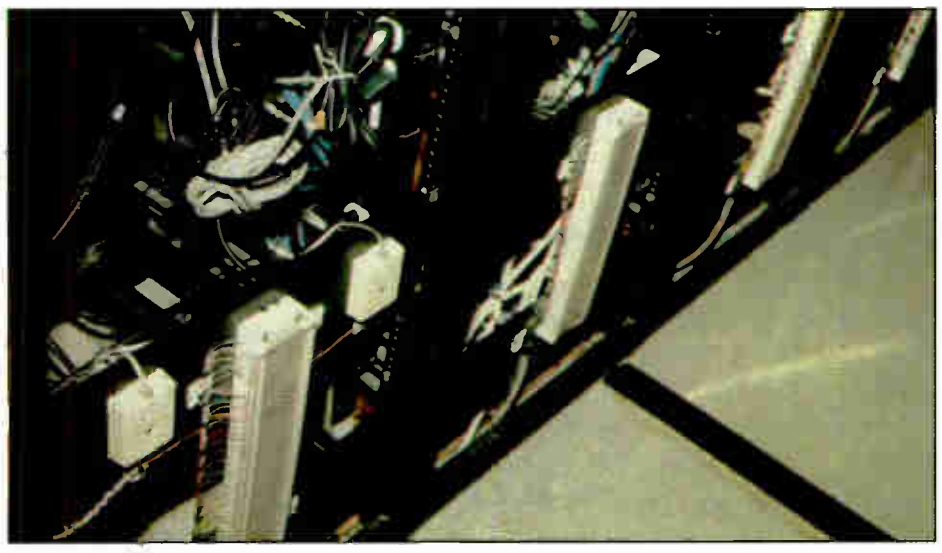

Fig. 1: Mount blocks on the outside of racks to simplify wire management.

In this case, each rack has a mult that terminates in a 66 block. The other end of the multipair cable runs to the terminal wall.

Mounting the blocks to the bottom outside of the racks makes access easier. You don't have to contort your body to identify or punch wires as you would if the blocks were mounted on the side.

Also, because they are outside the rack, there is no worry of deep equipment chassis knocking into the blocks.

★ ★ ★

Rick Shaich took issue with the suggested spare parts storage in our Dec. 8 column.

His point? Exposed electronic boards and chips stored in plastic trays on a tile floor are a recipe for disaster. The ESD (electro-static discharge) potential could ruin electronic parts, especially CMOS chips found in older gear.

Rick suggests the use of ESD bags, which can be saved when you receive parts or boards from manufacturers. The packing foam peanuts also are useful to save. ESD-safe peanuts usually are pink or gray.

Rick goes a step further when it comes to shelving. He uses metal utility shelves, but includes a couple of star washers between each metal connection. The star bites through the paint and ensures electrical continuity from shelf to shelf.

After determining that each shelf has continuity, Rick wires a 1M-ohm quarter watt resistor to 16- or 18-gauge wire, covered with heat shrink. Each shelf has its own wire, tied in "star-ground" manner.

Rick acknowledges the extra work, but in a large parts depot, having bad parts on the shelf is senseless. Keeping your replacement boards, switches and other components in bags also keeps dust away, preventing dirt-related problems.

★ ★ ★

Are you installing a hard-drive music or spot system? Give some consideration to the AC wiring.

A number of operational problems can be tied to power sources coming off different electrical phases. Especially if your studio complex is old, assume nothing.

Check the breaker box to ensure that your hard-drive systems will be fed from the same electrical phase. Figure 2 shows how one engineer had a new breaker box installed, with each studio's computer on a separate breaker, but off the same phase.

★ ★ ★

Those bid print sets that some transmitter manufacturers provide sure make circuit tracing easier, but how do you store them? They won't fit on a standard bookshelf with your other manuals, and many times they end up on the workbench or floor.

Jon Bennett at the AM/FM stations in Richmond, Va., came up with an inexpensive answer. Figure 3 shows screw hooks placed in the wall behind his transmitters. Spring binder clips fasten to the schematic set, and are looped through the screw hooks. Everything is in place, and the binder clips allow the print pages to be turned easily as the schematic binder is not damaged.

★ ★ ★

Bob Hawkins of WENS(FM) and WNAP-FM in Indianapolis sent in a quick diagnostic for STL systems using Anixter-Mark dishes. Because access to time domain reflectometers or 900 MHZ Bird wattmeters is rare for most engineers, there's an alternative method to troubleshooting STL receiver signal-level deterioration.

Fig. 2: Be sure that all hard-drive computers are on the same phase.

The first step begins in logging the signal strength periodically. Usually these failures occur slowly, and a log will

See WORKBENCH, page 34 ▶

FIRST PERSON

Visit to a Small Radio Station

Ken R.

Back in the day before the Godzilla-sized groups took over, small and fiercely independent stations ruled the radio landscape. They were owned by families, not insurance companies. And the people who owned them actually showed up and had something to do with their daily operations.

I worked at such a station, WGLN(FM) in Sylvania, Ohio, which sat at the rear of a large cornfield. I actually saw a big snake next to my foot when I hiked out to the mailbox one morning.

The station boasted a luxurious unairconditioned, unventilated air studio, a surprisingly noisy transmitter room immediately adjacent, a tiny production room, a small lobby and a bathroom. In the summer, we jocks sweated off several pounds a week. In the winter, we wore every piece of clothing we owned in an effort to stay warm.

The constant drone of the transmitter was heard over the air every time we opened our mic. We played country music and life was fine.

Try another channel

One of the misfits working at WGLN was a frustrated boss-jock-wannabe. Since CKLW, the top-40 monster in nearby Detroit, would never hire this kid, he was biding his time with us. This would-be rock jock actually ran two shows every day.

Let me explain.

Our studio control board had an A channel which sent our programming out over the air (throw all the pot switches to the right!) and a B channel for audition (throw all the pot switches to the left).

This personality's normal on-air country music show went out over the A channel and included Ferlin Husky, Dottie West and Johnny Cash.

But he also ran a simultaneous slammin' top 40 show on the B channel, complete with borrowed CKLW jingles and records by Three Dog Night, Chicago and The Four Tops. On the A channel he was "John Paul Jones" (we were the "home of the Jones Boys" then). On the B channel he assumed the imaginary identity of "Rocky Cliffs and his Wave of Hits."

Watching this dexterous and schizophrenic daily two-shows-at-once-performance was exhausting. The guy had two pairs of headphones and two sets of carts, but unfortunately one microphone.

One day, of course, he got it backwards and the rock show went out over the air. Our befuddled country music listeners (all nine of them) suddenly were treated to the adenoidal sounds of Rocky Cliffs and some rather unwelcomed rock music and jive talk.

One of these confused listeners was the owner of the station.

He called the studio and politely asked our air talent if some new records had been added to our list. Gradually Rocky Cliffs /John Paul Jones realized what was happening and apologized.

The kicker is, the owner didn't fire him! Rocky's punishment was that he was condemned to keep playing country music in his own private hell until he could get a more respectable job working in a hardware store years later.

Robert, our news director, believed his "rip-and-read" news was of vital importance to all concerned citizens. He delivered it all: hog reports, school closings and whatever goofy features AP sent us, with authority far in excess of what was required.

One morning Robert was having some digestive difficulties and trotted off to the station's only bathroom, which was right off our main lobby. A little later in the morning we convened a staff meeting in that lobby with all station members (all six of us) seated in a circle of folding chairs just outside the bathroom.

At one point, our secretary was asked to check something on last week's program log, which was stored on the shelves of the bathroom, which doubled for a filing closet. Sandy the secretary stood, walked over to the closet/bathroom and opened the door to reveal our rather embarrassed news director, who was seated holding a popular men's magazine.

There was a moment of stunned silence as everyone in the lobby stared at Robert, and his "deer-in-the-headlights"

See FIRST PERSON, page 39 ▶

Troubleshoot STL Level Problems

▶ WORKBENCH, continued from page 33

help spot the progression.

When the received signal deteriorates gradually, the problem is usually water in the dish's dipole element or in the pigtail jumper between the dish and the Heliax. To find out if water ingress has taken place, turn to your trusty Simpson 260!

Measure the resistance between the center and outer conductors of the line, at the point where the receiver would be connected. In a normal system, there will be no measurable resistance on the Rx10,000 scale of the Simpson 260. If the meter shows any indication at all, further investigation is warranted.

At WNAP-FM, Bob observed a gradual decline in received signal strength to 300 uV. The ohmmeter check showed 15k of resistance between the center and outer conductors. A climb up the STL tower revealed that the dipole had two drops of water in the connector end, accounting for the 15 kohms. Thirty seconds with a hair dryer changed the 15k to infinity. The jumper measured 500k of resistance, and was replaced. The result of the corrective action was 2,000 uV of received signal.

This method may work with other brands of dishes if the normal resistance reading of the dipole element is infinity. A call to the manufacturer of the antenna will yield that information. Remember to make the measurement after any preamps, cavities, isocouplers, etc. that may be a part of your system.

Fig. 3: Here's an inexpensive way to store prints.

Thanks, Bob, for a money-saving tip!

■■■

John Bisset has worked as a chief engineer and contract engineer for more than 30 years. He is a district sales manager for Harris Corp. Reach him at (703) 323-8011.

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

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World Radio History

Clear Channel Makes 'History' In Denver

Clear Channel Communications has completed what its systems integrator is calling the largest all-digital radio consolidation project built in the world.

RDA Systems Inc. completed the project at the Denver Technological Center in Colorado. As integrator, RDA worked with other major contributors including Lawrence Group Architects, Klotz Digital America and furniture supplier SFB Inc.

RDA President Rick Dearborn called the scope of the project astounding.

"By the time it was completed, RDA had delivered the equivalent of four fully loaded 52-foot semi-trailers of racks, furniture and equipment."

Started initially for Jacor and completed for Clear Channel, the project encompassed seven radio stations, including flagship station KOA(AM). RDA prewired and tested 28 studios and four rack rooms in St. Louis prior to delivery in Denver.

The systems integrator, the furniture supplier and the architect are all headquartered in St. Louis. The companies said that helped in planning.

Audio access everywhere

The fourth-floor Denver newsroom contains 20 workstations and a Command Center, each with access to every audio source in the building.

The main rack room was wired for 46 racks, 16 of which are audio and routing functions, 17 contain servers from Prophet Systems Innovations and Wireready, and 13 contain computer networking equipment.

Smaller rack rooms are on each studio floor and in the rooftop penthouse.

The Klotz routing and console system was used as a platform. Each studio area has access to any of 1,024 inputs and outputs at any time.

An innovation by RDA was the use of Krone termination blocks instead of conventional 66 blocks for digital installation.

Joe Carollo, an RDA project supervisor, said, "They provide a more secure connection through the thicker insulation on digital audio cable. In addition, their double density allowed our backboards to be half the size.

"If we had not used Krone blocks, the backboard in the main rack room would have been 100 feet long. In addition, using the Klotz digital system really simplified the wiring because the whole backbone is run on fiber. This allowed us to dramatically reduce the building audio wiring infrastructure."

Al Kenyon, vice president of technology for Clear Channel, said RDA Systems met or exceeded the company's expectations.

"They were able to deliver our facilities ahead of schedule, despite the fact that the project deadline suddenly got moved up midway through the project."

Jack Lambiotte, FM chief engineer in Denver, said. "If someone told me we would be moving seven stations and three sports networks into a new building in 10 months, I would have thought they were crazy. The aggressive schedule and enormous complexity of such a project, as well as the need to combine technologies which had never been married before, while all the while taking care of our normal day-to-day responsibilities, would have been impossible."

New Control Room at KOA(AM)

More photos of the Denver studios and rack room are posted at www.rwonline.com

For information about this or other projects, call RDA at (314) 872-8222, or visit the Web site at www.rdasystems.com

"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: RW Managing Editor, P.O. Box 1214, Falls Church, VA 22041.

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Orban 2200D (analog and digital I/O) List $4,650.00 SALE $3,995.00

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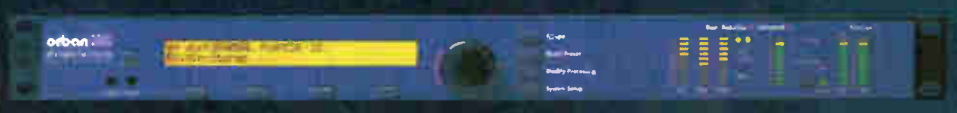

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World Radio History

Let's Standardize the Receiver

▶ DIGITAL, continued from page 26

to be progressing faster than modulation-coding technology. Even if a totally new audio compression technology (such as fractal audio) is developed, as long as it can be coded for the receivers, it can be implemented almost immediately.

The only part of the transmitted signal that would have to be defined would be the ancillary data system — this would be the mechanism which always would be used to transmit the decoding software to the receivers.

(Other information, such as station call sign or name, location, format, emergency information, etc., also could be transmitted using the ancillary data channel.)

This would be a low-speed signaling system that would occupy roughly 1 to 10 percent of the channel capacity. The other 90 to 99 percent of the channel would be occupied by the broadcast program material.

The ancillary data system could be a simple but robust single-carrier PSK (phase-shift keying) system, or a multiple-carrier OFDM (offset frequency domain multiplexed) system, time-shared with the program data. Or the ancillary data channel could be a noise-like spread-spectrum signal transmitted concurrently with the main program.

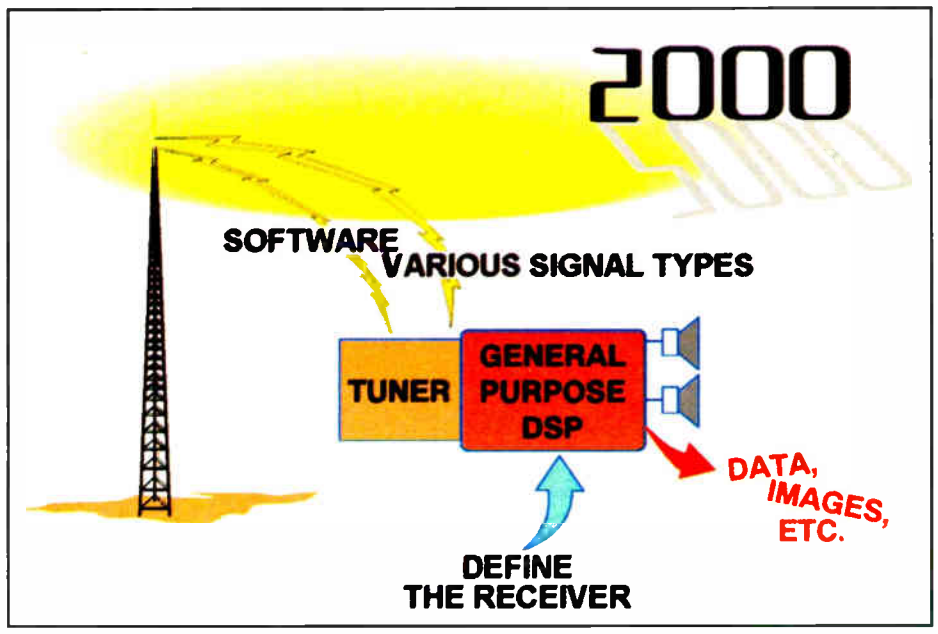
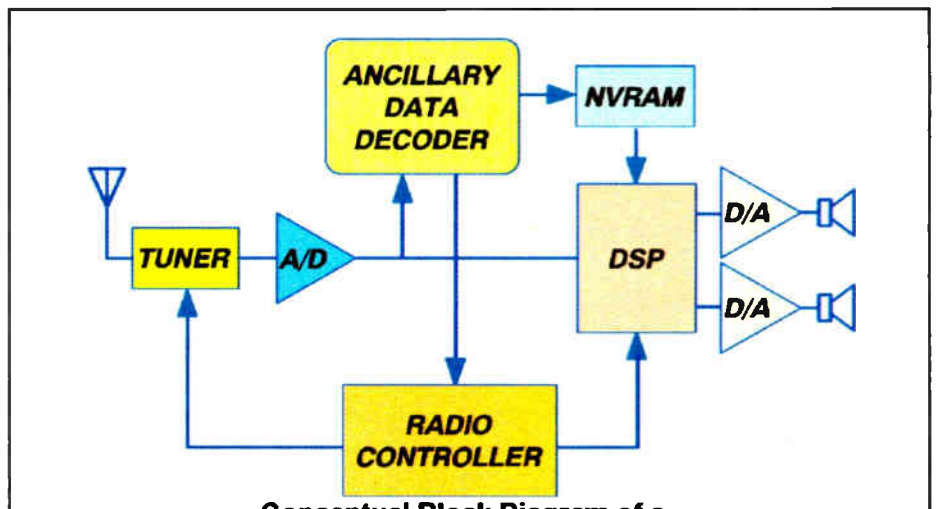


Figure 3

When a receiver is tuned to a digital broadcast station, it first looks for the ancillary data channel. Ancillary data informs the receiver what the modulation type is, and what kind of audio compression the station is using.

In most cases, the receiver will look in its nonvolatile memory (NVRAM) to find the particular decoding software for the station. If it finds it, it then will begin decoding the broadcast. In the rare situation when the receiver does not find the proper decoding software, it will download the decoding software to its NVRAM from the ancillary data channel.

While the software is downloading, the receiver may provide an indication to the user that it is in a "learning" mode and that decoding will commence shortly. When the software has been downloaded, the receiver's audio outputs will unmute.



Conceptual Block Diagram of a Software Controlled Digital AM Radio

Figure 4

In most cases, however, use of new modulation formats will be preceded by software downloads beginning, perhaps, a month ahead of time. By that time, most receivers will have been updated, so that when a new modulation type is broadcast, the receivers can already decode it.

Broadcasters may also wish to cooperate by transmitting all publicly known decoding algorithms so that when tuning to a new station, the receiver will already know how to decode it.

Receivers that include other functions, such as satellite DAB receivers, computers and television receivers, could receive software updates via alternative modes, such as FM broadcast subcarriers, the Internet, or data included with TV or satellite DAB.

Many receivers, including some battery-operated types, may include a software search function. When the receiver is not in use, it may periodically turn itself on and scan for stations using new transmission methods. If it finds a new transmission type, it would download the software for that kind of broadcast.

As transmission methods become obsolete, receivers could be made to sense the lack of use of a particular algorithm over time, and old decoding software could be automatically purged to make room in NVRAM for new software. Or a "purge" command could be explicitly broadcast for unused algorithms.

The architecture of the DSP portion of the receiver is beyond the scope of this article. However, its computational power, RAM, NVRAM, instruction set and other features will be determined by the requirements of present and expected future developments in modulation coding and audio compression algorithms.

A single architecture for a receiver's general-purpose DSP would be the most straightforward way to implement a software-based system. However, if more flexibility is required, it is possible to allow receiver manufacturers to use different DSP chips with different instruction sets.

Such an approach could be implemented by defining the system to transmit some form of abbreviated "source code" to the receiver, which would then compile it to run on the processor actually used in the receiver. In this scenario, each receiver would include a simple compiler targeted to whatever DSP chip it contains.

