

*****3-DIGIT 857
 S117298 DOB 0002
 TOM MILLER 878
 ASST CHIEF ENGINEER
 KTZR
 2033 S AUGUSTA PL
 TUCSON AZ 85710 7905

Football and Radio Spots
 Meet production ace Chris Robbins of KVIL-FM in Dallas.

Talk Into This
 Buyer's Guide presents a roundup of microphones and speakers.

Page 53

Page 63



Radio World®

The Newspaper for Radio Managers and Engineers

April 12, 2000

INSIDE

NEWS

▼ Traffic Patterns: What will Wicks do with CBSI and Datacount?

WICKS
 BROADCAST SOLUTIONS, L.L.C.

Page 3

▼ Michael Powell and Andrea Vargas comment on LPFM.

Inside

ENGINEERING

▼ Product wrapup from AES Paris.

Page 12



▼ Frank Foti reflects on a new batch of Omnis.

Page 23

GM JOURNAL

▼ Dain Schult's American Communications Enterprises pursues a different group strategy.

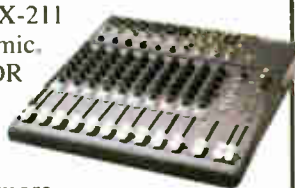
Page 37

▼ The latest Internet radio business news in Web Watch.

Page 47

STUDIO SESSIONS

▼ Audix CX-211 condenser mic, Mackie XDR preamps, Plexwriter 8/2/20 CD-R and more.



Inside

Visit RW Online at www.rwonline.com

NEWS ANALYSIS

How to Apply For a Low-Power FM

by Leslie Stimson

As the FCC gets closer to accepting applications from those who want to own a new low-power radio station, manufacturers, engineering consultants and telecommunication attorneys are stepping in to offer their services to potential clients.

Meanwhile, the commission outlined an application schedule that would divide the country into five groups of cities. Each group would have a five-day window to apply for low-power licenses.

Although industry groups such as NAB and the Consumer Electronics Association have asked the commission to change, delay or even stop implementation of its LPFM rules, the agency staff was proceeding as if the rules will become effective on April 17.

National Public Radio has joined NAB and CEA in urging the commission to reconsider the rules because of concerns about interference to existing stations. NPR has asked the agency to

See LPFM, page 5 ▶

L.A.'s KHJ Regains Its Legacy Call Sign

by Tom Foty

LOS ANGELES KHJ(AM) is back: The KHJ of Bing Crosby, Harry Von Zell, Steve Allen, Drake-Chenault's "Boss Radio," Robert W. Morgan and the Real Don Steele.

The language, format, talent and audiences are different, but after a decade and a half, the call letters are the same: KHJ 930 AM.

One of the earliest broadcast stations in Los Angeles, KHJ has regained the use of its historic three-letter calls through a creative and nostalgic bit of addition-by-subtraction.

Almost 78 years to the day it first received pre-FCC Commerce Department permission to use those call letters, KHJ(AM) has returned to the L.A. airwaves, minus the baggage of the extra letter that it had been carrying since a brief stretch as KRTH(AM) in the late 1980s and early '90s.

The change back occurred on March 15 and featured airchecks from the "Boss Jock" days and from as far back as Von Zell and Crosby in 1931.

See KHJ, page 10 ▶



KHJ Program Director Alfredo Rodriguez (seated) smiles as Chief Engineer Jerry Lewine notes the call letter change in the log.

Photo by Alex Roman

powerStar™

- ▶ AM/FM
- ▶ solid-state technology
- ▶ modular design
- ▶ digital audio inputs
- ▶ exclusive Digital Signal Processing System
- ▶ future ready

DR DIGITAL READY™

www.contelec.com 1.800.733.5011

CEC
 CONTINENTAL ELECTRONICS CORPORATION

NEWSWATCH

LPFM Battle Heats Up

WASHINGTON Hostilities escalated between the FCC and NAB as legislation to dramatically change the way low-power FM would be implemented has begun moving through Congress. The House Commerce Committee in late March passed legislation that would require the FCC to maintain all current channel protections — including those for third-adjacent channels — and mandates the FCC to have an independent party conduct interference tests.

In early April, observers hoped the

House would quickly vote on the bill.

"The amended legislation sends a very powerful message from Congress," said NAB President and CEO Eddie Fritts.

If passed, the number of LPFM allocations in medium and large markets would be substantially reduced. A source close to the FCC estimated that without third adjacent channel protection, the number of potential LP100s in the 60 markets evaluated by the commission would drop from about 400 to about 75. In the 20 cities with a population of half a million and above, the number of LP100s would drop from about 68 to 9.

The actual figures could be even lower, he said, because these figures do not factor in

the extra 20 kilometer so-called "buffer zone" the commission has required between LPFMs and existing stations.

With the field tests, experts would study the impact of LPFMs on several factors if the third adjacent channel protections were lifted: the digital transition, existing stations, FM translators and reading services for the blind.

The report would be due Feb. 1, 2001.

The tests would determine what is "objectionable and harmful interference to the average radio listener," and an evaluation of the economic impact of LPFMs on existing small-market and minority stations, according to an amendment offered by Reps. Heather Wilson, R-N.M., and John Dingell, D.-Mich.

Pirates would not be allowed to own any LPFMs, under H.R. 3439.

Before the committee vote, the sniping

between the FCC and LPFM opponents became more pointed as the FCC held a lottery March 27 to choose the states from which the first LPFM applications would be accepted.

The FCC accused NAB of submitting misleading information to Congress about the interference LPFM may cause existing stations.

"It's a misrepresentation of the engineering facts," said FCC Chairman Bill Kennard about a CD that NAB submitted showing potential interference effects to existing stations.

NAB said the CD is identified clearly as a simulation of so-called "crosstalk" that could occur as a listener would hear portions of two stations at the same time.

Dale Hatfield, chief of the FCC's Office of Engineering and Technology, said crosstalk would not occur with LPFM stations and the only interference listeners to stations might hear is noise or hissing.

RW asked Kennard if the FCC would consider conducting another study of the potential interference to receivers.

"We have developed a very, very extensive record in this proceeding, based on science that we know a lot about. We believe that we have a sufficient record to move ahead with the licensing process," he said.

— by Leslie Stimson

See NEWSWATCH, page 3 ▶

Index

FEATURES

At AES, New Technologies Shine	12
When You Have a DA Line Problem by W.C. Alexander	18
Foti Sees the Promise of Digital by Paul J. McLane	23
RFA Pushes Development Concept by Paul Flint	24
Workbench: Stop, Look and Listen Carefully by John Bisset	33

GM JOURNAL

ACEN: Big Plans in Small Places by Scott Fybush	37
BIA Ranks Radio's 1999 Top Billers	37
The Next Generation of Web Sites by Joe Dysart	38
Until the Deal Is Done — Don't by Harry Cole	42
Leverage Assets and Reap Growth by Vincent Ditingo	44

STUDIO SESSIONS

Web Watch	47
KVIL's Robbins Corrals the Spots by Ken R.	53
Audix CX-211 Condenser Mic for Radio by Ty Ford	53
Plextor Creates a Burning Desire by Read G. Burgan	54
Radio College in Session Online by Carl Lindemann	57
Preamps Silence the Competition by Carl Lindemann	58

BUYER'S GUIDE

Product Guide	60
MXL Mic Is a Hit with KACD by Dana Puopolo	63
FET Microphone Fits the Format by Russ Long	63
Engineer Explores Well-Behaved Mic by Loren Alldrin	64
Powered Monitors Going Digital by Loren Alldrin	68

READER'S FORUM

78

AUDITRONICS 4.0 NuStar

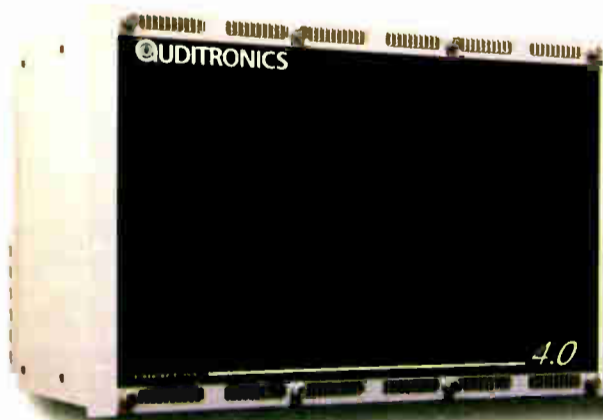
It's the **NEW CONSOLE** you've been asking for, with the trustworthy heritage you need — featuring a digitally controlled engine for your equipment room, so you can centralize all your electronics.



Modular serial control surface

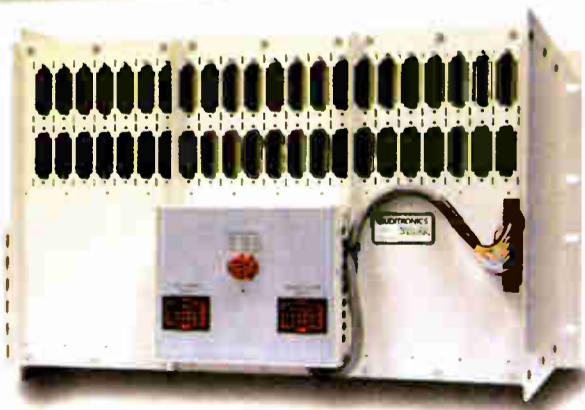
The Control Surface is **JUST RIGHT!**

Your operators won't need any training here: large brightly lit switches, 4 stereo program busses, and 4 internal mix-minus busses give it power. Each module has a rotary encoder with 8-character alpha display that can select any of the remote sources (up to 128) so you can get any job done.



All engine components are hot-swappable (maximum 128 stereo sources), letting you expand and service your NuStar without disrupting your entire system.

Centralized wiring has insulation displacement DB-25 connections so your installation and prewire go smoothly.



CONTACT US FOR MORE INFORMATION!

600 Industrial Drive, New Bern, NC. 28562
tel 252-638-7000/fax 252-637-1285/sales@wheatstone.com

AUDITRONICS



NEWS ANALYSIS

CBSI, Datacount Bulk Up Wicks

by Randy J. Stine

Traffic and billing software companies have largely been left out of radio's consolidation frenzy — until now.

In what company officials call "the first step of building a competitive broadcast solutions company," Wicks Broadcast Solutions has acquired Custom Business



DATACOUNT

Systems Inc. and Datacount Inc.

The sales closed Feb. 4. The purchase prices were not disclosed.

"We think we have brought together the two top radio traffic and billing software companies around," said Peter D'Acosta, president and chief executive officer of the newly created Wicks Broadcast Solutions.

WBS is an affiliate of The Wicks Group of Companies LLC, a New York-based private investment firm specializing in communications and media businesses. Wicks has owned radio and TV stations in the past and the company still operates a newspaper division.

Analysts said combining the two companies made sense. With CBSI and Datacount on board, WBS can sell to all sizes of markets.

Mostly small- and medium-market stations use Datacount, while CBSI is more successful in medium and large radio markets. The two companies combined claim more than 6,000 radio

customers worldwide.

Until February, the ranks of traffic and billing systems providers had been largely ignored by the move toward consolidation in the radio industry.

"It was a niche that consolidation had not yet found. Both CBSI and Datacount were very successful family-owned businesses that probably had maxed out their individual growth," D'Acosta said.

D'Acosta plans to have both companies operate as individual business units, but share technology and marketing strategies.

"When you combine the resources, the personnel and the idea sharing from the technical and support side of both companies, I think you really will see some serious improvements," D'Acosta said.

CBSI and Datacount have a combined 180 employees. D'Acosta said, "Most of them will be unaffected by the transaction."

WICKS

BROADCAST SOLUTIONS, L.L.C.

CBSI is based in Reedsport, Ore., while Datacount is headquartered in Opelika, Ala.

Datacount's current management team remains. However, there has been a major management shuffle for CBSI. Former General Manager Bob Richardson has been named president.

President Jerome Kenagy, Vice President of Sales Steve Kenagy and Vice President of Administration John Kenagy have left the company.

Richardson said CBSI management had been seeking a buyer for more than a year. "It presented a retirement opportunity for some and at the same

time allowed us to compete more effectively," he said.

Richardson said CBSI management was looking to diversify and add more to the product lines.

Wicks has high hopes for CBSI's digital audio system.

"The consolidated marketplace is demanding that we provide a full-line package of software for traffic and billing and interface it with other digital audio equipment," he said.

Both D'Acosta and Richardson said they have high hopes for CBSI's Digital Universe, a noncompressed digital audio software system.

"There is a lot of competition in studio systems, but we think when our clients see how everything interfaces, they'll like what they see," said Richardson.

CBSI provides billing and traffic software systems for single or consolidated billing, Richardson said.

The company's new Deltaflex III

accounts-receivable system handles revenue-reporting duties in a multistation environment.

Jerome and Steve Kenagy started CBSI in 1979, said Richardson, after the pair sold a traffic and billing software package they created for a radio station they owned in Oregon.

The other company in the deal, Datacount, has adapted as the radio traffic and billing marketplace has moved away from DOS to more user-friendly Windows applications in the past few years.

The company is testing the new D32 Windows/Open Database Compliant in six radio markets and hopes to launch the product later this year.

Bill White, operations manager for Datacount, said he sees a lot of benefits for his customers with new ownership.

"This allows us to have more emphasis on training personnel and adding additional services. Our customer service will be superior," he said.

White said Datacount was formed in 1976 by Jerry Johnson after a local AM station approached him for help with their traffic and billing system. "He wrote a program for them and then realized there was a market for it."

Look for Wicks to grow ancillary businesses aggressively to the broadcast industry, primarily focusing on radio. D'Acosta said he would be "shocked if in a matter of months (WBS) isn't announcing several more acquisitions."

He characterized WBS as "in discussion with several other complementary businesses."

NEWSWATCH

NEWSWATCH, continued from page 2

RAB: Radio Is Strong

DALLAS Radio is not dependent on "dot-coms" for its future ad revenue, said Radio Advertising Bureau President and CEO Gary Fries.

Fries reiterated his point in a letter to nearly 100 financial analysts in response to a March Barron's article that asserts that radio is set for financial decline.

"Radio's ('99) revenue increases were based on strong performances across the board by a diverse group of traditional advertisers — a strong foundation for the continued success of the industry."

Radio posted a 20-percent increase in advertising revenue in January 2000, compared to January 1999, according to the RAB.

Fries said, "Radio surpassed all expectations in 1999 to achieve over 8 percent of all advertising dollars. Entering the new decade with this

strong endorsement from advertisers is a clear indication that the growth pattern will remain constant throughout the year."

NAB's Ducey to Leave for BIA

WASHINGTON The head of NAB's Research and Information Group, Rick Ducey, intended to leave NAB for BIA Financial Network. Ducey joined NAB in 1983 and was promoted to senior vice president in 1987. At NAB, Ducey was in charge of a staff of 16 in the departments of Research and Planning and Marketing and Management Information Systems.

At BIA, Ducey will oversee a digital datacasting venture and lead consulting initiatives related to the Internet and convergence in various industries.

He planned to remain as a consultant to NAB on Internet-related ventures and to resign from NAB as of March 24.

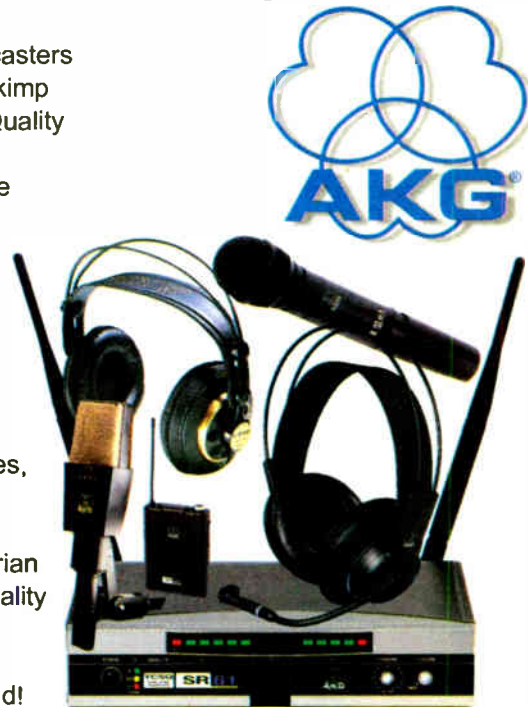


Technology Showcase Featuring...

Seasoned broadcasters advise never to skimp on transducers. Quality microphones and headphones make your productions sparkle with clarity, detail and rich character.

Richardson Broadcast features AKG brand microphones, headphones and wireless systems, bringing you Austrian innovation and quality at prices that will make you look as good as you sound!

Contact us today. Once you hear AKG, there will be no going back.



For more information, visit our online catalog at catalog.rell.com

More than 60 locations worldwide to serve you. E-mail: edg@rell.com, Internet: www.radiotvnet.com, Toll Free: 800-348-5580 (U.S. & Canada), Mexico: Mexico City +52 (5) 674-2228, Guadalajara +52 (3) 645-4641, Brazil: São Paulo +55 (11) 820-6199, Colombia: Santa Fe de Bogotá, DC (57-1) 636-1028, France: Colombes Cedex +33.1.55.66.00.30, Germany: Puchheim +49 (89) 890 214-0, Italy: Agrate (MI) +39 (039) 653 145, Roma +39 (06) 41.73.37.51, Sesto Fiorentino (FL) +39 (055) 42.08.31, Spain: Barcelona +34 (93) 415 83 03, Madrid +34 (91) 528-3700, Sweden: Stockholm +46 8 564 705 90, Turkey: Istanbul +90 212 2643721, The Netherlands: Amsterdam +31 20 446 7070, United Kingdom: Slough +44 (1753) 733010, Australia: Castle Hill ACN 069 808 108 +61 (2) 9894-7288, Bayswater ACN 069 808 108, +61 (3) 9738-0733, China: Shanghai +86 (21) 6440-0807, Japan: Osaka +81 (6) 6314-5557, Tokyo +81 (3) 5215-1577, Korea: Seoul +82 (2) 539-4731, Singapore +65 487-5995, Taiwan: Taipei +886 (2) 86915238, Thailand: Bangkok +66 (2) 749-4402, Vietnam: Ho Chi Minh City +84 8.811 1919, for other international inquiries call Corporate Headquarters: LaFox, IL (630) 208-2200, Fax (630) 208-2550. © 2000 Richardson Electronics, Ltd. MK0509

Trade Show in Your Own Backyard

Is there a place for strong regional equipment shows in radio?

I believe there is.

The evidence is strong: Radio engineers and other managers with an interest in equipment and technology like having suppliers come to their area to show their wares and discuss trends in an affordable, low-stress environment.

Big shows like NAB2000 are vital, and suppliers will continue to use them to make their major product announcements and scope out the competition.

But many people can't afford to pay their own way, and many employers won't send them. Also, radio exhibitors can feel lost among the array of more than 1,000 television, multimedia and other kinds of booths at a show like NAB.

And small, personal expos just seem to fit the character of radio better.

Regional conventions serve an important purpose.

If you live in the Mid-Atlantic states, there's a show for you coming this summer.

The American Radio Manufacturers Association will hold a two-day event with exhibits in Baltimore. The area Washington and Baltimore SBE chapters will hold concurrent meetings.

ARMA Expo 2000 is set for June 26 and 27 at the Baltimore Hyatt Regency Hotel on the Inner Harbor. Registration is free to radio engineers and managers.

RW readers will recall that ARMA was formed a couple of years ago by a group of manufacturers who felt frustrated with the nature and expense of big trade shows, and wanted their own forum and events.

Last year's show was held in conjunction with the New Jersey Broadcasters Association convention. While the show was well attended, the exhibit floor was not.

One reason is that the NJBA show attracted mostly owners and GMs, while ARMA booths and sessions appeal more to engineers.

ARMA Chairman Vince Fiola acknowledged that booth attendance last year was disappointing. He said the move

to Baltimore and the participation of two active SBE chapters should attract a more appropriate crowd.

"The philosophy has changed," said Fiola, owner of cabinetry maker Studio Technology. "Think globally, act locally."

Fiola would like to see the regional ARMA shows grow into a series of events in cities around the country each year.

"My idea is to take it to five or six places and invite every engineer and manager in the area to come and have a party."

He said ARMA has about 17 member companies, and is now open to distributors as well as to manufacturers.

"It's strictly a sales organization, not



Harris drew a crowd for its regional event in Burbank, Calif.

political," he said. "If you have a product to sell to a station in the United States, you're invited to take part."

Fiola said 16 companies have signed up to exhibit, at a cost of \$600 to \$800 per booth, and he hopes for a total of 20 to 25 booths.

USA Digital Radio will present a session on its digital audio broadcasting technology; other sessions are being planned.

For information about the ARMA Expo 2000 in Baltimore, visit www.armagroup.org or call Robin Fiola at (610) 640-1229.

A successful show of any size is a big undertaking. How have regional shows done in the past? The answer varies.

I've attended shows that were absolute

dogs, including a few national shows. I've walked the floors of state broadcast association events and SBE-sponsored shows that attracted healthy crowds, and others that disappointed me.

I've been to regional events that attracted hundreds of people. The winning formula has to do with geographic location, smart marketing, good sessions, cost, and the skill and elbow grease put in by the organizers.

For instance, Harris Corp. has succeeded recently with the concept of a "road show." Dave Burns of Harris calls the concept "taking it to the streets" — if you want broadcast customers, go where they are. The photo on this page was tak-

From the Editor



Paul J. McLane

schedule an event during the North Carolina State Fair, because most of the radio engineers in the state are working on remotes that week.

Anyone who has been to the North Carolina show knows it was Edwards and her relationship with her customers that made it work.

The ARMA event in Atlantic City last year offered fine booths and sessions, but was matched with an inappropriate audience. The prospects this year are better.

But Fiola also recognizes the obstacles. He didn't spell them out in our conversation, but they include competition with national shows; the difficulty of bringing together any group of natural competitors in an organization; the trouble achieving momentum among attendees; the cost of getting the word out; the time and legwork required when you have a business of your own to run.

This year, Fiola is the driving force behind the ARMA show, because he believes in the concept and the validity of a sales-driven regional event built around exhibits and engineering sessions. He and his wife Robin are doing most of the work, and I salute them.

I believe a healthy supplier marketplace is critical to us in radio. We need as many choices as possible in our equipment and services. Regional trade shows are part of that marketplace.

