OUR BIG NAB99 PRODUCT WRAP UP ISSUE: See Page 16

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Your Opinions
Readers Forum is now on the last inside page of RW.
See Page 94

Radio World Cool Stuff Award NAB

In This Issue
See Page 16

Radio World®
The Newspaper for Radio Managers and Engineers
May 26, 1999

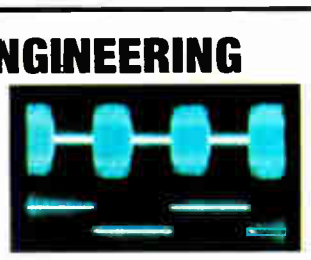
INSIDE

NEWS

▼ PR&E turned a profit in the first quarter after three years of losses. See Page 3

▼ SESAC talks dominate RMLC session. See Page 5

ENGINEERING



▼ Jeff Johnson returns with more tips for servicing and maintaining your DAT machines. See Page 66

▼ RW evaluates the Gentner DH30 Digital Phone Hybrid. See Page 69

GM JOURNAL

▼ Radio starts its year with concerns over LPFM and sorting through the effects of consolidation. See Page 75

▼ Radio comes up a winner in Net advertising. See Page 79

STUDIO SESSIONS

▼ Read Burgan checks out the new PlexWriter 8/20 CD Recorder. See Page 84

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Radio and the Boys of Summer

by Randy J. Stine

BALTIMORE Many of the greatest plays and games in the history of America's favorite pastime have become legendary thanks to radio.

Major League Baseball officials said they expect the number of radio stations carrying network games and local broadcasts of the 30 big-league teams to increase slightly this year.

ESPN Radio has entered its second season as holder of national radio distribution rights for the league.

T.J. Lambert, vice president of sports programming for the ABC Radio Networks, said ESPN Radio has 300 affiliates carrying its Sunday night broadcasts, up from around 250 stations last year. "We're up this year, thanks to McGwire and Sosa and what they did last year," said Lambert.

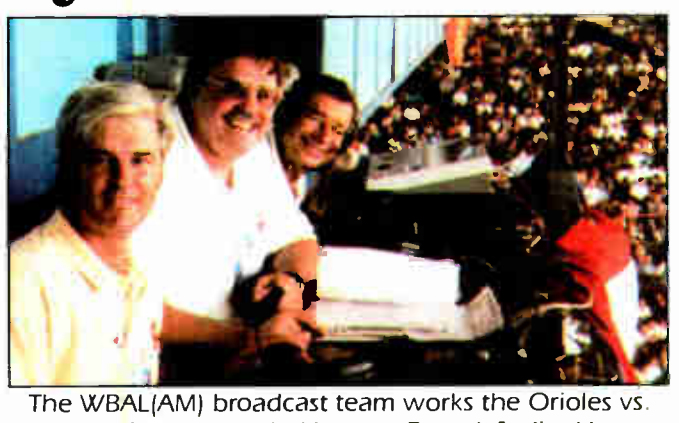
The combined efforts of Mark McGwire and Sammy Sosa stood the sports world on its head with 70 and 66 home runs, respectively, last year. In St. Louis, the Cardinal's McGwire has created legions of fans who follow his every swing.

The McGwire fans make KMOX(AM) very happy. The 50 kW news/talk station is the flagship for the Cardinals Baseball Network and has carried the team's games since the mid-1950s.

"This has always been a baseball stronghold, and with what McGwire did last year, it's generated even more excitement," said Tom Langmyer, program director of the Infinity Radio-owned station.

Jack Buck, Mike Shannon and Joe Buck anchor the KMOX broadcasts.

See BASEBALL, page 6 ▶



The WBAL(AM) broadcast team works the Orioles vs. Cuba National game in Havana. From left: Jim Hunter, Fred Manfra and Paul Eicholtz

IBOC Data Deadline Set for December

by Leslie Stimson

How much better than analog does in-band, on-channel digital audio broadcasting have to be for the U.S. to adopt this technology?

The question is at the crux of test evaluation guidelines recently approved by the DAB Subcommittee of the National Radio Systems Committee.

DAB Subcommittee Chairman Milford Smith said the group is trying to characterize how well analog systems perform now, in order to have something to compare IBOC systems to.

"It's tough to establish a guideline of how good something can be when you're not sure what you've got now," he said. "Until you see all the data submissions, you don't have a feeling as to

See IBOC, page 8 ▶

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World Radio History

◆ NEWSWATCH ◆

FCC Firm on $10,000 Fines

WASHINGTON The FCC has reaffirmed $10,000 fines for two parties for transferring control of their stations before receiving FCC approval. The commission said King Broadcasters, licensee of Soldotna, Ala., stations KSLD(AM) and KKIS-FM, "apparently transferred, without prior commission approval, control of stations to Chester P. Coleman and then to KSRMI, licensee of stations KSRM(AM), Soldotna and KWHQ-FM, Kenai, Ala." The FCC said that both KSRM and King did not respond to the Notice of Liability and did not pay the fines. Therefore, the commission reaffirmed the penalties and ordered both companies to pay the full amount.

OSHA Fines WCAU-TV, Skyline

PHILADELPHIA The U.S. Department of Labor's Occupational Safety and Health Administration has issued citations and monetary penalties against the NBC station management of WCAU-TV and Skyline Tower Services Inc. after completing its investigation of a tower fatality that occurred in November 1998.

NBC station management was fined $9,000 for a total of seven safety violations. The OHSA citation stated that the tower workers "were not provided with a landing platform for each 20 feet of height. ... " It also said the "contractor's employees installing a Heliax cable were exposed to a fall hazard in the excess of 100 feet without the benefit of a cage or safety device. Additionally, the ladder contained severely corroded rungs."

Skyline Tower Services Inc. was fined $3,600 for five similar offenses. The citation stated, "Employees did not use two lanyards while climbing tower members to ensure 100 percent protection. An employee did not tie off to a substantial anchor point and fell 100 feet."

That employee, which Philadelphia Police identified as Steven Bailey, died (**RW**, Dec. 9, 1998).

WOGL-FM leases antenna space on the tower and a spokesperson said service was not disrupted by the accident.

See NEWSWATCH, page 3 ▶

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Index

NAB99 PRODUCT WRAPUP

Recorder Lines Blur at NAB by Paul Kaminski 16
Options Plentiful in Automation by Bob Shotwell 21
Wired or Not, Here They Come by Mike Sokol 22
Odds and Ends for Every Need 24
Solid-State All Over the Place by Thomas G. Osenkowsky 32
Computing Power Benefits Traffic by Ted Nahil 34
Remote Controls Refined by Michael LeClair 37
Growth in Digital Audio Editing by Tom Richards 39
Processing Debate Rages at NAB99 by Mario Hieb 40
New Offerings for Tweaking Audio by Mario Hieb 42
Codecs: More Powerful, Portable by Frank McCoy 45
DAB, at Home and Abroad by Marguerite Clark 46
AM Transmitters Anticipate In-Band On-Channel by W.C. Alexander 50
New Designs at Top of the Tower by W.C. Alexander 52
STLs Turn Toward Bigger 'Pipes' by Michael LeClair 54
Satellite Firms Look Past Y2K Issues by Paul Kaminski 59
Consoles Step Into the Digital Mix by Mike Sokol 60
Test Equipment Floods the Floor by Harold Hallikainen 62

FEATURES

A Walk Through Panel Grounding by Buc Fitch 63
Workbench: In With Air, Out With Earwigs by John Bisset 64
Keep Up With Your DAT Service by Jeff Johnson 66
Digital Features Catapult DH30 by W.C. Alexander 69
Hotel Perils and the Short-Legged Table by Tom Osenkowsky 69
From Control to Transmission by Harold Hallikainen 74

GM JOURNAL

The Future of Radio Advertising by Bill Mann 75
1999 Opens with Low-Power Concerns by Lynn Meadows 75
The Mighty Wurlitzer Radio Hour by Jim Davison 76
L.A. Businesses Support Anti-Radio by Sandy Wells 78
The Right Profile: Net Radio Ads by James Careless 79
Post-Closing Blues: The Lovefest Ends by Dain Schult 81

STUDIO SESSIONS

Plextor Speeds Up CD-R Process by Read G. Burgan 84
Microphone Surround-Sound Experiments by David Moulton 84
Use the Web to Your 'Ad'-vantage by Travis 85

World Radio History

PR&E Shows 1st Q Profit

Publicly Held Broadcast Supplier Calls Net Income 'Very Significant' After Years of Losses

by Paul J. McLane and Leslie Stimson

LAS VEGAS Pacific Research & Engineering has reported a profitable first quarter with $4.2 million in sales and earnings per share of four cents.

At a press conference at NAB99, the publicly held broadcast supplier said it had net income of $90,000 during the quarter. President and Chief Operating Officer Don Naab called the results "very significant" in light of losses at PR&E over the past three years.

Earlier this year, the company reported a net loss of $4 million for 1998 (**RW**, April 28). It said then it had fallen below the listing guidelines for the American Stock Exchange, although PR&E continues to be traded on the exchange, and said it would restate financial results from earlier years to show losses.

PR&E blamed several factors for the poor results, including an error in how the company capitalized software-development costs. However, things are looking better following the first quarter of 1999, said Naab.

"We've cleansed ourselves," he said, referring to changes at the company in the past several months. "We have a very clean balance sheet at the moment."

The New PR&E AirWave Digital Console

Part of expected growth for 1999, he said, is a projected increase in foreign sales. He predicted the company would increase its non-U.S. business from 10 percent of total revenue in 1998, to 20 or 25 percent this year.

Things are looking better.
— Don Naab

At NAB99, PR&E also rolled out several new products. StudioAdvantage Total Studio Solutions is a turnkey offering, consisting of self-contained, acoustically isolated modules that can be moved and adapted to new locations.

"Literally everything in the studio comes together in one package," said PR&E Chief Executive Officer Jack Williams. "Audio source and control components, studio furniture, sound and vibration isolation, HVAC, cabling and wiring — everything."

This also marks the NAB debut of AirWave Digital, described as a "digital brother" to the company's popular low-cost analog console, and QuikBilt II, a line of modular studio furniture that ships flat.

Dealer Audio Broadcast Group also announced that its exclusive marketing and distribution agreement with PR&E has produced sales of AirWave and AirWave Digital on-air consoles and QuikBilt II furniture to several medium- and smaller-market stations.

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◆ NEWSWATCH ◆

▶ NEWSWATCH, continued from page 2

Both the station and Skyline had until May 17 to either contest the citations or pay the fines.

NAB Asks for LPFM Delay

WASHINGTON NAB has asked the FCC for another extension of the period to file comments on the proposal to create a new low-power service. The current comment deadline is June 1. NAB has asked that that be extended another 60 days.

In a letter to FCC Chairman Bill Kennard, NAB President and Chief Executive Officer Eddie Fritts said the association has a copy of the computer program the commission used to predict possible locations for low-power stations. "We are running it for every market in the country," stated Fritts.

He also said NAB has begun a study of the interference rejection characteristics for receivers — the first study — he said, to examine the ability of receivers to reject third adjacent channel stations. NAB would apply the results of the receiver study to predict the amount of interference existing stations would receive from LPFM's.

NAB is also concerned about new LPFM's stations' potential to interfere with existing stations' digital transition. The three proponents developing in-band, on-channel digital audio broadcasting technology have agreed to submit their lab and field test results to the National Radio Systems Committee by Dec. 15 (see story, page 1). Fritts said that late date is another reason the comment deadline for the LPFM proposal should be extended.

Kennard Praises Advertisers, Agencies

WASHINGTON FCC Chairman Bill Kennard has commended the advertising industry "for listening to reports about advertising placement bias against minority-owned media outlets and minority audiences and then doing something about it."

The American Advertising Federation announced that ad agency True North Communications has formed a new venture with its three minority-owned ad agencies to provide ethnic media planning and buying services to advertisers.

The AAF also said it would create a committee to study and recommend specific business plan models for advertisers and agencies to ensure they do not discriminate in making ad decisions.

The initiatives were a follow up to a February industry conference on ways to increase advertising targeted to and placed on minority-owned media.

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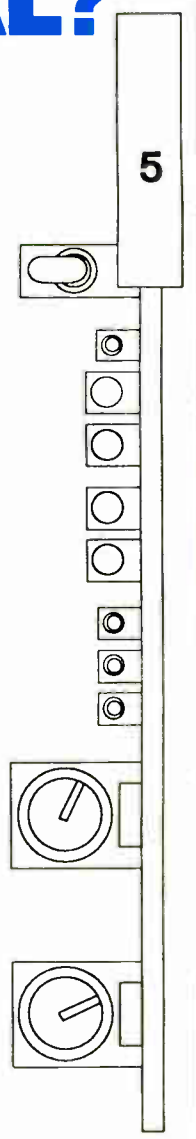

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World Radio History

How We Pick the Cool Stuff

Radio World is pleased to present the 15 winners of the coveted 1999 Cool Stuff Award. Starting on page 16 and throughout this issue, we describe the products and companies that our panel of judges considered worthy of this radio honor.

How do we choose?

I'm proud that this year's panel of 12 judges was the largest and most experienced to date. The majority are experienced radio engineers. Part of their job every day is to buy and use radio hardware.

The panel included a broad cross-section. Commercial and noncommercial, groups and individual stations, private and public sectors were represented. The names of their employers are well known to you.

The rest of the judges are experienced users with a technical bent, and journalists picked from among the editors of **RW** and our sister publications.

Some of the judges have written in the past for **RW**, others have not. At least five have appeared on engineering panels at this or other conventions.

The judges are anonymous. We want them to hear the product pitches as any attendee would, and feel free from pressure from manufacturers.

Anonymous engineers

I wish I could tell you their names. Their expertise was impressive. I began to tally the combined engineering experience, and stopped counting when I hit 100 years.

These judges walk the floor of the convention, talking to exhibitors and attendees, seeking candidates to nominate. They consider design, features, cost efficiency and performance in serving radio users.

They also look for products that make them stop and say, "Oh, cool!"

The panel meets toward the end of the show. Each judge explains their product nominations. Open discussion follows.

This year's panel was tough. A number of nominated products were not awarded, including several I liked very much.

Judges tend to be put off by certain things. Several promising products were not elected because their delivery date was uncertain, their final design had not been set or no firm price had been announced. Others did not pass because the judges felt their features were not unusual enough compared to others in the market.

Are advertisers favored? No.

I work to protect the judges from any such pressure. Some of the winners are long-time **RW** advertisers. Others are not. And the floor of the show was full of companies that support our industry and our publication, who would like an award, but don't win one.

The process can never be perfect. The debate at the award meeting gets intense. Some good products may not win in a given year. Others might win but turn out to be a disappointment in the field.

To me, the Cool Stuff Award list is a snapshot of what a certain group of experienced judges found interesting at a given show, in a given year.

I congratulate the winners. I also thank the judges who lent us their considerable expertise. You know who you are.

Also in this issue, our army of writers wraps up the new products and services from the floor at NAB99.

If we missed one that you liked, or if you make a product we overlooked, let me know. Send e-mail to me at *pmclane@imaspub.com*

★ ★ ★

Congratulations are also in order for Geoff Mendenhall of Harris Corp., winner of the NAB Radio Engineering Award.

In his acceptance speech, he commended the equipment design engineers with whom he has worked, and gave some perspective on how far FM transmission has come as it worked to keep pace with other media.

"In the 20 years between 1975 and 1995, we were able to reduce the distortion to FM audio by more than one hundred fold, and improve the signal-to-noise ratio by more than 30 dB, making today's FM transmitters capable of broadcasting compact disc quality," he said.

What next? Harris Corp. has called for a "Grand Alliance" among proponents of in-band, on-channel DAB. In his remarks, Mendenhall went on to predict that digital radio is well on its way.

"As both radio and TV go digital, there will be a convergence of technologies into a largely common transmitter architecture," he said. "Both digital radio and TV transmitters will utilize various forms of vector modulation to convey data to receivers. ...

"It is hard to imagine how far completely digital technology will take broadcasting over the next 25 years. We will see a redefinition of signal quality and how consumers will select and interface to broadcast resources."

The next 25 years, he said, will surely be more exciting and full of surprises than the last.

★ ★ ★

In our March 31 issue, you read about the fascinating Crossed-Field Antenna.

The engineering community is skeptical. Our masked engineer, Guy Wire, has done some investigating and writes about the CFA at the **RW** Web site.

"No longer do we merely excite a current in something metal and couple displacement currents into the ether," Guy wrote. "Its most startling and impressive claim is its ability to produce high efficiency and broad bandwidth with an aperture less than 3 percent of wavelength. That's incredibly small and implies we can forget about needing to build towers hundreds of feet tall to serve our AM listeners."

But does the magnetic magic work? See what Guy has to say on this controversial topic at *www.rwonline.com*

Last, one of our editors couldn't resist the temptation to snap the accompanying Radio World photo during a drive across the Nevada desert. Wonder if they read **RW** ...

Photo by T. Carter Ross

We are not alone. Somewhere in the Nevada desert, another Radio World thrives.

Photo by Alan R. Peterson

Geoff Mendenhall accepts NAB Radio Engineering Achievement Award at NAB99.

From the Editor

Paul J. McLane

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World Radio History

Telos Systems/Cutting Edge Grow

Companies Enlarge Staff, Anticipate 'Significant Convergence' of Radio and Computers

by Brian Galante

CLEVELAND Cutting Edge, a division of Telos Systems that specializes in digital audio processing, has appointed Michael Dosch as managing director, a newly created position.

Dosch, former vice president and chief operating officer of Pacific Research & Engineering, brings nearly 20 years of experience with professional audio to the company. According to Steve Church, Telos/Cutting Edge chief executive officer, the continuing growth of the company and the need for someone to guide that expansion was the drive behind Dosch's appointment.

"We needed the right executive to manage that growth while helping us define and execute future initiatives," said Church.

As managing director, Dosch will oversee day-to-day business activities, work on the improvement of management infrastructure and help define and implement strategy.

"The company has grown to a point where it needs to transition from an entrepreneurial company to a professionally managed enterprise," said Dosch. "Steve Church and (President) Frank Foti have done an incredible job

Michael Dosch

building this company. I am working with both of them to build upon their success and help take the company to the next level."

On a short-term basis, Dosch said the company will enhance its marketing and customer service organizations to enhance support for clients and dealers, as well as addressing inventory shortages on certain products.

"Market demand for our audio processors and codecs has exceeded expectations, creating inventory shortages. We are going to fix that," said Dosch. "We are also going to better coordinate R&D efforts to bring new products into the marketplace more quickly."

'Significant convergence'

Dosch said there will be "significant convergence" of computer and radio technology in the coming years, and believes the company is in the right position to introduce more products into this field. Telos/Cutting Edge has products in computer telephony, digital signal audio processing, networking and Internet audio.

"I have been amazed at the depth of the company's digital signal processing, MPEG, telecommunications and computer networking competencies," said Dosch. "As these technologies evolve, we are going to see digital audio products become much less costly while their performance increases." Dosch said that these benefits will allow Cutting Edge to create innovative products.

"We are planning some significant enhancements to the product line to include new versions of existing products as well as entirely new product categories," said Dosch. "Anyone who thinks we just build 'clever boxes' will be pleasantly surprised as the product line evolves in the months and years to come."

Marty Sacks

Telos Systems/Cutting Edge has also hired Marty Sacks as national sales director.

Sacks was most recently the large market account executive for the East Coast for PR&E. After a career that began in 1976 as a staff engineer for Washington, D.C., stations WPGC-AM-FM, he became chief engineer for WGAY(FM)/WWRC(AM) and transitioned into broadcast equipment sales with Northeast Broadcast Lab, Inc.

Radio Music License Agreements Update

by Chris Joaquim

LAS VEGAS Dominating a session at NAB on music licensing fees were the Radio Music Licensing Committee's ongoing talks with SESAC, one of three music licensing organizations. The other two are the American Society of Composers and Publishers and Broadcast Music Inc.

"SESAC seems to be a conversation piece," said RMLC Vice Chair David Hicks of Hicks Broadcasting, in the session titled "Radio Music Licensing — A Dialogue with the Radio Music Licensing Committee."

RMLC appointed a special council to address broadcasters' concerns about "disproportionately high" SESAC fees. In July of 1997, the RMLC met with the music organization to enact an industry-wide music performance license. In January 1998, fees were increased 100 percent over the next three years. "Although the committee does not endorse the SESAC rate structure, it does advocate negotiating with the organization to obtain an equitable deal," said RMLC attorney Jonathan Weiss, of Weil, Gotshal & Manges.

Weiss said, "Ultimately, your recourse is limited. You can stop playing their music, or negotiate."

Hicks said SESAC is a topic of discussion because the music licensing organization is unique in that, unlike BMI and ASCAP, there are no dissent decrees and no rate mechanisms in place to challenge unreasonable fees.

As for ASCAP and BMI, the committee is in various stages of negotiation.

The contract with ASCAP is valid through Dec. 31, 2000. The BMI license expired in 1996. RMLC and BMI are currently negotiating a new settlement in which RMLC seeks to eliminate revenue tax basis of calculating fees. "We are optimistic that we can negotiate, rather than litigate, a settlement," said RMLC Executive Director Keith Meehan.

Moderated by Ben Ivins, senior associate general counsel of NAB Legal and Regulatory Affairs, panel members included RMLC representatives Meehan, Hicks, Weiss, and Senior Technical Advisor David Fuellhart.

Ultimately, your recourse is limited. You can stop playing their music, or negotiate.

— Jonathan Weiss

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World Radio History

Baseball on Radio Takes Its Cuts

▶ BASEBALL, continued from page 1

Langmyer said the tradition of baseball on the radio is generational in the land of St. Louis.

"Fathers who grew up listening to Jack Buck listen now with their kids, like they did with their fathers when they were small. This is the heartland of America. Baseball still matters," he said.

Community action

The station is active in community events sponsored by the Cardinals, said Langmyer.

Cardinal game broadcasts are produced by Bud Sports, with the KMOX studios serving as master control. The network boasts 100 affiliates in six states.

Compared to its TV brethren, radio typically uses a simple technical setup to cover baseball.

Independent contractor Jim Jackson engineers and produces the games for Bud Sports. He said the equipment used by Cardinals broadcasters includes a Mackie Micro Series 1402 mixer board, with 14 inputs with 10 faders and two-channel stereo output. The announcer crew uses Sennheiser HD25-1 headset microphones. Jackson uses Musicam USA codecs for the ISDN line.

"I have two cases everything fits into. I also carry some backup equipment. When you tear down and set up 162 games a year, that creates wear and tear on things," Jackson said.

Jackson also carries a Comrex HotLine POTS codec and plenty of spare cable to road games.

"Every booth is different. Sometimes you could be side-by-side with the talent, and other times you could be 50 feet away," Jackson said.

The announcers use Sony MZ-R3 portable MiniDisc recorders to record pre-game interviews.

Photo by Bill Coby Photography

KMOX sportscaster Jack Buck (left) and former St. Louis University basketball coach Charlie Spoonhour are shown in the broadcast booth.

Post-game show

Jackson said the team also archives the game on MiniDisc in the booth and edits out game segments for the post-game show.

Jackson and the announcers travel on the team's charter flights.

St. Louis and Baltimore generally are regarded as two of the more passionate baseball cities. Stations in such markets take advantage of that.

In Baltimore, WBAL(AM) is home to the Orioles. The news/talk station has been the voice of Orioles baseball since 1988.

"Orioles baseball is a big part of WBAL. I mean a huge part," said Jeff Beauchamp, WBAL general manager. "We try to meet our audiences expectations and they expect to hear Orioles baseball."

See BASEBALL, page 15 ▶

Photo by Bill Coby Photography

Fans face the stage at a KMOX/St. Louis Cardinals Baseball Fanfest pep rally in downtown St. Louis.

WBAL(AM) Radio Goes to Havana

by Randy J. Stine

HAVANA It was both historical and nerve-wracking when WBAL(AM) became the first American radio station to broadcast a baseball game out of Cuba in over 40 years when the Baltimore Orioles played a Cuban all-star team this spring.

The game, played March 28 in Havana, was the result of high-level negotiations in Washington between the U.S. and Cuba. State Department officials gave the go- ahead to the visit despite the 37-year-old U.S. economic embargo on communist-run Cuba.

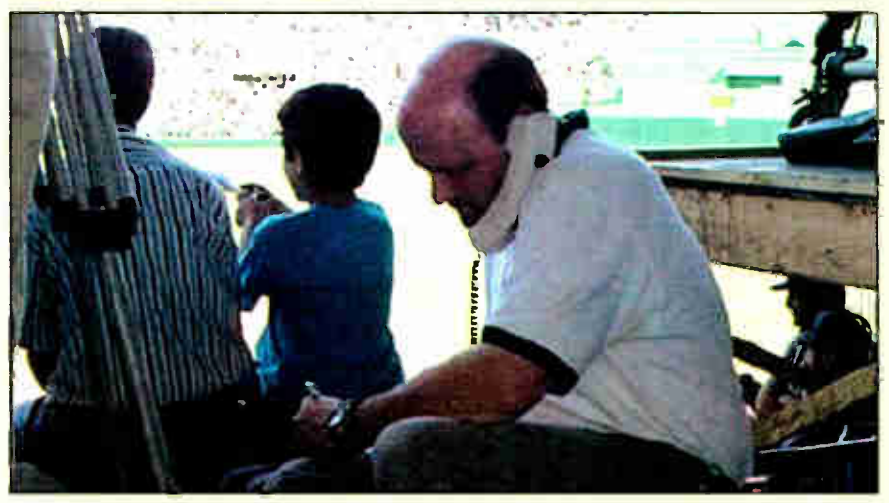
Government approval from both countries set the wheels in motion for WBAL, the flagship station for the Orioles, to go to Cuba to cover the game.

"We were not only dealing with a language barrier, but also a technological barrier," said Jeff Beauchamp, WBAL general manager.

With only a few weeks to prepare,

See WBAL, page 7 ▶

Havana Skyline



ABC News Radio correspondent Tim Scheld files during the Orioles-Cuba game.

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World Radio History

▶ WBAL, continued from page 6

Beauchamp and Paul Eicholtz, the Oriole's engineer and producer, knew they had to hustle to beat the deadline.

The first question Beauchamp and Eicholtz asked themselves was "How do you get a signal out of Havana?"

"Believe it or not, there is just one satellite uplink out of Cuba. It's owned by the government, but they only have one channel for audio and they had cleared it for ESPN to use to televise the game. And conventional ISDN was also out because it wasn't compatible to Cuba's phone system," Beauchamp said.

A little help ...

WBAL received some help from the ABC Radio Networks. WBAL is an ABC affiliate. Beauchamp said ABC had been in Havana to cover the Pope's visit (**RW**, March 4, 1998) and had experimented with different transmission modes. ABC had trouble getting its Comrex Hotline POTS codec to work with the Cuban's Russian-made phone system.

Reams of paperwork needed to be filed in order for the Oriole's broadcast team and Eicholtz to receive their passports and make the trip.

"The Cubans wanted extensive resumes on all of our people and a complete list of who they would be interviewing," Beauchamp said. Announcers Jim Hunter, Fred Manfra, reporter John Patti and Eicholtz were on the list to go to Havana.

With that taken care of, Eicholtz called Havana to order the necessary phone lines WBAL would need for the game. He worked closely with a government-appointed liaison assigned to help American media with their game coverage.

Eicholtz said finding someone who spoke English was sometimes difficult.

"I speak not one word of Spanish, so it took many hours sometimes to communicate a simple request like asking what power supply was available, a price on something or whether it was a modular phone jack or an RJ-11. They just kept telling me it would be OK," he said.

Eicholtz said he could not fax orders for phone lines to Havana because the fax machines could not communicate properly. "It was a bit of a nightmare at times."

With the phone lines finally ordered, Eicholtz next called Comrex to see what it recommended.

"They guaranteed me what I wanted to do would work," said Eicholtz.

Eicholtz wanted to use an older-model two-line Comrex with high-frequency and low-frequency lines for the signal. As a backup, he took along a Rudd two-line system.

Semi-confident that his system would work, Eicholtz left Ft. Lauderdale, Fla., where the Orioles train, and arrived in Havana the night before the game.

After finding his way to Latin American stadium the next morning, Eicholtz was led up to the broadcast area of the stadium. He found three phone line blocks that had numbers on them that matched his order forms and dial-tones on all three.

The Pre-Game Ceremony

Eicholtz said, "I looked skyward and said, 'Thank you.'"

Eicholtz tried ten times to get through on the open communication line back to WBAL and another ten tries to get through on the low-frequency circuit of the Comrex. Establishing the high-frequency circuit was more difficult.

"I was starting to sweat a little after 45 minutes of trying," Eicholtz said.

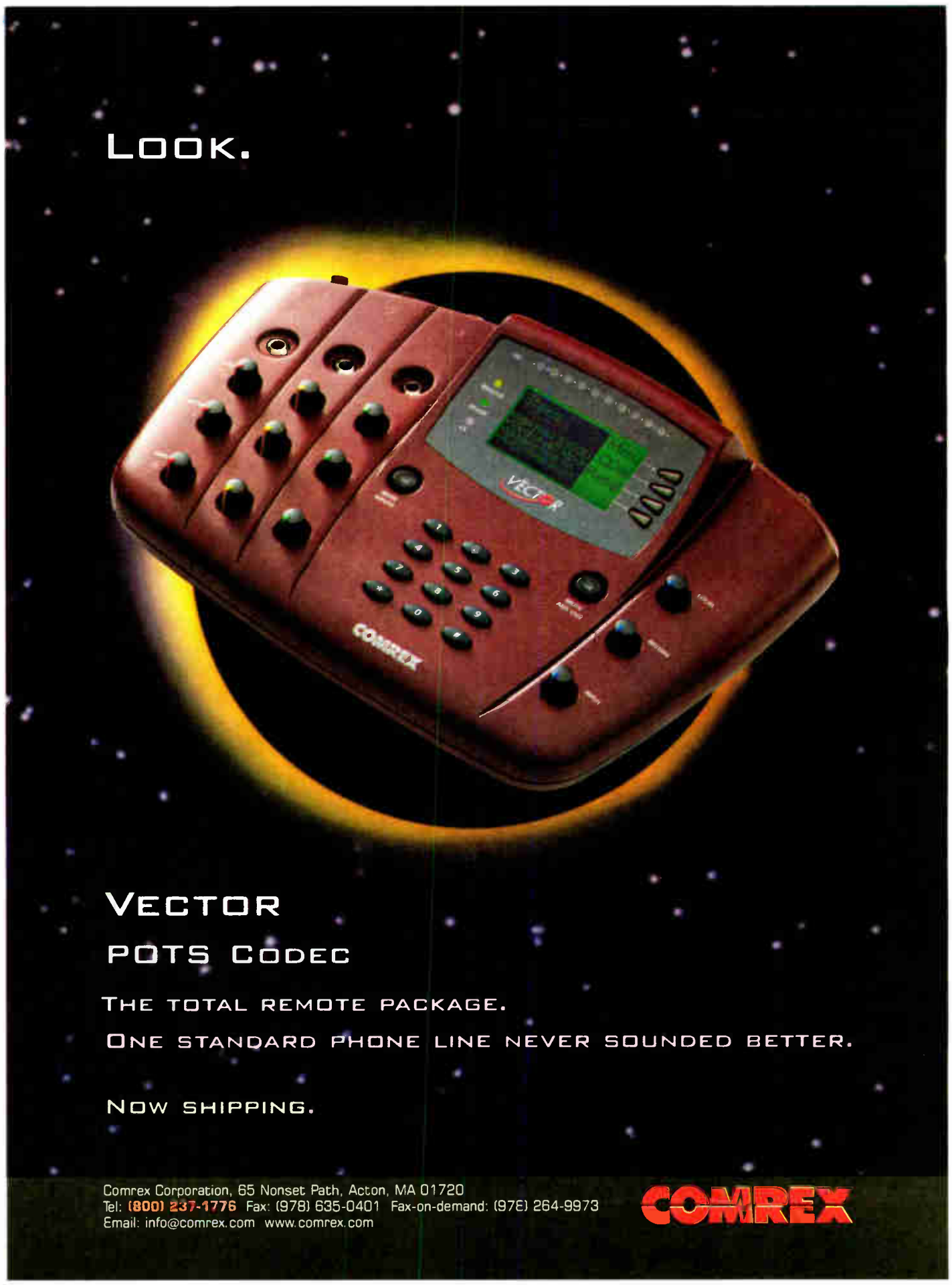
After finally establishing the high-frequency line and conducting some checks, Eicholtz received word back from WBAL, "not to touch a thing, it sounds great!" All three lines stayed up all day.

The broadcast went smoothly with the Orioles winning the game in extra innings. But as Beauchamp pointed out, it was about more than just winning or losing.

"We wanted to cover more than just the game. It was the event. It was the color and the pageantry of it all that made it so special," he said.

Beauchamp said the cost of originating the broadcast from Cuba was worth it.

"Who ever said capitalism is dead in Cuba was wrong. Everything, I mean everything, had to be paid for in cash and in U.S. dollars" Beauchamp said. "Our people took $10,000 to take care of all the bills and spent the majority of it."



Circle (5) On Reader Service Card

World Radio History

NRSC OKs Evaluation Criteria

▶ IBOC, continued from page 1

how the systems are going to cluster themselves or whether they will."

The evaluation guidelines spell out to each firm developing IBOC DAB technology what test data the committee believes is important and how the data will be evaluated. The committee previously issued lab and field test guidelines (**RW**, Jan. 6 and March 31).

All three proponents, USA Digital Radio, Lucent Digital Radio and Digital Radio Express, agreed to submit complete test results to the NRSC by Dec. 15.

Since it was reactivated last year, the NRSC has said it will only review complete submissions, consisting of AM and FM lab and field test results. Each proponent also must have a third party evaluate its system and submit that report with its results. The individual proponents, not the NRSC, choose the firms to conduct the independent evaluation.

The bulk of the evaluation guidelines were approved at the committee meeting at NAB99. The remaining items were left to be finalized at the May 25 NRSC meeting in Washington.

On May 15 and May 17, the NRSC planned to record its analog reference material that it will provide to proponents. The material includes short cuts of different music and other sounds and longer radio programming consisting of several formats including other program elements such as call-ins, jingles and ads.

Two stations, WCGA(AM), St. Simons Island, Ga., and WNNX(FM), Atlanta, have agreed to let the NRSC use their stations to prepare this reference material it will provide each proponent.

The proponents will then take the same source material used by the NRSC and send it through their IBOC systems in the lab. Independent evaluators will then compare the NRSC recordings to the proponents' recording to determine if the IBOC DAB audio sounds better (or worse) than analog.

"This reference station test hones in on one aspect of system performance, unimpaired audio quality," siad NAB Senior Engineer David Layer.

In a draft of the evaluation guidelines, the NRSC stated that IBOC DAB "represents the best approach for introducing DAB into the United States. IBOC technology, now having been through several generations of development, appears to be reaching the point where it is both feasible and ready for serious consideration."

Don Messer, chairman of the working group that developed the evaluation guidelines, said, "Within the next 9 to 12 months, we will know the answer to 'Do IBOC systems behave 'significantly better' to what you currently listen to?"

The NRSC is comparing each proponent's IBOC digital audio to its analog counterpart, rather than comparing systems to each other.

"It would be difficult or impossible to perform cross-system evaluations," the NRSC stated in its evaluation guidelines. "A test program designed to directly compare different IBOC systems would of necessity involve common test elements that are not present in the current NRSC process."

The focus of the evaluation will be on each system's performance in the "hybrid" stage.

"Even an IBOC system with an all-digital implementation included in its initial design is going to have to proceed through a lengthy transition phase during which the hybrid mode is going to be the principal mode of IBOC operation," the NRSC guidelines state.

Broadcasters are concerned how the hybrid digital signals will affect existing analog signals, "particularly since the viability of a hybrid IBOC system meeting the DAB subcommittee's objectives has never been proven."

Within the next 9 to 12 months,
we will know the answer to 'Do IBOC systems behave significantly better?'
— Don Messer

All-digital mode

The NRSC said it would be premature to focus on the all-digital mode now without understanding the performance and tradeoffs necessary with the hybrid mode.

Smith estimated the transition phase to be at least 15 years, or "as long as there is an appreciable analog receiver universe out there."

In the detailed description that each proponent is expected to submit, the NRSC expects to see a discussion of the tradeoffs and compromises made among key aspects of the system, especially those affecting audio quality, interference performance, coverage and compatibility with the analog host signal.

The guidelines stated, "For example, a proponent will have made decisions about the number of bits to allocate to source coding, and the number of bits to allocate to channel coding with this decision representing a tradeoff between audio quality and signal robustness.

"What is not clear at this point, and what a proponent's submission needs to establish, is exactly how and why the compromises for a given system were made, and the effect, if any, of these compromises on the analog and digital signals that will need to co-exist in the radio band."

The challenges

Smith said, "A good part of the challenge here is how you allocate the available (data) bits to make the basic compromises between audio quality, signal robustness and data overhead. ... The fewer bits you devote to the audio, some of those extra bits, can be used for additional error correction, error concealment, those kinds of things that make the audio more robust. So, it's not only a matter of picking up some data overhead.

There's some basic tradeoffs that can be made between the data rate of the audio and the robustness of the audio."

The NRSC will pay attention to other factors as well:

Signal durability — The signal's ability to withstand interference from other radio signals (co-channel, first adjacent and second adjacent channel signals in particular) — will be evaluated, as will other types of interference.

Acquisition performance — The NRSC is looking for tuning times of "less than one second" to achieve consumer acceptance.

Auxiliary data capacity — This refers to how much capacity there is for data not used for the main channel digital audio (program) signal. For FM, the NRSC considers 10 kbps to be the performance baseline, representing the average data carrying capacity of digital subcarrier technologies tested by the NRSC's high-speed FM subcarrier subcommittee in 1995-1997. Auxiliary data services are not currently supported for AM. The NRSC suggests the minimum usable capacity would be about 700 bits per second, equivalent to that offered by the NRSC RBDS (an FM digital subcarrier) standard.

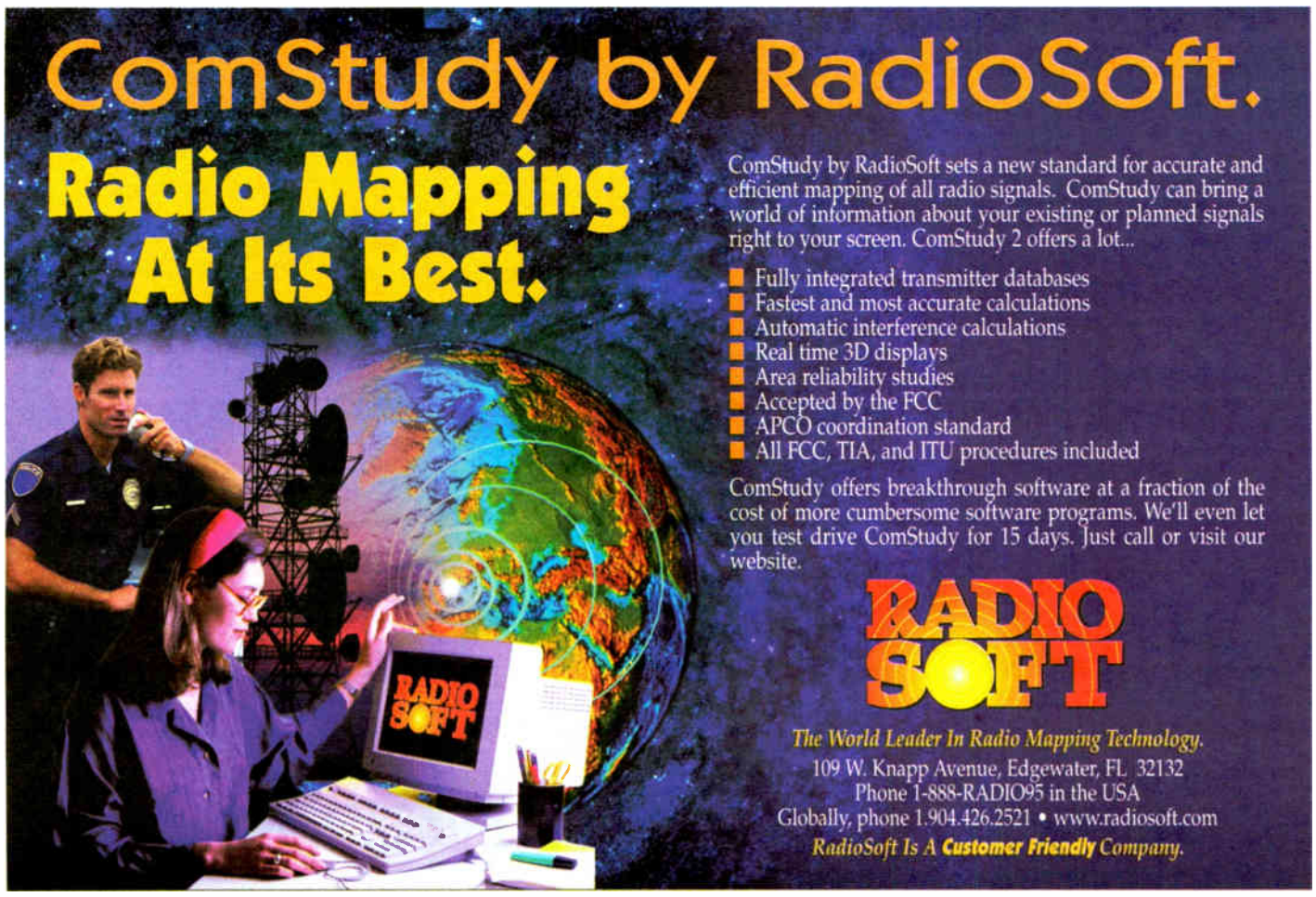
Performance at the edge of coverage — How each system avoids the sudden drop-off many digital systems exhibit at the edge of a coverage area and achieves a more graceful signal degradation (as consumers expect) will be examined.

Host analog signal performance — The NRSC could hold the host strictly to the baseline analog performance. But expecting the digital signal to have no impact on the analog host "may be unrealistic," stated the NRSC. Another option may be to "tolerate some amount of diminished performance" because there would be a "significantly improved" digital signal. The NRSC does not yet know, before analyzing the data, what would be considered an acceptable level of diminished performance.

At the end of the process, the NRSC will prepare three reports, one on each system. Members say they will work quickly, but have no set deadline to complete the reports.

Proponents have a chance to comment on what the NRSC says in its evaluations, and the NRSC can decide whether or not to include proponent's comments.

The NRSC will eventually make the reports public and would include them in any formal submission to the FCC in any relevant IBOC proceeding.



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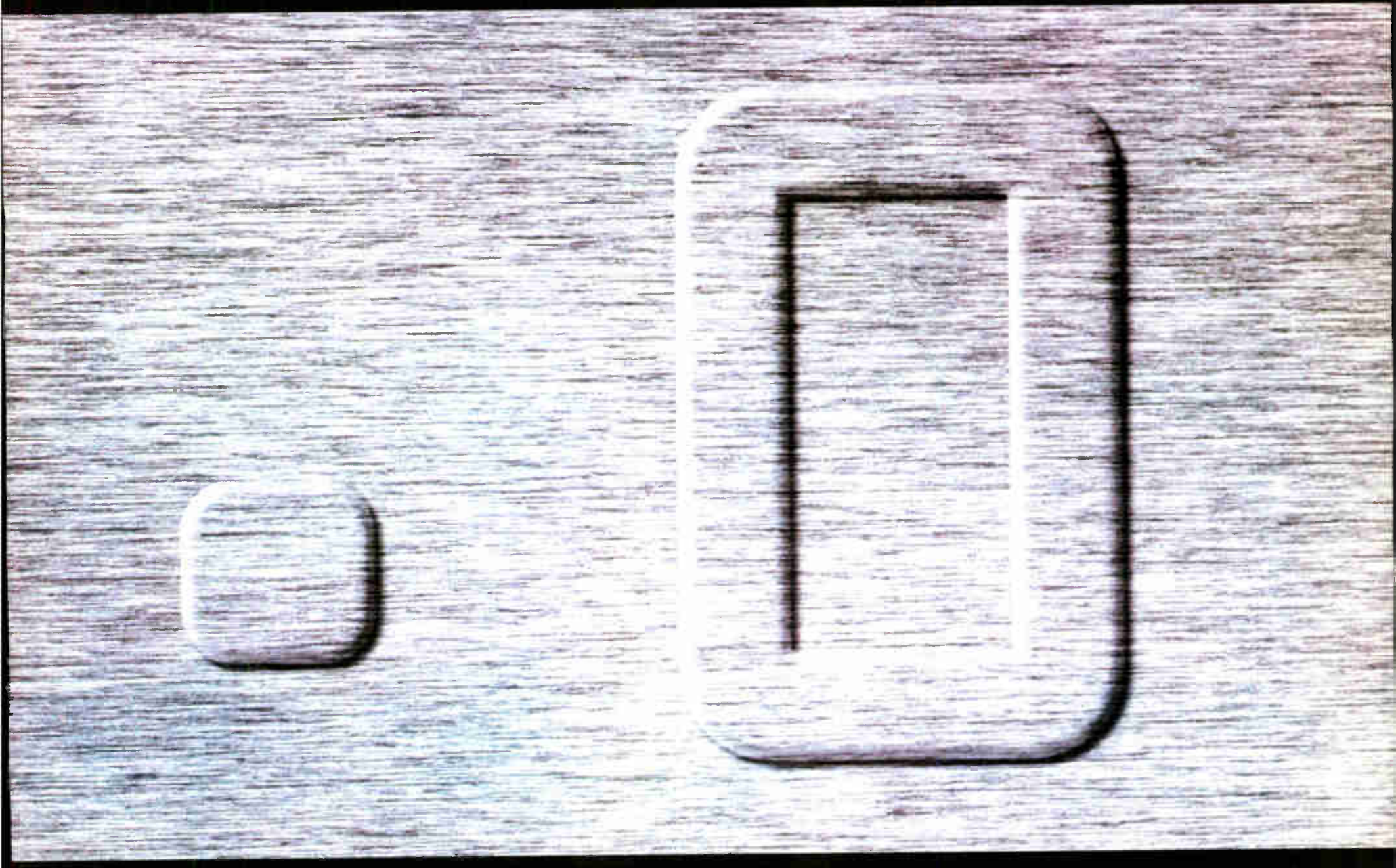

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World Radio History
Circle (11) On Reader Service Card

Commissioners on FCC Changes

by Naina Narayana

LAS VEGAS Although the possible creation of a low-power FM service and the developing technology for in-band, on-channel digital audio broadcasting dominated the regulatory and technology news at NAB99 (**RW**, May 12), other regulatory hot topics were discussed. Those included a possible FCC overhaul, ownership rules and EEO standards.

Among the proposed changes, said Ness, is the establishment of a consolidated enforcement bureau that would, for example, be responsible for closing pirate radio stations. Now, there are several enforcement bureaus scattered throughout the FCC.

In his proposal, Powell suggested consolidating the cable, mass media and international bureaus into one bureau and eliminating duplicative duties between the FCC and other federal agencies.

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Michael Powell

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Susan Ness

The commissioners agreed that increasing the efficiency of the FCC is at the top of their agendas.

FCC Commissioners Susan Ness, Harold Furchtgott-Roth and Michael Powell joined Larry Irving, Assistant Secretary of Commerce of the National Telecommunications and Information Administration at the session "Regulatory Dialogue," sponsored by Media/Professional Insurance and Royal & Sun alliance.

The commissioners agreed that increasing the efficiency of the FCC is at the top of their agendas. At a recent House reauthorization hearing, FCC Chairman William Kennard and the commissioners each outlined possible changes in the FCC's working methods.

"I think that the government has an obligation to every one of those functions and we should see whether they believe there is value ... and see whether it is duplicative," Powell said.

Among the many controversial issues the FCC faces is how to update the broadcast ownership rules. "It's going to be one of the more difficult deliberations the commission has," Powell said, adding that some of the current rules do not take into account the state of the current market, the creation of new media and provisions that predate the Telecommunications Act of 1996.

Complicating matters is the FCC's goal of encouraging diversity in the broadcast industry, said Powell.

The NTIA's Irving agreed. "We want to see more editorial voices," he said. "We continue to want to work with broadcasters and other concerned parties to see what to do. We want to come to judgments that make sense."

There also are concerns about too much consolidation, Ness said. Defending the FCC's approval of local mergers even when the Department of Justice has determined that no antitrust concerns exist, Ness said the FCC has the right to do so because the agency is charged with ensuring that all transfers of radio licenses — which is a component of a merger — are in the public interest.

The DOJ and the FCC, she said, look at different aspects of mergers.

However, Commissioner Furchtgott-Roth disagreed, saying that the FCC follows no existing rules when approving a license transfer, and he hopes to implement some well-defined standards soon.

Interference issues for low-power radio stations are also a concern for the commission. Powell said he hopes to conduct a study soon, but maintained that the government expects low-power radio licensees to operate with little interference.

Irving said the NTIA does not want low-power stations to conflict with established broadcasters, but at the same time, it strives to give minority voices access to the public airwaves.

"If you have more voices in the community, you make it richer," Irving said.

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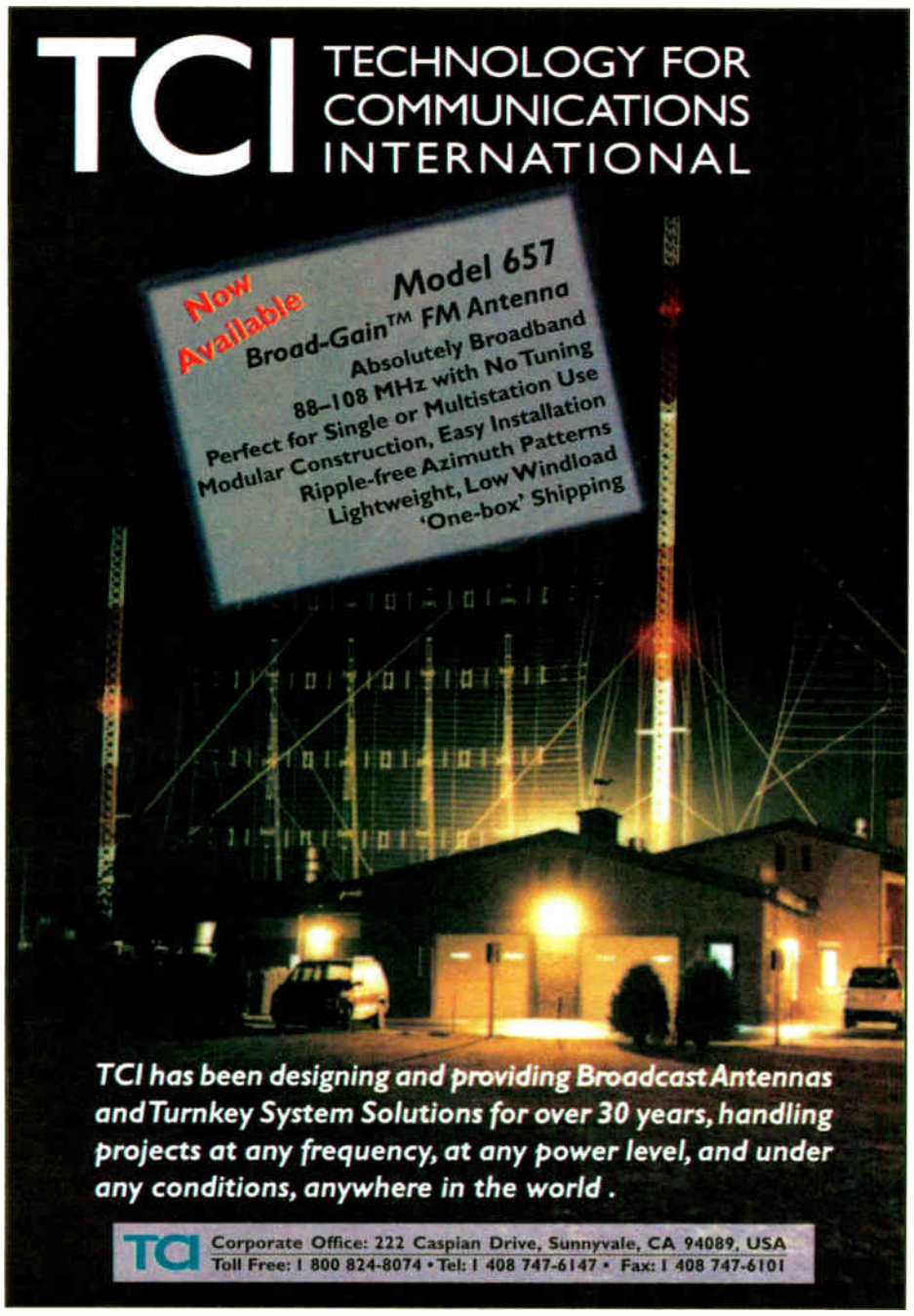

Circle (6) On Reader Service Card

United States, Mexico Seek S-Band Pact

by Gabriel Sosa Plata

MEXICO CITY As the start-up time for digital audio services grows nearer, representatives of the U.S. and Mexican governments are negotiating over S-band allocations for digital broadcasting.

The agreement between the two nations aims to ensure interference-free broadcasting for U.S. satellite-delivered digital audio radio services.

These digital pay channels, which will beam radio signals from space to receivers across the contiguous 48 U.S. states, follow an announcement to the International Telecommunications Union that both countries plan to use parts of the 2,310 MHz to 2,360 MHz segment of the S-band spectrum.

The dialogue

"We are discussing with the United States the most appropriate mechanisms so that both countries can boast their own systems for digital audio transmission via satellite," said Federico González-Luna Bueno, general director of Radio and Television Systems for the Ministry of Communications and Transportation.

In 1992, at the World Radiocommunications Conference (WRC-92) in Torremolinos, Spain, the United States received the go-ahead from the ITU to use the S-band for satellite DAB.

In March 1997, the FCC auctioned off two licenses for such services to CD Radio Inc. and to American Mobile Radio Corp., now renamed XM Satellite Radio. Each company has been allocated 12.5 MHz of space from 2,320 MHz to 2,345 MHz, and they plan to have services operating by the 4th quarter of 2000 or later.

Given the expected commencement of DARS operations, the United States has been negotiating with Mexico to ensure that DARS transmissions along the border do not interfere with Mexican operators and vice versa.

Mexico has more than enough reason to reach an agreement with the United States over S-band use. Mexico wants to protect point-to-point S-band links in rural areas, said González-Luna.

Mexican broadcasters also want to secure an agreement because of local plans to develop SDARS on the S-band. These plans were announced at WRC-97 in Geneva, Switzerland, in October 1997.

"The dialogue with the FCC has been very positive," said González-Luna. "They have a very clear grasp on Mexican reasons for promoting these services, and I believe we will manage an adequate share (of the spectrum)."