Although this approach would define a standard receiver, there would be nothing that would prevent the development of more advanced receiver types.

If additional receiver types are specified in the future, all that would be necessary would be to transmit several different versions of the decoding software. Each receiver would ignore packets carrying decoding software to other receiver types.

In conclusion, this general method can provide a high degree of flexibility for digital broadcasting. As new modulation and audio compression systems are developed, they can be used almost immediately. Broadcasters will be free to select the transmission methods that best suit their purposes and the needs of their listeners.

Standardization "mistakes" can be avoided because nothing about the transmitted signal is cast in concrete. As new modulation and audio compression algorithms are developed, they can be applied almost immediately.

Modern DSP hardware and software technology make automatically reprogrammable receivers feasible. Use of this technology will allow digital broadcasting to avoid an otherwise high risk of early obsolescence.

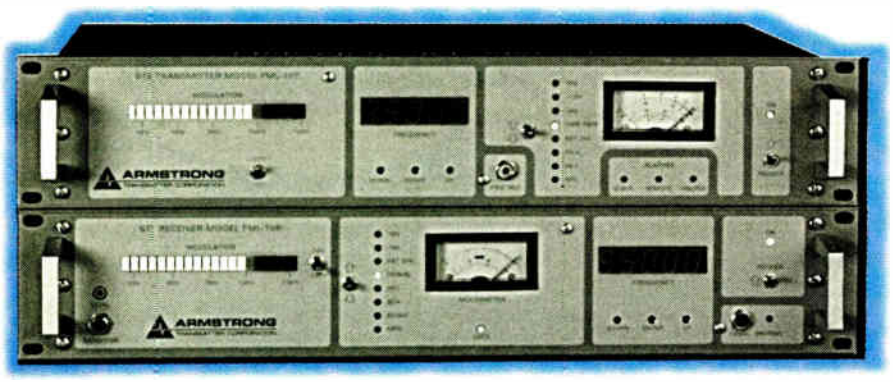
Let's not fall into the trap of continuing to standardize the signal. Let's stamdardize the receivers instead!

■■■

Dave Hershberger is principal engineer of Continental Electronics and is based at the Grass Valley Design Center in California.

RW welcomes other points of view.

Frequency Agile STL Systems



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World Radio History

Drama at the Edge of a Cornfield

▶ FIRST PERSON, continued from page 34

eyes stared back at us. He tried to gather his dignity and mumbled something about needing "just a few more minutes" and Sandy gently closed the door. Meeting adjourned.

Last shift

Then there is the sad story of a fellow who called himself Chick Johnson on the air. I never knew his real name because he kept to himself most of the time.

Chick was an obese drug abuser with flaming red hair. He was probably 20 years older than the rest of us radio novices and taught me a lot about the business.

While outwardly jovial and always cordial to everyone, Chick harbored a dark soul driven by demons I never knew. In the middle of his country music show he had a five-minute segment he called "The Parking Zone," in which he played very soft piano music and read little thoughts he had prepared ahead of time. The program director never said anything because he didn't want to set Chick off on one of his binges of profanity or crying, depending on the day.

Private destruction

One day I arrived at the station 10 minutes before my airshift and walked back to the studio where Chick Johnson was finishing his show. It was a sweltering summer day, probably 90 degrees outside and 100 degrees in our little box of a studio, and Chick was wearing a winter parka, knit cap and gloves. And he was shivering. His voice shook as he tried to get through the commercials and his forced smile came and went in quirky fits.

"Chick, are you OK?" I asked.

"I'm fine, Ken, fine," he answered. At the hour mark, I took over for him and played those Dolly Parton and Statler Brothers records, but I kept thinking about Chick.

If you have ever worked in a small, independent station, you probably have stories like these.

The next day when I came in, the program director had taken over Chick's shift.

"Where's Chick?" I asked.

"He died yesterday afternoon in his apartment at about 5 o'clock. Drug overdose, I think."

Chick Johnson was a nice man who had been working hard on his own private destruction for some time. And he finally found it at WGLN(FM) Sylvania.

■■■

The names have been changed but WGLN was a real station, no longer in existence. Ken R. worked there in the early 1970s. He is a free-lance writer and frequent contributor to ***RW****.*

RW *welcomes your stories about life in radio. Write to the address on the inside back page.*

MARKET PLACE

Sierra Systems Soft Panels

Sierra Automated Systems network Soft Panels enable remote control of SAS audio routing systems from a PC workstation connected to a local- or wide-area network or the Internet via PPTP and VPN.

The software control panels can be used over a LAN, which allows control from anywhere a computer workstation is in use, such as news edit stations, engineering administration or the general manager's office.

With access to the router via WAN or Internet, status and control are available from home or anywhere in the country.

Two single-output versions are available. One is visually similar to an SAS rack-mount panel, the other is a smaller "pull-down" scroll and select panel, a more common computer-type control. Also available is a full system-access XY panel.

Soft Panels provide real tally of switcher status using the operator-defined, eight-character alphanumeric labels that are used by the hardware control panels.

The new panels are free to clients.

For information, contact the company in California at (818) 840-6749 or visit the Web site sasaudio.com

World Radio History

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World Radio History

GM Journal

Radio World | Resource for Business, Programming & Sales | February 16, 2000

Some Dot-Coms Serve Radio Well

Carl Lindemann

Not all Internet entrepreneurs buy radio advertising to establish their online brands.

Some have developed services

Susan Pickering

for radio properties to extend station brands from broadcast to Webcast.

The rapid evolution of the Web promises to shift the question from "Can a station's Web site make money?" to "How can a station maximize profits from this new venue?"

A number of strategies, approaches and philosophies have emerged. This remains a wide-open field. Managers must decide whether it makes sense to stream their signals online, co-brand

See DOT-COMS, page 48 ▶

NEWS MAKER

ABC's Internet King: Rick Mandler

Carl Lindemann

It seems like an odd career path.

Rick Mandler landed the plum job of vice president of new media for ABC Broadcasting Inc. from a legal background.

But then, in the wide-open field of new media, there is no particular training to qualify in this new frontier. As the intellectual property boundaries of the Net are defined, Mandler's awareness of these legal issues could give him an edge over other executives with more expertise in the new media.

Mandler's charge is to create, develop and manage the new media properties for ABC's broadcasting division. This includes streaming content on 10 television stations and 41 radio stations — 25 AMs and 16 FMs — as well as the ABC Radio Networks.

His task is not just a matter of repackaging for online delivery. Inventing new content and concepts to enhance the traditional broadcast properties is crucial to his mission.

Mandler began his career in broadcasting after joining Capital Cities/ABC Inc. in 1992 as a general attorney. He was named director of business affairs for ABC News in 1994, where he was responsible for negotiating talent and business agreements.

In 1998, Mandler was promoted to general manager, new media for ABC Radio Networks, with operational and strategic responsibility for the ABC Radio division's Internet efforts. He was promoted to his current position last June.

RW's Internet radio correspondent, Carl Lindemann, spoke with Mandler about the Internet, radio and ABC's position in the new world of integrated media.

***RW:** They say that online, "Content is King." You have access to an incredible wealth of content — Disney, the Go Network, ABC — how are you able to manage this effectively?*

Mandler: As the radio groups go, we are light years ahead of everybody else. We have all of our non-radio Disney content

Rick Mandler

streaming 24-7 and some of our radio network programming, too.

Part of our success here is because we're a small part in this larger organization. Also, it helps that we don't have hundreds of stations. So the economics are different for us.

***RW:** What are the challenges for creating a unified Web presence across the network?*

Mandler: It's not just the management issues. In order to do it right, you've got to build some method of acquiring the audio from the station, encoding it and streaming it.

For really effective streaming, you'd need to work with service providers who specialize in delivering streams to significant audiences — like RealNetworks, or some of the others that are out there. That means having some kind of connectivity between the Webcasting service provider and each radio station that you want to stream.

That's a pretty big network to install. There are capital costs involved, and the network construction required is not the core competency of radio stations and radio companies in general.

***RW:** Aside from "repurposing" and rebroadcasting existing content, what can the online effort add to a radio property?*

Mandler: The power of the Web is not to create content for dissemination to users, as much as to allow the users to create the content for dissemination to each other.

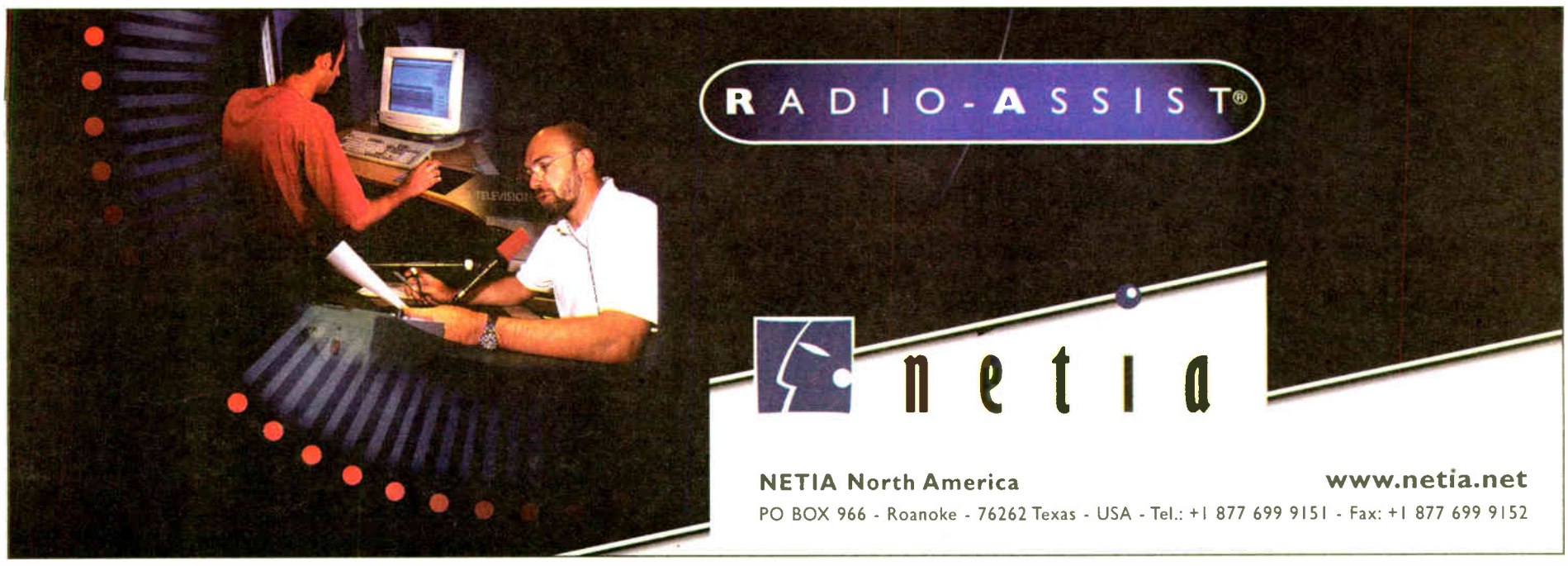
In creating this framework for them, you're adding value for everybody — if you can organize it and keep in a place where everybody can get to it. That's the cornerstone of what we're trying to do — building integrated local strategy between our TV stations, our radio stations and our Web properties. We plan to start rolling out some projects along these lines this spring.

***RW:** Do you see the Web as a means to add some of the localized element lost in consolidation?*

Mandler: I think that the general strategy is to use the connection to the community, the promotional power and the reach of the broadcasting properties to drive traffic to Web sites that are populated with a rich variety of content and information on a geographic, specific basis.

Radio properties have connection to

See MANDLER, page 46 ▶



World Radio History

Tech Toys for Net Radio at SMW

Bill Mann

Among the record 128 exhibitors who packed the exhibit hall at a recent streaming convention were several start-ups with potential tie-ins to traditional radio, as well as some well-known names and rivals like RealNetworks and Microsoft.

Akoo.com, an Illinois-based start-up, introduced "one of the Internet's most comprehensive streaming-media search engines" at Streaming Media West '99, according to company literature.

Akoo founder/CEO Niko Drakoulis proudly showed off his streaming-media scheduler/manager that is available at no charge at the company's Web site *www.akoo.com*

Akoo's home page features a prominent radio link leading to a comprehensive list of more than 2,500 Internet-available radio stations. A mouse click calls up detailed information on a station's call letters, its format, address, and personality profiles — as well as a quick link to the station's Web site, a Listen Live icon.

One of the site's features, "my akoo," allows the listener to customize his or her day's programming.

"You go there in the morning and select what you want to listen to that day," said Drakoulis. The streaming media scheduler/manager includes Web video and TV links. "You can get the news out of New York, maybe listen to a Chicago Bulls game later, then pick up a talk show out of Seattle, maybe listen to avant-garde jazz out of Stockholm. It's all there for you to customize with a few mouse clicks," he said.

Drakoulis, a Greek-American, said he expects Internet radio's growing ethnic audience to be among the early users of his streaming search engine.

"This will make it easier, for example, for British immigrants now living here in the United States to find their favorite United Kingdom radio stations."

Akoo's station roster — all U.S. Netcasting stations are listed by city — also lists next to each broadcast outlet a RealPlayer or Windows Media Player icon.

File photo, courtesy CEA

Bill Gates

On the home front

Akoo's other big rollout here was an affordable, consumer-oriented product called the Kima. The small base unit/receiving unit combo retransmits streaming media from a PC to any home stereo or portable radio system within 1,000 feet.

It's compatible with RealPlayer and RealJukebox, Microsoft Windows Media player and MP3. Kima can rebroadcast digital audio delivered originally via satellite and cable-TV sources.

The product will be released this quarter and will be priced under $200.

real™

RealNetworks

Kima faces stiff competition from a major player. A rival product, the Sonicbox imBand Remote Tuner, got a big launch at Streaming Media West, from no less than Microsoft CEO Bill Gates. He chose personally to showcase the product, a $50 PC add-on that uses Microsoft's Windows Media format.

Sonicbox Inc., which is promoting its product in alliance with Microsoft, is a Net start-up based in Mountain View, Calif. (Web address *www.sonicbox.com*)

The Sonicbox, which had been cloaked in secrecy before its unveiling, is a two-part device with a base unit that connects to the PC, and a purple, streamlined-looking portable remote tuner that looks like a portable radio that remains with the listener.

"It allows people to listen to hundreds of pre-programmed stations with the turn of a knob," said Sonicbox marketing rep Sara Fisher. The base unit transmits Web audio on an unused frequency to traditional FM radios within the home, and receives commands from the remote tuner.

"You basically change the channel by sending a message back to the PC," said Fisher, clutching a Sonicbox and surrounded by scores of curious onlookers. "It makes listening to Internet radio as easy as tuning an FM dial. You just turn the knob and tune in a wide range of Web stations from around the world. It uses unused frequencies like 88.3."

Shipment of the $50 unit is expected in the first quarter of 2000.

See SMW, page 50 ▶

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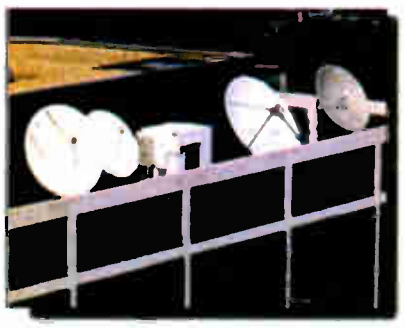

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World Radio History

Baldassano Walked Wire to the Web

Craig Johnston

One of the most familiar and respected executives in radio has moved over to the dot-com side.

Corrine Baldassano, general manager of the Associated Press Radio Division, left the news service in December 1999 for the position of vice president, broadcast programming of Internet music service startup SOUNDSBIG.com.

Her new duties include responsibility for planning and directing broadcast programming strategy, including channel programming, special events and Webcasts.

SOUNDSBIG.com was formed in April 1999 with the goal of becoming the most comprehensive single source of music services and selection on the Internet. The company offers more than 50 channels of local and highly segmented musical content over the Internet, as well as chat sessions with artists, free MP3 downloads and CDs for sale.

Baldassano cites changes in broadcast radio station ownership for opening the door to Internet radio.

"Consolidation, with debt servicing and its resulting need for strict financial performance, means every station in a group needs to be profitable. That means they can't try untested formats and can't nurture a format that is slow in growing. In this climate, the growth of FM several decades ago might not have happened.

"Internet radio can deliver hundreds of channels, and that allows you to slice and dice formats, program for niche markets. At SOUNDSBIG.com we have an Africa channel; that wouldn't happen in broadcast radio today," Baldassano said.

While no single channel may garner a large audience, she said the value is in the cumulative audience.

"From an advertiser standpoint, one of the greatest advantages of Internet radio is the ability to measure and track the audience," Baldassano said. "And it allows the programmer to completely target what's produced, and change instantaneously when necessary."

Moving from the AP to a dot-com company is not without its risks, she said. "Anybody who leaves an established business to go to the Internet is taking a chance. But the Internet will continue to grow, and there will be

Corrine Baldassano

demand later for those gaining experience now."

Baldassano compares the Internet employment situation today to the early days of cable. "There were no 'cable experts' in the beginning, so people came from a variety of different disciplines. Now that cable is a mature industry, you have an experienced cable industry employee pool to choose from."

Baldassano came to AP in 1997 without a news background, but with a wealth of experience in radio. She recalls it was the time of great consolidation in the radio industry, and the AP needed to change the way it did business. The AP's radio business was in decline.

"With a few stations dominating the news format, many other stations decided they didn't need the kind of news they thought they could get from the AP."

After spending a great deal of time with the large groups, "I was able to show what the wire service could offer and how flexible we could be." The radio division is growing again. AP

content is being licensed by terrestrial radio stations and others for Internet use.

The AP has begun its search for Baldasssano's successor but had not named one at press time.

They said the Radio Division continues to operate well under their 2000 strategic plan, and due to the experience of the existing staff, they see no emergency in filling the position.

Prior to her stint at the AP, Baldassano held senior programming positions at Westwood One, Sony and ABC.

Your Dot-Com Can Be Dot-FM

Carl Lindemann

Since mid-1998, BRS Media has promoted "The Newest Top-Level Domain(s) on the Net."

It encouraged radio stations to give up their typical top-level domains of dot-com, dot-org or dot-net for dot-fm and dot-am.

According to the company, a dot-com address is simply too "dot-*com*mon." Two hundred dollars buys a two-year registration of the domain name. Dozens of stations have made the move, along with various major radio advertisers including Bose, FTD Florist and Domino's Pizza.

Registration

BRS Media's Web site *www.dot.fm* is set up to be much like Internic used to be. Until recently, Internic handled all the dot-com, dot-org and dot-net registrations — but it cost just $70 for a two-year registration.

So how did BRS Media manage to create "new" top-level domains?

Actually, these TLDs are not really new. The dot-fm is assigned to the Federal State of Micronesia, dot-am to Armenia. BRS Media has an "exclusive" partnership with these

Ruth Choate

countries to market and register their Web addresses.