Radio World will inform the industry of regional trade shows, and continue to cover them. If you have an event of interest to our readers, let me know about it via e-mail to radioworld@imaspub.com

AutoPilot
FOR WINDOWS
automatically keeps your stations on course...

Switch Transmitters

Change Pattern

Maintain Power Levels

"The ARC-16 handles multiple sites with ease and has been sturdy and reliable. Combined with AutoPilot, it gives me the ability to set up complex control and monitoring routines. Because of the Burk we were able to comply with the unattended operation rules right from the start."

Rick Levy
Broadcast Signal Lab
Boston, MA

"Buy the company,
not just the box..."

BURK
TECHNOLOGY

Phone: 1-800-255-8090 Email: sales@burk.com
www.burk.com

Low-Power FM Gets Technical

► LPFM, continued from page 1
stay the rules or at least delay implementation until July.

The delay would give NPR time to complete receiver field tests and would give the FCC time to complete tests of subcarrier audio receivers used for reading services for the blind.

NPR said LPFMs might interfere with SCA receivers and impede the input signals to radio station translators.

NPR has asked the FCC specifically to protect translator input signals and to reconsider the decision to make translators a secondary service to LPFM.

NPR also seeks specific protection for existing translators.

"The grandfathering of existing translators does not assure the continuation of all or any particular translator service in existence today because such services may be dislocated at any time by a new or newly modified full-power station," stated NPR.

NPR said stations on the noncommercial portion of the spectrum are more tightly packed than in the commercial portion of the FM band, and that non-coms airing music formats use less signal processing than commercial FMs, making noncommercial stations more vulnerable to interference.

Doug Vernier, a broadcast engineering consultant and president of V-Soft Communications, agreed.

"In discussing what is acceptable interference to an audience, for classical stations, you have a lower noise floor than for rock. Lots of public stations only lightly process, or don't process their audio so the dynamic range is protected."

An FCC source said the agency is not required to act on such requests to change the rules within a specific time frame.

Congress, courts

Other potential impediments to the actual licensing of LPFM stations lie in Congress and the federal courts.

The U.S. Court of Appeals for the District of Columbia had not acted on NAB's request to vacate the FCC LPFM order as of late March.

Congress had not passed legislation to prohibit the FCC from enacting LPFM rules by mid-March. Although the two versions carried more than 130 co-sponsors between them, some experts remained unconvinced that the legislation or the court request would turn out favorably for NAB.

"It would be a hard call for members of Congress, since they will get calls from their local churches or civics organizations complaining about the effort to take away their construction permits," said one telecom attorney.

"I doubt most members of Congress would maintain opposition under that kind of political persuasion. Further, the federal courts (usually) defer to the commission on technical matters."

In the meantime, the FCC has taken the first of several simultaneous steps necessary to license the new service.

Instead of accepting LPFM license applications nationwide in one batch in May as originally planned, the commission has decided to spread out the time in which it will accept LP100 applications, because it does not know how many applications will actually be filed.

The FCC has divided up the 50 states,

Puerto Rico and the District of Columbia and placed them in five groups, unrelated by geography.

Applicants in states and jurisdictions in each of the five groups would be able to file LPFM applications during a specific five-day filing "window."

On March 27, the FCC selected which group would be able to file first and released the application form FCC 318.

Peter Doyle of the Audio Services Division of the FCC's Mass Media Bureau predicted the first applications would be accepted before and after the Memorial Day weekend.

He said each of the five groups includes several of the top 15 markets, "so no mat-

The FCC has taken the first steps necessary to license LPFMs.

ter what the sequence, every part of the country will have some activity."

The order of the other four filing windows was decided on March 27 as well as how much time would occur between application windows.

Current owners would be ineligible to own an LPFM. The commission wants to make the application process easier for those those who have never applied for a station license. The form will help FCC staff determine a potential owner's eligibility with a worksheet requiring "yes" and "no" answers.

Engineering consultants were divided on whether the general public could determine the answers to the most technical questions on the form, the antenna location coordinates and an antenna's center of radiation.

Applicants can determine coordinates using a 7.5-minute U.S. Geological Survey topographic quadrangle map. The latitude and longitude coordinates for LPFM service should be specified using North American Datum 27 coordinates from 1927.

Typically, GPS receivers use 1983 coordinates, so the FCC will provide an online conversion program.

Richard Mertz, principal engineer with Cavell, Mertz and Davis Inc., said of the antenna coordinates, "If you don't know how to use them, that could be fairly difficult and there's a good chance for error. You have to know how to pull location coordinates off the map."

He and others said a differential global positioning receiver, not a simple GPS receiver, could also be used to determine the tower's position.

He said his firm sometimes mails applicants a quadrangle map and the applicant puts an "X" where the tower should be. His firm determines the coordinates from that indication on the map.

"We also know what the ground elevation is from the topographic map so we can determine how high the antenna is

going to be off the ground," said Mertz.

Topographic maps typically are available from a map store or the geological section of a university.

To determine if LPFM frequencies are available, the FCC planned to provide a computer program at www.fcc.gov/mmb/asd/lpfm

James Bradshaw of the FCC Audio Services Division said even if applicants find an available frequency through the program or with professional services, they are not guaranteed an LPFM license.

In the game

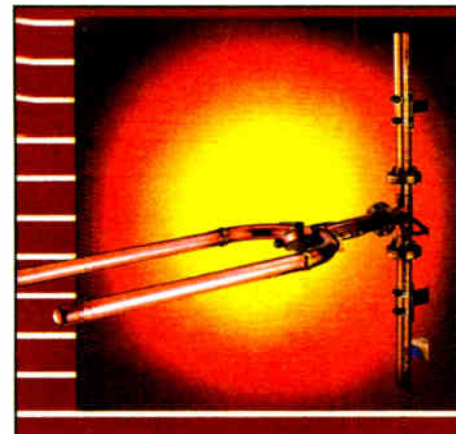
"The fact that you have a frequency doesn't mean you have a station. It just means you're apparently in the game."

FCC staff is working out some glitches in its new consolidated database system to be able to offer applicants the software online programs they'll need. Some online addresses were not finalized at press time.

Several Web resources have been developed to help LPFM applicants.

They include www.lpfm.com and nalpb.com, operated by the National Association of Low-Power Broadcasters. Both sites offer links to equipment companies, engineers and attorneys offering LPFM services.

Professionals listed on these sites reported varying degrees of interest from potential LPFM applicants. One engineer said he received about two inquiries a



Cablewave Systems manufactures EHFM antennas designed primarily for the low-power educational market, where power requirements do not exceed 500 watts.

day, while others received fewer.

Contractor Mike McCarthy, principal of Mike McCarthy Radio Engineering in the Chicago area, has identified three potential LPFM stations in his area.

"I will look at whatever they want to do and ask, 'Can I put my name behind this or not?' If they say, 'This is the way I have to do it,' and I have to cheap out, I'll say, 'Find someone else to do it.' Otherwise you'll end up with substandard installations which may result in spurious emissions or other types of artifacts due to the fact that they didn't install it properly."

LPFMs must adhere to most of the existing rules for transmission rules — for example, power levels — and they must use type-certified equipment.

Value

Quality, Simplicity, Dependability

If you ask me, they're all connected. And, when you find



something you like - it's because it has them all.

That's why I think everyone wants my son's products,

whether it's a console,  clock, audio distribution

amplifier or phone hybrid - they're

always great. Radio Systems

broadcast equipment - like double off coupons-

what could be better! 



radio SYSTEMS

601 Heron Drive
Bridgeport, New Jersey 08014
(856) 467-8000 phone
(856) 467-3044 fax
www.radiosystems.com

GUEST COMMENTARY

Churches Prepare for Low-Power

by Andrea Vargas

The Micro Radio Project is a two-year initiative on low-power radio to educate community organizations throughout the nation about the advantages of micro radio and to assist in the training about the intricacies of obtaining and operating low-power stations.

Funded by the Ford Foundation, the project is under the auspices of Office of Communications Inc. of the United Church of Christ.

Background

Based in Portland, Ore., OCI is an independent, not-for-profit agency affiliated with the UCC. OCI was created in 1959 to communicate with the media, to carry out public benefit programs related to communication under grants from other public organizations, and to establish or to assist in the establishment of other organizations to provide, use and encourage the ethical use of the communications media.

The UCC is a mainline Protestant denomination of 1.4 million members and more than 6,100 congregations in all 50 states except Alaska. The UCC has a deep and abiding commitment to being a multiracial, multicultural church, and so

it is a natural locus for an endeavor that seeks to promote democracy and justice among all segments of U.S. society.

As with previous communications efforts on behalf of public interest, OCI is enlisting the collaboration of sister denominations in the National Council of the Churches of Christ in the United States with its 39 denominations, including the Evangelical Lutheran Church in America and the United Methodist Church, and in consultation with the U.S. Catholic Conference and other faith groups.

What we don't want is just a micro example of existing national or regional formats that homogenize demographics and content.

We view three streams of immediate outreach: people and organizations ready to apply for a low-power license, folks who are very interested in starting a radio project, and groups who do not know about this unprecedented opportunity for their constituencies.

With the extraordinary number of civil

senior citizens, refugee communities, multicultural organizations, etc. sectors in this country, various low-power groups are emerging to assist specific communities. The Micro Radio Project is focusing on Protestant denominations, ecumenical councils, interfaith groups — most of who manage community and social ministries.

We also have a particular focus on racial and ethnic groups (African-American, Hispanics, Asian-American, Native American, and recently arrived immigrants and refugees), plus special communities like migrant farm workers,

senior citizens, refugee communities, multicultural organizations, etc.

We are working with national organizations in the planning of at least 10 regional workshops between now and May, providing and sending out as much information and instruction through a teaching resource, and offering a referral service to communications lawyers, engineers, and equipment providers.

We are not the only organization doing this, but we are collaborating with others.

We are also referring folks to other low-power organizations that are assisting specific groups, such as universities and colleges, regional and local governments. Our strongest partner in this is the Media Access Project in Washington, D.C., with Andrew Schwartzman and Cheryl Leanza, who have done the most extraordinary legal work in moving the low-power radio initiative with the FCC.

Haitian, Spanish queries

We have received numerous queries, among them: an evangelical minister in Texas who wants to offer new Christian musicians a way to share their music and message, a migrant farm worker union in rural Oregon, a group of Hispanic ministers in Cleveland to offer Spanish-language broadcasts in a city bereft of significant Spanish language press and media, and a Haitian community in southern Florida.

We are also seeking specific groups to inform them about low-power radio, among them:

- The Russian refugee community in Oregon;
- Retirement communities in the nation's Sun Belt;
- Low-income housing projects where social service offices are based;
- Community theatre groups for radio theatre;
- Protestant or Catholic-run hospitals and hospices;
- Local organizations working on civil rights and/or human rights serving particular communities;
- Youth groups.

What do we see as some of the consequences?

This is really an unprecedented opportunity given to the people of this country. In a time when high technology is permeating our lives, low-power radio allows



Andrea Vargas

us to take control of a small part of the information-gathering and dissemination processes for a given constituency.

Because of the geographic restraints of the broadcast areas, we'll have to identify our audiences, know exactly who they are, and be attentive to them.

We will discover who are our neighbors, the folks who comprise our communities, and we will begin to relate to them in an electronic-coffee-klatch kind of way.

Contemplation

What we do have to contemplate is how we should engage our audiences in two-way communication, so that they are participants in this endeavor and not just the receivers of the aural content. That is why talk and call-in radio are so popular and necessary.

As listeners, we are often compelled to respond and we really have something to say. As potential managers of these new stations, we need to assure the correct function of low-power radio.

Filling the minimum 36 hours of programming a week will be a shared responsibility. We trust that local community groups will use their imagination in establishing their identities, offering a menu of programming choices and formats, and will use this medium in new and creative ways never before contemplated.

What we don't want is just a micro example of existing national or regional formats that homogenize demographics and content.

The new voices will be heard with regional or linguistic accents, reflecting a variety of cultures, languages, community values, traditions and distinct experiences of millions of people who are or desire to be active participants in this society.

And low-power radio will be an effective training ground for new generations of people for the communications and information industries.

The experience of establishing community radio should also demystify the workings of the FCC for many of us. It is perhaps the first time in the history of the FCC that there is an intentional partnership and focus directly with the people of this country, and not big business and huge broadcast corporations.

The Jan. 20 decision by the FCC to move forward with low-power licensing allows it to meet its statutory mandate embodied in Section 307(b), that has been at the heart of the Communications Act's public interest goals.

The ends of low-power radio is not an exercise in radio development, it is the instruction and praxis of a communications model for community building and social interaction.

Vargas is the director of the Micro Radio Project.

Reach her at (503) 236 0527.

LOSING WEATHER-WIRE?

There is an affordable solution without subscription fees to receive information directly from the National Weather Service

 ZEPHYRUS

WeatherDirect

171 S. 122nd E. Ave. Tulsa, OK 74128
918-437-3333 Fax: 918-438-7322
www.BIG-Z.com

GUEST COMMENTARY

Powell Fears for Small Stations

The following are excerpts from FCC Commissioner Michael Powell's written statement on LPFM, much of which he also said before he cast his vote in favor of LPFM.

Attempting to give greater voice to narrower interests is generally laudable, and I support the objective. But, the question that gives me pause is what the cost is to existing stations that provide equally valuable service to their communities.

Because this order fails to give credence to this concern, I respectfully dissent in part.

I do not quibble with the commission's objectives. Certainly, the extensive consolidation of radio stations into large commercial groups and the financial challenges of operating full-power commercial stations have limited the broadcasting opportunities for highly localized interests.

Local focus

The introduction of a low-power FM service may partially address this concern. However, ... there presently exist many small and independent stations across the country that are especially notable for their local focus.

This admirable group includes a fair number of stations owned by minorities and women, as well as stations with smaller audiences and limited advertising.

These stations have struggled to survive as independent voices against the rising tide of consolidation brought on by the economic stress of small-scale production. It would be a perverse result, indeed, if these stations were to fail or the quality of locally originated programming suffer, because new LPFM stations diluted their already tenuous base of support.

There are two interrelated, yet distinct, threats to these small stations that stem from the new LPFM service: signal interference and erosion of economic viability.

The first has garnered all the attention. The commission has endeavored to minimize the dangers of interference in this item. It wrongly has ignored the second concern.

I have met with a number of small-market broadcasters who tell me that when they raise concerns about the threat of LPFM to their economic viability they are bluntly rebuked — told that such considerations are of no import, that we are only concerned with spectrum efficiency and that we do not pick winners and losers.

Internal deliberations

I, too, heard this line during our internal deliberations. I find the proposition absurd. We regularly consider the economic impacts of our actions on licensees. Just one example is the degree to which we have attempted to balance the need for consolidation to achieve economic efficiency against our goal to foster myriad diverse voices.

The introduction of the LPFM service is not simply a way to get greater use out of the spectrum, regardless of who gets the benefits. It is a policy choice to create stations that allow very small communal and parochial interests to find a voice.

We are not agnostic as to whether they proliferate and prosper. Indeed, we have made special accommodations to suit our conception of this service, like eliminat-

ing the third-adjacency protections normally imposed on FM broadcasters.

Indeed, for years, small broadcasters have tried to expand their services to the community by seeking more lenient interference restrictions, but to no avail. Similarly, we are minting a unique and distinct definition of "community" in order to facilitate the LPFM service.

Accommodations

My view is to make such accommodations for this service, while putting our heads in the sand as to the economic impacts on existing stations is, in fact, contrary to the assumption of some, pick-

ing winners and losers.

The threat to small independent broadcasters by the introduction of LPFM service is not trivial.

While the noncommercial educational LPFM stations will not be direct competitors for advertising dollars to existing commercial stations, they can threaten the economic health of these stations in meaningful ways.

LPFM stations might very well siphon financial support away from small-market stations. Local support that is presently coming to existing stations in the form of advertising might migrate to one or more LPFM stations in the form of underwriting.



FCC Commissioner Michael Powell

Photo by Leslie Simpson

Moreover, the presence of one or more LPFM stations will certainly dilute audience share, on which securing advertising dollars is based. I note, for example, that

See POWELL, page 8 ▶

Tough Remotes?

Matrix Can Handle them.

- POTS
- PCS/GSM Wireless
- ISDN

No matter where your remotes take you, with a Matrix codec, you've got options.

Call today for details
(800) 237-1776

Comrex Corporation, 65 Nonset Path, Acton, MA 01720
Tel: (978) 263-1800 Fax: (978) 635-0401 Fax-on-demand: (978) 264-9973
Email: info@comrex.com www.comrex.com

COMREX

Powell Favored 'Gradual' LPFM

► POWELL, continued from page 7
many of the order's protections exist only within the "protected contour" of the existing FM station.

Audience share questions

We know, however, that many FM stations reach significant audience share outside that contour and garner significant financial support from these areas.

Finally, market dilution may make it difficult to secure financial support from lenders or investors.

The proponents of LPFM retort that the number of new stations will be few in a given market, and limited in their reach. Perhaps, in some markets this is true. ... The (Mass Media) Bureau tells us that there is a possibility of 700 to 1,000 new LP100 stations (more if LP10 stations come into the market).

It is important to emphasize that an adverse impact on existing stations directly compromises the public interest. Locally originated programming that we favor is expensive to produce compared to the scale efficiencies of syndicated programming.

The erosion of economic return, even slight in small markets, may adversely impact the quantity and quality of local programming, which is unlikely to be replaced by micro stations operating under even greater economic constraints. ...

Are these threats minimal or serious? We are left to wonder, wait and see, for

the commission has refused to seriously consider what might be the economic consequences.

I fear that many small and independent stations will find this to be the straw that broke the camel's back.

I fear that many small and independent stations will find this to be the straw that broke the camel's back ... forcing them to sell out or cut back their local programming.

Signal interference

I must confess that I have no clear idea as to whether or not existing broadcasters will suffer intolerable interference.

The engineering studies on the record reach very different conclusions. When carefully examined, however, one finds that the basic methodologies and analyses are consistent with each other.

Where these studies differ, is what the various proponents believe is "acceptable" interference or degradation of service. This I find to be a relatively subjective judgment rather than an engineering

one, colored by the self-interest of the various proponents.

... Customarily, I would accept the

which we adopt here.

On balance, I would have taken a different approach to introducing LPFM service. I believe in light of lingering concerns about signal interference and my pronounced concern about the economic impact of the new service, we should have introduced this service gradually.

It might begin with some experimental licensing in certain communities to assess the real-world impact of signal interference.

Subsequently, we could have fully introduced the service with third-channel adjacency protections.

This would have two benefits. First, it would minimize the risk of interference in a manner consistent with existing services and second, it would introduce substantially fewer stations into the market, thereby allowing us to evaluate the economic impacts of these new stations in these markets.

Finally, if all went well, we could then move to full service with less adjacency protection, as warranted by our experience. Such an approach strikes me as prudent and preferable to the shotgun introduction which we let loose today.

staff's conclusion that third-adjacency protection is unnecessary. I do have some hesitancy, however, because I note that by doing so, we diverge from protections we have insisted on ... with respect to other FM services.

Nonetheless, to resolve this lingering doubt, I would have introduced the LPFM system another way than that

Industry Changes

Here's a roundup of recent personnel changes in the industry.

Mark Kaltman joined **Klotz Digital America** as VP of operations. Kaltman previously served as president of **AETA Audio Corp.** He also worked for **Denon** and for **Audioarts Engineering.**

Mike Starling, VP of engineering at **National Public Radio**, has been named to the board of directors for the



International Association of Audio Information Services.

The head of NAB's Research and Information Group, **Rick Ducey**, heads to **BIA Financial Network** to oversee a digital datacasting venture and lead consulting initiatives related to the Internet and convergence. **Lloyd R. Sams** has joined the **BIA Financial Network** as president.

David R. Walker has been appointed RF principal engineer for **Broadcast Electronics.** Walker previously worked as engineering manager for **Glenayre Electronics.** **BE** also promoted **Paul Jackson** to customer service applications engineer and **Jeff Ryan** to national accounts manager.



Ed Glass

Marti Electronics appointed **John Lackness**, formerly of **Crouse-Kimzey**, as sales manager.

Gary Black has been added to the sales team at **Prophet Systems Innovations**, responsible for the Central Midwest region. **Bryan Boutain** joins as Western regional sales rep, **Brad Young** was tapped as Southwestern sales manager, and **Wayne Domagala** will handle the Northeast.

Other changes at **PSI:** **Johnny Harms** has been appointed manufacturing manager and **Dave McKown** has been named to its information systems staff.

Paul Hufstader has been appointed sales executive at **RDA Systems Inc.**

Crown Audio named **Ed Glass** to VP, engineering. **Scott Robbins** was named VP of sales, and **Mick Whelan** is the new VP of marketing.

Davicom Technologies named a new general manager, **Michael A. Lafond.**

Digigram Inc. added two members to its team. **Gary Gunia** and **James Lamb** joined as business development managers.

Twenty-five year industry veteran **Lee Zapis** joined **Everstream** as VP/COO.

Rob Sisco was appointed senior VP of the **Entertainment Information Group (EIG)** of **VNU.**

David Wiener has been appointed to **Gentner Corp.**'s board. Wiener fills a position formerly held by **Edward (Ted) N. Bagles**, who passed away in December 1999.

Global Media Corp. appointed **Jeff Mandelbaum** to president and director. After 27 years of service to the pro audio industry, **Paul McGuire** announced his retirement as president of **Electro-Voice.**



Mark Kaltman



John Lackness

NSN Keeps Your Network UP!

Building the world's most advanced satellite delivery platform available to the radio industry.

Call us to find out why both the small regional and the nation's largest networks utilize NSN.

800-345-VSAT(8728)
303.925.1708
email: sales@nsn.net
www.nsn.net

Visit us at NAB Booth #R2581
April 10-13



A Clear Channel Communications Company

MILLION DOLLAR SOUND FOR UNDER \$4,000*

Introducing Omnia-3, the all-digital audio processor that offers all the clarity, punch and raw power of the original Omnia. At an amazingly affordable price.

Omnia-3 includes standard features not found anywhere else—like 48kHz sampling, three-band processing, digital audio inputs and outputs, integrated composite clipper, and a removable PC card that simplifies software changes.

Impressive features aside, it's the sound that will blow you away. No other processor sounds as good as Omnia. That's why leading broadcasters the world over choose Omnia to boost ratings and crush the competition.

For this much power—on the dial and in the marketplace—you'd expect to pay twice the price. But now, you don't have to.

Omnia. Redefining audio processing...again.