Nevertheless, the United States stands to gain the most from the negotiations, according to at least one sector specialist.

"That Mexico requested the S-band

See MEXICO, page 14 ▶

World Radio History

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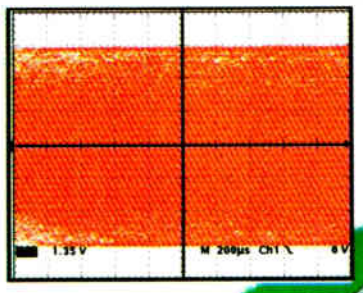
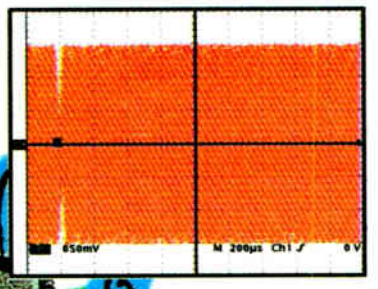
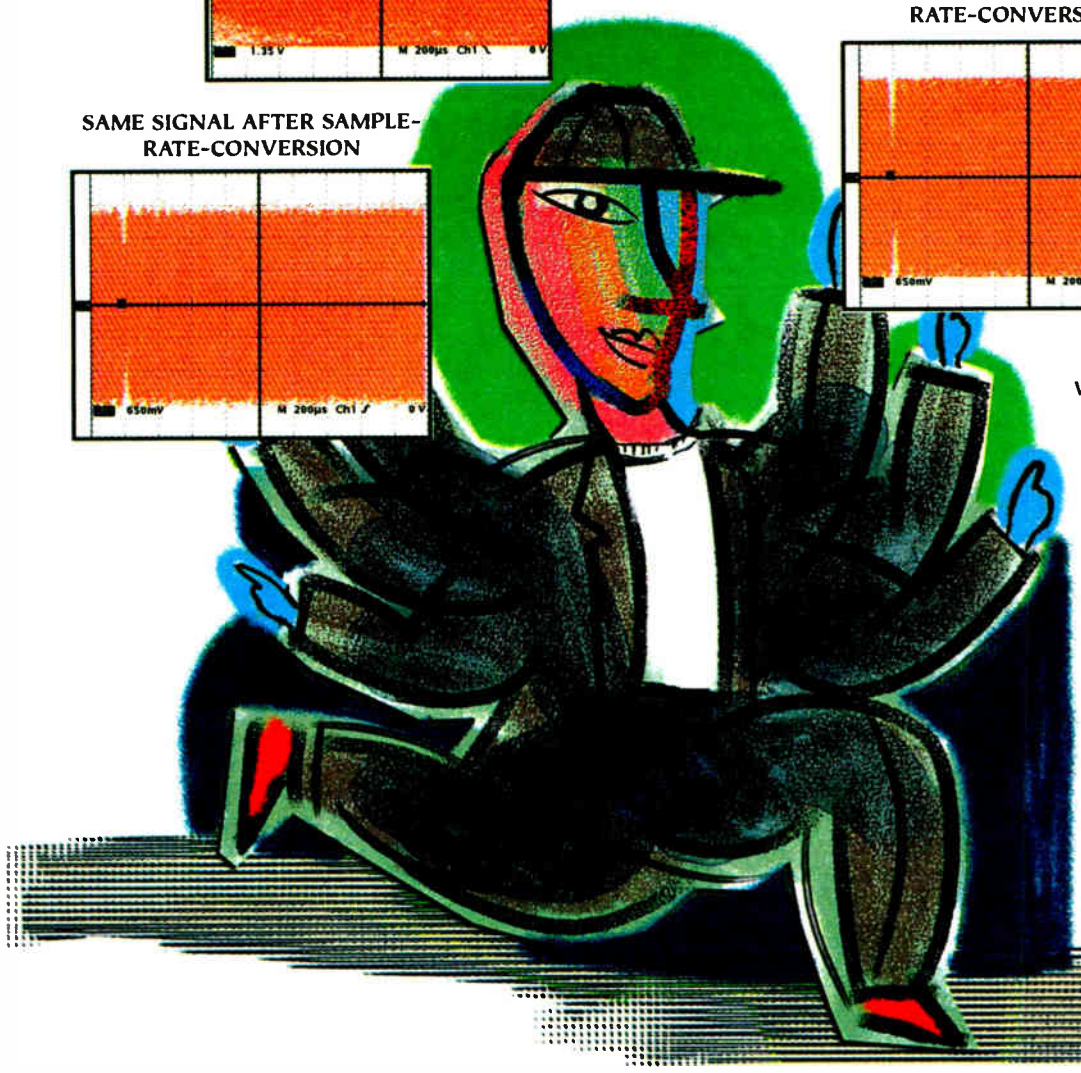


LEFT CHANNEL OUTPUT WITH PREDICTION ANALYSIS CLIPPING AND SAMPLE-RATE-CONVERSION



SAME SIGNAL AFTER SAMPLE-RATE-CONVERSION



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The "flat" lines along the top and bottom of the filled in section represent clipper performance. Any "dots" that exceed the reference level of 0.650 volts are overshoots. The lower left graph shows "blips" representing overshoots 15 to 20 percent beyond the reference peak level of ± 0.650 volts. The Prediction Analysis Clipper reduces overshoots in the sample-rate-converted signal path to an insignificant three percent.

For more information on the technical background of overshoot mechanisms, call us for a copy of our paper entitled "Omnia.fm: An Engineering Study." Or visit our web site: www.nogrunge.com.

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World Radio History

RADIO EMPLOYMENT

Job Seekers, Employers Joined

by Brian Galante

LAS VEGAS The Broadcast Education Association and NAB provided many useful outlets for job seekers at BEA99.

BEA99, an academic convention for the education of future electronic media professionals, presented conferences and events geared toward broadcast education and employment in the broadcasting industry.

The annual events with BEA and NAB were a precursor to NAB99. More than 1,000 college professors attended the 44th annual BEA convention for the 116 panel sessions, technical demonstrations, paper presentations, speakers and exhibits.

Connecting students, teachers

"BEA works primarily with college professors, among others, on issues happening in the broadcast industry," said Michael McKinley, director, broadcast resource programs, NAB Career Center/Human Resources Department. "NAB's relationship has always been to work with BEA and do various outreach programs with universities, professors and students," said McKinley.

Two events brought aspiring and established broadcasters together: the "NAB/BEA Employment Seminar: New Employment Strategies for the New Digital Broadcast Marketplace" and the NAB Career Fair.

"The objective of the employment seminar is simply to give those job applicants attending a first-hand opportunity to discuss job availability in broadcasting," said McKinley.

A diverse panel was on hand to speak about the job market and field questions from attendees. They included Kristine H. Mirrer, Kean University; Charles C. Walker, vice president of production, MediaLink; Olivia Campos-Bergeron, director of workforce diversity, KNBC-TV; Jack Gravely, director of workforce diversity, FCC; and Susan G. Pickering, general manager, WKPE-FM.

The NAB Career Fair focused on providing job opportunities to entry-level hopefuls and management candidates looking to secure positions in the industry. Numerous exhibitors were present to accept resumes, discuss job opportunities and provide guidance at the event, sponsored by the Home Shopping Network.

Donald W. Washington, Human Resources Associate for NPR said, "The young people I've seen are well-educated and well-prepared. It's easy to talk to them about opportunities because they are enthusiastic and excited (about the industry)."

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Job seekers and those already working in the industry discussed opportunities at the NAB Career Fair.

Teresa Nolt, a student at The University of North Iowa, said, "I feel comfortable handing out resumes this year. The companies have been very friendly."

"Exhibitors include Capstar and Jacor as well as various state associations who speak on behalf of jobs in radio and television for their home states," said McKinley.

Other exhibitors included Sony, ABC, Minnesota Public Radio, Home Shopping Network and the Black Broadcasting Alliance.

Broadcasters and job seekers were encouraged to meet at the Career Center in the lobby of the Las Vegas Convention Center and discuss employment opportunities.

"Employers stop by with job postings, and applicants are free to come by and see what's available," said McKinley.

Lifetime achievements

Although the educational and career seminars were the main lure of BEA99, there were many other events throughout the convention.

BEA and NAB presented the 1999 Hugh Malcolm Beville, Jr. award to Richard Weinstein, executive director and chief executive officer of the Media Ratings Council at the BEA awards luncheon.

The Beville award recognizes individuals whose lifetime achievements have made substantial contributions to the development, teaching or use of broadcast audience research.

Since 1993, Weinstein has expanded the scope of the Media Ratings Council by emphasizing the need for high-quality research in measuring audiences of various media, both in the United States and overseas.

BEA99 welcomed keynote speaker Bill Duke, chairperson, Howard University School of Communications, Radio, Television and Film Department at its awards luncheon.

Duke, also a Hollywood director, producer, writer and actor, focused on the importance of educating students. He said that Howard University is in the process of revamping parts of its curriculum so students are prepared for the real world.

"What are the true issues of life in the 21st century? We are trying to project the future so that students will be able to find employment and work with tools (to which) they will be able to adapt," said Duke.

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Circle (23) On Reader Service Card

U.S., Mexico Work on SDARS Implications

▶ MEXICO, continued from page 12

means allowing the U.S. satellite signals to come in here," said Celestino Antonioli, member of the New Technology Committee of the Cámara Nacional de la Industria de Radio y Televisión, which promotes the interests of Mexican broadcasters. Antonioli noted that this opinion was his own, not that of the CIRT.

Antonioli, who is also director of engineering for Grupo Radio Centro, said that Mexico will have problems implementing a mixed satellite and terrestrial DAB system in the S- and L-bands.

"Very difficult, the way I see it; a great deal of investment is needed," said Antonioli. "And, if I had the money to invest right now in satellite radio, I would not do it because it is not a business; there is no market."

According to Antonioli, there is a chance for a Mexican radio company to come to an agreement with one of the U.S. DARS companies that could bring DARS to Mexicans living in the satellite footprint.

"It could happen — why not?" said Antonioli, "But there is nothing concrete."

For its part, the ministry is more optimistic. González-Luna said he is confident that the negotiations with the United States will help secure the interest of investors in a digital satellite service for Mexico.

"Probably, this service will not happen in this millennium," said González-Luna, "but we are working for Mexico to have this technology in the near future."

Foreign infrastructure

González-Luna said that, under Mexican law, satellite-based radio would be open to foreign infrastructure investments of as much as 49 percent.

González-Luna said that the negotiations with the United States do not mean that Mexico has changed its plans for implementing a terrestrial DAB system.

"We continue to watch what happens with these technologies, bearing two aspects in mind: in the first place their economic and technical viability; and in the second place, the benefit to the public," he said.

Gabriel Sosa Plata covers the industry for ***Radio World*** *from Mexico. Contact him at telephone: +52-5-597-7288 or via e-mail at* sopla@ienlaces.com.mx

World Radio History

Baseball on the Radio

▶ BASEBALL, continued from page 6

The Orioles broadcast team consists of Jim Hunter and Fred Manfra.

Beauchamp said the station originates some programming from Oriole Park at Camden Yards, home of the Orioles, in addition to airing the games.

"We'll do some of our morning shows from the stadium throughout the year and some of our ancillary special programming on the Orioles," he said.

The Hearst-Argyle station is the flagship for 29 other radio stations that make up the Orioles Radio Network.

Paul Eicholtz, engineer and producer for Orioles broadcasts at home and away since 1988, said his job is to provide tech support when needed during a game and do set up and tear down.

For a game at Camden Yards, Eicholtz typically will arrive at the park by 3 p.m. The facilities there include a Ramsa WRS-4412 mixer board. For road games, Eicholtz packs smaller Shure 267 and 367 mixers.

For pre-game recording of the manager's show, the announcers use a Sony MZ-B3 MiniDisc recorder. The show is played back on a Sony MZ-1 MiniDisc player.

Highlights

A 360 System Short/cut Editor is used to record the game and edit "highlight plays" for the post-game show. Eicholtz said that up until this year, he used a cassette deck for the same purpose.

The Orioles broadcast team use a Sennheiser HD25-1 headset microphone and Sennheiser 421 microphones for the games.

Eicholtz said the telephone systems he typically finds at parks on the road have been standardized the past few years. "We use GlobeCast as our backhaul for ISDN. And every stadium we visit has their facilities in it. You just plug into the ISDN and you're set to go," he said.

In order to receive the feed, WBAL board operators call a number, assigned by GlobeCast at each ballpark.

"Everything is very uniform these days," Eicholtz said.

While official dollar figures are not released, radio station revenue generated from baseball is substantial.

While declining to say what his station pays in broadcast rights fees to carry the Orioles, Beauchamp said WBAL does not make a financial killing on the games.

"We don't make huge dollars on baseball, but there is that halo effect that is important to our radio station. Orioles fans are passionate about the team and I think it helps our station to be identified with baseball and the Os," Beauchamp said.

KMOX News/Talk 1120

Orioles baseball is a big part of WBAL. I mean a huge part.

— Jeff Beauchamp

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Central		**Central**	
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Chicago White Sox	WMVP(AM) (1000)	St. Louis Cardinals	KMOX(AM) (1120)
Kansas City Royals	KMBZ(AM) (980)	Cincinnati Reds	WLW(AM) (700)
Minnesota Twins	WCCO(AM) (830)	Milwaukee Brewers	WTMJ(AM) (620)
		Pittsburgh Pirates	KDKA(AM) (1020)
West		**West**	
Anaheim Angels	KRLA(AM) (1110)	Los Angeles Dodgers	KXTA(AM) (1150
Texas Rangers	KRLO(AM) (1080)	Colorado Rockies	KOA(AM) (850)
Seattle Mariners	KIRO(AM) (710)	Arizona Diamondbacks	KTAR(AM) (620)
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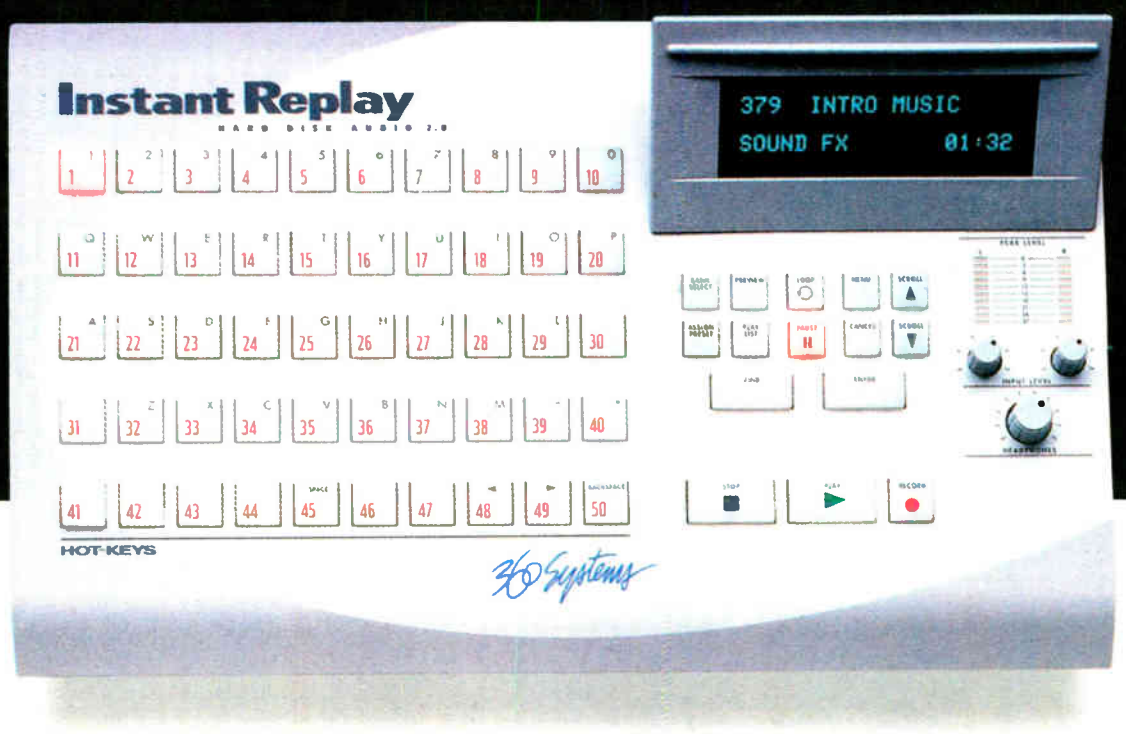

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Circle (10) On Reader Service Card

World Radio History

Recorder Lines Blur at Show

Paul Kaminski

The evolution from analog tape to hard disk and digital media rounded yet another corner at NAB99.

Not only are more digital products available, but the lines between product types continue to blur. Recorders incorporate codecs. Multitrackers are used for phone calls. Removable cards replace moving tape.

The analog options shown by companies like **Tascam** and **Otari**, ranged from two-head cassette decks to 2-inch multitrack reel machines. Although these devices are usually found in studios, they still attracted the interest of visitors with diverse backgrounds. Also, **Fidelipac** and **Audi-Cord** had their lines of NAB analog cart machines on display.

Tascam introduced the DA-40 DAT machine.

But digital recording was again the big news for radio users. There were choices in that category to meet every price point.

On the top end, **360 Systems** introduced the TCR4 and TCR8 digital recorders which seem appropriate for scoring a television or film production. However, there are similarities with its popular two-track recorder/editor, the Short/cut, and like that product is likely to find cross-over applications.

The Short/cut itself received a software upgrade to Short/cut '99, and now can perform fades and crossfades, gain changes within files and has improved controls.

The software upgrade facilitates editing of the file formats typically used by typical digital audio workstation, news server or automation system. Short/cut '99 will read and generate sound files that are easily transmitted via e-mail attachments. You can store all those edited files (two-and-a-half hours worth) with a new 2 GB Jaz disk or the old reliable Zip drive.

Another category of devices uses digital storage media of the PCMCIA type. Several equipment makers have entries that blend codec and recording features. Perhaps these will replace portable DAT machines for off-site recording.

For stations using WAV files routinely, perhaps as part of a hard disk playback system, the Courier V 1.5 portable recorder from **Sonifex** allows recording to standard PCMCIA flash RAM cards. Once recorded, audio can be edited and then transferred via dial-up POTS modem to a PC, Mac or other computer.

The Courier supports a wide variety of native file formats. Because it is a software-defined device, feature upgrades can be implemented through an

See RECORDERS, page 19 ▶

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Circle (8) On Reader Service Card

Radio World Cool Stuff Award NAB99

What was new for radio at NAB99? Find out in this special section.

The show attracted more than 105,000 people, and more than 200 companies described themselves as radio/audio exhibitors. Most of those could be found in the newly expanded North Hall of the Las Vegas Convention Center.

RW editors, writers and freelancers fanned out to discover who was making what, from transmitters to codecs.

We are also pleased to present the winners of the 1999 **Radio World** Cool Stuff Award, listed below and described in detail in the pages that follow.

The winners were selected by a panel of a dozen broadcast engineers and industry journalists, with a total of more than 150 years of experience in radio engineering and hardware applications. These are the products that our judges found to be most interesting, useful, cost-effective and, well ... cool!

1999 RW Cool Stuff Award Winners:

Aphex 1788 Mic Preamplifier

Broadcast Electronics FM-10S FM Transmitter

Harris Intraplex SynchroCast

Mager Systems Custom Cabinetry

Mayah EditPro MP3 Editor

Maycom Easycorder

Orban "Cart Chunk" Initiative

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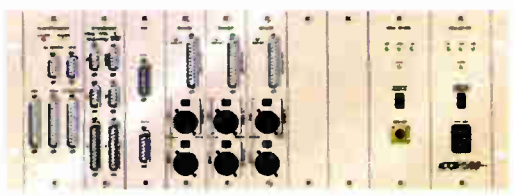

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World Radio History

Digital and Analog Recording

▶ RECORDER, continued from page 16

RS-232 port. According to Marcus Brooke of Sonifex, the editor and other functions are intuitive.

Two devices

The CTaxi from **Dialog4** is a marriage of two devices, incorporating digital storage and an ISDN codec. This device will be useful for radio journalists and will connect with the sports crowd. It can be used as a recorder and edit workstation — it even has a "scrub wheel." Pre-game and highlight material can be prepared and the game called live on the same device.

The 360 Systems TCR4

The CTaxi includes a file system and transfer utility. Recorded elements can be transmitted to a PC as WAV files, compressed using ISO/MPEG Layer II or Layer III. The same ISDN port can then hang up and dial a codec that supports MPEG and send live, real-time audio.

Storage is also flexible, making use of standard PCMCIA flash RAM cards. Hours of battery life are possible because of a strategy allowing for "hot swapping" of lithium batteries to provide indefinite continuous operation.

The **Maycom** EasyCorder earned a **Radio World** Cool Stuff Award this year. It is packaged a bit like a portable cassette machine, but that's where the similarity stops. It records to PCMCIA media of all kinds. It has two PCMCIA slots, file management and edit workstation functionality, and firmware to support a dialing directory for file transfer.

Plug in either an ISDN or POTS modem; it uses the second slot for your modem. This is a plus; future connectivity schemes like ADSL could be supported easily.

Superscope Technologies showed its **Marantz** PMD 650 MiniDisc recorder. Although Superscope didn't have its own booth, distributors including BSW displayed the 650. It has the MiniDisc transport and recording controls in a package that resembles the popular PMD series of cassette recorders.

PMI had two solutions for those using consumer-grade MD units like the Sony MZR series. The MD Report! and Report! Jr., both manufactured in England by **ASC**, are outboard units that connect to the mini plug connections on the units, and provide XLR inputs/outputs, phantom power and increased battery life.

Sony MiniDisc recorders were among the popular lower cost digital alternatives. The new MZR-55 is about the size of two MiniDiscs stacked on top of each other, with all the same features that past editions of the Sony portable recorders featured.

Denon promoted its new DN-991 MiniDisc studio recorder and established DN-M 1050R recorder.

As far as digital audio tape goes, **Tascam** introduced the DA-40 DAT, successor to its DA-30 mkII. **Akai** showed its line of hard-disk multitrack recorders.

Zaxcom showed its new Diva II audio recorder. This portable unit is specifically designed for four-channel audio recording in the field.

Denon added to its MiniDisc studio recorder line with the DN-991.

A removable hard drive with four track-hour capacity of 20 bit by 48 kHz audio, and a SCSI port for backing up to a DVD-ROM drive, makes this perfect for multitrack sound recording for both video and audio projects. Another handy feature is the fact that it's powered by a standard NP-1 battery.

What we found: The audio recording options for radio range from the traditional analog (cassettes, NAB carts and reel-to-reel) to digital solutions from the most basic digital two-track (MiniDisc) to the full-blown 64-track options shown by the **Digidesign** division of **Avid**.

How close is the total digital radio station? As Jacor Vice President for Development Bill Suffa said in a seminar, "Tape is going away."

■■■

Paul Kaminski is news director for the Motor Sports Radio Network, and hosts its "Race-Talk" and "Radio-Road-Test" programs.

Radio World Cool Stuff Award NAB99

Wheatstone D-600 Digital Console

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Gary Snow poses with the new D-600.

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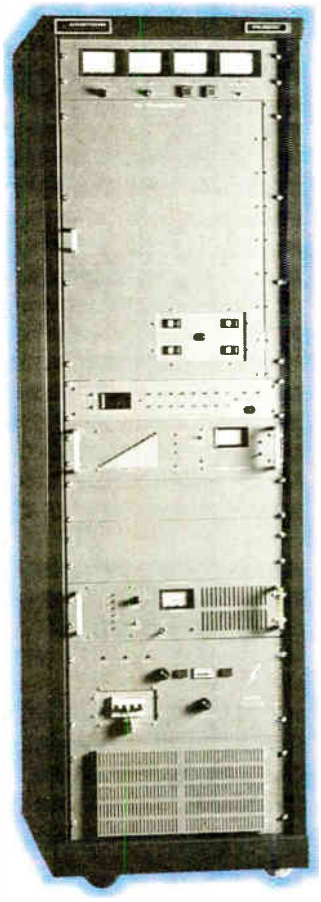

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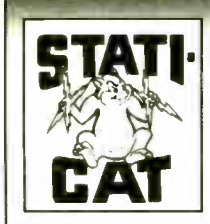

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World Radio History

Options Plentiful in Automation

Bob Shotwell

If you have shopped for a car in one of those multiacre new-car megalots, then you know what looking at studio automation or live-assist computer systems is like.

Do you want four doors or two? A V-8 or V-6? Foreign or domestic? Automatic or manual? What about the color?

Likewise, the selection and range of hard disk-based automation and live-assist systems is downright dizzying.

Something for everyone

Which is the best? Well, like a car, it depends on your needs, budget and taste. In any event, there certainly was something to suit most everyone at NAB99 — and then some.

Platform options ranged from DOS to Linux. Without a doubt the trend is toward multifunctionality and accommodation.

For the most part, manufacturers are designing 32-bit applications to run under Windows 95/98 and/or Windows NT.

Although the number of DOS-based programs were indeed few, any report of the death of DOS is premature. DOS still has a lot to offer.

Opinions abound, and some may argue the point, but my experience has been that crashes or freezes are considerably fewer with DOS-based programs.

If your need is to shut the lights, lock the door, and call it a weekend, then you are just going to sleep a little more soundly with a DOS-based system.

Pristine Systems and **LPB**, for example, run their studio hard disk-based systems on DOS. Nevertheless they are looking forward to Windows 2000, and Pristine has stated that free upgrades will be offered to those buying the current version.

Doing quite fine

Close in reliability to DOS is Windows NT. While consumers patiently await version 5.0 of NT or Windows 2000, NT 4.0 is doing quite fine. And most systems on the market run under either Windows NT or Windows 95/98.

Some manufacturers, like **Smarts Broadcast Systems**, operate the mission-critical portion under DOS and the studio workstation under Windows.

This seems to work well and is a creative way to provide the Windows functionality the studio operator needs while insuring a sturdy underpinning for the business end of things.

Finally, there is Linux.

The **Scott Studios** Scott System and the **On Air Digital USA** Radio Suite HD both were shown running under Linux. Linux has a reputation for extreme reliability and resistance to crashing.

Dave Scott of Scott Studios and John Schaab of On Air Digital both said that, at present, Linux is the best bet for those who require total peace of mind about a stable operating system.

ENCO Systems announced that its DAD$_{PRO}$32 digital system can now be configured using Linux.

Is this going to be the wave of the future? Only time and trends will tell. (See **RW**, May 12, page 6, for more on this topic.)

Another area where many manufacturers are accommodating broadcasters' desires for "freedom of choice" is in hardware.

And nowhere is this more evident than with soundcards.

Digigram and **Antex** are far and away the most popular choices for high-end, high-quality audio cards.

That notwithstanding, most systems being shown will allow any Windows- or SoundBlaster-compatible card to be used, as well. So called low-end consumer audio cards now sport stunning specifications, frequently surpassing typical FM broadcast specs.

One of the notable holdouts in this area is **Broadcast Electronics**. The BE AudioVAULT system requires the use of a proprietary audio card.

But ultimately it is "the program" and not the underlying OS or hardware the operator sees and works with. To the jock this is the business end of things. The rest is mere technicalities.

The Linux discussion factors into one of the many choices that an automation buyer must make.

Matter of taste

And it is in this area where things become decidedly a matter of taste, especially with respect to the on-screen layout.

What appears as a complete and logical layout of information to one person, can be hopeless gobbledygook to another.

Time and familiarity play a very important role.

For example, at first I found both the ENCO DAD$_{PRO}$32 MasterLog program and the Pristine RapidFire a bit confusing. After spending some time with them, reviewing the features and working the system, I became considerably more comfortable.

The **CartWorks** programs, **Axel Technologies**' RadioLight and a variety of manufacturers' "wall-of-carts" type displays were by far the easiest to immediately grasp.

In the middle I found the Smarts RightTouch and the **CBSI** Digital Universe to harmoniously balance a wealth of information in a clean and uncluttered manner.

Without a doubt being able to play with a system first and to familiarize oneself with it can make all the difference in the world.

To that end **BSI** provides free software for a complete working system downloadable on the Net. This short term try-before-you-buy test drive is a marketing strategy well worth copying.

Not long ago, it was enough for a studio hard drive system to turn the satellite on and off, play the spots and drop in the liners. Not so, now. Most systems will do that at the very least.

But additional functions and options are now *de rigueur*.

For example, with many stations placing their music on the studio hard drive system, music library database management becomes a key ingredient.

Being able to sort by song title, artist or year can make the difference between taking a request and playing it.

Also the Scott CD Ripper and the BSI Speedy are useful tools that allow you to "dub" CDs in a fraction of the songs actual length. Very helpful in updating the library.

The ability to quickly and randomly select audio cuts for air play is a must. Whether you call it a Cart Wall, a Jock Page or Hot Buttons, having to manually edit the log to drop in stingers and jingles or drag-n-dropping the news-noise or traffic special effects just isn't going to be acceptable anymore.

The ENCO DAD$_{PRO}$32, RCS Master Control, the **AEV** Aurad Virtual Radio, BSI, Scott, and Smarts all handle this task especially well.

Voice tracking is now starting to come into its own, too. Consider carefully any system that does not allow disc jockeys cutting the voice tracks to hear the music over which they are announcing.

This may seem like a small matter if you have never been on the air, but most announcers want to hear the music in order to pace themselves.

DJs will often work with the music as they voice track. Is this absolutely necessary? No, of course not.

There are some systems such as the Pristine Rapid Fire that incorporate what they call "I-codes" that allow the system to fit the voice track to the end-fade and intro-times ensure a perfect fit.

Voice tracking

Voice tracking from a remote location, home, another studio or a remote location is becoming easier and more common.

The Scott VTVI, **Tiesseci** System 7, **RCS** Master Control, the BE AudioVAULT and BSI are but a few companies with software and systems that provide this feature. All you need is an Internet connection or an FTP site.

And speaking about Internet voice tracking, unveiled at NAB99 was the **ABC Radio Networks** LocalMax.

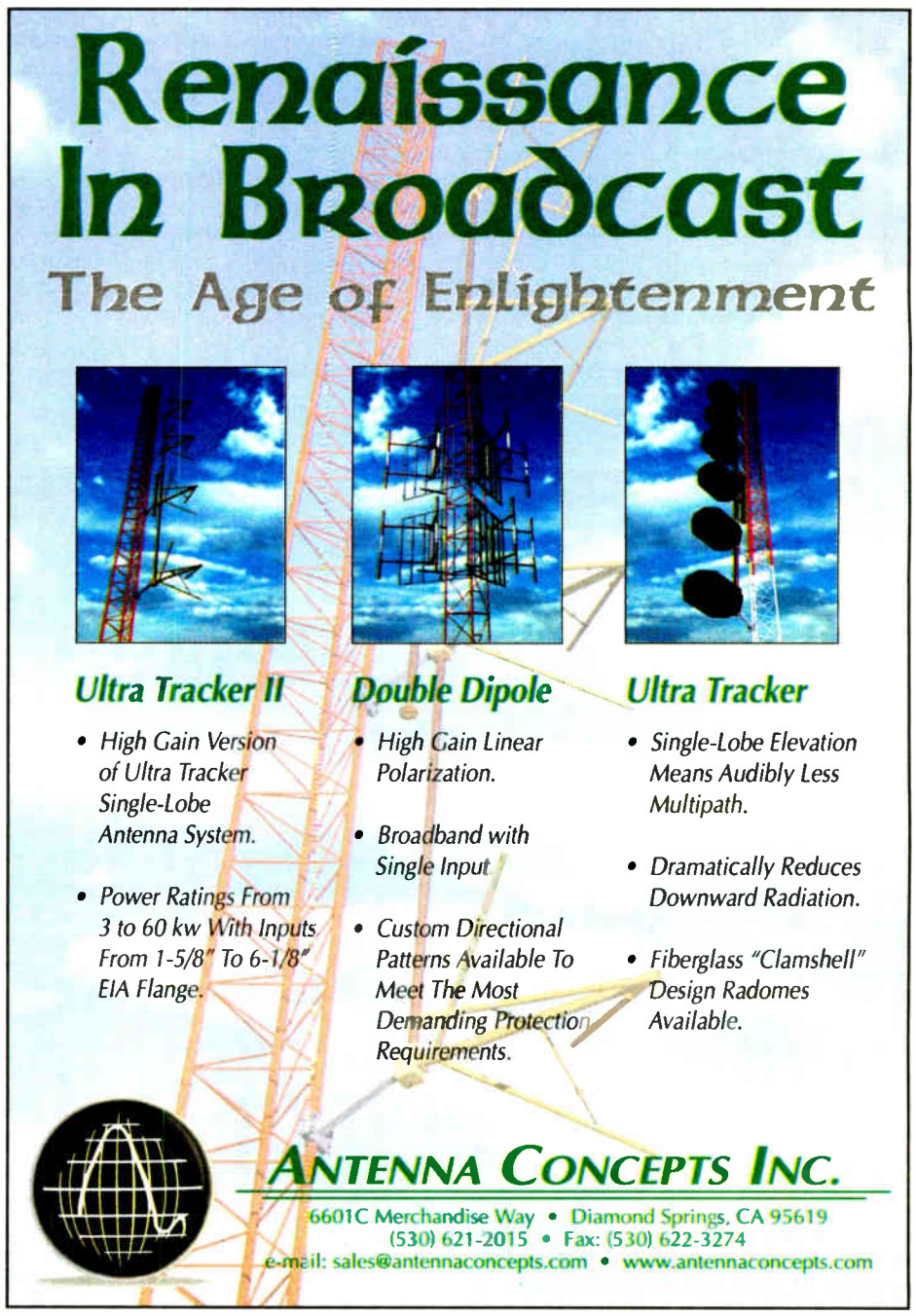
Long a provider of 24-hour network programming, ABC Radio Networks has finished beta testing a network-provided voice-tracking service.

Working with Broadcast Electronics and utilizing the BE AudioVAULT system, some of ABC's 24-hour format announcers have been doing voice tracking along with their regular duties in Dallas.

With LocalMax, network quality talent can be voice tracked with localization customized for a station.

Access by LANs is less a convenience and more a necessity now. The PD can update promo rotations, traffic can change start and end dates, and sales can listen to a spot or download it to a laptop for client approval, all while never setting foot in the studio.

See AUTOMATION, page 26 ▶



Circle (7) On Reader Service Card

World Radio History

Wired or Not, Here They Come

Mike Sokol

Just when we thought we knew everything about microphones, a new technology comes along that raises the bar.

So maybe we managed with basic monophonic and stereo soundtracks up to this point. Now that we have 5.1 surround sound, nothing will ever be the same again.

Don't turn the page just yet. Already a standard in many video productions, 5.1 surround is a real possibility for digital radio broadcasting, once the dust settles from the DAB format wars.

Shure updates a classic with the new SM7A.

One great feature of 5.1 audio is that it has the ability to reproduce a lifelike sound field that immerses the listener in the original sonic environment. But to do it properly requires more than just panning single mic sources into the various speakers.

New methods of capturing surround sound in the field need to be explored and developed.

Whether 5.1 appeals or not, microphone buffs found some interesting new products at the show.

Many microphones on display at the show feature ambidextrous qualities in that they can be used in both radio and television applications.

In one interesting demonstration, **Crown Audio** showed its SASS-P microphone. The company displayed a camera operator capturing "in the street" audio and video from in front of Treasure Island on the Strip and then played it back.

SASS-P is basically two PZM capsules mounted on a precisely engineered block, which provides an effect similar to a binaural head. But unlike binaural recording, the raw output works well even when played back over standard stereo speakers. The realism is very intense.

There were many examples of affordable wireless microphone systems operating in the UHF band.

If you were looking for announcer mics, there were some new side-entry condenser models that were worth closer examination (both visually and aurally).

The **Audio-Technica** AT4033a cardioid capacitor microphone is designed for on-air vocals by producing clean output signals and a dynamic range of 126 dB. A switchable high-pass filter and 10 dB pad help reduce sensitivity to "pops."

Featuring the DSDA-PRO software algorithm, the Audio-Technica AT895 adaptive-array microphone system caught attention by providing adaptive directional acquisition of sound sources. The output of the array is manipulated and filtered by acoustical, analog and digital means, providing cancellation up to 80 dB.

For its part, **AKG Acoustics** highlighted the new C4000B "true" large diaphragm microphone featuring a capsule that uses 6-micron thick gold-sputtered mylar to preserve the integrity of the source while retaining tonal coloration in the high frequencies. The microphone's transformerless output stage helps ensure low-frequency response and virtually no self-noise.

The company also announced a price reduction for a number of its large diaphragm microphones, including the Solidtube and C414 family.

CAD Professional Microphones introduced the VSM-1, a cardioid pattern, true-condenser microphone merging VX2 topology with Equitek servo technology. CAD also showed AraSys, a digital direct-sequence spread-spectrum wireless mic system with 20-channel simultaneous same-site capability.

Dave Bull of ABC Radio in Washington poses with the Electro-Voice ENG 618 integrated shotgun mic.

GT Electronics, a new division of **Alesis**, showed four new AM Series studio condenser mics: the AM51, AM52, AM 61 and AM62 (the latter two are tube microphones).

Each model includes a 3-micron gold-evaporated diaphragm. The AM51 and AM61 have a fixed cardioid polar pattern and the AM52 and AM62 offer three switchable patterns (cardioid, omni and figure-of-8).

LPB introduced a line of microphones from **Stedman** as part of its turnkey studio packages. The N90 is a large element dynamic side-entry mic designed for the announcer/voice-overmarket. Accessories include the WS-1 windscreen and SMC shockmount. The C15 is a studio-grade large diaphragm condenser mic that offers studio quality at an affordable price point.

Electro-Voice debuted the ENG 618 integrated shotgun/boom-pole microphone designed for sensitive pickup environments and offering the ability to collapse to 18 inches or expand to six feet. That kind of flexibility will be useful in many broadcast applications.

The hypercardioid-line, back-electret condenser microphone has an on-axis frequency response of 50 Hz to 20 kHz with a switchable 200 Hz roll off.

The electronics housing at the back

See MICS, page 23 ▶

Now that we have 5.1 surround sound, nothing will ever be the same again.

Circle (12) On Reader Service Card

World Radio History

▶ MICS, continued from page 22

end of the boom-pole offers a roll-off filter circuit, adjustable output 9 V battery-powered headphone amplifier and a low-battery LED indicator.

Also on hand was the **Shure** SM7A cardioid dynamic microphone with a frequency response of 50 to 20,000 Hz.

The unit, an upgrade to the company's SM7, offers a unidirectional polar pattern with maximum rejection and minimum coloration of off-axis sound.

New features

New features include a redesigned humbucking coil for shielding from electromagnetic hum.

Shure also has a cardioid condenser mic designed for critical audio work. The side-address KSM32 has Class A transformerless preamp circuitry, a 15 dB attenuation switch, switchable low-frequency filter and three-stage pop protection grille.

The SL version has an elastic shock mount. This product earned a Cool Stuff Award from **Radio World**.

Even in radio, there are some situations where a wireless microphone system is needed — for example, some remote broadcasts, live appearances, a station-sponsored music festival, a talk show with an audience that requires a roaming host or a storefront studio where the look of things has to be "just right."

Azden Corp. featured its new 400UDR portable UHF wireless receiver with true diversity and 63 frequencies available along with a 63-frequency body-pack and handheld transmitters. The 41XT plug-in gives full RF capabilities to any microphone with an XLR output.

Recording-studio quality

Beyerdynamic Inc. introduced the M99, a large diaphragm announcer's mic, and the RE600, a UHF, multifrequency diversity pocket pack receiver for ENG/IFP productions. Both products help bring recording-studio quality to your on-air or field productions.

Audio-Technica USA featured the AT849 stereo boundary microphone with interchangeable elements, internal electronics and low-end roll-off switch. Its frequency response is peak-free over an extended 30 Hz to 20 kHz range.

In addition, it comes with a two-position switch that allows selection of flat or low roll-off response.

Also on display form Audio-Technica was the new ATW-100 wireless system with true diversity reception, 100 selectable channels and all-metal construction. Systems are available with both beltpack (ATW-U101) and plug-on (ATW-U102) transmitters.

Sennheiser showed its Digital 1000 wireless microphone system, a four-channel user-selectable unit operating in the 900 MHz ISM band.

Internally mounted antennas operate in two independent diversity and audio sections, eliminating compander use and the audio degradation commonly associated with it.

Also shown was the SKM3063 body-pack transmitter and the MKE2 Gold ultracompact microphone using a dual diaphragm design whereby the first diaphragm acts as a humidity barrier leaving the second immune to moisture.

Lectrosonics displayed its new UCR-400D receiver, a true-diversity

See MICS, page 29 ▶

Radio World Cool Stuff Award NAB

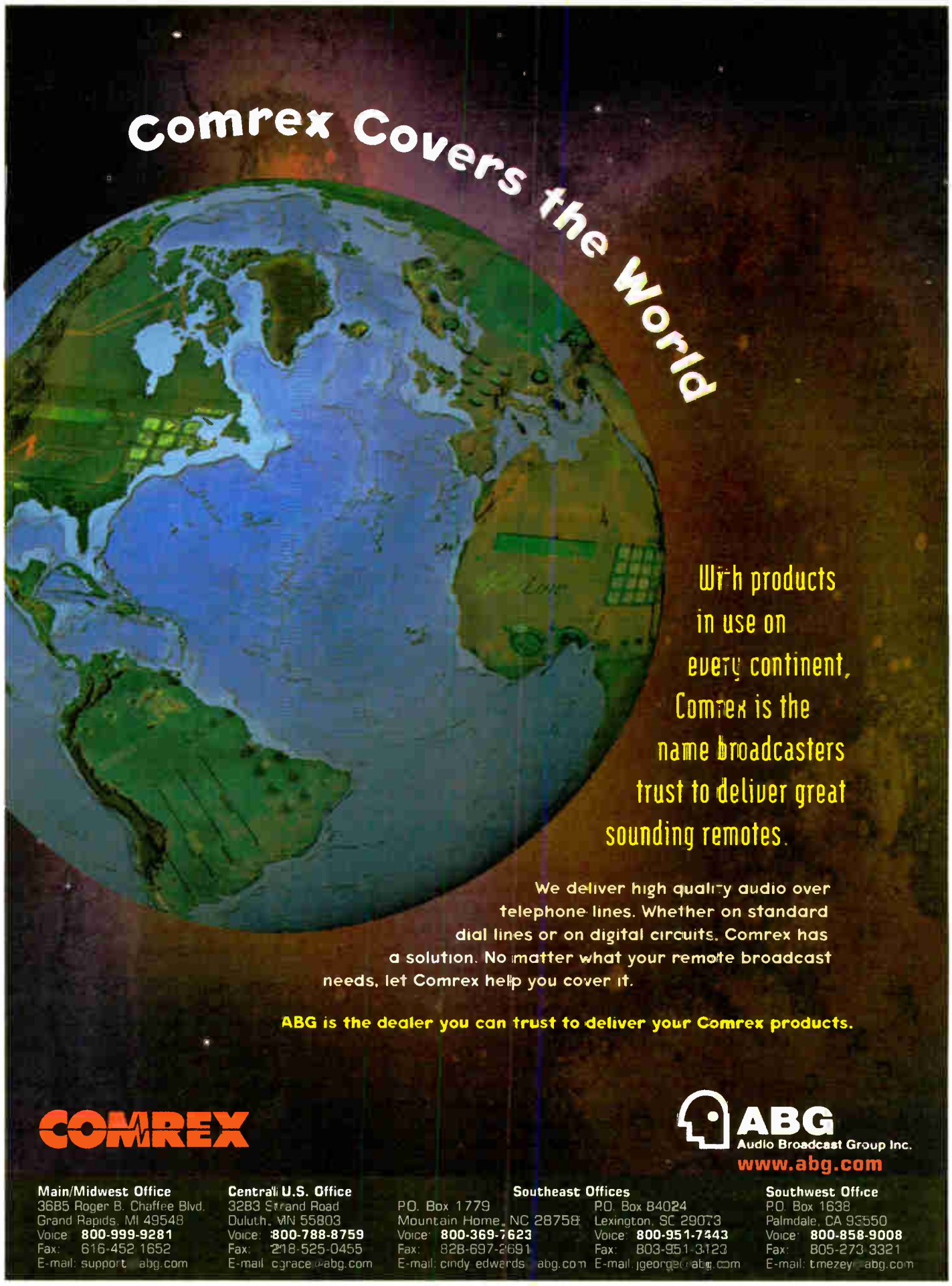
Aphex 1788 Microphone Preamplifier

The Model 1788 is suitable for a range of pro audio applications. The unit lets you avoid the usual problems associated with mic splitters, long lines and multiple inputs — namely, decreased load impedance, which causes lower output levels and frequency response anomalies. The 1788 also is suitable as a front end for a DAW or digital console.

Aphex software for Windows 95/98 provides control over functions. MicLim is a proprietary Aphex limiter circuit on the mic output that makes setup easier and prevents crashes. Digital systems can be driven at maximum levels without fear of overload. The list price is $4,995.

For information, call Aphex Systems in California at (818) 767-2929, visit its Web site at www.aphexsys.com *or circle* ***Reader Service 132.***

Marvin Caesar and a Whole Bunch of 1788s



Circle (19) On Reader Service Card

World Radio History

Odds and Ends for Every Need

In addition to the products found throughout this section of **RW**, there were some unusual and interesting things to see on the show floor.

Telos Systems introduced a new line of ISDN products.

The Telos ISDN Hybrid uses the digital phone network to cross-connect POTS lines with ISDN, maintaining an all-digital path from the studio to the telco central office, for performance not considered possible with POTS.

Digital connection

"Only the far-end analog part of the call needs conditioning," said Telos CEO Steve Church, adding that the digital connection produces lower noise and faster setup. The product includes two hybrids, built-in terminal adapter, dynamic EQ and other features.

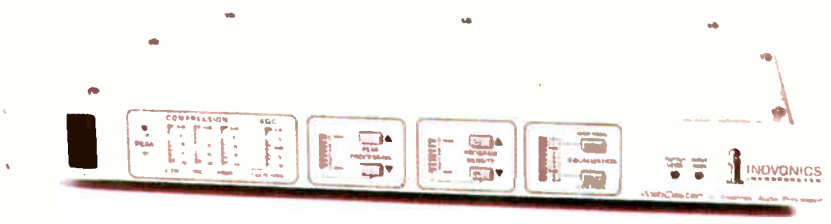
Telos also demonstrated its Series 2101 Digital Talk Show System, which uses an open network architecture for control of multiple phone lines in multiple studios. The design allows for flexible upgrades and can be expanded from the basic 24 lines to handle up to 96 lines.

The 2101 is described as the first large-scale multiline talk show system to interface directly with digital phone lines.

Also new from Telos was a self-contained digital phone product, the 2X12 ISDN Talk Show System, which handles 12 lines and allows broadcasters to upgrade POTS lines to ISDN easily.

Finally, Telos made the U.S. debut of the first commercial MPEG 2/4-AAC codec. "The AAC codec is the most powerful yet," said Church. According to tests, AAC performance was double that of ISO/MPEG Layer II, and about 30 percent better than that of ISO/MPEG Layer III, Church said.

Telos announced a partnership with



Inovonics WebCaster

Digital Bitcasting, in a move to "help end debate over competing streaming audio formats." The Telos Audioactive MPEG Realtime Encoder will now be compatible with RealNetworks RealSystem G2 players.

"For the first time, Webcasters can choose to offer simultaneous MP3 streaming audio content using both RealNetworks RealSystem G2 and Microsoft NetShow Services," Church said.Telos was not alone in seeking to expand its product and service lines through partnerships and acquisitions.

Harris Corp. for instance, has aggressively pursued other companies to buy or to set up partnerships. The effort was visible at NAB99. Harris showed its digital audio wide-area network capabilities, linking three booths in a special show-floor network.

Digital link

The Harris WAN used an Intraplex digital STL to link its booth in the Main Hall to the **Enco Systems** and **Orban** booths in the Radio/Audio Exhibits area.

The demo shows off the networking capability of the Enco DAD$_{PRO}$32 digital delivery system and the Orban Audicy multitrack editor to support multistation production, inventory and talent sharing.

Harris recently acquired **Intraplex**, and Enco recently named Harris as its exclusive worldwide representative.

"This demonstration shows how stations can seamlessly share audio inventories and centralize production," said Jim Woods, vice president of radio systems for the Harris Broadcast Communications Division.

Two suppliers, **Antex Electronics** and **Nétia Digital Audio**, announced a strategic alliance to market hardware and software solutions for broadcast automation.

"The alliance brings together the latest digital audio card advancements from Antex, which will run on future versions of Nétia software," the companies said.

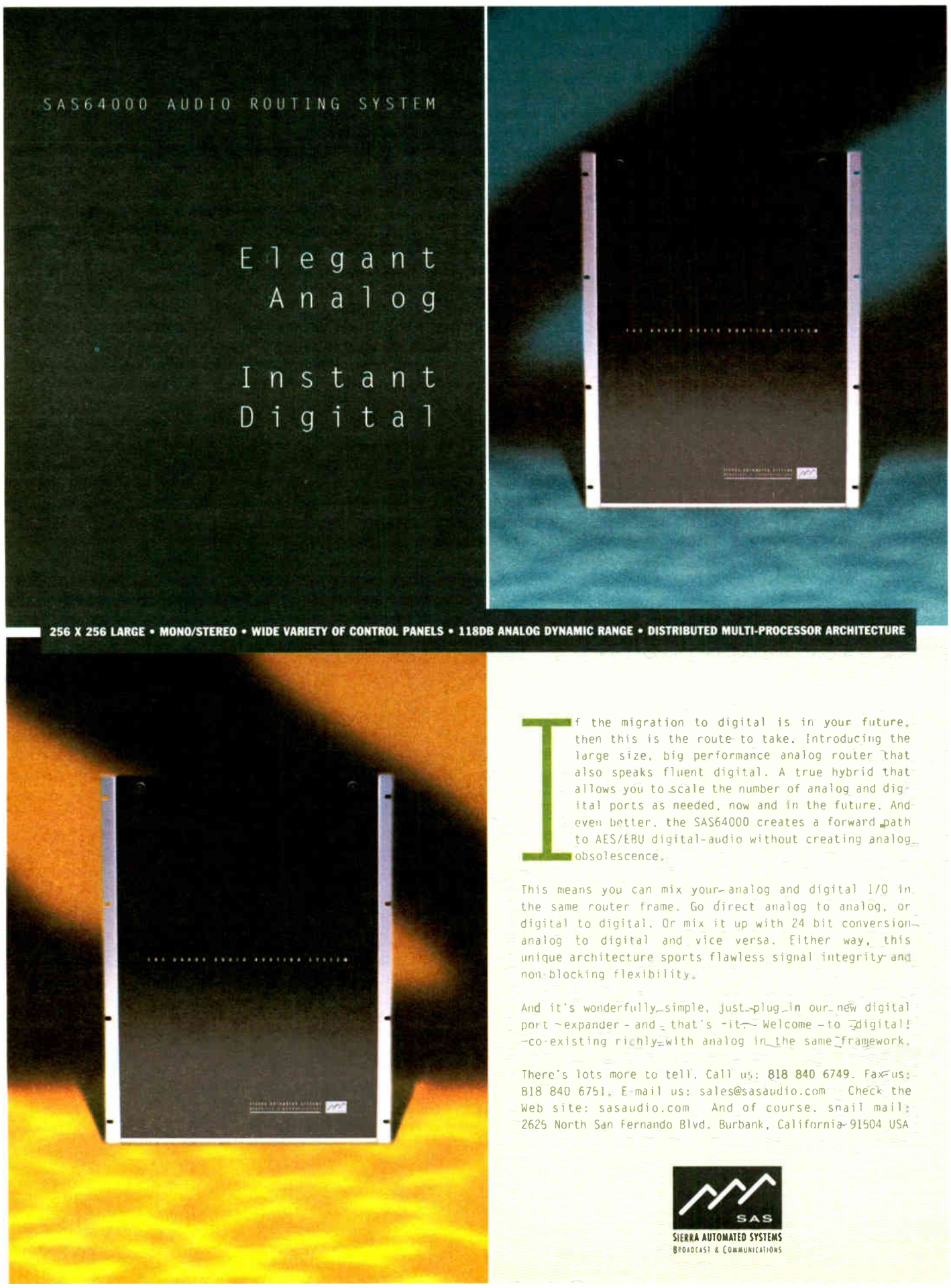
Acquisitions, contracts

Acquisitions and new contracts were also big news on the RF side.

Jampro Antennas Inc. announced the win of a contract from Bonneville Group station KSL(AM) in Salt Lake City for a broadband FM antenna system. It accommodates 13 FM frequencies with a total input power of 180 kW.

The antenna is to be installed at Farnsworth Peak, which rises more than 9,000 feet above sea level. The company said Farnsworth Peak is considered one

See ODDS AND ENDS, page 25 ▶



Circle (16) On Reader Service Card

World Radio History

▶ ODDS AND ENDS, continued from page 24

of the harshest broadcast sites in North America.

Andrew Corp. told attendees about its recent acquisition of Passive Power Products, a Maine-based supplier of RF products, systems and services to markets worldwide.

"The acquisition ... enables Andrew to provide complete RF system solutions from the transmitter output through to the antenna," said Thomas E. Charlton, group president of communication products.

Improving the bottom line is a surefire way to grab a radio manager's attention, and **Prime Image** knows it. Although the company calls itself "The Digital Video People," it has a processor named Cash that lets radio stations create additional commercial time — up to 60 seconds of time every 10 minutes — without artifacts or data compression.

Creative way

Utilizing the Net in a creative way was the **BSI** WebConnect software. WebConnect2000 not only permits updating audio, logs and satellite settings by an e-mail attachment, it will also e-mail out error notifications. BSI appears, at present, to be the only manufacturer with this feature.

At the Sands Expo Center, **WebRadio.com** showed Web Jockey, touted as the first online broadcast audio mixer for the Internet. The product makes broadcasting live over the Net easy by changing a computer into a broadcast console.

WebRadio.com is a turnkey service for stations, using Emblaze technology, which eliminates the need for users to download plug-in audio playback systems.

Also at the Sands and on the Net, **Digibid** announced a major expansion. It added a broadcast auction service, offering liquidation sales of radio and TV gear. Founder Matt Brosius said his online industry auction network will auction new and used radio broadcast gear.

Digibid considers itself a "major e-commerce trading market" that brings buyers and sellers together, and lets manufacturers dispose of discontinued, overstocked and B-class inventory without disrupting normal sales channels.

Internet related technology wasn't limited to e-commerce.

Infodia has Internet RadiOH, which uses an FM channel subcarrier to broadcast weather reports, convention dates, stock data and advertising. The palm-sized receiver unit has an interactive display and increased bandwidth than over other models, according to the company. The system uses data from an Internet content editor and server fed by service providers.

Thinking about FM subcarriers? Is RDS II in your future? **Geode Electronics** hopes so.