What are the risks for making the move? Like any real estate bought overseas (even cyberturf) it's not clear what you can do to hold onto your property if the political climate changes.

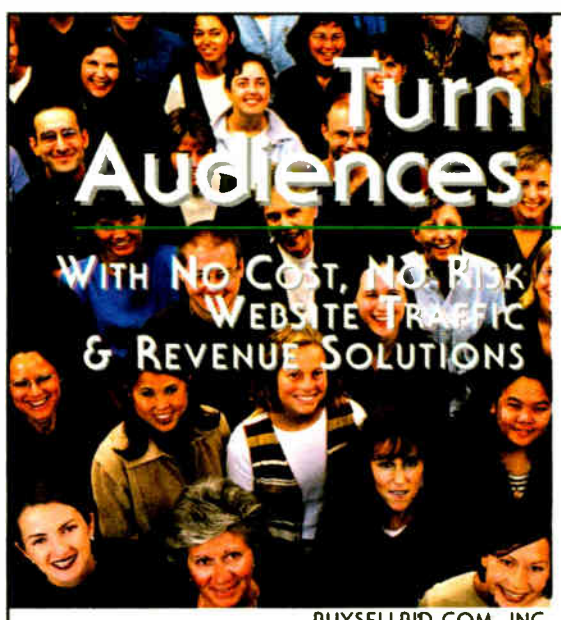
Ruth Choate, general manager at KNSX(FM) in St. Louis, hosts part of her station's Web site at *93x.fm*.

"*93x.com* was already taken, and then I heard about this. Yes, I don't have any control over this. But I have registered *93xFM.com* as a backup. I guess it's just the nature of the game that I have more protection with my terrestrial station than my Webcast. But so far, we haven't had any problems," she said.

93x.fm's alternative format rated No. 9 in Arbitron's first streaming audio ratings.

"If the Micronesians try to take it away from me, I guess it wouldn't be too bad to spend a few weeks down in a South Sea paradise to see what the deal is," said Choate.

AM station owners might find a trip to Armenia less enticing.



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World Radio History

ABC TV, Radio, Web Linked Is Goal

▶ MANDLER, continued from page 41

the community, promotional reach and a brand identity in the marketplace. You can move people to the Web site, and once they're there they need to have more than just the broadcasting content to keep them there. There needs to be a calendar of events, and things like that framework for connecting listeners.

RW: So a radio station can drive Web traffic — how about the Web directing radio listenership? How can you use the Web as a promotional vehicle for a station?

Mandler: Let's say you're a local broadcaster. You know somebody's interested in the New York Knicks because they've come to your Web site and they've told you so.

It just happens that you're about to break a story about Ewing's triumphant return. You can send them e-mail — "Tune into our broadcast tonight." And if they miss the show they can still catch up on your Web site. That way you can use the Web to market to your broadcasting business and vice versa. That's creating synergy.

RW: How do you fit within the context of the Go Network, the larger Web entity uniting all Disney properties?

Mandler: We constantly communicate. It's very interwoven.

We're moving into a direction of developing more and more cross-selling opportunities. The Go portal is the fifth or sixth most-trafficked Web site. So there's tremendous distribution potential in that.

Our research shows that a lot of people who are coming to the portal looking for geographic specific information. So if they come to the portal looking for information about L.A., we have a link for it. L.A. has a lot of broadcasting information properties, so that's a win.

'The ABC stations peak out each day around 4,500 to 5,000 simultaneous streams.'

RW: *How many streams do you typically handle?*

Mandler: The ABC stations peak out each day around 4,500 to 5,000 simultaneous streams. Very few companies could service us with that load. People tend to stay 15 to 20 minutes, which is pretty good TSL for the Internet.

RW: You also have staff dedicated to bringing content over to the station sites. How many people work to deliver content to the Web?

Mandler: There are people at each station whose job is to provide new content for the Web. Expanding those resources, or reorganizing them, is one of the things we're looking at now.

At the larger market TV stations, there's a guy or two whose job it is to maintain the Web site. The radio stations are headed in that direction. I would say over the next year, as we do the rest of our planning process for local end broadcasting, it's likely that we will revisit those issues and dedicate more resources to them.

RW: Is there another department to service the Web needs of the overall radio network?

Mandler: There's a small department — currently, about half a dozen people on staff. They do a little bit of everything. They maintain the relationship with RealNetworks, they're monitoring the audio, they're producing and supporting the Tom Joyner and Paul Harvey Web sites, they're working with the folks at Go for the radio sites.

'It's a ways away, if ever, that we'll sell streaming spots the way we sell over-the-air spots.'

RW: You were among the first to participate in Arbitron's Web ratings. How soon do you think you will be able to set advertising rates according to these ratings?

Mandler: It's a ways away, if ever, that we'll sell streaming spots the way we sell over-the-air spots. In the short term at least, it's more likely we'll sell a bundle.

We'll sell X gross rating points over the air, and X impressions of some kind or another online. To me, when you throw in the Web as a value ad, you're basically conceding defeat. You're saying to an advertiser, this has no value.

Once you say to an advertiser "This has no value," it's almost impossible to then come back and say, "I was wrong, it does have value." So you've got to sell it for something. As the audience base and the reach increases, it seems we should be able to sell it for more and more.

This is much like when FM radio first came along. People sold FM and AM as a bundled package, and then eventually FM stood on its own. I think we will see the same transition here.

RW: *Even though it is Arbitron's first study, how are you responding to the results?*

Mandler: I was happy we did as well as we did. When you look at that, I think that's example No. 1 for why we're ahead of the game.

There were four streaming service providers included in the study, and you hope that as Arbitron revises their methodology, more and more people will participate and it will cut across a broader slough of radio content out there on the Web.

RW: What about the relative value of online vs. airwaves? Figuring that production of content is the same, will it eventually be cheaper to reach listeners via servers instead of transmitters? What are the differences in operating costs?

Mandler: The assumption is that Webcasting is cheaper than broadcasting, but I'm not sure that's true. I can't sit down with a spreadsheet and compare, and also it's an artificial exercise, because you can't buy a frequency anymore.

But if you do an apples-to-apples comparison, there are all kinds of costs to Webcasting that people don't think about. First, we're in a unicast world. So you pay for every stream. Second, you've got to have a pretty sophisticated back-end system to handle advertising. That's expensive, too.

Third, the best Internet broadcasters out there, the guys with the largest audience, still only come up with a medium market radio station AQH. So there's a long way to go before you can make an apples-to-apples comparison.

But here's the real difference: After a regular radio station has built a tower and studios, the costs are the same — no matter how large the audience gets. With today's unicast Internet, costs scale along with audience size. That's something people ignore.

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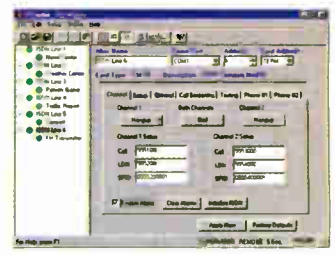

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World Radio History

'Dot-coms' Made to Serve Radio

▶ DOT-COMS, continued from page 41

with some of the large, established Web vendors, work with local Web specialists, turn their home pages into storefronts, or any combination of these choices.

Increasingly, the viable choice is to choose all of the above.

In the wake of hugely successful Internet IPOs, well-known streaming audio solutions like Yahoo's Broadcast.com have become an obvious choice for many. And upstarts like BroadcastAmerica.com have popped up to offer stations a place where they can have their content Webcast.

Streamers

These companies operate largely on a trade arrangement — companies provide streaming services in exchange for the content and/or for on-air promotion of the online provider. Here, stations get an easy, no-cost way to gain exposure through the Web.

Some services require that visitors to station Web sites be carried to the streaming companies' sites. Others, like WarpRadio, provide streaming services that reside on the station's Web site in exchange for airtime.

According to Greg Liptak, WarpRadio's vice president of business development, this arrangement best-serves radio's needs.

"After spending over 30 years in the broadcast industry, we felt that there had to be a better way to provide this valuable service and not cost an astronomical monthly fee. Therefore, we created a business model that radio understands: barter," said Liptak.

WarpRadio's barter amounts to two minutes of radio inventory Monday through Sunday 6 a.m. to 7 p.m. For stations completely sold out or for which this does not make financial sense, a sliding scale option costs between $800 to $1,200 per month.

WarpRadio connected KZTR(FM) in Bryan, Texas, to listeners in offices around town and as far-flung as Switzerland and Australia. Program Director Joey Armstrong sees ease of installation as being one of the biggest surprises.

"With their technical help, I set up everything myself. No engineer, no computer guru, no money spent on technical assistance on our end. It was quick, easy and as good as free. I have had zero downtime and no technical problems since coming online."

Armstrong said KZTR's radio signal missed many workplace locations before he chose the WarpRadio Webcast option.

"Our site traffic has increased from 25,000 hits to nearly 55,000 hits within the first two weeks KZTR(FM) started streaming. I know our listenership has increased right along with it. Don't forget — you get ratings credit for online listening," Armstrong said.

Don't forget — you get ratings credit for online listening.

— Joey Armstrong

Broad sweep

Other nationally known streaming media like RealNetworks offer a range of solutions targeted to the spectrum of the radio market, from beginners to experts.

The Real Broadcast Network aims its offerings at clients like ABC Radio Networks. For RealNetwork's Gregg Makuch, radio and music segment manager, that means quality audio for listeners and new revenue streams for broadcasters.

"RBN was set up to overcome many of the challenges of broadcasting to large audiences on the Web — after all, the Internet was not designed with multimedia broadcasting in mind. RBN has hundreds of 'broadcast hubs' placed strategically throughout the Internet backbone and ISPs.

"The programming is thus pushed out to the 'edges' of the Internet — avoiding those congestion points and traffic jams — to ensure a clear, clean signal that can accommodate large audiences. Listeners won't get a busy signal," he said.

Aside from servicing the end user, stations have new ways to connect their advertisers to these listeners, to create a real business out of Internet broadcasting.

In December 1999, RealNetworks announced the RealServer Advertising Extension, which enables broadcasters to use the Web to deliver rich media ads targeted to specific users within the RealPlayer.

RBN also announced in December the capability to replace over-the-air ads with Internet-only ads in a live network radio feed.

"We debuted this service with ABC Radio's hugely popular 'Tom Joyner Morning Show,' which is sold out for the year for terrestrial broadcast. ABC now has twice the inventory to sell, one for terrestrial, and one for Internet," Makuch said.

Outsource or not

While a large number of companies have sprung up to provide Internet services to radio, familiar radio vendors have developed products, too.

Established companies such as RCS and Dalet have created products that integrate with their existing computer systems to create a seamless extension from on-air to online.

According to Robin Wang, director of marketing at Dalet, there are a few fundamental distinctions every radio manager should be aware of.

"As radio stations evaluate their Web presence and strategy, I think stations should carefully consider whether they should outsource their Web presence to a service provider or provide these capabilities in-house," he said.

"Outsourcing allows a station to establish their Web presence quickly and easily. However, they could give up revenue opportunities and control of the content — hence the branding of their station — something they should think about very carefully," Wang said.

But given the increasing computer system sophistication, in-house solutions may not be as difficult as they once were.

"Stations with modern digital automation systems may already have much of the infrastructure necessary to allow stations to establish a Web presence," he said. "Systems like Dalet's can, for example, be used to stream audio onto the Internet and can also publish information such as what's playing now, last 10 songs played, top-10 hits, news stories, etc. onto a station's Web site."

This may not be as easy was turning this over to an outside service provider, but may be the better long-term investment.

"Performing these functions in-house will of course require some work and expertise, but it will allow them keep control of what is done on their Web site and hence the station's brand," Wang said.

Ad aid

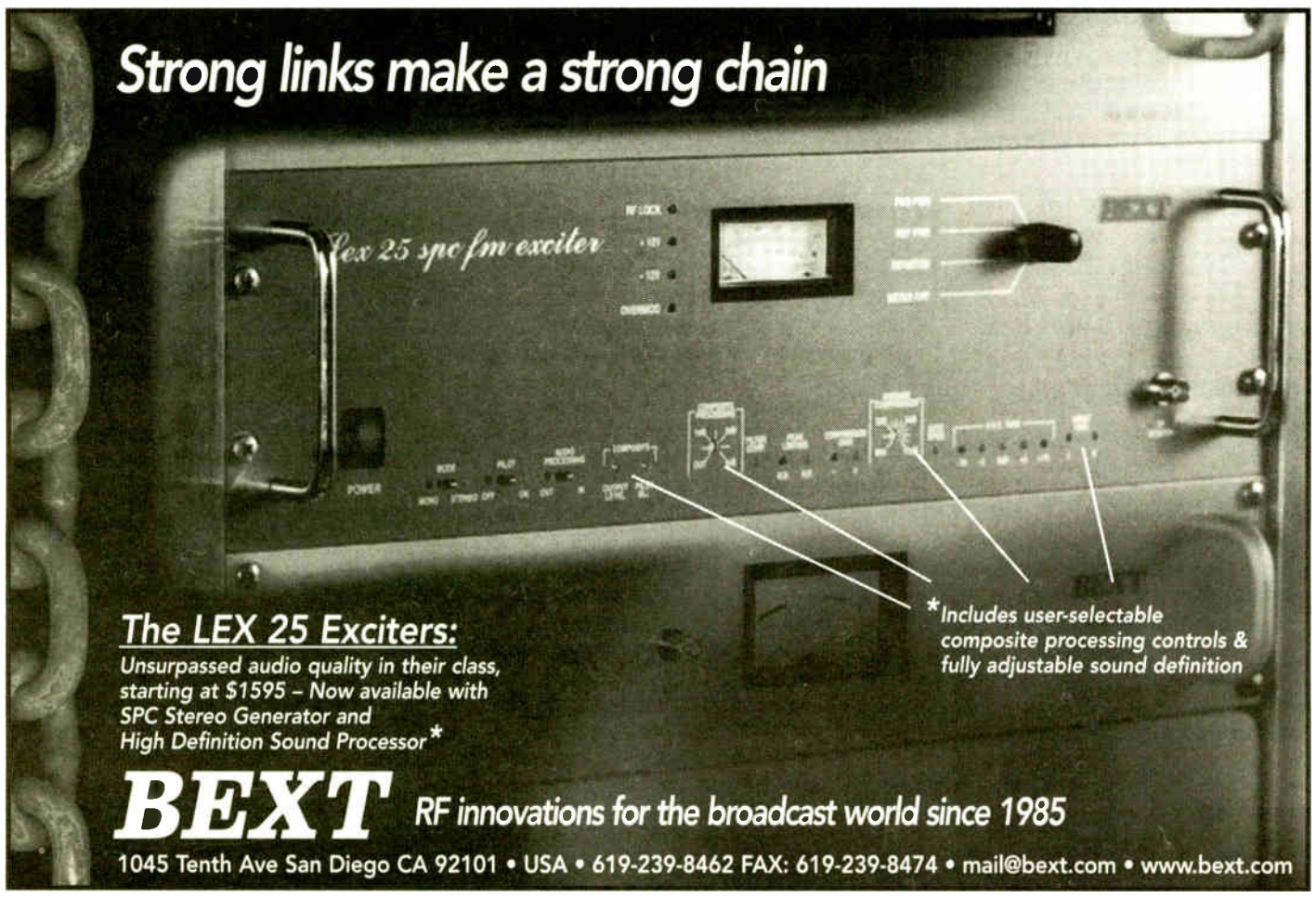
There are many ways stations can chase profits on the Web.

Making headlines this year with its broadcast partnerships, BuySellBid.com is an online classified, auction and personal ad provider. Skip Tash, radio division executive vice president at BuySellBid.com, believes that the Internet is a money maker, rather than a competitor, for radio.

"The Internet is the new frontier that offers significant revenue opportunities, but radio stations need to move now or lose ground to the competition," said Tash.

Another new vendor offers a way to sell your stations' unsold ad inventory. As a broadcastspots.com affiliate, a station can post its unsold inventory on the company's Web site, where media buyers from coast to coast can purchase it online.

See DOT-COMS, page 49 ▶



World Radio History

▶ DOT-COMS, continued from page 48

Allen Dick, CEO of Dick Broadcasting in Greensboro, N.C. and a broadcastspots.com client, said the "dot-com" service is a way for radio to move perishable inventory that has value to advertisers.

"If you're an advertiser and you want to buy, say, Greensboro/Winston-Salem/High Point, North Carolina and you want to get this frequency and you want to reach a specific demo target, this might be the way," Dick said.

Dick also said that he believes that broadcastspots.com's instantaneous access to unsold inventory, at a set and probably reduced price with no haggling, will be attractive to buyers.

Your brand

A number of streaming service providers have developed business plans that do not involve co-branding.

According to Webcasts.com CEO/founder Scott Klososky, Webcasts.com does not require stations to drive traffic to their site to hear the content.

"We place the content on the station's official site, where listeners expect to hear it. The revenue opportunities for the station are increased because the e-commerce application and integration are seamless," Klososky said.

WebPresence President David Owen said radio broadcasters should be wary of co-branding deals with "dot-com" providers. He said he could hardly believe the success co-branding strategies have enjoyed.

"It's appalling to me the number of stations signing up for this. Basically these companies say 'Come sign up with us — we'll give you, say, half the revenue — and you get free Internet presence.' I see that as selling yourself down the river," he said.

"We feel that is a really dangerous position for radio broadcasters to get into."

Owen offers an online radio advertiser guide, which he said makes it easy to put advertisers on a station's Web site.

"This goes head-to-head with classified advertising in newspapers. It adds everything that the newspaper has to differentiate itself from radio — detailed information, pictures of the product, retail locations, numbers, coupons.

"We've designed this as the newspaper killer for the radio ad rep," Owen said.

Other vendors following this "private-label" strategy include Radiomall.com, Ubrandit.com, Getmedia.com and Globalmedia.com. Dave Barlow created Radiomall.com in 1996 as the radio industry began to deregulate and the Internet started to come of age.

"What I saw then and still see today is radio station Web sites that are like old magazines. They do absolutely nothing to invite their listener back again," Barlow said.

"Once you have been to their Web site, read it, done it, did it, then there is no reason to come back. I have always said if we did the same thing on the air by playing the same song over and over, pretty soon listeners would get tired of hearing the same song and go away and start listening to another station," he said.

What Radiomall offers is content for station Web sites.

"We can do several things. We can offer stations content that changes on a daily basis, giving listeners a reason to come back on a regular basis — simple things like the weather, jokes, horoscopes and a whole host of other products," said Barlow.

Service

Greg Wilfahrt, marketing director of Ubrandit.com, sees station profits in the Ubrandit e-store music, book, video and DVD offerings that mirror the look and feel of a station's own home page.

"You are able to customize each 'store' with *your* name, *your* logo, *your* site's color scheme, and your site's return navigation information. Clicking on the 'home' tab or on your logo will return the shopper instantly to your home page. What's more, you feature the content — genre, artists, titles, etc. — that you wish to showcase in your store. Listen to clips from your favorite artists. You can even sell station merchandise from your store," Wilfahrt said.