CUTTING EDGE
2101 SUPERIOR AVENUE CLEVELAND, OH 44114
TEL: +1 216.241.3343 FAX: +1 216.241.4103
E-mail: info@omniaaudio.com

CUTTING EDGE EUROPE
JOHANNISSTRAÙE 6 D-85354 FREISING GERMANY
TEL: +49 81 61 42 467 FAX: +49 81 61 42 402
E-mail: info@omniaaudio.com

*For the name of your Omnia dealer, contact us at
+1 216.241.3343 or visit our website at www.omniaaudio.com.*

*\$3,580 (US) MSRP for Omnia-3fm model. Prices may be slightly higher outside the U.S. due to duties, freight and other costs.

KHJ: Back to Legacy Calls

► KHJ, continued from page 1

While not the first station to reclaim original or legacy calls, KHJ is the first of the "extra K or W" transplants of the 1980s, such as KKOB(AM), Albuquerque, N.M., WWOR-TV, New York City, and WWRC(AM), Washington, D.C., to succeed in jettisoning the unhistorical appendage.

Current licensee Liberman Broadcasting

Inc. accomplished that with an appeal to the FCC: that station KKJH's Spanish-language station identification resulted in a "double K" sound that was offensive to the station's predominantly Hispanic audience.

It submitted supporting documentation from Hispanic groups in Southern California and also pointed to its KHJ legacy. The FCC found the arguments persuasive and granted a waiver of its rules permitting LBI to resume using the KHJ calls for its "Ranchera" music-formatted AM.

Chief Engineer Jerry Lewine helped craft the call letter recapture after other staffers noted that the station could not even say its KKJH calls in Spanish for fear of giving offense.

"It's a heritage station. So much went on at this radio station," he said, "I wanted to see if I could figure out a way to get it back."

conform to the three-letter call sign."

James Brown, deputy chief, Video Services Division of the FCC's Mass Media Bureau, said KHJ's situation is unusual, as the commission no longer assigns three letter calls to new allocations.

Brown, who signed the letter notifying KHJ of its call change, said there is one main exception to the mandatory four-letter call-sign rule.

"The rules provide that if you have an existing three-letter call sign, be it AM, FM or TV, and you acquire another station, you can change that station's call letters to

Perhaps KHJ's greatest fame came under the RKO-General ownership as the original home of top-40 programmer Bill Drake's "Boss Radio" format in the 1960s, featuring fast-talking DJs like Morgan and Steele.

The format was so successful in L.A. that it was exported to other RKO stations, New York's WOR-FM and CKLW(AM) in Windsor, Ontario, serving Detroit.

But while RKO-General was successful as a group owner, its business practices, including those outside of broadcasting, came under review, said Lewine.

The KHJ calls disappeared from the AM airwaves when RKO was forced to divest its broadcast division in the mid-1980s following a legal battle over its qualifications to remain a licensee.

Part of the fallout involved splitting several AM-FM-TV combos. As stations went to different owners, then-current FCC regulations required different calls.

In L.A. and New York, that involved legacy

three-letter calls. In New York, the former RKO TV station tacked on an extra "W" to become WWOR-TV, with the WOR calls staying with the AM station.

In Los Angeles, the KHJ calls stayed with the TV station, which dropped them three years later for KCAL-TV.

The return of relinquished three-letter calls has happened rarely, with a few cases recorded in the last half century.

New York City's WHN(AM), now WEVD, became WMGM in 1948 and won the WHN calls back in 1962.

The KYW call letters followed owner Westinghouse from Chicago to Philadelphia to Cleveland and back to Philadelphia in 1965.

Other three-letter call reactivations are KRE(AM), now KVTO, Berkeley, Calif., and WGH(AM), Newport News, Va.



KHJ went on the air April 13, 1922 from a 10-by-12-foot room atop the Los Angeles Times building. KHJ was built and operated for the L.A. Times by 'electronics' businessman Charles R. Kierulff. The calls KHJ stood for 'Kindness, Happiness and Joy.'



Shown is a young Bing Crosby with the Boswell sisters at the KHJ mic in 1932.

conform to the three-letter call sign."

KHJ received a waiver, Brown said, because of its unique situation and because it used the three-letter calls in the past.

To prepare for the FCC filings and the call-letter change, Lewine collected material on the station's history, which dates to March 18, 1922, when the KHJ call letters were authorized.

The station went on the air the following month and through the years had management connections with Los Angeles Times and RKO-General, among others. Only one L.A. station still on the air, KNX(AM), preceded it, and it was the 90th station in the nation granted a commercial license.

In the "golden days" of radio, KHJ had its own orchestra and comedy acts and performers such as Steve Allen, who did the morning show in the mid-1940s.

Caller... are you there?

Are you there caller...?



"...Let's try line 2". On-air hosts don't want to hear themselves saying those words. And, with the help of the PROtalk4, they won't.



The PROtalk4 is designed around the features busy talent depend on to keep calls flowing smoothly.

Backlit, icon-based buttons make operation quick and simple. Talk to all four callers at the same time, with automatic level balancing for a consistent

on-air sound. Independent digital hybrids provide exceptional audio quality in the studio and between callers.

Plus, the PROtalk4 stands up to your most demanding work environment, with a robust but elegant housing, compact footprint, and straightforward rackmount connections.

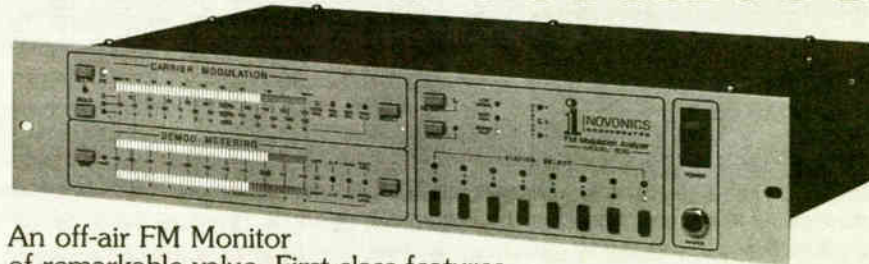
Before call management problems leave your on-air talent all strung out, take a closer look at the easy-to-use PROtalk4.

Call or visit us online today for more information.

PROtalk4
We hear you

BTS Broadcast Telephone Systems • www.broadcast-telephones.com • 1-888-890-7424

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



DON'T JUST
REDESIGN
YOUR SOUND.

OPTIMOD-FM 8400

REINVENT IT.

OVER FIVE TIMES THE PROCESSING POWER. INTELLIGENT PEAK CONTROL. READY TO PLUG AND PLAY IN YOUR BROADCAST CHAIN. WITH THE ALL NEW, COMPLETELY RE-ENGINEERED OPTIMOD-FM 8400, THERE'S NOTHING LEFT TO BUY. YOU CLEARLY OWN LOUD. FOR THE MOST UP-TO-DATE INFORMATION GO TO WWW.OPTIMOD8400.COM.

orban®

© 2000 Orban, Inc. Orban and OPTIMOD are registered trademarks.

INTRODUCING OPTIMOD-FM 8400 FROM ORBAN.

1525 Alvarado St., San Leandro, CA 94577 USA Phone: 1-510-351-3500 Fax: 1-510-351-0500 E-mail: custserv@orban.com Web: www.orban.com

At AES, New Technologies Shine

Despite an early start, radio broadcasting and pro audio equipment manufacturers managed to bring forth a bevy of new and improved products at this winter's European AES Convention.

Over the past four years, the European AES Convention has been held in March, after the annual NAB convention in Las Vegas. This year, however, attendees of AES got a sneak preview of some of the products on offer at NAB2000, as well as the chance to view a range of pro audio and broadcast offerings from European manufacturers that do not come to Vegas.

Digital recording

One of the more interesting categories of equipment on offer in Paris was the handheld digital solid-state recorder designed to replace tape. MiniDisc and other media for electronic newsgathering.

Nagra displayed the compact Ares-P solid-state recorder. The unit is based on PCMCIA Flash RAM technology, allowing reporters to record up to 3 hours and 15 minutes of 128 kbps stereo audio to a 192MB PCMCIA card, using ISO/MPEG Layer II.

Digigram adapted Ares-P technology to create the RCX220, which connects an Ares-P via its USB connection to a computer fitted with Digigram audio cards. This gives access to the range of software

applications developed for Digigram cards, including an audio editor.

Although still in prototype stage, Maycom showed its professional handheld recorder. It too is based on removable Flash RAM cards and MPEG compressed audio. Maycom expects to deliver preordered recorders at IBC in early September.

New from CCS Europe, the Germany-based partner of Musicam USA, was the Flashman solid-state recorder. It can record linear or ISO/MPEG Layer II or Layer III audio Flash RAM cards. The Flashman features S/PDIF I/O and sampling rates of up to 48 kHz.

All these units feature a built-in microphone and ports for external mics and headphones.

Of course, the one downside for these units is that reports cannot be filed directly from the unit via ISDN or POTS.

Sonifex offered version 2.5 of its software for the Courier portable recorder, which adds ISDN capabilities, including the transmission of live audio, to the portable

recorder/editor. The software features an improved MPEG algorithm for sending 11 kHz bandwidth mono audio over ISDN lines.

On offer from Dialog 4 was the C-TAXI portable recording/editing unit. It employs ISO/MPEG Layer II and Broadcast WAV format (BWF) audio and can transmit real-time audio via ISDN. The German company also highlighted the MusicTAXI Net TCP/IP

rackmountable full-function codec.

Maycom showed an enhanced version of its Easycoder portable recorder, which is now able to transmit live ISDN feeds. Also on offer was the Isys software-based codec.

New features of Isys include the ability to convert and route incoming/outgoing audio automatically.

Automatic reception

You/Com Audiocommunicatie featured its ReporterMate digital recorder with built-in ISDN hybrid, as well as the NewsDepot studio-end system for automatic reception of reporter feeds.

CCS Europe highlighted the new Mayah Centauri "audio gateway" codec system, which provides a range of audio transmission and networking capabilities for transmission via POTS, ISDN or IP. Billed as "the audio codec's successor," Centauri can handle communications and audio transfer within a facility, as well as with remote sites via dedicated lines, ISDN, GSM cellular connections or the Internet.

Products on show at the AEQ booth included two dual-channel multi-format ISDN codecs — the MPAC-02 portable and its rackmount counterpart, the ACD-5001. AEQ also displayed the TLE-02D portable communications unit featuring ISDN codec, digital hybrid and mixer.

Highlighted at the AETA booth was the Scoop Reporter II portable ISDN codec and the HiFiScoop 3 family.

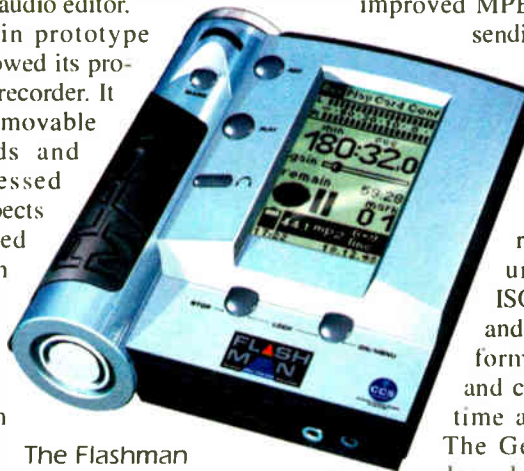
At the APT stand, several new apt-X compression-based ISDN products were displayed, including the new NXL Imux codec is designed for multiplexed audio in either single or dual destination mode with bandwidths ranging from 7.5 kHz mono, 7.5 kHz stereo to 15 kHz.

Comrex presented the EuroNexus portable ISDN codec, an international version of the Nexus ISDN codec. The EuroNexus offers 15 kHz audio at 128 kbps or 7.5 kHz at 64 kbps, with 6-millisecond delay.

Telos displayed two new products, usable with both ISDN and POTS lines: the 12-line Telos TWO x 12 system for phone-in management and the Telos TWO, which contains two digital hybrids in a single rackmount unit.

The Marti line of telco equipment, including the Smarti analog telephone line codec and the DSTL digital studio-to-transmitter link, was on display at the Broadcast Electronics stand.

Broadcast Electronics highlighted its new eSTREAM mediacasting system that provides on-air quality audio via the



The Flashman

Internet. The system was shown integrated with WebVault, a World Wide Web-enabled audio playout system.

Also on offer from BE were the AudioVault automation system and the NewsBoss newsroom system, as well as its AM and FM solid-state transmitters.

Most of the new software offerings from BCC focused on the new media market. Emisio and Broadcast Office both provide broadcasters and other content developers with a means of publishing content on the World Wide Web. The two programs also include facilities for Wide Area Protocol (WAP) transmissions to cellular telephones and other data receivers.

Dalet demonstrated its WAP Portal.

See AES, page 16 ▶

AES Paris Attracts Curious Crowd

The return of the Audio Engineering Society to France proved a success.

The 108th AES Convention, held in February at the newly renovated Palais des Congrès in Paris, drew a range of visitors from across the continent and around the world.

The 2000 convention was the first held in Paris since 1995, and the location seems to have helped draw in a crowd. More than 8,700 visitors came, compared to 6,400 attendees at the 1999 convention in Munich, Germany.



According to Roger Furness, AES executive director, Paris will be a regular location for the AES, alternating with Munich and Amsterdam, Netherlands.

Alongside the traditional mix of radio, live sound, post production and related professional audio fields, the 2000 AES Convention devoted a great deal of discussion time and exhibition space to new technologies such as DVD, multichannel audio and the Internet.

The organizers also emphasized the significant role the AES has played in overseeing the convergence of audio technologies and the exchange of ideas, ensuring a smooth transition toward the future.

During the opening ceremony, keynote speaker Jörg Wuttke, technical director of Schoeps Schalltechnik GmbH, said that in an age of technological expansion it is necessary to not lose sight of the original foundation upon which new technologies spring. The AES should be considered a "link between technology and art," he said.

Approximately 308 companies exhibited products at the Palais des Congrès, about the same number as at the 1999 European show.

— Marguerite Clark

Digigram POWERED

The best
sounding,
most reliable
digital audio
systems use
Digigram
sound cards.

Does yours?



Digigram Inc. 2101 Wilson Boulevard, Suite 1004 Arlington, Virginia 22201
Phone: +1.703.875.9100 • Fax: +1.703.875.9161 • E-mail: input@digigram.com • Web: www.digigram.com

TALK DIGITAL TO ME

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



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

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

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

Ready to talk digital? For more information or to get in touch with your Telos Systems dealer, contact us or visit our web site.



TELOS SYSTEMS 2101 SUPERIOR AVENUE CLEVELAND, OH 44114 USA
TEL: +1 (216) 241-7225 FAX: +1 (216) 241-4103
E-MAIL: info@telos-systems.com www.telos-systems.com

TELOS SYSTEMS EUROPE
JOHANNISSTRASSE 6 D-85354 FREISING GERMANY
TEL: +49 81 61 42 467 FAX: +49 81 61 42 402
E-MAIL: europe@telos-systems.com www.telos-systems.com

Telos Systems, the Telos logo, TWOx12 and Status Symbols are trademarks of TLS Corp.

Radio Daze

Clarify the dazzling array of engineering choices with a Dielectric FM Antenna System.

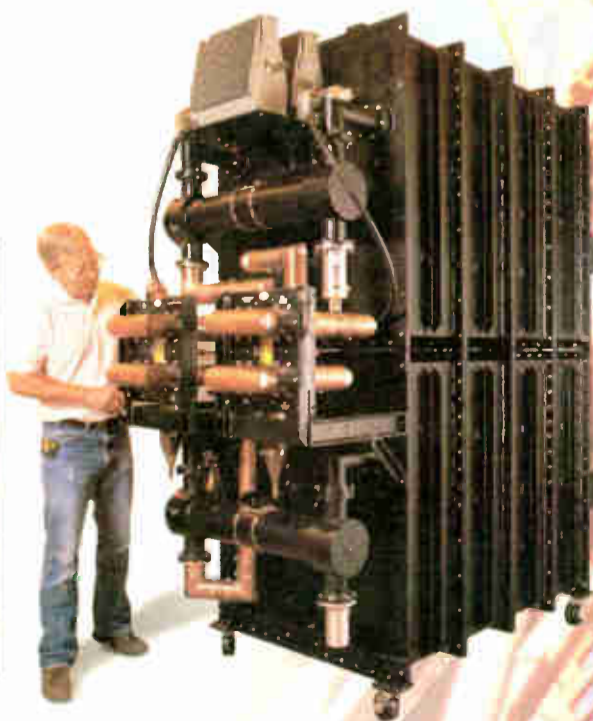
Choose an engineering partner who guarantees the quality and reliability of your new FM Antenna System. We offer a 5-year warranty for our complete Dielectric-built FM systems, covering everything from the transmitter output through the antenna, including transmission line, switches, filter and combiner. Select combiners with a clearer signal now and digital capabilities later; advanced antennas with variable bay spacing for better control of elevation and azimuth patterns; and patented transmission line that offers greater power handling and broader bandwidth than other manufacturers. With single source responsibility from Dielectric, you not only get the finest engineered broadcast equipment, but peace of mind as well.

See us at NAB Booth # R3789

Dielectric Communications • 22 Tower Road • Raymond, Maine 04071
800.341.9678 • 207.655.4555 • www.dielectric.com

Dielectric
COMMUNICATIONS

Engineering Excellence Since 1942



Let's work together. Call 800-341-9678.

Euro AES Provides Sneak Peek

► AES, continued from page 12

which eases the production of material for WAP, Internet or DAB datacasting. Such systems can be used, the company said, to provide ancillary services to listeners to provide reporters with instant access to radio station databases in a secure manner.

The company also showed its prototype multimedia broadcasting system, a music scheduler for the Dalet 5.1 system and the brand-new Digital Audio News Editor (DANE) package.

Management Data unveiled version 3.0 software for D'Accord, which features a unified interface for all modules and improved scheduling and archiving facilities. Management Data also presented ReadyOnAir, a complete start-up package for small stations.

A new automation product, MediaStation, the latest version of AirControl NT and a number of new plug-ins were on show at the **mediatron** booth. Aimed at small to mid-sized stations, MediaStation features plug-in technology and optional support for DAB and the Net.

Netia highlighted the latest innovations of its Radio Assist automation software, including Webcasting capabilities. Also shown was new Insider intranet software.

Station information

New modules for the DigiMedia automation were on view at the **Studer Professional** area, including the On Air Gateway, which gives listeners secure access to station information; an Internet publisher; and a remote control module.

The radio automation area at the **Harris Systems** stand featured Enco Systems DAD products, which have been selling well in Europe.

Fairlight On Air had its CoSTAR digital audio storage and playback system on display, along with numerous modules for storage and archiving, acquisition and editing, data management, CD-ROM management, scheduling, playback and systems management.

David presented three recent developments to its DigAS range of software tools: NewsPlayer2 eases the on-air management of audio and text material; version 3.0 of the Multitrack Editor features several new display modes and an active movie interface; and the AdCom scheduling and on-air system for commercials.

Visitors to the **Studio Audio** stand saw the latest version of SADiE, which featured POW-r, a new dithering plug-in for word-length reduction. A special 96-kHz version of the Cedar De-Click algorithm was also on offer.

Steinberg showed the Nuendo Media Production System for editing and post production work. Its comprehensive features include up to 128 tracks of digital audio, 24-bit 96 kHz performance and SurroundSound mixing.

CreamW@re presented the Windows/Macintosh-compatible STS-4000 sampler for its Pulsar DSP studio system. Features include up to 64 stereo voices, a resampling function and Akai S1000 and S3000 import/export capabilities.

Samplitude DAW software was on offer at the **Sek'd** booth. New to the system was an optional module for encoding/decoding MP3 audio. Sek'd also showed its AudioCaster and JingleCaster programs for small and mid-sized stations.

Sonic Solutions introduced an inte-



Sony's DMX-R100

grated production system for preparing, encoding, authoring and formatting content for use on DVD-Audio discs using Meridian Lossless Packing (MLP).

The company also announced a partnership with Sony that integrated ATRAC3 encoding into the iMaster suite of tools for the preparation of compressed audio for Internet distribution.

New from **Digigram** was digital encoding software for the creation of multichannel Dolby Digital audio and two new PCI-bus stereo soundcards — the full-duplex PCX924 and the playback-only PCX22. Digigram also announced a new Linux driver for certain Digigram soundcards.

The **Mixtreme 2000** Digital PowerPAK 16-channel expandable PCI card was shown at the **Soundscape** booth. It includes five software applications designed to enable users to build up a comprehensive recording, mixing and effects workstation on their PC.

Sony introduced the new DMX-R100, a smaller digital console that uses much of the same technology as the OXF-R3 but is a more defined package with motorized faders, full dynamic automation, 96 kHz sampling and 5.1 SurroundSound capabilities.

Euphonix showed for the first time in Europe the System 5 digital console featuring a mix of dedicated controls and assignability. The control surface is scalable to suit a range of studio needs and sizes.

New features for the **Studer** digital D950 console were highlighted at AES. Most important was a new central assign section, which allows all features of the console to be operated from the center position.

Version 2.1 software for the D950 expands the automation capabilities and adds off-line editing abilities, as well as 96 kHz digital support and an internal reverb plug-in.

One of the few totally new consoles at the show was the Sirius digital broadcast console from **D&R Electronica**. It can handle up to 32 channels with EQ and dynamics. An integral router allows internal control of audio input and output connections.

The control surfaces are arranged as 19-inch racks inset into the studio furniture with independent I/O racks and a central control panel. A wide range of I/Os are already available, and there is the possibility of linking systems together.

Klotz Digital had a large presence at the AES, showing its established Paradigm digital console and a project that it described as "an open audio-media for production and interactive broadcasting."

At the heart of this project are the 6400 Series of DSP units, which can be used by

third parties to interface with Klotz products to create a 64-channel digital broadcast mixer with a built-in fiber optic interface.

Wheatstone highlighted the D-600 on-

air digital console with a very analog-looking control surface with full parametric EQ, dynamics and automation that makes it suitable for small-scale production work, too.

Soundcraft featured its RM1d digital on-air console. Designed for self-operated stations with multiple users, the control surface was kept deliberately simple, although all the basic facilities are present.

Calrec launched the M3 remote production and live broadcast console available in 19-inch rackmount and desktop versions. The M3 features choice of input module types, four auxs, mix-minus on each channel, two main outs and up to four optional groups.