RDS II is a trademarked enhancement of the Radio Data System protocol. Geode believes its software and applications — such as Color Radio, which will display information screens for 30 seconds before being updated with new information — will expand the capabilities RDS dramatically.

Musicam USA demonstrated an AAC software recorder. The AAC algorithm supports compression ratios on the order of 30:1, permitting high-quality audio to be stored and transmitted in less bandwidth, which means, for example, quicker download of audio from the Internet.

Digigram introduced the NCX200 Network Audio terminal, hardware designed for networked audio applications including audio on demand, permanent playback and public address systems.

Gentner Communications offered the DH30 digital telephone hybrid. Designed to work with traditional analog equipment as well as the latest digital consoles, its acoustic echo cancellation and digital signal processing (DSP) technologies eliminate unwanted noise and enhance the quality of both incoming and outgoing audio signals.

Marti Electronics introduced the GX-500 remote mixer. An analog cell phone adapter and power cord allows the GX-500 to utilize popular models of analog cell phones for remote broadcasts.

Cutting Edge introduced the Omnia ToolVox, a microphone processor tailored specifically to interact with on-air processors. Among its features are AGC and compressor sections designed with ratios and time-constants that work in concert with those in the on-air processor.

Summit Audio showcased the MPE-200 mic-pre equalizer. The MPE-200 features two channels, high performance microphone amplifiers with dual range HP/LP filter section and coarse and fine gain control for each section.

Cables, connectors

New ideas in cables and connectors and connectors were also evident at the show.

Gepco debuted the D5524EZ, a dual-pair digital audio cable. Its 24-guage conductors are insulated with a precision low-loss dielectric and each pair is shielded by 100-percent foil/Mylar with drain wire.

The company also introduced the 552604GFC, an ultra-flexible four-pair cable designed for transmission of 110-ohm AES3 digital audio.

Neutrik introduced EaSZyCon Super Z series of XLR connectors. The connection system offers easy assembly with self-adjusting cable strain-relief that provides increased retention force under tensile stress.

Broadcast Richmond displayed its prewired console harnesses. The harness affixes inputs and outputs to the console for audio sources, on-air lights, telephone logic and intercoms.

Gefen Systems was at the show with the ext*tend*it PC/MAC 2000 CPU switcher. The switcher allows simultaneous. access to multiple PC and Macintosh computers using any keyboard, mouse and monitor. It can be expanded to accommodate 24 different CPUs.

Wheatstone introduced the 1024 AES Routing Switcher, the first foray into this product area for the manufacturer of digital and analog consoles. The 1024 was designed to bring multiple signals to a central point for large facilities, television stations and consolidated radio stations.

Sonifex announced plans at the show for expansions to its Digital Redbox Range. Prototypes were on display including a digital distribution amplifier with S/PDIF or AES3 outputs, an A-to-D converter and a sample-rate converter.

Euphonix introduced a full line of multichannel audio converters. Available in groups of 24 I/Os, each converter is available in a 2 RU-high rack-mountable chassis and features auto-detection of external sync, on-demand sample-rate conversion and bit reduction per AES3 stream.

Modular products

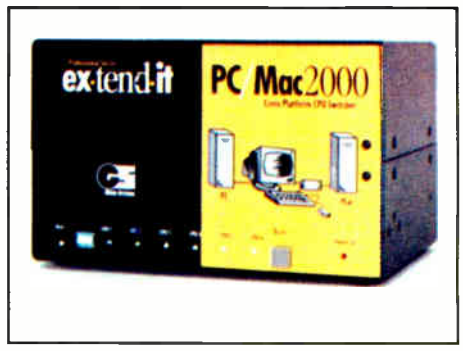
Graham-Patten launched a new range of modular digital audio products at the show, as part of an integrated line of audio and video terminal equipment developed in conjunction with **Ensemble Designs**.

Maxwell displayed a new line of digital media for professional audio applications including MD-PRO, DAT, DTRS and ADAT. **HHB** displayed the new HHB MD80, an 80-minute professional audio MiniDisc.

Need a place to put all that new equipment you ordered at the show?

Wheatstone offers a solution with a furniture line that takes a semi-custom building-block approach to creating studio furniture. The cabinets are made of birch plywood and are covered with horizontal-grade Formica with rounded cherry trim.

There were some unusual and interesting things to see on the show floor at NAB99 in Las Vegas.



Gefen's Six-Position Cross-Platform CPU Switcher

Another alternative is QuikBilt II studio furniture from **Pacific Research & Engineering Corp.** Easily assembled with just a screwdriver, QuikBilt II features high-pressure laminate work surfaces, Euro-hinged removable access doors and built-in ventilation grids.

PR&E also unveiled StudioAdvantage, self-contained, acoustically isolated "modules" which can be moved and adapted to new locations.

Selco introduced a line of aluminum knobs configured to fit D-shaped, spline or smooth shafts and are offer in set screw or push-on styles.

Also on display from Selco were control knobs, digital panel meters, analog panel meters and VU and PPM Meters.

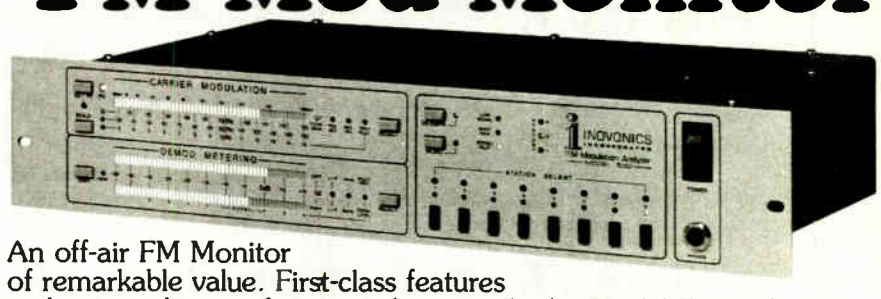
Finally, several syndicated programming celebrities could be seen on NAB99 show the floor.

Among them were **Talk America Radio Networks'** personalities Mike Siegel and Paul Lyle. They broadcast their radio shows live to national audiences from the show floor and a nearby casino.

Another syndicated program touted to stations was "A Word on Health" hosted by Danielle Lin and distributed by **ABC Satellite Services**.

— Paul J. McLane, T. Carter Ross and Karen Robb contributed to this article.

A Best-Value FM Mod-Monitor



An off-air FM Monitor of remarkable value. First-class features and outstanding performance have made the Model 530 a favorite the world over. Check these product highlights:

- Accurate, high-resolution bargraph metering of carrier deviation and demodulated program audio; pilot, subcarrier and residuals. Meter also displays signal strength and multipath distortion to aid antenna alignment.
- Pushbutton tuning with 8 station presets for "comparative market evaluations."
- Rear-panel outputs for composite MPX and balanced program audio; plus remote peak flasher, carrier-loss and program-loss alarms.

MODEL 530 FM MODULATION MONITOR

Inovonics, Inc.
1305 Fair Ave., Santa Cruz, CA 95060 USA
TEL: (408) 458-0552 • FAX: (408) 458-0554
www.inovon.com

Circle (20) On Reader Service Card

World Radio History

Live Assist and Automation

▶ AUTOMATION, continued from page 21

Leading the pack in this area is the CBSI Digital Universe 2.0 whose client/server architecture has a demonstrated capacity of 40 plus stereo channels.

Rapid changes are taking place with video displays. LCD or other non-CRT displays are become more popular and affordable. The **ViewSonic** View Panel VP-140 was by far the popular choice in this year's booths.

These can be setup over a console much like a copy stand, making life much easier for your air talent. Plus, unlike CRTs, there is no mic buzz as there can be when some microphones and CRTs are in close proximity.

Among the systems at NAB99, **Computer Concepts** offered a new version of Maestro, where users can set more personal preferences than ever, including number and type of cart decks.

Enhanced functionality includes more flexible access to external equipment, improved fades and the new Event Notification feature. This provides system-wide control mechanisms.

Nétia Digital Audio showed the Radio Assist Real Time Newsroom Integration system, a complete Windows NT digital systems for acquisition, production, broadcasting and archiving.

New features include Radio Quarterback for stations with three to five workstations and a server, and One-Man Show, for which only two workstations are necessary.

New from **Arrakis** was the Digilink IV with triple play and record in the base workstation. New features include satellite automation, phoner editor, and edit and play.

Connect two stations with the "Share" system for six plays and dual record from a single-shared hard drive, and the Digilink IV services as many as four studios for on air and production.

Mediatron exhibited the AirControl NT 99 for live assist and 24-hour automation. Among the plug-in cards are the VoiceTrack, to pre-record announcements; VoiceEngine for time announcements during an automated broadcast; and DMX-100 Hardware Control Panel for digital mixing.

In the area of networking, **Prophet Systems Inc.** introduced NexGen Digital. The system is "scalable" from a single station to as many as 128 stations out of a single facility.

Based on the PSI Audio Wizard, NexGen Digital allows the sharing of audio and data between stations, with drag and drop features and automatic copying of programming materials.

New functions

Register Data Systems exhibited The Phantom Control Room, with new functions including: Multicuts Carts, for trafficking; music on hard drive, new special format clock codes with audio overlap and a new music schedule import routine.

Also, RDS showed the new Replicator, a companion to The Phantom. The Replicator can record and delay long-form network programming. It records both the audio feed and break/liner/ID closures and plays back anytime after recording has started.

Dalet also promoted a networking system, the Dalet5. The system covers live or automated programming, scheduling, production, news and traffic management.

Other products from Dalet on display were the new InterWeb for newsroom applications and TeamRadio for group traffic management.

AEQ showed the MAR4WIN 32-bit automation system. Features include MAR4News for news production; MAR4Cont and MAR4Mark for voice tracking; MAR4Remote, for remote news operation; and MAR4Prompt, for presenter scripts.

Audio Follow also offered an automation system with a full range of capabilities for a single station to a network.

The Associated Press demonstrated its ENPS electronic news production system. The system features newswire capture, scripting, rundowns, archives, assignments and production device control.

EPNS also offers video and audio playback within the same workspace as text handling.

Among the announcements from **MediaTouch** is a licensing agreement that will allow MediaTouch to incorporate the **Qdesign** ISO/MPEG Layer II software codec into all of its radio and multimedia products.

MediaTouch will market the codec in the "Card Independence" product line that plays MPEG audio on virtually any sound card. The product line includes production and editing software, CD ripping, on-air playback and WAAN (Wide Area Audio Networking).

Without a doubt there are many choices available in selecting a system that will meet your needs and budget. Lavish or simple, domestic or foreign manufacture, proprietary hardware or non, the options are many.

In any event, choosing a studio automation or live-assist system is going to require the input of everyone from the DJ and PD to traffic and engineering.

■ ■ ■

Bob Shotwell has been a broadcast engineer for more than 20 years and is SBE and NARTE certified.

He co-owns WPVQ(FM) in South Deerfield, Mass.

BSW Has a MiniDisc Recorder for Every Application

SONY.

NEW Sony Studio MiniDisc Recorders

Sony's latest studio releases include single- and double-space rackmount MD recorders. The single-space MDS-E11 is a pro unit with fader start, remote control, fully-featured editing and balanced XLR analog I/O. The double-space MDS-E58 is a more affordable unit with excellent features and unbalanced RCA analog I/O (both units have digital I/O).

Sony MDSE11 MD Recorder
List $825.00 **SALE $619.00**

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World Radio History

BOTTOM LINE BROADCASTING

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Want to increase creativity without adding personnel? Add life to drive-time shows? Win new advertisers with better station-produced spots? An **Eventide Ultra-Harmonizer®** brand effects processor really does all that. Designed specifically for radio and production, the new DSP4000B Ultra-Harmonizer features radio effects designed by production whiz Jay Rose. Hundreds of comic voices, sound effects, reverbs, pitch changers and more are instantly accessible at the touch of a button. Plus, the DSP4000B has superb Timesqueeze® time compression /expansion capability. Shorten a 60 second national spot to allow for a local tag. Squeeze or stretch a music bed to fit the spot. The DSP4000B has optional digital I/O to interface easily with digital editors and consoles. It's the radio effects box designed to bring stations more business and more listeners.

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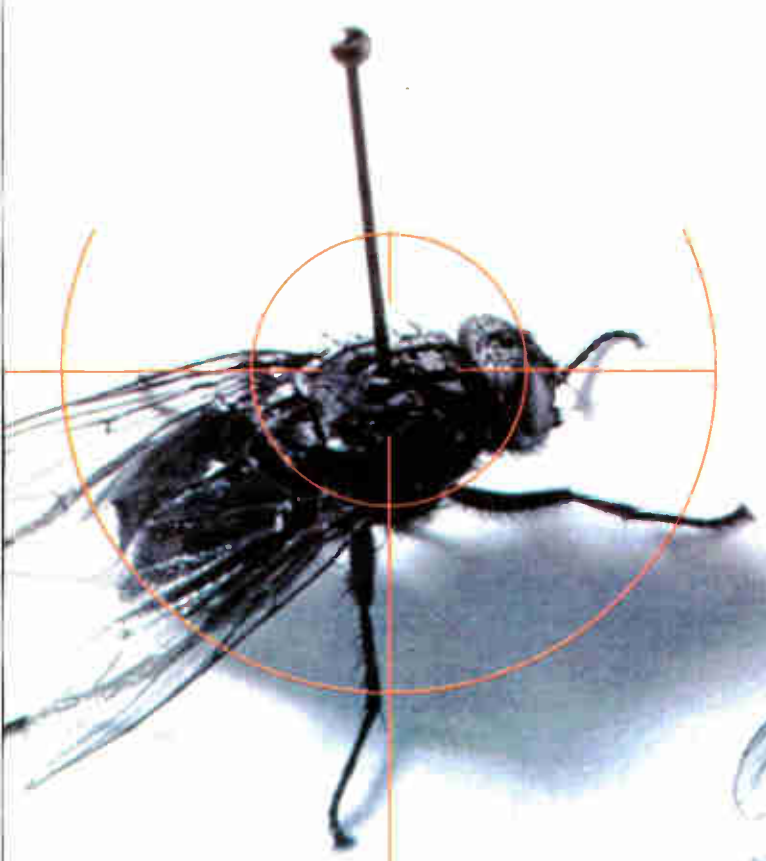
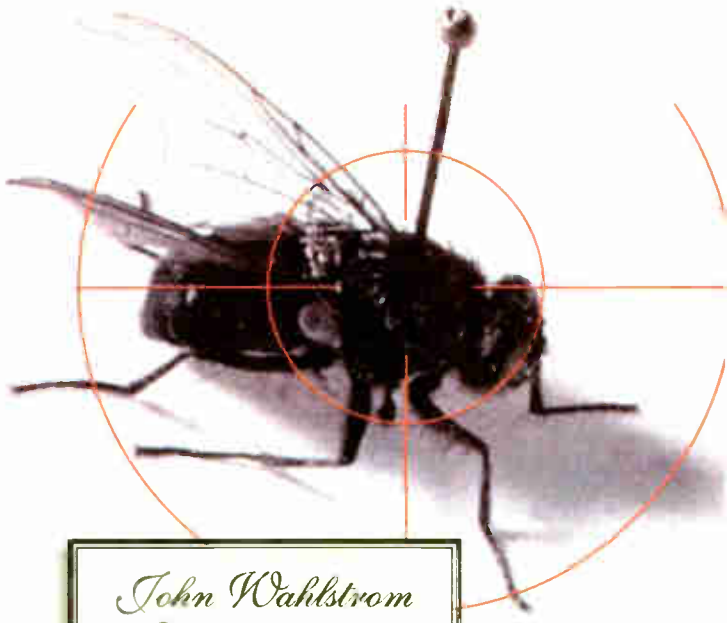
World Radio History

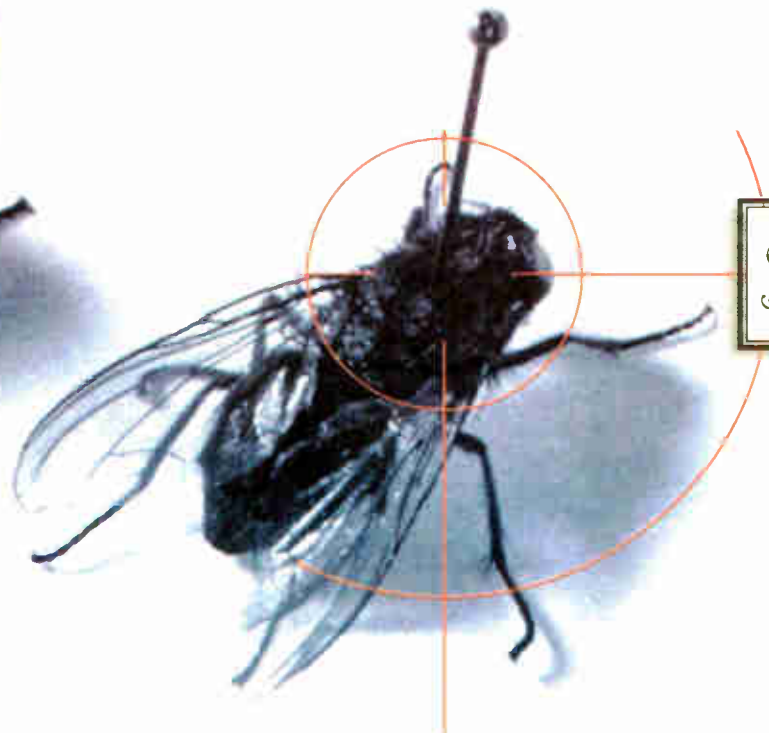
Their biggest regret was not talking with Dalet...



Bruce Wodder
General Manager 1998-99



John Wahlstrom
Engineer 1996-97



Steve McAllister
Program Director 1997-98

MEDIACTION

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World Radio History

Mics and Monitors Abound

▶ MICS, continued from page 23

UHF synthesized receiver with 256 selectable frequencies. Powered by two AA batteries, the UCR400D brings the advanced features and performance of Lectrosonics' wideband UHF wireless systems to field production.

Plug-on transmitter

Telex Communications Inc. introduced the ProStar UHF UT-12 universal plug-on transmitter for use with any XLR-compatible dynamic or electret type microphone. This allows operators to use favorite handheld mics with the ProStar wireless receiver.

Also shown was the ENG-100 beltpack transmitter and SH-100 handheld transmitter, which operate on two AA batteries and feature a headphone monitor and adjustable audio output.

In addition, Shure will soon have **Danish Pro Audio** (DPA, formerly Brüel & Kjær) microphone capsules in wireless body packs as an option.

Systems Wireless announced the Advanced ISO System Upgrade for the HME Series 800 and Vega Q Plus Series wireless intercoms. The AIS Upgrade provides ISO and auxiliary functions for remote beltpack operators.

In the ISO mode, beltpack users can communicate independently from the talk path of the hardwired intercom system.

The auxiliary functions permit direct interfacing with two-way radios, digital matrix intercoms and paging systems. After using this once, it will be hard to go back to a wired system.

Monitor upgrades

Monitoring and communications has always been important, and there was some new hardware to help you hear what you're doing.

Shure upgraded its PSM 600 in-ear monitoring system to a PSM 700, now with 32 selectable channels and universal dual-driver earphones. It now has even more selectable channels, so the risk of RF interference is reduced and more mixes are available for complex monitoring applications.

Hafler featured the P1000 Trans*ana compact single-rack height amplifier. The P1000 is designed for monitoring, recording, headphone system amplification and surround sound. The company also displayed the two-way powered TRMS active Monitor Speaker System.

Genelec introduced the 2029A Digital Stereo Monitoring system, a compact two-piece nearfield monitor system designed for a wide range of listening environments.

HHB showed the Circle 3 range monitor that combines a linear response 5.5-inch bass/mid driver with a ferrofluid-cooled soft-domed tweeter.

Yamaha highlighted the MSP5 nearfield monitor. The MSP5 features a biamplified design that provides 40 W of power to each 5-inch woofer while separate amplifiers feed 27 W to each 1-inch titanium tweeter.

Radio World Cool Stuff Award NAB

Syntrillium Cool Edit Pro

NAB99 was the first spring-show appearance for this multitrack recording studio for Windows. Judges like that it handles 64 tracks on a PC, for just $399.

The program lets you record and build spots, stretch and condense cuts, and add music and sound effects easily. With nice graphics, big on-screen buttons and lots of power, it's a winner all around. See a downloadable demo at *www.syntrillium.com*

For information, call Syntrillium Software Corp. in Arizona at (888) 941-7100 or (602) 941-4327, send e-mail to cepro@syntrillium.com *or circle* ***Reader Service 124.***

Ryan Foster, Peggy Aspinwall and Jo Gilmore of Syntrillium

Don't be surprised if you find yourself looking for new office furniture.

It's quite possible that if you go with digital broadcast equipment from CEC, you'll start noticing your job isn't quite as stressful. At least, that's what some of our customers have told us. But it's really not very surprising when you consider that over the years, CEC has built a reputation for quality and reliability while utilizing cutting edge technology. Things just don't go wrong. Frankly, it's a recipe for boredom.

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World Radio History

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2 TFT

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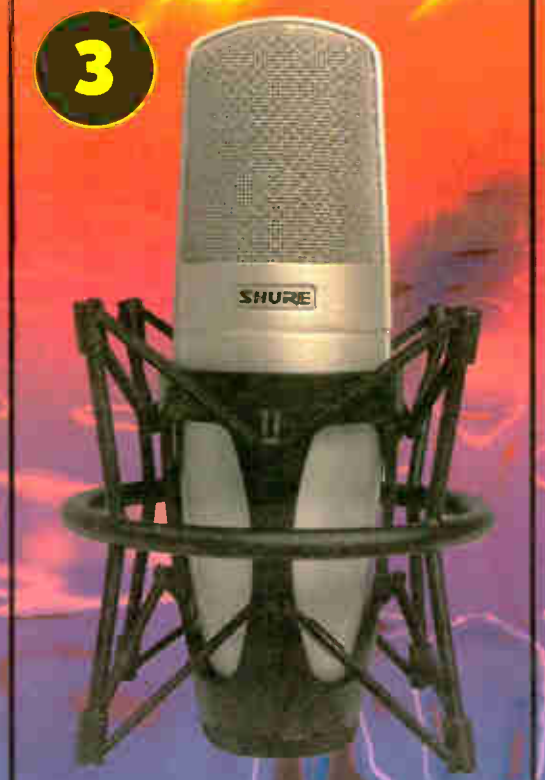

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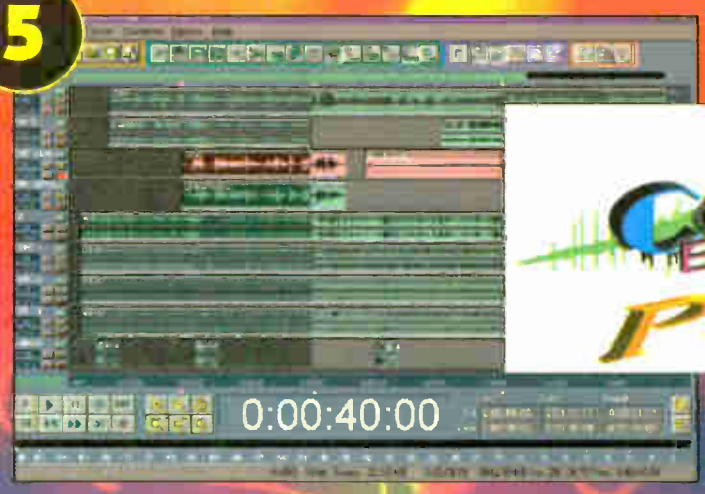

COOL EDIT PRO

6 Radio Design Labs

World Radio History

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9 APHEX SYSTEMS

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Radio World Cool Stuff Award NAB99

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2 TFT

The **TFT Model 999 Digital Insertion Unit** is a digital device that is transparent to an AES/EBU digital audio stream and provides the capability of interrupting that stream to insert another AES/EBU stream or analog audio. The TFT Model 999 contains an A-to-D converter that senses the sampling rate of the normal AES/EBU input and digitizes and formats the interrupt input at the appropriate rate to be delivered to the output.

3 SHURE

The Shure KSM32 Studio Condenser Microphone for professional studio production and live sound recording.

4 Intraplex

Intraplex SynchroCast
Create an FM powerhouse by expanding coverage with multiple overlapping transmitters on the same frequency.

5 Syntrillium

The complete multitrack studio for Windows™

Do you: Produce ads? Edit news spots? Move vinyl to CD?

Cool Edit Pro offers the tools you need to create high-quality audio: 64 tracks; 34 effects including Normalize, Noise Reduction, Click and Pop Eliminator, Graphic EQ; more than 20 import/export file formats... and more!

6 Radio Design Labs

The **RU-SM16** is the ideal choice in most applications where audio level metering is to be designed into a system, or added to existing equipment. The **RU-SM16** has two separate line level inputs. Each input permits the connection of either balanced or unbalanced, high or low impedance audio lines. Jumpers on the rear panel allow the installer to set each meter individually for either peak or average audio level display.

7 TerreSonde

Acoustic Analysis Tools: Real Time Analyzer, SPL, ETC, RT60, Speaker & Mic Polarity

Session Helpers: Tuner, Tempo Computer, MIDI Data Monitor, MIDI Transmit, SMPTE Read/gen/re-gen, Hum Cancellation

Test Functions: Signal Generator, dB/Frequency Meter, S/N, Phase Meter, Frequency Response, Sample Scope

Utilities: Headphone Amp w/guitar fx, Cable Tester, Phantom Power Checker, and more...

8 Radio Systems

The StudioHub Wiring Solution
StudioHub is the new CAT-5 wiring system featuring a complete range of pre-made cables, harnesses and integrated plug-and-play studio accessories. Use StudioHub for single or multi-studio, analog or digital buildouts.

9 Aphex

The 1788 is an eight channel analog mic preamp with complete digital remote control via PC or the 1788-R remote control. With two analog and three digital outputs simultaneously, the 1788 features the MicLim* limiter on the microphone itself making the the 1788 crash proof while providing up to 20dB additional dynamic range. The 1788 has application in Radio and TV production and post production, ENG and live remotes.

for COOL STUFF!

Circle (31) On Reader Service Card

World Radio History

Solid-State All Over the Place

Transmitter Makers Aren't Waiting for DAB To Roll Out New or Improved FM Transmitters

Thomas G. Osenkowsky

Buying an FM transmitter? Solid-state designs continue to proliferate.

Broadcast Electronics introduced the FM-10S 10 kW solid-state FM transmitter. Featuring frequency-agile operation and modular design, its power modules may be removed while the transmitter remains on air.

If one module is removed, the FM-10S will remain at 95 percent power. The FM-10S can be supplied in either single- or three-phase versions with no cost difference. The FM-10S is expected to ship in the third quarter of 1999.

Cool

BE, which offers an extensive line of FM exciters and transmitters in both low- and high-power categories, won a **Radio World** Cool Stuff Award for the new FM-10S.

Also available from BE is the Predator digital FM exciter. It can produce power levels up to 250 W, making it an ideal standalone low-power transmitter. The Predator accepts analog inputs or can be converted to a fully digital path with the addition of a digital input module.

Nautel debuted the FM20 20 kW solid-state transmitter with redundant IPA and PA module design. The FM20 is powered by a digital exciter with AES/EBU or standard composite interface.

RF power modules may be removed while the transmitter is on air. Each power module produces approximately 3 kW of power.

The FM20 has six power modules. The IPA module is conservatively run at 50 percent of capable power.

Another new product from Nautel is the FM16, a 16 kW solid-state FM transmitter.

Low-cost alternatives

QEI introduced the Quantum-M FM solid-state transmitter series. The M series features a low-input power requirement of only 20 W, redundant modular PA and IPA sections and can operate in a variety of site conditions.

Also making a debut is a 500 W version of the popular model 695 exciter. Another first is the model 695-B, a basic low-cost version of the 695. The 695-B does not contain the AutoMod composite clipper or spectrum analyzer.

A relative newcomer, California-based **Nicom LLC**, introduced the NPT-20 solid-state internally programmable 20 W FM exciter. The NPT-20 accepts a standard composite input or optional internal stereo generator card.

Nicom also debuted its NTR-25 low cost FM translator. The NTR-25 has a built-in receiver and filters.

Continental Electronics Corp. showcased the PowerStar F10 10 kW solid-state FM transmitter that incorporates the new 802D1 50 W digital FM exciter.

The F10 utilizes a special high-power combining system that reduces potential interference with nearby stations. This is an important feature because many FM stations either diplex into a common antenna or share tower space with neighboring broadcasters.

Itelco is among the many companies offering new transmitters for the FM market.

Tailored to fit

The F10 is available in single- or three-phase AC power and can be tailored with internal or external blowers and multidirectional airflow. The latter feature helps keep site modifications to a minimum. The F10 is also available 1 and 5 kW models.

Harris Corp., which manufactures solid-state and tube FM transmitters with combined powers up to 70 kW, displayed the Z10CD 10 kW solid-state FM transmitter, among others. The Z10CD uses the Digit CD digital FM exciter.

The Digit CD, SuperCiter and Quest FM exciters were on display. The Quest recently underwent cosmetic changes to bring its appearance in line with the rest of the Harris family of transmitters.

Harris recently won a contract with Emmis Communications for three Z10CD transmitters for the group's flagship New York City stations. Harris said Emmis plans to purchase seven more Z10CDs.

Energy-Onix displayed the Legend "C" solid-state transmitter, available in portable versions of 300 W, 500 W and 1 kW; cabinet models are 1, 1.5, 2, 3, 5 and 10 kW, broadband. It is fully accessible with drawers mounted in slide rails.

Elettronika Srl showed the EKA 3000S FM solid-state transmitter featuring MOSFET technology on display. Also on display was the EKA 6000S FM solid-state transmitter.

Superior Broadcast Products displayed its line of FM transmitters and solid-state FM STL transmitters and receivers. Superior manufactures single-tube models of 2.5, 5 and 10 kW. New at NAB99 was the 120 and 300 W frequency agile, solid-state transmitter.

The models PM-120 and PM-300 offer built-in stereo generator and compressor/limiter. Superior also manufactures FM translators and solid-state power amplifiers up to 1 kW. Superior's high-power FM transmitters range up to 30 kW.

High power

OMB America introduced the EM-250 compact FM exciter featuring front-panel frequency programming, SWR protection and lightweight design. The EM-250 is a high-power MOSFET-based design. Approximately 15 EM-250s are in use in South America and Haiti.

While known as a supplier of quality, refurbished, pre-owned equipment, **Armstrong Transmitter Corp.** also manufactures a line of FM exciters and transmitters.

Armstrong products on display included solid-state exciters, transmitters and amplifiers with power outputs of 10 W to 10 kW. Armstrong also makes tube-type transmitters from 1 to 30 kW.

Bext Inc. had new products, including the LEX-25 SPC 25 W FM exciter that incorporates built-in audio processor, limiter and stereo generator. The audio processor is the David design, licensed from **Inovonics**.

For those wishing to use their own processing and stereo generation, a composite input jack is provided. The LEX-25 SPC is shipping.

Also new is the FMR-25, a 25 W translator with programmable receiver. The FMR-25 EMR is designed for use in non-congested areas and does not contain internal filtering.

Bext has a line of programmable FM exciters, solid-state broadband FM amplifiers with power levels up to 1 kW and single-tube high-power amplifiers with power levels up to 30 kW. New to NAB99 were the FS-5000 and FR-10000 high power FM transmitters.

DB Elettronica introduced the KE-20 20 W FM exciter. The KE-20 has many available options including digital stereo generator, digital audio processor and front-panel frequency programming.

The KE-20 is also used in the MOSFET-based PM-100 and PM-300 power amplifiers. Also introduced at NAB99 was the PM-500 solid-state compact FM transmitter. DB Elettronica makes FM amplifiers up to 35 kW and the new KF series of high efficiency MOSFET amplifiers up to 10 kW.

Auditem S.A. of France exhibited the Audemat DT-100, a digital FM transmitter that is adjustable from 5 W to 100 W. The DT-100 features 96 kHz and 24-bit AES/EBU digital audio inputs.

Also available are 32, 44.1 and 48 kHz

See FM TRANSMITTERS, page 33 ▶

Solid-state designs of FM transmitters continue to proliferate.

Circle (25) On Reader Service Card

World Radio History

▶ FM TRANSMITTERS, continued from page 32

inputs. Planned for release this month are 500 W, 1 kW and 2 kW versions.

Eddystone Radio displayed its B6600 series of low-power, solid-state FM transmitters. Power ranges from 250, 500, 1000 and 2000 watts.

Eddystone also manufactures the XE-11 programmable synthesized stereo exciter and the SBS FM-25 synthesized exciter.

For those requiring unlicensed Part 15 operation, **LPB** manufactures two new FM transmitters. The FM Advantage uses a vertical radiator, while the model FM-2500 is designed to feed a leaky coax distribution system. The FM Advantage is a certified device and has a fixed-audio input level.

The FM-2500 features built-in stereo generator, pre-emphasis and individual left/right adjustable audio inputs. Part 15 operation allows a field intensity of 250 µW at a distance of three meters.

Elenos Srl displayed the new FTG stereo exciter with a digital control panel. It is easily customized with plug-in boards to add audio processing.

Also new is the E4TX5000 and E4TX1000 5 and 10 kW tetrode transmitters that are compact and have broadband input and high efficiency.

The company also displayed its range of FM tube amplifiers and transmitters up to 25 kW and FM solid-state amplifiers and transmitters up to 2 kW.

Under development are 300 and 500 W solid-state exciters. Expect availability within 1999.

Digital exciter

CTE International Srl showed the DEX30 digital exciter with oscillator and modulator that provides built-in RDS and cofrequency functions. Also available is the VL1000 1 kW amplifier, which is lightweight and ETSI 300-384 certified.

Itelco SpA displayed its line of FM exciters and transmitters, alongside some new DAB transmission gear.

New at NAB99 was the TFMK-02 2 kW solid-state FM transmitter. The TFM transmitter series features power levels up to 20 kW.

Link Comunicaciones S.A. displayed the 1 and 12/20 solid-state FM exciter/transmitters. Its line of CSSC (compact solid state cavity) broadband amplifiers have models from 20 to 600 W power levels. The SSC line features power levels of 1, 2, 3, and 5 kW. Link also manufactures the Slim Series Exciter with a 20 W power output.

Siel Srl debuted the 1501 solid-state broadband 1.5 kW amplifier at NAB99 and also showed solid-state programmable FM exciters and transmitters. The EXC series has power levels up to 600 W.

Siel also makes the EB series of tube transmitters with power levels up to 10 kW.

For those in need of FM power amplifiers, **Silicon Valley Power** offered its B series with power levels of 150 W to 2 kW.

Rohde & Schwarz introduced the SR series of solid-state FM transmitters. Ready for delivery are 2.5 kW, 5 kW and 10 kW models. The SR series is driven by the SU135 20 W exciter.

Crown Broadcast displayed its FM line of solid-state transmitters, available at 30 to 500 W levels.

Also from Crown are the FM1000A and FM2000A solid-state FM amplifiers. Crown also makes an FM 100 W translator with FSK ID to comply with FCC translator identification rules.

Nuova Elit debuted the NE TD30F and NE TD100F digital FM exciters. Featuring powers of 30 and 100 W respectively, these exciters may be used to excite the family of Elit amplifiers.

Nuova Elit is developing the NE RTD 100G, an FM translator featuring digital mod/remod and digital filters. Expect availability in the third quarter of 1999.

International companies continue

to introduce product lines to the U.S. market.

R.V.R. Elettronica Srl manufactures the PTX series of solid-state FM exciters. Available in power levels of 30, 60 and 100 watts, PTX exciters typically are used as the drive source for the PJ series of FM broadband solid-state amplifiers. Power levels range from 500 W to 5 kW.

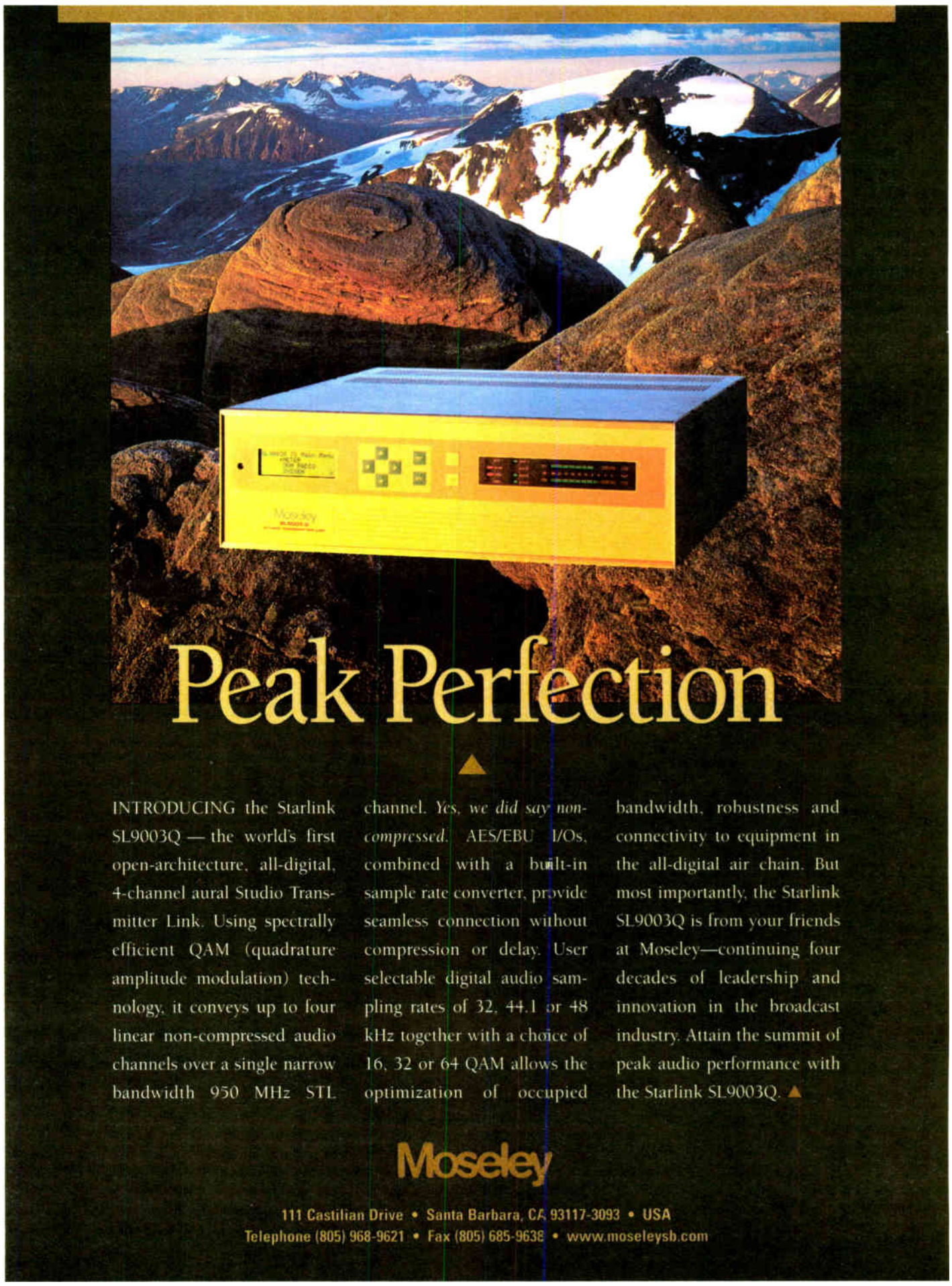
The David Group, also known as **STD**, manufactures the TF(S) series of MOSFET and solid-state FM transmitters. The TF(S) models are available in 20 to 500 W versions.

High-power models include the TF(S) 1000 and TF(S) 3000. The FM transmitters do not require retuning when changing frequency.

Larcan TTC displayed a solid-state 30 W exciter, and FMS 100, FMS 500 and FMS 4000 transmitters.

Larcan also manufactures the XL-10FM 10 W translator. Higher-power versions are available in 100 and 500 W models.

The selection of FM exciters ranges from analog to digital and the company's solid-state FM transmitters are gaining popularity over their tube counterparts.



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World Radio History

Computing Power Benefits Traffic

Ted Nahil

Dramatic changes in both the cost of computing power and the structure of the radio industry have meant many changes in traffic, billing and scheduling software.

And the fruit of these changes was evident in the systems on offer at NAB99.

All the traffic products at the show, both new and established, were designed to take advantage of the power of operating systems like Windows NT.

Also, many of the products were designed to offer centralized storage of data for retrieval via a workstation connected to a local area network (LAN) or the Internet.

Instant snapshot

With access to centralized data, broadcasters can look at all the stations in their group, create and retrieve reports based on that data, and have an instant snapshot of how the stations are performing.

Internet access also means agencies have access to the same data — with appropriate security restrictions — allowing them to place timely and accurate buys for their clients with confidence and to obtain billing information quickly. Ultimately this means more efficient and faster reconciliation resulting in faster payments for the stations.

The proliferation of consolidation within the radio industries has led manufacturers such as Datacount, Columbine JDS, Computer Concepts Corp. and CBSI to redesign their offerings to meet the changed needs of broadcasters.

For example, the companies are offering 32-bit programs designed to run under Windows NT and/or Windows 95/98. Thirty-two-bit architecture means faster processing, increased flexibility and greater multitasking capabilities.

In addition, data files used by Datacount, Computer Concepts and CBSI systems are 100-percent Open Data Base Connectivity (ODBC) compliant, allowing a station to export data to a variety of office-based software programs.

New package

The new Datacount32 (D32) software package from **Datacount** interfaces with accounting programs like MAS90, Great Plains and Peachtree, as well as more than 20 digital audio management systems.

Powerful wizards with extensive filtering options allow users to generate and save customized invoice printing and report instructions.

Multistation and multigroup support, multiple commission structures, multiple account executives for the same order, static spot scheduling, multiple transaction codes and different database security levels are standard features of D32.

There have been many changes in traffic, billing and scheduling software.

The Internet and the trend toward larger group holdings and centralized operations are the forces behind the latest offering from **Columbine JDS**.

The new Web-based version of the ColumbineNet sales and traffic system for radio uses an easy-to-learn Web browser-based interface, giving users access to spot and media scheduling, logging and inventory management information.

Spotdata Electronic Invoicing, also from Columbine JDS, gives agencies a secure way to download station invoices via the World Wide Web. Using American Association of Advertising Agency data structure, the process speeds reconciliation and payment.

Traffic Web from **TeraTek Software**, scheduled to ship in November 1999, is a structured-query language (SQL) based application designed to run on an NT server.

The user interface is a Web browser that gives direct access to a centrally located database.

TeraTek said the system is designed to give clients and agencies direct access to station avails, using specifically controlled filters to provide privacy and security.

CBSI introduced version 3.0 of its DeltaFlex traffic engine, which includes a feature called Revenue Maximization.

This new tool makes it easy for traffic managers to protect spots that are part of a package buy, reducing lost revenue by preventing those spots from being bumped and voiding the terms of the original contract.

DeltaFlex is designed to run on a single Windows 95/98 workstation or in a Windows NT- or Novell 4.1x-based network.

It features expanded report filtering

See TRAFFIC, page 35 ▶

NEW NEW NEW NEW NEW NEW NEW NEW NEW NEW NEW

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Model PM218 Up to 18 Modules
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Circle (33) On Reader Service Card

World Radio History

▶ TRAFFIC, continued from page 35

and unlimited design, customer comment fields and redesigned customer information fields with e-mail.

In keeping with the NT-based, 32-bit application architectural approach many companies are taking, **Audio Follow** showed a 32-bit version of its Public-All commercial scheduling system.

A powerful database and a user-friendly screen permits the definition of different scheduling parameters based upon daypart, commercial type, customer type and different radio stations.

Several companies introduced new or enhanced 32-bit Windows NT-based traffic and billing systems.

RDS 2000 from **Register Data Systems** is based on the popular System Six and System Seven traffic, billing and accounting systems. A 32-bit Windows-based program, RDS 2000 uses the same data files as the earlier DOS-based packages and features the ability to handle more clients, multiple printers, multiple commission and multiple ad executives on the same order.

System 32, available later this year, is being designed for larger stations and larger markets. It will have enhanced payroll and accounting features, the ability to handle multiple stations, and its data will be accessible via the Internet.

Centralized

Visual Traffic (VT) from **Computer Concepts** is a standalone software product with export capabilities to most major digital audio systems. Using a centralized database, VT allows users to enter order information only once for multiple sites.

The confirmed order, once checked against internal parameters such as credit limits, is then available to all group sites. VT has the ability to have multiple commission structures on the same order, 160 existing reports that are completely customizable and an ODBC compliant database.

Consolidation has led manufacturers to redesign their offerings to meet the new needs of broadcasters.

With the addition of Peak Traffic & Billing and Music 1 to the **Nétia Digital Audio** line of production offerings, the company now offers complete solutions for the traffic, billing, scheduling and digital audio demands of the radio industry.

The new version of Peak Traffic & Billing is a 32-bit Windows application that features customizable schedule plans, built-in user-dependent task lists, dynamic log generation and multistation support.

Using a Flashfiler server system, which is based on btrieve, Peak Traffic & Billing can even interface with a Palm Pilot to allow ad executives in the field to enter orders directly, retrieve data and maintain current information.

Music 1, a 32-bit music scheduling system, utilizes an ODBC-compliant database and features interactive scheduling to warn users of conflicts as they appear, giving the presenter or music director a chance to correct them on screen.

It also includes the ability to merge a traffic file with the music file so that all the details of an hour can be seen. Exports can be in the form of a combined log or a music-only log, as required.

Both Peak Traffic & Billing and Music 1 can operate as standalone systems or they can share data with most major radio automation systems.

Adaptable to blocks

Integration is a feature of products from MediaGenix and Lysis. Although predominantly known for television software systems, these companies have scheduling software adapts well to block-formatted programming, such as talk radio or public broadcasting.

Lysis systems feature controllable, variable bandwidth transmission for the distribution of programs, all under the control of its master software.

The system called whats'On from **MediaGenix** utilizes a central database that makes changes anywhere available to all users instantaneously. MediaGenix specializes in customizable broadcast management systems for radio and television stations.

On Air Digital USA released a 32-bit music-research system that includes an ODBC/SQL interface for server databases. It allows stations to customize interview parameters, to record audio and to conduct in-house music and market research.

The system, named CallOut!, includes a headset and integrated telephony-soundboard and offers optional access via the Internet for data, updates and documentation.

On Air Digital also showed its OAS scheduler, a basic music-scheduling system designed for standalone use or for integration with the UDS II digital automation system.

OAS features support for multiple clocks, categories and breaknotes, more than 32,700 songs and 5,000 songs per category. This inexpensive system easily exports files in ASCII format for use by many different digital automation systems.

Dalet Digital Media Systems showed its Dalet5 suite of integrated programs for radio stations, which included extensive traffic and music scheduling capabilities.

Windows-ready

Radio Computing Services (RCS) showed a new, 32-bit version of its industry standard Selector software, which previously was available only as a DOS product.

The new RCS SelectorWIN features drag-and-drop capabilities that allow users to move songs onto the log or from one open window to another. Colorful round format clocks can be adjusted or changed instantly.

SelectorWIN also includes the ability to link screen information to a Web site, allowing DJs to get up-to-the-minute weather, concert information or other information on the screen. To make the program easier to learn, SelectorWIN includes .AVI-format movie files.

A-Ware, makers of MusicMaster, announced a completely redesigned, 32-bit version of its MusicMaster software. Joe Knapp, president of A-Ware, said that support for existing DOS-based versions of MusicMaster will extend for at least the next five years.

The new version will operate under a client-server-based distributed-network architecture that is fully ODBC compliant. A-Ware will publish its specifications for MusicMaster, allowing other vendors to write interface software for the new system.

With the new system, users can use wizards to define their own database structure, fields and rules, essentially creating a customized scheduling system.

There is an export feature that allows users to create HTML pages for their Web sites, allowing listeners can see what songs are about to be played.

Memex came to Las Vegas with Prism, a Windows-based database system that integrates program management, sales and traffic, operations and a media library.

In addition, Memex introduced SalesTrax, a broadcast-oriented sales contact management system. This 32-bit, multi-user relational database includes among its many features agency tracking, contact management, ad executive tracking, extensive search capabilities and unlimited note fields.

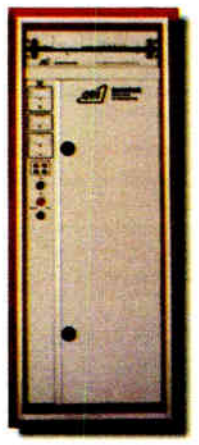
One of the more powerful tools included with SalesTrax is a billing/forecast sales analysis module that retains threes years of actual billing data and can produce two-year forecasts with automatic comparisons and analysis done by user-defined criteria.

■■■

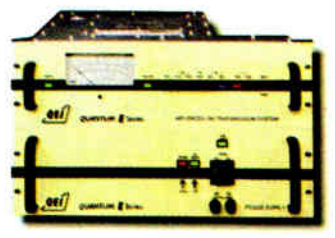
Ted Nahil is director of engineering for Salem Communications radio and satellite properties in Colorado.

QEI

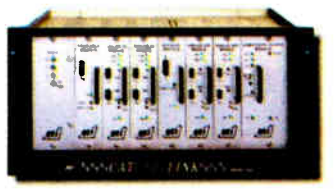
And You Thought You Knew Us.....



Solid-State and Single Tube Transmitters



Low Power Transmitters



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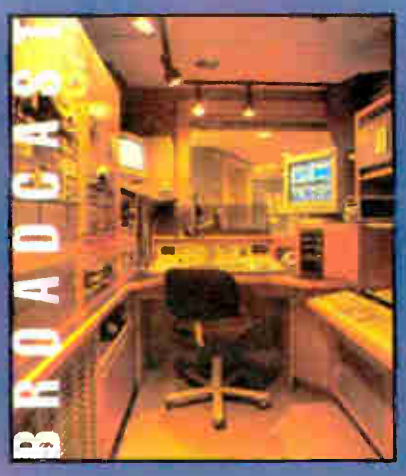
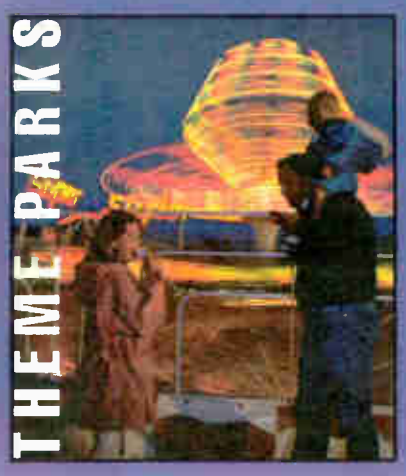
World Radio History

The Versatility Of MiniDisc





HOT 10 START

Introducing the new Denon DN-M991R MiniDisc recorder/player. MiniDisc is the most versatile media available for archiving program material for playback in a variety of applications including broadcast, theme parks, theatres and shopping malls, among others. The DN-M991R offers all the features and functions that engineers have asked for, such as a large and easy-to-read florescent tube display with multiple readouts, Hot Start, keyboard entry, seamless Sleep mode, front-panel Program Play and a variety of control terminals including RS-232C, RS-422A, D-Sub 25 pin and PC-compatible Mini Din keyboard connector. For additional information, contact our broadcast products specialist at (973) 396-7492.

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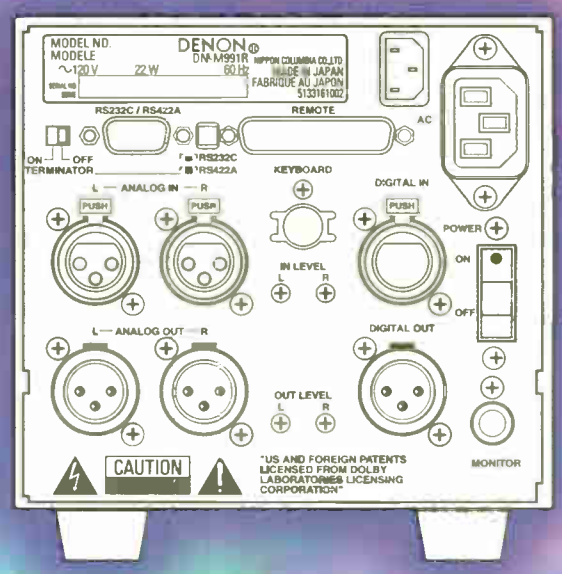
- Auto Level Rec Start
- Optional Wired Remote RC-650



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Circle (36) On Reader Service Card

World Radio History

Remote Controls Refined

Michael LeClair

Although the use of remote control with transmission equipment has been with us for years, manufacturers continue to improve and refine the performance.

One major trend in today's equipment is to offer more and better ways to access equipment from afar, including the use of the Internet for the ultimate in availability.

Software databases

Another interesting trend is the use of software databases to organize transmitter data in many more powerful ways.

The database model generally parallels developments in business computing, where leading organizations have realized that greater efficiency and better performance is achieved by improving the way data is managed.

Evidence of these trends was on display at NAB99.

Manufacturers continue to improve and refine remote-control performance.

While the standard remote control package still contains the familiar hardware interface, the use of a customized search screen can allow a user to look at everything at a particular site or to view just a couple of key parameters.

Unused channels with no information can be filtered from the display. Custom screens can be created to allow transmission staff to monitor a large number of sites simultaneously.

Driving these developments is continued consolidation trend within the radio industry.

Powerful structures

Using powerful data structures, radio groups with hundreds of stations can centralize the control and monitoring of transmission sites on a national level.

With increased flexibility of access, any number of individual users or engineering managers can check on a transmitter (or a dozen at the same time) and respond to problems quickly.

An example of this could be seen at the **Davicom Technologies** booth. The Davicom software uses a geographic-based user interface that starts the user with a map of the country or region showing available transmitter sites.

With the click of a mouse the user can move immediately to a particular site and call up the latest information.

Other details about the site can be linked to this database, such as the transmitter type, contact information for local

See REMOTE, page 44 ▶

Radio World Cool Stuff Award NAB99

Broadcast Electronics FM-10S FM Transmitter

The broadcast engineers on the Cool Stuff panel liked this new, solid-state offering from radio's own "Big Blue."

Extensive redundancy and protection systems make the FM-10S a solid bet. It allows you to run at 95 percent of full power into a normal load with one module removed, and an optional standby power supply provides full power running with one supply removed.

A large removable front panel allows easy access; in fact, all RF modules, main and optional IPAs are removable from the front of the unit.

This is an impressive solid-state entry for BE at the 10 kW level. List price is $15,950.

For information, call Broadcast Electronics in Illinois at (217) 224-9600, e-mail to bdcast@bdcast.com *or circle* ***Reader Service 140.***

Get Better Jocks for Less Money

Decrease costs, *increase profits* and run your station more efficiently. Outside of drive time, why pay your talent to sit around *waiting* to talk? A Scott digital System can put all your songs, spots and prerecorded Voice Trax together smoothly and easily—without anybody in the air studio!