In much the same way, Getmedia.com turns music stations into a storefront for music sales. The playlist on-air is synched with the artist information online. Listeners are a click away from making an impulse buy.

According to Globalmedia.com's media consultant Susan Pickering, the company provides services while remaining invisible to visitors.

She said Global Media offers a plug-and-play solution for audio streaming, video streaming and a complement of entertainment and e-commerce. It is customized for each station.

"This makes a station's Web site as high-quality sounding and productive as their on-air terrestrial station," Pickering said.

All this comes with little outlay for the station, according to Pickering.

"We generate our revenue in a shared revenue profile. If a station's site does not attract viewers, we cannot make money, so we are truly a partner in the full sense of the word."

Global Media, she said, recognizes that on-air inventory is valuable but may be limited, so the company has a new method for generating its revenue.

"We use a revenue-sharing model based on site-generated revenue," said Pickering.

For Global Media client Jack Mullen at WQZK-FM, a 50 kW classic rock station in Keyser, W.Va., the chance to deal with a single vendor for all his station's needs has simplified matters tremendously, and promises to be lucrative. WQZR-FM has been a Global Media client since early last year, when Mullen wanted to upgrade their "Web store."

"We were using Jam TV on our site for some eight months. When Global came, we were excited because Global gave the best impression that this was us, our brand. Visitors to the site never leave the site. They do an excellent job making the 250,000-plus items look like they're in our inventory," he said.

In addition to creating a "private brand" solution, the streaming audio service is also "private brand" — the RealAudio player is customized to the station logo.

It's also cost-effective.

"I looked locally to see what it would cost to do this on my own. A T1 line alone cost $550 a month — with no hosting. Here, the price for unlimited streaming, plus a share of the revenues from banner ads is just $1,000 a month.

"The best part is that by buying the package — the store and streaming — we get a higher cut of the store revenues. You get 40 percent of the Net without streaming, and 60 percent with."

Though Mullen has not reached a break-even point with his online venture, he sees this as the key to survival of his independently owned station.

Though a large number of vendors have entered the field, there is no sign of a shakeout anywhere in sight. Relationships between stations and vendors are likely to evolve fast to keep up with the changes in the Internet world. The particulars may change, but the need to have such partnerships is likely to remain.

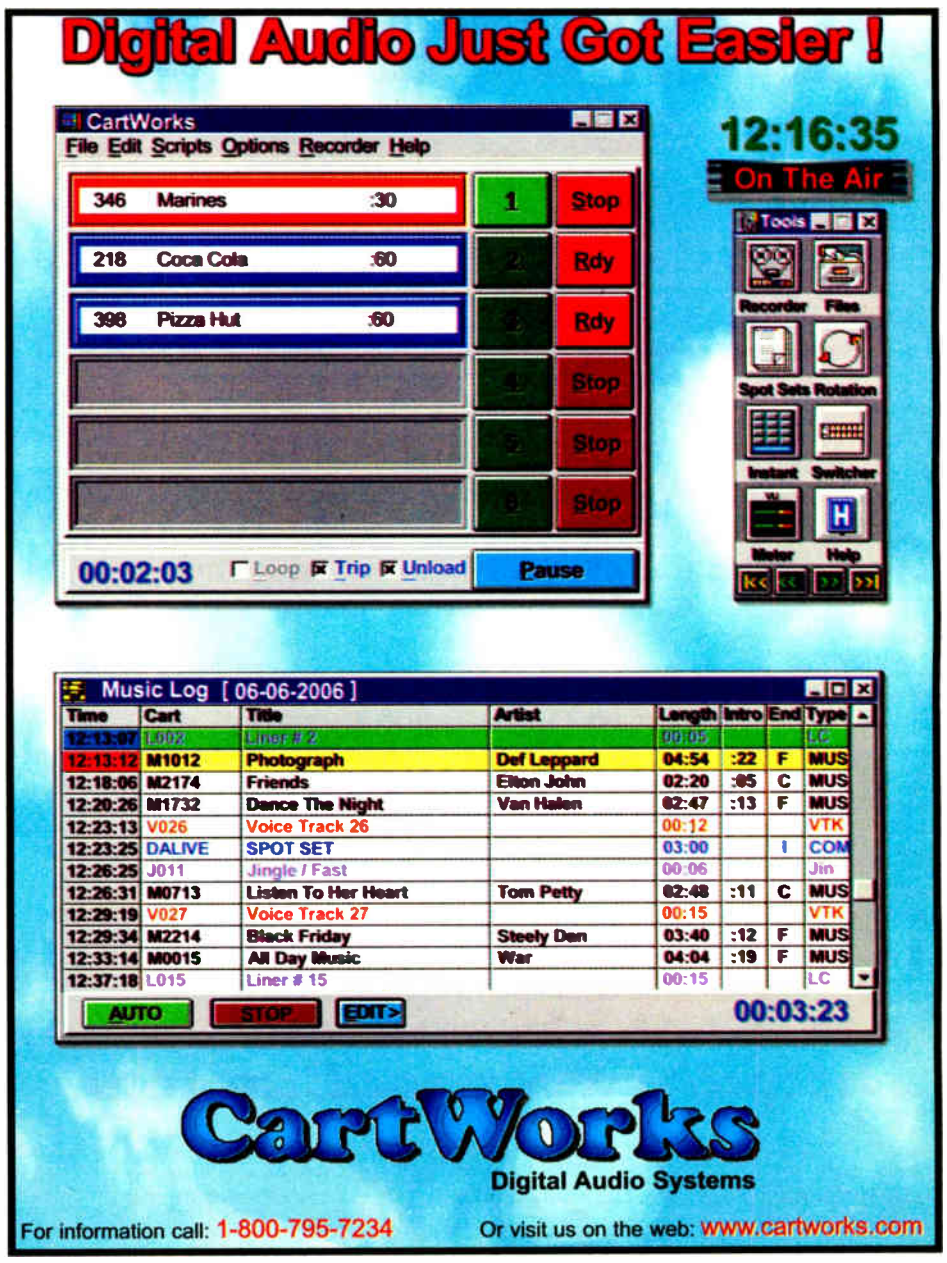
■ ■ ■

Carl Lindemann has worked in radio as a field reporter and production director.

He consults on radio/new media projects. He also is political correspondent for the PRI program "Beyond Computers."

ABC's' Tom Joyner Morning Show' now has twice the inventory to sell, one for terrestrial, and one for Internet.

— Gregg Makuch
The Real Broadcast Network



World Radio History

Streamers Look to the Radio

▶ SMW, continued from page 42

"The Sonicbox takes radio into its next evolutionary step to imBand — Web radio that makes listeners happy and stations profitable. It uses the PC as the nerve center to deliver killer music and audio from the Web," said an enthused Sonicbox President Niko Bolas.

The Front of the Sonicbox

Alternative Net radio stations were much in evidence here.

Major player MP3.com announced that after it quietly launched a service called "Stations" in late November, allowing users to create their own Web-based stations, some 4,100 were launched in the first two weeks.

Users get to create their "radio stations" by accessing MP3.com's 200,000 songs. (There were a number of first-time companies here providing the hardware to set up beefed-up "personal radio stations.")

"'Stations' adds a layer of content to MP3.com through users' song recommendations, and this significantly increases exposure for MP3.com artists with radio fans," said MP3.com CEO Michael Robertson.

"One artist can now be promoted on an unlimited number of stations as consumers drive friends and families to MP3.com to view their Web site." For information, visit *www.mp3.com*.

Seattle-based RealNetworks CEO Rob Glaser showed up to make several major announcements of interest to radio broadcasters who are Netcasting. The company unveiled advancements to the RealSystem G2, ad-insertion solutions,and a relationship with DSL provider Covad.

Real System G2 advances include a new RealServer 7.0, which Real said delivers up to 250-percent improvement in server capacity, improved client connections and reliability. The new improvements, Real said, are designed to ensure rigorous scalability and unattended operation "to meet the increasing demands of high-quality media content over the Net."

RealServer 7.0 includes the new Advertising Extension to make it easier to include streaming advertising on Netcasts. Beta versions of RealServer 7.0 Plus are available for purchase and download. (*www.realnetworks.com/*)

The RealPresenterG2 was unveiled; it's made with Intel Internet Presentation software. It converts Microsoft PowerPoint presentations into broadcasts and installs itself directly into the menu of PowerPoint97 and PowerPoint2000. A 60-day free trial of the RealPresenterG2 beta is available at *www.RealNetworks.com*

RealNetworks also said its Real Broadcast network (RBN) and big Net ad agency DoubleClick have teamed up to make it easier for broadcasters to provide targeted in-stream ads. It's offering ad services to radio stations that want to increase sponsorship revenue on their Netcasts. RBN said it can now replace on-air spots with different streaming ads.

Also at Streaming Media West, WarpRadio.com (*www.warpradio.com*), a radio-station streaming-media provider, announced it had signed up 100 traditional radio stations for its Net/barter service.

The Denver-based company's President, Greg Liptak, said, "We're providing radio stations with an Internet channel to penetrate new local, regional, national and international markets and develop incremental audiences."

WarpRadio has developed a barter arrangement with the radio stations available on its Web site. In exchange for continuously streaming the stations' programming live on the Net and providing each station with its own informational site on Warp's site, Warp gets two minutes of prime-time ad time each day. (Further info: *www.warpradio.com*)

Pro-Bel, part of Chryon and a broadcast-equipment maker, has introduced what it calls a simple "plug-and-stream" media coder for anyone who wants to encode streaming media for Webcasting an event. The Pro-Bel Clarinet coder, the company said, "will revolutionize streaming media encoding."

New products are blurring the lines between radio and the Net.

Phillip O'Farrell of U.K.-based Pro-Bel said, "We recognized that audio pre-processing is currently the key to successful streaming on the Net, and we've taken the guesswork out of configuring domestic PC hardware for use as an encode engine."

Available in a number of configurations, the broadcast-compliant Clarinet has dual power supplies with internal cooling and an integral LCD screen for monitoring and for status information, all in a 2U rack-mounted frame. In addition to basic modes including System, Encode and PSU monitoring, Clarinet displays useful navigational information including ISP target address, streaming rate and status, basic DSP parameters and options for the type of encoder. (More info: *www.pro-bel-clarinet.com*)

KIMA transmits streamed media to a home stereo.

Sonic Foundry, a major convention presence and sponsor, showcased its high-end digital audio editor, the Sound Forge 4.5. It affords rich streaming-media formats for both Windows and Real players. It contains tools for sound design, applications for audio production, digital editing options and the ability to automate any process, effect or tool that ships with Sound Forge — or any other DirectX plug-in — across thousands of files. The company said this can eliminate hours of "unproductive tedium."

The company's Vegas Pro is a new advanced multitrack media-editing system. Vegas Pro offers everything, the company said, from complex, simultaneous multitrack recording and playback to simple punch-ins. (Info: *www.sonicfoundry.com*)

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World Radio History

Choosing The Stream: Web Audio

Ken R.

More stations than ever are streaming audio. What can we learn about it from smart station Web site managers?

Before presenting some opinions, hear what Norman Barrington, a Scotland-based Web designer, has to say about the basics of Web audio.

"RealAudio was the first format to allow streaming audio and later, video. The drawback is that the sound is interrupted if the data flow is too slow and the buffer is empty," he said.

Many stations don't have a clue about Web radio processing.

— Dave Biondi

"Quality was poor to begin with, and stereo files sounded even worse. Gradually, with algorithms improving and faster modems, quality has improved," said Barrington.

Of Windows-standard WAV files, Barrington said, "Most audio files are too large, and long downloads limit the use on a Web site. However, the quality of WAV files can be excellent, as good as a 44.1 kHz stereo CD.

"As Web designers, we must balance our content with availability of the software, and now most people have access to RealAudio."

Many sites present short welcoming jingles or other brief effects as WAV files.

"Microsoft noted the popularity of RealAudio and therefore included the format in its Media Player. The audio this software produces is identical to RealAudio's software, and so it does not matter which is used at the receiving end. The Web

See WEB AUDIO, page 56 ▶

Latest Twists on Stream Schemes

Mel Lambert

It appears the monopoly of FCC-regulated stations supplying audio on the airwaves may be coming to an end.

Companies are using the Internet to provide audio-based services that offer a variety of music and related materials. Radio stations have been exploring

MPEG 01 07 10

marketing opportunities to establish themselves in this alternate way of transmitting to an increasingly Web-conscious audience around the world.

Due to the restricted bandwidth available for most Internet users, several techniques or schemes have been established to data-compress material before delivering it by dial-up, cable-modem or DSL links.

Real-time streaming

Typical data rates for real-time streaming audio are between 32 kilobits per second for dial-up and 284 kbps or more for high-capacity digital links.

Complementing such compression schemes are encoding/encryption schemes that enable non-compressed material to be purchased from electronic commerce sites offering CD-quality audio.

The key to the success of streaming audio is the trade-off between low data rates and sufficient replay quality. Consider that a mono 32 kbps audio file has been data compressed 22:1 from its original 16-bit/44.1 kHz CD-compatible content. The fact that these schemes can produce an acceptable-sounding result is remarkable.

However, most consumers listen using small speakers with restricted low-frequency response. The end result is nonetheless intelligible, even with complex music waveforms.

In essence, to significantly reduce the number of bits, all data-compression techniques delete redundant information, and then decode the data at the receiving end in an attempt to make those deletions inaudible.

A signal is analyzed either within the Temporal Domain or the Frequency Domain. Temporal Domain compression encodes information in fewer bits than required by conventional 16-bit PCM systems by coding level-change differences, rather that instantaneous levels measured every sampling period.

Frequency Domain analysis uses bits that designate the contents of important "critical" bands of information, particularly within the low-frequency region.

Finally, these coding systems make intelligent estimates of the material being masked or hidden by dominant tones or transients and then eliminate that data from the bit stream. Because the ear is less sensitive at mid to high frequencies, such frequencies are allocated fewer bits in certain coding schemes.

All three techniques utilize Transform Coding, which analyzes the signal in the frequency domain. Bands in which information is masked by continuous tones or transients will be ignored by such systems, thereby enabling the compression algorithm to concentrate its bit allocation to the bands containing subjectively relevant information.

liquid audio

In addition, transform-based systems normally utilize a system of predefined waveform patterns from an established library of sound models, and send an identifier for the decoder to resynthesize the closest-fit library model.

A number of companies offer proprietary data-compression schemes that provide different twists on the same theme.

The emergent market leader is RealNetworks, which developed RealAudio players for Windows- and Mac OS-compatible systems, as well as compression/encryption engines for Web site masters that provide streaming audio.

Using its own proprietary data-encryption schemes, RealAudio pro-

real™ RealNetworks

vides techniques for streaming audio files on the Internet at mono data rates as low as 32 kbps, on up to 44, 64 and 96 kbps for stereo files.

For additional security, the firms various PC-based applications also enable files to be encoded in RealAudio Secure (RMX) or Unsecured (RMJ) file formats. Secure files can only be replayed on the computer that encoded the file. Unsecured files can be transferred freely between different computer systems.

Internet commerce of copyrighted music and related material can only be optimized on the secure encoded format, plus a replay-only password or similar de-encryption scheme.

Also popular is the industry-standard

See STREAMING, page 54 ▶

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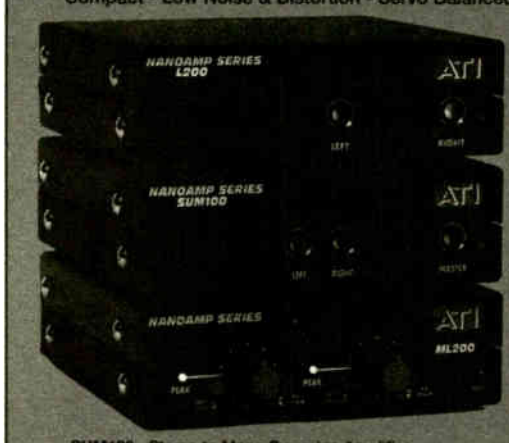

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World Radio History

PRODUCT EVALUATION

VCR Records Multiple RA Feeds

Read C. Burgan

Almost every day I find another Web site with some great RealAudio (RA) files. Listening to them is another matter. Web congestion, server overload dropouts — all these make it more hassle than it's worth, until now.

I discovered a nifty software utility that has changed my attitude about audio on the Web and the way I listen to RA. It is produced by Streambox Inc. and called VCR or "x-file get."

Streambox VCR allows downloading RA files from its resident Web site right onto the computer's hard drive. The company has had some recent headaches (see sidebar), but the utility works quite well.

You would want to do this for several reasons. The first is reliability.

How many times have you listened to a radio station feed in RealAudio, only to have Web congestion or server overload disrupt the stream? This is solved with VCR. If the stream is interrupted, it will reconnect and resume the download where it left off.

The second reason for downloading is to take advantage of the maximum streaming rate offered by the host Web site.

If limited by a 28.8 modem or a bad telephone line, it can still be played flawlessly at the maximum rate off the hard drive. Even those with higher speed hookups find that Web congestion interrupts the flow or reduces the useable streaming rate.

The third reason to use this utility is that it can download more than 10 streams simultaneously. It's like having 10 or more recorders all recording at the same time.

I downloaded 10 RA files, each an average of 25 minutes with a 16 kbps streaming rate, at an average transfer rate of 50 kbps each. In less than 10 minutes, I had 10 programs downloaded.

Until this utility came along, I recorded each program in real time to a cassette deck. That took five hours, if congestion didn't disrupt the stream.

If I want to keep the programs, I can archive it in the original RA format, avoiding the kind of losses that occur when encoding and decoding audio to cassette.

It is a reduction in archival storage space. One month's worth of programs takes up about 80 MB. That is 27 programs. At that rate, I can archive about 189 programs on one CD in the same space that would require around 90 C-60 cassettes.

The program is used by opening the SI VCR program, finding a Web site with RA, click on the RA link and drag it from your browser to the VCR software window.

VCR performs the transfer automatically, displays the size of the original file and the amount transferred, and indicates when it is complete. The software can even be set to do the download at a predetermined time — overnight, for example, when you are sleeping and not using the computer for anything else.

I have successfully downloaded files from Minnesota Public Radio, Focus on the Family and NPR. The Minnesota site archives "Prairie Home Companion" in individual segments. I downloaded the two-hour program with VCR in less time than if I had streamed each segment simultaneously.

In some cases, the transfer speed is

See VCR, page 54 ▶

Court Fight

Streambox found itself in the middle of a court fight thanks to the popularity of its products.

On Dec. 23, 1999, a federal court in Seattle issued a restraining order against Streambox Inc., requiring it to "halt the development, production and sale of various company products, pending a full hearing on Jan. 7."

Subsequently, the court issued a ruling that had both sides claiming victory.

Restraining order

The restraining order, issued by a U.S. district court, was in response to an action filed by RealNetworks, which alleged that the Streambox Ripper, Ferret and VCR caused irreparable harm to RealNetworks.