Harris showcased a complete radio station assembled from products it makes or distributes. New was the Impulse digital on-air/production console from **Pacific Recorders & Engineering**. Able to accept analog or digital inputs, the Impulse has three stereo program buses, telco mix-minus outputs and analog/digital outputs.

Thum + Mahr displayed its new Intellimix desktop mixer/router, which is

See AES, page 16 ►



API Console Warms Up 'Prairie'

Minnesota Public Radio installed a 32-channel API Legacy Console in its Studio P last fall. The console is used for post-production on "A Prairie Home Companion," "The Writer's Almanac," "St. Paul Sunday" and other programs.

The station's classical music service uses the Legacy to record live programs in the studio, and the station recently began recording non-MPR clients to generate supplemental income.



Nikhil Ranade of API, left, and Craig Thorson of Minnesota Public Radio pose with the 32-input API Legacy Console.

Perry Carter, MPR's director of operations, said, "I worked on an API board at WGBH in Boston. API equalizers are well-known in the industry for their fantastic sonic quality, and it was interesting to pit them up against all those other big names."

For information contact AT1/API at (410) 381-7879 or send e-mail to gordon@audiotoys.com

Launch Selects MXPRESS.COM

Launch Radio Networks, formerly SW Radio Networks, will use the **Musicam Express** distribution system MXPRESS.COM for its daily news prep service.

The move helps replace the existing Dax system.

"Since MXPRESS.COM uses the StarGuide digital satellite receiver," said Dave Martin, director of operations for Launch, "we should have no constraints on our bandwidth needs, allowing radio stations to automatically receive our products."

The StarGuide satellite receiver was chosen recently as the new digital standard for satellite distribution to the U.S. radio industry, the company said. StarGuide is the parent company of Musicam Express.

Perry Wilder, director of operations for Musicam Express, said the old Dax system was a private network that required the installation of PCs.

By downloading free software, anyone in any studio, of any station, can receive and send media files. Stations with local-area networks can have files downloaded direct to the LAN for pickup with their automation systems.

Launch will use the service to distribute show prep to affiliated stations. It prepares audio and text products for 15 formats daily and provides content to more than 1,000 stations.

Musicam Express is a joint venture of StarGuide Digital Networks and Infinity/CBS Broadcasting.

For information, contact Musicam Express in Kentucky at (800) 847-8391.

Digital Audio Dominated AES

► AES, continued from page 15 designed for small editing suites and similar space-restricted rooms.

On display at the **Marantz** booth was the PMD650 portable MiniDisc recorder, which the company announced is now available for delivery. The company also introduced the CDR500 combination CDR recorder/CD player and the CDR631 professional CDR/RW recorder.

While there appeared to be little new in traditional stereo headphones at AES, the concept of "surround headphones" — headphones that use digital electronics to create a full SurroundSound image from a multichannel input — is gaining ground.

Simpler systems such as the **Dolby**

Headphone move the stereo image outside the head making detail easier to identify, while R&D demonstrations by **Studer** and **Lake Technology** showed how far this might go.

FM reception tests

French company **Auditem** celebrated its 20th birthday in Paris and gave itself a gift: Audemat Goldenear software for analyzing FM reception. Goldenear analyzes each parameter — RF, subcarrier level and multipath — in detail, allowing broadcasters to assess the exact sound quality of their station.

Also new at the Auditem booth was **Total Control**, which the company offers

in collaboration with **Davicom**, monitors and controls all conditions of the transmission site as well as signal continuity and quality.

Aztec Radiomedia, now part of the **Digigram** group, was on hand at the Digigram booth with the AZ100 FM Navigator. The compact system is designed to provide decoding and complete analysis of a multiplexed FM signal.

Among other test gear on display was the **Neutrik** Minilyzer, a handheld audio measurement unit designed for cost-effective, reliable test results. The company also introduced the Easy-Patch patch panel for fast and easy configuration.

DK Audio of Denmark highlighted

new software and routing matrix functions for the MSD600M master stereo display. The company also showcased the CDR-1616 digital audio matrix.

Sonifex introduced two new products for its Redbox range of studio accessories — the RB-HD6 six-way headphone amplifier and the RB-MMI automatic mix-minus generator. The RB-HD6 distributes stereo audio to a maximum of six different sets of headphones, while the RB-MMI is designed for consoles without a dedicated telco channel.

Penny + Giles displayed its range of controllers for studio and broadcast applications, while the Freeway range of routers was among products at the **Pro Bel** stand. **NTP Elektronik**, now part of the Telecast Group, displayed the 625 digital multinorm routing switcher with a fader panel control system. The company also showed the 677 multifunction audio system. At the same booth, **Telecast** showed its range of analog audio routing switchers.

Processing

Although much of the focus at AES is on gear for the pro audio market, broadcast equipment made up a significant part of the show floor. This was especially noticeable when it came to audio processing gear.

Thum + Mahr showed the Yellowtec VIP/digital microphone processor, which features a special chip card interface that makes it easy for DJs to recall their personalized processor settings.

New from **Cutting Edge**, a Telos Systems company, was the Omnia ToolVox digital microphone processor, which provides front-panel access to approximately 100 stored presets. Cutting Edge recently delivered the Omnia ToolVox to French broadcaster Skyrock. Also on offer were Omnia units for AM, FM, DAB and webcasting.

Impact Développement (IDT) showed off the Digital Virtual Processor (DVP) FM. The processor, equipped with an FTP signal analyzer, is now in use at a number of broadcasters in the Paris area, giving AES attendees an easy way to sample its sound at their leisure.

On display at the **Orban** stand was the low-cost Optimod FM 2200 processor, designed for smaller stations and based on the 8200 technology. The US company also highlighted the version 2.0 software for the Optimod-AM 9200, which features new presets for shortwave broadcasting as well as front panel lock-out that requires a code to access settings.

Also on show at the Orban booth was the Optimod-6200 all-digital audio processor for radio, TV and Webcasting.

Sintefex Audio showed its Replicator FX8000. This unique unit uses patented technology to sample and then reproduce digitally the effects and sound of traditional analog processors and other equipment.

T.C. Electronic was present with the System 6000 multichannel processor for music, post production, broadcast and mastering applications. The Danish firm also announced that it is now shipping the M-One Dual Effects processor and the D-Two Multi-Tap Rhythm Delay.

Among the products on display at the **Lexicon** stand was the MPX 500, which features 24-bit A-to-D and D-to-A, balanced XLR analog I/O, SPDIF digital I/O, and more than 30 effects.

■ ■ ■

Peter Finch, Marguerite Clark, Keith Spencer-Allen and T. Carter Ross contributed to this report.

Everything you need
for your studio project...
in ONE place.

www.**SystemsStore.com**

Getting Things...Right

A Division Of **RDA**
Systems

314-872-8222
888-616-7980



**YOUR LINK
TO NEW MARKETS
...GO BEYOND**

VADIS

A/D - D/A
Mic preamp
Routing matrix
Digital I/O interfaces
Fibreoptic network
On-air codec management
Automatic gain control
Compressor/limiter/gate
Digital mixing console
EQ (graphic/parametric)
Time switching
Level meter
Mix-minus
Delay

**KLOTZ DIGITAL - THE ARCHITECT OF
THE OPEN AUDIO-MEDIA PLATFORM
FOR INTERACTIVE BROADCASTING,
PRODUCTION AND PUBLIC-ADDRESS.**

THIS PLATFORM COMPLETES THE LINK
TO NEW MARKETS AND INNOVATIVE
COMMUNICATION SERVICES.

OUR EXPERIENCE FOR YOUR SUCCESS

Eliminate wiring

- reduce installation cost
- save installation time
- earlier to production & on-air

Share resources and equipment

- reduce capital investment
- cut operating costs
- greater efficiency
- powerful flexibility

Unlimited functionality

- integrate all audio functions
- combine operator tasks

KLOTZ DIGITAL AMERICA Phone: +1-678-966-9900
KLOTZ DIGITAL FRANCE Phone: +33-1-48874681
KLOTZ DIGITAL ASIA Phone: +60-3-5193233
KLOTZ DIGITAL AUSTRALIA Phone: +61-2-95187430

KLOTZ DIGITAL AG HEADQUARTERS
Hans-Stiessberger-Str. 2A
D-85540 Haar/Munich
Phone: +49-89-462338-0
e-mail: info@klotz-digital.de
www.klotzdigital.com


DIGITAL

**FOR AM/MEDIUM
WAVE ANTENNA
SYSTEMS
COME TO THE
CHOICE OF RF
ENGINEERS
AROUND THE
WORLD**

KINTRONIC



LABS, INC.

**FROM CONCEPT
TO OPERATION**

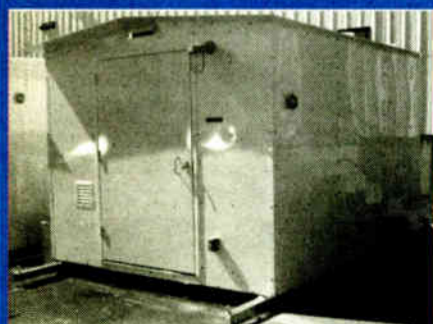
KINTRONICS OFFERS THE STATE-OF-THE-ART DESIGN SERVICES AND TOP-QUALITY PRODUCTS TO PUT YOUR STATION ON THE AIR WITH THE COVERAGE YOU NEED ANYWHERE IN THE WORLD



**CUSTOM HIGH POWER AM
DIRECTIONAL ARRAY DIPLEXERS**



**RACK MOUNTABLE MAIN/AUX/DUMMY
LOAD TRANSFER SWITCHES**



**ALUMINUM CONSTRUCTION, CLIMATE-
CONTROLLED PRE-FAB ANTENNA
TUNING HOUSES OR TRANSMITTER
BUILDINGS**

KINTRONIC LABORATORIES INC.
P.O. BOX 845
BRISTOL, TENNESSEE 37621-0845
PHONE: 423-878-3141
FAX: 423-878-4224
EMAIL:
KTL@KINTRONIC.COM
WEB SITE:
<http://WWW.KINTRONIC.COM>

FEED LINE

When You Have a DA Line Problem

W.C. Alexander

This is the fourth in a series of articles about troubleshooting and repairing directional antenna systems. The previous part appeared March 15.

We have been taking a systematic look the parts of a typical system, starting with the most likely to fail and working our way down to those less troublesome.



Photo by J.T. Anderson

The Array of KKJH(AM) in Los Angeles

Transmission lines are some of the most trouble-free parts in a directional antenna system, but a problem in a line can quickly wreck a directional pattern.

Water can enter a line and change both the impedance, loss and velocity factor of the line. Bad connections can generate heat and eventually cause a burnout. Arcs can occur, also leading to a burnout.

When a transmission line problem is suspected, start with a good visual inspection on exposed parts of the line. Any evidence of heating (such as a melted jacket) or arcing (soot or pitting) should be investigated.

Pressure integrity

Check pressurized lines for pressure integrity by closing the valve from the pressurization manifold to the line and watching the line pressure gauge.

Keep a look out for anything out of the ordinary.

Recently in one of our systems, a problem in a foam-dielectric transmission line showed up visually as snow melted in certain spots on the ground above where the transmission line was buried.

The line, which was carrying a great deal of power, had gotten wet. In the places where the water in the line was conducting RF and being heated, enough heat was produced to actually melt the thin layer of snow!

When there are no external signs of damage to a suspect line, it is best to

use a time domain reflectometer to check the condition of the line throughout its length.

Most stations do not have a TDR lying around, so start with some simple bridge measurements that can reveal a great deal about the condition of the line. These measurements can be made on any transmission line, including sample lines.

Don't let the math scare you. The formulas are simple and can be run on just about any scientific calculator. If you are industrious, you might even write a code for your programmable calculator, computer or spreadsheet.

Two measurements are all that are required to determine line impedance: A short-circuit measurement and an open-circuit measurement.

Start by disconnecting the transmission line to be measured at both ends. With the far end of the transmission line open, measure the resistance and reactance of the line at a frequency on which the line will be close to an odd number of eighth-wavelengths long.

The actual frequency doesn't matter except that resonant lengths should be avoided. Be sure to correct reactance readings as indicated on the bridge for frequency.

Next, with the far end of the line shorted, again measure the resistance and reactance of the line.

With the open-circuit and short-circuit resistance and reactance values in hand, the results are used in the following formulas:

$$Z_0 = \sqrt{Z_{sc} Z_{oc}}$$

$$\theta_0 = \left(\frac{\theta_{oc} + \theta_{sc}}{2} \right)$$

Where:

Z_0 is the magnitude of the measured impedance of the transmission line
 θ_0 is the angle of the measured impedance

Z_{oc} is the magnitude of the measured open circuit impedance

θ_{oc} is the angle of the open-circuit impedance

Z_{sc} is the magnitude of the measured short-circuit impedance of the line

θ_{sc} is the angle of the open-circuit impedance

Z_{oc} , θ_{oc} , Z_{sc} and θ_{sc} are computed using the following formulas:

$$Z_{oc} = \sqrt{R_{oc}^2 + X_{oc}^2}$$

$$\theta_{oc} = \arctan \left(\frac{X_{oc}}{R_{oc}} \right)$$

$$Z_{sc} = \sqrt{R_{sc}^2 + X_{sc}^2}$$

$$\theta_{sc} = \arctan \left(\frac{X_{sc}}{R_{sc}} \right)$$

The angle component of the line's impedance can yield information about the condition of the line in addition to the magnitude component.

If the angle component is high — say, anything over about 20 degrees — there may be a defect in the line causing it to have a high reactance.

A perfect line would have a purely resistive impedance, but in the real world we almost always see some reactance. A low angle component of the impedance value is sufficient to indicate that the line is probably okay.

Likewise, a high angle should be a clue that there is a problem. If your measurements and calculations show a high angle component, it is probably time to beg, borrow or rent a TDR and find the exact location of the fault.

The following series of equations gives us K, A and B:

$$A = K \cos \left(\frac{\theta_{sc} - \theta_{oc}}{2} \right)$$

$$K = \sqrt{\frac{|Z_{sc}|}{|Z_{oc}|}}$$

$$B = K \sin \left(\frac{\theta_{sc} - \theta_{oc}}{2} \right)$$

Where:

K is the magnitude portion of the impedance.

A is the real component of the impedance.
B is the imaginary component of the impedance.

Using the results of these calculations, the attenuation of the transmission line can be calculated using the following formulas:

$$D = \frac{2A}{1 + K^2}$$

$$L = 5 \log_{10} \left[\frac{1+D}{1-D} \right]$$

Where L is the loss of the entire line in dB

The measured loss of the line is useful in seeing whether the line's actual loss is close to the rated loss as published by the manufacturer.

If the measured loss is very far off the manufacturer's rated loss for a given length and frequency, chances are there is a fault in the line.

With a couple of simple bridge measurements and a handy pocket calculator or PC, a great deal can be learned about a transmission line, probably enough to pronounce the line "good" or indicate a fault.

I have made available a handy

See FEED LINE, page 21 ►

intellimix

SIMPLE! AND SMART!

Due to the extensive introduction of computer-networked systems in radio and TV broadcasting, the requirements of modern workstations have changed dramatically.

Traditional ideas no longer provide practical solutions. Routing, mixing, monitoring: The pressures of the broadcast workplace require faster-to-operate and more intuitive equipment. A large number of signal sources needs to be accommodated,

and a mix has to be made quickly and intuitively, but still produce professional results.

Think digital, pay less.

Check out the compelling benefits of the versatile digital layout of Intellimix®. Explore the new synonym for smart solutions in broadcast.



Enjoy top performance equipment at an affordable price.

**NAB 2000
R.761**

intellimix KEY FEATURES

- ▶ Compact Desktop Control Unit
- ▶ 12 Stereo Inputs (AES/EBU, S/PDIF, optical and analog)
- ▶ 2 Microphone Inputs
- ▶ Out-of-Phase Warning Indicators
- ▶ Versatile Source Selection
- ▶ Alphanumeric Displays for Navigation
- ▶ Level Indicators
- ▶ SmartCard® for individual User Setups



- ▶ Powerful WINDOWS® Configuration Software
- ▶ 2 Mix-Minus Feeds
- ▶ Full OnAir Logic
- ▶ All Digital Design, Sharc DSP
- ▶ Value Pricing
- ▶ Remote Base Unit (only 1U high)



YELLOWTEC
 Heinrich-Hertz-Strasse 1-3
 D-40789 Monheim · Germany
 Phone +49-2173-967-30
 Fax +49-2173-967-400
 e-mail info@yellowtec.de



WE TALK BROADCAST

To get the whole story, visit

www.yellowtec.com

...where smart buyers get smarter!

World Radio History

More Truth in Advertising



It's no longer a secret, people all over the world are discovering, despite the hype, that digital dynamics processing can't compete with good analog. Even Cutting Edge® claims their Omnia unit sounds almost as good as analog, while both Cutting Edge and Orban® claim each others digital product trashes the signal.

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.

No digital grunge, no aliasing, no overshoot. No subcarrier artifacts from composite clipping. Just the loudest, cleanest FM processing with the greatest possible coverage area.

Better sound *and* more listeners - too good to be true? Call Aphex today for a demonstration, and we'll show you there *is* truth in advertising.



APHEX SYSTEMS

*Improving the way the world sounds*SM

11068 Randall Street, Sun Valley, CA 91352 U.S.A
818-767-2929 Fax: 818-767-2641 <http://www.aphex.com>

Cutting Edge and Omnia are registered trademarks of TLS Corporation. Orban and Optimod are registered trademarks of Harman International.

What Do I Do When It Breaks?

▶ **FEED LINE**, continued from page 18
Windows applet for this application. You can download it from the Internet at <http://members.aol.com:/cbceng/pub>

Find the fault

If your bridge measurements indicate a fault in a line, the next step is to find a TDR and locate the fault.

TDRs are available for rent from most of the larger electronic test equipment rental outlets. Many tower service companies also have TDRs, so you may be able to call your local tower service company for help.

The best case, which Mr. Murphy ensures is seldom the case, is where the fault is located very near one end or the other or in an area where the line is above ground.

The worst, naturally, is when the fault is in the middle of a buried line. Usually, the biggest challenge is to dig in the right place. This is where "as-built" drawings of the site come in handy, pinpointing the cable trench routes to each tower.

Once the location of the fault is known, there is every chance that the line can be repaired.

The usual procedure is to cut out the damaged portion and splice in a new piece of line using splice kits obtained from the manufacturer. If the line is an older type no longer in production, a piece of a different type of line (as long as the characteristic impedance and size are the same) can sometimes be spliced in.

Factory splice kits can't be used to splice dissimilar line types, but EIA flange connectors can be installed and used to join the line pieces. The resulting mismatch will, in most cases, be so minor that it can be ignored.

If you use a pair of flange connectors to make a splice, tape and waterproof the outside of the splice before reburying it.

Fix the foam

Foam-dielectric lines that have gotten wet must be cut and spliced in the

same way as discussed above. First, locate and deal with the leak. Look for prior splices, nicks or cuts in the outer

water-soaked line. It is best to cut out and replace more than just the obviously wet portion, to be certain you

located and repaired. Remove the connectors from both ends and connect a vacuum cleaner hose to one end (usually the tower end) with electrical tape to form a tight seal.

Turn on the vacuum cleaner and allow it to run for several hours. This will usually pull all the water out of the line and evaporate most of the remaining moisture.

Reattach the connectors and open the petcock at the tower end of the line. Use dry air or nitrogen to purge the line of the last vestiges of moisture. Close the petcock, pressurize the line and check for leaks.

Next time, we'll look at towers, insulators and ground systems.

■ ■ ■

Cris Alexander is director of engineering for The Crawford Group.

**Don't let the math scare you.
The formulas can be run on just about
any scientific calculator.**

jacket or other anomalies in the vicinity of the problem.

Then cut out and replace all of the

got it all.

Wet air-dielectric lines often can be dried out once the source of the leak is



LEADERS KNOW

BROADCASTING HAS NO BOUNDARIES!

That's why leaders look to BE.

You Read It Here

Ten Years Ago

It was a show where we aimed forward with the formal bow of digital radio transmission; where we witnessed the car radio of tomorrow, capable of tuning by format ...

It was also a show where scads of Grateful Dead fans camping out for a three-day concert nearby wandered in tie-dye, creating a near-grotesque but amusing contrast to the more contained appearance of broadcasters.

The National Association of Broadcasters 1990 convention ... boasted its highest attendance ever — 50,443 — but apparently a low concentration of radio attendees, tainting what generally was otherwise a smoothly executed, well-regarded show for equipment manufacturers and the technically oriented.

*"Atlanta Hosts Lively NAB"
May 9, 1990*



Visit our booths at NAB for demonstrations of:

- Digital Audio Storage and Studio System
- Open Architecture Software Design
- News/ Music/ Traffic Workgroup Software
- Remote Configuration Tools
- Streaming Internet Radio Solutions
- Satellite, WEB, WAN Tools
- Leading Transmitters
- Purchasing Programs
- Innovative Transmitter Technology
- Low Power FM Solutions
- MARTI®
- AudioVAULT®
- eSTREAM™
- NewsBoss™

Leaders in broadcasting manage revenue today by working in a dynamic environment that crosses efficient radio station automation, innovative transmitter technology, streaming Internet audio, and multimedia radio - **THERE ARE NO BOUNDARIES!** In this new industry it's all about trust, talent, flexibility, robustness, "best of breed", and accountability. And there are no boundaries in what BE has to offer:

Support: BE offers 24 x 7 support both by phone and Internet. Our core belief is that customer's needs come first!

Training: BE offers hands-on classes, which give your people the understanding they need to successfully operate BE equipment.

Partnerships: BE has formed relationships with digital technology and broadcast industry leaders to ensure that our solutions successfully serve our customers needs today and into the future.

Customized Solutions: BE takes pride in working with customers to provide them innovative broadcast solutions that are unique to their environment.

Visit BE at NAB booths R3682 & I6123, or if you can't wait, call us today at 888.232.3268.



Broadcast Electronics
Quincy, Illinois • 888.232.3268

PWD 300 © 2000 Broadcast Electronics, Inc. AudioVAULT and the BE emblem are registered trademarks of Broadcast Electronics, Inc.



has a website
 & really smart people
 who sell & deliver
 & service your every need
 & really nice people who
 answer the phones
 & has over 600 lines of the
 best equipment in a
 really big warehouse
 & a really great catalog.

Check out what's on
SALE right now by calling
800-356-5844

Need it after hours?