For years, Scott Studios' client stations have been successfully pre-recording incredibly live sounding fully localized 4 hour music shows in just 10-20 minutes. If you have a hub and spoke cluster of stations with similar formats and names (like Mix, Magic, Kiss or Kicker), you can sound great and save even more.

Scott Breakthrough: Free Software!

Thanks to Scott Studios' new *free* Voice Trax Via Internet (VTVI) software, announcers can phone in shows with studio quality from anywhere. All they need is a good microphone, mic pre-amp and processor, Internet connection, any Windows® computer with sound card and Scott Studios' *free* VTVI!

Simply schedule your station's music. With the touch of a button, your log and latest local copy points are automatically e-mailed to your announcers. And Scott's VTVI works seamlessly with all music schedulers and traffic/billing programs.

Live tags, trivia and copy are displayed automatically on the screen. Announcers don't need a clumsy copy book or liner cards. They can talk as early as they want before songs fade and over intros or in the clear. VTVI is *so* simple to use: a touch of the space bar triggers the next song or the next spot. Voice Trax are recorded with the computer's regular sound card with exceptional digital quality.

Unlike live radio, any or all of the Trax can be reviewed and possibly improved by re-recording. With the VTVI's Segue Editor, announcers can fine-tune their timing of song intros, back sells and donut spots without re-recording.

VTVI is Goof Proof!

VTVI includes Scott Studios' exclusive Voice/Music Synchronizer. Whenever the announcer mentions song title or artist, he or she turns on the link so the back sell or intro plays *only* with the correct song.

You Can Even Do Time & Temp!

Scott's VTVI lets you record every possible time check, or do a range of alternate recordings mentioning the time in any Voice Trax. The Scott NT System picks the right one at air time. You can also record all the seasonal temperatures and let Scott's optional temperature announce equipment play the right one at air time.

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

$10,000 a Year Cheaper than WANs

When the announcer is done, a click on the VTVI Auto-Send button dials the Internet over a standard phone line and uploads the entire show to your Scott Studios digital audio system automatically. Transfer does take a long time, but your announcer can be answering e-mail, writing copy or creating promos on the VTVI computer while the show transfers.

VTVI isn't limited to music announcements. It gives high quality audio to recorded spots, remotes, weather, stock reports, news and election returns.

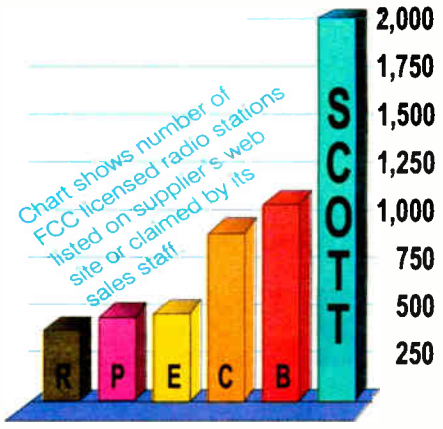
Your station will sound great with Scott VTVI! The only thing you need is an Internet connection on each end, a $29 a month FTP transfer site and the Scott NT System with Remote Recording Router.

Voice Trax play seamlessly without anyone back at the station. And if the announcer forgets to record something, or if songs or spots get changed at the last minute, Scott's Voice/Music Synchronizer automatically substitutes a generic Voice Trax with the same voice for the day and hour of that break.

3 VTVI Models: Good, Better, Best

Scott Studios also offers a $500 VTVI+ that sends your distant announcer telescoped song intros and endings via the Internet. With VTVI+, a telescoped aircheck can be previewed and fine-tuned in the context of starts and ends of songs and spots.

Or with VTVI Deluxe, your announcers record their Voice Trax *while listening to song and spot intros and endings* in context!



VTVI is just one of several ways Scott Studios digital systems can improve your sound *and* your bottom line.

It's a fact: More U.S. stations use Scott Studios than *any* other major digital audio system. 2,000 radio stations use 4,400 Scott digital workstations, including *major* groups like CBS, Chancellor, Disney/ABC, Clear Channel, Emmis, Citadel and many more. Last year, 418 U.S. stations bought new Scott Systems. That's more than chose some other "major" digital systems in several years! Call 800 SCOTT-77 to find out why Scott Studios are chosen the most.

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World Radio History

AUDICY CAN TURN YOUR GM FROM SKEPTIC TO BELIEVER IN :30 SECONDS.

BUT WE'LL GIVE IT TO YOU FREE FOR 30 DAYS, JUST TO MAKE SURE.

General Managers are paid to be skeptics. So why waste time explaining to them how Audicy has turned production managers, interns, and on-air talent into fanatics from coast to coast. Show your GM. We'll arrange to give your station free use of an Audicy workstation for thirty days with no obligation. And no strings attached.

In fact, in the time it takes a GM to recite the "we can't afford this" speech, you can demonstrate why so many fiscally-minded stations have concluded just the opposite. There is no better way to speed up audio production; no quicker return on investment. The new Audicy offers features that keep the entire station working smarter today and tomorrow. Fully networkable and file compatible with major on-air delivery systems, it's fast, flexible, intuitive, and easily the most creative tool you can use.

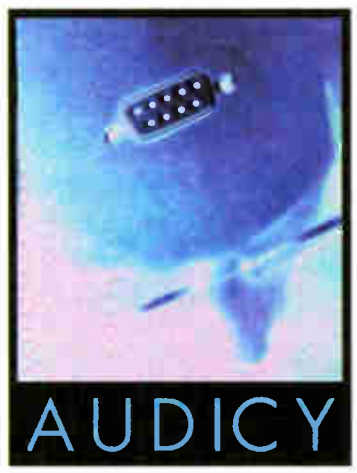
STILL A SKEPTIC?

Let your GM set an unrealistic deadline. Then stand back and watch Audicy go to work with RAM-based speed, editing and mixing up to three times faster than other digital workstations. With Audicy you edit in real time, by ear, working on up to 24 tracks. Access to audio is instantaneous even when using its complete suite of built-in effects including OPTIMOD compression, EQ, and Lexicon reverb. Not to mention Time Fit, the industry's best-sounding time compression.

WORK FASTER, WORK SMARTER.

The sleek controller gives you positive, tactile command over all functions, with dedicated controls for every key operation and parameter setting. The transport controls and scrub wheel let you "feel" the audio, scrubbing with sample-accurate precision—and sounds to match at any scrub or fast wind speed. And since most of your work is done from one screen, you never get lost navigating through endless drop-down menus.

Everyone who sits down at Audicy learns faster, works smarter, and gets more done in dramatically less time. And since time is money, why not think like a GM. Call us on it, toll free of course. To arrange your free Audicy for 30 days, call 1-800-622-0022.



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Circle (38) On Reader Service Card

World Radio History

Growth in Digital Audio Editing

Tom Richards

"Connectivity" has become the catch phrase in production tools, as next-generation DAWs reach out to integrate with as many audio users as possible.

The most promising new concept is "cart chunk," as introduced by **Orban** Senior Software Technician Dick Pierce. The idea: when editing is completed on a commercial, promo, or sweep — anything to air on a hard-drive system — streamline the process by including a digital cart label, containing common traffic information such as account name, cut title, cart number, start and end dates, secondary and tertiary tones. Embed this information into the file to be recognized by the digital cart delivery system.

The initiative earned Orban a Cool Stuff Award from **Radio World**. It was outlined in detail in the May 12 issue.

Euphonix introduced the R-1 Multitrack Recorder at NAB99. It is an expandable, 24-bit, 24-channel recording system.

Alesis jumped further into production with the premier of ADAT/EDIT, a nonlinear editor and hard-disk recorder intended for commercial radio production. The system is PC- and Mac-compatible and can time-compress the final mix.

Klotz showed its Vadis DC radio production console, a modular unit available in six rack sizes and features four stereo buses, various mix-minus options, and mono sum output capabilities.

At **Bradley Broadcast and Pro Audio**, attendees saw **Microboards Technology** CD-R Desktop Publishing, which performs automated, virtually hands-off CD duplication. It loads up to 50 blanks at a stretch, burns up to four CDs at a time, prints labels then moves them to a hopper. The device lists for $9,445.

Talk to the Net

Sonic Foundry debuted M.A.P. 2000, a bundle consisting of its award-winning two-track editor, Sound Forge 4.5, the unique loop-based royalty-free music composing tool, ACID PRO, and the audio CD software, CD Architect 4.0.

Also included in the broadcast-friendly bundle are DirectX audio plug-ins such as Noise Reduction, Acoustic Mirror, and XFX 1, 2, and 3, along with 22 loop libraries and six special effects CDs.

Sonic Foundry now offers "Stream Anywhere 1.0," which authors Microsoft's Windows Media Technologies 4.0 (.ASF) files, which feature multiple bit rate encoding (Intelligent Streaming) and Microsoft's new audio codec, code-named MS Audio.

Sonic Desktop Software had its new releases of Smartsound for both Mac and Windows. The packages enable users to create custom soundtracks automatically.

Using music from well-known libraries, such as Killer Tracks, Hollywood Edge and Sound Ideas, Smartsound performs user-specified changes in pace and mood.

Many manufacturers of digital management systems incorporate production features.

Dalet Digital Media showed the Dalet5 system, which includes the Surfer editing application.

Scott Studios offered its proprietary Trim and Label program, which enables existing audio editing software to write cart information to its Scott System and AXS 2000+ hard-drive systems.

Musicam USA announced its EditPro software-based audio editor for MPEG 2 and MPEG 3 files. EditPro can edit compressed files without the need to uncompress the file prior to editing. EditPro also supports Broadcast Wave Format (BWF) and raw MPEG files.

Studer upgraded software and hardware for its V-Eight 20-bit ADAT type II modular recording system. Version 2.03 for the V-Eight includes a software upgrade, RS-422 machine control port and new I/O board with improved MIDI and word clock circuitry.

In the cards

Soundcard companies had big things brewing.

Antex Electronics jumped in with three new digital audio cards. The LX-22M and LX-24M have 20-bit with variable sample rates of 6.25 to 50 kHz, balanced or unbalanced I/Os and MPEG I/II. The LX-22 is designed for the recording and playback of MPEG digital audio files and the LX-24M is intended for multitrack digital audio sampling and playback.

The LX-44 digital audio adapter features 20-bit audio, four balanced or unbalanced I/Os and a dynamic range of 96 dB.

Soundscape Digital Technology debuted the Mixtreme 16-channel PCI card, as well as the System 12 and System 24 editors.

Digigram displayed several new products at NAB99.

The VXpocket is a type II PC card designed for professional sound work on a laptop. The VXpocket features simultaneous and independent recording and playback, 24-bit converters, a balanced analog stereo input at mic or line level; and balanced stereo output and a S/PDIF input and output for direct digital transfer.

Also new from Digigram, the VX222 is a linear dual-channel sound card with balanced analog I/Os with 24-bit converters, as well as digital input/output in AES/EBU or S/PDIF formats and two General Purpose Interfaces (GPI) I/Os. The VX222 is compatible with Windows 95/98, NT 4.0 and Mac OS 8.x.

Rounding out Digigram's new products are two full-power stereo cards: the PCX222np with both analog and digital inputs and outputs and the digital-only PCX221np.

Digidesign Pro Tools|24 MIXplus earned attention as one of the most notable DAWs introduced in the last year. Digidesign's ProControl tactile control surface also was on display.

Suppliers continue to upgrade existing products.

Roland showed its V-Studio Series, including the VS-1680, VS-880EX and VS-840EX.

For **Yamaha's** computer-based digital audio recording station, the DSP Factory, improvements have been made in software support for Mac and PC platforms. The company has added interface options including an ADAT-format optical interface card.

An additional ADAT I/O for the DSP Factory is Yamaha's AX16AT, a PCI card that provides two pairs of Alesis ADAT-format optical connectors for transferring 16 tracks of digital audio to and from the DS2416 at 24 bit.

Yamaha also released the AX88 Audio Expansion Unit for the DSP Factory, featuring eight I/Os at 24-bit analog audio and word clock sync. And the new Yamaha D24 multitrack recorder features four-track 24-bit, 96 kHz audio, based on 3.5-inch magneto-optical disks.

Otari came here with a family line of digital products. The Advanta series digital production system features a range of I/Os and user configurations, 40-bit SHARC-based signal processing and 96 kHz.

The Radar II HDR series is a multitrack hard-disk recorder providing 24-bit/48 kHz with a 9 GB swappable hard drive capable of 42 minutes of 24-track record capacity.

The Otari Lightwinder series of audio transmission and routing products provide networking and integration solutions for analog and digital audio/video.

Eventide introduced a new addition to its Harmonizer line of effects processors. Orville is a multichannel effects processor and sampler that features 24-bit/96 kHz audio, UltraShifter program for vocal processing and 174 seconds of sampling time.

Akai upped the ante in the 24-bit/96 kHz arena with the debut of the DR16 Pro recording system. The DR16 Pro is a hard-disk recorder with editing capabilities and a built-in 16 channel mixer.

HHB/Genex demonstrated its knowledge of recording with the GX8500 multi-format digital audio recorder, equipped to record in both linear and non-linear modes and designed for multi-channel recording and mastering applications.

For those finally coming to grips with cutting loose their beloved two-track, quarter-inch analog tape decks, **360 Systems** waits with a box of hankies, open arms and good news: the "jump to digital" is a simple step away.

Grab-and-run

As a remote audio news editor, the updated Short/cut '99 is a grab-and-run digital editor — complete with built-in speakers and scrub wheel — that's just as comfortable in the field as in the newsroom back home. With the new WAV file conversion feature, a field report can be tracked and edited, then filed via e-mail upload.

Syntrillium brought an upgrade to NAB99 with its Cool Edit Pro, a digital audio recorder, editor and mixer for Windows, based on Cool Edit 96. The software features up to 64-track mixing Time Display Window, level meters, clip indicators, and Mute/Solo/Record color coding loop, crossfade, zoom, and "snap," and SMPTE/MIDI slave capability. The software won a **Radio World** Cool Stuff Award this year.

■■■

Tom Richards is image and production director for WBEB (FM) in Philadelphia.

Circle (34) On Reader Service Card

World Radio History

Processing Debate Rages at NAB99

Mario Hieb

Nothing in radio broadcast engineering is as controversial as or invokes as much passion as audio processing.

In many ways it is like religion. There are the charismatic leaders, believers, non-believers and of course, doctrine.

At NAB99, discussions of doctrine centered on the topics of digital grunge, "junk science" and a digital composite standard.

Digital grunge

Digital grunge has been the subject of much heated debate over the last year; the controversy focuses on what "grunge" is and where it comes from.

"The fact of the matter is there is such a thing as digital grunge," said Marvin Caesar, president of **Aphex Systems**. "The more processing you do, the more grunge there will be. ... Our tests have proven it, and listening tests have proven it."

There are other opinions.

"You can probably say that all digital processors create grunge and that all analog processors that are loud create grunge, too," said Bob Orban, founder of **Orban**.

"The question is whether the grunge is audible or whether it is psycho-acoustically masked by the program material and/or by the analog-like grunge that would be produced by the clipping process anyway," Orban said.

What causes digital grunge?

"Digital grunge is any kind of non-linear phenomena that occur in digital audio," said Donn Werrbach, director of engineering for Aphex Systems. "You have quantizing distortion to begin with, and then you have non-aliasing distortion that inherently creeps in because of non-linearities in signal processing circuitry. Any digital processor by nature is going to cause digital grunge."

Orban agreed with this assessment.

"Yes, digital processors produce some different types of artifacts than analog processors do," he said, "but when it comes down to the sound on the air, I think the fact that we have thousands of satisfied 8200 customers speaks for itself."

Are there solutions to digital grunge?

"The analog world is so perfect, the digital so imperfect. One day we (Aphex) will probably build a digital processor," said Werrbach, "but unless we can feed the signal through, at truly high sample rates — at perhaps mega-samples rather than kilo-samples — you cannot achieve anywhere near the precision and accuracy and sound quality of an analog sound processor."

Throughout the show, Frank Foti of **Cutting Edge Technologies** jabbed back at his critics by wearing a badge emblazoned with the label "Junk Scientist."

During the Q&A session after Foti's presentation on Digital Peak Modulation Control, Foti responded to a question from Bob Orban about the technique used to deal with protected overshoot compensation saying: "It is a full linear process that produces a non-linear function."

A perplexed Orban responded, "That sounds like gobbledy-gook to me, it's either going to produce new spectrum or it's not."

Digital grunge has been the subject of much heated debate over the last year.

Later, Orban said, "I am not quite sure whether Frank understands the mathematical principal of linearity and non-linearity ... basically he gave a non-answer, I tried to get him to clarify, but was unsuccessful in doing so."

The principles are expressed with high-level mathematics.

"If something is not linear, then, by definition, it is non-linear, and linear systems have a property called super-position. ... You cannot test a non-linear system like an audio processor with single sine waves and expect that to apply to complex program material," Orban said.

Mathematics

Referring to claims made by Foti, Geoffrey Mendenhall, vice president of **Harris Corp.**, said, "Some of the analysis I've seen on the Internet does not stand up to the mathematics of digital sampling theory."

Orban said, "When you start running ads showing what one processor does to a 12 kHz sine wave, and then invoke the name of Mr. Fourier, who is the god of linear systems, you are simply doing wrong mathematics ... 'junk science' is what I would have to call it."

Laboratory methods were another area of debate. "Frank has never responded to my challenge to provide some actual double-blind conducted tests to justify some of his claims about

See DEBATE, page 41 ▶

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▶ DEBATE, continued from page 40

the superiority of his shallow-slope filters vs. the steeper slope filter," said Orban.

"Frank has made a lot of unsupported claims about subjective sounds that pretty much come down to 'It sounds better to me, it sounds better to me, it sounds better to me.' It's very hard to do these tests well."

Foti said, "All our tests have been designed to support what we hear or don't hear with regard to how something sounds. ... I have published the precise test methods that we've employed ... we've issued a number of white papers, copies of which are posted on our Web site.

"I am fairly educated as to who my critics are, and to them I say what's been of interest is that in many of the tests they've run, they've never posted their test methodology, and I feel that if you are going to run some tests, you must share the methodology," Foti said.

DCET debate

Last year, a proposal known as Digital Composite Enabling Technology (DCET) caused a big stir at NAB98. Manufacturers are divided on such a standard.

"Our objective is to provide the greatest flexibility to the customer," said Dave Herschberger of Continental Electronics. "If an audio processing designer makes more heavy use of composite clipping, then this interface is probably necessary."

Herschberger said Continental plans to develop an exciter that would accept a digital composite signal, but he didn't indicate when it would be released.

Foti, a proponent of DCET, said, "DCET continues to move forward in concept ... what we've done and what we show in a prototype is one way to do it, there are many other ways of doing it.

"I'm hoping what we'll see is continued interest on the manufacturing side, but more importantly there's been a huge amount of interest from the broadcasters," Foti said.

However, there is opposition to the DCET concept.

"I am not convinced it is needed," said Orban. "There is only one reason to have it and that is that it supports composite clipping in the digital domain.

"The downside of a new standard is that it is incompatible with what's in the field right now and requires people to buy new hardware or to retrofit what they have," said Orban. "I would be hard pressed to make a good argument that there is any great advantage to the consumer to do this."

According to Mendenhall, "Frank Foti is trying to create a new standard to differentiate him and his product. This manufacturer, Harris, nor any other manufacturer I've spoken to sees a need for that.

"There's been a lot of misinformation put out about the fact that limiting the bandwidth of left and right audio to 16 kHz causes overshoots, there are also suppositions that rate conversion causes overshoots in a system and that's not correct," said Mendenhall.

"If the mathematical requirements of the Zenith 19 kHz pilot tone system are adhered to, and they need to be adhered to, there is no problem with overshoots due to rate conversion."

Radio World Cool Stuff Award NAB

Harris Intraplex SynchroCast

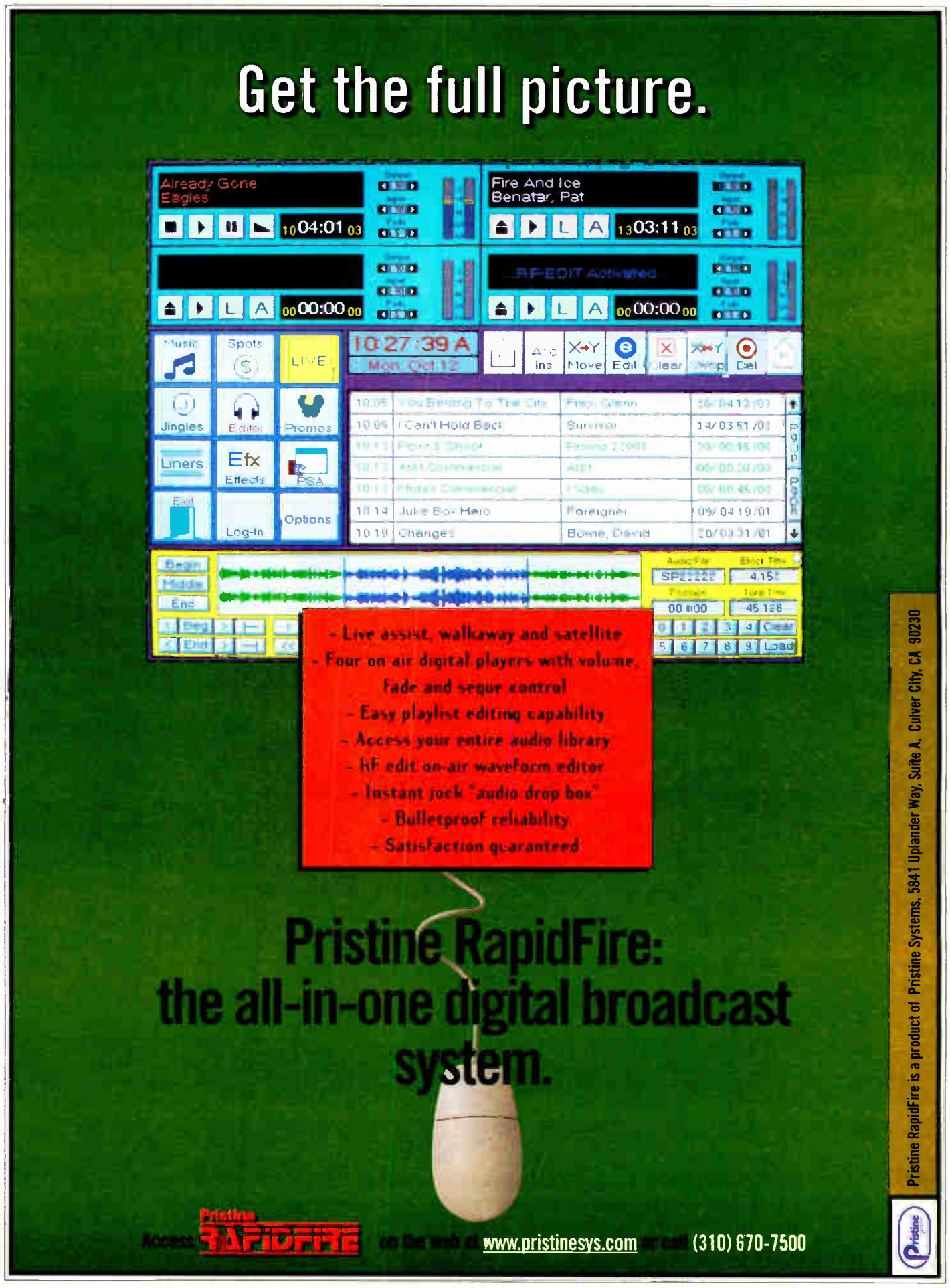
SynchroCast opens up a host of possibilities for FM managers, who can use multiple overlapping transmitters on the same frequency to achieve greater coverage. Applications include ringing a market, covering an interstate highway and filling dead zones with synchronized boosters.

The system is based on the Intraplex STL Plus, which supports bi-directional transmission of program audio STL/TSL, remote control, LAN data and phone service on a T1 digital line. It can use leased T1 circuits, microwave radio links or fiber optic links. The system automatically synchronizes broadcast transmitters using GPS satellite receivers.

For details on how the system works, see the discussion in RW's April 14 issue, page 40.

For information, contact Harris Corp. at (877) INTRAPLEX, visit the Web site at www.harris.com/communications *or circle* ***Reader Service 153.***

Stephen Solaski and Bill Gould of Harris Intraplex



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World Radio History

New Offerings for Tweaking Audio

Mario Hieb

Beyond all the debate about connectors, grunge and "junk science," a number of new or improved audio processors were on show at NAB99.

Orban showed the Optimod-DAB 6200, an audio processor for digital radio and Webcasting.

New presets

In addition, the company featured new software for the Optimod-AM 9200, with new presets for high-frequency (shortwave) radio and version 3.0 software for the Optimod-FM 8200.

Despite the apparent demise of the all-analog processor, hybrid processors combining the most popular features of analog and digital enjoy a loyal following.

One such example which was seen at NAB99 is the **Aphex Systems** FM Pro 2020, a hybrid analog/digital FM processor.

Cutting Edge Technologies incorporated plug-in technology and multitasking functions that expand the Omnia processing platform.

New for NAB99 was the Omnia.am, a dedicated all-digital dynamics processor for AM.

Omnia.am features NRSC low-pass filtering, as well as selectable narrowband filters for news/talk formats and international requirements. In addition, Omnia.am includes EQ adjustment for plate modulated transmitters, processing presets, and day-part scheduling and remote control.

The Omnia.fm also displayed some new capabilities at NAB99. Kevinn Tam, Cutting Edge director of sales and marketing, said updates for version 1.6 of the Omnia.fm software include prediction analysis clipping and a "supercharged" Omnia.fm.hot, for the "ultimate in loudness."

A number of new or improved audio processors were on show at NAB99.

Also on display were Omnia.fm.jr, Omnia.dab for DAB and Omnia.net for Webcasting.

New from **Inovonics** was the WebCaster, an Internet audio processor designed to ensure optimal audio quality for limited-bandwidth streamed-audio applications.

Broadcast processors

Inovonics also displayed the David II FM stereo processor/generator 235-00 and 222-00 AM NRSC broadcast processors.

The David II FM stereo processor/generator was also shown integrated with the new Bext exciter.

Internationally, radio is becoming more competitive and sophisticated, and international equipment manufacturers — a growing presence at NAB — were on hand with new processing equipment.

French company **IDT** – Impact Développement introduced 24-bit, 96 kHz Digital Virtual Processor (DVP).

With DVP, IDT breaks from the traditional division of processing into bands, preferring to use predictive algorithms and real-time analysis (±10 µs) to process the whole spectrum at once.

Also, DVP will make use of plug-ins to add, for example, stereo enhancement options to the radio station signal without additional hardware units.

Danish company **TC Electronic** showed the 24-bit/96 kHz Finalizer 96 multiband dynamics processor, as well as the DB MAX Mark II 2.02, a hardware and software enhancement for the digital broadcast multiband signal processor with 24-bit A-to-D/D-to-A conversion.

Conformity

The DB MAX Mark II is FM-, AM-, TV- and DAB-compatible and shipped to conform to all major standards worldwide.

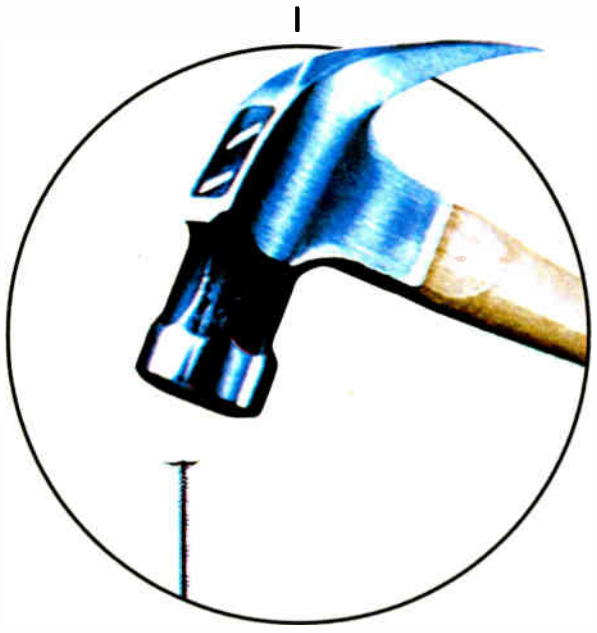
From Italy, **AEV** upgraded its Exclusive FM 10-band processor, adding a new card that helps provide additional loudness.

Also, AEV highlighted the Mirage FM three-band, the Exclusive FM 10-band, the Luxor, Starlight and Thunder on-air processors.

Another Italian company, **Axel Technology**, showed the Falcon Series five-band digital audio processor at the show.

Tiesseci, which announced at NAB99 the opening of a U.S. office in Dallas, showed the Digimod 8300 digital processor.

When you need to nail the sound



COURIER, the portable recorder from Sonifex, is the breakthrough in portable digital audio recording that journalists and sound recordists have been waiting for. The Courier records to and plays back from a PCMCIA hard-disk or flashcard. It records standard mpeg compressed, linear .wav, or broadcast .wav files. With the use of a scrub-wheel, graphical LCD waveform and undo actions, non-destructive editing is the easiest in the business with the Courier. The Courier uses standard camcorder batteries or AA cells, and comes with a power supply/charger that can be used in any country. It's light weight 1.5kg (3lb), so it's not going to be a burden in daily use, and has professional XLR connectors.

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World Radio History

Truth in Advertising

The hype for digital audio has been deafening. While digital offers advantages for storage and control, it has severe limitations for dynamics processing. Indeed, Cutting Edge® claims their Omnia unit sounds almost as good as analog.

The Aphex 2020 FM Pro offers the purity of an all analog signal path with the power of digital control. Through its use of 11 patented circuits, the 2020 achieves the greatest possible loudness while retaining musicality and naturalness.

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Remote Control Options Abound

▶ REMOTE, continued from page 37

engineer or manager, local time zone information, and even a CAD drawing of the site design.

"In Canada the Canadian Broadcasting Corp. is using our remote systems to monitor 135 transmitter sites from a single location in Toronto," said Marketing Director Elaine Jones.

On display

As for Internet access, **Gentner Communications** had a new IP software module for use with the GSC-3000 remote control system on display at the show.

The IP software module allows transmitter parameters to be downloaded onto a Web site for worldwide access. In development is an interface that uses the ubiquitous Web browser to access remote data.

Showing a new remote control interface this year was **Electronic Associates**. The Dataline series controller is aimed at medium-sized installations and is designed to complement the existing Electronic Associates product line.

The transmitter interface is modular and can be combined with other units to create configurations of up to 64 channels.

Electronic Associates also offers RF Host and RF Manager software compatible with the Dataline controller.

The Dataline controller comes with a voice interface or the ability to use Skytel text pagers for alarm notification with up to 255 characters.

"We find that many engineers familiar with voice interfaces prefer the pager interface," said W.T. McGill of Electronic Associates.

One interesting trend is the use of software databases to organize transmitter data in more powerful ways.

Burk released a new version of the Autopilot for Windows at NAB.

New graphical displays of the data, such as bar graphs and simulated meters assist in using their established ARC-16 remote control interface. Custom viewing screens are possible to show multiple transmitter sites simultaneously.

Moseley Corp. showed new software with the ability to capture data screens from its MRC-2 remote interface and post this to the Web.

Moseley is using Access 97 as a database engine to sort the remote data. This Microsoft software package allows easy transfer of data to other office applications, such as Excel, so users can sort remote control data in any way they choose.

Finally, have you ever wanted to install a device that would remotely reset the AC power on a device from the telephone?

Pulizzi Engineering introduced the Intelligent Power Controller that can remotely control the power on outlets on demand. It can also be programmed to operate on a regular schedule or in response to site conditions.

This handy device might be just the answer for those difficult-to-access sites with data circuits or other computer equipment that needs an occasional reset to operate.

You Read It Here

Two Years Ago

The Clinton Administration wants to end funding for the Public Telecommunications Facilities Program, popularly known as PTFP ...

Last year, PTFP grants to public radio and television stations and educational institutions amounted to $15.25 million, according to sources at the NPR National Affairs Office.

"Clinton Wants to End PTFP"
May 28, 1997

Five Years Ago

Spanish language radio networks and stations are blazing a hot trail across the United States, forging a strong cultural bond with Hispanics here and in Latin American countries.

With a population of more than 22 million Hispanics ... and a projected increase to over 31 million by the year 2000, the market potential for Spanish language radio is enormous.

"Spanish Radio in U.S. Heats Up the Airwaves"
June 1, 1994

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World Radio History

Codecs: More Powerful, Portable

Frank McCoy

Codecs are transformed. Manufacturers have learned to pack more in their packages than ever.

As recently as a few years ago, if you were sent on an out-of-town remote, you worried that all your equipment would arrive intact. I can remember carefully dividing my equipment into two piles, one of which was equipment I carried and never let out of my sight while traveling.

With the arrival of ISDN, we added two pieces of equipment to the "must-get-there" pile: a codec and a terminal adapter.

Two generations of equipment later, all that has changed: Now everything fits in a carry-on, and you can leave the bag of patch cables behind. In addition, the latest entries auto-negotiate bit rates and even compression algorithms.

Small, light, yet rugged, the TLE-02D from **AEQ** is an example of multifunction.

Slick

"It's the slickest little ISDN box on the market," said Peter Howarth, describing his company's latest entry.

The TLE-02D has everything but headsets in a single box. Two mic inputs and a third mic/line switchable allow for pre-game interviews and highlight playback.

AETA Audio showed the newly improved Scoop Reporter II portable codec.

There is a separate output for recording or feeding a PA system. And, if ISDN is unavailable at the remote site, just find a dial tone. The unit has a frequency extender and echo cancellation, and can operate on AA batteries.

Sometimes you don't know where you're going to be sent. If that's the case, a POTS codec may be the answer.

At the show, various program sources were available to dial up and audition. Knowing the limitations of the typical POTS circuit, it's hard not to be amazed at the Vector's transmission quality.

According to Kris Bobo of **Comrex**, the Vector algorithm delivers 15 kHz with a 24 kbps connection, falling back to 12 kHz at 21.6 kbps.

As with all systems that aggressively compress, there is significant coding delay.

Compared to the very popular HotLine, the Comrex Vector reduces coding delay to about 100 milliseconds. That still means two-tenths of a second full travel time, so any live operation should provide for a mix-minus.

Comrex also promoted the HotLine, with 3,000 now in use around the world, and Nexus ISDN codec.

Telos Systems, maker of the popular Zephyr line of codecs, rolled out several new ISDN products, which are better described as studio phone systems.

Global use

Unlike POTS, ISDN is not the same everywhere in the world. That can come as an ugly surprise when you plug in halfway around the world.

"You're never quite sure until you get there what variant of ISDN you'll find," said Shima Varsani of **Systembase**.

The Systembase C400xr supports no fewer than 11 flavors of ISDN, and provides 15.6 kHz mono audio over a single B channel through AES3 inputs and outputs.

Musicam USA takes the software approach. It showed SendIt 3.1, "the world's first and only hardware independent, all-software codec." The product is made by **Mayah Communications** of Germany, and distributed in North America by Musicam USA.

SendIt runs on Windows 95/98 or NT Pentium II PCs. Using a standard audio card and connected to an ISDN line, SendIt can send and receive 20 kHz stereo audio from most hardware codecs or a similarly equipped PC. A companion editing program, EditPro, earned a **Radio World** Cool Stuff award this year.

The RoadRunner, also from Musicam USA, is a slick, compact one-box solution with a mixer, codec and ISDN terminal adapter that runs universally available G.722 as well as ISO/MPEG Layer I and Layer II. Once again, you need bring nothing else except headsets.

MediaTouch offers the Card Independence software codec, allowing radio stations to play CD-quality MPEG II audio on any Windows-compatible soundcard.

Moseley Associates promoted its established DSP-6000 digital audio codec.

See CODECS, page 56 ▶

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The technology is so reliable you can set your clock by the Harris DX transmitter line with power ranges from 10kW to 2MW that have 110% sine wave modulation, hour after hour.

DX has the highest reliability record in the world with high power units reaching an MTBF of greater than 100,000 hours. Its patented Digital Amplitude Modulation practically eliminates unscheduled off-air time.

Harris DX transmitters tick so solidly that they virtually pay for themselves with efficiencies gained of up to 86%.

With specifications like this, it's hard to believe one would ever go down, but statistics show that a Harris DX transmitter might go off the air once every millenium or so. But, we doubt it.

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World Radio History

DAB, at Home and Abroad

As DAB Products Proliferate Overseas, IBOC Alliances Grow in the United States

Marguerite Clark

Digital audio broadcasting is still on the conceptual level in the United States, but it is a reality abroad.

To welcome the digital era, a number of companies were on hand at NAB99 showing advances in their digital transmission gear.

Among them was Austrian firm **Richard Hirschmann** with its DAB 660 transmitter. The compact DAB 660, introduced in the summer of 1998, can be configured for Eureka-147 DAB broadcasting in both VHF band III and L band.

Eddystone Radio of England highlighted the 735-0027/01 DAB COFDM generator, which is compliant with ETS 300 401 and features DSP technology.

U.S. transmitter manufacturers now are taking a more visible role in working with IBOC developers.

Output power

Italian company **Nuova Elit** showcased its Eureka-147 DAB systems for VHF band III and L band with an output power from 5 W to 1 kW and COFDM modulation. **CTE**, also from Italy, highlighted its DAB transmitters.

Rohde & Schwarz of Germany showed its DAB Transmitter Series 6000, which features a modular design, an integrated COFDM modulator and GPS receiver.

Italian manufacturer **Itelco** displayed the DAB 800 W L-band Eureka-147 DAB transmitter with LDMOS technology. Itelco pointed out that 14 transmitters of this type have been placed in Canada. The company also showed the DAB VHF band III transmitter, which features air cooling amplifiers.

In the **Continental Electronics** booth was German company Telefunken Sendertechnik, displaying its line of solid-state L band and Band III DAB transmitters.

Larcan TTC, which is based in Canada, displayed its Eureka-147 DAB transmitters for VHF band III.

French company **Itis**, part of the **Harris Corp.** Broadcast Systems division, highlighted its DAB product range, which includes the D-ACE and DACE-MNGR DAB audio encoder; the D-SMUX and SMUX-MNGR DAB service multiplexer; and the D-EMUX and EMUX-MNGR DAB ensemble multiplexer.

The French firm said the second generation of its DAB products feature modular construction and incremental capabilities.

Not just transmitters

Among other exhibitors with digital transmission equipment were Swedish company **Factum Electronics** with the MAP110D MPEG/DAB audio decoder, MAP100E MPEG/DAB audio encoder, DRC100 dynamic range controller and DBS100 DAB broadcast server; **Teracom Components** with its DAB filters; and **Delta Meccanica** of Italy, present at NAB for the first time, with its family of DAB filters.

DAB support products are also proliferating. Processing supplier **Cutting Edge Technologies** highlighted the Omnia.dab audio processor. **Orban** showed its Optimod-DAB 6200 processor.

Digital Radio Mondiale, a consortium developed to create a global standard for digital radio service for short-, medium- and long-wave, exhibited for the first time at NAB.

During the show DRM announced that French company **Thomcast** and **Deutsche Telekom**, previously competing system proponents, would now combine approaches so as to reach a DRM standard.

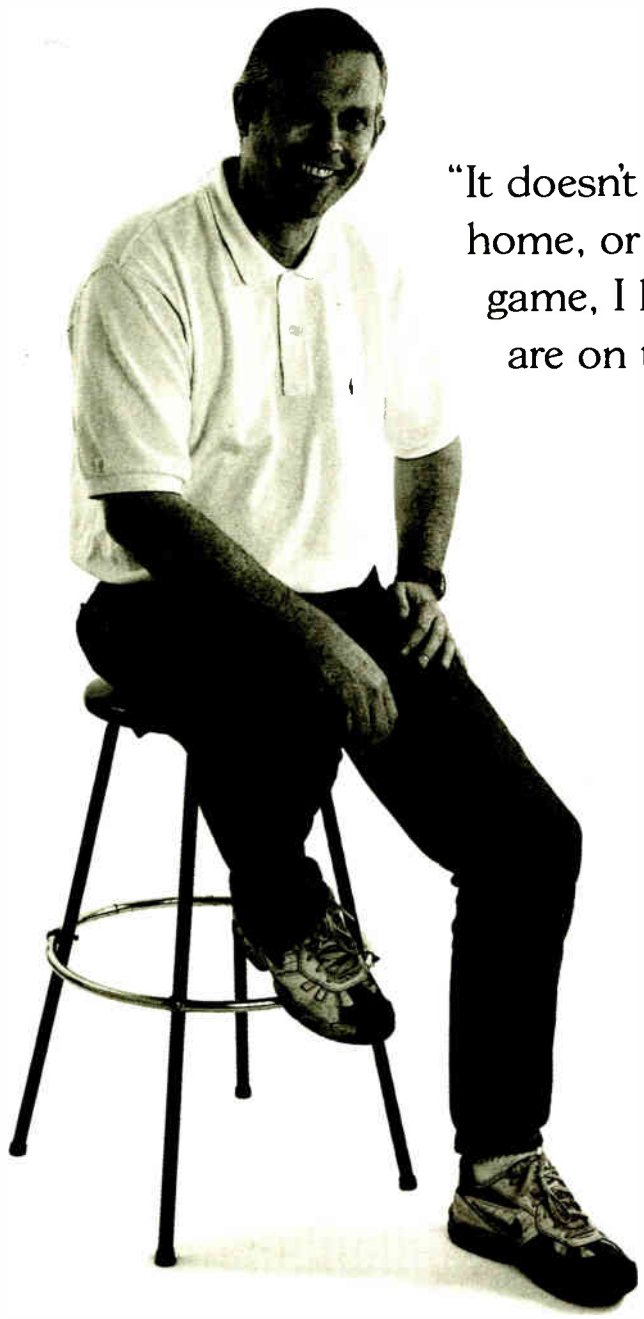
WorldSpace exhibited the receivers designed for use with the WorldSpace satellite-based system.

In-band, on track

IBOC DAB was an important theme at NAB99 (**RW**, May 12).

Lucent Digital Radio showed a simulation demonstrating FM audio quality at the edge of a coverage area. Visitors could compare analog FM, a single-stream IBOC FM system and Lucent's FM multistreaming approach. LDR also announced new audio coders, based on its patented PAC system.

See DAB, page 50 ▶



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World Radio History

"The situation here is not what it seems."

Qui-Gon Jinn, Jedi Master

I was recently told by the president of another digital automation company, *"Ron, you're leaving money on the table. You could charge twice as much and they'd pay."* I said, *"Mr. XXXXX, that's not the point. We charge a fair price and that generates a lot of referral business. That's worked great for us; our users are our best salesmen."*

From LPI to NetRadio Networks, thousands of satisfied WaveStation users worldwide have decided they don't need to pay outrageous prices for powerful, reliable non-proprietary digital studios.

Our $999 WaveStation 3.0 automation software has all of the features of the more expensive systems, and some they don't, such as control & query of your automation system via regular email, Microsoft standard digital labeling and even built-in support for their proprietary audio formats. Plus... it's non-proprietary, just add a PC and sound card an you're on the air.

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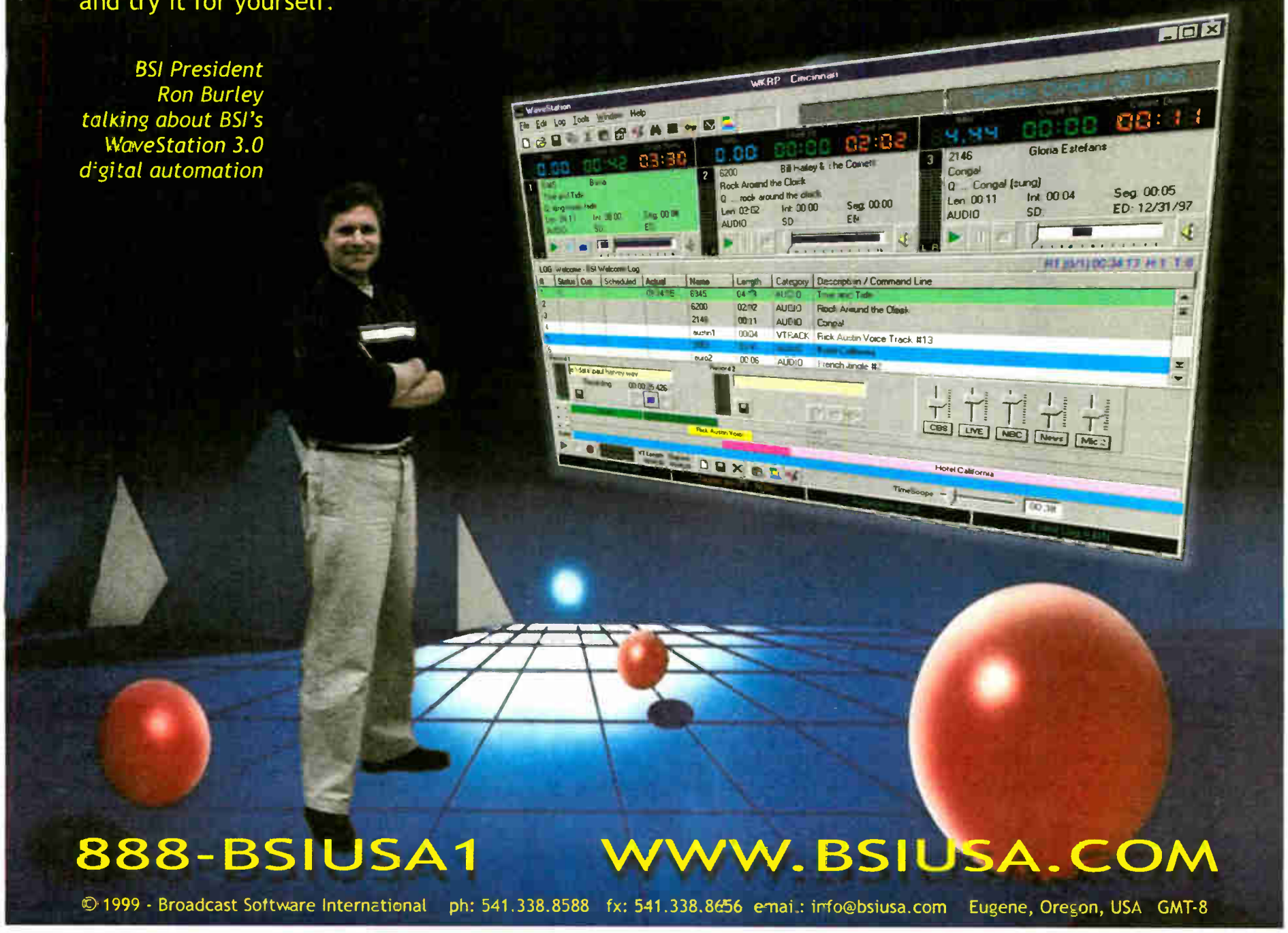
BSI President Ron Burley talking about BSI's WaveStation 3.0 digital automation



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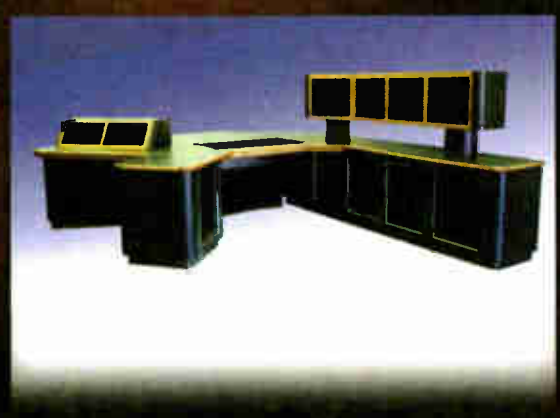

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World Radio History

AM Transmitters Anticipate In-Band On-Channel

W.C. Alexander

It seemed that AM transmitters and transmitting equipment were everywhere you looked on the exhibit floor at NAB99.

The term "IBOC" was overheard in conversations throughout the exhibit area, and the transition to some form of digital broadcasting was certainly a hot topic at the convention.

Some transmitter manufacturers had anticipated this and had answers ready for prospective buyers' questions about IBOC compatibility.

The international consortium **Digital Radio Mondiale** and in-band, on-channel (IBOC) DAB proponent **USA Digital Radio** were both on hand, demonstrating their plans for digital broadcasting in the amplitude modulation wavebands.

Harris had its Gates One 1 kW transmitter operating with a USADR IBOC exciter as a demo. Don Sprago explained the vector signal analysis of the transmitted signal to attendees. Harris also had its all-digital DX-10 on display.

LPB is a recognized name in broadcast equipment, and the company was showing its low-power Part 15 and Part 73 AM transmitters and accessories.

The AM-60P is a 60 W low-power Part 73 AM transmitter suitable for low-power nighttime, PSA, PSSA and emergency use.

Omnitronix had its Omni 5000 and Omni 1000 5 kW and 1 kW transmitters on display. The company also showed its line of shortwave transmitters, with power of 500 W to 10 kW.

Established line

Armstrong Transmitter Corp. showed its established line of AM transmitters, as did British company **GEC Marconi**, well known for the Eddystone line of transmitters.

Altronic Research brought a 150 kW air-cooled dummy load to the show, along with a 25 kW air load equipped with a calorimeter and PC interface for making accurate power measurements.

On display

Also on display was a 35 kW water-cooled load with calorimeter. Altronic's Doug Starkey said the company has just acquired a line of coaxial lightning arrestors. Both series and shunt models for 1-5/8-inch line were on display.

Broadcast Electronics had on display its rack-mountable 1 kW AM-1A (the user supplies the rack). BE claims that this versatile unit is the most popular 1 kW AM in the world.

Tim Bealor, manager of RF Products at BE, said, "The demand has become so great that we have to keep some of the transmitters built and tested so that they can be put on frequency and shipped in a very short time."

The AM-10A 10 kW unit was also on display. The company says this is the only solid-state 10 kW transmitter in a single rack.

Continental Electronics is another familiar name in AM transmitter circles. The company debuted its new Power Star A50 50 kW solid-state transmitter. This unit features DSP modulation synthesis.

Modulation scheme

Continental's Dave Hultsman said unit can synthesize C-Quam or virtually any modulation scheme with proper programming, including regular AM. Continental offers a full line of AM transmitters from 1 kW to 1 MW.

Nautel, a pioneer in solid-state AM transmitters, had an IBOC demo setup of its XL-12 12 kW solid-state AM transmitter.

Using a USADR-supplied exciter, Nautel engineer Wendell Lonegran showed vector signal analysis of the output waveform.

Gary Manteuffel, manager of broadcast sales for Nautel, said, "The XL-series of broadcast transmitters' compatibility with IBOC DAB performance criteria gives broadcasters high performance now and a secure investment for future digital AM broadcasting."

Nautel also had the solid-state 60 kW XL-60 and 5 kW ND-5 on display.

Energy-Onix brought its new Pulsar series of solid-state AM transmitters. Models at 1 kW and 2.5 kW models were shown, but this transmitter is available in power levels from 250 W to 10 kW.

Sender, a transmitter manufacturer from Chile, showed a 1.5 kW solid-state AM transmitter. The company also offers 7.5 and 15 kW versions.

Tubes

Econco was on hand with samples of its rebuilt transmitting tubes. The company is manufacturing the 3CX3000A7, for which duds have become scarce.

Econco's Bill Barkley said dies are currently being made for the 4CX3500, so users can look for new tubes in that series soon.

Also supplying tubes were **D&C Electronics**, **RF Parts Company**, **Svetlana** and **ARS Electronics**.

Manufacturers were on hand with answers regarding IBOC compatibility.

The transition to some form of digital broadcasting was certainly a hot topic of conversation.

In-Band On-Channel DAB Alliances Bloom

▶ DAB, continued from page 46

USA Digital Radio announced an alliance with **Nautel**, which will allow the two companies to work together to "develop, test and promote" IBOC/DAB transmission gear. Shortly after the show, USADR announced a similar agreement with **QEI Corp.**

Nautel highlighted its XL12 AM transmitter, a 12 kW transmitter shown passing the USADR AM waveform. The XL12 is equipped with plug-in modules and a standby exciter section with automatic changeover for uninterrupted servicing. In addition, the firm showcased the XL60 IBOC-ready transmitter.

Move toward IBOC

USADR also announced a program called "Early Adopter Station Enhancement," which it said will make it easier for U.S. broadcasters to start implementing and participating in the move toward IBOC.

Harris Corp. made headlines when it called for the United States to adopt a single consensus standard for in-band, on-channel digital radio.

The company has been conducting factory testing to verify that its AM and FM transmitters are compatible with IBOC, and said two of its transmitter lines can do so now. The company demonstrated its Gates 1 AM transmitter passing the USADR waveform.

Three other FM high-power amplifiers were tested by USADR. Models from **Broadcast Electronics**, QEI and **Energy-Onix** were tested successfully.

Various transmitter manufacturers are talking to one or more of the three announced IBOC proponents.