Ripper is a software utility that enables the user to convert CD audio, RealAudio and Windows Media Audio to MPEG-3, WAV or Windows Media Audio files.

Ferret is a media search application that enables the user to search for video, audio, live and archived media on the Web.

According to the CEO of Streambox, Robert Hildeman, "The main complaint is that our Streambox Ripper product allows content owners to control file format, not RealNetworks. We believe that the larger picture of Real's whole tactic is about preventing migration of digital media files from RealMedia to other platforms, such as Microsoft's Windows Media. We think that's unfair to both consumers and content providers."

RealNetworks alleged in the action that Streambox had violated the Digital Millennium Copyright Act and copyright infringement.

On Jan. 18, the court issued a ruling that appears to let Streambox sell Ripper. But a preliminary injunction prohibits Streambox from marketing VCR and Ferret. Alex Telisine, chief technology officer of Streambox, said, "We plan to work with Real to open 'Copy Switch' and make VCR completely legal."

Rebuttal

However, Bill Way, associate general counsel for RealNetworks, is skeptical.

He said, "Assuming that they were somebody who had not demonstrated themselves to be a pirate, I don't know if we would look at them as someone who we would want to partner with anyway.

"We contacted them and asked them to stop and they just blew us off completely, and told us that they were going to do whatever they wanted to do," he said.

"So, we've had to go and spend and awful lot of money and an awful lot of time and effort to get a court to actually order them to stop. We're not really of a mood to suddenly start working with them," said Way.

"Copy Switch" allows RealAudio content providers to turn off the record function. Currently most RealAudio providers disable the record function, so this could have the effect of rendering VCR incapable of downloading the majority of RealAudio content on the Web. The future of Ferret is uncertain.

Because the ruling was a preliminary injunction, expect to hear more on these issues.

Streambox argues that VCR is important to content owners as it allows the owners to extend their brand and manage their digital distribution. Streambox has digital rights management built in.

The Ripper program will continue to be available for $34.95.

— Read Burgan

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World Radio History

Decisions on Streaming Audio

▶ STREAMING, continued from page 51

MP3 (or MPEG Layer 3) format. Standalone MP3 encoder/decoder programs are available, plus compatible options within RealAudio applications making MP3 a widely accepted format for delivery of high-quality audio.

MP3 encoders can be set to run at 32 kbps/mono, 56, 64 and 96 kbps/stereo, in addition to enhanced-fidelity modes of 112, 128, 160, 192, 224 and 256 kbps.

MP3 offers Variable Bitrate Encoding, which allows the Internet user to select the bit rate or quality level based on the needs of each piece. More complex sections such as orchestral pieces may require more data bits to create a high-quality sound. Such demanding sections might be recorded at 128 kbps.

The obvious result is a compromise between high-quality sound and smaller data files or additional Internet bandwidth.

Liquid Audio

Liquid Audio, like RealNetworks, has spent a great deal of creative R&D to perfect a proprietary encoding scheme, based on Dolby Labs AC2 data-reduction algorithm, rather than MPEG-derived techniques to provide secure, data-reduced transmission and storage options.

Also designed for Internet commerce, Liquid Audio-compatible "Music on Demand" sites enable vendors to publish files for real-time browsing and possible e-commerce purchase. Musical selections can be streamed live over the Internet, in addition to brief, high-quality audio clips that can download to a Liquid Player.

Convenient, easy-to-use software allows downloading of a recordable version of the full song, for example, after a customer has purchased a copy on a secure credit card transaction. Although the "Liquid Track" can only be recorded onto a CD once, to reduce piracy and unauthorized distribution, users can store and replay them indefinitely on a hard drive.

Finally, the Microsoft Windows Media application that comes with most Window and Mac PCs can be used to decode a variety of compressed formats. These include the proprietary Streaming Media audio and video formats, as well as MP3 on the Internet.

Considerable advantages

The process is similar to RealNetwork and Liquid Audio, and includes a suite of audio/video players plus data-conversions and encoding functions. Just to jack up the competitive wrangling another notch, there are considerable commercial advantages at stake.

Microsoft recently publicized claims that its Windows Media player provides better audio playback quality on a wide cross section of data links, when compared to MP3 encode/decode schemes.

I believe this is the beginning of this debate, rather than the end.

■■■

Mel Lambert has been involved with the production and broadcast industries on both sides of the Atlantic for several decades.

I believe that this is the beginning of this debate, rather than the end.

Interest in Online Music Purchases

According to a recent PricewaterhouseCoopers Consumer Technology Survey, Internet access in the United States at home increased to 43 percent during 1999, up by nearly 60 percent. It nearly doubled in the United Kingdom to 24 percent.

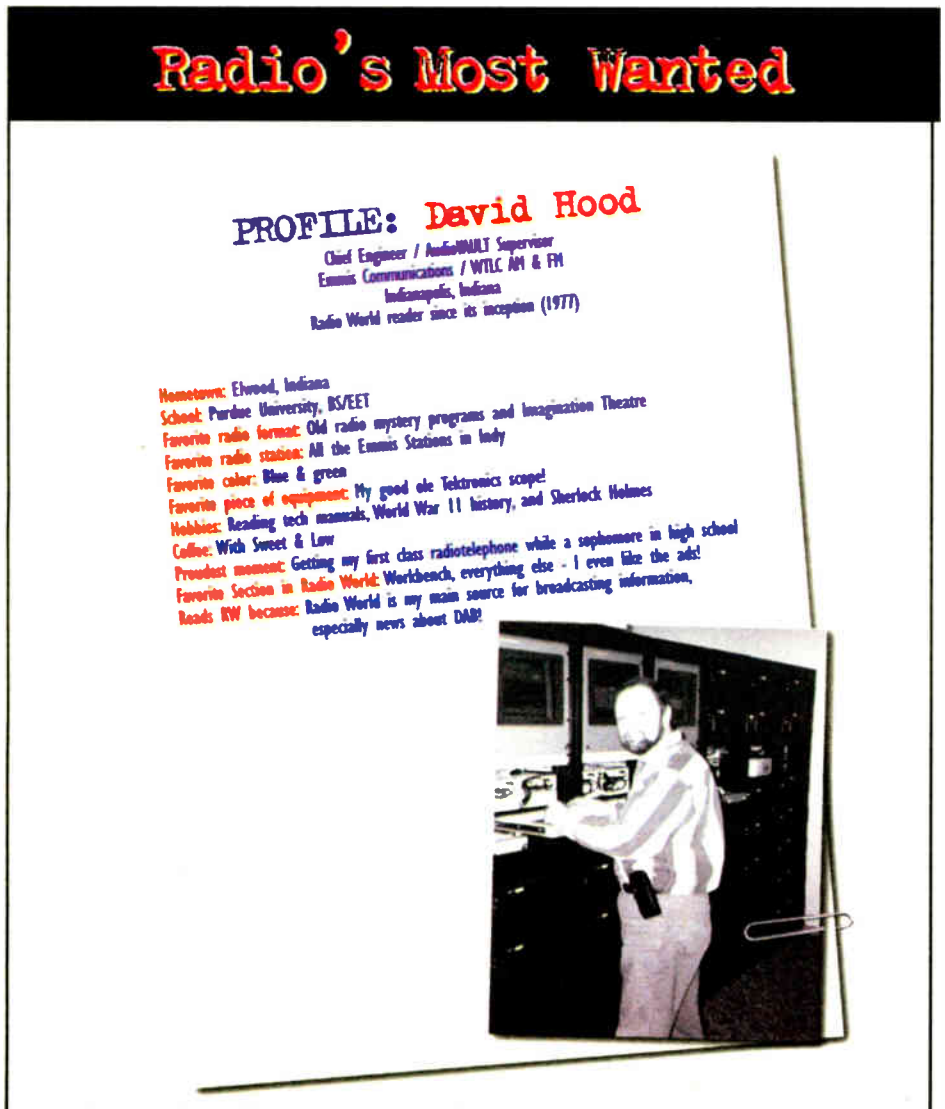
U.S. consumers spend almost twice as much time on the Internet as Europeans — an average of 5.3 hours a week in the United States, compared to an average of 2.4 hours in Europe.

The survey concludes that this growing number of consumers with home access are communicating over e-mail, and MP3 and similar technologies have made their presence felt.

Twenty-five percent of Web surfers polled in both U.S. and Europe said they download music from the Internet. Approximately 60 percent of the Internet users polled said downloading music has exposed them to new artists and music, which prompted the user to go buy a CD or tape.

Meanwhile, half say that downloading music has saved them from making a purchase.

— Mel Lambert



Archiving RealAudio

▶ VCR, continued from page 53

faster than if you were listening to the clip in real time. In other cases, it remains at the same rate as real time.

In all fairness, the VCR does not work with every Web site. It is designed to work with RA clips. Even then, I could not download the RA old-time radio clips on the Radio Spirits Web site.

I tried it on live RA feeds, even though the software is not designed to accommodate those. I had no success in downloading live feeds from Yahoo's broadcast.com but I was able to download Minnesota PR's live mono feed. The stereo feed downloaded, but was unusable due to congestion. The software cannot go back and pick up what it missed from a live broadcast.

The performance of VCR depends on the circumstances, including the server, the host server for the RA clips and Web congestion.

The most amazing part is the cost for SI VCR. It is shareware and can be purchased from the Web site. A working demo can be downloaded for free so you can try it for yourself. The product may be free in the future, if advertising supports it.

There is a downside to VCR in that it will not work if the Streambox Web site is down. On several occasions, the site was down for several days, so the software was not functional during that period. The company did not answered our inquiries.

I am using the new Beta 1.0 version, but I have also used the current version and performance is similar.

Now, if someone would develop a CD player that plays Real Audio and MPEG-3 files off a disk in the native format, I will be one happy camper.

■■■

Read Burgan is a writer and former public radio station manager. He can be reached at (906) 296-0652 or via e-mail at rgb@bresnanlink.net

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World Radio History

◆PRODUCT GUIDE◆

Products for Radio Production

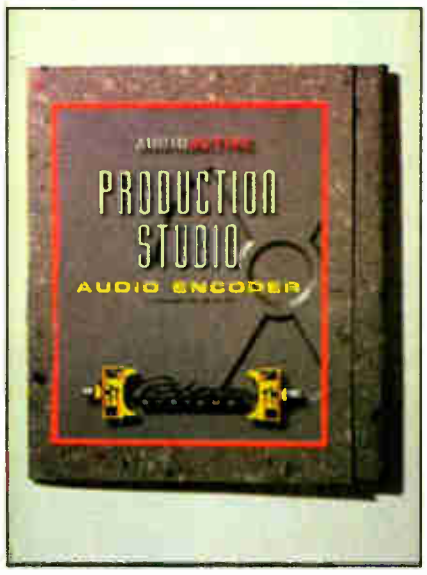
Mail info and photos to: RW Product Guide, P.O. Box 1214, Falls Church, VA 22041

Telos Products for Web

Telos and Cutting Edge offer several tools for Webcasters.

The digital Omnia.net Internet Audio Processor is a DSP-based audio processor from Omnia. It uses processing algorithms developed to provide spectral balance and loudness control for Webcasts.

Omnia.net compensates audio for the reduced bit rates used in streaming formats, and for conditions typically found in desktop multimedia listening environments. The interface includes presets for novice users and an expert mode for precise control of



dynamics.

Telos also offers the Audioactive Streaming Decoder, a stand-alone Internet audio receiver/player that supports stereo broadcast-quality audio over LANs, intranets and broadband connections. It is suited for professional point-to-point or point-to-multipoint live audio transmissions, audio backhaul, audio database browsing and remote monitoring over IP networks.

Instant playback of MPEG Layer 2 and 3 files and live streams is facilitated using the built-in 10base-T Ethernet port. The decoder also has a 24-bit D/A converter, balanced or unbalanced audio outputs.

The Audioactive MPEG Realtime Encoder is a standalone hardware platform for real-time encoding of audio signals for Net streaming.

Telos Omnia.net

Sold as a complete streaming solution, the encoder can be used for Web streaming with both Microsoft Media (included) and RealAudio servers or both simultaneously. It can also stream directly using MP3 multicast, and can connect to an intranet for live streaming using IP Multicast where no Web servers are required.

Applications include audio backhaul, satellite back-up, point-to-multipoint audio distribution and audio logging/archiving.

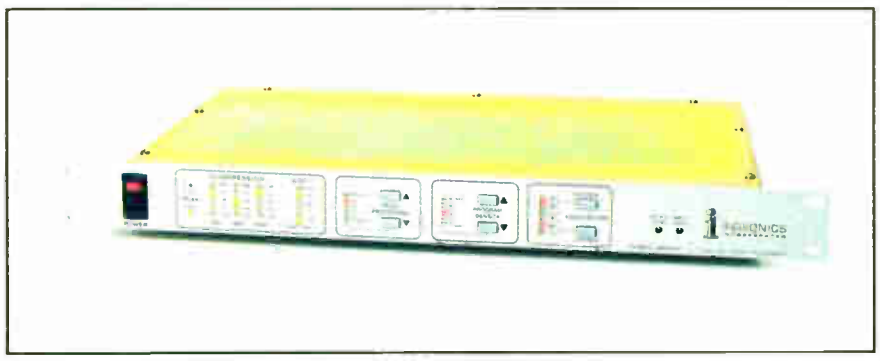
Audioactive MP3 Production Studio is software for encoding MP3. Production Studio is designed for optimal audio encoding, supporting bit rates from 8 kbps to 256 kbps using Fraunhofer compression codecs.

It also will convert PCM files to compressed WAV and Microsoft ASF formats. The Production Studio Pro upgrade includes unlimited batch capability and encoding options for broadcast-quality audio.

For more information, call the company in Ohio at (216) 241-7725 or visit the Web site at www.telos-systems.com

Inovonics on The Web

Inovonics has developed the WebCaster, an Internet broadcasting audio processing system to optimize monaural Internet audio transmissions assuming a top-end cutoff of about 5 kHz.



It operates in the analog domain and does not include the A/D conversion and streaming audio coding functions.

The WebCaster has a slow, gain-riding AGC stage, followed by a three-band compressor.

It then feeds a peak controller and sharp low-pass filter, ensuring that program peaks and out-of-band energy will not overload subsequent analog-to-digital conversion.

For more information call Inovonics in California at (800) 733-0552, or download the WebCaster data sheet from the Web site at www.inovon.com

BE Launches New Streaming Device

Broadcast Electronics promises that its new eStream will deliver on-air quality over the Net.

The eStream is a streaming audio hardware/software processing solution that enables radio stations, media producers and corporate Web masters to convert analog content into the digital medium without sacrificing sound quality or taxing CPU power, according to the company.

eStream allows users to stream several media servers at one time, and enables producers to do live Webcasts with the quality sound that stations provide to their terrestrial signals. The product offers customers an audio processing card that is powerful enough to carry the workload of analog-to-digital conversion, and includes audio plug-ins from Waves Ltd.

The plug-ins allow content producers to customize and prepare sound for streaming media across the Net.

"eSteam allows streaming media producers to leverage their existing infrastructure with our advanced hardware and software solution," said Mark Jamieson, Broadcast Electronic's vice president of sales and marketing.

For more information, contact the company in Illinois at (217) 224-9600 or check out the Web site www.bdcast.com

Orban Assists Webcasters

The Orban Optimod 6200 audio processor is aimed at traditional broadcasters adding Internet streaming audio to their services as well as non-traditional Webcasters of Net-only programming.

The 6200 offers three processing structures: protect, two-band and five-band. Features include four-band EQ, compressor and a look-ahead peak limiter. The two- and five-band modes also include automatic gain control.

Jake Solomon, creative special ops and A/V engineer for RealNetworks, said, "The 6200 is a triple threat of solutions to longstanding Web audio problems. First, it eliminates cheap sound cards' line-in A/D converters. Using the digital output to go to the encoding machine means less noise in, fewer artifacts out. Secondly, the 6200 has a 'set and forget' optimized signal to take care of gain problems. Thirdly, the 6200's multi-band dynamics make Web audio sound the best it can."

For information on the Optimod 6200, call Orban in California at (510) 351-3500 or visit the Web site at www.orban.com

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World Radio History

Different Streams, Different Sound

▶ WEB AUDIO, continued from page 51

designer has no control over what the Internet listener uses."

Barrington said, "Media Player can start playing a WAV file before the complete download is done; however, it's common for the buffer to empty, interrupting the audio and requiring the user to 'wind back.'"

Barrington acknowledged the growing importance of the MP3 format.

"I would use it in preference to both WAV and RealAudio since it offers the best compression/quality ratio of all formats and will probably become the audio standard for the Internet."

Dave Biondi, president of Bnetradio.com in Houston, uses a hybrid system.

Robert Abbett

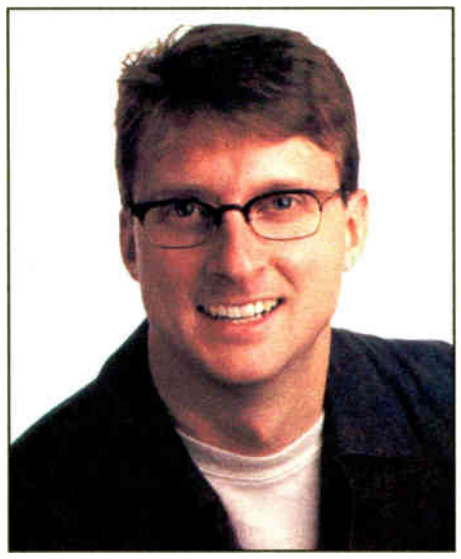
"We have a Telos Systems real-time MP3 encoder server which you can hear if you have the Winamp player," he said. "We have two streams, one at 32 kbps and one at 48 kbps, and we're stereo with both. It's my feeling that anything below 32 kbps should be mono, because if you try to run it in stereo you get different artifacts on each channel, which ruin the spatial presence."

Of course a user needs an ISDN or better line to receive the 48 kbps streaming audio, but Biondi claims to have more people using the higher rate.

"They have access to a T1 or other high-speed access. We average about 200 people at all times, and within three hours, we have over 1,750 streams going at once on the higher kilobaud rate."

At Internet Radio Hawaii, RealAudio was chosen because in 1995 it was the only viable streaming program. Programmer and engineer Robert Abbett, who goes by the name Rabbett, was a beta tester then.

"The original specs didn't work well for music, but I got it to work on my Macintosh and we were written up in publications all over the world," Rabbett said.



Paul Marszalek

"Now there's a program called Virtual PC by Connectix, which allows us to run Windows 98 on a Macintosh.

"When it comes to audio quality, RealAudio is number one, QuickTime Apple's streaming technology is number two and Windows Media Player is number three."

John Cooper, Web master at WWOZ(FM), also uses RealAudio because it is the preferred software of Broadcast.com, which carries WWOZ.

"My preference would be for our listeners to have as many choices as possible," Cooper said. "We have many listeners around the world listening to our authentic New Orleans jazz programming, including people using Unix and Linux."