Pro Audio, Video, Lights
800.476.9886
 M-F 8am-10pm, Saturday 10am-6pm(CST)
www.compassxpress.com



Sells Mics &

Mixers & Wireless & Tape &
Stands & Recorders &
Signal Processors & Parts &
Keyboards & Software & Cable &
CD Players & Test Equipment &
Amplifiers & Speakers & Headphones &
Intercoms & Lights &
Gel & Cases & Cabinets & Screens &
Carts & Projectors & Video Cameras &
DVDs & Televisions & Monitors & Tripods &
Gaffers Tape & Connectors & Tele Conferencing &
 Lots Of Other Things



AUDIO • VIDEO • LIGHTS
Call 800.356.5844
www.fullcompass.com

NEWS MAKER

Foti Sees the Promise of Digital

Paul J. McLane

This is one in a series of interviews that RW will publish this year with manufacturers of audio processors for radio.

The thing you notice about Frank Foti is his passion.

Whether he is preaching the gospel of audio processing in the digital domain or holding court about his beloved Cleveland Indians, the president of Cutting Edge leaves no doubt he believes.

Consider his zeal when discussing new products in the Omnia family of processors (see story below).

"The discerning broadcaster who wants the flexibility and the power will pay for it," he told RW. "But there is a big market out there for an efficiently priced product that sounds great."

That's the concept behind the new Omnia-3 processors, priced at \$3,580. Compare that to the suggested retail of the original Omnia at \$8,000 to \$10,000.

"I can't tell you the number of customers who have said, 'Man, I just love this product, but we're a small radio station in Montana or Gdansk, Poland, and I don't have that kind of money.'"

Foti said the product family has grown in two directions.

"The Omnia-6, for the real discerning

broadcaster who says 'Nothing matters but sounding the best on the dial,' and in the other direction how do we leverage the Omnia to make it available to everyone."

Energetic

Foti, 44, seems even younger than that. Perhaps his black hair, which he

seems to have boundless energy.

He started his own processing company after tinkering with audio boxes as a chief engineer in Cleveland and New York.

Eight years ago, Cutting Edge merged with Telos Systems and Foti became minority owner. Majority owner Steve Church also serves as CEO of



At Z100, Frank Foti, right, and Scott Shannon, left, joined Kid Kelly when WHTZ(FM) threw the switch and activated new studios in Jersey City, N.J.

wears long, and his informal attire enhance the impression of youth.

But with Foti, it's also his outlook. He

Cutting Edge.

The company also makes phone hybrids, codecs and Internet products.

"I'm very involved in all facets of the business," Foti said during an interview in his office in a converted factory in Cleveland's old garment district.

"But if we had to get down to it, Frank's day job is in here playing with audio processing."

Asked how radio has changed in recent years, he points to improvements in digital processing.

"A lot of people anticipated the digital processor being the quantum leap," Foti said. "As history has shown, the first attempts left a bit to be desired. ... The feedback to us, before we introduced our

product, was that 'It works, it doesn't sound bad, but boy, my analog box still sounds better.' ... We've seen digital move forward. The feedback (since) has been that we've at least matched analog performance, if not exceeded it."

Foti said some markets still experience "loudness wars" among stations, but that consolidation has changed things.

"Five years ago, if you were the CHR station in town — yes, you had to beat the other CHR station, but it was for bragging rights to be the loudest in town.

"Now if you are the CHR station, you may be clustered in with an urban, an AOR, a light rock, and you have to be respectful of your brethren."

These broadcasters don't want to cause sonic damage to other members of their franchises.

"Yes, there are a few markets where you could see people who want to fight for the bragging rights," he said. "I was in D.C. not too long ago, and there seems to be some high octane going on. To my ear," he said.

"I think it probably comes down to a couple of really competitive program directors for competing companies saying 'I'm going to get him,' formatcally and sonically."

Claims of success

Is Foti still playing the role of processing upstart, particularly compared to Orban?

"We're not an upstart to where it was 10 or 11 years ago, when it was Frank and his big black cat Vito Corleone," recalled Foti.

"I was building Vigilantes, in my apartment, by myself. Drill-pressing everything, to redo the front panels. It's not that anymore.

"But everyone loves an underdog. People like the Cleveland Indians 'cause they're an underdog. Cleveland is an underdog," he added with a laugh.

"We're No. 2 with regard to sales volume, total number of units out there. But in the major broadcast markets, we've been outselling Orban by a pretty wide margin. That, I think, is a good indicator

See FOTI, page 26 ▶

MARKET PLACE

Omnia for Under \$4,000

Expect to see the name Omnia a lot in coming months.

Telos Systems/Cutting Edge is introducing an expanded line of digital audio processors at NAB2000 this week.

At one end of the price spectrum is the Omnia-3, aimed at station managers in small and medium markets who haven't been able to afford an Omnia in the past. It will carry a retail price of \$3,580.

Managing Director Mike Dosch said the existing processor has been a success at FM stations in major markets since its introduction three years ago, but that clients with smaller budgets were left wanting.

He said advances in DSP speed and software and efficiencies in manufacturing technology helped the company build the lower-cost unit. The limiting and AGC functions of the new models also are simpler.

"You'd have to look hard to see what's different from the original Omnia," Dosch said.

The Omnia-3 uses many of the same algorithms as its older cousin. It will be offered in three-band



The Omnia-3

versions, for FM and Internet applications, and a four-band version for AM.

It provides 48 kHz sampling, AES/EBU inputs and outputs, integrated clipper and composite filter, and a digital stereo generator in the FM model. A removable PC card lets users store and recall settings, and simplifies software upgrades.

"The really good news is that we will have them in stock at NAB, ready to ship," Dosch said.

Also new this spring is the Omnia-6, a high-end model for FM applications.

"Market leaders behave differently," Dosch said. "If they can have an extra ounce of power, they want it."

The unit, which will accept the same plug-ins as the original Omnia, allows the user more access to settings and to make subtle changes in the AGC, limiter and crossover.

It can be configured as a four-band or six-band processor, has more DSP power than the original Omnia and offers a more intuitive user interface with color display.

The Omnia-6 is aimed at major-market power users. Dosch called it "the processor Frank Foti would want if he was still running a radio station."

The price of the Omnia-6 had not been finalized prior to the NAB show. It is expected to ship in early summer.

— Paul J. McLane

You can measure...
with the best monitor and the most accurate test set.

The FMM-2/FMS-2 series monitors provide an even greater degree of precision measurement than ever before... You can measure S/N below 90 dB, You can measure crosstalk below 85 dB, You can measure separations of better than 70 dB, You can measure frequency response to better than 0.25 dB, You can measure distortions to lower than 0.01%, and much more... Our uncluttered panels and autoranging voltmeters make these measurements a dream.

BELAR www.belar.com (610) 687-5550
ELECTRONICS LABORATORY, INC.
LANCASTER AVENUE AT DORSET, DEVON, PENNSYLVANIA 19333
Call or write for more information on Belar AM, FM, Stereo, SCA and TV monitors.

GUEST COMMENTARY

RFA Pushes Development Concept

A Paper at NAB2000 Explains Radio Free Asia's Broadcast Open Development Exchange Initiative

Paul Flint

As broadcasters shift to operations in the digital domain, a new dilemma faces the modern broadcast technician — how to best take advantage of rapidly evolving computer technology and stay within budgetary restrictions.

In an effort to meet this challenge, members of the Technical Operations Division of Radio Free Asia are publicly launching "The Broadcast Open Development Exchange Initiative" at NAB2000 this week in Las Vegas.

They are discussing the initiative on Tuesday, April 11, as part of the Broadcast Engineering Conference session "The Foundations of Radio: The Physical Plant."

The initiative and corresponding Web site are being launched to serve as an open platform for the free exchange of information and technical development within the professional broadcast community.

Two projects

The initiative consists of two initial projects: Radio Broadcast Open Source System, or R-Boss, and The 3d-Project.

The R-Boss is a suite of digital broadcast applications being developed and

distributed under the Open Source Software, or OSS, model.

The 3d-Project is a shared distribution and exchange project of broadcast-specific 3-D drawings, material and texture

bitmap files.

Broadcast-quality gear has always maintained a distinction from consumer technology through a number of traditional features.

Typically, premium broadcast quality equipment is delivered with service manuals, essentially complete documents that allow for maintenance, repair, modifica-



Figure 1: Audio-X Graphical User Interface

tion and system rework if, in a particular situation, the gear requires it. This distinguishing feature allows for heavy use in exceptional conditions with long life cycle and good reliability.

As we now occupy the networked digital age, program production, storage and transmission are more and more based on digital systems. To this end, production and transmission facilities that are maintained as state of the art are, with few exceptions, totally digital and under computer control.

The data representing programs and the data representing associated information (such as program date and content) are only distinguishable as pure bandwidth. Specific software is required to access and manipulate the program bandwidth data.

The creation of this software has been an evolutionary process with proprietary technology bases which will blossom eventually into publicly accessible standards.

Until now, we have been sensitive to this evolution because of the need to retool periodically with yet another new proprietary system in order to remain technically innovative. We may even share the feeling that getting what we want from technology is elusive, with goals always appearing to be a model release or upgrade away.

OSS changes all of this in a profound fashion.

It changes the conditions under which we obtain the computer software needed to work. When we get the software, we get the source code, the service manual of this particular technology. All that is asked is that we pay it back by adding our own "secret sauce" — whatever tooling modifications we make to the cauldron of ongoing design and innovation.

OSS comprises simple concepts that are intended to protect the usefulness of the software for posterity. Open source doesn't just mean access to the source code.



The distribution terms of open source software must comply with the following criteria or freedoms:

- The freedom to run the program, for any purpose;
- The freedom to study how the program works, and adapt it to individual needs;
- The freedom to redistribute copies so it can be used by other users;
- The freedom to improve the program, and release those improvements to the public, so that the whole community benefits.

With a growing list of applications, open source software is proving to be adaptable, robust and reliable. A large portion of the software user community has become involved in working together to fix problems and upgrade the applications.

Users not only report bugs; they fix bugs and share the fixes. The users work together as a community to improve the software. Rather than a proprietary asset, the software becomes a shared resource.

R-Boss

According to David Baden, head of Radio Free Asia's Technical Operations Division, the goal of the Radio Broadcast Open Source System project is to "create a self-perpetuating, continually evolving, dynamic software platform for the radio broadcaster."

The motivating forces operating under this umbrella envision R-Boss as a suite of programs, portable to various operating systems and hardware platforms, that allow operation of a full-featured radio broadcast station.

Beyond this broad overall goal, the development team remains committed to ongoing structural adjustment. Their refined first cut divides broadcast operation newsgathering and production into the following areas:

- Track-X, a facility scheduling and archival management program;
- News-X, an input news source search and edit program;
- Audio-X, a digital audio production program.

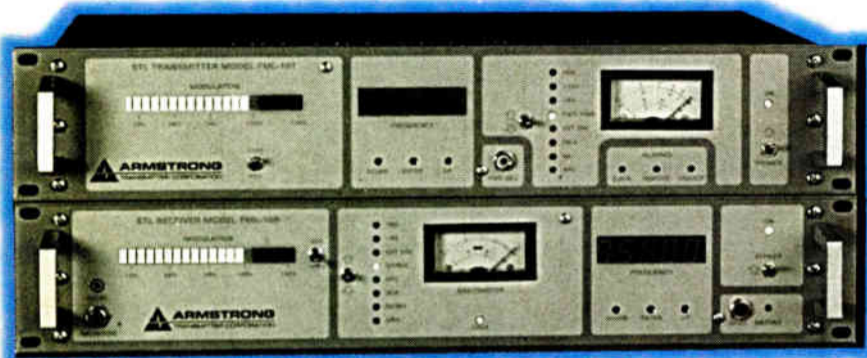
Track-X

Track-X began as a simple tool to carry a short description of what programs aired during the day. It is seen as the eventual glue that binds all of the R-Boss applications together.

Due to its database role in providing the basic program tagging and description, it is the obvious place to specify and coordinate different categories of material. These categories include time accounting, piecing together playlists, on-air scheduling and programming summaries.

See DIGITAL, page 35 ▶

Frequency Agile STL Systems



▲ If you are looking to deliver clean, crisp audio to your transmitter via microwave, Armstrong FML-10 STL system offers unsurpassed audio purity in a rock-solid, feature-packed package.

▲ Built to tough manufacturing standards throughout, FML-10 system features microprocessor controllers, advanced PLL circuitry, ultra linear VCO and front panel frequency programmability with digital frequency readout.

▲ Currently in service at over 300 stations in 21 countries, this field proven design is a "rock-solid" STL choice for any station.

Complete System Under \$5500.00
Same Day Shipping
30 Day Money Back Guarantee



ARMSTRONG
 TRANSMITTER CORPORATION

4835 N. Street • Marcellus, NY 13108 • PH: 315/673-1269 • Fax: 315/673-9972
 E-mail: info@armstrongtx.com • www.armstrongtx.com

In-Band On-Channel (IBOC)...

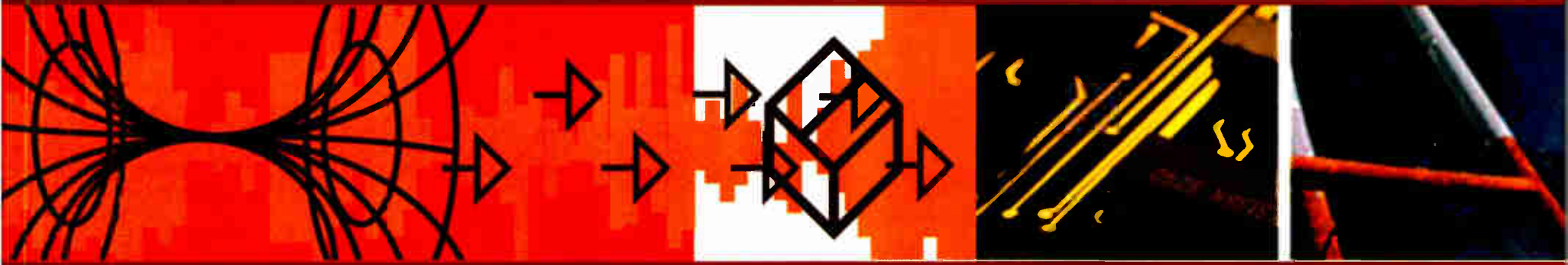
From analog to digital...

Digital audio and data...

Enhanced advertising...

End-to-end solutions...

And, best of all...



NOW!

Lucent Digital Radio.

The future of radio is in Booth R357
at NAB 2000...

Come hear it...

NOW!

Lucent Digital Radio

Radio will never be the same.

www.lucent.com/ldr

Frank Foti, the Father of Omnia

► FOTI, continued from page 23
for us business-wise. ... We're not No. 1 yet, but I think we're coming on."

Foti describes his relationship with competitor Bob Orban as one of mutual respect.

"While our two companies are competing very strongly against one another, if anything I'm hoping it's making us both better."

Marketing fight

He recognizes that the marketing battle between the various processing manufacturers has sometimes been a bit, well, personal. But he believes that trend is past.

"I think the marketplace spoke and

said, 'We don't like it when people come to blows in print media.'"

He also has learned something about the way competition works, he said. He points to the example of Frank Lloyd Wright, a designer of a different type who gave birth to architecture like that at Falling Water or the Guggenheim Museum.

"There is a penchant to criticize the innovator," he said.

Foti recognizes that many engineers aren't convinced digital audio processing is easier to listen to than analog, especially in loudness situations — that they think digital is less forgiving. He says those opinions pre-date the Omnia.

"High-end sounded like a ball peen hammer going through shattering glass," he said of earlier digital processors.

"If you go out and get the greatest op amp and misapply it, it's not going to give you great performance. You're going to get oscillations, you're going to get distortion.

"The same thing in digital. There's certain aspects about final limiting that if you're not totally aware of what's going on in the digital system, you can generate aliasing distortion dynamically," he said.

"We did overcome that. We are probably the first, and possibly the only, ones to overcome it. I would imagine that there are people out there who still have a

bad taste in their mouth, who were probably burned once, twice, three times with supposed software updates of other products, that still did not deliver. ...

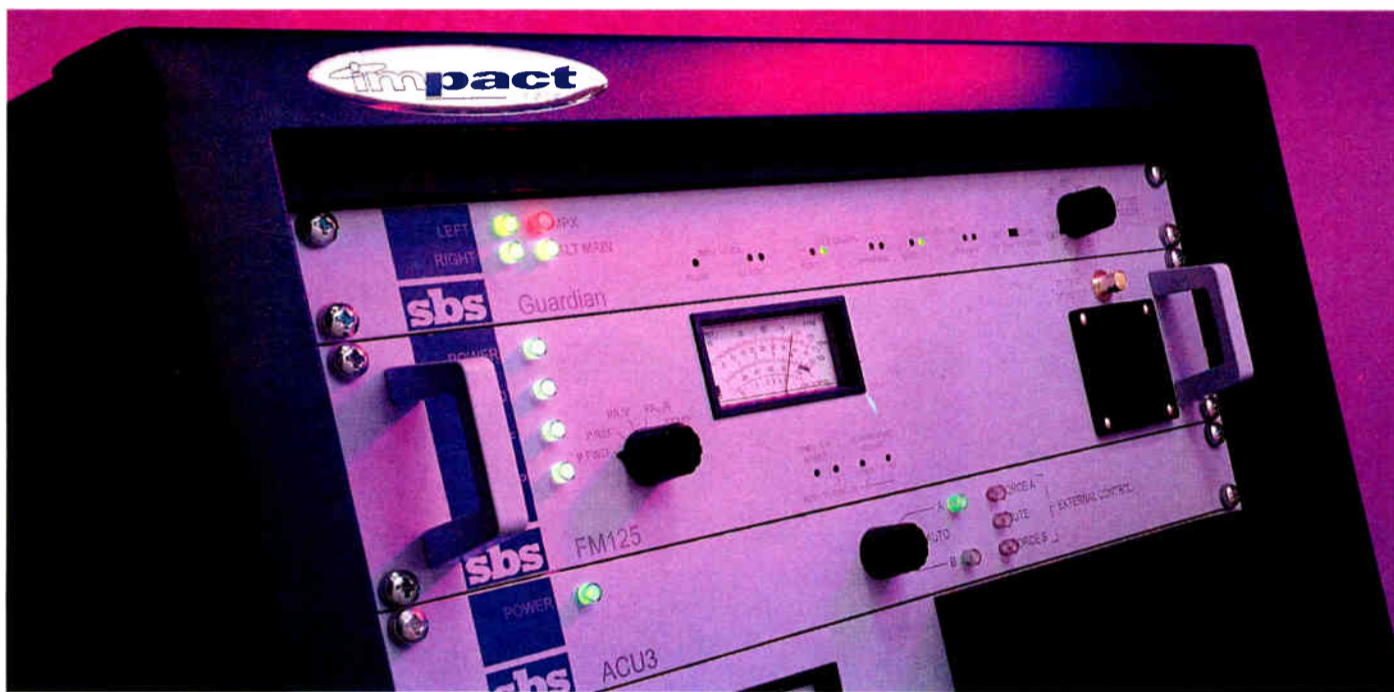
"Digital-based processing got a bad name, not because of the technology, (but) because of it was a great technology that was misapplied."

Foti likes the idea of letting engineers access the digital signal processing resources in his products, and applying them as they see fit.

The Omnia 'flavor'

"Sure, there can always be the Omnia 'flavor' of processing, but within the same architecture, there can be a design based upon another person's idea, and they might not be related to our company," he said.

Born from experience.



As one of the worlds leading broadcast manufacturers, sbs has gained experience internationally in both product development and real world installations. From this experience we created Impact.

Impact brings together the ultra high quality components that have become industry standard in many countries, featuring some of the most innovative and comprehensive features you will find anywhere.

And to top it all, Impact transmitters come with a five year warranty - Lets face it, if the manufacturer doesn't believe in the product, why should you?



Broadcasters General Store
Phone 352-622-7700
Fax 352-629-7000
www.bgsfl.com



See Us At NAB Booth # R2383

World Radio History

Foti tells fellow engineers to become friends with their program directors.

For example, the Omnia.hot module was designed in collaboration with Paul Sanchez and Mike Guidotti; the Omnia.veris was a collaboration of two engineers at Swedish Radio and Foti.

Foti says he has been lucky to work with two or three legendary programmers who cared a lot about their sound: John Gorman at Cleveland's WMMS(FM) in the 1970s and Scott Shannon at WHZ(FM) in New York in the 1980s.

"They're not going to talk to you in dBs and compression ratios and attack-and-release times. They're going to say, 'Hey, man. It ain't loud enough, give me more punch, man. It ain't cutting through. My baby DJs, they can't hear themselves.'"

Foti tells his fellow engineers to become pals with their program directors and educate them.

"Scott Shannon always used say to me, 'Franco, just give me the tool, man. My baby DJs only know how to push buttons and talk on their radios. You give me the tool to paint the canvas, and I'll make us No. 1.' The record shows we did do that."

Another mentor and friend is Jim Somich, with whom Foti worked at Malrite Communications, and from whom he learned the art and desire of tinkering.

"The first piece I started modifying, that became part of our arsenal, if you will, was an Apex Model 700. Those modifications actually became the first Cutting Edge product known as the Vigilante."

His early efforts only excited him more.

"Wow, you could make a difference — a little bit of ingenuity and a respect for the scientific side — it was pretty exciting.

"Audio processing, we can't totally define it as just a set of mathematical equations ... it's how that is applied in a very subjective way. It could be 50 percent science and math, and the other 50 percent black magic."



©2000 Harris Corporation

Complete station makeovers. Employees not included.