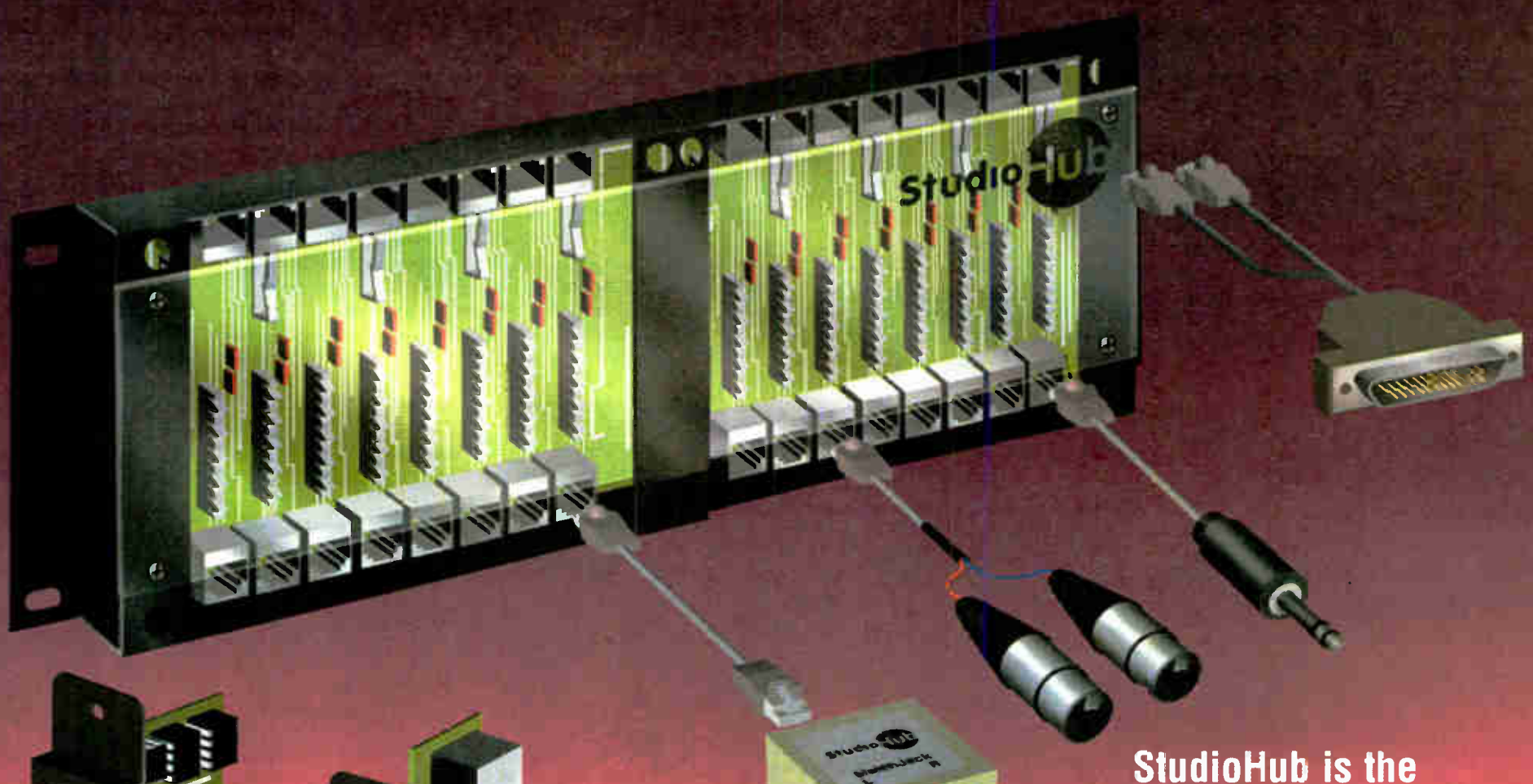
■■■

Leslie Stimson contributed to this story.

Circle (30) On Reader Service Card

The StudioHub Wiring Solution

Winner of both the prestigious BE Radio "Pick Hit" and Radio World "Cool Stuff" new product awards at this year's NAB convention.



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BE Radio

Radio World
Cool Stuff Award
NAB99

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World Radio History

New Designs at Top of the Tower

W. C. Alexander

NAB99 produced a bumper crop of innovations from antenna manufacturers and support industries. Many of the new ideas offered solutions to the tower space crunch that stations are facing as they try to make room for DTV antennas.

Exhibitors also introduced products that will offer better bandwidth and yield less multipath, both of which will be factors in the IBOC equation.

Dielectric Communications brought a new topmount FM antenna designed to be located on the top of a tower structure rather than on the side.

Plethora of antennas

Also on display were Dielectric's standard sidemount M- and C-series FM antennas, DCPC panel antennas, combiners and filters, and the DCRM broadband sidemount antenna, which will accommodate up to five stations with a 10 MHz bandwidth.

Sally Rich, Dielectric marketing manager, said, "We have products available to allow the use of common antennas by many stations."

Antenna Concepts showed its Super Tracker antenna, a new product with improved gain characteristics and sidelobe suppression.

It also introduced the Ultra Tracker II FM antennas. A CP omnidirectional antenna with virtually no downward radiation, it puts 99 percent of power in the main lobe.

"FM broadcasters all over the country have found that the Ultra Tracker single-lobe antenna can dramatically reduce the effects of multipath," said Jeryl Schooler, COO of Antenna Concepts.

Electronic Research (ERI) has long been a popular supplier of FM antennas and supporting structures. The firm featured a new comprehensive structural analysis, reinforcing design, fabrication and installation service for existing structures.

ERI President Tom Silliman said, "We are expanding our focus to include structural analysis and reinforcement. We have added two structural and two electrical PEs to our staff. We are also working on several new products to be unveiled soon. The Lambda designs have been very successful for us. We are now offering a package design approach — tower, antenna and site."

Sidemount solution

Jampro Antennas showed a new line of FM broadband antennas, made up of the JSWB super-wideband FM sidemount antenna, the JBVP broadband vertical dipole FM antenna, and the JSWB broadband circularly polarized FM antenna.

The JSWB is ideal for multiuser applications requiring excellent bandwidth for combining two or more FM frequencies on a common antenna.

The company also showed its JAHD "Arrowhead" dipole along with an array of combiners, filters, rigid transmission line and other components.

Propagation Systems Inc. showed its new FHR and FMR broadcast antennas. The PSI-FMR antenna is an omnidirectional, circularly polarized antenna with a series-fed element, for input power up to 12 kW.

RFS Broadcast introduced a line of new sidemount FM antennas designed to relieve the FM vertical real estate squeeze.

Star of the show

The star of its show was the new circularly polarized 828-series stainless-steel sidemount antenna, which covers the FM band with power capability from 1 kW to 8 kW per input.

The company also showed the advanced 904 Series of broadband, high-power FM panel arrays and a selection of branched and balanced FM combiners.

Shively Labs displayed its family of FM sidemount antennas and combining systems. The company offers sidemount and panel antennas, multistation systems, directional antennas, antennas with special spacing and using special elevation techniques as well as translator and booster antennas, combiners and filters.

Propagation Systems Inc. showed its new FHR and FMR broadcast antennas.

Armstrong showed its line of circularly polarized FM antennas, filters, combiners and isocouplers. The company also manufactures directional antennas for FM.

Nicom LLC brought its line of FM antennas, including the BKG1/P portable broadband FM dipole. The company offers FM antennas from portable yagis to circularly polarized antennas and panels.

Spanish company **RYMSA** exhibited antennas, combiners and switchers for radio and TV broadcasting. **The David Group** displayed a line of circularly and vertically polarized FM transmitting antennas, feeder cables, connectors and multiplexers.

Kathrein-Werke KG of Germany showed FM and DAB broadcast antennas and combiners. **SWR – Systems With Reliability** had its line of FM antenna products on display. **DB Elettronica** was here.

Technology for Communication International (TCI) featured the Model 657 OmniGain wideband FM broadcast antenna.

OMB America had several of its established antennas at NAB99. The company makes FM transmitters, antennas, microwave links and translators. **Co.El. Complementi Elettronici** was on hand with its line of RF products.

Italian manufacturer **Sira Sistemi Radio** introduced a new FM directional combiner that provides high selectivity in a compact package. Macedonian antenna systems manufacturer **Dasto** made its first appearance at NAB99.

Cables and switches

In addition to antenna manufacturers, several manufacturers were displaying antenna accessories and transmission lines, too.

Andrew Corp. introduced the XT4500 Dryline automatic dehydrator for pressurizing broadcast transmission line. Designed for large-volume sites, it provides sufficient dry air for pressurizing up to 2,500 feet.

Andrew also featured samples of its HRLine rigid coaxial cable, Heliax air-dielectric cables, and Inners Only inner conductors.

Micro Communications Inc. displayed its established line of coaxial transfer switches.

"We offer (these switches) in a variety of configurations, three- or four-port, suitable from AM to UHF," said Sam Matthews, president of Micro Communications.

On the AM side, **Phasetek** showed AM antenna phasing systems, antenna tuning units, diplexers and RF components.

Established products

Kintronic Laboratories, a widely-recognized name in AM phasing, coupling and diplexing systems, showed many of its established products.

Among those on display were an AM directional antenna phasing system cabinet, an AM antenna tuning unit suitable for IBOC DAB, an AM dummy load, an AM folded monopole kit and a variety of RF components. Also shown was Kintronics Optilink fiber-optic PCL controller.

There was no shortage of tower manufacturers on hand, offering towers of every configuration and height. Among them was **Allied Tower Co.**, which builds towers up to 2,000 feet, welded guyed towers, knock-down guyed towers and self-supporting towers.

International Towers Inc. (ITI) had a display featuring trimount guyed towers which it builds to 2,000 feet and self-supporting towers to 1,000 feet. **Magnum Towers Inc.** was on hand offering guyed and self-supporting towers as well as installation and maintenance.

Utility Tower, in its 50th year, offered custom towers to 1,500 feet. Utility offers custom-engineered designs to fit any need. **World Tower** offers towers featuring solid-rod construction. The company uses only in-house crews to build its towers.

The Will-Burt Co., known for its telescoping RPU and ENG masts, introduced an 8.5-foot nested telescoping mast that extends to 48 feet and that can support a 200-pound payload.

The company also debuted a 9.5-foot nested mast that telescopes to 56 feet. Will-Burt also showed its D-Tec safety system for telescoping masts, which earned a Cool Stuff Award at NAB98.

Other companies on hand included **Stainless Inc.**, **Rohn Industries**, **Central Tower**, and **Kline Towers**, which featuring guyed and self-supporting towers.

Lights, shelters, strobes

No tower is complete without lights, guy wires and an equipment shelter.

Lightning Control Systems Inc. displayed its range of systems for diffusing the damage that lightning can do. **Flash Technology Corp.** showed its tower lighting products, including both medium- and high-intensity lights and monitoring systems and tower light monitoring service for broadcasters and telecommunications companies.

TWR Lighting Inc. was also at the show with its line of red, white and dual lighting systems along with solid-state and motorized controls.

Red light

Unimar Inc. showed its red lighting systems and custom controls. The company has a strobe system in development. Unimar also distributes SSAC and Crouse-Hinds products.

Huey & Phillips had on display its red, white and dual lighting systems along with controllers. The company also offers tower light monitoring service.

The name **Phillystran** is synonymous with non-conductive Kevlar fiber replacements for steel guy cables. Phillystran HPTG-1 high-performance tower guy sections were on display. The company manufactures non-metallic tower guy cable assemblies from 0.44 to 2.40 inches in diameter.

GFRC Shelters was on hand at NAB99 with its new line of portable concrete transmission equipment shelters. These shelters feature steel-reinforced walls, concrete roofs and integral HVAC systems. They are available in any size up to 1,000 square feet.

Finally, several tower service suppliers offered a range of tower-related services.

Among them was **Crown Castle International** with a comprehensive tower management package, offering a complete solution for radio as well as analog and digital television.

DTA Carlson, a consulting company, offered architectural, engineering, construction and systems integration services.

Another consultant company, **Tower Engineering Consultants Inc.**, specializes in tower evaluation, inspection and analysis.

World Radio History

Airwave™ Digital. Three program busses. Two mix-minuses. One remarkable board.

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Circle (52) On Reader Service Card

World Radio History

STLs Turn Toward Bigger 'Pipes'

Michael LeClair

There were many new equipment offerings at NAB99 designed for use as studio to transmitter links.

An almost overwhelming variety of technologies now exist to build an STL, including RF solutions from 300 MHz to 2.4 GHz and just about any type of synchronous data connection imaginable.

Choices

A similar choice of data compression options allows users to configure an STL with the exact quality desired, depending upon application and budget.

In particular, several new products using T1 circuits were introduced. As the basic building block of telephone company data infrastructure, the T1 has become the fundamental unit of data transfer for audio links.

Manufacturers are developing equipment designed to utilize commercial data circuits of all kinds, exploiting the wide availability and improving reliability of public telecommunications companies.

As this data market has developed, additional products that use the T1 frame structure are being developed to create specific broadcast solutions, such as the need for hot standby links and EAS insertion.

Emerging interest in spread-spectrum technology has resulted in new RF options for STL users in markets where no channels remain available in the traditional 950 MHz band.

In particular, several new products using T1 circuits were introduced.

These spread-spectrum systems, operating at 2.4 GHz, do not require a license to operate. While convenient, this is also potentially troubling; however, proponents of spread-spectrum technology estimate that as many as 100 users may be able to operate without interference in a given area.

Still popular were products using traditional composite transmission and RF amplifiers available on all frequencies.

At the **Harris Intraplex** booth, a new series of T1 equipment was on display for STL use. The DCS-9560 T1 router is designed to route up to six channels of data between studio and transmitter site.

A range of interface cards is available for purposes such as ISDN, voice or program audio.

ISDN interface

The ISDN interface can be configured to automatically connect program audio via a secondary circuit upon detecting a failure of the main T1 data interconnection.

Or, multiple T1 links can be accommodated with automatic switching between them upon failure detection using the Intraplex DCS-9500.

The DCS-9560 was being shown using the Harris Aurora spread-spectrum radios as an option to the conventional land line T1 circuit.

According to Dan Rau of Harris Intraplex, "Consolidation is creating some STL environments where the 950 MHz band is overloaded basically by one group. You have common studio sites with six or more studios all shooting to the same transmitter tower," he said.

"Spread spectrum can accommodate those situations with up to eight discrete T1 data streams on a pair of transceivers."

Also at Harris, the CD Link digital STL was on display, designed to convey uncompressed stereo audio via the traditional 950 MHz band channels.

Moseley Corp. showed a range of STL solutions, in its Starlink 9003 series. The SL9003Q employs a user variable QAM modulation scheme at 950 MHz to pass up to four channels of uncompressed linear audio, sampled at up to 48 kHz.

Interfaces are available for AES3 or analog audio, and data can be multiplexed with the audio stream. In the SL9003 series are T1 and spread-spectrum options as well.

Moseley also introduced the TPT64, a switcher that can select a standby T1 circuit in the event of a failure of the main data circuit.

Other new STL units

A pair of new digital audio codecs was introduced by **Audio Processing Technology**. The BCF256 and NXL384 include an integrated ISDN terminal adapter that can automatically dial up a backup connection should the main data circuit fail.

These codecs are designed to operate

See STL, page 55 ▶

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World Radio History

▶ STL, continued from page 54

on fixed digital links such as the X.21 standard or on fractional T1. They use the proprietary apt-X algorithm that is designed for multiple coding generations and minimum coding delay. The NXL384 operates at data rates of up to 384 kbps.

Such solutions are becoming increasingly popular in the United Kingdom, where traditional STL frequencies are unavailable and leased landlines are sometimes prohibitively expensive.

Quality requirements

Musicam USA promoted the TEAM, or T1/E1 Audio Multiplexing system. TEAM is a modular frame system that allows the user to configure multiple program lines according to the quality requirements of the STL.

Up to 12 mono program lines are possible on a T1 circuit, using data compression, or the system can be configured to provide uncompressed stereo audio.

Modules are available for many different types of coding algorithms, such as ISO/MPEG Layer II and Layer III, J.41 (384 kbps), or G.722.

Armstrong Transmitter Corp. was on had with its established STL line, the FML-10 series. This line is available with digital coders for a data compressed digital STL.

Bext exhibited its family of composite and compressed digital STL products.

From **Marti Electronics** was the STL-MAX, a new export STL with 30 W of continuous-duty power.

When combined with the R-10 receiver, the system meets worldwide needs for high transmission distances and is available in frequency bands from 140 to 500 MHz.

Composite type

DB Elettronica showed STLs, including a conventional composite type and digital coder, both designed for RF links.

DB Elettronica specializes in building systems on almost any frequency band for the global broadcast market and can provide systems on frequencies ranging from 150 MHz to 2 GHz.

TFT Corp. introduced the Digital Insertion Unit for use with AES digital audio paths. This unit maintains synchronization between two AES data streams to allow seamless switching with no unnecessary pops and clicks. The product won a Cool Stuff Award from **Radio World**.

Among the applications are insertion of EAS test generation in radio stations with an all-digital program path or use as an auxiliary switch to a back up AES audio path in case of failure.

Radio World Cool Stuff Award NAB

Orban 'Cart Chunk' Initiative

A big frustration among equipment users is that products aren't designed to "talk" to each other. Proprietary systems are developed, and users are left to work out the interface, create "sneaker nets" or lobby their suppliers for custom interfaces for their specific need.

Orban makes digital audio workstations, and its files are used in a variety of digital delivery systems. The company is pushing the so-called "cart chunk" extension to the BWF, or B-WAVE, standard.

The extension, described in the May 12 RW, allows finished audio productions to go directly from an Audicy workstation to on-air delivery systems, with traffic and continuity information embedded directly in the sound files. That includes outcues, titles, artist names, start and stop dates, time markers and other labels common to various delivery systems.

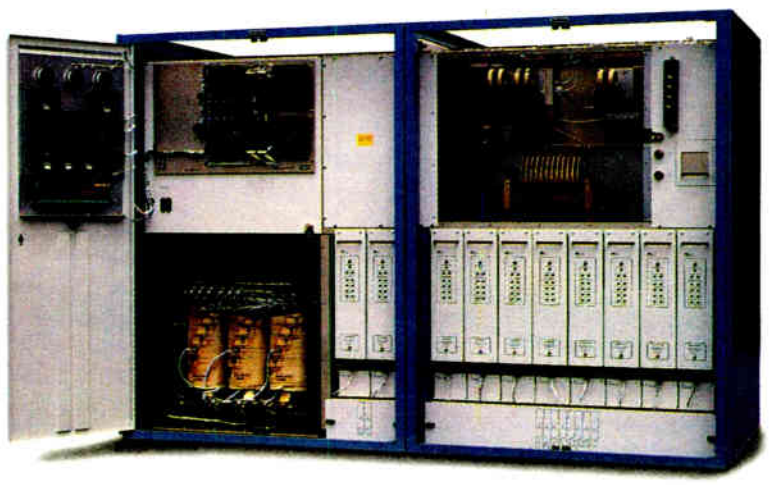
The cart extension has been proposed as an optional extension to BWF and is under review by the EBU. The Cool Stuff judges felt that Orban deserved the award for contributing to the improvement of cross-platform communication.

For information, contact Orban in California at (510) 351-3500, send e-mail to custserv@orban.com *or circle* ***Reader Service 115.***

Dean Tiernan and Dick Pierce of Orban

An almost overwhelming variety of technologies exist to build an STL.

Knowledge



is power.

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The Nautel XL series of AM transmitters are built to provide the reliability you've always wanted, and the capabilities you'll need in years to come. Every XL model is 20% more powerful than competing transmitters. That's enough reserve power to accommodate simultaneous IBOC digital transmission while maintaining full AM performance.

With this reserve power, an XL transmitter virtually has a spare module built in. They're hot-pluggable, which means you benefit from unsurpassed system reliability and can maintain full operation even in the unlikely event that a power module requires service. Full duplication of critical low-level circuits further contributes to system reliability.

The XL series is available in power outputs from 12-60 kW. If you're considering a new transmitter, take a close look at Nautel. You'll find elegant design, rugged engineering, digital capability and, literally, power to spare.

For more information about our full line of AM and FM transmitters, visit us on the Web at www.nautel.com.

nautel

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World Radio History

Codecs at the NAB99 Show

▶ CODECS, continued from page 45

Meanwhile, at the studio, **Harris Intraplex** has undertaken to bring some order to the rack of assorted codecs and terminal adapters that most stations maintain.

The IntraLink is touted as the first codec multiplexing system that allows broadcasters to manage multiple ISDN connections and multi-brand remote codecs from a single Windows-based user interface.

Mismatches

"We looked at a lot of stations and saw racks of mismatched codecs," said Bill Gould, product manager for the Harris Intraplex IntraLink.

IntraLink supports up to six B-channels with an integrated open-architecture design that allows for users to choose from any of the commonly used coding algorithms. The IntraLink also allows the user to build a table of "valid call locations" that, in essence, permits call screening.

Calls from unfamiliar locations can be rejected without answering. A module even supports pure data, allowing this product to provide server-to-server connectivity as well.

On a broader development note, **Lucent Digital Radio** announced new audio coders, based on the Lucent Perceptual Audio Coder, or PAC. The new coders deliver "transparent" CD quality at 128 kbps and "CD-like" at 96 kbps.

Unimpaired channels

One version is intended for digital audio transport on unimpaired channels; another, which incorporates Lucent multistreaming technology, is for broadcast applications over impaired channels.

One use for these coders is in-band, on-channel digital radio, such as that being developed by Lucent. Another application is in remote codecs. One product that uses PAC now is available from **Audio Video Communications**, which has a bi-directional audio codec called the AVC TieLine for use with analog phone lines.

AETA Audio rolled out its new Scoop Reporter II portable audio codec for field reporting, and showed it in several dealer booths.

The product is compatible with POTS and ISDN lines. It is a substantial upgrade to previous models, with internal "D" cell battery backup, multiple AC voltages for worldwide use and a three-channel mixer. The company is showing the product in the booths of dealers.

Marti Electronics was here with its lineup of products including the Smarti POTS codec.

The right mode

AEV debuted a six B-channel system that solves another nagging problem.

When the studio end unit is unattended, how can we be assured that the correct mode (mono, dual mono, stereo, joint stereo) will be set?

The ITU has established a standard for auto-negotiation and auto-recognition independent of the compression algorithm in use. Look for this standard, ITU T-J.52, to appear on everyone's stereo codecs in the not-too-distant future.

Meanwhile, the AEV Millennium supports bonding of B channels and virtually every implementation of ISDN found worldwide.

The BCF256 from **Audio Processing Technology** represents yet another category. As a full-time or standby program delivery device it, it bonds up to four B channels. It would make a terrific alternate STL, providing automatic fail-over, at a reasonable cost.

The BCF256 features an integrated terminal adapter, auxiliary data, back-up circuitry and both digital and analog ins and outs.

Life is better for the engineer doing remotes these days. No more suitcases full of boxes and cables to interconnect them.

I, for one, won't miss any of that. Instead we have a wide choice of compact, rugged devices with enhanced functionality.

Now I can pack a change of clothes on these trips.

■■■

Frank McCoy is vice president of engineering for GulfStar, the flagship regional operating company for Capstar.

Now everything fits in a carry-on, and you can leave the bag of patch cables behind.

Things you can say about our old fashioned meters

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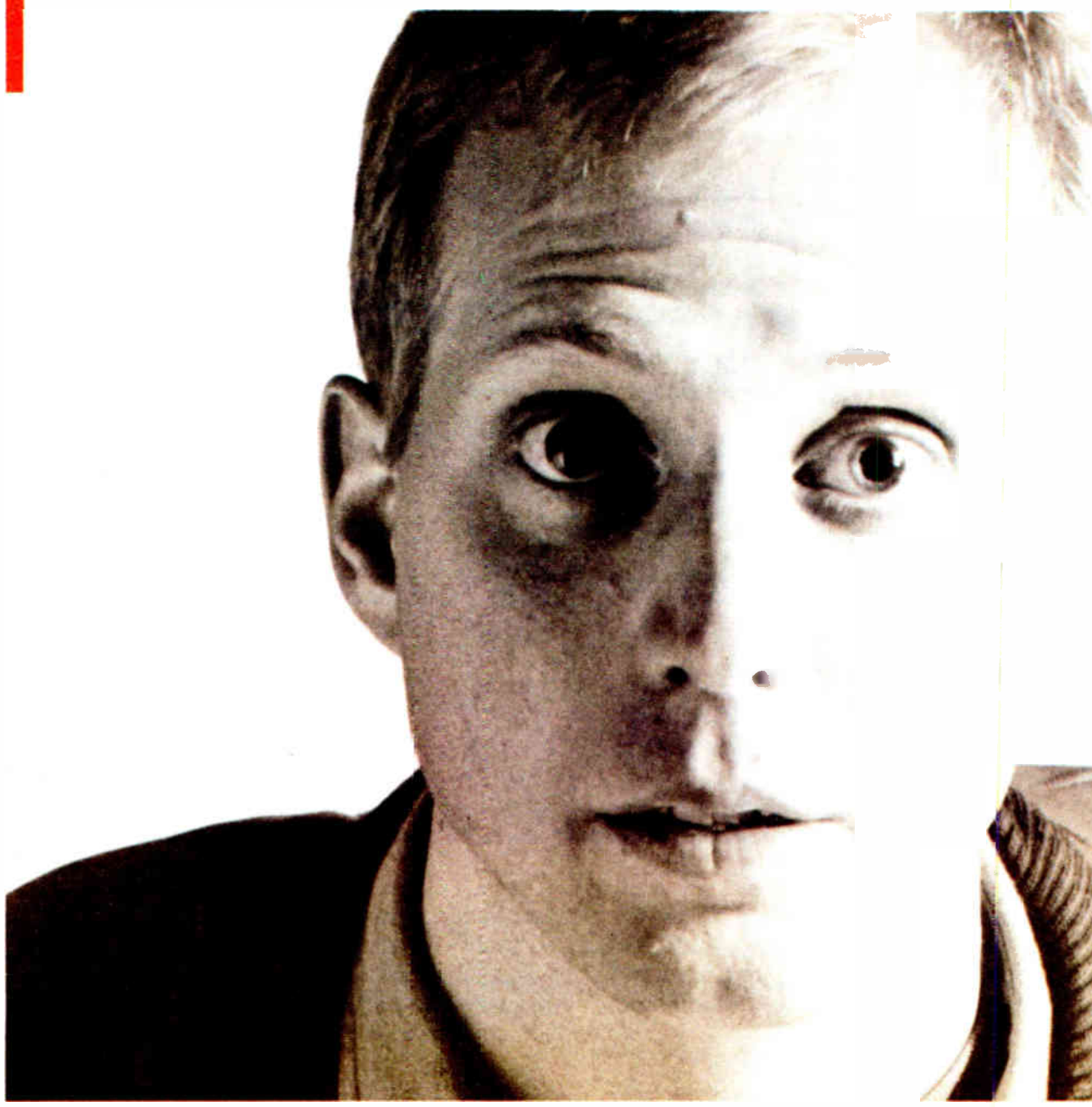
World Radio History

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



Intraplex STL PLUS

Wondering how to handle growth? More groups have placed their trust in Intraplex than any other digital transmission solution.

The Intraplex STL PLUS T1 multiplexer transmits program audio for STLs, TSLs and intercity links, data for remote control, automation, and LANs and voice for off-premise extensions and intercom. Consolidate program audio, data and phones over one high quality digital line, with STL and TSL at any distance over any terrain. Even better, you'll be ready to handle the next station. And the next.

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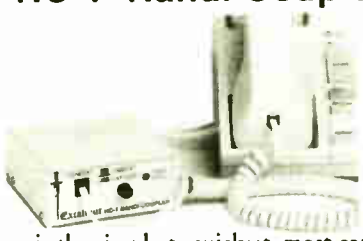

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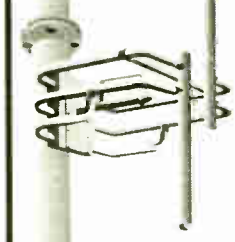

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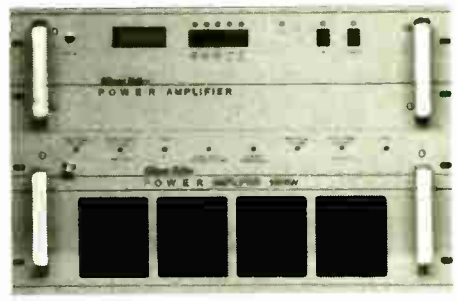

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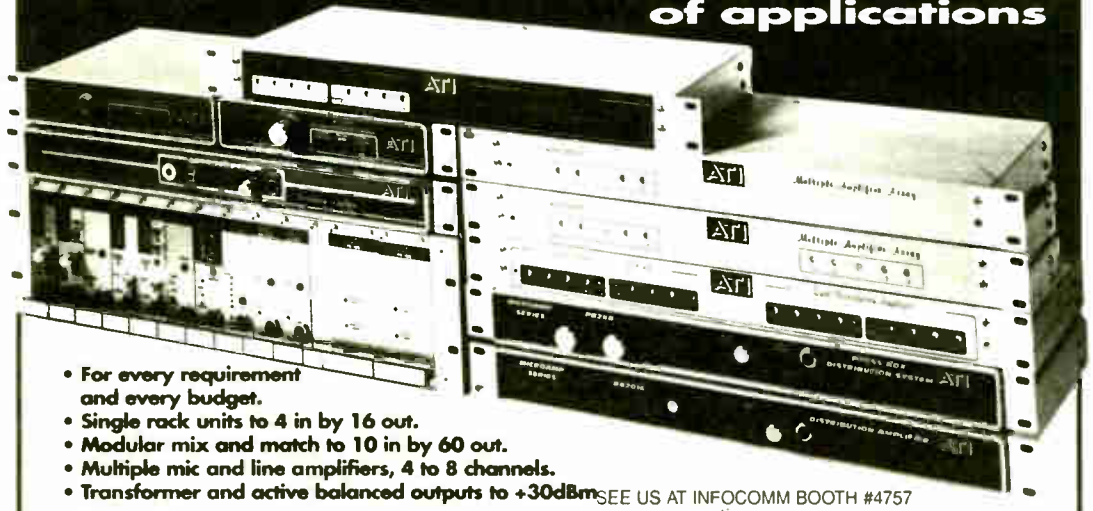

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World Radio History

Satellite Firms Look Past Y2K Issues

Paul Kaminski

Most of the satellite offerings at NAB99 featured television uplinking and downlinking services. But visitors interested in radio program delivery and equipment could find many suppliers to help.

PanAmSat's Tuesday morning breakfast briefing was tailored toward the video market, but audio people had interest because, later this year, a replacement for Galaxy IV will be launched, and the Galaxy VI satellite will go into backup status. PanAmSat also spent part of its briefing outlining their strategies for dealing with theY2K problem.

Globecast, too, used NAB99 to promote its video offerings. The company continues its full-service uplinking on Satcom C-5 with, as Globecast's CK Bower said, "over 6,000 radio stations with receivers."

GE Americom, the owners of Satcom C5, where many networks and program distributors have their signals, discussed plans for the eventual replacement of the workhorse radio bird, scheduled for 2001.

One of the more interesting satellite providers was **Merlin Communications**, which not only offers worldwide satellite audio distribution, but shortwave distribution as well. The British company is a spin-off of the BBC World Service, and controls the shortwave transmitter network for that service. Program providers can reach an international audience on satellite, and audiences in developing countries on shortwave.

National Public Radio, the first network to distribute its programs via satellite 20 years ago, showed products and services available from its Satellite Services division. It offers uplinking capability and can recommend and supply the receiving equipment. According to their latest system map, more than 3,000 radio stations can receive program via their satellite.

NSN Network Services specifies and can provide receivers, dishes and low noise block downconverters (LNBs) for signals on C and Ku bands. It also can arrange for the uplinking of the signal to those ground stations.

NSN was described by General Manager Greg Thomas as a "full turnkey system integrator."

With the addition of **Boeing Aerospace**, an attendee could literally design a satellite distribution system from launch pad, to orbit to earth station.

The satellite technology used to distribute and backhaul radio programs for broadcast is relatively mature, yet it does still evolve. Managers, operators and engineers found a mix of the new and the familiar at NAB99.

Digital transmission of broadcast signals is changing by the hour, according to Bill Wagner, communications director for **BAF Satellite and Technology Corp**.

"The digital transmission of radio signals allows you to almost carve out the size you need (on the satellite transponder)," said Wagner.

"The digital era, with digital compression of signals, has ushered in more confusion than clarity because of the different standards and codecs used to transmit and receive digital signals," he said. "It is a lot like the 'Captain Midnight' decoder ring — to get the right digital signal you need the right decoder."

The BAF version of a "decoder ring" is leased digital satellite space segment capacity; BAF offers space to radio stations on long-term, short-term and occasional basis.

Loral Skynet is expanding its Telstar 6 satellite broadcast and syndication services through the United States, southern Canada, Mexico and the Caribbean.

Thanks to outages, radio users are more aware of their reliance on satellite services.

An integral link in the satellite system that needs to be utterly reliable, especially in the digital age, are LNBs.

Dawn Satellite Inc. introduced its line of digital-ready LNBs with improved stability, noise temperature and phase noise performance.

ATCi/Antenna Technology showed the Simulsat multibeam earth-station antenna and its Wide Arc and PMFSR parabolic retrofit systems, which allow parabolic antennas to receive signals from several satellites simultaneously.

Also showing satellite antenna solutions were Dawn Satellite, **Comtech Antenna Systems** and **LNR TrexCom**.

Intelsat introduced its system for global satellite communications for broadcasting and Internet services. PanAmSat Corp. brings its microwave/satellite product line, satellite communications equipment and satellite distribution services to the show.

Crown, ComStream and **Wegener** showed their lines of receivers.

From Germany, **Deutsche Telekom AG** offered a range of Europe-based broadcast transmission services via satellite.

International Datacasting was here with its SuperFlex satellite digital broadcast system, providing flexibility in data distribution. The system is bitrate-agile, with data rate capacity from 256 kbps to 31 Mbps, using synchronous, asynchronous or Internet protocol datastreams, and allowing for distribution of multiple datastreams.

SCA Data Systems Inc. was on hand with its Micro-Miniature line and SCPC Satellite Receivers. And for direct-to-the-user digital radio programming, **WorldSpace** Corp. was on hand.

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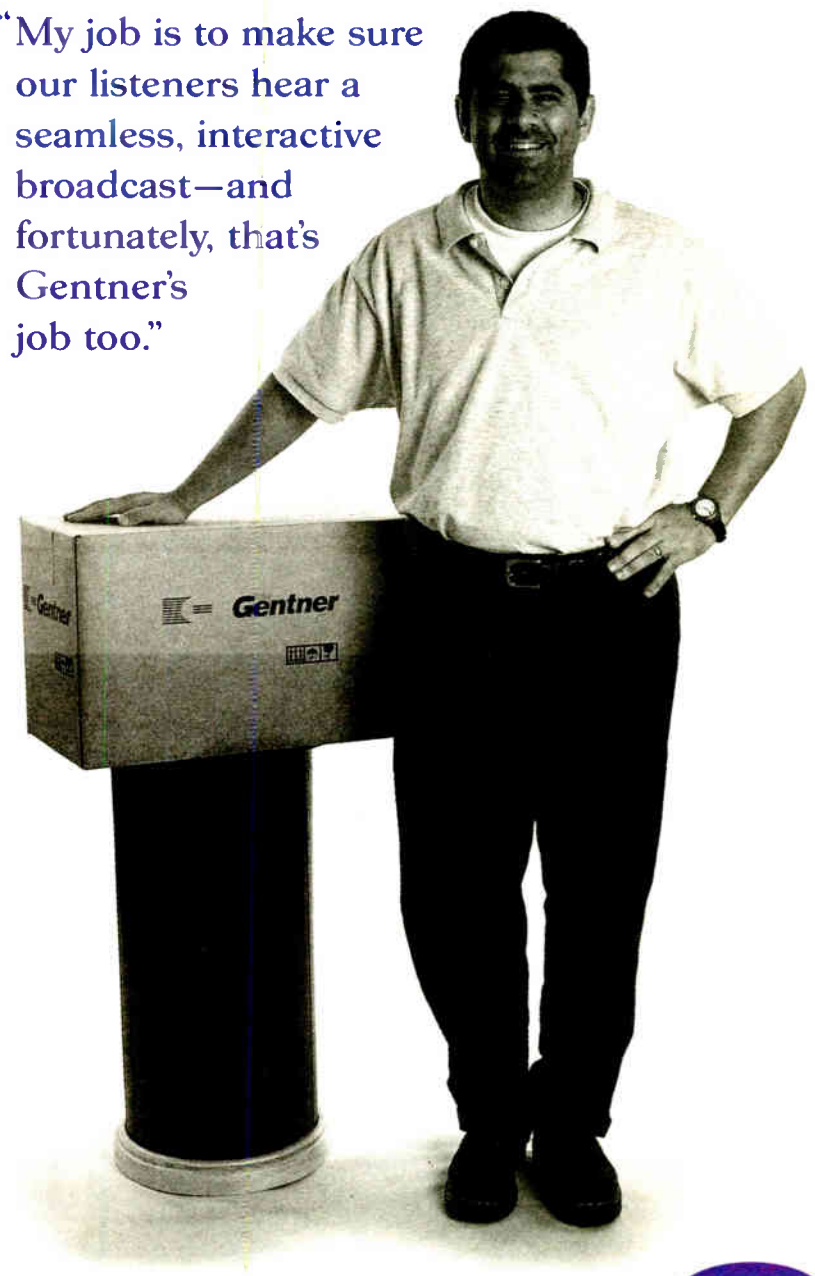

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World Radio History

Consoles Step Into the Digital Mix

Mike Sokol

The trend among console manufacturers these days is clear: make more digital mixers, incorporate more broadcast features and make them tough enough to withstand 24-hour operation.

The following is a sampling, from A to Z, of console offerings on the exhibition floor during NAB99.

AEV Srl showed the Excalibur radio console, which offers a range of input modules on a 16-module or 26-module mainframe. Micro-Line and Line-Line modules are balanced and use laser-trimmed components to reach 80 dB of common mode rejection ratio and a signal-to-noise ratio of -120 dB.

AEQ presented several of its mixing consoles: the BC-300, BC-500, BC-2000 and BC-2500 models.

Wheatstone's D-600 Digital Audio Console

Options available

Arrakis Systems Inc. showed the 12,000, 22,000 and 1,200 Live On Air digital consoles. The 22,000 series Gemini console is available in 18- and 28-input module mainframe sizes and may be ordered with or without the VGA monitor mount. Three extended-range LED meters display the three main console output buses.

The Gemini control surface makes this product useful for live studio applications when connected to one or more Arrakis digital workstations. Each of up to 40 jocks may have their own set of "carts" on the 99-button panel along with push-button control of record, trim, and playback of phoners.

The Digilink DM-4 digital audio console from Arrakis is an expandable, rack-mounted console. The company showcased its ability to offer eight input channels and complete monitoring when used with Windows PC software. Existing 12,000 or 22,000 series consoles can be upgraded to support digital by placing an input module into the mainframe for each digital channel.

The **Audioarts Engineering** line from Wheatstone included two new products. The Sparky is an on-air console that accepts both analog and digital signals. Its open architecture design has 12 inputs, three stereo buses, multiple format A-to-D converters, machine control, digital mix-minus and phone module support for two callers.

The R-17 radio on-air mixer from Audioarts is a modular, small-footprint console with 10 inputs, two stereo buses, machine control and "better-than-digital audio quality." It integrates well with modern hard disk-based automation systems.

Auditronics, which is also now owned by Wheatstone, introduced the NuStar 3001 digital on-air console. The unit features 22 universal positions for 15.5- x 1.5-inch modules, a removable meter bridge with four VU meters and a modular design.

Clock and timer are included as standard on the NuStar 3001. I/O includes AES3 with optional sample-rate conversion and four stereo buses. The company also presented its Comet 4600 consoles and the 2500 consoles.

Up to pace

Autogram Corp. showcased the Pacemaker consoles. The PM218 includes a frame size for up to 18 modules, while the PM228 can hold up to 28. The PM228 can source up to 56 stereo inputs. Both feature the bi-modular concept with DC control for easy replacement of front-panel modules with no clicks or pops.

On the smaller side, **Audio Technologies Inc.** (ATI) announced the MX101 mono field mixer, a low-cost addition to its NanoAmp Series of studio and field mixers. It combines in a 1.25-pound package three low-noise mic/line inputs with phantom power, switchable low cut filters, limiter and headphone cue with a slate mic, tone generator and bright three-color LED metering. Also shown was the DDA series of AES3 digital audio distribution amplifiers.

Axel Technology Srl introduced the Nexus Series of broadcast audio consoles available in sizes from portable packages up to 40 input channels.

Euphonix introduced the CS3100B console, which builds upon the CS3000 technology. Improved redundant power solutions for critical console components ensure that the CS3100B remains on the air. A backstop PFL has been added to channel faders to provide users with a fast and reliable soloing option.

Fidelipac Corp. showed the MXA analog broadcast console, which features 12 stereo inputs, two stereo output buses, two mono output buses, a 13-inch wide frame, fully independent remote features and modular construction.

Graham Patten showed the D/ESAM 8000 consoles, designed for surround sound mixing. Because the multichannel surround environment requires a mixer with plenty of inputs, the D/ESAM 8000 accepts up to 96, digital or analog, in groups of 16.

Digital applications

Harris Corp. introduced the DRC 2024 digital audio console, offering a 24-fader control surface and control of up to two audio processing units for a total of 44 mono or 22 stereo inputs. Large on-air radio applications are handled through an additional seamless router control. An auxiliary surface for locating telephone interface panels and routing controller modules can be added.

Klotz Digital introduced Spherion, a mid-priced digital audio console for live broadcasting and production applications. The foundation of this new console is Klotz VADIS third-generation router technology. The Spherion is available in a 12-fader version with a minimum of 24 input sources and a 20-fader console with a minimum of 40 sources, including mic, stereo analog line and digital line inputs.

Also shown by Klotz was the Paradigm digital radio console with voice processing and three-band EQ on mic inputs, SRCs on digital line inputs and machine control on line inputs. In addition, the VADIS DC on-air radio console was displayed. Available in six

The RM1d is from Soundcraft.

mainframe sizes, it has four stereo buses, various mix-minus options and mono sum output capabilities.

LPB showed the 7018 (sliders) and S13 (rotary faders) on-air consoles, designed to be either standalone or integrated as part of a turnkey package.

The 7000 series console is available in both 12- and 18-fader versions and features two inputs per channel, three stereo output buses, three mono-mixdown plug-ins (one standard), three stereo and three mono tape outputs, modular plug-in electronics, I/O mic processing, I/O talkback, illuminated VU meter and timer.

Broadcast configuration

Pacific Research & Engineering introduced the AirWave Digital broadcast console. It is available in two mainframe sizes with 12- or 20-input modules that are configurable to fit virtually every application. Included are three stereo program buses, outboard sample rate and A-to-D/D-to-A converters, dedicated split-track

See CONSOLES, page 61 ▶

Radio's Most Wanted

PROFILE: Jeff Littlejohn

Vice President of Engineering, Chancellor Media Corporation
Cincinnati, Ohio
Radio World reader for 15 years

Hometown: Gary, Indiana
School: ITT Technical Institute (Bachelor's Degree)
Favorite radio format: Chancellor's Jammin' Oldies
Favorite place to listen to the radio: In the car
Favorite color: Green
Favorite piece of equipment: Neutrik A2 test set
Hobbies: Spending time with my wife, Tina; my dogs, and flyfishing
Coffee: Black
Proudest moment: Any time a major studio or transmitter project goes "on-the-air."
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Best thing about your job: Working with the best engineers in the world!
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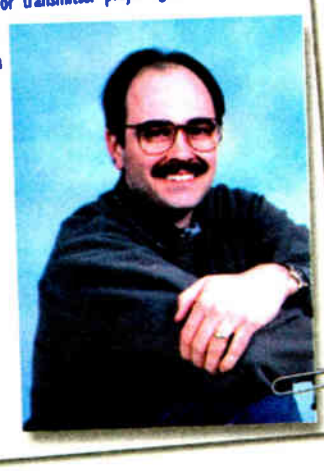

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World Radio History

▶ CONSOLES, continued from page 60

telco record feed, and control room and studio monitoring.

AirWave Digital incorporates many features requested by international broadcasters, including fader start, PPM metering and metering-in-cue.

Radio Systems showed its Millenium line of consoles. The company also debuted StudioHub, a new analog and digital wiring system based on industry-standard shielded CAT-5 standards. This product line features plug-and-play cable harnessing, integrated balancing amplifiers, patch panels and a host of additional accessories. StudioHub earned a Cool Stuff Award from **Radio World** at NAB99.

Soundcraft showed its new RM1d digital console, available in two frame sizes, a six-fader model and version that supports 12 faders and a script tray. A pool of digital and analog inputs is provided, any of which can be assigned to any fader. There are two mono mic/line inputs on the six-fader frame with selectable 48 V and insert point, two analog stereo line inputs and four AES3 inputs and one S/PDIF input. All input connector numbers are doubled for the 12-fader.

The **Studer** OnAir 2000 digital mixing console was displayed complete with a touchscreen user interface. The unit does not require external racks and power supplies and it integrates all systems into the single chassis. Features include snapshot automation, administrative software user access/lockouts and extensive configuration possibilities. The console was designed for smaller applications with six- to 24-input channels.

Tascam showed the TM-D4000 digital recording console. The TM-D4000 offers 32 mono plus two stereo inputs, eight-bus/six-aux structure, four-band EQ and dynamics on every channel, and 100 MM motorized faders. The three I/O slots can accept cards for TDIF-1, ADAT, AES3 or analog sources. Machine control is included and up to four mixers can be cascaded together. In addition, 24-bit A-to-D converters and I/Os are used throughout the console.

Full integration

The **Wheatstone** D-600 digital console for radio features serial control of all switch, fader and eight-character source display settings for true integration with routers and automation systems. It can accept both analog and digital input signals, process them in the digital domain and then provide output signals in both digital and analog formats. The console earned a **Radio World** Cool Stuff Award.

Also new from Wheatstone is the A-5000 console, which users can purchase as an analog console today and then can switch over to digital operation with no rewiring. It accepts modules from Wheatstone digital D-500 and D-600 consoles for an easy switchover in the field.

Ward-Beck Systems Ltd. showed the R2K radio console series. Available in three frame sizes for 12-, 20- and 28-input channels, it features serial port facilities for interface to automation, four stereo program buses, two mono-mix buses, six telephone clean-feeds and balanced inserts and direct output from each module.

A rackmount power supply frame houses two modular supplies for dual redundancy and can accommodate external audio distribution and A-to-D/D-to-A interfaces.

Radio World Cool Stuff Award NAB

Radio Systems StudioHub System

Sometimes the simplest ideas are the best.

Radio Systems earned a buzz and a Cool Stuff Award at NAB99 with a new integrated analog/digital wiring system that uses pre-made I/O patch cables for all popular consoles and source equipment.

Pre-made cables are a great time saver any time. This system, though, uses shielded twisted pair Category-5 data cable to carry analog and digital signals. The cables and connectors are more familiar to computer users than radio folks. The company says the tightly twisted pairs in CAT-5 cable are ideal for this kind of studio wiring.

The core of the system is a 16 in, 16 out shielded RJ-45 Stereo Hub Connector Panel. A series of low-cost universal mounts, matching amplifiers, patch panels and cables in various lengths let you install wiring for data, balanced digital AES/EBU or stereo signals, and DC with ease. Call for a price list.

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World Radio History

Test Equipment Floods the Floor

Harold Hallikainen

It is interesting to note that several new and interesting products in the test and monitoring category either used digital techniques (especially digital signal processing) or were adapted from the DTV arena.

Years ago, I hiked over hill and dale measuring AM field-strength readings. At the time, I thought I should have attached the field-strength meter along with a LORAN receiver (this was before GPS) and a data recorder to a cow. It could come back in a week and have a full AM proof.

Bill Sepmeier, then the VSAT guru at **National Supervisory Network** (NSN), wanted to replace the data recorder with a VSAT terminal so we could get real-time data from the cow.

There *were* problems with the plan — such as getting the cow to aim the AM antenna towards the transmitter while keeping the VSAT dish aimed at the satellite — but I'm sure those problems could've been worked out.

Measurement tools

Auditem showed us a more practical approach to automated field-strength measurements.

This device monitors the field strength (and other characteristics) of *many* AM or FM stations simultaneously. This data is logged to the hard drive of an external computer along with position data from a GPS receiver.

The data may be dropped on digital terrain maps to generate measured patterns. Though they suggest placing the unit in a car and driving around, I imagine a cow could be used.

Though they suggest placing the unit in a car and driving around, I imagine a cow could be used.

Potomac Instruments is developing methods to quantify signal impairments for digital television.

A strong signal is not good enough for DTV, and probably won't be for digital radio. Their work should transfer to radio.

Delta Electronics had its new wideband digital RF ammeter on display and operating, featuring 3-1/2-inch digit display, autoranging circuitry and a 100:1 dynamic range. This digital meter is ideal for low- and high-power applications where accuracy and ease of reading are important.

Delta also had on display examples of its line of analog RF ammeters, operating impedance bridges (OIBs), receiver-generators, AM stereo exciters and monitors, and splatter monitors.

Neutrik introduced the Minirator MR1, an analog generator that provides a comprehensive set of audio test signals that are required in broadcast audio environments.

Audio Precision showed audio testing solutions for DTV and digital radio with the Portable One Dual Domain, an audio/interface analyzer that simplifies digital audio measurements.

The analog plus digital plus interface tester generates and measures analog and digital signals in their native domains.

Separate digital I/O connectors and separate generator/analyzer functions make connections to digital audio signal chains straightforward.

Davicom showed a new FM power monitor. This unit receives a sample from a directional coupler and outputs a DC sample representing the power. The unit also demodulates the FM and displays the modulation level on a bar graph.

The SCMA-1 from **Belar Electronics** is a digital FM SCA modulation analyzer designed to operate in conjunction with the Belar FMMA-2 or FMM-2 modulation monitors or another wideband composite source. The unit digitizes the composite and decodes the selected subcarrier signal using digital signal processing techniques.

The Wiz

Belar also brought its AM Wizard modulation analyzer to the show, along with its tried-and-true AMM-2B and AMM-3. The AMM-4 digital AM frequency monitor was on display, too.

New this year was the AMDA AM distribution amplifier, which allows multiple monitors or receivers to be driven from a single-loop antenna.

The 923A from **TFT** is an AM modulation monitor with a carrier shift level meter. Overshoot liner phase filtering is absent and a built-in voltmeter facilitates proof-of-performance measurements.

Bird Electronic Corp. is adapting a DTV product to radio. The company showed its new BPM series in-line Wattmeter, which can accurately measure the total power when multiple carriers are present. Such a meter could be placed after the combiner in multistation FM antenna systems.

Boonton Electronics unveiled the Model 4530 for RF peak-power analyzer at HDTV and DAB transmitter sites as well as the 4500A RF peak-power analyzer for laboratory R&D of HDTV and DAB digital audio.

Inovonics displayed its Model 520 off-air AM modulation monitor. The monitor tunes off-air signals with its built-in preselector and provides independent indication of positive and negative carrier modulation.

Analyzing audio

DSP techniques have moved the complexity of audio quality analysis from hardware to software. Many excellent existing products were on display. A new one that caught my attention is the Audio Toolbox by **Terrasonde**, a 1999 **Radio World** Cool Stuff Award winner.

This hand-held device is designed for the sound-reinforcement roadie, but it should find application in radio. A single box, the unit measures sound pressure level, shows audio spectrum, measures reverb decay time and can draw an "energy time graph" to analyze room acoustics.

It also generates sine and square waves, as well as white or pink noise. It measures audio frequencies and levels. You can also view audio waveforms or X-Y plots (for stereo phasing) on its digital storage scope.

Musicians can use the device to tune instruments and monitor or generate MIDI. Anyone can use it to get rid of hum. Instead of filtering out the hum frequency, the hum is sampled, then subtracted from the audio.

The unit can also be used as a monitor amp, cable tester (it draws the schematic of the cable) and phantom power tester. To keep the tech from getting bored, games are included in the unit (the datasheet disclaims any guarantee against addiction). It is truly an *audio toolbox*.

Canford Audio showed reference CDs and DATs. These recordings have precisely recorded signals allowing them to be used for a variety of test functions. **Dorrough** was on hand with its family of metering products, including LED-based level meters.

Logitek introduced a new version of its Super-VU meter. The Super 5.1 Meter is designed with six LED bars in a single enclosure with either analog or digital inputs. Each bar has 40 LEDs with true 300 ms VU ballistics and peak indication and hold. The Ultra-VU 5.1 and 7.1 meters were also shown, with 62 LEDs per bar and 300 ms VU and peak indication.

TC Electronic showed the stereo display units from **DK-Audio**. These very colorful displays show level, phase, and other audio characteristics on very bright color LCD displays.

Radio Design Labs, winner of a **Radio World** Cool Stuff Award, also offers metering devices within its line of small, affordable problem solvers.

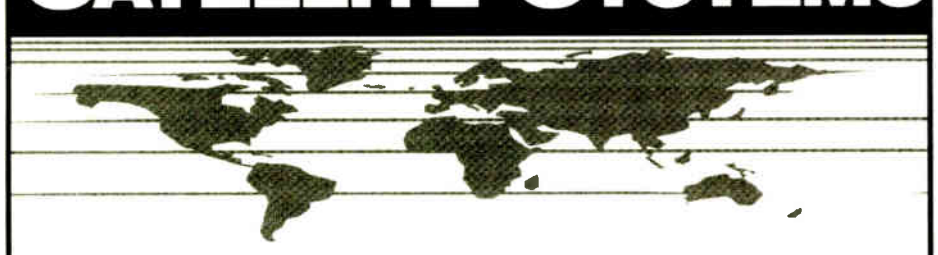
TFT also showed the 999 Digital Insertion Unit, which also earned a Cool Stuff Award. This box will insert EAS audio in a *digital* audio stream, useful for those all digital radio stations.

In addition, the company showed the "EAS Home Alert." This single channel AM EAS receiver is AC operated with an internal backup battery. You could silk-screen your station call letters on it and use it as a useful station promotion.

■■■

Harold Hallikainen is president of Hallikainen & Friends, a company providing product design, technical writing, and research services.

SATELLITE SYSTEMS



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Circle (53) On Reader Service Card

World Radio History

A Walk Through Panel Grounding

Buc Fitch

This is one in a series of articles about the National Electrical Code. The series and supporting materials are available online at www.rwonline.com *in the reference section.*

The National Electrical Code, first published in 1897, is in a way still celebrating its 100th anniversary. Very few other standards that affect us so much are as old or have been in such continuous use.

The NEC is part of building codes in all 50 states because of its broad scope, consensus development and exceptional detailing. For these reasons it has also become a world standard, with extensive application in Central and South America. To assist in this worldwide application, the NEC has been available in a Spanish version since 1993.

Another milestone in both the NEC and electrical system applications was the inclusion of a mandatory grounding requirement that first appeared in the 1913 edition.

In previous episodes, we brought the utility power via the service through the meter, into our station's main panel, and identified the most important connection(s) in the station: the connection point of the mandatory *grounded* conductors with the station's primary *grounding* conductor.

There is a fine but important distinction between concepts and words.

In our electrical system, there are many grounded conductors which include all the neutrals. These neutral wires are power-carrying conductors that complete the circuit back to the power source.

In a stroke of fundamental genius, early electrical engineers realized that if they could ground one conductor in each two-wire circuit, they would reduce by half the statistical possibility of any shock hazard. This elegant, simple expedient has saved untold human lives.

Although electrical safety grounds, such as the wall of conduits and the separate green and bare wires found in a properly designed and installed system, are grounded, they are viewed exclusively as grounding conductors. They are designed only to carry power safely to ground when in a fault condition. These are included in the system to save lives and property.

Yes, it will work when you cut off the third prong on a power cord to avoid having to walk three feet to your tool box to get a proper grounding adapter for an old outlet. However, if your trusty drill faults through its case, the ground path will probably be through you! I am sure your friends will eventually forget how stupid you were before you overdosed on electrons because you did not take the time to keep the grounding conductor connected. The boss might remember your job dedication for another five minutes.

Let's get back to the electrical panel. In our model studio main panel we will make an important, unique connection between three vital components of your electrical system: the neutral bus, the ground bus and the grounding wire that runs to your main grounding electrode.

The neutral bus is that connection point where all the neutrals, those ubiquitous white (and sometimes gray) wires, are attached in the breaker panel so that these can be at ground potential and be connected to the main neutral conductor of the utility supply.