Quality

KFOG(FM) uses both Windows Media Player and RealAudio on its Web site. Paul Marszalek, operations manager, prefers the Windows system because of the sound quality. He said, "We did a side-by-side comparison between Windows Media Player and the free downloadable version of RealAudio, and Windows wins it."

KFOG is a San Francisco radio station. Marszalek is concerned that the air signal be accessible on the Web.

John Cooper

"There will probably be three or four players that will battle it out. It's not unlike VHS and Betamax. With Windows Media Player, people have to 'buy up' to the second level and people like the free players best.

"Unless there is an extensive leap in technology, people won't have more than one or two players on their desktop."

Marszalek feels the technology isn't of interest to most listeners who want the player to be transparent.

He said, "We're just a content provider, so we'll let the technology folks fight it out, but as we expand we will go with the top formats."

As to the relative costs of the three main streaming schemes, Rabbett of Internet Radio Hawaii said, "RealAudio is the most expensive, QuickTime is second and Windows Media Player is the least expensive.

"My audio services are provided on a donation basis because a university in Japan was able to find a sponsor. A basic 60-stream server might cost between $5,000 to $6,000 a month for on-demand streaming."

To EQ or not to EQ, that is the question.

Dave Biondi of Bnetradio said, "So many radio stations don't have a clue about processing. The stations think it can just run the air signal into a computer.

"Telos makes the Omnia.net, which has different frequency curves and rolloffs. Another manufacturer is Orban, which has the Optimod 6200.

"On the Internet, the station is not in a loudness war, so you don't want the dynamic range to be overly squished. It's fatiguing to listen to."

Inovonics is another manufacturer of an audio processor for the Web, with its new Webcaster product.

Rabbett has a different opinion. He said, "Compact discs do not need assistance. All you need to do is watch your levels and know what you're doing."

At KFOG, Paul Marszalek feels that the audio should be tweaked for the Web, just as it's differently tuned up for FM and AM broadcasts.

At WWOZ, John Cooper just runs the air signal straight into a computer. "We may get into additional EQ and processing within the next year but we don't do it right now."

For information on Web sites to learn more about streaming audio and to read Web comments from the experts, check out www.rwonline.com

■ ■ ■

Ken R. is president of Ken R. Inc., an ID jingle production firm located in Toledo. He is a frequent contributor to ***Radio World****.*

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World Radio History

USER REPORT

This Little Buddy Is a Keeper

by Edwin Bukont
Chief Engineer
WWZZ(FM)/WWVZ(FM)/WXTR(AM)

WASHINGTON Every engineer and technician acquires a stable of tools and test gear over the years. Many items do one or two jobs and have lots of other functions you never use.

Test gear is a necessity, but it is often difficult to allocate precious dollars or space in the toolbox for a myriad of test devices. Far too many pieces of test gear lack basics, such as proper connectors or the ability to sample something in a real-world setting, to justify spending the money to do a job that will require additional tools in order to obtain the information wanted.

A bit of hope

Then there is the Audio Bit Buddy, the **Ward Beck** ABB-1, distributed by **Harris**.

I have been using one for nearly a year at WWZZ and I am not sure how we got along without it, which proves to me why we bought it in the first place.

The Bit Buddy is a battery-powered analog or digital monitoring device that fits nicely in your hand, though it is a little larger than palm-sized. The unit accepts either an AES/EBU signal via a female XLR or stereo analog signals via a pair of quarter-inch TRS jacks.

At first I frowned on the unit for not having XLRs for the analog signal. I grumbled as I made up adapters to go from quarter-inch to XLR — until we had a problem with our traffic line and Bit Buddy came to the rescue.

The quarter-inch connector accepts a patch cord quite nicely and because it does, you can plug a patch cord from the Bit Buddy to your patch bay in a panic without having to hunt for adaptors.

During our Y2K preparations, we constantly turned to the Bit Buddy as our primary piece of test gear to verify that switching systems were working properly. I don't think we would have finished if we had to lug around the more traditional test gear.

For only a few hundred bucks, the Bit Buddy is built with features and rugged quality you would expect to see in units costing 10 times as much. On the front panel is a set of multi-segment LED bargraph meters, which display audio levels from -50 dBu to +6 dBu. Using the NAB Test CD, we checked the Bit Buddy's meters against other venerable pieces of gear and found the meters to be very accurate.

The LEDs are quite bright, which makes this box ideal for adjusting levels on devices hidden in racks or with rear-mounted pots. I can drop two patch cords from the rear through a space in the rack and run them to where I need to adjust something.

This makes changes easier than having someone stand in front of the rack calling out "just a little bit more" over and over as they read the meters on the other "portable" equipment.

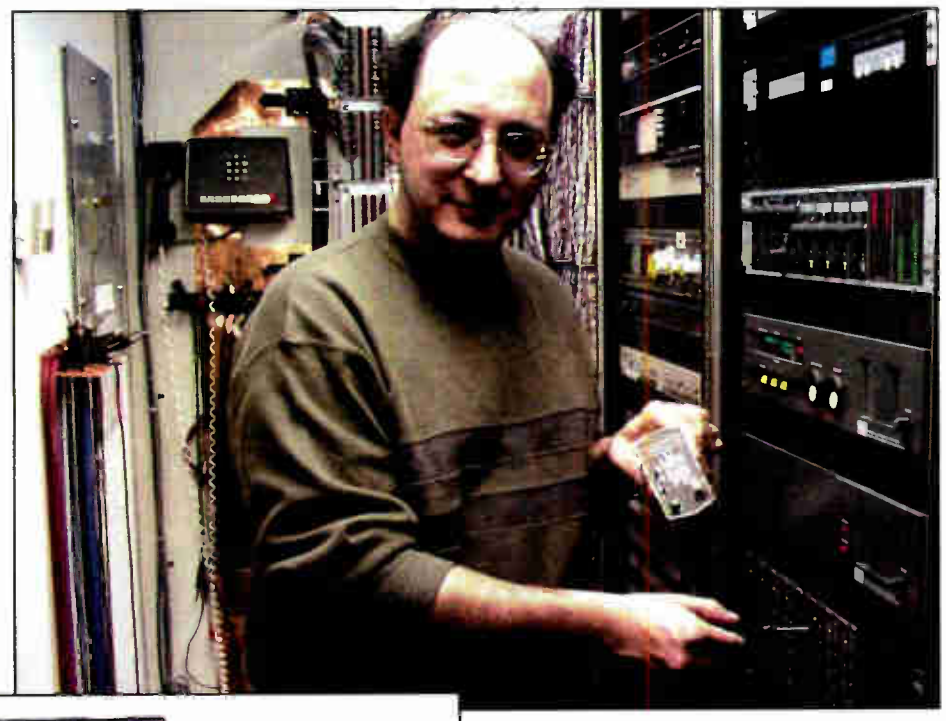
I especially like the Bit Buddy for field service where stereo monitoring is needed but where space is a commodity.

Good in tight situations

We have also found the unit is a must for any shop that services professional PC audio cards. Again, you can walk to the back of the server rack and in a matter of moments see what is leaving the card without going nuts.

Next to the meters in the center of the unit are a multisegment indicator and a switch that allow the user to display either "Status" or "Error" conditions by flicking the switch. This is for deciphering what is wrong with your AES stream. There are indications for all major clock rates and the parameters of consumer and pro-grade devices.

To the right of the status display is an on/off power switch that can also select either analog or digital mode. Unfortunately, too often I find the unit with a dead battery or no signal shown because the convenient switch with the long handle has hit against something and been turned on at the wrong time or for the wrong signal. This is my only complaint with the device.



Ed Bukont uses the Bit Buddy to check levels as he adjusts a DA in the WWZZ tech center.

My suggestion for the next version, make the switch flush or recessed, please.

Above the power switch is a bright low-battery indicator and a volume knob for the quarter-inch TRS headphone jack and it is loud.

Keep one of these babies around and if you loose your D-to-A converter, you can use the Bit Buddy to go down from digital to analog in a heartbeat, provided you have a way of getting from the headphone jack to your other devices.

The rear panel contains the connectors for input and power (via wall-wart). A switch allows the AES input to be either terminating or bridging. I have found the connectors to be of excellent quality and have not yet had a nuisance unplugging of audio or power. The unit does have a rechargeable battery that seems to last a reasonable amount of time.

Get 'em while they're hot

I am quite fond of my little Buddy and recommend this as a "must-have on the shelf" sort of device for every audio shop, especially as radio begins the migration to digital systems.

This is the only truly portable stereo device that can look at digital and analog audio signals on a moment's notice without a lot of preparation or effort. Harris has developed a companion signal generator for the Audio Bit Buddy called the Audio Bit Spitter (ABS-1).

Ed Bukont has more than 20 years of experience with audio design, sound reinforcement and broadcast engineering and as a contractor and staff engineer for individual facilities and networks.

For more information contact Harris Corp. in Ohio at (800) 622-0022, fax (513) 701-5318 or visit the Web site at www.harris.com/communications

TECH UPDATE

Audio Precision Releases APWIN 2.0

Audio Precision's newest software for operating its audio analyzers is APWIN 2.0.

This is a test-and-measurement software package operating on Windows 95/98/NT and designed for its System Two Cascade, System Two and System One products.

The software adds enhancements for all products, including new time/frequency domain switching and a new Quick Launch toolbar for simple and immediate startup of tests or procedures.

APWIN 2.0 Cascade support includes many improvements and requested features, as well as support for the 96 k and 192 k digital audio sampling rates for Dual Domain and Digital-Only Cascade versions. APWIN 2.0 for Cascade also includes a Harmonic Analyzer capable of simultaneous individual and group harmonic distortion measurements.

APWIN 2.0 is available as an APWIN upgrade.

For more information contact Audio Precision in Oregon at (503) 627-0832, fax (503) 641-8906 or visit the Web site at www.audioprecision.com

World Radio History

USER REPORT

Sine Has Things Under Control

by Mark Persons
Owner
M.W. Persons and Associates

BRAINERD, Minn. The **Sine Systems** dial-up remote control has been my favorite since the first one I laid hands on in 1989. It is straightforward with no outward frills and is priced right.

This, I believe, has been the success formula for the product in its 10-plus years of existence.

I find Sine Systems remote controls mostly at small- and medium-market stations. They fit in well because they are easy to install and use. The only thing that prevents Sine from going to the big markets is remote access via computer.

Sine's Intelligent Rack Adapter

Yes, you can get readings and do commands via computer with the hardware that Sine has, but what is needed is a Windows software package. Sine is working on designing a Windows interface.

Finding the signs

Sine is great for AM stations that switch pattern or power at sunrise and sunset. The RFC-1/B controller has a built-in clock and can be programmed easily to do the switching at any time of the day or night.

Better yet, it does the switching with an "action sequence." Up to eight events can be programmed in an action sequence.

For example, a user can turn on day transmitter filaments, wait 40 seconds, turn off night transmitter high voltage, switch phasor to day pattern, turn on day transmitter high voltage, wait 20 seconds, turn off night transmitter filaments.

No special adapters are required for stations with antenna monitors. The Sine RFC-1/B remote control can be programmed to close a relay contact on a metering channel whenever that channel is dialed. That closure will select a tower on the antenna monitor.

Mark Persons

For stations with two directional patterns, I build a small board with diodes to take the closure and select pattern and the tower to be monitored and then relay it to that channel.

The Sine uses metering and control connectors that do not require soldering. Each connector is a plastic block with screw terminals and they are connected one channel at a time. Those connector blocks can be removed or moved from channel to channel in seconds when needed. I have used this successfully to disable specific commands on a short-term basis.

A good example of this is when the transmitter has a problem, I have put it in the low-power mode and I don't want operators to try to put the transmitter in the high-power mode. I pull off one connector. Operators have the ability to turn the transmitter on and off, but cannot put it in the high-power mode until I have made repairs and reconnected the high-power control circuit.

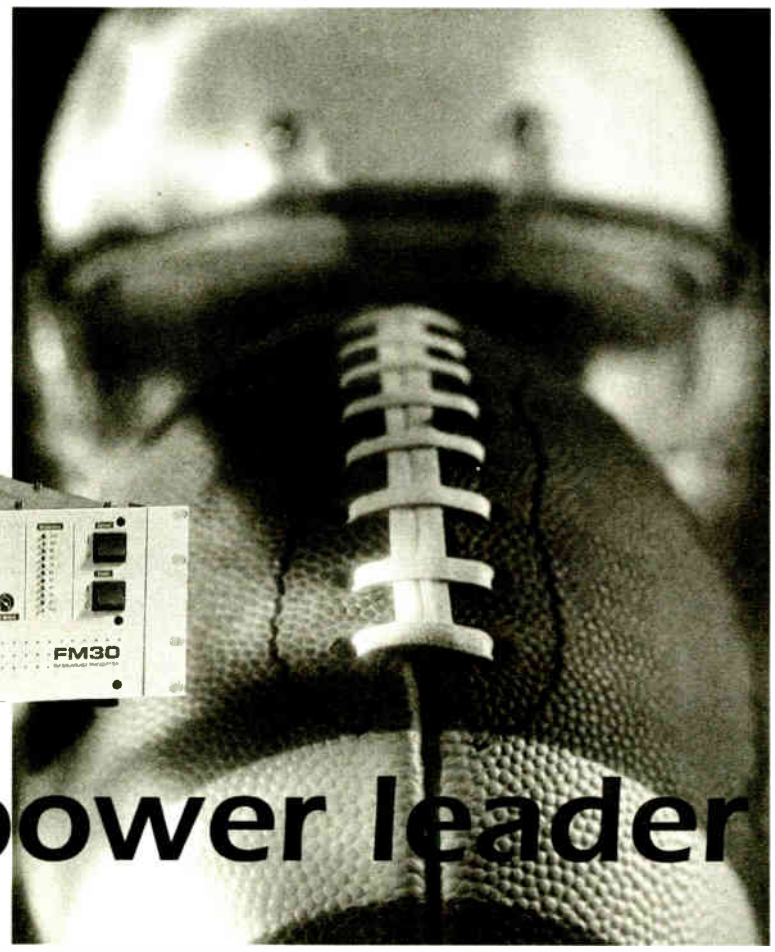
The Sine RFC-1/B remote control has a good analog-to-digital converter for sampling DC metering voltages.

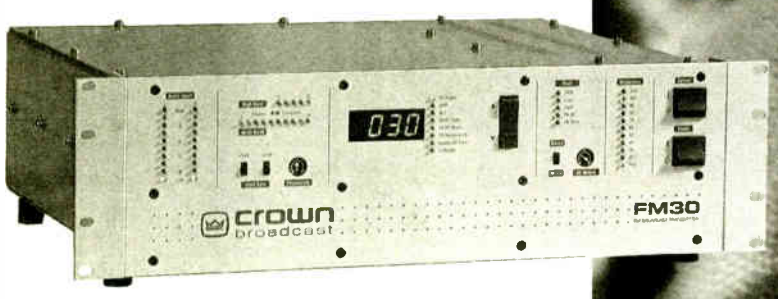
First, it is not referenced to ground so it can read voltage above ground, even negative voltages. Second, it has high resolution so the accuracy is higher than competitor units when reading small DC samples. This becomes important when metering fractional volt forward and reflected power samples on older FM transmitters.

See SINE, page 59 ▶

Crown was there... where were you?

Five Crown Broadcast FM30 Transmitters were the backbone of the nearcast network at the biggest sporting event on the planet.





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Crown transmitters are the standard for many LPFM and FM nearcast applications throughout the world with power levels and flexibility to meet any broadcast requirements. Crown Broadcast transmitters are designed and engineered to the same reliable performance standards known worldwide as the hallmarks of all Crown products.

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World Radio History

▶ SINE, continued from page 58

Sine remote controls are easy to program. If I want to change volts to kilovolts on a metering channel, I change just two numbers in the programming. I do not hear the long string of programming information, which is not changing.

The Sine can be programmed to call an operator after power is restored following a power outage. Even the clock speed can be adjusted with simple software programming. I look at the Sine programming as "open" in the sense that anyone can create how he or she wants the remote control to act.

All good things ...

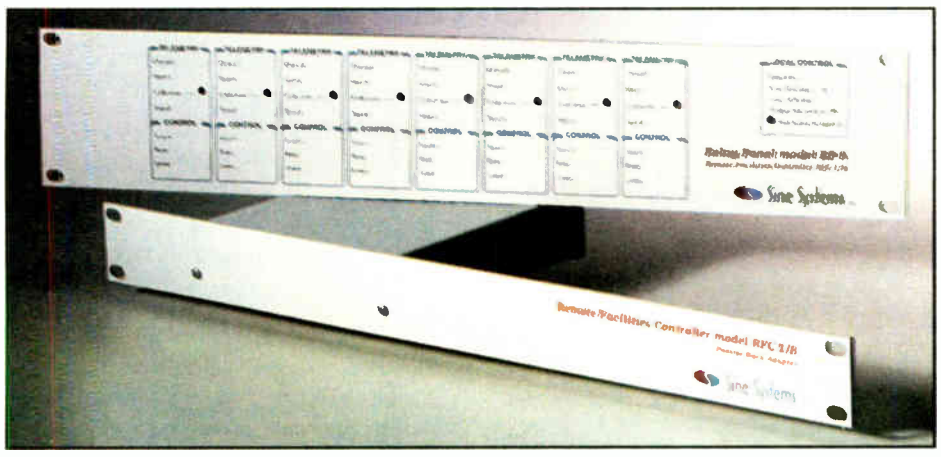
Although best known for its remote controls, Sine Systems is a creative company with a no-nonsense approach to designing and building equipment for the broadcast industry.

Sine makes the TTT-1 Time-Temp Thing to announce time and or temperature on demand by automation systems. It also makes the MBC-1 Message Board Controller to display alarms in a studio and the DAI-1 Dial-Up Audio Interface to make remote broadcasts possible when no one is at a radio station to put the broadcast on the air.

■■■

Mark Persons is certified by the Society of Broadcast Engineers as a professional broadcast engineer with more than 25 years experience. Visit his Web site at www.mwpersons.com

For information contact Sine Systems in Tennessee at (615) 228-3500, fax (615) 227-2367 or visit the Web site www.sinesys.com



Control Products From Sine

TECH UPDATES

QEI's IMP Protects Transmitters

QEI offers mobile and transportable RF transmission systems that include, as an option, an intelligent monitoring and control system.

QEI developed this system for industrial, scientific and medical applications of its transmission products. The company adapted the system for broadcast transmission applications and called it IMP, for intelligent monitoring and protection.

The IMP monitoring and control system is capable of making high-speed calculations on multiple RF output port loads and then addressing these changes by matching the output tuning to the changing condition.

QEI recently applied this technology to replace a monitor system for an eight-station combiner and antenna in St. Louis, Mo. With more than 2 million watts of peak input power into the antenna, speed and accuracy of control are paramount.

The system design specification calls for continuous monitoring of each station's forward power and calculated VSWR. Furthermore, the system maintains and watches over antenna forward power, antenna VSWR, patch panel interlock status and nitrogen flow rate.