Today's radio industry is always changing. Success depends on how your station changes with it. That's why Harris leads the way in constructing new stations or redesigning existing ones. We help you through the entire process, from concepting, budgeting and planning to furniture design and fabrication. We offer pre-packaged or completely-customized design capabilities, along with the widest selection of analog and digital products in the industry. Our commitment is to provide a facility that can change as your needs do. Cost-efficient. Future-proof. Successful. And with Harris, always in style.

next level solutions

WIRELESS

BROADCAST

GOVERNMENT

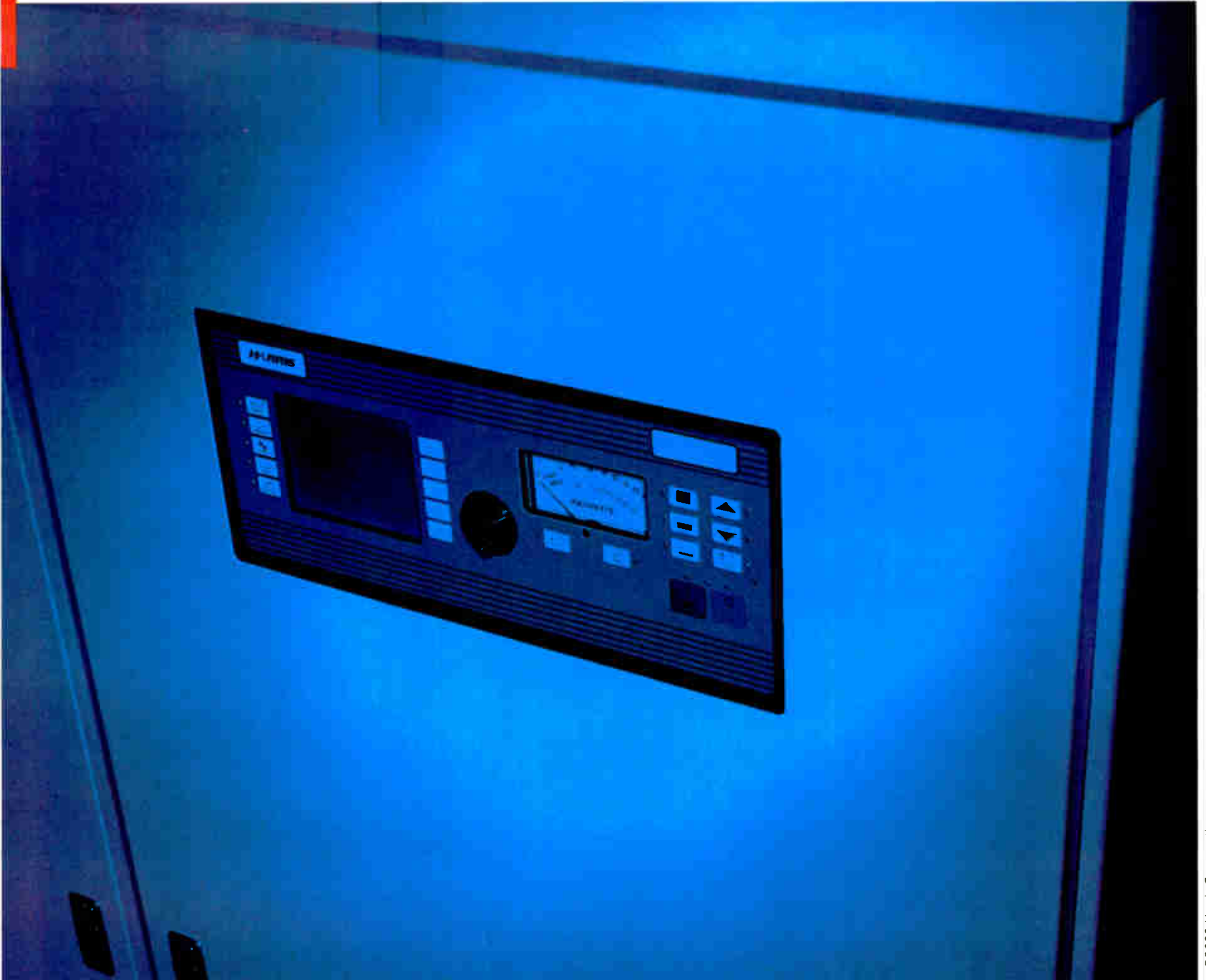
NETWORK SUPPORT

HARRIS

1-800-622-0022 ■ www.harris.com

World Radio History

A more linear, efficient & reliable DX transmitter? We like to think it was Destiny.



©2000 Harris Corporation.

Introducing DX DESTINY™, the new 3DX-50 AM transmitter that takes Harris' industry-standard digital transmitter technology to the next level with patent-pending 3D™ Direct Digital Drive. 3D technology is a new concept that allows the Destiny to improve modulation linearity and keep your station on the air at maximum power and performance *continuously*—with improved energy efficiency and signal accuracy for optimum IBOC amplification. Additional innovations include DSAM™ Digital Serial Adaptive Modulation, which substitutes spare RF modules automatically so you don't have to make emergency trips to the transmitter site; IntelliStat™, the ultimate in diagnostic user interfaces; hot pluggable RF modules; and redundant digital exciter capabilities. Together, they enable the DX Destiny to operate at maximum performance at all times. The DX Destiny— built for your freedom and peace of mind. AM radio's destiny has arrived.



DX Destiny redefines the standard for 50kW AM transmitters.

next level solutions

WIRELESS

BROADCAST

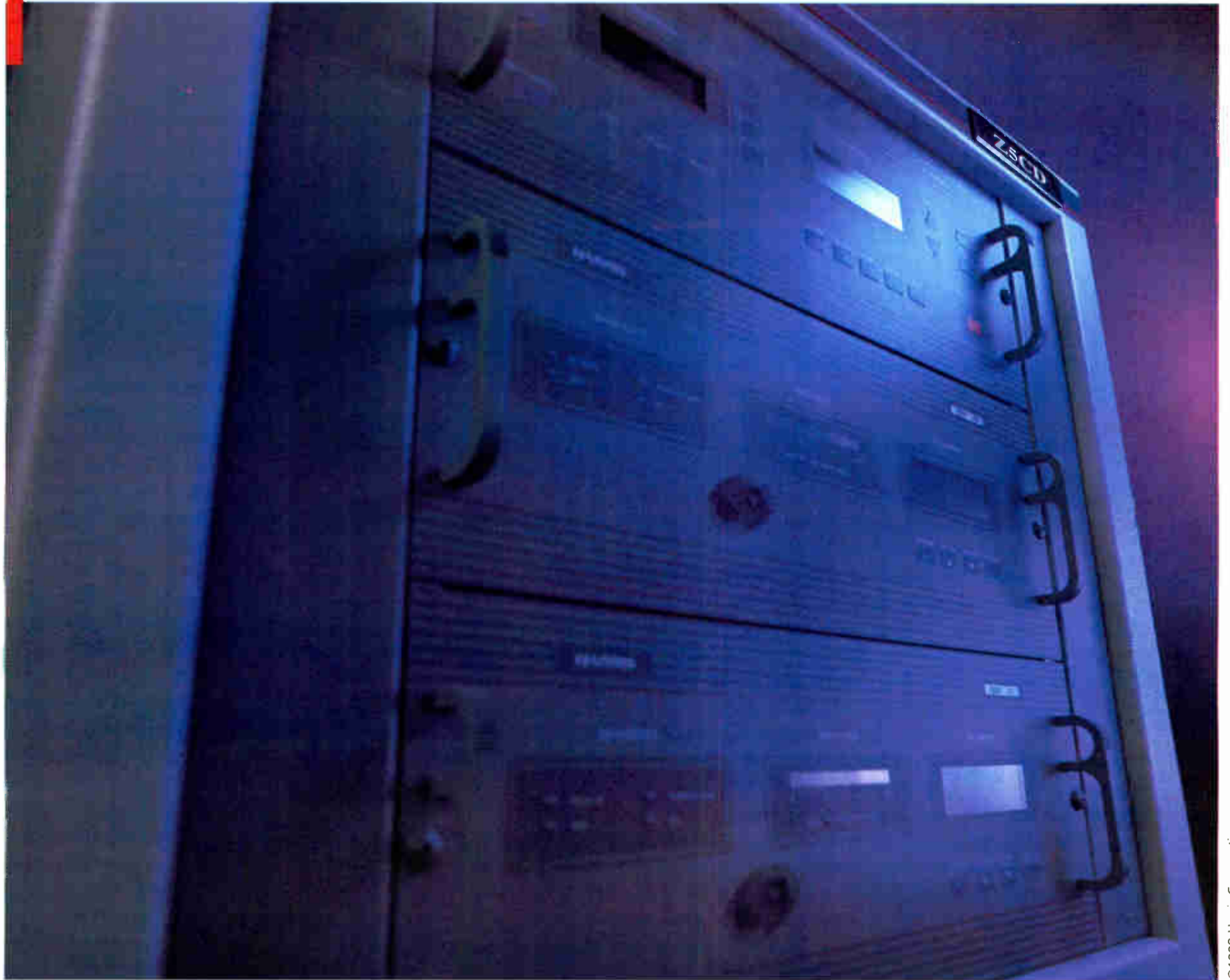
GOVERNMENT

NETWORK SUPPORT

HARRIS

1-800-622-0022 • www.harris.com

***Solid-state reliability. Built-in redundancy.
You'll appreciate why we named them ZZZs.***



©1999 Harris Corporation.

Engineers sleep easier with the Harris Z Series of FM transmitters for lots of reasons. Like their solid-state reliability, redundant IPA systems and power supplies, hot-pluggable RF modules for easy on-air repairs, *and* the option of two exciters with automatic switching built in. Outfitted with our unrivalled DIGIT CD™ FM digital exciter, Zs deliver the trend-setting, CD-quality sound listeners increasingly expect. And now, we're putting your worries about the future to rest as well. We're actively working with DAB system proponents on modifications to Z transmitters for IBOC field testing, so when a new standard is established and you need to start broadcasting IBOC DAB, you won't be caught snoozing with Harris. Or, then again, maybe you will.



Z Series transmitters include an easy-to-read LCD panel for diagnostics plus a main and backup controller.

next level solutions

WIRELESS

BROADCAST

GOVERNMENT

NETWORK SUPPORT

HARRIS

1-800-622-0022 • www.harris.com

World Radio History

FEATURES

MARKET PLACE

Ultramod Is Updated

Broadcast Technology is out with a new version of the Hnat-Hindes Ultramod on-air processor.

the compressor/limiter are consistent.

Bass enhance allows the Ultramod FM to be tailored to any format with the adjustment of one control.

A new "smart clipper" increases the loudness of the audio without creating excessive distortion. It "looks" at the



The Ultramod

The Ultramod FM incorporates the split-band compressor/limiter of the original as well as a stereo generator.

New low-pass filters and an input automatic gain control ensure that levels into

audio and determines if clipping or limiting is appropriate.

The composite processor adds the correct amount of loudness and is adjustable from 0 to over 3 dB.

Ultramod FM provides two composite outputs, a pilot output and an SCA input.

For information contact Broadcast Technology in Colorado at (719) 336-3902.

Armstrong Offers LPFM Services

Armstrong Transmitter Corp. offers services and products for the low-power FM rollout.

"We are in a unique position in the industry," said owner Sinan Mimaroglu. "Not only do we manufacture low-power plug-and-play transmitters, but we also manufacture a full range of FM antennas."

This, he said, lets the company offer complete Armstrong RF packages.

Mimaroglu said the FMX series of exciters/transmitters are self-contained units with remote-control capability, internal harmonic filter and directional coupler. An internal stereo generator option is available for most models. These units are available at 10, 30, 100, 150 and 300 watts.

Armstrong 707 LPFM antennas are constructed of heavy-duty brass for long life. The company said the only difference between them and their medium-



Armstrong FMX Exciter

power cousins is that the 707 is external fed and nonpressurized.

For information contact the company at (315) 673-1269 or send e-mail to emie@armstrongtx.com

Broadcast Electronics 'Plug-N-Play' Low-Power FM

Broadcast Electronics is pursuing the low-power FM market with the Plug-N-Play 150, an LPFM transmitter system.

The company said the PNP 150 offers LP100 users the ability to provide a service radius of about 3.5 miles, with power from 50 to 100 watts.

Another product, the Plug-N-Play 20, will support a service radius of 1 to 2 miles, with power from 1 to 10 watts, for LP10 stations.



The Marti PNP 150

"While we have been greatly anticipating the FCC announcement, Broadcast Electronics has been diligently developing the Plug-N-Play 150 and the Plug-N-Play 20," said John Pedlow, president and CEO of BE.

"We are very happy to provide broadcasters a complete, robust, one-stop solution so they will not have to piece-meal low-power broadcasting technology together."

The Plug-N-Play line will be marketed through Marti Electronics, a BE company, and Marti resellers.

For information contact Marti in Texas at (817) 645-9163. Information will also be posted at www.martielelectronics.com

Do More, Spend Less

"Scott Studios Saves My Stations \$45,000 per Year"

Doug Lane, owner and GM of WWDL (FM), WICK (AM) and WYCK (AM), Scranton and Wilkes Barre, PA says he "saves more than \$45,000 per year with Scott Studios' Voice Trax automation. While the investment was major for a small family company like ours, *the pay back was fast and real.* And the savings are year after year after year.

"Unless we are running evening baseball or Friday night high school football, we close the building at 6PM and operate unattended until 5:30 the next morning.

"We use several independent announcers to record Voice Trax for us, along with our regular staff. Even me! We operate both live assist and automation."

Normally, each announcer records a fresh show every day. Scott's exclusive Voice/Music Synchronizer guarantees every song plays only with the correct voice track. If a jock gets too busy and doesn't do their show in time, Scott's unique Voice Trax System automatically airs evergreen standbys that sound right! Doug says, "No one but Scott Studios has this great fail-safe feature. Scott Studios' System provides a separate specific generic Voice Trax for every track for every hour and every day of the week in case someone can't track their show in time."

Scott's Voice Trax recorder is the industry's easiest to use: most tasks are done with just one button. The mouse and keyboard are seldom touched. Voice Trax take only seconds per cut to record. Scott's AutoPost makes announcers sound better and minimizes Voice Trax re-cuts. Experienced jocks don't waste time checking their work because they hear their voice and surrounding music and spots in context while recording.



Doug Lane, Owner and GM, WWDL, WICK and WYCK, Wilkes-Barre and Scranton, PA
Doug's stations have used Scott Studios' Voice Trax systems for many years.

Stations can lock the door and go home with confidence. Scott has exclusive watchdog circuits that make our systems more self-healing and reliable than others. Scott predicts many problems *before* they occur, usually as soon as logs are done. Scott also pages people who can make last minute adjustments off-site by modem (if needed).

After a year of trouble-free operation, Doug Lane says, "It was fun to get five calls at the studio over the Holidays from out of town PD's and GM's wanting to speak with me because they heard me 'on the air'. Guess what? I wasn't even there! They were amazed at our Voice Trax and Scott's accurate Time Checks too. Actually, they were 'very impressed'!

Doug is now installing Scott's automated temperature announcer. He says, "Scott's features are great. The savings are even better! I wouldn't want to run my stations without Scott Systems!"

Scott Systems are delivered with your music library pre-dubbed, plus time-saving CD rippers that digitally transfer music to hard drive in seconds, no-dub instant LAN spot uploads from Sonic Foundry multi-track production, MPEG and uncompressed digital audio (at

9:23:13 On-Air 2	I Knew I Loved You Savage Garden 11:44:24/F HIT DA3468 7:43 #1 for 2 weeks in March, 2000	Half A Minute Basis L 6/28 2p N 7/10 3p	Hands Jewel L 7/5 5p N 7/13 6p	Hang On Tight Ric Ocasak L 7/2 3a N 7/9 3p
Start 3	Show Me The Meaning Of... Backstreet Boys 17:4-13/F HIT DA5204 7:48	Happiness Vanessa Williams L 7/9 4p N 7/12 7a	Happy Girl Beth M. Chapman L 7/6 11a N 7/18 8p	Harbor Lights Bruce Hornsby L 7/4 2a N 7/12 7p
Start 3	Backstreet Boys Backsell Doug Lane 00:0-13/C VT JU1094 7:52	Harvest Moon Neil Young L 7/7 4p N 7/16 2a	Have I Told You L Rod Stewart L 7/2 7p N 7/13 5a	Have You Ever Re Bryan Adams L 7/1 5a N 7/8 10p
Start 3	Dodge Trucks Q: Your Dodge Dealer 00:0-80/F COM DA2215 7:53	Have You Ever Brandy L 6/30 5a N 7/13 9a	Having A Party Rod Stewart/R. W. L 7/2 8p	He'll Never Leave Kathy Troccoli L 7/4 3a N 7/11 5p
Start 3	Kozy Kitchen Q: Kids Eat Free Tonight 00:0-80/C COM DA1234 7:54	Healing Wynona Judd/M. E. L 7/2 9p N 7/15 4p	Hear Me In The Ha Harry Connick Jr. L 7/2 10a N 7/15 3p	Heart Don't Fall Me Rita Coolidge/Lee L 7/1 3p N 7/13 7a
Start 3	WWDL Fast Jingle Q: WWDL 00:0-13/C JIN DA4315 7:55	Heaven And Earth Al Jarreau L 7/4 10a N 7/12 11	Heaven Knows Luther Vandross L 7/1 9p N 7/28 10a	Here In My Heart Chicago L 7/2 2a N 7/14 3p
Stack	Time	Time	Time	Time
Auto	Next	Prev	Stop	Play
:08				
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z				

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

a compressed price) and a week of Scott School training of your whole staff at your station. You get Cart Walls for instant requests, a phone recorder with waveform and audible scrub editing, the ability to record Voice Trax in your air studio while listening to your music in context in headphones, title and artist displays for your website, time announce and Cat. 5 audio wiring for fast installation. Scott's SS32 System can feed different spots to webcasts or second stations, run satellite formats and ABC's LocalMax. Scott Studios offers optional auto-transfers of spots and Voice Trax to distant stations over Internet or WAN, wire capture and newsroom editors, unattended school closing reports and 24/7 live support via toll-free cell phones.

Scott Studios' unequalled money-saving features mean more U.S. stations use Scott than any other digital air studio systems (5,500 workstations in 2,250 U.S. Stations and nine of the top ten groups). See our web site and toll-free phone at the right.

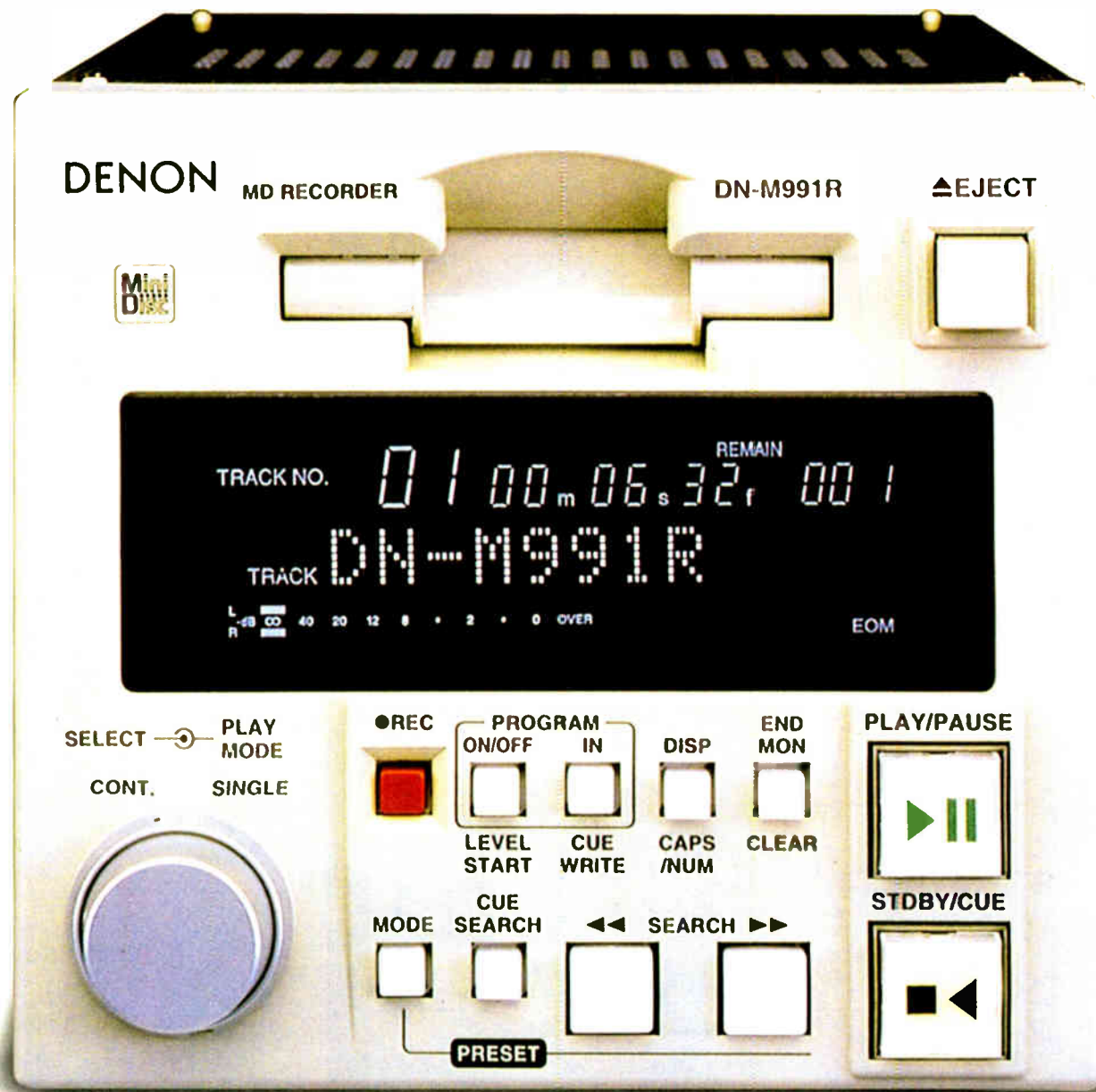
See Scott's NAB Radio Booth R4093 and Video Booth L2506 at the LVCC.

Scott Studios
13375 Stemmons Freeway, Suite 400
Dallas, Texas 75234 USA
Internet: www.scottstudios.com
(972) 620-2211 FAX: (972) 620-8811
(800) 726-8877

Visit
RW Online
at
www.rwonline.com

THE TAPE CART KILLER

DN-M991RM



- 10 Hot Starts
- Instant Start
- Auto Cue
- Multiple Display
- Seamless Sleep Mode
- $\pm 8\%$ Playback Speed Control
- Program Up To 25 Tracks
- Multiple Editing Functions
- Rotary Track Selector
- Relay Recording
- Auto Level Rec Start
- Optional Wired Remote RC-650

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

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

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



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

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

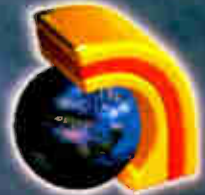
NEW Five Minute Skip Search: This new function allows the user to jump through long tracks in five minute increments and is particularly useful for news gathering and interview applications.