As a convenience, most major panel manufacturers give you the option of connecting these two buses together with a screw. Although most adequate in a residential or studio environment, out at the transmitter where there is a penchant for lightning currents circulating through the electrical system, it is GEP and most prudent to also include a solid wire jumper of at least a number 8 between the two buses. On occasion, the screw mentioned above can become a fuse, so it is GEP to also have a more gutsy jumper that is easier to inspect.

Your friends will eventually forget how stupid you were when you overdosed on electrons from not keeping the grounding conductor connected.

Similarly the ground bus is that connection point where all the grounding wires are attached in the breaker panel to provide a fault path to ground.

Most panel manufacturers provide an appropriately sized lug that is part of the grounding bus to run the grounding conductor from the panel to the main grounding electrode.

The logic that runs through the NEC 250 (grounding) is that this most important conductor should run as direct as possible to that electrode without splices.

Why this strict limitation? Because if it can happen, it will happen, and the last thing you want is for anyone or anything to disconnect your ground.

Depending on where this panel is located and other circumstances, the electrode

See NEC, page 71 ▶

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Circle (60) On Reader Service Card

World Radio History

Workbench

Radio World, May 26, 1999

In With Air, Out With Earwigs

John Bisset

After reading about Hal Kneller's experience in "blowing out" the water from his sodden Heliax, Dick Bailey, maintenance engineer for KGTV in San Diego, wrote about a similar problem.

KGTV was experiencing a signal loss in an RPU microwave link to its studio. Dick had to clear 100 feet of waveguide.

It turns out that there was an opening at the feed hook of a 12 GHz transmitter at the dish antenna, located about 50 feet up the tower, atop Mt. Miguel in San Diego County. Weather and earwigs had destroyed the protective mylar covering at the end of the feed hook!

An adapter from waveguide to air hose was constructed. After disconnecting the equipment from the waveguide, air from a portable compressor was forced into the waveguide. Out came a couple dozen earwigs and gunk that was blocking the signal. After reconnecting the equipment and resealing the line, all was normal.

Dick adds a postscript: The top of Mt. Miguel is the only place he has ever seen earwigs that have wings and fly. Can you imagine those flying pincers! Any entomologists want to hazard a guess as to what all that 12 GHz energy was doing to those bugs? (Maybe that's how they got wings!)

Next we'll read about the "Attack of the Killer Flying Earwigs" on Southern California ... stay tuned!

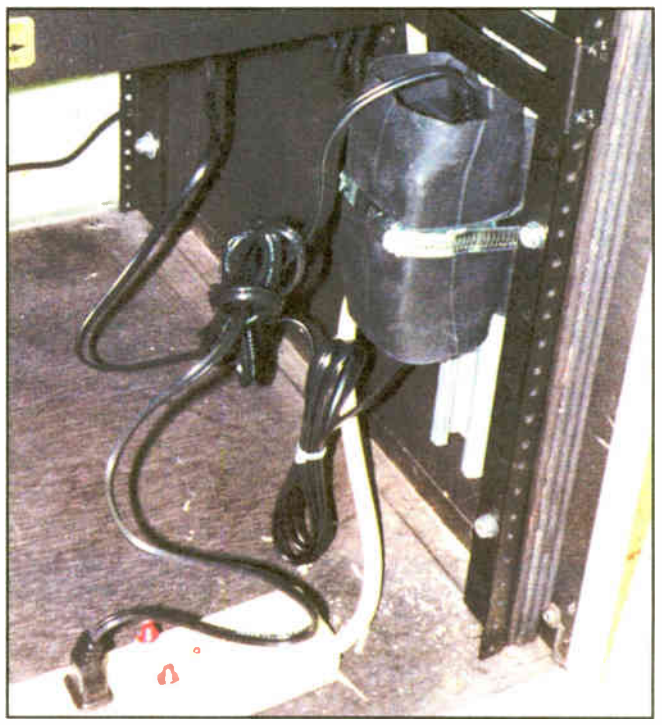
★★★

Other than in Florida, where they worry about lightning *all* the time, it's that time of year for the rest of us.

I was greeted on my return from NAB to a pock-marked car, pummeled by golf ball-sized hail stones. 'Tis the season! If you are looking at ways to harden your site, maybe not necessarily against hail, but surges, read on. Dick Weer from WAYR-FM in Brunswick, Ga., told me about a neat product that uses fiber-optics to provide isolation to phone and audio lines.

Stormin Protection Products, located in Florida, sells a device called Optillator. The device is basically a fiber-optic transmitter, a coil of fiber, and a fiber-optic receiver. The signal is converted on either end, and provides about 70kV of isolation. The best part is the cost: less than $200 per unit. Compare that to your post-lightning equipment repairs.

For more information contact Stormin Protection Products at (727) 548-5418 or circle **Reader Service 91.**



To prevent a wall-wart from rolling around in a road case, wrap it in a piece of rubber inner tube and hold it in place with a hose clamp.

★★★

With remotes in full gear, Figure 1 should be helpful. Dan Ryson from WJFK(FM), which serves the Washington, D.C., market, put an interesting remote kit together years ago. What makes it special is the way Dan prevented the wall wart from flopping around inside the case.

Label each outlet box so the breakers can be easily located.

The "wart" was wrapped with a layer of rubber inner tube, and then secured with a couple of hose clamps. Try shaking that wall wart loose! Thanks, Dan, for helping to make our remotes "fool" proof. (Certainly no play on words for the folks that bang the remote gear around!)

★★★

Have you tapped your local college or university for an engineering school intern this summer? When you get this person on board — even if it's for one day a week — plan to identify all your AC outlet boxes and breakers at each of your transmitter sites. The procedure is simple: Using a Sharpie marker, as shown in Figure 2, will make your life easier when emergencies occur.

I was reminded by Lee Parr, who engineered in Baltimore for many years before his relocation to the "country" of Southwestern Virginia, that many transmitters have two supplies: a 3-phase "main" and a 110VAC circuit, which in older rigs, powered crystal heaters. The unwary engineer might feel safe throwing the "mains" breaker, forgetting, or not knowing, about the other lethal AC feed.

★★★

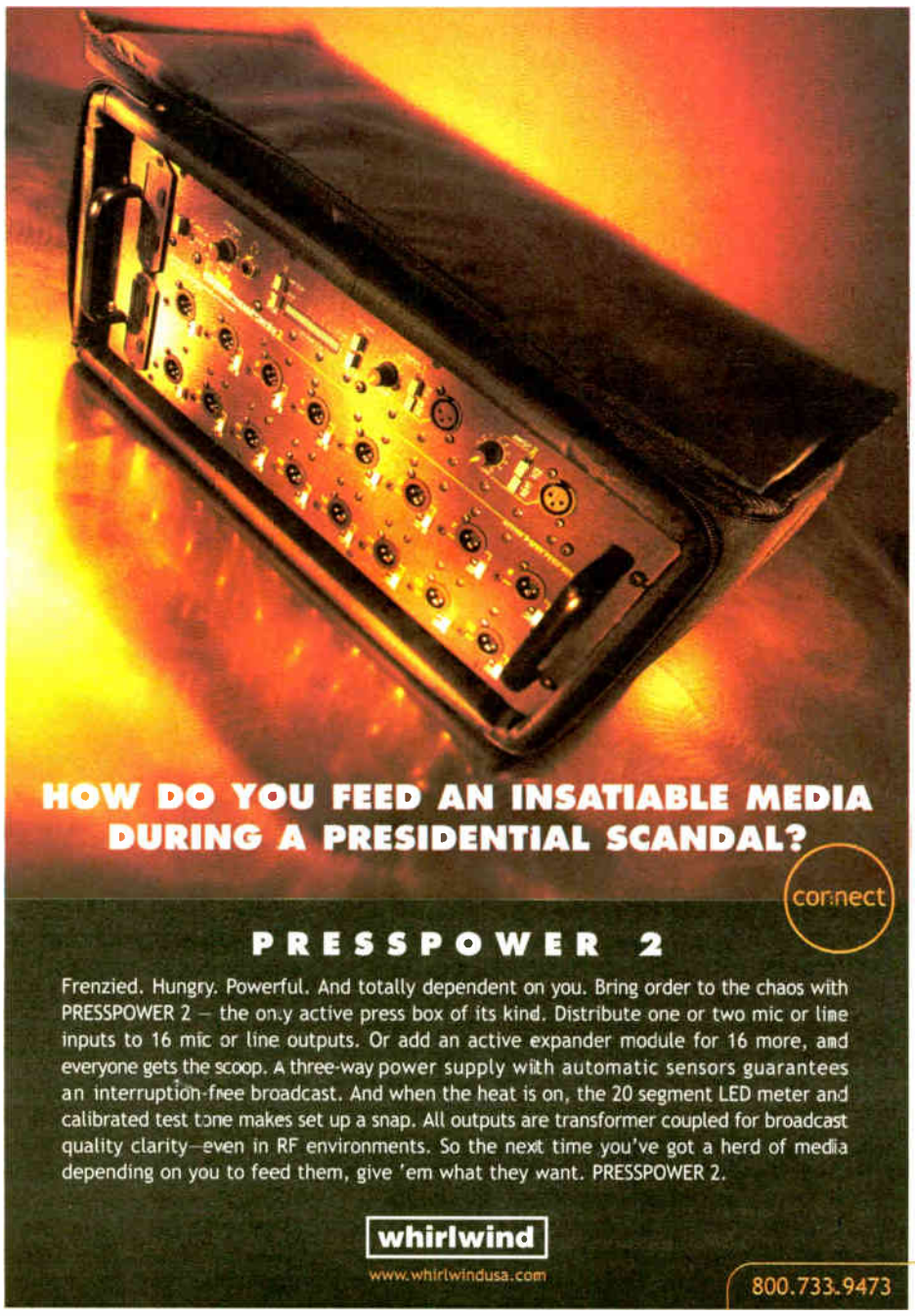
If you missed NAB, you missed a great show, as you'll see in **RW**.

Copies of the NAB Proceedings are available at *www.nab.org/nabstore* or by calling (800) 368-5644. Harris papers are available by faxing (217) 221-7099.

■■■

John Bisset has worked as a chief engineer and contract engineer for more than 20 years. He is a district sales manager for Harris Corp. Reach him at (703) 323-8011.

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



Circle (54) On Reader Service Card

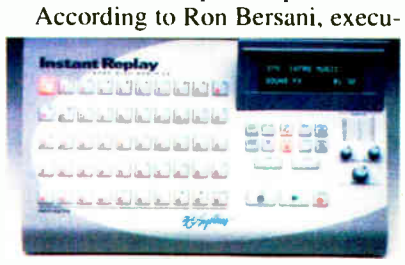
World Radio History

TIC Radio Network Calls on 360

Massachusetts-based TIC Radio Network, a non-profit, non-commercial network, recently installed several Instant Replay 2.0 digital hard-disk recorders and Short/cut Personal Audio editors from **360 Systems**.

TIC Radio Network, which offers closed-circuit broadcasts to blind listeners in six metropolitan areas throughout the state, uses the Instant Replay units for transmission of regional and national daily newspapers, magazines and other information read and recorded by volunteers. The network uses the Short/cut to record and edit PSAs and promo spots.

According to Ron Bersani, executive director of TIC Radio Network, the original goal was to replace reel-to-reel recorders and cart machines with the Instant Replay for reliability and cost reasons, but as an added bonus, the volunteers found the units simple and fun to use.



"Our volunteer readers range in age from 10 to 103 ... it is equally important that they be able to understand and work with our audio recording system," Bersani said. "Instant Replay has fit the bill perfectly."

For more information contact 360 Systems in California at (818) 991-0360; fax (818) 991-1360 or circle ***Reader Service 116.***

RFA Orders Transmitter

Continental Electronics is set to provide Radio Free Asia with a new 100 kW shortwave transmitter and antenna upgrade. This will be the third transmitter provided by the company to RFA's Saipan station.

RFA, a private, non-profit corporation news and information service, awarded Continental a $1.7 million contract for the transmitter and antenna upgrade. The transmitter will be used to expand the delivery of timely news, information and commentary to listeners throughout Asia.

For more information contact Continental Electronics in Texas at (214) 381-7161; fax (214) 381-4949 or circle ***Reader Service 123.***

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

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

Mager Systems Custom Cabinetry

Mager Systems has been building furniture for 20 years, helping to pioneer the use of curves, round corners and unusual designs.

The company, which specializes in the use of solid surface material, stood out this year with a multilayer, thermal formed arrangement that looked as though it had been cut out of the floor of the desert or a nearby national park.

"All of our solid surface tops get the reaction, 'Is this stone?' So we decided to really go for that," said owner Mager Kizziah. "It's as though you found a nice piece of rock in the forest park, dragged it out, cleaned it up and put it in the studio."

Even the guest position pods were made out of the material, for a really cool effect.

Mager cabinetry has a 10-year warranty. *For more information, contact Mager Systems in Arizona at (623) 780-0045, fax (623) 780-9860 or circle* ***Reader Service 92.***

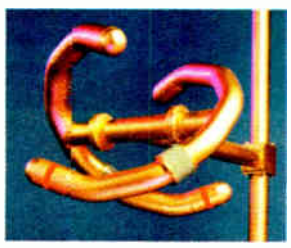
This solid-surface countertop has a unique stone look.

im•i•ta•tion \ im-ə-'tā-shən \ adj.

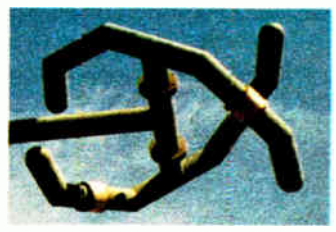
1:Resembling something else that is genuine and of better quality. 2:not real.

BEFORE YOU BUY YOUR NEXT ANTENNA, MAKE SURE IT'S REALLY AN ERI-TILLER

The Spring NAB show revealed numerous imitations of the famous ERI tiller style FM antenna, complete with their derivative of the industry christened "roto-tiller" name. But, is it really as good as the genuine article?

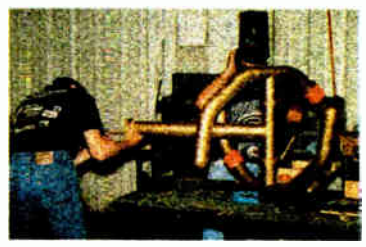


Do the imitators have the assurance of performance guaranteed by ERI's 55 years of experience and 24 years of "ERI-tiller" fabrication knowledge.



Well, no. But, we are eager to try and have some good ideas.

Will the imitators be able to provide same day parts and 24 years of assembly experience?



Give us a few years and we'll be able to figure it out.

Do the imitators offer full scale antenna range measurements and an extensive library of tiller style antenna patterns?

Scale models are almost as good and we are accumulating some patterns.

How many of their antennas have actually met their advertising claims?

Well, if you want to be technical, NONE.

"I am flattered by the imitations of the ERI-tiller design. I actually thought many of their supposed improvements were a good idea, 25 years ago when ERI first tried them. But, the fact remains, the ERI-tiller is the best antenna design and only ERI can make it. To insure the quality you have learned to expect specify the ERI-tiller by name. Don't be fooled by an imitation."

Tom Silliman, P.E.
President, ERI

There are no imitations of an ERI lambda mounting and tower system. Allow ERI to construct your antenna-tower package with the best equipment at the best price.

To prevent customer confusion the ERI FMH and FML series FM antennas are no longer available. Current owners may contact ERI directly for parts and service. All ERI products remain available from other vendors. Contact ERI for further details

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FAX (812) 925-4030
ELECTRONICS RESEARCH, INC.
www.ERIinc.com

Circle (59) On Reader Service Card

World Radio History

SPECIAL REPORT

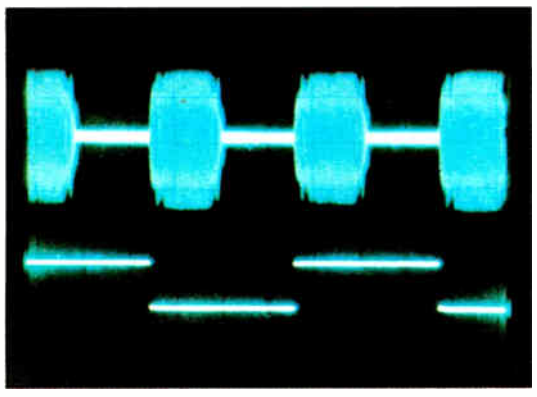
Keep Up With Your DAT Service

Jeff Johnson

Our recent series of articles on DAT machine service generated many thought-provoking questions from readers. Since that last series, the author has been in contact with numerous individuals faced with DAT servicing issues.

The editors of **RW** asked me to update the previous series, available in the Reference Room section of *www.rwonline.com*, and provide additional detailed service tips, seasoned with the experiences of others.

DAT is perceived to be troublesome,



Desired Oscilloscope Alignment Trace Resulting From Correct Adjustment of Supply and Takeup Posts

and indeed it can be. Even though a DAT cassette disappears inside a machine, DAT is a physical magnetic contact technology. It is unlikely anything in your studios is more miniature or complex.

Unlike non-contact laser technology, DAT machines require periodic maintenance. That maintenance requires considerably more finesse than an assault with alcohol and Q-Tip. The fact that the cassette is sucked into a mysterious recess and misbehaves in quirky ways adds to the frustration and anxiety.

A few basic facts:

DAT is a standard format, and tapes are expected to be interchangeable among all brands of machines. Some machines do not have the 2x Long Play format.

One hundred passes is a reasonable limit to tape life. Archival storage on DAT is unreliable and is not advised.

The particular advantages of DAT are its fine uncompressed digital audio, portability and compactness.

DAT faults fall into a few general categories.

"My DATs play on some machines and not others." Another: *"DATs sent to us won't play, but the ones recorded here are all OK."*

This typically is an alignment problem. It concerns the angle the tape heads take across the tape. It is a standardized angle. Proper adjustment is covered in the original series of articles. The recording machine, the playback machine, or both may be incorrect. In a pinch, adjust the tape guide rollers nearest the head drum slightly until the tape will play.

"My DATs play OK for a while and then start squalling or muting."

The culprit here usually is magnetic coating buildup in the capstan. This is the most common problem encountered.

The tape's magnetic coating faces the capstan on a DAT machine; it is inevitably transferred to the capstan in rings of buildup. These rings cause the tape to "walk" up or down the capstan, forcing misalignment. A quick fix is to pause the machine briefly while playing to allow the tape to snap back in the groove. Cleaning will be required.

The tension builds

Another common failure with this symptom is caused by improper tape tension during play. An earlier part of a DAT cassette may play properly, but then begin to misbehave with chirps, dropouts and muting.

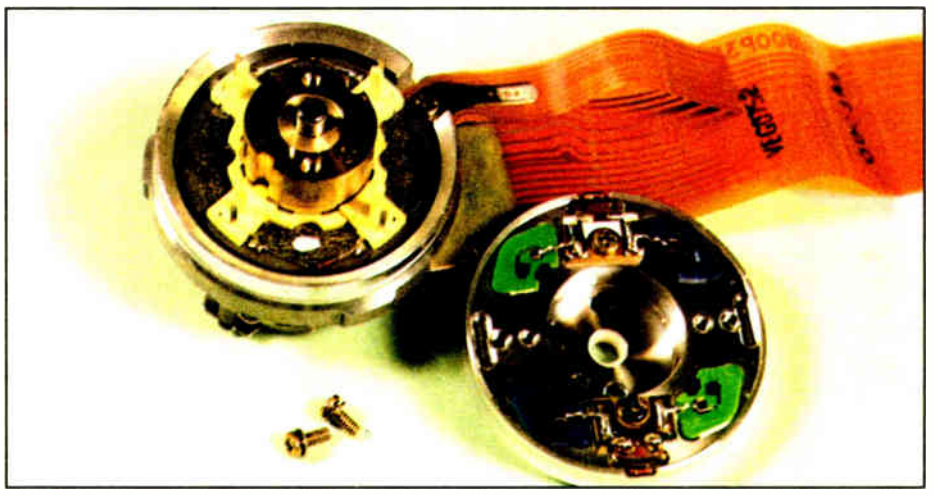
Tape tension is maintained across the head drum with a back tension brake band in a servo configuration. If the tension is too loose, head contact is erratic. The band should be adjusted for the tension arm to be in the middle of its range during play. It should deflect the tape perhaps one-eighth of an inch.

The portion of the tape passing the tension arm should not be close to straight, indicating too much tension, nor should it be close to the maximum outward travel of the arm, indicating that tension is too loose.

Adjust the clamp position of the tension band in and out until proper tension range is obtained. Some machines have an additional adjustment of the associated spring, but this is rarely necessary.

"I have tapes that will play on one brand of machine but not another."

First, check alignment incompatibility. All DATs are interchangeable; however some machines do not support the slow, long-play mode. Perhaps the tape was recorded in this mode.



Panasonic: The head drum is removed from the drum motor. Reversing the normal position of the heads is a useful means of isolating one bad head.

The relationship between the signal recorded on the tape by each head and a switching signal that selects the heads is called "PG phase." Panasonic DATs are more tolerant of a wider range of PG phase than the Sony models. Be certain that Panasonic machines have the PG phase set to 125 microseconds between the switching signal changing state and the beginning of the RF signal from the heads. Use the Sony TY-7111X tape. A dual-trace, delayed-sweep scope is necessary for this adjustment.

Digital record level is important. This is not the record volume of the audio! If the ATF (Automatic Tracking Function) is not properly recorded, playback will be erratic. The TY-7111X tape is used in conjunction with the shop manual and a scope for this adjustment.

"I have tapes that play but the 'cleaning' warning comes on."

The cleaning warning actually means that the digital error rate is above a certain threshold for both heads. Cleaning may be necessary, but other problems may illuminate the cleaning warning.

The Panasonic machines allow observation of the error rates from each head. It is possible for one head to show a rate of close to 5,000, meaning it is inoperative, but the tape may play fine. Any DAT can play with only one head operating.

Never use a cleaning tape unless desperate measures are called for; they do more harm than good. A few seconds of touchup on very dirty heads is the only time to use one.

In all instances, look at a scope trace of the RF signal from the heads.

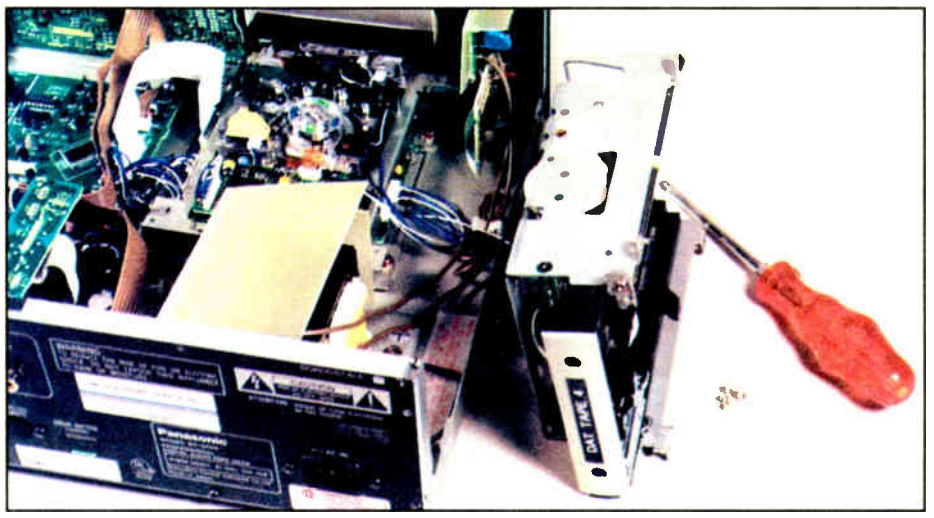
Keep these supplies on hand for routing maintenance: miniature foam-tipped swabs; a chisel-tipped plastic stick for scraping capstan; a jeweler's miniature screwdriver set; and magnifying goggles plus a first-surface dental mirror.

As for cleaning alcohol, use 99-percent Isopropyl alcohol only. This has almost no water and is available from a pharmacy. Anything else is tantamount to throwing a dishcloth in there.

The minimum test tape required is the Sony TY-7252 for alignment. At approximately $150, this tape features a standard skew angle. Adjusting alignment with this tape will assure compatibility between machines.

The Sony TY-7111X tape, at approximately $125, is used to set the ATF playback

See DAT, page 68 ▶



Panasonic: The loading sled is removed and laid aside. Electrical connection is maintained to allow alignment operation of the mechanism.

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Circle (55) On Reader Service Card

World Radio History

Maintenance Tips For DAT Decks

These are my experiences and opinions concerning problems with specific machines. The routine maintenance points previously discussed apply to all machines.

Readers are welcome to share their own comments with our readers. Send e-mail to *radioworld@imaspub.com*

Panasonic SV series

SV-3500: This machine is difficult to access for service. Parts are available. If one is functioning well with routine maintenance, keep it, but heroic efforts are not warranted.

SV-3700, SV-3800, etc.: These machines have a beautiful cast aluminum mechanism chassis. They are the easiest of all machines to service, in my experience. Disassembly is simple and adjustment points are readily accessible, both mechanical and electronic. Panasonics receive recurrent criticism due, in my opinion, to their ubiquity.

Weak points: The brakes are small pads rubbing against gear teeth. They wear rather quickly, but are easy to replace. Tape-handling problems are often due to worn brakes. To test, watch the tape during fast rewind, hit stop, and if slack tape jumps off the guides, replace the brakes.

These models are well worth the ongoing maintenance.

There is a drive gear with a built-in felt slip clutch. This can become weak, causing the tape handling to become sluggish, resulting in snagging. Replace the gear.

The connector from the heads to the head amp is of the flexible printed circuit sort. It can become loose in its socket. Back it up with a tab of clear plastic cut from a blister pack.

Be careful when replacing the loading sled assembly. It must be done in a certain manner to avoid binding. Turn the eject gears until the sled opens approximately one-eighth of an inch. Slip it into place over the mechanism at an angle by first inserting the sled into the opening in the front panel.

Before lowering the back of the assembly, move the cassette tray base forward to align with the hub shafts. Carefully lower the assembly while aligning the mating tabs near the screw holes.

Attempt a manual eject and load before activating the machine to be certain there is no binding.

Contact Zack Electronics for replacement parts at (888) 329-0225.

Tascam DA-30 MkII

These machines have the flimsiest mechanisms, in my experience. They have a plastic chassis and a number of plastic rubbing surfaces.

Access to the tape tension adjustment requires disassembly, trial adjustment, reassembly, test, and reiteration.

The tension adjustment must be correct within a narrow range due to the tension arm being swung into place by a cam which requires the arm to be centered in the cam groove by the exactly correct adjustment of the band.

Contact Teac America for replacement parts at (323) 726-0303.

Sony consumer models

The DTC-75ES and DTC-700 models are virtually identical. They are well made, function reliably, and are supported with parts availability. These models are well worth ongoing maintenance.

Many machines may be sitting idle due to the fact the MODE SWITCH drive gear cracks on all of them. Replacements are available.

The plastic gears which directly drive the load rings can become worn.

The DTC-670 and DTC-690 models have a mechanism, identical in both machines, which is considerably cheaper, but is adequately reliable. There is no tension band, but back tension is applied with a fixed brake.

The mechanism's load gears are retained by plastic retainers that crack and fall off, causing jamming. A symptom of this is that a jammed machine, when unplugged, will relax gear tension allowing resumption of operation.

Contact Zack Electronics for replacement parts at (888) 329-0225.

—Jeff Johnson

COMING SOON

Coming in Radio World

- A look at Data FM
- The tragedy in Littleton, Colo.
- Digital Domain Returns

Confiability with Life Time Warranty

EDUCATIONAL CIRCULAR SERIES

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

LOW POWER CIRCULAR SERIES

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

MEDIUM POWER CIRCULAR SERIES

Model	Bays	Power	Gain	Price
SGP-1	1	4,000W	-3.3	$690
SGP-2	2	8,000W	0	$2,690
SGP-3	3	10,000W	1.4	$3,595
SGP-4	4	10,000W	3.3	$4,500
SGP-5	5	10,000W	4.1	$5,300
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The antenna gain may vary with the frequency. For powers up to 20 KW please, make the request to provide the specific configuration.

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Circle (611 On Reader Service Card

World Radio History

DAT Machine Service

▶ DAT, continued from page 66

level. While normally unnecessary, it is useful if you do a good deal of DAT service.

The Sony DAT Torque Gauge, with an approximate cost of $300, is a mechanical spring torque gauge mounted in a DAT cassette. There is one for each hub and measures the pull or drag of the mechanism on the tape from each hub. Not necessary, but handy if it fits your budget.

Other unnecessary but useful tools are alignment jigs, which are for rapid factory mechanical alignment of the tape path. A first-service dental mirror and the service and technical manuals can be used for tape alignment.

The capstan is most often the major cause of a malfunction. The magnetic coating is pressed against the capstan and is gradually transferred to it. The buildup, formed in rings, is the result of a slight initial formation pressed into the tape, which causes an increase in the growth of the ring. Eventually the rings cause the tape to walk up or down the capstan, which leads to mistracking.

A quick diagnosis and short-term remedy is a momentary pause during play. The release of the tape from the capstan allows it to snap back into the correct path. If the pause cures the mistracking, you almost certainly have a dirty capstan.

Cleaning the capstan is the most difficult chore you will face. It must be swabbed with alcohol, turned and scraped. Close inspection with the magnifying goggles is a must. Inspect while turning to spot remaining buildup.

The capstan is a mirror surface, and reflections must be differentiated from buildup. Scrape with a chisel tip cut onto the end of a plastic stick (a used swab is good), or use your little fingernail. With your fingernail, you can feel any remaining dirt. Turn the capstan by pushing the edge of the motor armature or press the pinch roller into place and turn. Be diligent so the capstan is spotless and wiped with a clean swab and alcohol when finished. Do not use too much alcohol; it will wash the oil from the motor bearing.

A good check of capstan condition as well as general tape path alignment is done by observing the tape from directly above the segment immediately on the outlet side of the pinch roller during reverse cue. The mechanism is pushing the tape in this mode. Incorrect take-up tension, bad path alignment and a lack of capstan cleanliness will be apparent if the tape twists any more than a very slight amount.

The head drum and heads should be swabbed carefully in the plane of rotation only! Viewing the RF signal from the heads is a good means of ascertaining clean heads.

For difficult cases of stubborn buildup, play a cleaning cassette for 10 seconds; never rewind a cleaning cassette. I previously advised against the use of cleaning cassettes as they are essentially sandpaper. However, a few occurrences of badly coated heads have required their use.

A note concerning head life: Heads last many thousands of hours; they are replaced prematurely far too often. Tape tension trouble is often construed as having bad heads. Worn heads should be replaced only after all else fails. If heads are replaced and dramatic improvement (scope trace) does not occur, there's another problem. On Panasonic machines, reverse the drum top; if the problem reverses, it is a head.

Swab all other tape path surfaces. Check rollers for free rotation by stroking back and forth on their sides with a swab. They should turn freely. You can't see them turn due to the smooth white plastic, but you can feel if they are binding.

Look at brakes, pinch roller, and tension band for wear. Replace them as a kit. Part numbers for soft part kits for different machines with sources are listed elsewhere. Worn brakes are a major cause of erratic operation and snagging due to sloppy tape handling. The pads may be found to have become unglued.

Circle (56) On Reader Service Card

Radio Design Labs RU-SM16 Meter and Full Line

What's not to like in the RDL family? Our judges liked the new RU-SM16 dual audio meter, but they also acknowledged that RDL deserves kudos for its continuing solutions — small, inexpensive problem solvers that can stick onto a surface or mount in a modular rack system.

Audio DAs, switchers, sequencers, meters, equalizers, relays, amps ... you name it.

For information, contact Radio Design Labs in California at (800) 281-2683 or (805) 684-5415, fax to (805) 684-9316, visit www.rdlnet.com *or circle* ***Reader Service 101***.

Jerry Clements of RDL

World Radio History

PRODUCT EVALUATION

Digital Features Catapult DH30

W.C. Alexander

In an era when the focus seems to be more and more on digital telephony and less on making the plain old telephone call sound good, Gentner has hit a home run with the DH30 digital phone hybrid.

The purpose of a hybrid is to split the full-duplex two-wire telephone circuit into discrete send and receive paths.

A hybrid is an integral part of any telephone set, but that type of fixed hybrid is generally not adequate for broadcast use, where a high degree of send/receive isolation is needed to prevent feedback or otherwise poor audio quality.

Analog hybrids are adjusted into balance by placing a call, sending a tone or some other send audio down the line and adjusting the balance control for minimum send audio in the receive audio (called "nulling" the hybrid).

This works fairly well, but that setting is good for one call only. The next placed or received call will use an entirely different path.

To get the best isolation, the hybrid should be nulled every call. This is simply not practical in a fast-paced world of broadcasting. Typically, the hybrid is nulled once and the performance on subsequent calls is what it is.

Digital hybrids are able to adapt to line conditions for each and every call. Once a call is selected, a burst of noise is sent down the line, the DH30 "reads" the spectrum of the noise in the return feed and adapts for the best send/receive isolation — more than 55 dB — across the 250 Hz to 3.5 kHz audio passband.

It does this using a 24-bit digital signal processor (DSP). This powerful DSP technology also permits adjustable echo cancellation, expansion, compression, limiting, three-band equalization and bass boost.

The DH30, which replaces the DH3 hybrid, has many unusual features, such as a built-in 2-watt monitor amplifier. By connecting a speaker, caller audio can be monitored in the studio for off-line caller/talent interaction. This eliminates having to use the console cue bus or an external amplifier.

Also built in is a selectable auto mix-minus, which eliminates the need for an external mix-minus. This is a handy feature if your console is not equipped with a mix-minus.

Programmable auto-answer and auto-disconnect are also available. These features can make DH30 operation hands-free in some situations.

The Gentner DH30 Digital Phone Hybrid

Cue function

The "cue" button is an interesting new feature. When engaged, whatever audio is present at the cue input is sent to the caller. This allows the talent to speak to the caller off-air without having to switch to a different mix-minus feed.

A good way to use this is to feed an output of the studio mic preamp to the DH30 cue input. Press the cue button and the studio mic is fed straight to the caller, bypassing the regular send audio.

In the talk show environment, it is sometimes desirable to "shout down" unruly callers. The DH30 offers 6 to 12 dB of caller control capability, so that the talent can talk over the caller who just won't shut up.

Many stations take calls off-air and record them for air play a few minutes later. Contests, requests and the like all require off-air recording and editing. The DH30 has a record feature that will start an external recording device when a call is selected.

Using this feature in conjunction with auto-answer/auto-disconnect, a busy newsroom can automate the recording of news bits from reporters in the field.

If you are using a digital console and want to stay in the digital domain with your hybrid, the DH30 has an AES/EBU input and output with auto sample rate.

It is not necessary to compromise with this unit. Digital remote control of the DH30 is available via an RS-232 port. Conventional DC closures are also available for controlling the unit.

Setup of the DH30 is made via a menu-driver front-panel interface using a two-line LCD display. Operation is straightforward and easy to understand. Engineers will love the fact that setup parameters are password-protected, keeping well-intentioned talent from messing with critical parameters.

Three presets are also available, allowing the user to return to a previously defined set of parameters. If power is removed, the unit defaults to the preset in use when the lights went out. A wide array of built-in performance and performance evaluation diagnostics are available via the menu and LCD display.

No adjustments

For easy adjustment and operation, the DH30 features bright, easy-to-see front-panel digital VU indicators for both send and caller. Send audio is switchable between mic and line levels. The unit auto-senses line voltage and adapts, so 220 V operation requires no changes or adjustments.

I tested the DH30 in one of our stations' production rooms, connecting the unit in place of an analog hybrid that station uses for telephone recording. My evaluation consisted of more-or-less typical use of a stand-alone hybrid in a typical broadcast environment.

I found the send/receive isolation, audio quality and ease of operation to be excellent. It was fun playing with the equalizer, compressor, expander and other DSP functions to achieve a wide range of effects on the caller audio.

I could not find a single thing I did not like about the unit.

■■■

For more information, contact Gentner in Utah at (801) 975-7200; fax (801) 977-0087 or circle ***Reader Service 102****.*

Cris Alexander is director of engineering for Crawford Broadcasting.

HUMOR

Hotel Perils and the Short-Legged Table

Tom Osenkowsky

I'm sure you remember the opening line "You, who are on the road, must have a code that you can live by."

It's from the Crosby, Stills, Nash & Young song "Teach Your Children."

For those of us who are on the road, having a code can mean the difference between a good trip and a downright rotten one. With NAB99 gone and many more to follow, here are a few rules of the road that every traveler should heed.

Stay on the level

Most restaurants offer a choice between a booth or a standalone table. If you choose the latter, be sure it doesn't rock. There's nothing worse than an unbalanced table (ask any engineer).

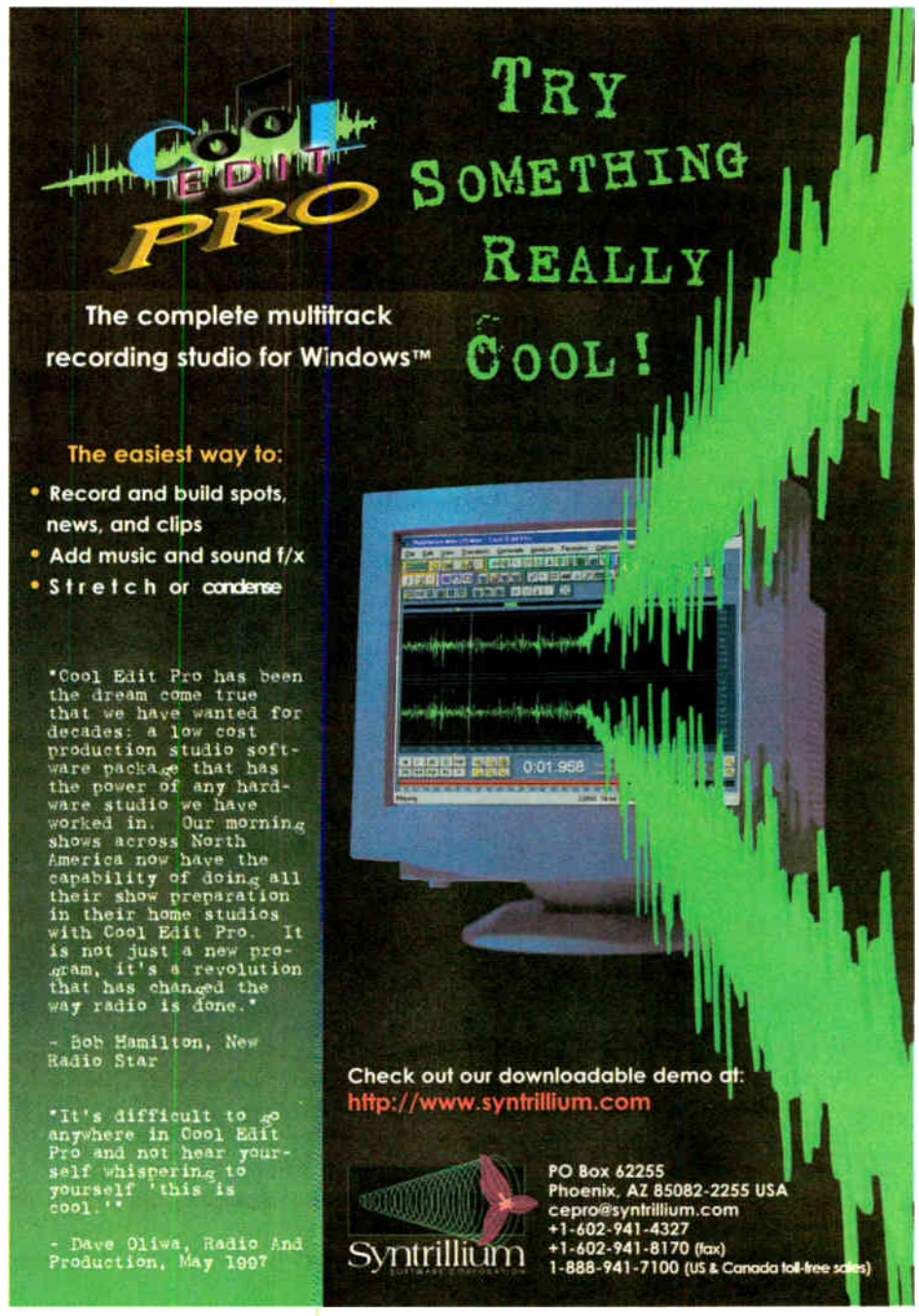
Tables having three or four feet usually are equipped with trimming screws to balance the table. Because no regulatory agency that we know of inspects tables for balance or floors for flatness, owners simply don't pay attention. Those few who do often use a matchbook or paper napkin to shim up the short leg.

If you choose a booth, be sure the clearance between your body and the table isn't so great that you can't order pizza, spaghetti or soup without fear of some portion of it ending up in your lap. Nothing worse than a table so far away that you cannot comfortably reach your plate.

If you are a tea drinker like me, always ask to inspect the serving kettle if one is used. I can recall numerous occasions where the spout was too narrow, causing the tea to spill all over the table. The kettle manufacturer needed a lesson in design physics.

Also, for those who prefer sugar substitutes, ever wonder why these products never come in a jar like regular sugar?

See HUMOR, page 73 ▶



Circle (62) On Reader Service Card

World Radio History

Mayah EditPro MP3 Editor

Visitors to the Musicam USA booth were impressed with EditPro, described as the only software audio file editor that works directly on compressed MPEG Layer 2 and 3 files.

EditPro lets users edit compressed files without the need to uncompress prior to editing, and then recompress afterwards. The system uses "pointers" to the original compressed file when each edit decision is made. The retail price is $600.

Musicam USA is the North America distributor for EditPro and a companion software codec called SendIt. Both are made by Mayah Communications of Germany. The products are available separately or as a package called "Compact Studio."

For information, contact Musicam USA in New Jersey at (732) 739-5600, fax to (732) 739-1818 or circle ***Reader Service 111.***

Art Constantine and Jill Fitzpatrick of Musicam USA

RadioSoft ComStudy 2.0

ComStudy is a radio engineering program for Windows. Our judges like the graphics, the map creation capabilities and the many ways ComStudy presents the information you want.

Version 2.0 lets you do point to point studies, calculate single and multisite contours, conduct propagation studies, calculate interference and more. The software is compliant with the new TIA allocation standard TSB-88.

Real-time, real-terrain signal mapping is done in 3D. ComStudy transmitter databases are expanded, to include data from the FCC and dozens of countries.

Pricing depends on program version and overlays; call for a price list.

For information, contact RadioSoft in Florida at (888) 723-4695 or (904) 426-2521, send e-mail to pmoncure@america.com, *visit* www.radiosoft.com *or circle* ***Reader Service 104.***

Peter Moncure of RadioSoft clearly enjoys his Cool Stuff Award.

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World Radio History

Always Practice Safe Grounding

▶ NEC, continued from page 63

that this wire goes to can be one or more of the following:

• The classic 8-foot metal rod driven into the ground.
• A copper water pipe that immediately leaves the building and continues under and in close intimacy with the ground.
• An "Ufer Ground," which is a glorified re-bar system in a concrete foundation that is intimate with the ground.
• Building steel, which is under heavy compression providing low-resistance electrical conductivity that eventually leads to the foundation, which is in intimate contact with the ground.

From the main panel on, there is no further cross-connecting of these two ground systems. Once again, the exclusive purpose of the grounded neutral is to carry current and the purpose of the grounding conductor is to provide a fault path. If they become cross-connected, then it is possible to have current flowing on the skin of the conduit and other metal parts. This is *not* a good situation and a defeat of the NEC's intention.

Ordinarily, the grounding conductor, once it reaches an appliance or device, is used to ground the exposed metal parts to extend this safety grounding feature.

Do not cavalierly cut off the ground prong on the AC plug to your equipment in some misguided attempt to eliminate ground loops in audio, video or computer networking paths. If your station is properly designed and wired and you have ground loops, they aren't coming from this ground circuit.

All grounds are not equal; conductive metals have their own unique resistance. The higher the resistance with a value of current flowing through it, the higher the voltage drop. The NEC sets the minimum wire sizes of both the current carrying conductors and the grounding conductors. Additionally, it highlights the devices per the currents presented or expected as well as the circuit length such that a very low-resistance path for fault current to ground is assured.

In the loop

Once you have broken the integrity of that fault path to the designed grounding system, there is no way of knowing what convoluted journey that fault current might take to get back to ground.

As mentioned, if you're looking for "loops," look in the signal path and play with the grounding there. It's a lot safer and it will keep your insurance carrier a lot happier.

Grounding is contentious. A station contains many other ground systems other than power. Also, in more complex electrical systems, the grounding system sometimes is attached to another grounding electrode near the point of utilization to achieve the lowest ground resistance or to reduce system electrical noise.

We'll treat these on a case by case basis as we come to them.

Incidentally, article 250 in the 1999 NEC has some notable changes in many important details. Check with your local enforcement office before starting any ground construction to see which version of the NEC is being used in your locale. If your construction is wrong, you will have to correct it, which could mean you have to start over. The call is well worth your time.

In upcoming episodes, we will review some of the loads on our panel and the NEC regulations specific to these. We will begin with a load that is pertinent to the radio business: tower lighting.

■■■

Charles S. Fitch, W2IPI, is a registered professional consultant engineer, a member of the AFCCE, a senior member of the SBE, lifetime CPBE, licensed electrical contractor, station owner and former director of engineering of WTIC-TV in Hartford, Conn., and WHSH-TV in Marlborough, Mass.

The Boring Electrical Convenience Outlet

I'm a basic kind of guy. My idea of an exciting evening is a trip to the tool department at Sears or across town to Home Depot in the electrical section. Inversely, it is my wife's idea of purgatory on Earth if I cajole her into coming along.

As we cruise these store aisles across America, it becomes evident that we are blessed with endless choices and selections of tools, construction material, maintenance aids, etc. Most often, our decisions are not limited to how to accomplish something technical, but the best way to do it from the innumerable alternative and competing solutions we have.

Electrical work is no different. In the area of connectors, we have an endless array of materials to find the perfect solution to our technical challenges. We have straight blade, twist lock, waterproof, priority grounding, polarized, multiphase, *ad nauseam* in all manners of colors and amperage.

For everyday use, however, we have standardized on the three conductor, straight blade outlet to access 120 V convenience outlets (COs). We are indeed lucky that this most ubiquitous power output connector is such a flexible and intrinsically safe device.

Fifteen and 20 amperes of power at 120 V usually is available at these outlets in residential and commercial locations respectively. The blade size is adequate for these currents with an opening such that it is hard for curious little people to stick their fingers into the "hot" phase wire port. The custom in many foreign countries is to have fewer outlets but higher voltage and current available at each. Some have the perfect size openings for small children's fingers, many of which are lost each year from electrocution.

The proper way that our straight blade (normally duplex) outlets should be installed is with the ground connection up when mounted vertically, and with the neutral up when mounted horizontally. Gravity usually makes things, especially conductive objects like jewelry and screwdrivers, fall down. When they happen to fall into the blades of a connector, it's best when they fall onto the neutrals and grounds first.

Modern electrical systems are not maintenance-free. One of the greatest wear items are outlets in high-use areas such as kitchen counters in the home and workbenches in your station.

If you need to service a worn-out outlet, replace it with a high-quality unit. It would not have worn out unless it was getting more than its fair share of use. An $8 hospital/commercial grade unit is more expensive than your 50-cent residential receptacle, but it is well worth the cost.

Outlets in commercial environments have a tendency to have more current drawn through them, be subject to more wear and abuse and it is just imprudent to jeopardize your business (not to mention your professional career) on an inappropriately selected device. That last euphemism means you foolishly chose cheap over logical and necessary.

Now that you have that beautiful duplex outlet in your hand, I bet you're saying to yourself, "How convenient, two screws to connect the incoming and two screws to connect the outgoing wires ..."

Under the 1996 as well as the 1999 NEC, you are no longer allowed to use a device to act as a splice and continue the circuit. Now, when you install or replace an outlet, you must first make the splice to carry on the circuit and then pigtail from this splice to the device, our outlet.

If this is the case, then why do they still supply four screws? If you look carefully at the outlet, you'll see that one can cut the link between the two screws on each side, which then makes each of the duplex outlets a separate device.

In homes, quite often the top outlet is on a convenience outlet (CO) circuit and the bottom is wired to the wall switch to allow furniture lamps to be turned on and off as you enter the room. When you clip out these jumpers, each pair of screws powers one of the outlets and can be wired separately.

Occasionally vending machines, independent computer servers, etc. are fed this way from separate circuits.

—Buc Fitch

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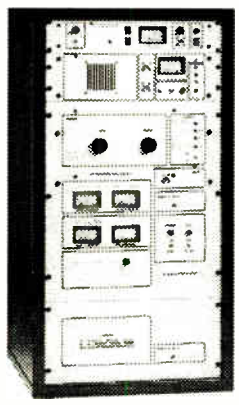

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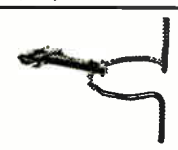

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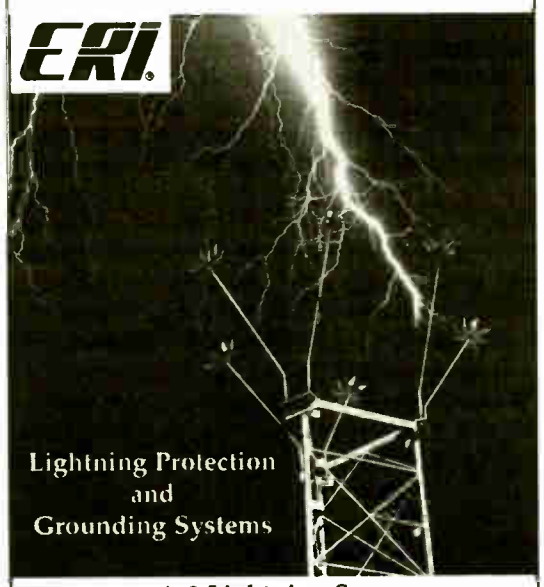

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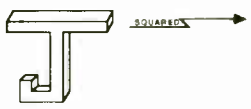

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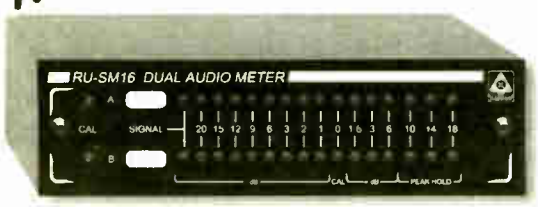

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World Radio History

The Hotel Shower Conspiracy

▶ HUMOR, continued from page 69

Seems like you always have to ask the waitress for some packets.

These things aren't that bad when you consider the worst that can happen in a restaurant. Your waiter/waitress comes over to take your order empty-handed. Yes, they really believe they can memorize your order. How annoying when they come back minutes later asking questions about your order!

Water level

For hotel rooms, never stay near the elevator or ice box. Reasons obvious. Not so obvious, however, is the shower, until the morning after. Ever have one of those showers where the water head is at chest level or below? I guess you're not supposed to wash your face or your hair.

Then there's the water dispersal pattern. Too wide and you wash the shower door and the walls, missing 80 percent of your body. Too narrow and you get beaten up by the water stream.

I recently stayed in a hotel with a weird shower problem: water resonance. Turning on the shower caused a howling sound. Not only in my room, but in every room. This was a first!

After you finish inspecting the shower, check the sink. Is the water spout so close to the sink wall that you can't wash your hands? Must be a conspiracy. When I built a new bathroom a few years ago, the plumbing store thought I was crazy for specifying faucet holes so close to the sink edge. I just wanted enough room to fit my hands under the spout!

Wouldn't you just love to meet the person who invented the idea of separate hot and cold water faucets? Scald your hands with hot water first, then freeze them off under the cold or vice versa?

Use an rechargeable electric razor? Be sure there's an outlet in the bathroom. If the outlet is tied into the light fixture, it probably goes dead when the light is turned off. Beware.

Speaking of elevators, ever wonder why there isn't a car status panel on each floor? For those who suffer from anxiety and are on any floor other than the main, it's a real problem not knowing which car will be the next one.

Touch tones

Be sure the lobby has a pay phone with true DTMF touch tones. Avoid those ugly room telephone surcharges.

In one famous Las Vegas hotel, all the pay phones have tones that sound like they are modulated with 60 Hz. Can't access your voice mail from any of them!

Use your long-distance carrier, not the one from the pay phone. Beware, some small telcos are out there to get ya!

If you have to work late nights on a job, ascertain what languages the maids speak. Be sure the "Do Not Disturb" sign is clearly printed in each language. In one hotel in the Caribbean I always got a phone call or knock on the door asking what time I'm going to check out, even though it was well before the noon checkout time.

Dim bulb

Tired of spending money on new light bulbs? Bring along an assortment of burned-out bulbs on your next trip. Discretely swap the bad ones for the working ones in your room. Don't be greedy, though. Wait until the hotel replaces your burned-out ones. Now you've got new bulbs!

Do the same thing with almost-empty rolls of toilet paper. You'll walk away with at least two fresh rolls! Love those extra bars of soap, bottles of shampoo, etc.? I just returned from a hotel in Pennsylvania. They've outsmarted the guests on the shampoo. Imagine my chagrin when I found a push-button shampoo/conditioner dispenser in the shower. No take-home bottles here!

Most business travelers are keen enough to shop for the best rental car, airfare and hotel rates, ensure that their credit card or regular insurance covers rental accidents, and use common sense on the road.

I hope these few extra tips can make your next travel experience a more enjoyable, maybe even profitable one.

Happy trails from the Midnight Consultant.

■■■

*Tom Osenkowsky is a regular contributor to **RW**, the editors of which never know quite when the author is being serious.*

In one famous Las Vegas hotel, all the pay phones have tones that sound like they are modulated with 60 Hz.

◆ MARKETPLACE ◆

Products for the Radio Broadcast Professional

Mail info and photos to: RW Marketplace, P.O. Box 1214, Falls Church, VA 22041

Mixing System

The V-Mixing System from **Roland** is comprised of two models: the VM-7200 V-Mixing processor and the VM-C2700 V-Mixing console. Models 7100 (processor) and C7100 (console) may also be combined for a V-Mixing system.

The system gives users many configuration options between console and processor, providing up to 94 channels of digital mixing and eight stereo-effects processors.

A separate-component system, the unit employs an all-digital console with quiet motorized faders and an expandable 3RU processor that contains all inputs, outputs and effects.

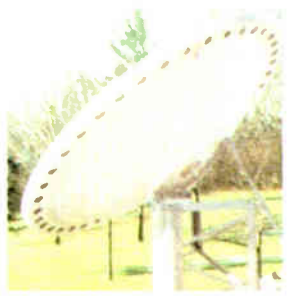
Instead of audio, the V-Mixing System primarily exchanges digital control data between console and processor, allowing placement of the console up to 220 yards from the processor.