It must accomplish this in real time using a graphical interface to depict the status of the event visually, send appropriate alarms and take the corrective action.

Additionally, the monitor and control system concurrently logs data for each station, combiner and antenna during a critical change in status. The system also applies priorities to algorithms for controlling the transmitter modes of operation in the event of combiner or antenna component failure

Many control and monitoring sequences are possible because software for the system is adapted for each installation. Developing a monitoring system through analysis of combiner and antenna failure modes will not only provide early warning of component failures but also will limit damage and downtime.

For more information contact QEI in New Jersey at (800) 334-9154, fax (856) 629-1751 or visit the Web site at www.qei-broadcast.com

Dayton Industrial AFC3 Monitor

Dayton Industrial Corp. has rolled out a line of receivers for professional or EAS monitoring. The receivers are available as stand-alone or as a 1-3/4-inch rack-mounted unit (AFC3), which contains three receivers.

The AFC3 contains a small speaker and a headset output with volume control. Also mounted on the front panel are an audio selector switch and LED indicators that indicate carrier and modulation activity for each receiver.

The front panel includes an alert indicator and test/reset switch for receivers that use alert tone detectors, such as weather and public service monitors.

The AFC3 rear panel contains line, speaker and carrier detect relay outputs for the receivers. Power input is derived from a 12V source, making the AFC3 suitable for use with remote or emergency power sources.

For more information contact Dayton Industrial Corp. in Florida at (941) 351-4454, fax (941) 351-6081 or visit the Web site at www.daytonindustrial.com

AEA's Complex Impedance Analyzer

The CIA-HF Complex Impedance Analyzer is **AEA**'s latest in its wireless communication test instrument line.

The CIA-HF is housed in a portable, battery-operated, custom plastic package with graphical LCD screen. The unit combines a sweep frequency generator, impedance bridge and liquid crystal graphical display in a rugged and compact package.

For field use, internal AA alkaline can power the unit or NICAD batteries (not provided), or an optional wall charger can be used for laboratory operation and NICAD charging. A soft case is available for unit storage or hands-free operation using the swivel hook or neck strap.

The CIA-HF Analyzer primarily was designed to assist technicians in designing, tuning and troubleshooting RF communications antennas, baluns, tuned feedlines, filters and duplexers. In the RF design laboratory, the CIA-HF also functions as a vector impedance analyzer.

Additional features include a direct reading capacitance meter, inductance meter, Q meter, graphical grid-dipper and stable single or sweep frequency signal generator. The insertion loss of a filter or cable can be determined using the Return Loss readout at any frequency in the unit's 400 kHz to 54 MHz range.

For more information contact AEA in California at (800) 258-7805, fax (760) 598-4898 or visit the Web site at www.aea-wireless.com

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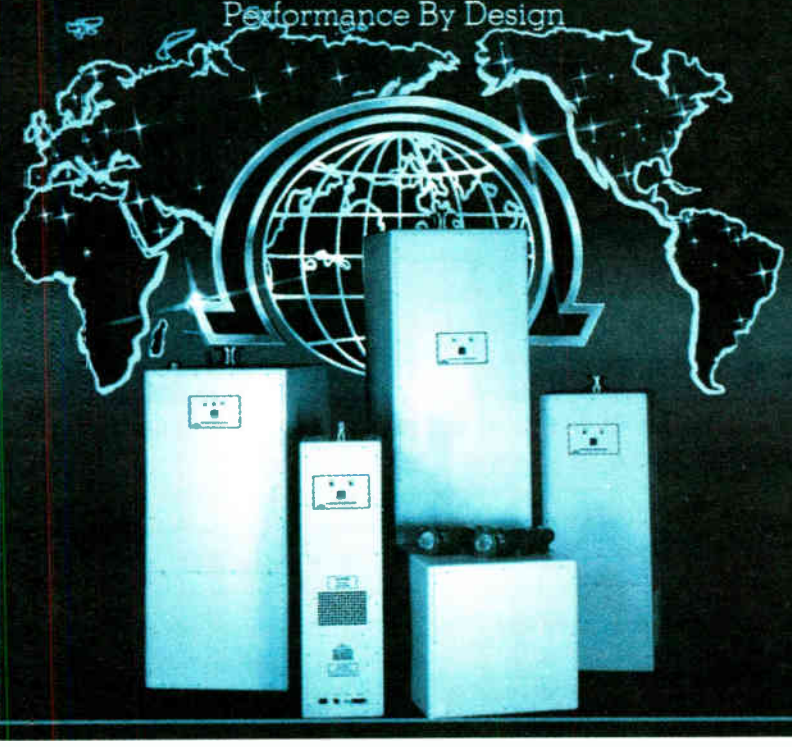

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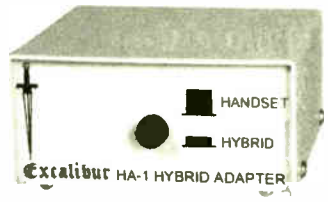
HA-1 Hybrid Adapter



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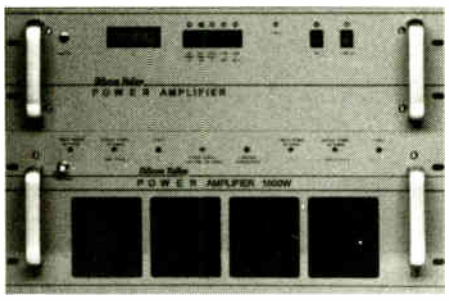

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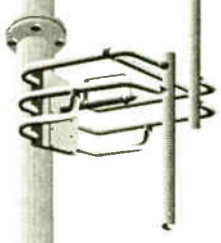

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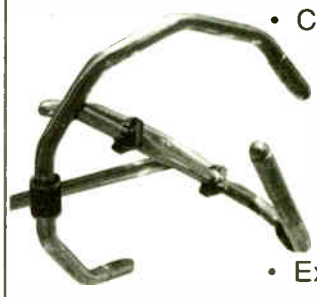

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World Radio History

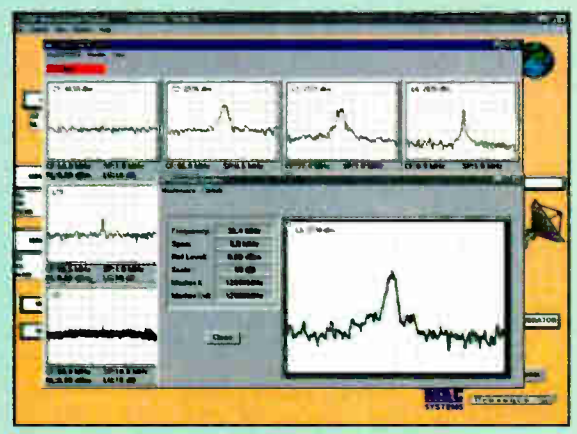
TECH UPDATES

M & C Systems Presence and VCMS

M & C Systems Presence is the satellite industry's first monitor and control system to operate using the 32-bit Windows NT 4.0 platform.

Presence is based on an open architecture and interfaces with a variety of earth station devices. The open architecture allows the entire earth station to be monitored and controlled from a single computer through a point-and-click interface.

When Presence is integrated into a local or wide area network, monitor and control of an earth station can be accomplished from one computer located almost anywhere in the world.



Other features include uplink power control to compensate for rain fade, an event scheduler that provides automated scheduling of transmission events, macro capabilities, multi-level security and database event tracking, and carrier monitoring capabilities to ensure signals meet the operator's requirements.

Virtual Carrier Monitoring System

The Virtual Carrier Monitoring System, also by M & C Systems, replaces spectrum analyzers and stand-alone carrier monitoring systems within a PC-based Presence monitor and control system to provide an alternative for monitoring satellite frequencies.

The VCMS can be monitored and controlled from remote workstations anywhere in the world. Operators can monitor multiple carriers and manually tune to carriers, simultaneously monitoring the entire signal or particular parts of it. manipulating individual signal frequencies as needed.

The carrier monitoring system can monitor uplink and downlink signals of a satellite earth station. The carriers to be monitored are both transmitted to and received from single satellite operating in all bands. The carriers are continuously monitored for frequency, power levels and other RF characteristics.

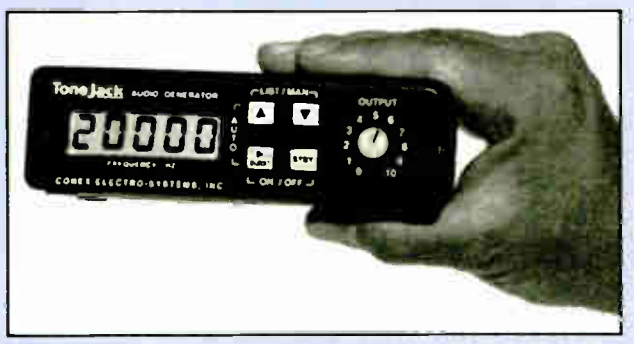
The bands of interest also can be monitored for spurious and interfering signals as well as other unauthorized transmissions. The system will alert operators when carriers are performing outside user-defined limits and when activity on the satellite payload is illegal or unauthorized. An additional feature is an alarm and logging function with output capability to a master historical log.

For more information contact M & C Systems Inc. in Texas at (972) 422-5524, fax (972) 422-0790 or visit the Web site at www.mcsys.com

Conex ToneJack Gets Response

The **Conex** RX-11 ToneJack is a hand-held battery-operated audio tone generator. It will produce accurate frequencies from 1 Hz to 29,999 Hz in increments of 1 Hz. It is useful in testing the frequency response of amplifiers, filters, tone sensors and similar equipment.

The ToneJack performs other functions such as user-programmable frequencies, Tone Burst, Sweep Generation and RS-232 control.



User programmable frequencies are manipulated in the List mode. The List mode lets users manually or automatically step through up to 10 frequencies that the operator programs into the ToneJack. The on-time of each frequency can be set to durations of 1 millisecond to 29.999 seconds.

With the Tone Burst mode, users can program the ToneJack to output a specific frequency for a specific number of milliseconds. The tone will stop at the end of the next complete half cycle following the specified time interval.

Sweep Generation mode allows the operator to check quickly the frequency response of a unit under test while observing its output on a standard oscilloscope. The sweep is from 50 Hz to 20 kHz and the on time of each frequency can be varied from 3 milliseconds to 29,999 milliseconds.

The ToneJack can be controlled by a standard RS-232 interface such as a computer or terminal. This feature allows users to test a piece of equipment from another location by communicating with a remote computer via modem or write a simple test procedure program for the computer that would automate production testing.

The ToneJack operates on a standard 9V alkaline battery or from an optional plug-in power supply. It measures 5- x 2.8- x 1.5 inches.

For more information contact Conex in Washington State at (800) 645-1061, fax (360) 676-4822 or visit the Web site at www.conex-electro.com

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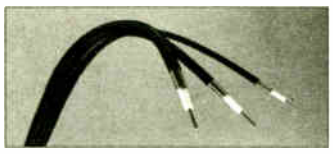

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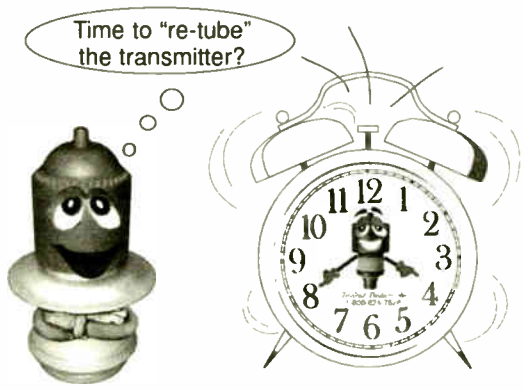

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World Radio History

TECH UPDATES

Gentner Upgrades RFM System

Gentner Communications Corp. released version 1.9 software upgrade and the Network Module for its Remote Facilities Management system.

The system is used to monitor and control mission-critical operations 24 hours a day, seven days a week.

Software version 1.9 and the new Network Module enable users to access Gentner's GSC3000 RFM system through wide-area networks and corporate intranets. The Network Module uses TCP/IP to make information on a host computer available to other networked computers. Special security features ensure that only authorized personnel have access.

Other features of the new software include increased programmability, prioritization of alarms and alarm enhancements.

The GSC3000 will communicate alarms and site conditions by phone, pager or data transfer, and is capable of taking corrective action whenever necessary. It is customizable and will operate independently of any other device.

For more information contact Gentner Communications Corp. in Utah at (800) 945-7730, fax (801) 977-0087 or visit the Web site at www.gentner.com

Aztec Radiomedia's FM Navigator

The FM Navigator, AZ100, from **Aztec Radiomedia,** provides decoding and analysis of multiplexed FM signals.

The AZ100 is designed for rapid field measurements, which can be stored for later analysis. Automated sessions can be programmed using the included FM Explorer software, eliminating the need for a PC in the field.

Applications include evaluation of coverage of RDS and DARC subcarriers.

Frequency agile, the FM Navigator can be used to compare signals of multiple stations. Digital signal processing performs measurement functions such as RF level, MPX and subcarrier deviation, MPX power and peak, and RDS and DARC decoding and analysis.

The combination of programmable data logging, GPS Global Positioning System functions and flash memory storage allows the portable analyzer to collect and compare data obtained throughout the station's coverage area. Using GPS, the AZ100 can pinpoint the location; that information is stored simultaneously with FM signal information.

Additionally, five relays can be used to generate alarms and switch external equipment. Also available is the rack-mounted AZ1000 for permanent, supervisory installations.

For more information, contact Digigram Inc. in Virginia at (703) 875-9111, fax (703) 875-9161, e-mail input@digigram.com *or visit the Web site at* www.aztec.fr

ATI Nanoamp Meters

The Nanoamp series BGD200 and BGD400 dual and quad bar graph meters from **ATI** are designed to display up to 12 audio lines in a single rack space.

Remote, shared power supplies allow mounting of the three-color VU or PPM meters directly under video monitors or critical audio circuits without magnetic interference.

The product is available in two-channel horizontal and four-channel vertical configurations with either VU or PPM ballistics with multiple color 10-segment displays that are visible in bright sunlight. VU models display a range of -20 to +3 dB around 0VU and PPM models cover a range of -15 to +12 dB.

Zero reference levels for both models are selectable to -10, +4 or +8 dBu, with front-panel trimmers for fine adjustment. Balanced, high-impedance inputs bridge -10 dBu unbalanced lines without loading.

Two-piece, screw clamp connectors for each input are used for installation. Rack kits mount one to three units in one rack space. Phase indication and a headphone monitor are available in the dual bar graph meters.

For more information contact ATI in Pennsylvania at (800) 959-0307, fax (215) 443-0394 or www.atiguys.com

Modulation Sciences Adds Demodulator

Since 1989, the FMMM-1 FM ModMinder by **Modulation Sciences** has allowed FM broadcasters to increase their overall modulation without using excessive processing or over-modulating.

Its only drawback was the lack of a built-in demodulator. The new FMMM-2 FM ModMinder features a frequency-agile built-in demodulator. It is now a complete, stand-alone FM modulation monitor.

The FMMM-2 is designed to eliminate measurement artifacts. Conventional FM modulation monitors register brief modulation overshoots. These overshoots, which last for less than 1 millisecond, can rob the station of loudness by causing false peaks on a conventional modulation monitor. The system ignores brief overshoots and allows stations to increase their modulation by 1 to 4 dB without adding processing.

The operating frequency of the FMMM-2 FM ModMinder is programmed easily from the front panel. This allows an engineer to perform modulation checks on an entire cluster of FM stations.

The unit is calibrated and certified when it arrives from the factory. For maximum accuracy, Modulation Sciences uses the Bessel null method of calibration. The user can set the ModMinder to the station's frequency, connect it to a suitable RF sample and adjust the RF level according to the front-panel indication.

The threshold peaks can be set from the front panel. This allows stations with SCA subcarriers to monitor their modulation properly, since the FCC allows FM stations to increase their peak modulation by 0.5- over 100-percent for each percent of total subcarrier injection.

When an FM modulation monitor is installed in a studio, away from the transmitter site, multipath will cause such measurement artifacts as false modulation peaks and excessive distortion of the recovered audio. The FMMM-2 FM ModMinder features analog metering outputs, allowing use with a remote-control system.

An RS-232 port allows digital communication with the FMMM-2. These ports allow the ModMinder to be installed at the transmitter site, providing freedom from measurement artifacts and allowing greater modulation of the station.

For more information contact Modulation Sciences Inc. in New Jersey at (800) 826-2603, fax (732) 302-0206 or visit the Web site at www.modsci.com

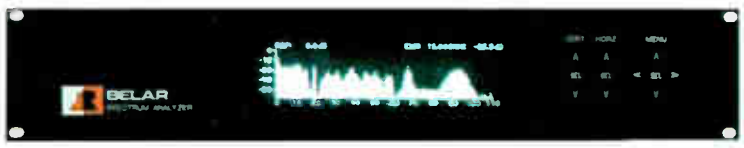
Readers Forum can be found on page 70.

World Radio History

TECH UPDATES

Belar CSA-1 Spectrum Analyzer

The **Belar Electronics** CSA-1 is an FFT-based spectrum analyzer designed to be used by the broadcaster for measurements of RF, IF, baseband composite and audio signals.



The two-rack-high CSA-1 uses a 256 x 64 dot vacuum fluorescent display to provide clear high-contrast imagines with several different display modes — ranging from real-time to infinite hold. Front-panel controls consist of individual vertical axis, horizontal axis and menu selection pushbuttons.

The vertical amplitude axis features a 120 dB dynamic range with a 0.1 dB amplitude resolution and adjustable reference. Horizontal frequency axis controls include both the ability to adjust the frequency resolution and frequency range. A cursor function allows direct reading of any frequency and amplitude displayed to 0.1 dB.

The CSA-1 has multiple inputs for analyzing the spectrum at different points in the signal chain. The high-frequency 2 MHz input allows viewing the spectrum of both the commercial AM band or the IF output of our FM and TV monitors.

The 150 kHz input is optimized for viewing the FM and TV baseband composite signals. This input is useful for seeing at a glance what subcarries are present, for checking interference around the pilot and/or subcarries, and for verifying quality of the baseband signal.

Finally, there is a pair of 24 kHz audio inputs. The analog inputs provide both XLR and unbalanced BNC connections; the digital inputs may be either AES/EBU XLR or S/PDIF RCA type connector.

Using the split-screen display mode, both the left and right audio spectrums may be displayed simultaneously.

A dual cursor function allows direct reading of the frequency and amplitude pairs, for easy measurement of separations and crosstalks.

For more information contact Belar in Pennsylvania at (610) 687-5550, fax (610) 687-2686 or visit the Web site at www.belar.com

AVCOM of Virgina's ADA-10A

AVCOM of Virginia features the ADA-10A Analyzer Display Adapter option. This unit enables the user of a portable spectrum analyzer (PSA-33A, PSA-37D, PSA-65C) to save the trace and settings as seen on the spectrum analyzer onto an IBM-compatible PC during use and to later recall a trace to compare it to a new trace.