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

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

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

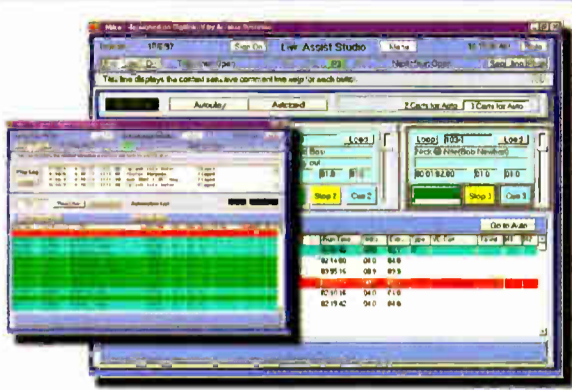
DENON
The First Name In Digital Audio



Arrakis Systems Inc.
Condensed Catalog

DL4 System II

- NEW - On Air & Production System
- Live On Air, Hard Disk Automation, Satellite Automation, Production, Jingle Box, Segue Editor
- Complete - just add 2 PCs
- Only **\$7,995**



The NEW DL4 System II comes complete with a triple play & record DL4 workstation, 105 hours of audio storage, 7 input play switcher, 7 input record switcher, DL4-AUTO software for On Air, and DL4-SCHED for Production and Scheduling. This powerful 2 studio system requires only 2 customer supplied PCs and installation.

DL4 System III

- NEW - dual On Air & Production System
- Live On Air, Hard Disk Automation, Satellite Automation, Production, Jingle Box, Segue Editor
- Complete - just add 3 PCs
- Only **\$16,995**



The NEW DL4 System III comes complete with a 6 play & dual record DL4 workstation, 210 hours of audio storage, two 7 input play switchers, two 7 input record switchers, (2) DL4-AUTO software packages for On Air, and DL4-SCHED for Production and Scheduling. This powerful 3 studio system requires only 3 customer supplied PCs and installation.

Instant 3-Play

- NEW - Instant 3-Play
- Triple Play & Record Jingle Box
- Control from 1, 2, or 3 PCs
- One PC has triple play -or- three PCs have a single play
- Only **\$2,995**



Just connect 1, 2, or 3 PCs running our INSTANT 3-PLAY software to our rack mounted digital workstation and you are ready to go. The workstation has 3 simultaneous plays with record. Software setup assigns play control to the PCs. 3 times the power of other Jingle Boxes, the Instant 3-Play provides access to the SAME jingle from 3 places.

See Us At NAB Booth # R1574

World Radio History

How to Buy

Domestic Dealers:

BSW
(Broadcast Supply Worldwide)
(800) 426-8434

CROUZE-KIMSEY
(800) 433-2105

BGS
(Broadcasters General Store)
(352) 622-7700

SCMS
(Southern Coastal Marketing)
(800) 438-6040

BRADLEY BROADCAST
(800) 732-7665

CONTINENTAL ELECTRONICS
(800) 733-5011

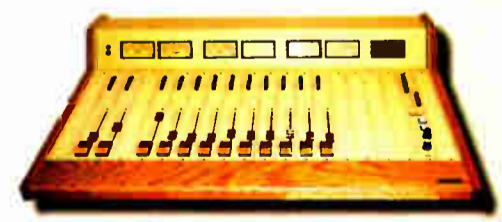
RF SPECIALITIES
(contact their regional offices)

For more complete information on any Arrakis product visit our website at:

www.arrakis-systems.com
-or-

email to:
sales@arrakis-systems.com

Other Products



Consoles



Furniture

Workbench

Radio World, April 12, 2000

Stop, Look and Listen Carefully

John Bisset

I hope you've had time to enjoy your day of managing by wandering around the transmitter site, as described in *Workbench* last issue.

To show you how times have changed, I heard from several engineers who said their "day" turned into a week or more. So much for the different ways consolidation has affected us.

If you are managing multiple sites, I guess you could spend a week or more to thoroughly inspect each one. That's the problem we have, not enough time, and so many sites to visit!

You've read in *RW* about that Cash device from Prime Image, which squeezes programming to allow for additional commercial time. Wouldn't it be great if we could apply that same concept to ourselves?

I dare say none of us would turn down a few extra hours in each day, even if we used them for sleeping!

We were about to enter the transmitter building last time, and complete our "management by wandering around" exercise, by inspecting the inside of the transmitter room.

To start, flip on that light switch. Count the bulbs or fluorescent tubes you'll need to order. There's nothing more frustrating than working on equipment in the middle of the night with one 40-watt bulb burning.

Is there a trouble lamp around? Check the bulb, and buy a couple of spares to keep on hand. I used to get a good case of butterfingers at 2 a.m., and can't tell you how many trouble lamps I dropped.

Not having the spare bulbs only makes your midnight troubleshooting episode more maddening.

Right by the door, you ought to have a fire extinguisher. Make sure it's rated for electrical fires.

Check the date on the tag. Expired extinguishers are like that backup genera-



Figure 1: Thermostats monitor the building air.

tor that never gets tested and doesn't run when you need it. It's useless.

Although maintenance logs are not in vogue, buy a spiral notebook to keep pertinent information recorded.

Here are some examples: STL received signal strength; the last time tubes were changed; any filament voltage maintenance that you perform.

If you have an auxiliary transmitter, keep a record of the test meter indications; make a similar record for your main transmitter. Notes about overloads or maintenance conducted on the equipment aren't a bad idea, either.

You can probably come with a few other things to check. Remember, you will return to this site, probably under less-forgiving conditions. Use some of your time to prepare for the worst!

Check on your spare fuse inventory. Go through each piece of equipment and determine the proper fuse required. These can be ordered economically from suppliers like Digikey or Mouser.

Bring along a dusting cloth and some cleaner, and do a little housekeeping.

As we did with the outside air handler, check the condition of your transmitter air filters. Make a notation, on the filter, when it was installed.

This will help you budget for an adequate number of replacement filters.

Check pilot lamps, alarms and fault indicators. If the equipment

has a lamp-test function, use it. Nothing is more frustrating than trying to troubleshoot equipment when the fault indicator is burned out or defective. LEDs can fail, so don't be lulled into complacency thinking that they will "last forever."

If you have a backup air exhaust system, check to see that it operates. Automatic louvers can jam. It is better you find out now than when a meltdown has occurred.

Figure 1 shows two thermostats wired to an emergency exhaust fan, pictured in Figure 2. The air intake assembly, with its filter removed, is seen in Figure 3 on page 34.

The system works with the main air conditioner, providing emergency cooling in the event the main air conditioner fails.

If you have nitrogen-pressurized line, check the valves, tank volume or the dehydrator. If your nitrogen tank is nearing empty, get a spare on order. Make sure your nitrogen tanks are chained to the wall securely.

See WORKBENCH, page 34



Figure 2: Triggering an emergency fan ...

Now You're Connected

Minirator™

Professional hand held audio tone generator. Pink noise, white noise, sweep, sine, square wave and polarity tests. Capable of remembering settings when turned off and on. Automatic off helps save battery strength. Balanced XLR and unbalanced RCA inputs.

Easycon®

Uses gold IDC tuning fork contacts. A solder version will be available in the first quarter of 2000. Made of only 3 pieces—and no set screws—Easycon is the fastest way to terminate a cable with an XLR connector on the market today.

BNC

NEUTRIK introduces the push pull BNC connector, the first in a series of BNC connectors that will include bayonet and friction fit styles, chassis mount and PCB receptacles. Features include an ergonomic straight push-pull lock/release operation. Ideal for high density applications.



www.neutrikusa.com
info@neutrikusa.com
732-901-9488

World Radio History

NEUTRIK USA
CONNECTING THE WORLD

The Wandering Manager

► WORKBENCH, continued from page 33
 Figure 4 shows a manifold for multiple gas lines. This transmitter site leases space to a number of PCS and cell companies.

The valve/gauge manifold permits isolating a leaking line, and also prevents purging the entire system, should one line need to be opened.

Feel any rigid transmission line for hot spots. Elbows may be warm, but not hot to the touch.

Test your emergency systems. This includes the generator and backup STL, auxiliary transmitter, ISDN and phone lines.

Check the clock on your remote control system. And while you are poking around in the back of the rack, pull the plug on your UPS to simulate a failure, just to make sure your power truly is uninterrupted.

★ ★ ★

As you did with your doghouses, keep your eyes open for signs of vermin and insects. Scatter a couple of handfuls of mothballs in the bottom of equipment racks and on the floor to discourage snakes and mice.

But remember, the mothballs evaporate, so replenish them periodically. Spray the outside door frame with bee

killer to discourage nesting insects. Sweeping the floor is a good idea, but if your transmitter building floor is unpainted concrete, you may be sweeping up lots of dust. Prevent the headache caused by concrete dust, and paint the

floor. Not only will the site look nicer, but you'll reduce failures, too.

If your site uses an outside air compressor or air handler, check that the caulk has not dried and separated where the ductwork or pipes enter the building.

And speaking of the air conditioner, if your cooling system uses an economizer (a device that mixes cool outside air), make sure that filter is clean as well. There's nothing more frustrating than replacing filters, attempting to keep your site clean, only to have the economizer

pressor or air handler, check that the caulk has not dried and separated where the ductwork or pipes enter the building.

And speaking of the air conditioner, if your cooling system uses an economizer (a device that mixes cool outside air), make sure that filter is clean as well. There's nothing more frustrating than replacing filters, attempting to keep your site clean, only to have the economizer



Figure 3: ... and air intake louvers, to provide emergency cooling.

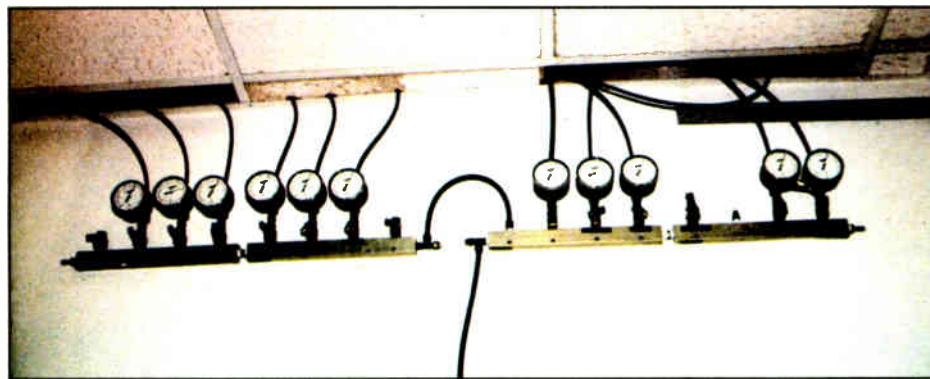


Figure 4: A gas manifold with a valve and gauge assembly permits quick isolation of one leaking line.

killer to discourage nesting insects. Sweeping the floor is a good idea, but if your transmitter building floor is unpainted concrete, you may be sweeping up lots of dust. Prevent the headache caused by concrete dust, and paint the

sweep in pollen-ridden air. You've been pretty busy for the last couple of hours, so take a break just before you leave. As you relax, listen. Do you hear the familiar high-pitched squeal of bad bear-

ings on your transmitter blower motor? Any unfamiliar grunts or groans of transformers? How about the heart-stopping sound of arcs?

Investigate now. If you don't, you know the call will come in the middle of morning drive!

Our list is by no means exhaustive, but should get you pointed in the right direction.

■ ■ ■

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

Submissions for this column are encouraged, and qualify for SBE recertification credit.

Fax your submission to (703) 323-8044, or send e-mail to jbisset@harris.com

MARKET PLACE

United Power TVSS

United Power Corp. offers the Model SDX, a high-performance series design Transient Voltage Surge Suppressor for critical applications.

The second generation of United Power's Model SD family of surge suppression systems, the SDX is intended for service entrance applications and distribution systems that provide power to critical equipment.

The company says SDX has continuous current ratings of up to 4000 amps, voltage ratings up to 600VAC, 640,000 surge amps per phase (320,000 per mode) and superior noise filtering performance.

SDX incorporates model-specific inductive elements placed between modular hybrid TVSS circuits. The inductive elements reduce the impact of a fast-rising transient. The company says this eliminates damaging peak currents, lengthens component life and lowers clamping voltage.

The inductive elements also add to the noise attenuation provided in the hybrid circuit, further reducing electrical noise.

For information contact the company at (804) 254-8456 or visit the Web site at www.unitedpowercorp.com



Internal View of the Model SDX

Label Your Cable

VIP Division has a useful line of high-visibility cable and conduit labels. They are suitable for indoor and outdoor applications and are available in two colors, three sizes and a variety of legends.

"Caution" labels are printed in black on bright orange, and identified for Telephone, Data, Fiber Optics or other nomenclature.

"Danger" labels are printed in white on bright red, identified for High Voltage as well as nine legends for voltages from 120V to 600V.

Sizes range from 1/2-inch to 3 inches high. The company also offers custom designs, sizes and colors, useful in applications around the radio station. VIP Division makes cable markers, signs, tapes, tags and other identification products.

For information call the company in Texas at (800) 950-4921 or fax to (800) 967-3986.



Dependable Modulation Monitors for AM & FM

520 AM Mod-Monitor

- Built-in, tunable preselector for accurate off-air measurements
- Easy-to-read, peak-hold modulation display
- Alarm and RS-232 data outputs
- Companion active antenna option



530 FM Mod-Monitor

- Off-air operation with 8 station presets
- High-resolution displays for deviation, audio, pilot, RF signal and multipath
- Accurate and affordable



Download full spec sheets at www.inovon.com

Inovonics
 1305 Fair Ave. • Santa Cruz, CA 95060
 TEL: (831) 458-0552 • FAX: (831) 458-0554
www.inovon.com • e-mail: info@inovon.com



Initiative Envisions a Better Way

► DIGITAL, continued from page 24

Past experience has shown that just as people are interested in using audio in any way possible, they are also interested in receiving data about how and where music and text can be used. This includes searchable audio and text archives with rapid access to old material.

This does not mean that the average user enjoys entering this information. Therefore methods have to be developed to streamline data entry as well as to ensure it is done regularly and correctly.

Some thought to security also must be involved, both to prevent external hacks from breaking into the system and to prevent one user from inadvertently erasing material of another.

While this sounds complex, it is nothing new. There are many similar open-source projects providing the capability of doing large amounts of recording Multiple Program Emission Generalities to and from compact disc ("ripping"), with database back-ends providing the jukebox function of keeping it all organized.

Ironically, it appears there are more hackers writing complex programs for personal CD collections than there are broadcast engineers writing integrated broadcast systems.

News-X

News-X is a news source application for the storage, searching and editing of incoming text-based wire-service information. This application is in use at Radio Free Asia.

It is an open platform system in which the user interface runs under any Web browser. It is multifeed- and multilingual-capable and also capable of processing News Server (e-mail) input.

William Eldridge, Radio Free Asia's director of technical development and author of the News-X software, said, "News-X was designed as a cheap-and-easy replacement for our newsfeed system at the time, which ran on a DEC Alpha (computer) using the OpenVMS operating system.

"I had wondered why people spent so much money on systems that basically consisted of setting a speed on a serial port, reading the port, parsing the output through simple regular expressions, and providing the output in a database format."

Today's diverse methods in which news stories are provided — serial feed/modems, e-mail, WWW, etc. — also add to the programming challenge.

How to standardize format, specify minimum requirements for tags (i.e., Subject or Date) and even to weight sources by figures of merit — say, The New York Times vs. a local newspaper — for all these various sources?

While this may require continual fine-tuning, the existing News-X framework was developed to minimize the pain of adding new sources and to keep the overall news-site maintenance effort low.

Audio-X

Audio-X was conceived as a networked digital audio broadcast system. Beta testing is taking place at Radio Free Asia.

According to William Eldridge, "This is intended to provide an open-ended modular desktop audio recorder. In its infant stages, the recorder provides single-track editing of uncompressed audio as WAV files, with a generic SQL database input of name, sampling rate, author, etc."

As the system grows, Eldridge said, pieces will be added to handle MPEG Layer 2 and 3 compression, multitrack recording, various audio effects and further database integration.

"Two interesting in-band audio organization ideas to be considered for integration include the Cart Chunk ideas by peo-



Figure 2: CAD Rendering of RFA Studio From Virtual Panoramic

ple at Orban for assisting rack gear and other equipment in processing audio, and XML specifications for standardizing audio and other broadcast structure interfaces for Web sites and databases," he said.

"With one import of OpenSource being cooperation, we plan on leveraging the work and ideas of others to speed up development time and enlarge features."

Audio access

The eventual goal of Audio-X is to provide a digital audio system that will integrate the many ways audio data is accessed and disseminated in a modern broadcast facility.

This includes the acquisition (recording/data-file transfer) and manipulation (editing) of audio data files for broadcasting, archiving and Webcasting.

The development consideration process includes convergence among various audio formats (PCM, MPEG Layers 2 and 3, WAV), organization of audio with related textual and time-based information, and allowance for automation with interoperability between various types of broadcast gear and computer equipment.

Providing a system that works seamlessly across the different common desktop systems — Unix, Windows, Mac, BeOS — and their unique graphical user interfaces is demanding, as are time constraints when dealing with networks or scheduling for distribution.

3-D computer-aided design, or CAD, allows the construction of realistic design models, which can be downloaded directly to fabrication shops for "just-in-time" manufacture at competitive pricing.

Think of a 3-D file outputting a completed broadcast facility, which arrives prepackaged on a truck. While this seems futuristic and far-fetched, it occurred in 1998 at Radio Free Asia when studios and furniture were delivered that were identical to the 3-D virtual renderings created before the bidding process was begun.

Three-dimensional CAD drawings allow for the ergonomic study and virtual walkthroughs of broadcast facility design. While this may seem extravagant on the surface, there is a growing population that has a hard time making a spatial correlation from a 2-D drawing to reality.

The closer to life your documentation can be, the larger audience you can share the facility vision with.

The potential of CAD and computer-aided manufacture, or CAM, relies on the

ability to share and reuse information. The key to realizing this potential is using common organizing principles. The 3d-Project attempts to establish broadcast engineering CAD standard guidelines.

The most time-consuming task in migrating documentation to a 3-D platform is creating the numerous drawings for objects that make up a facility or flow drawing. These are the individual objects (i.e., various broadcast equipment, furnishings, etc.) that are inserted into multiple final drawings.

The availability of pre-existing 3-D object drawings will save broadcast engineers an extraordinary amount of time when migrating to a 3-D platform.

The 3d-Project serves as a free exchange clearinghouse for these 3-D object drawings. The 3d-Project Web site will also include 3-D tutorials containing detailed information for the standardization of file/layer naming and material/texture bitmaps.

The public availability of these drawings will encourage manufacturers to provide updated 3-D renditions of new items in their product lines that will provide time-saving access by facility managers and engineers to various templates.

Conclusion

Quality, reliable and flexible public-domain OSS platforms are springing up throughout the world. The Internet has allowed exchange of OSS software to go to levels undreamed of.

It only made sense that the cooperative nature of the Internet would spawn additional cooperation at the software development level.

The OSS model is a particularly pervasive manifestation of this miraculous cooperation. In broadcasting, the RFA-sponsored projects described here are only harbingers of good things to come.

More information on the Broadcast Open Development Exchange Initiative is available at www.techweb.rfa.org

■ ■ ■

Paul Flint is a former contractor to Radio Free Asia and an inventor, with experience in broadcast management, appraisal, engineering, systems network design and security architecture.

Strong links make a strong chain

The LEX 25 Exciters:
*Unsurpassed audio quality in their class, starting at \$1595 - Now available with SPC Stereo Generator and High Definition Sound Processor**

*Includes user-selectable composite processing controls & fully adjustable sound definition

BEXT RF innovations for the broadcast world since 1985

1045 Tenth Ave San Diego CA 92101 • USA • 619-239-8462 FAX: 619-239-8474 • mail@bext.com • www.bext.com

THE RESULTS ARE IN:

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

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

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

AND... two out of the three top stations in Los Angeles use Omnia.***



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

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

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

***Source: Arbitron Fall 1999 12+ TSA Cume, Mon-Sun, 6:00am-12 midnight



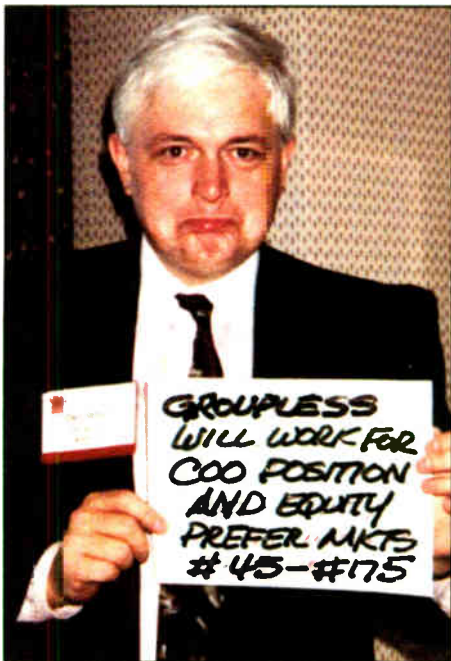
ACEN: Big Plans in Small Places

Scott Fybush

To describe his new radio group as "Radio Wal-Mart" was, Dain Schult admits, probably a mistake.

After all, the giant retailer is probably best known in radio circles for refusing to advertise on radio.

"That's probably the most inflammatory statement we could have used," Schult said.



Dain Schult strikes a pose in ACEN's earliest days, circa 1997.

But while Wal-Mart itself may not be a poster child for radio, Schult said the concept behind the chain is much the same as the philosophy behind his new group, American Communications Enterprises: using consolidation to take advantage of the buying power in thousands of tiny markets around the country.

The company uses the acronym ACEN, which is also its stock symbol.

Schult has been in radio since age 14, when he had a shift on Georgia State University's WRAS(FM) in his hometown of Atlanta, Ga.

"Scott Shannon was my first PD at WQXI(AM) (also in Atlanta) a few years later," Schult said, "and within a few years I was consulting myself."

After working for two decades as a consultant and doing turns as CEO at the Sunbelt Radio Group and Equicom, Schult, now 46, turned his attention to station ownership when he created ACEN last year.

Schult, who has written as a columnist in *RW* about methods of obtaining station financing, hopes to own 400 radio stations in the South and Southwest, all in small, unrated markets, within four years.

"It's very easy to consolidate major- and medium-market operations, but the tough nut to crack is doing this in small markets," he said.

For ACEN, that process starts in the small town of Brownwood, Texas, 120 miles west of Dallas.