The processor features two stereo multi-effects processors, with the possibility of expansion to three VS8F-2 effects expansion boards to provide up to eight stereo or 16 mono channels of automated effects processing.

*For more information contact Roland in California at (323) 685-5141 or circle **Reader Service 119.***

Pipe-Mountable Antenna

Andrew Corp. is manufacturing a 3.7-meter pipe-mountable earth station antenna, offering a considerably lower price than the traditional pedestal version.



The earth station antenna can be securely mounted onto a customer-supplied six-inch nominal pipe instead of a pedestal. The easily-installed pipe-mount allows for noncritical foundation orientation.

The new design eliminates the equipment enclosure, enabling the antenna to be installed in areas where space is a factor. Outdoor RF equipment can be attached to the antenna mounting frame near the feed system if necessary.

The pipe-mountable ESA is available with C-, X-, Ku- and K-band feed systems. Electrical performance by the antenna is given off by using advanced dual-reflector technology with a two-piece precision-spun aluminum reflector to provide accurate surface contour, high-gain and closely controlled pattern characteristics.

*For more information contact Andrew Corp. in Illinois at (708) 349-5661, fax (708) 349-5222 or circle **Reader Service 127.***

See MARKETPLACE, page 74 ▶

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World Radio History

From Control to Transmission

Harold Hallikainen

This is the second part of a three-part series summarizing chapter 4.8 of the NAB Engineering Handbook, Eighth Edition. The book can be ordered at www.nab.org/nabstore *or by calling (800) 368-5644. Thirty-three pages of the Handbook are condensed into these three articles. The chapter (and this series) "starts at the transmitter" and works its way back to the control point.*

In this part, we'll look at control, data conversion and transmission.

Transmitter remote controls have traditionally provided momentary isolated relay contact closures for control. Two control outputs were provided for each analog input. These outputs were designated raise and lower. If the operator had analog channel 1 selected (perhaps plate voltage), pressing the raise button closed a pair of contacts that were wired to the plates on control input of the transmitter. The transmitter plates would go on, and the operator would see the plate voltage go up.

Similarly, pressing lower would turn off the plates. The raise and lower buttons might switch between day and night power when analog channel 2 was selected. Use of momentary controls allows the remote control to be connected in parallel with the local control (transmitter front panel) while allowing control from both locations simultaneously. Latched control lines (non-momentary) would disallow control from more than one location.

Use of isolated relay contacts allows the remote control to drive a variety of control circuits. Older transmitters used 120 to 240 VAC to drive the control relays. Isolated relay contacts were suitable for driving these transmitters, though such transmitters did place hazardous voltages on the remote control. Some current transmitters are expecting the remote control to provide a momentary contact closure to some positive voltage (generally +12 to +28 V). Again, remote controls with isolated relay contacts can drive these directly.

Many remote controls provide open collector control outputs. This is generally a cost-saving technique. A single integrated circuit may provide 32 or more open collector outputs. This compares quite favorably to one control output per relay. Further, open collector outputs allow for a higher wiring density since only a single ground return line is required.

It would seem, from a remote-control manufacturer's point of view, that all control and status should rely upon closures to ground via mechanical contacts or open collector (or drain) transistors. However, transmitter manufactures point-to-safety advantages in using high-side switching in control circuits. It is, as they point out, far less likely for a control wire to accidentally short to +24 V than it is for that wire to short to ground, possibly activating a transmitter.

Control interface panel

In all but the simplest transmitter sites, it is common to have a relay interface panel between the remote control and the various pieces of transmitter site equipment. Besides any repeat relays that may be required to convert from open collector drive to whatever the transmitters may require, such a relay interface panel will generally use relay ladder logic to interlock various transmitter site functions. (We may see the use of Programmable Logic Controllers for this application). Such an interface panel may handle the sequencing of RF switches in transmitter or DA switching, and ensure that a transmitter drives a load before it can be enabled and that dummy load cooling is on before power is sent to a dummy load.

In the design of a transmitter site, there is an interesting division-of-responsibility problem. Various portions of the site control and monitoring can be assigned to the remote control, control interface, or the transmitter. It has been common practice for a transmitter to accept control pulses and report back to external equipment. Many transmitters now include an automatic power control, which moves some of the control into the transmitter.

It has been common practice for a transmitter to accept control pulses and report back to external equipment.

In most stations, however, there is a fair amount of decision making required outside the transmitter. A fairly common decision problem is the RF sequencing of an AM station pattern change. This sequencing could be accomplished through a series of timed pulses (drop plates, wait, switch antenna, wait, return plates). It could also be handled through a parallel logic, similar to the interlocking requirements required on directional arrays under previous FCC rules. Such a logic system would provide pattern interlocking (insuring all contactors switched) and provide very fast pattern change. It could be implemented using "relay ladder logic," either using relays or a PLC.

IEC 60864

This standard defines an interface between a transmitter and transmitter control equipment. Because it requires all control, status, and metering circuits to be "earth free," the extensive use of relays, optical couplers, and isolation amplifiers is required. The resulting higher cost has prevented its use in the U.S. to any great extent.

Analog multiplexing

A transmitter site presents many analog samples that need to be transmitted to the studio. Under "extension metering" (a method of remote metering specifically defined by the FCC until recently), each sample was transmitted to the control point over its own pair of wires. A large number of samples or an extended distance makes this very costly.

Analog multiplexing sends only one sample at a time to the control point. The multiplexer may select which channel to send under operator control. In such a case, the remote control is acting like a voltmeter with very long leads. The operator directs the system where to measure the next voltage.

Early remote control systems utilized electromechanical stepper switches from the telephone industry. More recent systems utilize analog multiplexer integrated circuits.

Once the particular parameter to be transmitted has been sampled with the analog multiplexer, it needs to be sent to the control point. Very early remote- control systems merely placed the sample on a metallic pair (a telephone line with DC continuity) provided by the local telephone company. Later systems used a voltage-to-frequency converter to send a frequency corresponding to the analog sample. A frequency-to-voltage converter at the control point restored the original sample for display on an analog meter. Current systems measure the analog sample with an analog to digital converter, then transmit the data to the control point using either a modem over an analog circuit or using a digital circuit. At the control point the data is suitably converted to drive a digital display.

Recent systems utilize a microprocessor or microcontroller with appropriate software to handle the data manipulation required for data transmission and display.

It is necessary to get the control and telemetry data from "here" to "there." A variety of methods exists. These include full-time telco circuits (leased lines), part-time telco circuits (dial-up lines), radio links (such as part 74 group P channels), and other dedicated licensee-controlled circuits (such as STL subcarriers or digital subchannels, satellite subchannels, VSAT satellite links, etc.).

Until recently (1995), the FCC has required some sort of a full-time circuit for control fail-safe (though telemetry and routine control could be through temporary circuits such as dial-up). Use of a temporary circuit can be much less expensive than a dedicated circuit. When a transmitter site is operating properly, a control system may either transmit no data or keep sending the same data over and over again. It is wasteful to hold a circuit up for redundant or nonexistent data. Further, noncontinuous data transmission would allow the sharing of a single radio frequency by several sites using packet radio techniques.

Many systems continuously transmit the status of the transmitter site (analog readings and status). While this gives a quick update time, it results in the continuous use of a circuit to transmit redundant data.

Some systems, instead, report the status of a site on a significant change in the status of the site. This exception reporting allows the shared use of a circuit or the use of noncontinuous circuits. This, of course, is the standard operating mode of dial-up control systems where a call is originated only when an operator wishes to send a command or a transmitter site has something new to report (such as an alarm).

Next time, we'll have a look at transmitter control system user interface and data analysis.

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Products for the Radio Broadcast Professional

Mail info and photos to: RW Marketplace, P.O. Box 1214, Falls Church, VA 22041

▶ MARKETPLACE, continued from page 73

FM Notch Filter

Microwave Filter Co. offers the 11673 Series notch filters to tune over the FM band from 88 to 108 MHz. It can attenuate a specific interfering frequency while allowing other frequencies to pass at the transmitter.

Model 11673-1 has a tuning range of 88 to 98 MHz, while model 11673-2 handles 98 to 108 MHz. Notch attenuation is 25 dB minimum and the 3 dB notch bandwidth is approximately 1 MHz.

The units work with transmitters that operate at 5 watts maximum at the notch frequency.

For more information contact Microwave Filter in New York at (315) 438-4700 or circle ***Reader Service 117.***

Transmitter Assistance

The Radio PIE (Program Input Equipment) rack from **Broadcast Richmond** processes the audio signal of an AM, FM or short wave transmitter to allow the highest possible modulation level without side effects.

By achieving this, the broadcast range of a transmitter is extended since the maximum peak level is maintained and loudness is not distorted. Equipment must also be utilized to permit both incoming and radiated signals to be monitored, measured and compared visually and aurally.

The unit also facilitates immediate emergency audio bypass of a problem point and then audio re-insertion after the identified problem. This can put your station back on the air in seconds as opposed to hours following a failure.

Standard features include AC distribution with terminal block input and 20 amp breaker protection, a fan assembly with a minimum of 240 cfm, a one-point grounding system to be tied to station ground, and labeled cabling for easy reference.

For more information contact Broadcast Richmond in Indiana at (765) 966-6468; fax (765) 966-5505 or circle ***Reader Service 141.***

World Radio History

GM Journal

Radio World | Resource for Business, Programming & Sales | May 26, 1999

INTERNET RADIO NEWS
Radio Works
Page 79

The Future of Radio Advertising

Bill Mann

Global Media's online radio station, Indieaudio.com, which launched March 30, looks and feels different.

The image is associated with Gen Xers, and the cutting-edge feel of the site has lots of attitude and rich media or animation in the advertising.

If you go to *www.inidieaudio.com/* to listen to the brand-new Netstation and click on the slower 28.8 modem speed, for example, the icon reads "Wah. I want my Mommy." The 56K icon says, "Now we're getting somewhere."

Are we looking at the prototypical radio and marketing operation of the future?

Michael Metcalfe, president of British Columbia-based Global Media, and his Vice President, Winston Barta, would have you believe so.

Ambitious start

Besides the radio station, Global Media's young hi-tech entrepreneurs have put together a record label, a licensing program, an A & R department for bands and artists and a venue to sell "Indie Artists" and radio station merchandise, plus an "online community" called Indielife.com with edgy, youth-oriented features and graphics.

The new company is wagering that this integrated approach will "revolutionize the record industry" and will allow "Indie Bands" — a fast-growing and, as Global Media believes, an underserved sector of the business, to market and promote themselves online as well as sell their CDs online.

Barta said the company aims to "be on the edge of the changing paradigm of media distribution as it continues to move toward digital delivery."

RW had plenty of questions about all these ambitious plans for the high-energy, tech-savvy Barta, a Montreal native, when we caught up with him at a meeting with investors in Los Angeles recently:

RW: Explain exactly what your licensing program is.

Barta: It's the most important aspect of Global Media's business. We will be licensing to businesses their own private-label storefronts to sell entertainment products. These will include textbooks, books, a catalogue of 250,000 CDs, videos, DVDs, and magazine subscriptions. The licensing program will run off our back end. In addition to providing the licensees the catalog of products, the fulfillment service, the electronic-transaction processing and the store portion of their Web site, we will also be providing them with editorial

Winston Barta

and multimedia content for their store. Indieaudio and Indielife are a showcase of some of these content elements.

We provide the storefront for free to the licensees and share the revenue of the products sold through it as well as the advertising revenue. The revenue split is based on the volume the licensee does: The more volume they do, the more of the revenue they keep."

RW: Your initial announcements indicate that Indieaudio will provide the "content feature." Could we get more details? What kind of content are we talking here? What's the appeal?

Barta: Currently, Indieaudio and its sister site Indielife are quite similar but the sites will diverge over time. Indieaudio will become a resource for independent artists. It will consist of several venues to showcase their work, the current one being the online radio station. Other planned venues include a community-type environment where artists can post their work, band information, concert dates, etc. Indielife is poised to be the central point for Internet independent culture and lifestyle. It will have all types of multi-media and editorial content geared toward the Gen-X/Y market.

RW: What are the "network of licensees" you refer to in your company statements? What authority do they have to grant a license? What will the license protect and prevent?

See ADVERTSIING, page 80 ▶

1999 Opens With Low-Power Concerns

Lynn Meadows

Groups continued to get their houses in order during the first quarter of 1999. At the same time, the FCC gave the industry plenty to talk about with its introduction of the Low Power FM Notice of Proposed Rule Making to create a new class of low-power stations. No shocking deals were announced last quarter, but the potential was there when Chancellor Media Corp. (NASDAQ: AMFM) sorted through its "strategic options" and did not rule out selling its entire company.

Steve Pruett, senior vice president of Communications Equity Associates, said the big news of the first quarter was that Chancellor was put on the market, taken off the market and reorganized. He said he thinks the Chancellor news "overshadowed" all other activity because would-be buyers were waiting to see what spin-offs would be sold if Chancellor were bought by another company. "I think the industry just held its breath while this thing was in play," Pruett said.

Chancellor's reorganization included

See FIRST QUARTER, page 83 ▶

Q1 Performance of BIA's Top 10 Groups

BIA RESEARCH

	Stock Prices	
	1/1/99	4/1/99
1. Chancellor Media Corp.	47.88	47.13
2. Infinity Broadcasting	27.38	25.75
3. Clear Channel	54.50	67.17
4. ABC Radio (Disney)	30.00	31.13
5. Cox Radio	42.13	51.13
6. Entercom	N/A	35.38
7. Heftel Broadcasting	49.13	43.38
8. Susquehanna	N/A	N/A
9. Emmis Communications	43.38	50.00
10. Citadel Communications	25.88	33.13

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World Radio History

The Mighty Wurlitzer Radio Hour

A Trio Dedicated to Live Radio Creates a Special Cleveland Tradition in Nostalgic Show Fashion

Jim Davison

It's 6:45 p.m. on a wintery evening before Christmas, and I have been invited to attend my first live production of the "Mighty Wurlitzer Radio Hour."

More than 100 guests are making their way into a specially designed music hall in northern Ohio.

I notice announcer Wayne Mack, organist Larry Kass and the president of WCLV(FM), Robert Conrad, going over final notes for tonight's show.

As I look around the room, I see an early "On Air" sign above the Wurlitzer organ. I notice about a half-dozen old carbon and ribbon microphones, some with the call letters WCLV and KASS displayed on them.

The time is 6:55 p.m. The mood is set.

WCLV Engineer James Patrick Murphy makes a final audio check. The live show will be recorded in stereo onto digital audio tape.

At exactly 7 p.m., the lights in the room begin to fade and my heart starts to beat a little bit faster. I have never been to a 1930s radio production.

Since 1993, the trio of Mack, Kass and Conrad has created a special series of live radio events in Cleveland — a dozen shows for broadcast on WCLV, built around themes such as Christmas, spring, the Fourth of July and Thanksgiving.

One day, about six years ago, Kass was seated at the 1928 Mighty Wurlitzer Organ when a friend, David Lemire, was visiting. Lemire heard Kass playing the organ, entered the room and was impressed with what he heard.

Kass said, "David, I know you're a sponsor on WCLV. You should sponsor a music show, so the people could hear what the Mighty Wurlitzer organ sounds like."

Lemire went to WCLV and returned with Conrad so Kass could play a few numbers. Conrad obviously liked what he heard. He told Kass and Lemire, "We will do a radio broadcast, and we will call it 'The Mighty Wurlitzer Radio Hour.' We will feature Larry at the organ and piano. I will read the commercials of the sponsors, and we will get Wayne Mack, the dean of Cleveland radio, to narrate the show."

"And," he said, "we will do the whole production live."

Within a week, Mack visited to hear Kass play. The three men discovered a special bond in radio.

Wayne Mack, left, and Robert Conrad work the microphones as Larry Kass looks on from the organ.

Each show, they decided, would have a theme. Mack is the creator of the shows; he has been on the Cleveland airwaves since 1931 and is now in his 68th year as a broadcaster. He spins stories about each song, their backgrounds and writers, what the theaters were showing back then and other interesting history.

The men rehearse the show. This gives them a chance to edit it and get their timing down to the second. During a one-hour show, Kass will play 35 to 50 songs without sheet music.

The men

Kass began playing piano at age 5. He made his radio debut on WSPD(AM) in Toledo, Ohio, at age 11, on "Uncle Jules' Kiddie Carnival Show." At 12, he discovered jazz.

In high school, Kass played piano on a live program on WTOL(AM), located atop Toledo's Bell Building. He entertained listeners every Saturday night, and would join singer Bob Howe to perform a half-hour nostalgia radio show. In college, he performed and wrote musicals while studying medicine. Today, he is a medical professor at Case Western Reserve University.

Mack started his career as an announcer in Cleveland in 1931 at radio station WJAY. He left in 1934 to join WGAR(AM), where he stayed for 16 years, then moved to WDOK(AM) in the Cleveland Recording Co. building.

There, Mack created "Home Town Park Band," a program airing concerts from various make-believe locations. Later, he moved to WZAK(FM) and WRMR(AM), where he performed "The Palace Ballroom on the Lake," this time fooling listeners with a ballroom filled with guests and entertainers. Today, you will find Mack's rich voice on WCLV.

In 1997, he received a Citation for Distinguished Service in the field of radio from the Ohioana Library Association in Columbus. The following year, he was honored with a Lifetime Achievement Award from the March of Dimes at the 1998 A.I.R. Awards.

Conrad is president and broadcast manager at WCLV, and a fixture of Cleveland's classical radio and performing arts scene. He began his career as an announcer at WKAN, Kankakee, Ill., at the age of 14, and became known as "Sagebrush Bob." For more than 30 years, his has been the voice of the Cleveland Orchestra, and his commentaries on orchestra broadcasts are heard worldwide.

The Mighty Wurlitzer first entertained in the Plaza Theater in Kansas City, where it was installed in October of 1928.

In the 1950s, it came into the possession of organist Ronald Wehmeyer, who restored it in his home. That work took 13 years. Kass acquired it in 1987.

The piano in the radio productions is a 1927 Steinway Duo-Art Aeolian Reproducing Piano that once belonged to H.T. Keller, president of Chrysler Motor Co. in the 1920s and '30s. The organ and piano are arranged so Kass can play them both from one seat.

James Patrick Murphy is the technical engineer for the live shows. He uses a Sony MXP-21 mixer and records the programs onto a Tascam DA30 DAT Recorder.

His microphones are an Electro-Voice RE20, which Mack uses during the program, and Shure SM57s used by everyone else on the set. A Shure SM81 mic is used on the organ. Two AKG 225 mics are mounted over the pipe organ chambers; the piano is equipped with Audio-Technica 4030 microphones.

It's Christmas and we're back in the Mighty Wurlitzer music hall in northern Ohio. The On Air sign is lit, and Kass begins to play the "Mighty Wurlitzer Introduction."

Special program

Announcer Mack steps up to the microphone, and in a deep voice shouts, "Good evening everyone, and welcome to the 'Mighty Wurlitzer Radio Hour,' with your Organist Larry Kass, along with Robert Conrad and Wayne Mack. We are glad to see each and every one of you as we present tonight a special Christmas Program."

The crowd responds. Conrad is swinging his arm, keeping the applause alive. He brings his hand down, the signal for the crowd to stop. Kass brings up the organ volume and Mack begins to narrate tonight's story.

Ten minutes into the program, Mack says, "Here is Bob Conrad to tell you about tonight's sponsor." Conrad does a live two-minute commercial without any errors.

I'm amazed at how well the production is going and at the quality of the sound in this room, with more than 100 people and 1,000 organ pipes.

In the next 45 minutes, Kass plays dozens of songs that fit the Christmas theme. Conrad reads two more live commercials.

As the show ends, I look at my watch. The show has lasted exactly 59:30, just like a broadcast show in the 1930s. Kass' Wurlitzer playing, Mack's distinctive voice and Conrad's stage expertise have made this a lifetime experience.

Afterwards, everyone enjoys side-dish entrees prepared by Kass' wife, Sarah. The night was perfect.

WCLV radio has aired the 'Mighty Wurlitzer Radio Hour' since 1993.

Wurlitzer Hour on Tape

Kass has put together a package for fans who would like to relive radio's past. There are 30 cassettes and CDs, containing more than 800 songs and 12 Wurlitzer Radio Shows.

For a free catalog, call Razz-Ma-Tazz at (800) 776-6455, or write Razz-Ma-Tazz. P.O. Box 401, Hinckley, OH 44233.

Radio World Cool Stuff Award NAB

Shure KSM32 Microphone

It's hard to crack the radio microphone market, which is dominated by a few established models, but a few suppliers have done so in the past couple of years.

Shure is back in the studio microphone market with a cardioid condenser mic that was designed for critical audio work and impressed our judges for its performance and look.

The side-address KSM32 has Class A transformerless preamp circuitry, a 15 dB attenuation switch, switchable low-frequency filter and three-stage pop protection grille. The SL version also has an elastic shock mount. Retail price for the SL model is $1,029.

For information, contact Shure Brothers in Illinois at (847) 866-2200, fax to (847) 866-2279, visit the Web site at www.shure.com *or circle* ***Reader Service 120.***

Jack Contney poses with the KSM32. Jay Leno looks on?

World Radio History

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World Radio History

L.A. Businesses Support Anti-Radio

Sandy Wells

Tim Trenton is fed up with corporate radio executives who can't take a joke. He's a disc jockey in Los Angeles who rejects the notion of the researched, niche playlist, instead airing an unfiltered potpourri of unsigned/small label acts and asks callers to vote for the songs they want to hear again.

His radio show, "Anti-Radio," airs early evenings on a station that, otherwise, has nothing to do with the local music scene. Tim "Poorman" Trenton, however, is proving that advertisers in the region will support his free-wheeling, anti-corporate radio show.

To see Tim "Poorman" Trenton perform his show "Anti-Radio" on the air, you have to visit studios in Pasadena, Calf., which is about 20 to 30 minutes traveling time outside the station's signal coverage area to the south.

"Anti-Radio" runs on KMNY(AM) 1650 in Pomona, a 5 kW brokered-time station at the extreme right of the AM band owned by MultiCultural Radio Broadcasting. Heard throughout Orange County and parts of Riverside and Los Angeles, "Anti-Radio" comes on after four hours of financial talk shows. It's not the best of lead-ins.

After Trenton signs off at 8 p.m., KMNY runs all Chinese programs until noon the next day. Forget about building "stationality," by the time Poorman comes on again at 4 p.m., he must win back his audience, which KMNY Station Manager Jeremy Landau believes ranges from 5,000 to 20,000 listeners per hour. Playing music on a small AM, non-Arbitron-rated station is a tough sell.

> **A thousand bucks a month is dirt-cheap for the plugs you get.**
>
> — Win Lam

Last summer Trenton was making money on another small Orange County station, KPLS(AM).

Rebellious radio

The Poorman is not only incensed about the music business. His battle with the corporate world includes a resentment toward Infinity, the company that fired him, and a lawsuit against MTV and KROQ-FM on the copyrights of "Loveline," a radio show that originated on KROQ-FM and is now in syndication.

Most of all, Trenton laments what he views as the theft of "Loveline," the nightly teen sex and romance talk program he originated with Dr. Drew Pinsky while working as an air personality at the Pasadena/Los Angeles station in 1983.

KROQ-FM directors later fired him for pulling a prank on morning show hosts Kevin and Bean. A string of short-lived comeback attempts followed on commercial stations KIIS-FM, KPWR(FM) ("Power 106") and KACD(FM)/KBCD-FM ("Groove Radio").

Trenton is currently suing MTV and Infinity's KROQ-FM over ownership of the program. Neither MTV nor KROQ will comment on the lawsuit.

Then Trenton struck out on his own. This time, he was determined not to be bound by the constraints of a commercial radio format.

"I can choose from 10,000 independent labels and unsigned bands out there. The big stations choose from the five major labels," Trenton said.

"He needs to be where he can be creative," said Wahoo's Fish Taco owner "Win" Lam, one of the first sponsors of "Anti-Radio." "Every week the numbers go up. It gets harder and harder for me to get through (on the listener lines). The only people missing are the indie labels buying the time."

The Poorman welcomes unsigned bands to his show.

Trenton's rebelliousness is not a manipulative ploy. His lack of guile and skill at corporate gamesmanship may have allowed him to lose control of "Loveline." Poorman's downbeat idealism may never make him rich (unless he wins his lawsuit).

For now, a small AM station has become the perfect vehicle for fulfilling his promise of giving listeners a concentrated dose of new music, paid for by a small group of visionary advertisers.

Listener response

On the air, Trenton is not above groveling for sponsors or berating those who owe him money. But behind the posturing appears to be a sincere effort to provide a prime-time outlet for exposing some of Southern California's thousands of struggling rock, hip-hop, rap, punk, metal, and even jazz artists to an audience adventurous enough to find music on a small AM signal.

To date, those sponsors that have signed on include Hansen's (natural soda), Mountain Dew, Pacifico Beer, Wahoo's Fish Taco, Ski Mountain High, a number of local rock clubs and a local real estate broker.

Listeners are invited to respond to what he plays. From their preferences, he compiles a weekly "Anti-13" list of the most-requested songs. He continuous to sponsor "Anti-Concerts" at clubs such as Jack's Sugar Shack in Hollywood and Hoagie Barmichaels in Newport Beach.

"It's money well spent," said Lam. "A thousand bucks a month is dirt-cheap for the plugs you get."

Breaking in bands

"An endorsement from him is worth it, even though he's not what he used to be," Lam said. "It will take a long time to wear out. He broke tons of new bands on KROQ-FM. That's what bothers him. They don't call him back (now)," said Lam.

Successful bands he helped launch such as No Doubt may have no time for the rebel air personality now, but lack of appreciation hasn't dampened his enthusiasm for the music.

"Poorman lives for breaking new bands," said Lam. "He also loves to tell them when they suck (though), he'll find very nice ways to tell them they don't have it or that they need to work harder at bringing people in to see them perform."

In his deadpan performance voice, Trenton said, "The big corporations like niche (music) radio formats to increase ad revenue. It's not because people want niche. People like the variety."

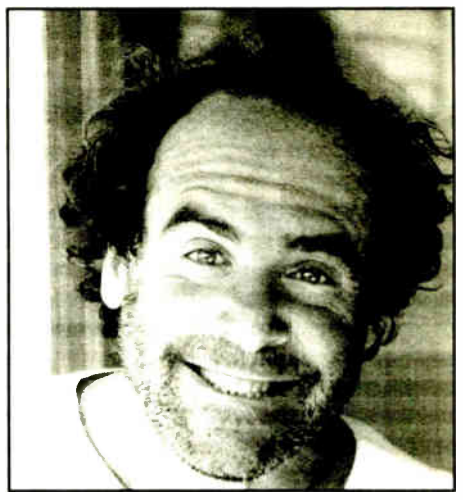
Or do they? In fact, "Anti-Radio" fans were recently engaged in a debate regarding the question: Should "Anti-Radio" play only punk bands? Studio guests Rick and Brigg said that an all-punk format would draw a bigger audience. When fans are looking to build audience share, it's worth discussion, according to Trenton.

"Should we change the format to all punk instead of all kinds of new music?" Trenton asked on-air. The debate continues at this writing and the format remains varied in music genre, but limited to unsigned bands.

Unconventional ads

The Poorman's show can improve your love life, according to testimony from a young man who called in during a recent anti-radio show. He said he got a date with a girl while on the Internet after he revealed that his band was played on KMNY. She had heard of the "Anti-Radio" show and agreed to a date.

Callers are interrupted but all listeners participate in the live commercial for a soft-drink distributor. It is the ceremonial opening of the Hansen's soda cans, which is known as "The Daily Hansen's Functional Hour," named after a line of beverages from the Corona, Calif.,-based beverage company.



Tim 'Poorman' Trenton

According to Trenton, everyone grabs one can of soda and on his cue, the Poorman and all those in the studio, pop open their cans, preferably close to a live microphone. And, of course, everyone agrees that the drink has good taste.

Hansen Beverage New Business Development Director Robert Scott said sponsoring "Anti-Radio" is a way to build word of mouth about their new product lines and to earn the loyalty of thousands of young, physically driven surf boarders, skate boarders and skiers.

"Coming in [to the clubs] with the DJs and the bands help build demand for the product," said Scott. "It's very, very soft sell. (The kids) look up to the bands and if they see them drink (Hansen's) they'll try it."

Another unconventional way to bring in revenue is the "Anti-Radio" format's "Payola Hour." Band members are seated in the studio for an interview that they've paid for. Following a brief plug of their next live performance schedule, Trenton launches into a short set of songs culled from the band's CDs.

Is Trenton opposed to radio, as the name suggests? Not really.

"It's 'Anti-Radio' because it's music on AM," said Trenton of the radio project he began in 1997.

"We only play unsigned and independent artists. We play all sorts of styles of music in one format from rap to country, punk, hard core, jazz, Chicano, Salsa, blues. We let the people decide what they want to keep hearing."

■■■

Sandy Wells is a Los Angeles-based reporter. Reach him via e-mail at sandywells@prodigy.net

COMING SOON

Coming in GM Journal

Cyber House: The Final Column

The Players: Real Or Media?

CBS Promotions Group: RW Talks With WINS' Greg Janoff

Radio World

World Radio History

The Right Profile: Net Radio Ads

James Careless

In the new trading place of Internet-related advertising, radio is blowing away the competition. Its share of the market is growing radically faster than either of the stakes claimed by television and print.

In fact, according to the latest information from Competitive Media Reporting, the Internet industry spent $44.6 million on radio advertising in the first three quarters of 1998, compared to just $15.6 million for all of 1997.

TV's share is larger: $146.1 million for the first three quarters, and $169 million for all of 1997. Still, its growth is nowhere near that of radio.

And indeed, of all the media measured by CMR, only radio's first three quarters of 1998 exceed its 1997 total.

Radio's attraction

So why are Internet companies buying radio?

America Online spokeswoman Wendy Goldberg said, "It's a relatively inexpensive way to reach out to a lot of people."

Most of AOL's radio buys occur in the summer, Goldberg said, "It's when people travel a lot in their cars or lay on the beach listening to radio."

Meanwhile, Brian Sroub, vice president of marketing for software vendor Beyond.com, lauds radio's access to

motorists stuck in traffic.

The reason? Beyond.com's radio campaign features frustrated commuters. The campaign aims to present the same kind of people as those actually hearing the commercial via radio. Having built this empathy, the company's pitch then goes in for the kill.

"We get them at the relevant moment and say, 'Boy, if you were buying software from home, you wouldn't be doing this,'" Sroub said.

He said the radio medium serves the company's pitch because of the length of the ads and the targeted audience their ad campaign wishes to reach: commuters stuck in traffic.

"Radio offers a way to get your message out in a somewhat longer format — 60-second commercials — and in a very targeted way."

Beyond.com's pitch is served well by radio, Sroub said.

"We think broadcast in general, but radio in particular, is one of the ways you can actually create a brand. Perhaps better than print, even," Sroub said.

One thing is clear: Radio works for Beyond.com. "We see that, in the markets where we have radio, the business has gone up quite a bit more," said Sroub. "It's about 75-percent greater growth than in your non-advertised markets."

We think ... radio in particular is one of the ways you can actually create a brand. Perhaps better than print.

— Brian Sroub
Beyond.com

Mega Web presence and co-branding partner to many Web-based, virtual businesses, online bookseller Amazon.com buys radio.

"It helps us reach both a national audience and a local audience in a very efficient and effective way," said spokesman Bill Curry. "Radio in particular allows us to talk to key targeted markets. TV puts us on programs that reach key demographic groups."

As the age of push technology forges ahead, many radio industry companies are becoming Web-based in addition to their traditional off-line stature. Interep, a research firm based in New York, has added the New Business Development Division to its company profile.

The new division is dedicated to pursuing Internet radio-related marketing and e-commerce information. Stewart Yaguda, president of the new division, said targeting audiences and co-branding are important but that's not all there is to radio and the Internet.

"These are all good reasons, but there are even more," said Yaguda. "If you take a look at the profile of the Internet user, it really matches up very well with radio."(Both users and listeners are young, more educated and busy.)

He said at-home surfing cuts into prime time TV viewing. In fact, "Something like 30 percent (of those) using the Internet say they watch less TV, whereas 7 percent of those people who are on the Internet say they listen to more radio now," Yaguda said.

Radio's saving grace is that you can use it and surf the Web at the same time. That's something you can't easily do with TV or print. Hence it makes sense for Internet-related companies to use radio: It just has more going for it.

The bottom line: Because it can co-exist with Web surfing and because its prime usage doesn't mirror that of the Internet for home users, radio is the medium that will probably profit most from the current Web explosion.

In contrast, it's TV that is most likely to suffer, just as radio did when television was introduced on a mass scale five decades ago. Evidently what's taking place as far as radio is concerned, is a classic case of "what comes around, goes around."

■■■

James Careless is a frequent contributor to ***Radio World****.*

Gala Radio Honored For Excellent Service

Joseph Lemire knows a few things about survival in a tough radio market.

Over the past five years, the president of Gala Radio in Kiev, Ukraine, has seen the worst of regulatory capriciousness, a stagnant or worse advertising market and truly unfair competitors.

At the same time Gala Radio has managed to persevere to create an innovative, community-oriented radio service that is the winner of the 1999 NAB International Broadcasting Excellence Award in the single or independent station category.

In 1997, the government seized the station equipment and reassigned the Gala Radio license to a competitor. But Lemire managed to win a court case that overturned the "coup" and soon Gala Radio was the leading commercial station in Kiev.

Key to the success of Gala Radio is its team management approach to running the station and its close involvement with the community.

"We pushed community service," Lemire said.

Among the projects the NAB recognized were Gala Radio's annual charity bazaar and the Children's Charity Contest, which invited listeners to mail in small-denomination bills to help a Kiev orphanage.

The station has also organized charity 5k and 10k races, "Save the Trees" urban environmental campaigns, a soccer league and charity musical projects.

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Circle (230) On Reader Service Card

World Radio History

Internet Audio: The Gen-X Scene

▶ ADVERTISING, continued from page 75

Barta: Global Media is building a network of licensees, all interfaced to our back end, through which we will distribute all these products, all this content and, of course, advertising. We offer the completely customizable storefront for free. It's a turnkey operation. Licensees can choose which products and content elements they want on their site. Licensees can enter the world of e-commerce without having to invest in any of the infrastructure or management of the project. Global Media participates in the sales and advertising revenue.

Our primary target market for the licensing program consists of media companies, particularly radio stations. Radio stations have millions of extremely loyal listeners coming to them for music. Global Media now offers them the ability to sell music and videos and books to those potential customers, online, without suffering the customer erosion inherent in affiliate programs.

Participation in an affiliate program essentially entails giving your customer away: You send them to a retailer, and the retailer keeps them. With Global Media's licensing program, the entire purchase experience takes place on the licensee's site, no customer erosion. Licensees maximize profit and are able to market products to their existing as well as an expanded customer base outside their normal market. Since launching the licensing program in mid December, we've amassed approximately 1,500 licensees, most of them radio stations.

RW: *Can you elaborate on your referral to the "further direct revenue opportunities" that your organization announced were available to radio stations in February of this year?*

Barta: Now here's your network: You've got 1,500 radio stations, representing nearly 10 percent of the North American radio market, with millions of listeners, who now have the financial motivation to leverage their customers online, to their store, which is hosted and provided by Global Media. Through that store, we can distribute, products, content and advertising.

Radio stations are only the beginning. We're going to be targeting television stations, newspapers, magazines and bricks and mortar retailers. We're on our way to building an immense and powerful network.

RW: *Explain what you mean when you say Global Media is an "aggregator" of the various technology and content elements required for the successful retailing of Internet products over the Net.*

Barta: If you want to sell entertainment products on the Internet, namely books, CDs, videos and DVDs, you need to aggregate a group of components.

Those components are broadly divided into two main categories. First are the back-end technical infrastructure components and second are the front-end Web site and compelling editorial content that makes a site interesting, *sticky*, and provides utility beyond just a catalog service.

So we've taken all these back-end components, the catalog of a quarter million CDs, 150,000 videos, 2 million books, the transaction processing, the multiple-fulfillment partners, and created the database architecture and integration that makes it all function with the front-end components.

On the front end we've got an encyclopedia of entertainment content, sound samples, licensed editorial content, proprietary editorial content, interactive content-like chat and user-posted reviews and even our own radio station. We've taken all these components and we offer it as a business-to-business, licensed, managed, turnkey solution. So any company that wants to get into the business of distributing entertainment products over the Internet can get their own private-label store, with content, from Global Media.

RW: *But why would a radio station want to become a licensee?*

Barta: Right now, stations really don't have a financial motivation to go on the Net; there's no revenue. How will they generate revenue? Using Global Media, they can put up their own Amazon.com-like storefront. Your station can sell tailored-to-audience items like books and CDs. Global Media's licensee program is all about setting up your own *e-tailing* site according to your own business plan.

You're the boss; you can market and build brand-name recognition for the site any way you want. We'll give you that store, and you can call it KFOG.com, or whatever your call letters are.

Plus, we'll provide the content. It's a private-label store, with your station's own feel, designs, and colors. This gives stations a viable e-commerce outlet.

RW: *Who's been buying your streaming audio and video spots? What's the cost? Can a local restaurant or nightspot, for example, afford to advertise? Are you using live jocks on the Net station selling as they do on the air?*

Barta: In the short term we do not see advertising as a viable revenue model for Indieaudio. However, when our network of licensees is up and running, there will a huge market for broadcast and other forms of advertising. Live jocks on the Net selling as they do on the air will happen in the future.

RW: *Why are Indie bands such an important marketing item?*

Barta: They represent a highly underserviced market on the Internet. They also have a very loyal fan base which can be leveraged onto our sales site.

RW: *Will these unsigned bands pay a fee? How much? Any guarantees if they do pay the fee? And if they offer downloadable music, why should anyone buy their CDs?*

Barta: We will split the revenue on the sales of bands' digital audio files. We will also be able to offer fulfillment for their hardcopy CDs if their music proves to be popular. No fee for the bands. We may ask for a percentage of the publishing rights if they get signed.

RW: *How's your newly launched online licensing center going?*

Barta: It's doing great!

RW: *You mention that BMG, EMI, etc., have pledged to develop standards which would allow more widespread digital-music sales. Why should these industry leaders and high-tech companies be interested in protecting artist rights, and are they really the proper reps for musicians?*

Barta: I can't speak for the labels or the other organizations, but I'm sure that everyone is interested in protecting the artists' rights.

RW: *You mention that you will employ cost-effective marketing. What are your strategies, and how have they helped Global Media?*

Barta: Sorry, that's a trade secret.

RW: *How many unsigned bands have checked in?*

Barta: Over 100 so far.

Barta also said that Indieaudio offers users the ability to optimize sound quality based on their individual connection speed, adding that the station can deliver broadcasts at "near-CD quality."

Indieaudio launched with an alternative-rock channel. Two weeks after launching the Internet radio station, Global also announced a deal to sell thousands of mainstream textbook titles through its licensing program.

Working with distribution partner Baker & Taylor, Global will offer home delivery of the textbooks.

Global President Metcalfe's comments about the textbook deal resonated with the Gen-X/Y-oriented strategy of his ambitious, upbeat new company:

"Our licensees targeting the college segment can now tell their customers to stay home and have another beer," said Metcalfe, "while ordering books from the comfort of their dorms while listening to Indieaudio.com."

■■■

Bill Mann is based in San Francisco and is a regular contributor to ***Radio World****.*

Radio is only the beginning. We're going to be targeting television stations, newspapers, magazines and bricks and mortar retailers.

— Winston Barta

Radio World Cool Stuff Award

Applications include EAS A-to-D conversion, remote pickup to digital conversion, and backup switching to a digital or analog alternate program chain. List price is $1,595.

For information, call TFT in California at (408) 727-7272, visit www.TFTInc.com *or* ***circle Reader Service 114.***

TFT 999 Digital Insertion Unit

The Model 999 is designed for use at "all-digital" FM stations. It allows an AES/EBU or analog signal to be inserted in the station's AES/EBU signal path.

Intended to serve as the digital version of the Model 940A program/Transmitter Interrupt Unit, it also can insert any analog audio into an AES/EBU program chain.

Jesse Piatte of TFT picked up a Cool Stuff Award.

World Radio History

STATION FINANCING

Post-Closing Blues: The Lovefest Ends

Dain Schult

This is the final in a series of 14 stories on becoming a radio station owner.

Just like the Skipper and Gilligan pulling out away from the dock with their passengers for that "three-hour tour," you're thinking there is smooth sailing ahead, routine stuff. What could possibly go wrong after the closing?

After all, you're "in" now. As owner, you are master of your own destiny, you control the vertical and the horizontal, right?

Wrong.

Despite weeks, months or even years of show prep for this momentous occasion, Mr. Murphy and his band of merry pranksters can come to live with you with such a vengeance, you might think you're stuck with paying back Adolf Hitler's karma.

What could possibly go wrong? Everything, almost all at once.

Dodging bullets

The key is not to just have reams of operating and contingency plans lying around, but to have the flexibility to improvise at a moment's notice.

Once the former owner is out of the picture, skeletons that were tightly packed up in the back of the closet that you failed to see during your due-diligence tend to finally come tumbling out all at once. Every employee who didn't take all of their vacation time before now will be jumping up and down now either to take it or be paid in cash for passing on the time.

Plus now it is becoming more apparent as to who really likes whom inside the staff. Or, it becomes obvious which staff members are really enemies or different thinkers. It can be a short honeymoon. Just remember in a smaller market, gossip is a major source of entertainment and in some regions of the country, it is considered a blood sport.

You will soon know more about every one of your employees than you ever wanted to know. And they will know more about you — whether you told them anything about yourself or not.

Inevitably there are alleged creditors who will show up flaunting verbal agreements that prove beyond a shadow of a doubt that they are owed something by the station.

Then there are the would-be broadcasters who have been biding their time until you have closed and taken over operations. Now, they are willing to step in and offer their take on what the weaknesses and wrongdoings at your station are and why no one is listening to it any more.

After due diligence

This is normally the point at which the transmitter decides to shut down for a break or the control room board wiring wants to short out. Everything checked out swimmingly during the due-diligence period. But that was then.

This is now. And now can really get you.

Did I mention the weather?

Haven't seen a hailstorm around these parts in a dozen years until of course you've closed on the station ... then it's time for the hundred-year storm with hail the size of cannonballs that blows holes through the roof of your building.

What do you do with all of this? Display the wisdom of Solomon, the patience of Job, the creativity of Edison and the Teflon coating of Clinton and you'll be just fine.

Seriously, you have to learn, very quickly, not to take *everything* seriously.

If you have few, if any, financial partners, you'll be okay during this period.

If your partners have no prior broadcast experience, the atmosphere can change abruptly and not necessarily for the better. Some investors are risk-averse and unfortunately, understanding-averse. They can see the hail landing on the ground but can't square that with what it is doing to the bottom line.

You have to have the flexibility of projecting sales and expenses that allows for some wiggle room for things you can't control. Otherwise you'll be behind from Day One and never really able to catch up.

Another key is to avoid over-promising and under-delivering. That is the eternal challenge of dealing with OPM (Other People's Money). You want a partner who can see beyond the immediate to the long term.

How bad can it get? Here are some hypothetical doomsday scenarios.

You work diligently toward finding a financial partner.

You finally locate that partner and a marriage is arranged. You immediately start to execute your business plan but because everyone is in the lovefest segment of the proceedings and you have your partner's blessing to add more bang to the proposal, you increase the size and scope of the plan.

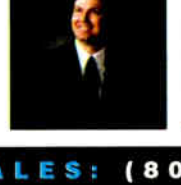
Instead of just buying one or two stations, you go for building a group much more quickly. Everything accelerates and suddenly you find yourself running out of time on a daily basis.

There just doesn't appear to be enough time in the day to negotiate new deals, handle the due diligence on the pending and proposed deals, deal with the lawyers, placate the bankers, implement the operating plans with the existing acquisitions, oversee all of the operations and remain focused on the bottom line.

Add to this bubbling cauldron the fact that details are dropping like raindrops

See OWNERSHIP, page 82 ▶

It's a radio revolution.

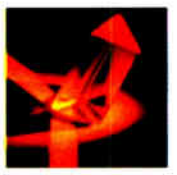


You've faced some battles in this changing radio marketplace and there are more challenges on the horizon. How do you get the most from your leaner staff? What efficiencies can be made to meet the ambitious ...want to win?

profit goals set before you? How

can you compete with the duopoly across town? It is a given that virtual radio must be part of your arsenal if you are to compete. How do you choose which digital automation system to

depend upon? What if we assure you of no off-air time? Let us give you a system that can accommodate growth from one or two



workstations to hundreds. Is ease of reassigning workstations or adding hardware important to your station group? This is real user-friendly GUI interface. We have something so scalable that big groups, small groups and single stations will find us affordable. And it is flexible enough to meet your most specific demands. What is it? We have taken our AudioWizard–the current industry leader–to the next generation. Call us or visit us on the web at www.prophetsys.com.

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I demanded that NexGen™ surpass your current needs so you can lead the market rather than follow.
You make the rules with this amazingly flexible digital audio product.
- Kevin Lockhart , President kevinlockhart@prophetsys.com

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Circle (73) On Reader Service Card

World Radio History

Dealing With Other People's Money

▶ OWNERSHIP, continued from page 81

through the cracks and then when you get to the important task of delegating any number of responsibilities to subordinates, they disappoint you.

Beat up your lawyer

The matter of picking Mr. Murphy up at the airport demands your attention. Equipment just has to self-destruct today. New equipment is also in the mix (with yet-unrealized new learning curves) and has to be installed. It doesn't deliver what was advertised and now you have the chance to get into daily verbal fisticuffs with vendors and suppliers. The next thing you know, in the aftermath of the visit from a representative from Murphy's law, you're passing out bumper stickers that read, "My lawyer can beat up your lawyer."

Now Mother Nature enters the fray.

First you get a drought of Biblical proportions and then flash-flood conditions. In between there are violent thunderstorms and hailstorms just to prove that they can show up. Lightening zeroes in on and repeatedly strikes only your tower. Hailstorms do serious damage to your station's dishes and vehicles but no one else's.

While the weather is pounding you, advertisers can play their games too. A major advertiser suddenly stops running ads because their own suppliers are on strike and they're in the throes of not getting product to sell. When that happens, you would think the competitors of this particular advertiser would jump at the chance to take up the slack left by their absence from the airwaves. But, you're wrong again.

The competing advertisers take the attitude that they don't have to advertise either any longer because their competition can't advertise and any interested consumers will show up at their doorsteps by default anyway. Perfect logic, isn't it?

Accelerated growth means more capital needs, which means you'll probably have to find a bigger senior lender and you need more equity partners to feed the baby that is literally bursting out of its high chair. That means even more meetings as one meeting begets another. Meetings eat up time, and time has now become the most precious commodity of all.

The addition of any new partners may also mean new learning curves for everyone. That can eat up time too.

By now you may be tormented by a recurring nightmare that you're appearing on the "Ed Sullivan Show" and your act is to keep dozens of plates spinning on their respective sticks without any of the plates slowing down and crashing to the floor.

The act starts innocently enough with just a few plates but with each succeeding plate added, the pressure mounts and the threat of plates crashing and breaking grows with each passing second. When do you wake up? After the first plate crashes or after the 15th?

Now that you've bolted upright in bed, what have you learned? Here are some key points to remember in becoming a radio station owner.

1. Everything can go wrong despite the best of intentions and plans. When the unexpected occurs, remember that you *can* have the satisfaction of having done your best to proceed according to your plan while displaying as much creativity and flexibility as possible when things didn't always run according to plan.
2. To thine own self be true. Despite any and all surprises that may whirl around you, you have to be true to yourself and your convictions. If you can't do that, nothing else matters.
3. Know yourself and everyone else who will be a major participant. Routine reference checks don't reveal much more than basic information on the people you may be working with and planning to depend on every day. You can check backgrounds and still not really know someone. Apply subjective gut-feelings and a rational review of their backgrounds in your approach. Don't ignore those intuitive feelings. Chemistry matters.
4. Tomorrow is another day. Nothing is worth dying over, not even radio. If you have assembled the right staff to work with you, obtained solid financial partners who will see the big picture for all seasons and you genuinely believe in yourself, then you can and will succeed. Persistence, in the end, will triumph.

If this were easy, everybody would be doing it. It is still the toughest thing to do in this business, but ownership is the thing that will only make certain broadcasters complete.

To each and every one of you, I raise my glass in salute to you. Good luck in your quest for this sacred goal.

■ ■ ■

Dain Schult, a consultant in the industry, has recently closed on his ownership of two stations in Austin, Texas. The deal marks his second experience in becoming a radio station owner. For more information or to contact Dain Schult, send your request to RW.

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NAB's 1999 Crystal Radio Award Winners

Brian Galante

Award-winning celebrations helped to kick off the NAB Radio Luncheon at NAB 99 last month in Las Vegas.

During the luncheon, the 10 winners of the 1999 Crystal Radio Award were announced. They were selected from among 45 nominees, chosen for their range of community programs and initiatives during 1998.

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1999 Crystal Award Winners

A winning circle

The mood of the event was upbeat. Prior to the award ceremony, Gary Fries, president and CEO of the Radio Advertising Bureau, addressed the room with a positive outlook for radio's future, noting that 1998 had been another record-breaking year for sales.

"Radio has never been stronger," said Fries. "We can (make it) continue to grow well into the next century."

The award ceremony was a celebration of community relations and good works.

KUDL(FM) of Westwood, Kan., was the first winner announced. General Manager Michael Payne accepted the award on behalf of the station.

Some of the many projects KUDL involved itself with included "Adopt-A-Family." The station also raised $2 million for local charities and

See CRYSTALS, page 83 ▶

World Radio History

Chancellor Moves Dominated 1st Q

▶ FIRST QUARTER, continued from page 75

the resignation of Jeffrey Marcus as chief executive officer. He was replaced with Chancellor Chairman Thomas O. Hicks. Marcus will continue to serve on the board.

James de Castro became vice chairman of Chancellor Media and president and chief executive officer of the newly formed Chancellor Radio and Outdoor Group. R. Steven Hicks became vice chairman of Chancellor and president and chief executive officer of its newly formed Chancellor Media Services Group.

The company plans to form a new Internet business unit. Chancellor also terminated the merger agreement between it and LIN Television Corp. Both Chancellor and LIN television are parts of the Hicks, Muse, Tate & Furst Inc. investment portfolio. Chancellor and Capstar Broadcasting Corp. (NYSE: CRB) agreed that Capstar stockholders will receive 0.4955 shares of Chancellor Media stock for each Capstar share held. Entercom Communications Corp. (NYSE: ETM), which bounded into the top 10 radio groups last year, went public in January, offering 13.6 million shares at $22.50 per share. The company's stock closed the quarter right around $35 per share.

In January, Citadel Communications Corp. (NASDAQ: CITC) announced that it would sell 25 radio stations in smaller markets to Chicago-based Marathon Media for $26 million in cash.

Local trends

Citadel plans to use proceeds from the sale to repay bank indebtedness. Citadel Chairman and chief executive officer Larry Wilson, said his company will "focus its energy on mid-sized markets."

For local station operators, a couple trends continued in the first quarter. John Casciani, owner and operator of country station WNUC(FM), Buffalo, is tracking several trends in his market.

"Virtual radio" is one of those, he said. Large groups are beginning to make use of "hub" programming and forming their own "mini in-house networks" to use economies of scale. He said business was good in Buffalo last year because groups were finding those economies of scale and the economy was very good. But this is a new year, said Casciani, and some of those economies were one-time savings. He said it will be interesting to see what happens this year especially if there is a dip in the economy.

Casciani is still waiting for the stronger spot rates that were expected from consolidation.

"I don't see that happening at all," he said. He said he would bet that the unit rate at most Buffalo stations is not increasing, but has fallen.

Casciani said he has also noticed a lack of opportunity for people in broadcasting in his market as local stations have been combined. He has had some of those people come knocking at his station door looking for a job. "Ours is the first stop," he said crediting that partly to the fact that the station is locally owned.

He said a lot of people in his market have taken new routes, seeking jobs in advertising, cable and television.

The FCC gave broadcasters plenty to talk about in the first quarter, beginning with its release of the Low Power FM NPRM. The idea of opening the FM band to hundreds of community broadcasters met with intense resistance from many broadcasters, who compare it to Docket 80-90, which allowed many FMs to be "dropped-in" to the band in the 1980s.

Another hot topic was the FCC's continued interest in broadcast advertising dollars in local markets.

On a select few of the assignment applications it receives, the FCC has included the comment, "We request that anyone interested in filing a response to this notice specifically address the issue of concentration and its effect on competition and diversity in the broadcast markets at issue." One Washington lawyer said "It's like hanging a 'kick me' target on their back."

For instance, Marathon Media filed an assignment application in February to acquire WYTE(FM), Whiting, Wis., from Sharon Broadcasting Corp. In its comments, the FCC wrote it "intends to conduct additional analysis of the ownership concentration in the relevant market."

The lawyer said this makes the interaction between the Department of Justice and the FCC more confusing.

"That relationship has never been clear," he said and "It continues to be muddy."

The FCC and DOJ have been more closely investigating large radio mergers since passage of the Telecom Act. Broadcasters are frustrated that both agencies review such mergers, and say the lengthy review process delays completion of transactions. The agencies say their duties do not overlap because they are looking at different aspects of the potential mergers.

Communications Act

As a basis for its market analysis, the FCC cites section 310(D) of the Communications Act, which authorized the FCC "to grant an application to transfer or assign a broadcast license or permit only if so doing serves the public interest, convenience and necessity."

Also in first quarter, the FCC, under the leadership of Chairman William Kennard, continued its interest in minority broadcasters. The LPFM proceeding is viewed by many as a way to provide broadcast opportunities to those who cannot afford to own stations.

The FCC released a study in January showing that broadcasters serving the minority community earn less per listener.

The study, done by Kofi Ofori, director of research for the Civil Rights Forum, found that 91 percent of minority radio broadcasters who responded said that they had experience with 'no urban' or 'no Spanish' dictates — instructions from advertisers not to buy advertisements on their stations

The result of those dictates and the lower rates paid to stations serving minorities reduced their revenues by an average of 63 percent according to the study.

▶ CRYSTALS, continued from page 82

and provided 150 tons of food and supplies for victims of Hurricane Mitch.

Mary Campbell, owner and vice president of winner KBHP(FM) in Bemidji, Minn., thanked the station's listeners and staff as well as the NAB "for recognizing stations who assist the community."

Among KBHP's programs last year was a 24-hour radiothon to end child abuse. The station also aired some 13,000 public service announcements.

Top of the world

KUEL(FM) of Fort Dodge, Iowa, headed an anti-drunken driving and drug abuse campaign that brought together students and law enforcement officials in the community.