The trace is transmitted from the spectrum analyzer to the PC. Settings are entered via the keyboard to be saved with the trace. The ADA-10A consists of an output port installed in the spectrum analyzer rear panel, an analog-to-digital converter, a cable from the spectrum analyzer to the converter, and a printer cable from the converter to the computer printer port.

Windows-based software is included. The list price is $375 with an order for a portable spectrum analyzer and $470 as an upgrade.

For more information contact AVCOM of Virginia Inc. at (804) 794-2500, fax (804) 794-8284 or visit the Web site at www.avcomofva.com

Prism Media dScope

The dScope Series III from **Prism Media** is a new computer-based analog and digital audio test system comprised of a Windows 95/98/NT-based GUI (Graphical User Interface), with a compact audio I/O module for notebook computer use.

The dScope features two-channel programmable (twin-, multi-tone and tone-burst capable) analog and digital signal generators, two-channel sweep analyzer and a two-channel multi-functional, programmable precision voltmeter. The unit also includes a two-channel FFT analyzer, supporting any number of programmable measurement detectors based on the FFT.

dScope Series III provides full support for AES3 interfaces including channel status generation and decoding. It provides a digital interface test capability with measurement of various carrier parameters (jitter, eye pattern, etc.) and the ability to degrade the AES3 test output. Automation is by means of Visual Basic Scripting.

Additionally, scalar and graphical measurement limits can be defined and violations flagged and the unit is capable of an analog measurement bandwidth of 86 kHz with a digital sample rate up to 192 kHz.

The dScope Series III is compatible with other software applications and can exchange test data with other Windows applications such as spreadsheets, databases and word processors for report generation, record keeping and analysis.

dScope Series III retails for under $8,000 (excluding notebook PC).

For more information contact Prism Media Products Ltd. in New Jersey at (973) 249-7790, fax (973) 249-7759 or visit www.prismMPI.com

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Leitch FR-882 DA power supply, 10 card chassie, $350; (10) Leitch stereo DA cards, $150 ea; WBS D8212Q DA power supply & 12 card chassie, $400; (12) WBS stereo DA cards, $150 ea. C Fraley, 215-351-0831.

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Scala 5 element Yagi, one ctr mount & one rear mount, both 106.5, $150/ea. C Marker, 906-249-1423.

Andrew 400' 1-5/8" foam heliax on spool w/type N female connectors, $2000; ERI Roto-tiller 7-bay FM on 99.3 MHz, up to 12 kW input, $3000. B Campbell, 915-673-5289.

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Collins Type 37 circ pol FM antenna w/de-icers, 97.9 MHz, working when removed, buyer transports from Central Indiana, $1000. B Tennant, 765-642-2750.

SWR FM-10 4 bay FM antenna tuned to 102.3 MHz, working when removed for power upgrade, $2500/BO; Cablewave 4" xmission line, 100', $1000/BO; Cablewave 3" xmission line, approx 150', $1000/BO. P Bossart, 719-738-3636.

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Optimod 8000A, gd cond, $850. J Ingram, 662-563-4664.

Sony VO5850, new heads, $1000. Bill, 973-773-3559.

Symetrix 528, rack space prod channel, mic pre, EQ, de-ess comp/limiter, $200. M Schackow, 605-374-3424.

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JBL Control 1 speakers, gd cond, 3 pairs, $75/pr +shpg; Orban 621B dual parametric EQ, gd cond, $150 +shpg; Orban 111B dual spring reverberator, gd cond, $125 +shpg; Orban 672A 10 band graphic EQ, excel cond, $250 +shpg; QSC 1100 140W audio amps (3), gd cond, $125 ea of $325/all +shpg; Audio Logic MT-44 quad noise gate, OK cond, $100 +shpg. Morningstar Sound, 732-938-4217.

Marti SCD-10 subcarrier demodulators (2), $150 ea. M Connor, 914-592-1071 ext 103.

PR&E Multilimiter AM/FM, gd cond, $300; DAP 310, gd cond, $300; Collins 26J03, 26U-3 comp & limiter combo, fair cond, $300. AC Elliott, 601-776-6197.

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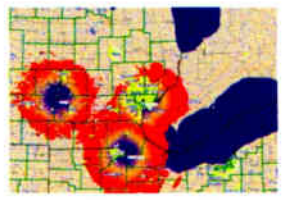
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2.5 KW	FM	1974	Harris FM 2.5H3	
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5 KW	FM	1989	Harris HT-5	
5 KW	FM	1976	RCA BTF 5E1	
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6 KW	FM	1994	Henry 6000D	
20 KW	FM	1984	Continental 816R2A	
20 KW	FM	1973	Harris FM 20H/K	
25 KW	FM	1981	Harris FM 25K	
30 KW	FM	1986	BE FM 30A	
1KW	AM	1979	Harris MW1A	
1KW	AM	1993	Continental 314T Solid State	
1KW	AM	1995	Nautel ND-1	
5KW	AM	1981	Harris MW5A	
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ACTION-GRAM

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World Radio History

◆READERS FORUM◆

More on DAT

Dear **RW**,

I got such a kick out of the Dec. 8, 1999, article by Ken R., "Why I Hate My DAT Machines."

When Nagra was in the design stages of the series-C machines, they referred to the project as the ARES, Ares being the Greek god of war. Their idea then was to design a digital recorder that would provide the ultimate reliability. In essence, they were declaring war on DAT machines and their inherent problems.

Now, some six years later, the product has undergone advancements in sound quality, editing capabilities and digital signal transmission. Those who have used the machine love it. Why do you think this format has not been embraced by the broadcast market for which it was intended?

Dan O'Grady
Sales and Product Specialist
Nagra USA
Nashville, Tenn.

Wal-Mart mentality

Dear **RW**,

I just read the "Wal-Mart Mentality" editorial in the Dec. 22, 1999, **RW** and couldn't agree more.

I am the news director of an AM-FM combo in eastern Missouri. I cover the local city council meetings. We broadcast election returns live from the courthouses in the three counties we serve. We air lost dog and cat announcements and, yes, we do on-air obits.

(Our communities have no daily newspapers. Most folks would be buried before the community knew they had passed away if it were not for our on-air funeral notices.)

Will we survive the onslaught of satellite radio, Internet, etc.? I don't know. But as long as our listeners demand — and our local advertisers support — local news, high school sports (much of which we broadcast live), and, yes, funeral notices on the air, we will comply.

We also "print" our news and sports stories and funeral notices, along with much, much more on our online news service, *suntimesnews.com*

Yes, we do have the competition from the big city stations. St. Louis is an hour away, and in fact, one of the so-called St. Louis stations is officially licensed to our town of 4,400, but you never would know it by listening to them.

People tune in to our stations and visit our Web site because we offer them something they can't find anywhere else. And that is the key to radio marketing in the future. Give the people what they want and what they cannot get anywhere else. I believe as long as you do this, they will continue to listen, no matter what the other guy is doing.

People tune in to our stations because we offer them something they can't find anywhere else.

— Don Pritchard

Don Pritchard
News Director
KSGM(AM), KBDZ(FM)
Ste. Genevieve, Mo.

CD-R debate

Dear **RW**,

I am writing in response to "Readers Respond to CD-R Debate" (**RW**, Nov. 24, 1999).

It appears that there is no "standard." I recently had issues with "dual-layered" DVDs (they will cause certain computer configurations to malfunction.) You will need to verify that the media is *completely compatible* with the hardware you are using.

Mike Edmonds
Tucson, Ariz.

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Low-Power Winners and Losers

Who wins and who loses in the FCC's approval of low-power FM?

Bill Clinton and Bill Kennard win. Without question, LPFM is the child of Kennard, who is clear in his goals of ownership and program diversity. The administration can claim a victory for small voices over those big, bad guys in the media, everyone's favorite bogeymen.

The NAB gets a bloody nose, but it will dry soon. The association doesn't like to lose a battle like this, and rarely does. But its members have bigger problems, like competition from new media and keeping TV networks in the ranks.

Big commercial broadcasters need not worry about LPFMs sucking up ad money; the new stations can only sell underwriting. But smaller-market stations may feel the pinch of competing even for those dollars.

Will stations be hurt by the decision not to provide third-channel interference protection? Unlikely; the industry simply didn't prove its case on that, and other, more significant protections remain.

Churches, community and ethnic groups, town councils and some colleges win. As we reported when the FCC first opened the question last February in the issue shown here, these aren't pirates, despite the frothing of some in Congress right after the vote. They are responsible entities who have been thirsty for a drink at the spectrum fountain for years. Many are led by long-time radio people who understand the power of their medium and don't think its owners are using it wisely.

But just as we don't think LPFM spells the doom of radio, we doubt it will be the panacea its fans had hoped for. It won't create as many stations as fans would like. The biggest impact will be where the fewest people live. This dilutes their victory, but the FCC acted wisely; stations at 1,000 W would have been much more intrusive.

Radio engineers win. Already, their phones are ringing with calls from low-power hopefuls looking to dip into the technical talent pool. Smart radio engineers have never had better security in their income and careers than right now.

Suppliers and consultants win. Equipment companies have been lusting (quietly) at the prospect of a thousand new transmitters and studio rigs. As one wag put it during the EAS rollout, "There's nothing like a government mandate to get customers to spend money."

Most important, listeners win thanks to a vote that allows them more choice in programming, while maintaining important spectrum protections and requirements. However, the benefit is only in proportion to the number of new stations in each market. LPFM will mean little to people in New York, San Francisco and Philadelphia.

That's one reason the biggest losers in this vote are radio pirates.

Real pirates, anarchists who don't acknowledge the FCC charter, won't be satisfied with what they see as a handful of signals in big markets and a few more in the boonies. They are unlikely to participate politely in the application process.

A wise man once said, "To defeat your opponent, give him what he wants." This FCC vote knocks the legs out from under these people. It blunts their real purpose. No longer can they claim that the government didn't hear them. When they don't qualify for the bulk of licenses, or they find that their signals are unheard in big markets, expect them to come back on the air. And the FCC has all the political cover it ever needed to slam them down hard.

We think the most important threat to the way radio does business comes not from LPFM but from the Web. As seen in our CES and Internet coverage in this issue, new media companies are gunning for our listeners through new technologies, both wired and wireless. While we were debating LPFM, thousands of audio sources have been springing up online, with no government license, EEO, EAS or Part 74 to worry about.

Expect the NAB to continue its fight against LPFM. The battle is not over. But if the rollout happens, radio will survive it. Its biggest foes are elsewhere.

— **RW**

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Radio World
Vol. 24, No. 4 February 16, 2000

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NEXT ISSUE OF RADIO WORLD MARCH 1, 2000

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Radio World (ISSN: 0274-8541) is published bi-weekly by IMAS Publishing (USA), Inc., P.O. Box 1214, Falls Church, VA 22041. Phone: (703) 998-7600, Fax. (703) 998-2966. Periodicals postage rates are paid at Falls Church VA 22046 and additional mailing offices. POSTMASTER: Send address changes to Radio World, P.O. Box 1214, Falls Church VA 22041. REPRINTS: Reprints of all articles in this issue are available. Call or write Michael Crossett, P.O. Box 1214, Falls Church, VA 22041; (703) 998-7600; Fax: (703) 998-2966. Copyright 2000 by IMAS Publishing (USA), Inc. All rights reserved.

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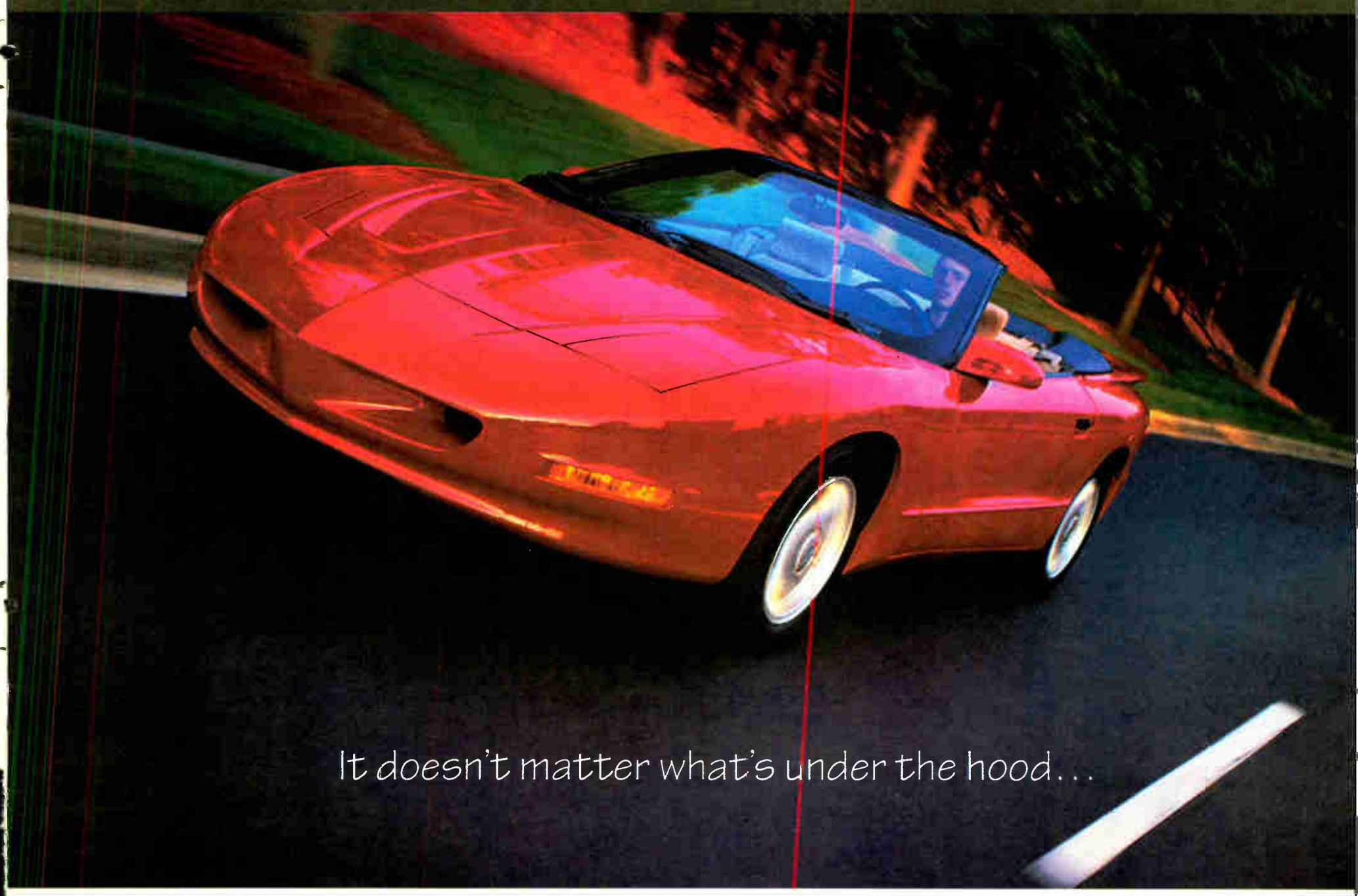

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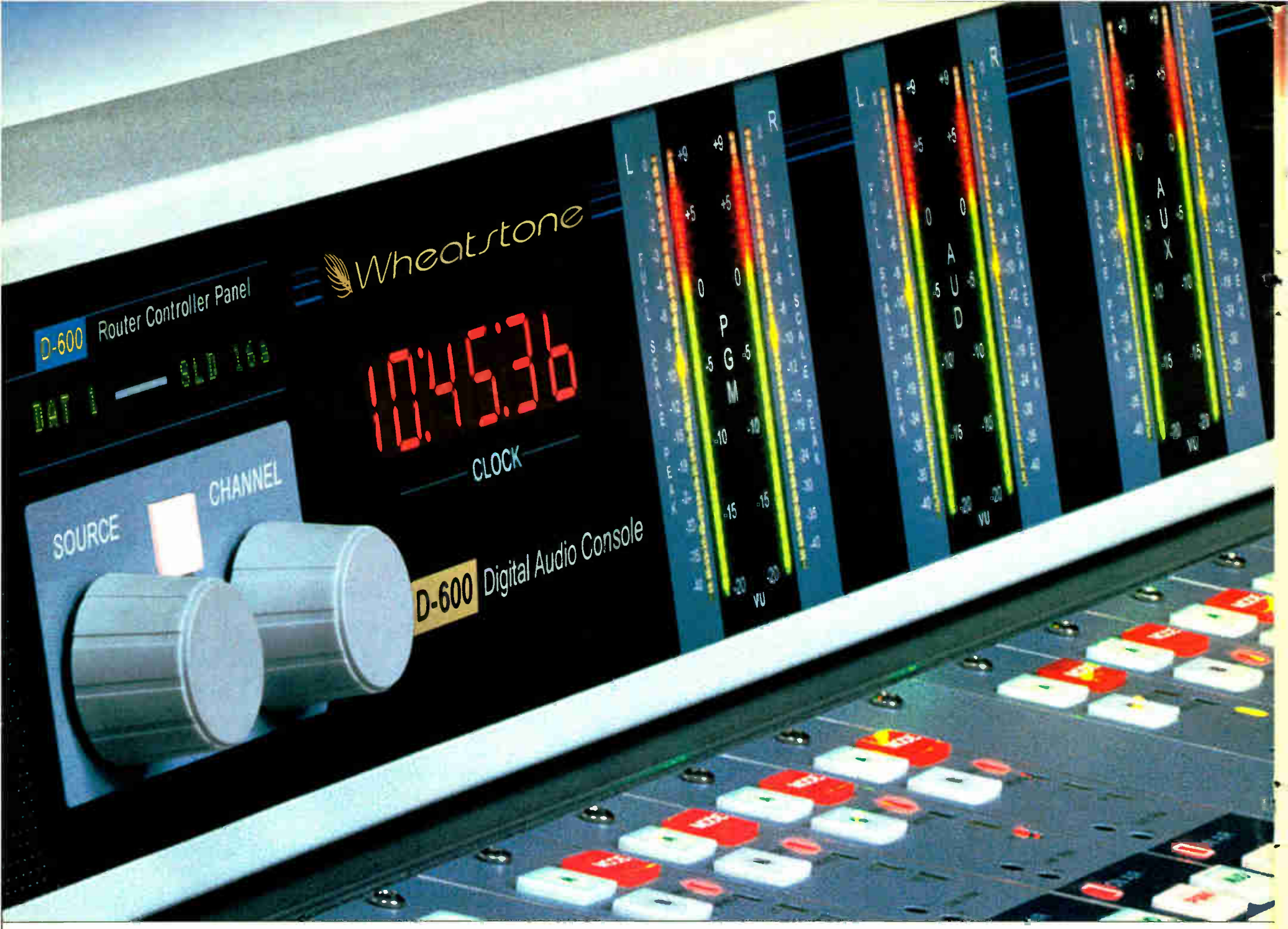

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