A rapid rise of methamphetamine use and production as well as drunken driving were addressed with campaign messages. In addition, the station raised $40,000 for the United Way during a five-hour remote broadcast.

After being nominated for the past several years, Francis Nash, general manager of WGOH(AM) in Grayson, Ky., said it was "good to finally bring one of these home." The station airs the popular "County Conversation," on which local officials discuss local issues; it also sponsored a record-breaking local blood drive.

The station recently celebrated its 40th anniversary.

"We are still owned by the same local people who built the station 40 years ago, so it's a good way to celebrate our anniversary," Nash said.

WYTZ(FM)-WZTY(FM), a "double-dial" station in St. Joseph, Mich., continuously strives for improvement, according to Station Attorney David Oxenford, who accepted the award.

In 1998, the station hosted "Stuff-A-Truck," during which it raised 50 tons of food. In addition, the station provided free trick-or-treat bags emblazoned with safety tips for local children preparing to enjoy Halloween.

Richard Mecham, vice president and GM of Bonneville International, accepted awards for KSL(AM) in Salt Lake City and KZLA-FM in Los Angeles.

"We legitimately try to make a difference in our community," said Mecham during the acceptance speech for KSL. The station hosts "Let Me Speak to the Governor," a local show broadcast heard in other areas of Utah as well. KSL also provided 1,400 hours of airtime to local groups.

KZLA-FM sponsored "The Sunday Show," where 200 community leaders raised money for AIDS research and a food bank, among other community concerns. The station donated more than $3 million to the communities they serve, too.

KLOS(FM) of Los Angeles provides a great service to its communities with the "Community Switchboard." The Switchboard provides assistance with everything from consumer questions to suicide prevention. Maria Guardi, director of community affairs for the station, accepted the award.

Hometown hero

The station also sponsored the "KLOS Blood Drive," which yielded 3,700 pints of blood.

The seven-member staff of winner KBHR(FM) in Big Bear City, Calif., is certainly an ambitious bunch. All staff members participate in a total of 12 nonprofit organizations in addition to their regular jobs.

In addition to airing three political debates last year, the station located a few small children lost outside in the cold just before nightfall.

WHUR-FM in Washington, D.C., was the final winner announced. Its "Hometown Hero" series is popular among listeners. Additionally, "Project Harvest" raised $57,000 for Thanksgiving dinners for the needy, and "Project Hope" provided door-to-door immunizations for disadvantaged children.

Millard J. Watkins, general manager of the station, which is affiliated with Howard University, accepted the award.

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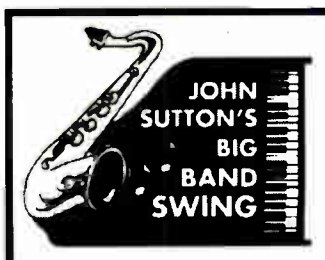

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Circle (65) On Reader Service Card

World Radio History

See Page 87

Radio World — Resource for Radio Production and Recording — May 26, 1999

PRODUCT REVIEW

Plextor Speeds Up CD-R Process

Read G. Burgan

Recently, I backed up 1.2 GB of files in under 28 minutes with two CDs at less than $1.50 each. There is no question that this small investment was valuable.

When my hard drive crashes, I will be able to reboot from my CD-ROM and restore everything including the operating system, registry, shortcut and desktop settings in one operation. My system will be exactly as it was when I made the backup. All of this is possible using Plextor's amazing new PlexWriter 8/20 CD Recorder.

The PlexWriter 8/20 CD Recorder

The PlexWriter 8/20 is an SCSI-based CD-Recorder that can record up to eight times normal speed and play at up to 20 times. It has a 4 MB buffer and comes in both an internal and external version.

Since I have three computers, I opted for the external version. Connecting it was a snap — almost. Plextor uses the "micro" 50-pin, SCSI-2 connector. I have two Pentium-II computers with Adaptec's Ultra-Wide 2940 SCSI PCI controller that use the 68-pin Ultra-Wide connector, and one Pentium-166 using an old Adaptec 1540 ISA controller with a 50-pin centronics connector. So in each case, I had to come up with an adapter.

On the two computers with the ultra-wide SCSI card, performance was superb. As long as I kept my hard drives defragmented and turned off any software that might interrupt a burn, the Plextor 8/20 breezed along at 8x speed. An audio CD containing 74 minutes of material burns in about 11 minutes, including write-in and write-out tracks.

However, on the computer with the older Adaptec 1540 ISA-based SCSI card, I couldn't even record at 4x speed. Replacing the SCSI card with an Adaptec ISA-based 1520B SCSI-2 card didn't provide much improvement. Only when I went to a full blown Ultra-Wide PCI SCSI card did I reliably achieve the full 8x record speed.

The moral of the story? If you intend to record at 8x speed, be sure your system is up to snuff. That means a state-of-the-art SCSI card and a fast hard drive.

I also have a Plextor UltraPlex 40 max CD-ROM player. Using the Plextor Manager software supplied with each unit, the two team up to make an effortless duplicating system. The Plextor Manager has an icon at the bottom of the Windows desktop.

By clicking on it, you have immediate access to a disk duplicating utility. Simply verify that the correct drives have been selected for player and recorder, select the recording speed, and click the "Start Copy" button.

The two units work flawlessly in tandem to make a perfect copy of the selected CD. You have the option of copying the CD to the hard drive first, but I have copied more than a dozen CDs directly from the UltraPlex 40 at a full 8x speed without a single buffer under run. How sweet it is.

Plextor also supplies Adaptec's CD Creator and CD Copier Deluxe software. CD Creator is an intuitively easy program to use, and allows you to select individual tracks from an audio CD or WAV files from a hard drive to make up a new audio CD. Similarly, files on any of your hard drives can be copied to CD using the same utility.

CD Copier is similar in function to the Disc Copy utility in the Plextor Manager software, but whereas the Plextor Manager software is limited to Plextor CD drives, CD Copier allows you to copy from virtually any CD-ROM drive that supports digital extraction.

I have only one fault with this version of CD Copier: If you choose to record an audio CD at 8x speed, the software defaults to a setting that forces you to first

See PLEXTOR, page 86 ▶

Microphone Surround - Sound Experiments

David Moulton

Part I of II

Although much surround-sound production is assembled in post-production from mono and stereo tracks, the temptation to actually record live multichannel surround information is quite strong.

Such recording presents some interesting problems, which are worth considering briefly.

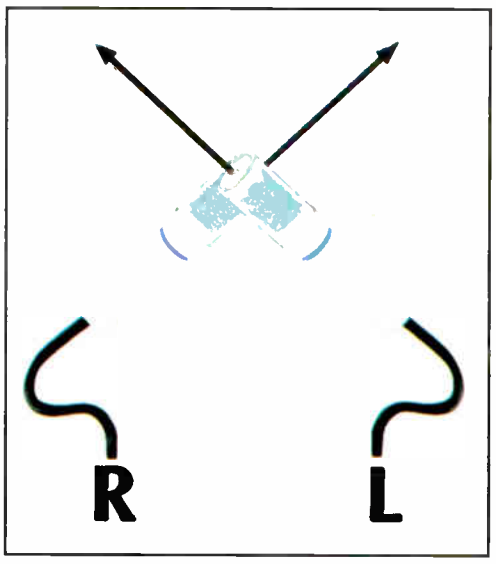
Let me point out here that surround miking and recording really does not blossom in a binaural "stereo" radio broadcast, and as such, is not a necessary skill. But it is invaluable for any production person or audio pro to have a working understanding of the technology and methods. And anything that makes you better at your job is worth knowing.

I recently completed an experimental recording of the Boston Classical Orchestra at a Faneuil Hall concert in Boston. We recorded the orchestra with three different surround-sound setups as part of a joint Audio Engineering Society (AES) and Acoustical Society project.

There are two ways to think about surround-sound miking. The microphones can be treated as a spaced array so that during playback delivers the audio "within the space" recorded by the microphones.

On the other hand, the microphones also can be treated as a coincident array, like a dummy head, so

See SURROUND, page 86 ▶



A coincident pair normally consists of two mics placed one above the other, angled to the left and right sides of the performing ensemble.

Circle (74) On Reader Service Card

World Radio History

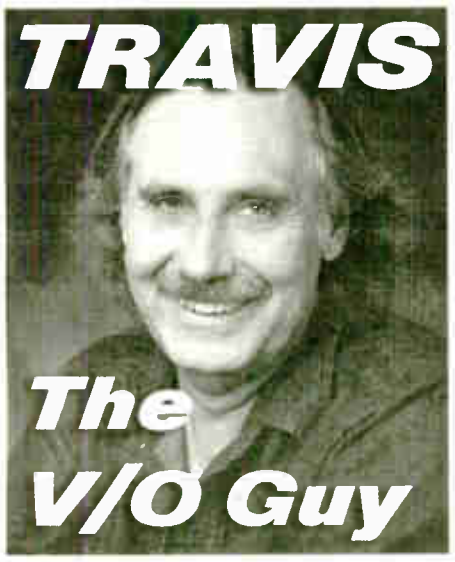
Use the Web To Your 'Ad'-vantage

Travis

It seems to me that it was only a few months ago that we discussed the Internet and how it relates to voice-over. Even though it has been only a short while, things are changing so fast on the Net, it seemed like this would be a good time to revisit the subject.

The most profound change in my career in the last few months has been that approximately half of my voice-over work has been directly connected to the Internet.

Most of the commercials I have done have included a Web address in the copy. The phrase *dot-com* has replaced "1-800" in terms of importance. If I get advance copy, it is almost always e-mailed to me rather than faxed. A few commercials have been for Internet services or companies whose primary business is on the Web.



Approximately half of the corporate or industrial narrations I have recently done involved the Net in some way. Either the subject matter was the Internet itself, or at least a portion of the recorded material was designed to be placed on it.

Living in the past

Some things are slow to change, however. For instance, almost all of my auditions in Los Angeles are still read from *fax* copy. Either my agent, or the production companies and advertising agencies who call my agent, have yet to figure out e-mail communication.

As far as I am concerned, that is very unfortunate. I have always found fax copy very difficult to read, even when the fax itself is clean. Often, the fax is a third- or fourth-generation copy, making reading almost impossible.

There have been some other Internet developments recently which, I expect, will be affecting voice-over talents in major ways.

The most important development is that an Internet connection is rapidly becoming a necessity for almost every business. Soon, almost half of the homes in the U.S. will be using the Net on a regular basis. That means that you can pretty much count on being able to use the Net to obtain and do business.

The second major Internet development that affects us is bandwidth, or the speed

See TRAVIS, page 88 ▶

TerraSonde Audio Toolbox

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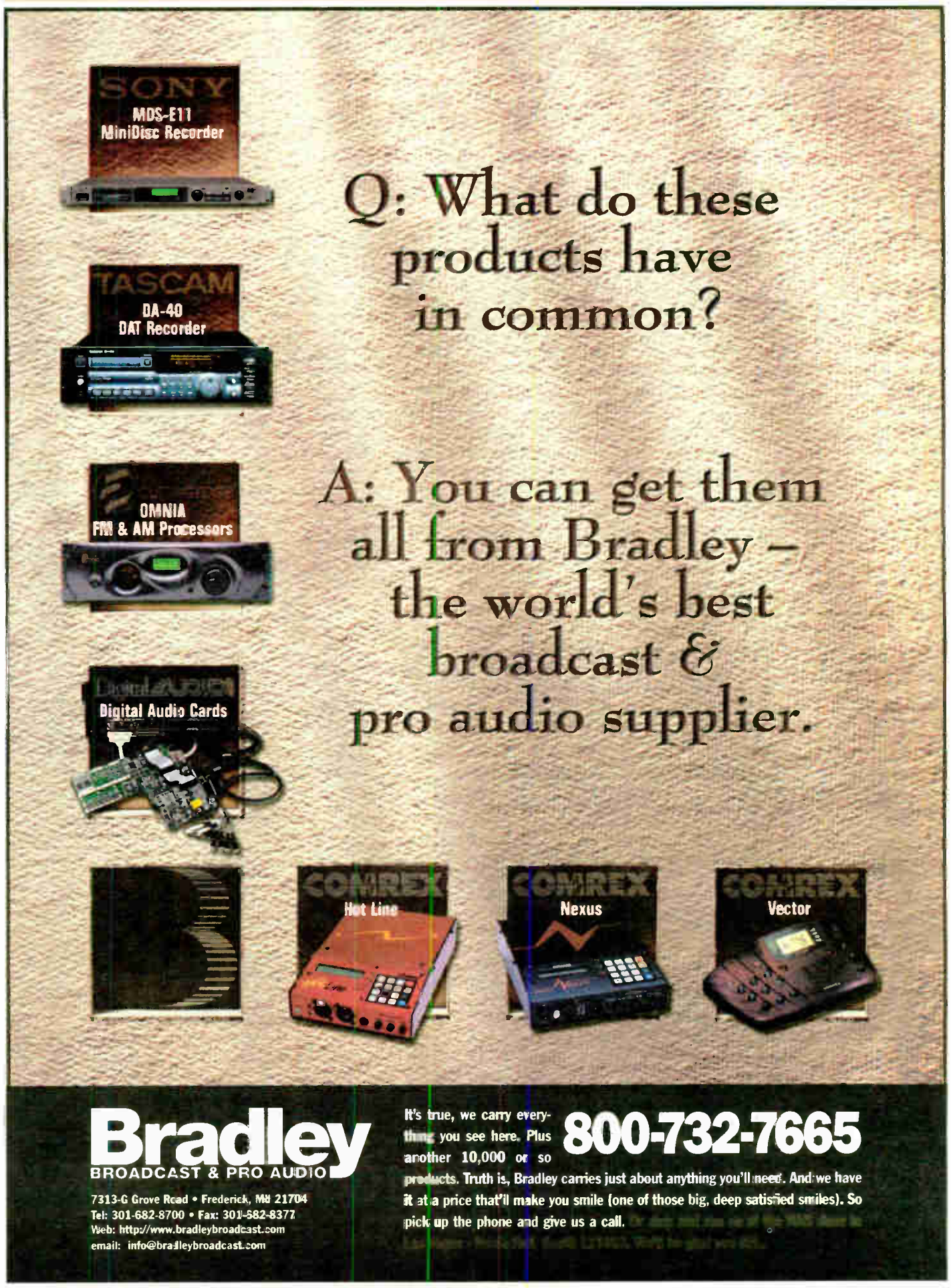

Circle (82) On Reader Service Card

World Radio History

Software Provides CD-R Help

▶ PLEXTOR, continued from page 84

copy an image of the files to a hard drive.

While having this ability in the event that the CD-ROM player can't supply the data at a fast enough rate is good, it should provide the option of recording on the fly. The time required to first copy the CD image to a hard drive cuts speed down to that of a 4x recorder.

Theoretically, you can uncheck this feature, but when you try using the 8x recording mode, it won't uncheck.

Smile for the software

Plextor also bundles another software with some of its 8/20 recorders. Called CD Res-Q, it is a DOS-based software that allows you to back up any hard drive up to 8 GB. It does this by creating a "snapshot" of the hard drive that includes the operating system, hardware settings, registry, data, etc.

In the past, using CDs for this purpose was impractical given the multi-gigabyte size of today's hard drives and the 650 MB limitation of CDs. CD Res-Q spans as many CDs as are necessary to back up the hard drive.

If you have a computer that can be booted from a CD-ROM, it will create a bootable CD-ROM. In the event of a hard drive failure, you simply install the replacement hard drive, boot from the backup CD-ROM, and everything on the original hard drive at the time of backup will be restored to the replacement hard drive. After that, you simply reboot and carry on as if nothing happened.

For less than $3 per gigabyte, you can back up almost any hard drive up to 8 GB. On average, I found that it took slightly less than 28 minutes to back up about 1.2 GB of files, and half again that time to verify them.

Plextor also includes a packet writing software that allows you to format a blank CD so that it can be treated like a hard drive. Once the software, Adaptec's Direct Drive CD, is installed, the Direct Drive icon remains at the bottom of your Windows desktop.

If you choose to use this option, once the CD is formatted, Direct Drive "locks" your CD-Recorder so that you can't accidentally remove the CD before you're finished. When you want to remove the CD, you have to close the session using CD Direct.

Last call

Closing the session formats the disc in ISO 9660 format that can be read by any other CD-ROM drive. The first time a session is closed, the formatting requires 22 additional MB of space. Each additional session closing requires another 13 MB of space.

I have used this mode — and it works nicely — writing to the CD at a rapid pace. One of the advantages in using this mode is that you don't have to worry about buffer under-runs ruining a disc. Essentially, it's an easy way to copy files to CD if you don't mind giving up some space for the formatting procedure.

Of course, the 8/20 can be used with other CD recording software, provided the software supports the 8/20. When I went to burn a CD using Sonic Foundry's CD Architect, the software didn't recognize the recorder.

After downloading the latest upgrade for CD Architect from Sonic Foundry's Web site, the software recognized the 8/20 and everything worked fine. If you plan on using an 8/20 with third party software, Adaptec has a list of compatible software on it's Web site. You should also contact the manufacturer of your software.

Manufacturers of 8x CD-Recorders recommend that you use only discs that are certified for recording at 8x speed. My supplier of blank CDs related to me that one of his distributors indicated there are some 8x recorders that have problems with discs certified at 8x. I have used over a dozen of my regular blank CDs (not certified for 8x) and have not had a single problem.

I believe the PlexWriter 8/20 is a remarkable unit. Recording at an 8x speed is chancy, but Plextor has done a fine job of anticipating most of the problems. As far as I know, Plextor is one of the few manufacturers of 8x recorders with a 4 meg buffer.

In the past the accepted rule of thumb has been that for 2x recording, you should have a 1 meg buffer; for 4x, 2 meg. Other manufacturers are selling 8x recorders with a 2 meg buffer and calling it "generous." What it is, actually, is chancy.

The PlexWriter 8/20 is available in several versions, including internal, external and with or without PCI SCSI cards. The PX-R820Ti/SW internal version has a list price of $599. The PX-R820Te/SW external version carries a list price of $689.

Most of the software, drivers and utilities for the PlexWriter 8/20 are compatible with Windows 95, NT and Mac systems. The CD Res-Q software is packaged only in "retail kit" versions, but can be purchased separately from Plextor for $35 if you verify you own a PlexWriter 4x or 8x recorder by supplying the serial number of your unit. For questions about the compatibility of Plextor software and hardware with your system, check out their Web site at *www.plextor.com*

I can think of only one other feature that Plextor might add to improve the 8/20: The capacity to record on re-writeable discs. Aside from that, Plextor seems to have covered all of its bases with extraordinary efficiency and skill.

■■■

For more information contact Plextor in California at (408) 980-1838 or circle ***Reader Service 112.***

Read Burgan is a free-lance writer and a former public radio station manager who can be reached at (906) 296-0652 or through e-mail at rgb@up.net

New Mics Capture Boston Ensemble

▶ SURROUND, continued from page 84

that during playback the audio at a particular point in space is heard.

Both views have some merit, but they also both present some problems. Fortunately, they are not mutually exclusive, and it is possible to make very successful surround-sound recordings that include elements of both techniques.

When using spaced techniques, in very general terms, the playback space becomes sort of a miniature hall. As one moves about in it, the perspective shifts from increasingly dry to increasingly reverberant, just like in a real concert hall as one moves toward and away from the stage.

Meanwhile, localization is a little vague, and little sense of any sounds seems to originate from within the array of playback speakers. When recording with a coincident array (See Fig. 1), a more specific, highly defined illusion that is primarily detected from a very specific point in space is created.

That illusion includes comparatively sharply delineated acoustic sources and ambiences, as well as a clear sense of being at a particular vantage point in the hall. Both illusions are fun and can be extremely satisfying musically. But, the sensations they provide are quite different.

Orchestra recording

In the case of the Boston Classical Orchestra recording, the orchestra was recorded with two different coincident arrays and a quad-spaced (actually *quint*, or five-spaced) array. These were recorded on 16 channels of digital multitrack with no intervening signal processing.

The quad/quint-spaced array consisted of four Earthworks omnidirectional microphones hung in a trapezoidal pattern about 12.5 feet in the air, with the front pair approximately 6 feet apart and just above the first row of the audience.

The rear pair were about 14.75 feet further back and nearly 12 feet apart. A fifth microphone, a cardioid, was aimed at the ceiling from above and behind the rear array.

One coincident array was a purely experimental microphone array built by acoustician Dick Campbell. It consisted of four Audio-Technica cardioid capsules placed at 90 degrees to each other.

This microphone was oriented in a classic XY configuration, with the capsules facing 45 degrees left and right and 45 degrees left-rear and right-rear. It was suspended a bit shy of 6 feet behind the podium and nearly 9 feet up.

The final microphone used was a preproduction 6.1 prototype developed by Michael Godfrey of Toronto in conjunction with George Wong of the Canadian National Research Council.

In a surround-sound application, stereo images literally surround the listener from several directions.

The 6.1 microphone is designed for location film work, complete with battery power and seven channels of wireless transmission from the microphone to the recorder. It is actually suitable for a broad range of applications.

Six Sennheiser capsules are mounted on the "dummy head" to pick up left, center, right, left-rear, right-rear and overhead. In addition, a seventh capsule inside picks up low frequencies omnidirectionally. This microphone was hung about 9 feet behind the conductor and 6 feet up.

With these microphones in place, we just recorded directly to tape.

Steven Lipsitt conducted a program of Mozart's overture to "The Marriage of Figaro" and a work for string orchestra by Alfred Schnittke with some interesting stage movements by the players, as well as Haydn's "Trumpet Concerto" and "London Symphony."

The house was full, to a point where the sound was just slightly dry. The playing was generally excellent, in terms of ensemble, intonation and time. No major calamities occurred — just the usual coughs, rustles and urban noises.

Due to a busy work schedule, I have not had a chance to play back these recordings for any serious analysis. A listening session is planned for a Boston AES meeting, hopefully in the new Boston Acoustics big Surround Sound Playback Theater.

In the meantime, I will check out the recordings and critique their sound. The opportunity to audition three different surround-sound techniques in the same hall on the same (good) orchestral performance is invaluable, and I am looking forward to sharing the results.

■■■

Dave Moulton is head of Moulton Laboratories and Digital Media Services in Groton, Mass. Contact him via e-mail at dmoulton@ma.ultranet.com

For information on the 6.1 Surround microphone, contact Mike Godfrey of Rising Sun Productions Ltd., Toronto, at (416) 504-5953.

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

Propellerheads ReCycle

Steinberg North America and Propellerheads Software introduced Version 1.7 of its ReCycle application, a Windows and Mac tool used for editing sampled loops and grooves for audio production.

ReCycle prepares drum loops and other audio events by analyzing them, then slicing them into individual audio elements. It transfers the elements into a sampler and saves required MIDI data to disk.

The result is that the element and resulting loop it creates is tempo-independent, and timing information can be applied to other elements in the production.

ReCycle is appropriate for locating and assembling samples and grooves for broadcast production elements and music.

Propellerheads is a Swedish music and audio software company. Steinberg is best known for the Cubase sequencing program and for creating the VST standard for audio plug-ins.

For information contact Steinberg North America in California at (818) 993-4091 or circle ***Reader Service 122.***

Denon Dual CD Deck

Denon Electronics introduced the DCM-5000, a 100-disc CD changer with two independent CD drives for uninterrupted play and seamless segues.

The unit can be used as a standalone player, or as the master controller of a CD changing system of up to 600 discs (when used with five additional daisy-chained decks).

CDs can be selected from front-panel controls, by a supplied infrared remote device, or by computer control via an RS-232 port. The DCM-5000 features 24-bit Alpha processing, a technical formula for reproducing standard CD 16-bit data in 24-bit quality. The deck is also HDCD compatible, with decoding capability for high-definition compact discs.

The CD drives can be set to segue with a programmable crossfade, or can be used as two discrete drives to feed two separate program lines or building zones.

Suggested price of the Denon DCM-5000 is $1,800.

For information contact Denon Electronics in New jersey at (973) 396-0810 or circle ***Reader Service 133.***

Minnetonka Fast EdDit 32

Minnetonka Audio Software of Minnesota is releasing the newest version of Fast EdDit this month.

The retooled Fast EdDit 32 is a fully 32-bit version of the company's legacy two-track audio editor, known in earlier versions as "Fast Eddie." The program is popular with radio news reporters for its speed in editing voicers and actualities.

The latest version supports the 24/96 standard, and in fact can go to 32/96. DirectX plug-ins are supported in Fast EdDit 32, and can process audio in real time or in offline-processing modes for more complex processing.

True multitasking lets you perform edits during playback. A transport control window with time display replaces the pulldown menu of the earlier 16-bit version, and the program supports long filenames.

For more information, visit the company's Web site, *www.minnetonkaaudio.com*

For information contact Minnetonka Audio Software in Minnesota at (612) 449-6481, fax (612) 449-0318, or circle ***Reader Service 152.***

Radio World Cool Stuff Award NAB

Maycom Easycorder

Radio professionals are always looking for options for recording in the field. The Easycorder is a solid-state portable from Maycom Automation Systems.

This is the company's second-generation digital audio recorder, with on-board editing that uses internal memory and removable PC cards. Internal memory enables direct use of the recorder without PC cards. Audio files can be copied to your desktop or notebook, using the parallel port or a PC card.

Features include digital and analog mic/line inputs and outputs, and linear or compressed digital audio storage. "Time Shift" Recording lets the machine start recording before the record button is pressed, using a RAM buffer for up to 60 seconds of audio. Judges also liked the PCMCIA ISDN plug-in and firmware to dial and connect.

For information, contact Maycom A.S. in the Netherlands at 011 31 481 377 740, fax to 011 31 481 377 380, send e-mail to sales@maycom.nl, *visit the Web site at* www.maycom.nl/ or *circle* ***Reader Service 125.***

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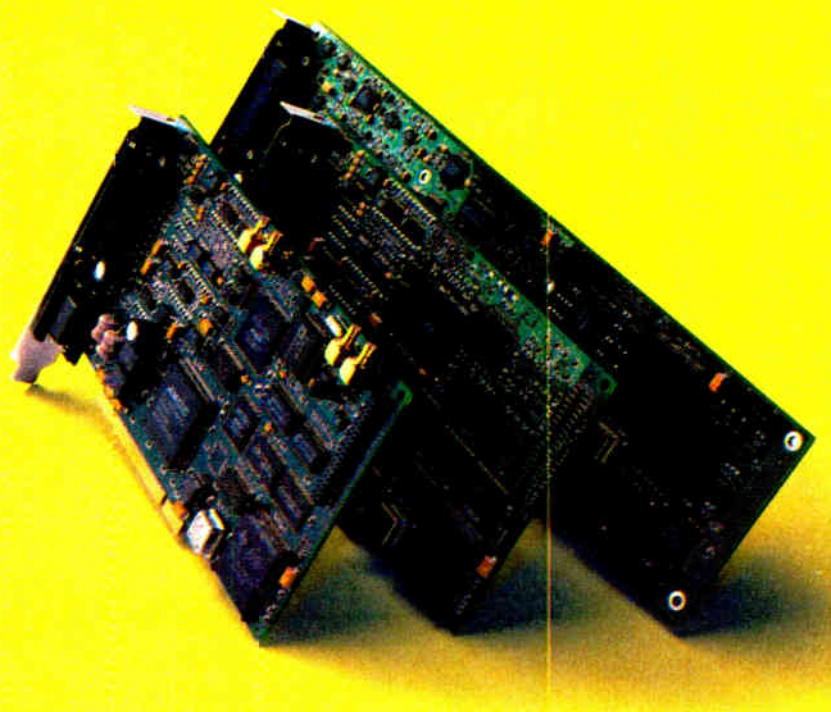

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World Radio History

Establish Yourself on the WWW

▶ TRAVIS, continued from page 85

and capacity at which most people transfer data. Less than a year ago, the standard accepted speed was 28 kb, or 28,000 bits-per-second. That might sound like a pretty fast rate, but not fast enough to transfer decent quality audio in real time.

Today, the accepted standard is 53 kb, commonly called "56K," even though the system never reaches that speed. The new, faster speed, combined with new technologies, can actually transfer audio over the Internet that is enjoyable to listen to. It is expected that, by the end of this year, still faster systems will be commonplace.

A third development is MP3 technology. You already read about it here in **RW**, in an article by Jeff Laurence ("MP3 Delivers Audio for Stations," Feb. 17). You have also heard about the music industry's concerns over it and subsequent attempts to limit its use on the Web.

It is quite easy to transfer a popular song from a CD to an MP3 file and place it on an Internet site. Once downloaded from the Web to a computer, the song can be played back with fidelity that almost matches the original CD.

While the fortunes of the music industry is not the topic here, the important point, for us voice-artists, is that very high-quality audio can be delivered through the Internet. The implications are important for those all of us who work with electronic media. In addition to MPEG-encoded audio, other popular compression methods used on the Web are provided by RealMedia, and Microsoft.

I am reasonably sure that, in less than three years, the expected place for your voice-over demo will not be on the shelves of potential customers, but on the Internet.

I have scored several jobs directly through my Web site, but on the whole, we are not there yet. The vast majority of my jobs have come the old standard ways: either through auditions or the result of my demo CD or tape being available.

However, one job in particular that I booked shows how a Web site can serve to promote work.

Yahoo to the rescue

A company in Hollywood had hired another voice-over talent to work on their project. For some reason, the producers decided that they had not hired the right person, and needed to re-cut the commercial in time to meet a 5:30 p.m. Fed-Ex deadline.

The director recalled he had found a listing of voice-over performers in the Yahoo search engine. He got on the computer, found my site, listened to my demo, determined it was right for their commercials, and called my agent. In about a half-hour they had gone through the entire process of selecting and booking talent.

Now, we certainly hope that most of our sessions will not be as last-minute as this one was, and it was pure luck that the director happened on my site, but this one instance demonstrates how useful the Internet can be to producers and talent. It is my expectation that in less than two years, most producers will listen to my demo over the Internet, rather than through my CD or tape.

If I do a quick search for voice-over talent, I come up with only about 300 references. That means only about 300 voice-over professionals have their demos on the Web. If the Web does become the primary source for voice-over demos, the number will expand to literally tens of thousands.

Until recently, the fact that there have been relatively few voices on the Web has worked to the advantage of myself and others like me. Those who have used the Internet to search for voice-over talent did not have too great a selection of talent to wade through. That will change as more talent camps out on the Web.

That's the bad news. The *good* news is that, as the Internet grows, we will have an extremely efficient and inexpensive way to deliver our demo materials. The real work for us will be to direct those who need our talents to our sites.

To help achieve that for myself, I recently purchased a domain name:

It may not be *microsoft.com* but it is memorable, it makes me feel like one of the big guys and it looks good on a business card.

The cost to get a domain name is quite reasonable. You can get your own for two years for less than $150.

If you would rather not spend that much, there is a less expensive way: a redirect service. While not giving you the same *dot-com* service that a full domain name gives you, a redirect service can prove most useful. For example, you can also reach my Web page by typing *www.listen.to/mydemo*

The particular service which provides this address charges either $18 more per year or provides it free, if you don't mind subjecting your clients to a banner ad on their way to your site.

There are several inexpensive ways to get the hosting service you might need for a Web site. More than likely your Internet Service Provider (ISP) already provides you with enough capacity for a reasonable demo.

As an example, America Online provides me with a total of 10 MB of space, enough for almost 15 minutes of very high-quality audio.

If you are on a budget, there are Web services that will provide you with free space and some easy-to-use tools to set up your site. In order to pay for this "free" service, visitors to your site must endure a commercial message from one of the sponsors of the service.

One aspect of the Web that I believe is exciting for us voice-over performers is that almost anyone can set up a site to play audio productions of reasonable quality. That not only means some extra work for us, but we also can produce some of our own stuff and put it out there.

One frustrating aspect about being an *audio artiste* is that almost all of our work has to be commercial, without any good cheap distribution system for what we consider our "art." The commercial work pays the bills, but it means that nature of our work is dictated by others.

The Net gives us the opportunity to display our artsy side, done just for the heck of it. No profit is required. A few friends and I have put together a little radio drama, now playing at *www.listen.to/d-galaxy*

By visiting this site, you will see how a Web redirect service works, check out the quality of a free Web site (complete with the ads, provided by host *geocities.com*) and evaluate some high-quality Internet audio.

Next time we get together: Putting together a good voice-over demo tape.

■ ■ ■

"Travis the V/O Guy" writes from California, the land of a thousand faxes. Write him at vo-guy@pacbell.net

The phrase 'dot-com' has replaced '1-800' in terms of importance.

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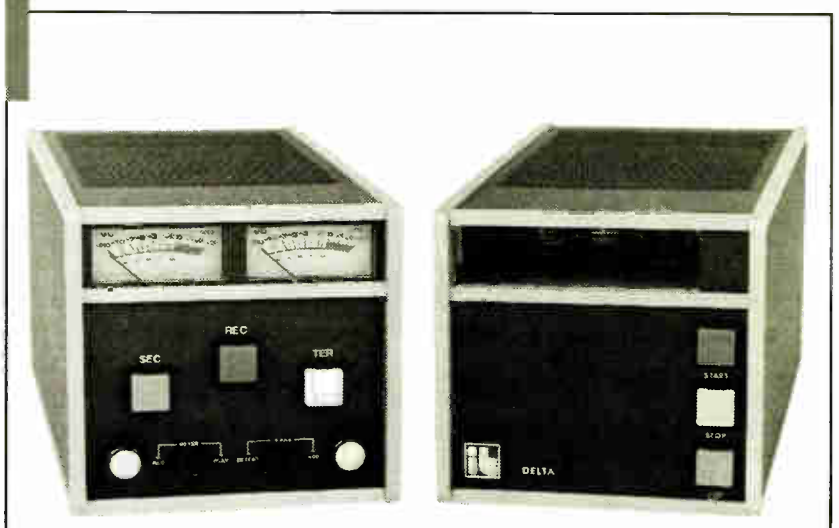

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Dielectric 3-1/8" coaxial relay, Mike, 800-588-7411.

AUDIO PRODUCTION

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Alesis Midvirb X, excel cond, $110. B Barnes, 1-888-456-4340.

Altec 4024A digital signal processor. B White, 530-273-9679.

Eventide DSP-4500 effect processor, limited edition, all of Eventide's preselects ever written in one box & 188 second stereo sampler option, $2950; DigiTech Studio 400 multi-effect processor, reverbs, flanges, effects, 4 inputs, 4 outputs, 400 preselects, $450. J Laurence, 828-524-9602.

Peavey Deltafex digital stereo FX processor, 16 FX, 2 parameter adjustments, rackspace, perfect cond, $85. B Barnes, 1-888-456-4340.

Sony PCM501ES PCM 16 bit digital audio processor w/manual, perfect, $500. B Neuse, 650-969-2433.

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KLH Burwen TNE 7000A transient noise eliminator (2), excel cond, $125 ea; Maze R- reverb, rebuilt 1/99, gd cond, $75. D Railey, 214-343-0879.

Roland 6101 vintage pro 20 band EQ w/all freq switchable, mint cond studio unit, $375/BO. J Thornton, 320-634-3213.

Sansui SE7 graphic EQ, RCA ins & outs, workhorse, $100. P Paquin, 508-385-0805.

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Schafer 8000 w/complete pwr supply & 10 working modules +EQ module, gd working, complete w/manuals, 15 yrs old, BO. M Sedota, 843-249-3441.

Tascam MM1 kybd/line mxr FS; Tascam MM1 20 line input stereo mxr, MIDI mute, rack mount, treble/bass, effect sends, $600. M Hugh, 301-962-6823.

EV/Tapco 5212, 12 bal in, 2 out, working, $100 +shpg. P Paquin, 508-385-0805.

Mackie 1604 mixer board, 2 yrs old, new still in box, never used, $700. J Smith, 336-751-0758.

Schematic & manual for UREI 1681 Serial 188 8 chnl stereo bdct console. G Morgan, 423-886-3438.

Tascam M-3500-24ST rcdg console, factory recond by Tascam, 260 point patch bay in 6.5' oak console w/full length 32 meter bridge, 24 input chnls & 8 stereo chnls, 56 input capability, $5500. Bill. 616-271-5275.

Wheatstone SP5 multitrack prod console in fair to gd cond, $4500. J Evans, 207-942-3311.

Logitek 12 stereo mixer. Mike, 800-588-7411.

MCI/Sony 618, 24x24, $6.5K; Quantum 24x24, $4.5K; Soundcraft 600, 32x16, $5.5K, like new; Model 30, $295; 512, $950; 520, $1450. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

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Orban 8100 A/ST Optimod-FM, excel cond, BO. C Marker, 906-249-1423.

Audio Logic MT-66 stereo limiter w/gate, excel cond, $175; dbx 163 (pair) overeasy limiters, great cond, $150/pr. D Railey, 214-343-0879.

WANT TO BUY

Gates SA-39B for parts; Gates Sta-Level M5167, to make a pair; UREI LA-3, one or pair. M Schackow, 605-374-3424.

UREI or Telefunken or Neve or Fairchild limiter. M Hugh, 301-962-6823.

Teletronix LA-2A's, UREI LA-3A's & LA-4's, Fairchild 660's & 670's, any Pultec EQ's & any other old tube compressor/limiters, call after 3PM CST, 972-271-7625.

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Sennheisser headphone mike, Electret Boomset HME 45CA, brand new in box (2 pairs). $260 ea. M Hugh, 301-962-6823.

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MICROPHONES cont...

Astatic 77, exel cond, $250. M Schackow, 605-374-3424.

Beyer 101 omni (2), 1 gd 1 needs work, $350/both; Radio Shack Gooseneck (3), balanced cardioid, $15 ea +shpg. P Paquin, 508-385-0805.

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Comtek MR-72 & MR-182, 3 circuit boards for MR-72 xmtrs & 3 circuit boards for MR-182 xmtrs, $150 ea. R Barwig, 773-283-2820.

Comtek MR-72 wireless mike system w/lav mike, xmtr & AC rcvr, $250; Comtek MR-182 wireless w/lav mike, xmtr & AC rcvr, $450. R Barwig, 773-283-2820.

Comtek PR-72B (10) personal rcvrs w/27 extra crystals of various freq, $50 ea. R Barwig, 773-283-2820.

Crown SASS-P stereo mic, perfect cond w/case & manual. $425. T Hoffman, 503-788-8841.

Neumann U47, $3900; U67, $3300; U87, $1800; KM83 or 84 pairs, $1400; KM88s, $950 ea; RCA 77DX, $1200; BK5, $700; BK1A, $300. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

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Shure SM33, 330 or Neumann mike. M Hugh, 301-962-6823.

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VAC AA-1PC, 2 rack mount silence alarms, excel cond, $150/both; Middle Atlantic D-2, 2 rack unit enclosed drawer, blk, vgc, $50; OmniCraft SP-1 dual freq cue tone generator, vgc, $40. R Branske, 708-399-5444.

Arrakis 8 chnl switch extender w/power supply, $100. J Smith, 336-751-0758.

National HRO-7R rcvr w/coils 1.7-30.5 MHz, pwr supply & speaker, $375. E Reilly, 206-282-6914.

Russlang tape deck mixer console, designed for Otari 5050 but perfect stand for Mackie mixer, excel cond, $75; OC White mic arms (2), $35 ea. D Railey, 214-343-0879.

Sage EAS Endec, like new, $1500. J Evans, 207-942-3311.

ADC TT (Bantam) Patchbays, $149; TT or 1/4" cords, $10; new short MRL test tapes, $229 for 2", 1/4", $79; Gates dual stereo tube limiter, $1200; Gates top level, $595; Allen & Heath GL2 rack mixer, mint, 14x4, $795; CBS Labs Audimax, $400 ea; tube preamps, $300-400; MX10 mixers, $795. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

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Jazz record collections, 10" LP/12" LP be-bop, swing, dixie, highest prices paid. B Rose, Program Recdgs, 228 East 10th, NYNY 10003. 212-674-3060.

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Tascam 112B (2) & model 122B in perfect cond, extra plugs, all manuals, BO. R Miller, 808-572-5534.

Ampex 440C 4 trk 1/2" w/servo & w/narrow gap heads goes out to 15 kHz at 3-3/4, $950; Ampex 440C 1/4 w/servo, $1000; (2) King 780 cassette loaders, $2750 ea; King 790 loader, $4000; Ampex 440C 1/2" w/servo, $1000. J Bishop, 601-841-1444.

Audi-Cord E21 mono R/P, uncrated but never used, clean storage, $350/BO. D Strahan, 281-479-1614.

Crown America 722, 10" r-r, great cosmetic cond, fine working, little use, $450, will ship UPS in cont US; TEAC A-6010 r-r, electr fine, motors & mech gd, needs capstan. $120/firm, will ship UPS. C Keith, (fax) 603-352-8461.

MCI JH110A 1/4" 2 trk reproducer in rollaround console. excel cond, $300. D Railey. 214-343-0879.

Sony TC WE805S, 3 cassettes, dual well, dual record, like new cond, $225 ea +shpg. P Paquin, 508-385-0805.

Ampex 4 trk tube deck, $2500; stereo 351 (recond), $1800; Akai Adam, new, digital 12 trk, $3500; MM1000-16 w/new heads, $4500; Otari MTR10-4, $3500; Ampex ATR102s, search to cue, $495; Ampex locator for ATR or 1200, $895; MCI 110C-8, $3.5K; Tascam 85-16 recond w/dbx, rc & loc, $3K. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

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Revox A77 (2), 4 trk, 3.75-7.5, one gd cond, the other for parts; (2) Altec 604E w/enclosures; MAC C20 MACMR65B (2) rebuilt Dyna-70, need & will exchange in part for Sony 854-4 CNL service manual circa 70s recorder. WA Stead, 561-734-8076.

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Sony 5LO-323 Betamax recorder player, comm deck, $200 +shpg. Bud, 616-733-4040.

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Ampex PR10 tape recorders. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

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Moseley PCL 505 STL rcvr, $350. J Evans, 207-942-3311.

Moseley PCL 6010 TX/6020 RX, both work fine, out of service, $5000; Moseley DSP 6000E 2 chnl encoder, works fine, not in service, $1900. T Nelson, 507-696-8618.

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Scientific Atlanta Encore DSR 3610, 1 yr old, perfect cond, DATS, Sedat, MPEG capability to receive 2 mono or one stereo chnl simultaneously, LNB pwr supply built in w/manuals, $3000/BO. R Miller, 808-572-5534.

Fairchild/Dart 7300 rcvr w/down converter & (4) tuneable audio cards, $1500. J Smith, 336-751-0758.

Channel Master 6218 1.8 meter Ku band sat dish AZ/EL, new, $325; Ku PLL sat dish LNB, new, $405. J Katonah, 800-657-2346.

Prodelin 3.7 meter, 41 dB gain, polar mount, $400 ea. J Smith, 336-751-0758.

Wegener 1806-03 single chnl receiver, BO; Wegener 1600 Series-50, modules 1624, 1622, 1645, 1646, 1608-21, 1684, 1646, 1683-08, 1605-12, gd cond, BO. E Dave, 218-732-3306.

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EMPLOYMENT CONTINUED

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Broadcasting school grad w/exp in live studio seeking position at your station, multi-task oriented, any position sought. Victoria, 405-681-9538.

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OKC talent looking for opportunity, Ted Kurz, seeking on-air position, location not a problem, original & reliable attitude, 405-682-0741.

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Recent graduate of broadcasting school, young & full of energy & motivation, ready to find break in radio, looking for position in announcing or sales. James, 405-350-7970.

Sound great on-air, very tight boards. will relocate, very funny & hard working, great addition to your team. Susan, 405-672-3931.

The millenium bug could wipe out your virtual reality station; live, veteran talent could restore your genuine reality. Alex, 513-777-8423.

Young, energetic, humorous, trained broadcaster, recent grad, willing to travel & work hard for your station, knowledgeable & interested in all areas of radio. Heather, 405-495-2359.

ACTION-GRAM

EQUIPMENT LISTINGS

Radio World's Broadcast Equipment Exchange provides a FREE listing service for radio stations and recording studios *only*. All other end users will be charged. This FREE service does not apply to Employment Help Wanted ads or Stations For Sale ads. These are published on a paid basis only. Send your listings to us by filling out the form below. Please be aware that it takes one month for listings to appear. The listings run for two consecutive issues and must be resubmitted in order to run again. Thank you.

Please print and include all information:

Contact Name _____

Title _____

Company/Station _____

Address _____

City/State _____

Zip Code _____ — _____

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Are you currently a subscriber to Radio World?.
❑ Yes ❑ No

Signature _____ Date _____

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- ☐ F. Recording Studio
- ☐ K. Syndicators/Station Providers
- ☐ M. Ind. Engineer
- ☐ B. Commercial FM station
- ☐ G. Audio for Video/TV Station
- ☐ C. Educational FM station
- ☐ H. Consultant/ind engineer
- ☐ E. Network/group owner
- ☐ I.Mfg. distributor or dealer
- ☐ L. Consultant
- ☐ J.Other _____
- ☐ N.Delivery Service (Internet/Cable/Satellite)

II. Job Function

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- ☐ G. Sales
- ☐ B. General management
- ☐ E. News operations
- ☐ C. Engineering
- ☐ F. Other (specify)
- ☐ J. Promotion
- ☐ K. Production Mgt or Staff
- ☐ H. Programming/production

WTS ❑ WTB ❑ Category: _____
Make: _____ Model: _____
Brief Description: _____
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Price: _____

WTS ❑ WTB ❑ Category: _____
Make: _____ Model: _____
Brief Description: _____
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Price: _____

WTS ❑ WTB ❑ Category: _____
Make: _____ Model: _____
Brief Description: _____
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Price: _____

*Closing for listings is every other Friday for the next month's issue. All listings are run for 2 issues unless pressed for space or otherwise notified by listee.

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ADVERTISER INDEX

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Page No.	Advertiser	Reader Service No.
15	360 Systems	10
17	AETA Audio Corp.	17
70	Air Corp	105
22	Altronic Research	12
21	Antenna Concepts	7
87	Antex Electronics	75
43	Aphex	171
19	Armstrong Transmitters	15
4849	Arrakis	49
76	ATI	106
5	Audio Broadcast Group	14
30,31	Audio Broadcast Group	31
50	Audio Precision	30
2	Audioarts Engineering	2
34	Autogram	33
73	Belar	72
70	Boston Financial & Equity	86
85	Bradley Broadcast	82
20	Broadcast Devices, Inc.	70
3	Broadcast Richmond	-
47	Broadcast Software Int'l (BSI)	47
72	Broadcast Technology Company	109
20	Broadcast Tools	100
46	Broadcasters General Store	44
26	BSW	24
4	Burk Technology	4
14	Cartworks/DBM	23
54	CBSI	39
20	Circuit Werkes	76
3	Clark Communications	103
63	Computer Concepts Corp.	60
7	Comrex	5
23	Comrex	19
73	Conex Electro-Systems	63
29	Continental Electronics	41
20	Cortana	69
68	Crown Broadcast	56
13	Cutting Edge	13
28	Dalet	28
76	Davicom Technologies	87
36	Denon America	36
70	Econco	84
72	Electronic Research Inc.	90
65	Electronic Research Inc. (ERI)	59
27	Eventide	27
76	Excalibur Electronics	77
59	Gentner	50
82	Ghostwriters	84
20	Gorman-Redlich Mfg. Co.	67
82	Grace Broadcasting Service	-
72	Halland Broadcast Services	79
1	Harris	1
77	Harris	233
88	Harris	66
44,45	Harris	29
57	Harris-Intraplex	57
20	Henry Engineering	110
82	IBN Radio	94
42	Independent Audio	43
25	Inovonics	20
66	Inovonics	55
79	INXSYS	230
72	J Squared Technical Service	89
82	La Palma Broadcasting	-
56	Logitek	40
76	LPB	99
84	Mackie Design	74
40	Mager Systems	101
61	MediaTouch	48
33	Moseley Associates	32
18	Musicam USA	18
55	Nautel	45
70	Nott Ltd.	85
67	OMB America	61
38	Orban	38
1011	Orban	11
53	PR&E	52
39	Pristine Systems	34
41	Pristine Systems	35
20	Propagation Systems	68
81	Prophet System	73
72	PTEK	108
35	QEI	42
72	Radio Design Labs	99
16	Radio Frequency System (RFS)	8
51	Radio Systems	51
8	RadioSoft	22
32	Register Data Systems	25
72	S.C.M.S., Inc.	80
62	Satellite Systems	53
37	Scott Studios	26
76	Shively Labs	78
24	Sierra Automated Systems	16
76	Silicon Valley Power	88
6	Sine Systems	21
76	Studio Technology	107
71	Superior Broadcast Products	71
69	Syntrillium Software	62
12	Technology for Communications	6
9	Telos Systems	9
75	UPI	81
83	Webster Audio Products	65
95	Wheatstone	95
96	Wheatstone	96
64	Whirlwind	54

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World Radio History

◆READERS FORUM◆

Monitor mention

Dear **RW**,

Thank you for your mention of the SSAC three-phase monitor in the Charles S. Fitch sidebar "Converter Case Study" (**RW**, March 3). As a former chief engineer, I can appreciate the problems of proper three-phase power at a remote location. I was fortunate enough to always have a stable supply to work with at all the stations that I worked at.

Now that I am at SSAC as an applications engineer, I only have to work Monday through Friday from 8 a.m. to 5 p.m. and don't have to wear a beeper. But it's not as exciting as broadcasting.

The reason I'm writing is to let you know that the QVM 611A three-phase power monitor has been replaced with the WVM 611A, which has a number of improvements. If anyone contacts **RW** looking for the QVM mentioned in your article they can be directed to the WVM series at *SSAC.com* or at (800) 377-7722.

If you would like a data sheet on the WVM series, the easiest way to obtain it is to use our Web site or our fax-on-line system at (315) 638-7158. When asked for the document number, enter 410 and it will ask for the fax number to deliver it to.

Thanks for the interesting article.

Dave Wickham
Applications Engineer
SSAC Inc.
Baldwinsville, N.Y.

Thank you for the clarification. The entire series about the National Electrical Code, including the Converter Case Study diagram, is available in the Reference Room section of www.rwonline.com

LPFM concerns

Dear **RW**,

I have found it necessary to comment on the foolishness of the comments from John David, NAB executive vice president of radio, in the March 31 issue.

Here, he's made the claim that LPFM will be (as he put it) "adding interference to a radio band that is already heavily congested." However, he probably wouldn't think twice about the addition of yet another commercial, full-power station. He makes it sound as though LPFM would be operating out of tolerance of FCC regulations. If the FCC approves of LPFM, then it would only make sense that such a station would need to be within proper parameters, albeit, low-power.

Why doesn't Mr. David make the same fuss about LPTV or FM translators? Or, maybe that doesn't personally affect him, so he doesn't care.

Just what does he have to be so worried about with an LPFM anyway? You would think he'd want to have more concern about pirate radio than someone with a *legal* LPFM. Just what kind of "danger" could LPFM pose anyway? Perhaps he doesn't want the "little guy" to have a piece of the pie. How is an LPFM going to interfere with a 100 kW FM?

Here he is, NAB executive vice president of radio ... of course his opinion is going to be biased ... it's corporate politics! His kind of thinking really concerns me.

Bob Henry
Broadcast Engineer
Albuquerque, N.M.

If you build it ...

Dear **RW**,

Thank you!

Radio World never fails to amaze me. It seems like someone there is always reading my mind. I am referring to the article "Build a Remote Box the Right Way" in the April 14 issue with all the information concerning remote equipment. However, I just have one little nit pick with Mr. Singer's article on how to build it and what to use.

In the article he makes reference to building the box for user-friendliness, citing the promotions department as being incapable of handling the task. I have to balk at this statement (as I am) a former promotions director.

Maybe I am an exception to this, but let me explain. I came to radio via a broadcasting school internship in the promotions department at a major-market station. After working in promotions, the two engineers took me under their wing and taught me the ropes — or should I say wires — to the extent that I now sub-contract those engineers and several stations for sporting events and such.

As a promotions director, not only was I charged with setting up and running the equipment, but in most cases I also recommended which equipment to purchase.

In my experience I found I had to *keep it simple* for the jocks.

My other comment is this: Has someone created one unit which can utilize both ISDN or POTS lines rather than having to carry another unit (meaning more baggage when traveling)? Several times I have found myself setting up out of town only to find a snag with the SPIDS/LDNS at the location.

Dave Stenner
Owner
Daron Services
Baltimore

Radio's alternatives

Dear **RW**,

I was reading the Page 4 column "Wake Up to Radio's Alternatives" (**RW**, Feb. 17) as I listened to *Spinner.com* (in stereo ... I had just "switched" from "my station," "Slick's stuff" in "The Saloon" at *Imagineradio.com*), and was seriously considering obtaining DSL service for better delivery.

The biz has taken listeners for granted too long (as a listener first, then a pro, I know it's true); it's too late for some.

I have purchased a CD-RW for recording so that I can listen mobile (download, save, dub, re-record).

I fear the worst if we keep taking listeners for granted. By the way, I'm also watching video/TV online. I don't need cable.

"Slick" Mike Edmonds
Tucson, Ariz.

Time for An IBOC Alliance

A critical event in the move to digital TV was the formation of a Grand Alliance among interested parties.

Radio should learn from that experience and encourage such an alliance now among the companies racing to develop an in-band, on-channel digital radio system.

An alliance should include many industry players, but the concept won't work unless the IBOC proponents themselves agree to take part. All along, **RW** has asked these proponents about such an alliance. All have agreed that the concept is possible in theory.

The tricky part is choosing what parts of each system would be best, and compatible. Another problem is that the proponents are natural competitors Getting them to agree on a course that fits their individual business goals is not going to be easy. USA Digital Radio, Lucent Digital Radio and Digital Radio Express are by no means at the same levels of research, investment and technical achievement.

But the proponents agree that a digital system is critical for U.S. radio, and that there must be one standard before the practical implementation can begin.

All three companies are facing the same challenges and tradeoffs — seeking the lowest acceptable bitrate to encode and decode the digital signal, and using the portion of the bitstream not taken up by programming for a mixture of auxiliary data use and error correction and concealment to achieve a more robust signal, free of interference. The compression systems they are using are similar.

Yet each proponent brings unique skills to this gargantuan task, with different kinds of investors and different business goals.

The receiver makers, understandably, are waiting for a standard before committing production lines. They are also waiting to see whether IBOC or satellite-delivered digital radio will succeed first.

Harris Corp., a major radio transmitter manufacturer, recently made a high-profile call to the industry in favor of an IBOC alliance. Without such a mutual attempt at developing a standard, Harris argues, other media sources will siphon radio's audience, and IBOC might never come to pass.

Unless the proponents get together now, a selection for "one" system would have to wait at least until the data from lab and field tests are submitted to the NRSC by the end of this year, and probably longer.

An alliance won't be easy to achieve. But with so much at stake, it makes sense to develop a synthesized system that represents the best ideas each proponent has to offer.

— RW

Write to Us

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