Since last year, the company has

leased KXYL-AM-FM in Brownwood and KSTA-AM-FM in nearby Coleman. This spring, the four stations will become the flagship for "Radio Wal-Mart."

Behemoth not

The idea, said Schult, is to steer clear of the territory already claimed by giants like Clear Channel and Infinity, focusing instead on the stations that are too small for the big groups to bother with.

"Because we're out here first," he said, "we're not getting into bidding situations."

Instead of paying 18 or 20 times cash flow, as has become the norm for major-market properties, Schult is buying stations

See ACEN, page 48 ▶

BIA Ranks Radio's 1999 Top Billers



Infinity station WFAN(AM) in New York City is the No. 1 billing station for the fifth consecutive year, according to BIA Financial Network.

Overall, CBS/Infinity was the dominant player, with six stations that earn 61 percent of the estimated revenue of the top-10 billers.

For the second consecutive year, CBS/Infinity stations held first and second place in the BIA top-billers ranking. In addition to sports/talk WFAN(AM), CBS/Infinity's alternative WXRK(FM) holds second place.

Ranked by owner, Clear Channel was No. 1, with \$3.1 billion estimated revenues, and CBS/Infinity ranks second, with \$1.7 billion in estimated revenues.

CBS/Infinity all-news station WINS(AM), also in New York, moved up one position to No. 4. Taking its former place at No. 5 is Clear Channel's top-40 KIIS-FM, based in Los Angeles.

Other Clear Channel stations in the top-10 are New York-based WLTW(FM) and WKTU(FM).

There was only one top-10 biller not in New York or Los Angeles: ABC's KGO(AM) in San Francisco, which took 6th place on the BIA list. Last year it was not even in the top 10.

Top-10 Radio Billers 1999

Based on BIA's 1999 Estimated Station Revenues

1999 Rev. Rank	Market Rank	Market Name	Calls	Format	Owner	BIA's 1999 Est. Stn. Rev. (in millions)
1	1	New York	WFAN(AM)	Sprts/Talk	Infinity	\$60.8
2	1	New York	WXRK(FM)	Alternative	Infinity	\$53.3
3	1	New York	WLTW(FM)	Lite AC	AMFM	\$51.1
4	1	New York	WINS(AM)	News	Infinity	\$48.2
5	2	Los Angeles	KIIS(FM)	Top 40	Clear Channel	\$47.0
6	2	Los Angeles	KTWV(FM)	NAC/Jazz	Infinity	\$41.9
6	4	San Francisco	KGO(AM)	News/Talk	ABC Radio	\$41.9
8	1	New York	WCBS(AM)	News	Infinity	\$41.3
9	1	New York	WKTU(FM)	CHR/Rhymc	AMFM	\$39.3
10	2	Los Angeles	KLSX(FM)	Talk	Infinity	\$38.4

RADIO-ASSIST®

www.netia.net

NETIA North America

PO BOX 966 - Roanoke - Texas 76262 - USA
Toll Free 877 699 9151 • Fax 877 699 9152

Booth R3160

The Next Generation of Web Sites

Joe Dysart

While the Internet's World Wide Web works great as a fancy display device, the real power of the Web lies in its interactive potential.

With the right interactive programming, a radio Web site can be transformed into a sophisticated marketing and sales tool that offers every visitor a personalized, responsive experience.

"In essence, these next-generation Web sites take advantage of a simple truth: people who take the trouble to visit business Web sites are generally extremely thirsty for information," said Stella Gassaway, co-author of "Designing Multimedia Web Sites."

"Take the time to offer slick ways to slake that thirst, and there's a good chance a 'Net cruiser' can be transformed into a Net customer."

Fortunately, the Web inspires a constant flow of new twists on slick interactive presentations. What follows is a sampling of key interactive elements that every radio industry Web manager should consider.

Text-only option buttons

Here's an offering where less is definitely more.

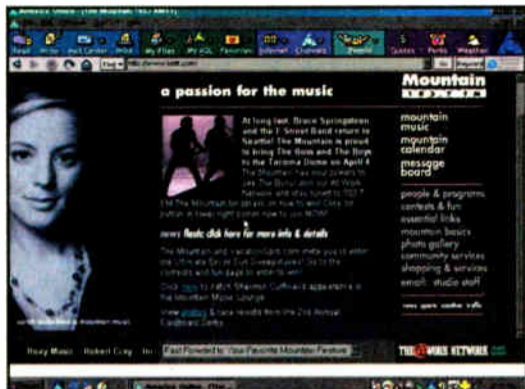
While too many Web sites feature every technological bell and whistle known to man, savvy Web site builders realize that many people cruise the Net with low-power modems and PCs.

Smart site builders accommodate cruisers by enabling them to "click" to "text-

only" versions of their sites. The result: visitors get to the data they want without the interminable download times for the fancy graphics, frames that they don't want.

Data drills

This is a variation on the search engine. Data drills enable Web site visitors to narrow their quest for information to an ever-finer point quickly. With every point-and-click, they get closer to the



At The Mountain's site, visitors can use a data drill to make quick hops to specific areas of interest.

precise data they really want.

The Mountain, www.kmtt.com from KMTT(FM) in Seattle, offers a handy data drill that visitors can use to make quick hops to a ticket exchange, surf report, advertiser links and more.

Special interest data domains

Special-interest data domains shine for

those who seek to provide comprehensive information on a narrowly defined field.

At "niche" sites like www.wala.com by WAOA(FM) in Melbourne, Fla., visitors can access a sophisticated concert database. Here, they can search for a con-



WAOA features a special-interest concert domain at its site. Visitors use a sophisticated search tool to find concert experiences that interest them.

cert by artist, event, city, venue and even their physical distance from the concert.

Postcards

Why pay for a cybercard at American Greetings site when you can send a trendier one from a radio station site?

KONI (FM), based in Maui, Hawaii, cashes in on this concept.

Station fans can send friends a station-branded "postcard" from the Web site at www.konifm.com

This sly promotion requires the recipient to visit the station site to pick up the card. And maybe tune in online while they are there.

Smart freebie downloads

Nothing enamors a Net cruiser like free data, software and the like to download instantly. For example, www.3ak.com.au Melbourne by Radio 3AK in Melbourne, Australia, recently was offering free, station-branded screen-savers for download at its site.

Web site search engines

Too many Web sites are little more than elephantine filing cabinets floating in cyberspace. There's plenty of information, but digging for it can be irksome.

Onsite search engines help solve this problem by fetching very specific data. Practice with search engines like Yahoo or Excite, and then decide how you can put a search engine to use on your Web site.

Contests

A staple of traditional radio promotion, it's no surprise stations use the Net to expand on this tried-and-true stalwart.

At www.wjbr.com, run by WJBR-FM in Wilmington, Del., visitors can enter many of its contests via e-mail at its Web site.

Chat rooms

This is the application that catapulted America Online to the premier spot among Internet service providers.

Essentially, it's a place where 30 or so people can "congregate," and exchange live text messages with one another over the Internet.

The operative word here is "live." In a chat room, everyone instantly gets to read and respond to anything anyone else feels inspired to write on the spot.

www.mix1015.com by WMXO(FM) in Olean, N.Y., offers a chat room at its site.

Cool tools

Besides the obvious online helpers, some stations have come up with some innovative solutions to catapult their sites beyond the everyday.

At www.kflx.com, the site of KFLX(FM) in Scottsdale, Ariz., visitors can "fax" a song request directly from the Web site. And at www.kmxs.com from KMXS(FM), based in Anchorage, Alaska, visitors can listen to the station live using Real Audio software, which is downloadable free from the KMXS Web site.

Piggyback services

Why spend all the time, money, manpower and effort to create a cool interactive service on the Web, when you can simply add a link to a site that already does that? It's a practice that is catching on at savvy business Web sites because it's a win-win situation for all participants.

Any radio station can provide a link to useful online services at no cost to themselves. The radio station site that

provides the link generates good will through tips to visitors of a cool, free service, such as Mapblast!, which provides free driving directions between any two points in the United States. Visit www.mapblast.com

And the online link gleans additional exposure that they can use either to sell their service for proprietary needs, or to attract advertisers.

And that, as they say, is just for starters. During the coming year, look for ever more interactive technologies to continually raise the bar on Web site appeal.

Big world

Perhaps the "bleeding edge" of interactive Web design is the presence of panoramic Virtual Reality Web sites, which offer visitors photo-realistic, 3D-like representations of products and environments that seem irresistible to visitors.

Given that panoramic VR works best only on high-end PCs with high-speed connections, the medium probably will not catch on until these applications are more widely used.

Nevertheless, it's a technology that should be tracked, if only to be aware what the next level of interactive Web design will be.

Interesting Web-based panoramic VR work is done by firms like Infinite Pictures at www.smoothmove.com, View360 at www.view360.com, Evox Productions at www.evov.com and Communicate at www.cvcmedia.com.

Change or perish

Of course, the prospect of a site upgrade with new interactive elements may cause a Web designer, who may have just recently finished a Web site, to grumble.

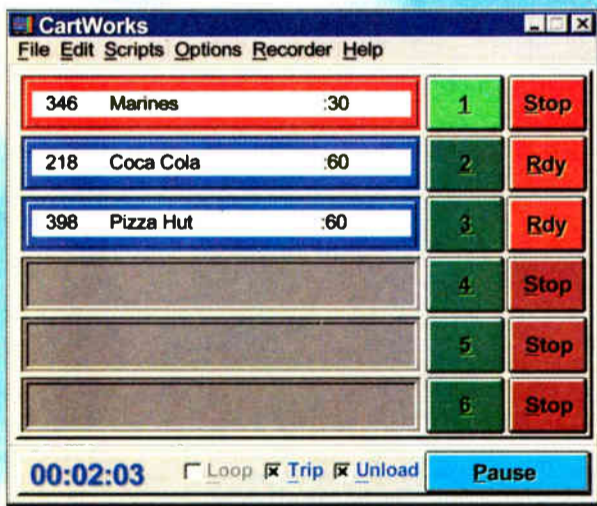
But given the financial stakes involved, it appears inevitable that interactivity will soon be considered essential for Web e-commerce.

And in the process, the medium will be transformed into something eminently more useful, personable — and profitable.

■ ■ ■

Joe Dysart is an Internet business consultant based in Thousand Oaks, Calif., and a frequent contributor to RW. Reach him in c/o RW.

Digital Audio Just Got Easier!



12:16:35

On The Air



Time	Cart	Title	Artist	Length	Intro	End	Type
12:13:07	M1012	Photograph	Def Leppard	04:54	:22	F	MUS
12:18:06	M2174	Friends	Elton John	02:20	:05	C	MUS
12:20:26	M1732	Dance The Night	Van Halen	02:47	:13	F	MUS
12:23:13	V026	Voice Track 26		00:12			VTK
12:23:25	DALIVE	SPOT SET		03:00		I	COM
12:26:25	J011	Jingle / Fast		00:06			Jin
12:26:31	M0713	Listen To Her Heart	Tom Petty	02:48	:11	C	MUS
12:29:19	V027	Voice Track 27		00:15			VTK
12:29:34	M2214	Black Friday	Steely Dan	03:40	:12	F	MUS
12:33:14	M0015	All Day Music	War	04:04	:19	F	MUS
12:37:18	L015	Liner # 15		00:15			LC

CartWorks
Digital Audio Systems

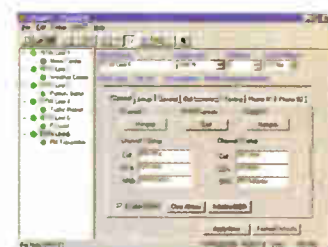
For information call: 1-800-795-7234

Or visit us on the web: www.cartworks.com

Saves space. Saves money. Saves you searching for the codec that was in the control room yesterday.



We've all been there before. You've got a remote broadcast to get up and running in an hour, and the codec that was in the control room yesterday is missing. The Harris IntraLink by **Intraplex** ensures that you're always ready for your remote by consolidating all of the functions of up to six codecs into one, space-saving, 5.25" rack-mounted unit. Because IntraLink is compatible with most popular brands of codecs, you don't need to store and maintain separate codecs in-house and match them to those in the field. You'll always have the codec you need for that traffic report or sports event. Plus, you can control and manage all of your remote broadcasts from a single system—and save money by deploying existing codecs to the field. The Harris IntraLink. You won't have to search hard to see the advantages.



Monitor and control all of your ISDN lines via IntraLink's easy to use Windows®-based user interface.

next level solutions

WIRELESS
BROADCAST
GOVERNMENT
NETWORK SUPPORT

HARRIS

GET THE FULL

You gain special benefits when you buy



NEW

COMREX

One Unit For ISDN, POTS and PCS

You won't want to miss the exciting new Matrix from Comrex at the NAB2000 show. This incredible codec offers the ability to send high quality, full duplex audio over POTS, ISDN or PCS wireless services - all in a compact, lightweight mixer package that is perfect for the road. Be sure to see it at the Comrex booth #R3178.

Omnia
A Telus Company



On-Air Processing Bundle

Upgrade to Omnia, the processor that's used by the world's most demanding broadcasters and for a limited time get the Omnia Tool Vox voice processor FREE with your purchase! Contact BSW for more information on how you can get in on this limited time offer.

FREE
Voice Processor

orban

**Call for
Best Price**

Superb AM Processing

Now you can have the polished, proven sound of the OPTIMOD™-AM with exceptional digital controllability and a wider range of sound signatures with the OPTIMOD 9200 with version 2.0 software. Call BSW today about sale pricing and additional information.

Orban 9200U mono analog I/O List \$4,250.00

Orban 9200UD analog & digital I/O List \$4,650.00



- Extended Product Warranty
- Extensive On-Site Installation
- Factory Trained and Certified Technicians

Spectacular 4-Day Sale

Visit BSW Booth #R3465 Audio Hall and L6713 Video

- Spectacular sale pricing during show hours
- Hundreds of products on display
- Daily product giveaways

Advantage Partner

360 Systems #R3163, Arrakis

Moseley #R3174, Omnia #R2057,

**Temporary
Factory
Price Reduction**



There's Never Been a

For a limited time, you can buy any model in the Zephyr line at special sale prices starting at only \$2,873.00 for the 9100. Call for details on Layer 2 and G.722 transmission modes. Contact BSW for more information.

For more information
or visit www.bsw.com

ADVANTAGE

Buy Advantage Partner products from BSW.



Warranties on All Partner Products
Inventory for Fast Delivery
Certified Sales Professionals

ular

Hall



NAB Booth #s
#R1574, Comrex #R3178,
Urban #R3686, Telos #R2057.



Better Time to Buy a Zephyr

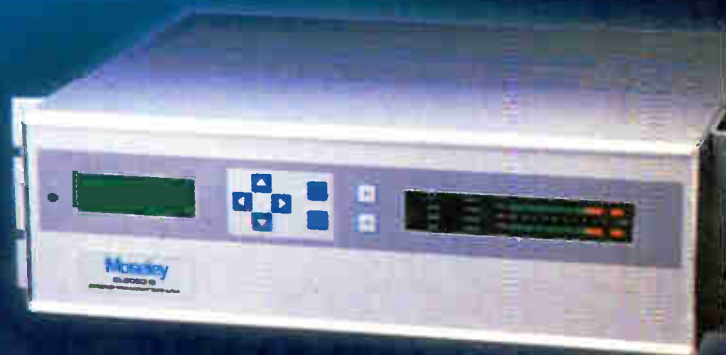
Buy the popular Zephyr line for super-low promotional
2 upgradable mono model. All models support Layer 3,
Contact BSW today for pricing on the model you need!

call 1 • 800 • 426 • 8434
www.bswusa.com

State-of-the-Art Digital STL

Using spectrally efficient QAM (quadrature amplitude modulation) technology, Moseley's StarLink SL9003Q conveys up to four linear uncompressed audio channels over a single narrow bandwidth 950 MHz STL channel. This uncompressed 16-bit linear audio is absolutely uncompromised. Call BSW today to discuss how the SL9003Q can improve your transmission.

Moseley



BSW to Give Away 360 Systems Product!

BSW offers you the chance to win a 360 Systems Short-cut™ or Instant Replay™ this year at the NAB show. Stop by the BSW booth #R3465 to enter. Also, demo the Instant Replay or the Short-cut from 9:00 am to noon at the show and get an official Morning Team coffee mug from 360 Systems and BSW's own Broadcaster Blend coffee!

360 Systems



Win a Short/cut
or Instant Replay
at NAB2000

BSW Carries the Full Line
of Arrakis Consoles,
Digital Automation
Systems and
Studio Furniture.

arrakis
SYSTEMS INC.



BSW

BROADCAST SUPPLY WORLDWIDE

World Radio History

COLE'S LAW

Until the Deal Is Done — Don't

Harry Cole

Finality — you may be hearing about that more these days. And not just because of Mr. Philbin's oft-repeated question on "that other broadcast medium" ("Is that your final answer?").

In light of the ongoing consolidation juggernaut, it is likely that you are or will be in that universe of likely buyers or sellers sooner or later. And you no doubt know that contracts for the sale of broadcast stations almost invariably require that, before closing can occur, the FCC must have issued a "final order" approving the sale.

If you are among the many broadcasters contemplating the purchase or sale of a station, you more than likely have found or will find some such language in the purchase/sale agreement.

Reports from the operators at the Cole's Law Hotline indicate some confusion about exactly what makes an order a "final" order ... and also about why anybody really cares about that, anyway.

So as a public service, we offer the following exploration of this particular piece of FCC Arcanum.

Nothing is as it appears

Let us assume that we are dealing with a run-of-the-mill application for consent to the assignment of a broadcast license. Members of the Mass Media Bureau would normally process

that application. Barring any extraordinary circumstances, the bureau staff, upon completion of their review, signs off on a form indicating that the application is granted.

As of that moment, the parties would be free to close the deal as far as the FCC is concerned. If the staff member who actually signs the grant form were to call the applicants and advise them that the

form had been signed and the application granted — as some staff members are wont to do — the parties could proceed to closing right away.

Regardless of whether the staff does call the parties, a formal written public notice of the grant is issued shortly thereafter, usually within a week or so of the grant itself.

But the mere fact that the application has been granted does *not* mean that that grant is "final," etched in stone, and impervious to any effort to undo it.

Section 1.106 of the commission's rules provides for the filing of petitions for reconsideration, in which the petitioner asks the bureau (or whatever other office actually made the decision) to think about it again.

And section 1.115 provides for "applications for review," in which objectors unhappy with the bureau's action ask the full commission itself to look at the deal

and determine whether the subordinate office (e.g., the bureau) which made the decision did the right thing.

Such petitions for reconsideration and applications for review can be filed within 30 days of the issuance of the formal, written public notice of the grant.

Also, if the grant was made by, say, the bureau, the full commission has the power (under section 1.117 of the rules) to review the bureau's decision on the commission's own motion within 40 days of the written public notice.

As long as some such possibility for further review of the application exists, so, too does the possibility that the review could lead to a change of the FCC's mind and, ultimately, denial of the application.

And as long as that possibility exists, any actions taken by the parties to close would be taken at their own risk.

The way we were

That is, if the parties to the deal were to go ahead and close as soon as the initial grant was made by the bureau, and if that grant was to be reviewed and reversed later (whether by the bureau, or by the full commission, or even by a court on appeal of the commission's decision), the parties might have to unwind the transaction and put themselves in the positions they had been in before the closing occurred.

(Helpful tip: Lawyers refer to this as returning to the "*status quo ante*," a fancy Latin term meaning "the way things were before." Feel free to use this expression to impress your friends.)

Of course, nobody wants to be in the position of unwinding a deal, a process that has been likened to unscrambling an egg. And understandably, the folks who are least anxious to have to engage in that process are the ones who have let go of a gazillion dollars for a station and now have to hope that they will be able to find all gazillion dollars still in one place.

It is the desire to avoid this unwinding scenario that has historically motivated the routine inclusion of "finality" provisions in most purchase/sale agreements.

For the purposes of most such provisions, "finality" is achieved once there is no possibility of any reconsideration or review of the grant either within the commission or by a reviewing court. To attain the nirvana of finality with respect to a bureau action, you first have to get past

the filing deadlines for petitions for reconsideration and/or applications for review.

If no such pleadings are filed, you are almost home free; you just need to wait to see if the full commission chooses to review the decision on its own motion. And since, at least as far as we are aware, the commission has undertaken such "on its own motion" review no more than one or two times in the last 25 or so years, this possibility normally does not constitute much of a threat.

If some initial review or reconsideration is sought, then the "finality" clock is re-set. In that case, "finality" won't occur until action is taken on the petition for reconsideration and that action itself becomes "final," i.e., no longer subject to any agency or court review.

Of course, if further review is sought of that decision, then the clock is reset yet again, and so forth. This means that a determined adversary could conceivably keep filing petitions for reconsideration, or applications for review, or judicial appeals, and thereby keep a grant from becoming "final" for years.

So while the possibility of having to unwind a deal is an incentive to insist upon "finality," that insistence could lead to serious delays in closing, even if the grant is upheld at each step of the review and appeal process.

Rush to risk

The Trend Observation Cadre here at Team Cole's Law has noted in the last several years a distinct and increasing inclination to close deals whether or not the underlying grant is final. (Note, however, that in any case you have to have a grant before you close — all we are saying is that that grant does not necessarily have to be "final.")

In this cyberkinetic age of instantaneous shifts and adjustments, parties seem to be willing to take the risk of having to unwind so that they can avail themselves of the advantages of their deals as quickly as possible.

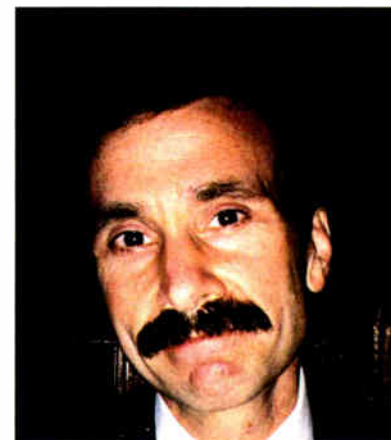
This is not an irrational or foolhardy approach by any means. As a practical matter, the likelihood that any grant is going to be overturned at any level of review tends to be extremely small (except in certain limited situations). So it's usually not a bad bet to close prior to finality and get on with life.

See COLE'S LAW, page 49 ▶

Right Caption, Wrong Man

That was not David J. Halberstam pictured in the story "From Courtside to the Sales Suite," (RW, March 15, page 40). This is Mr. Halberstam.

We apologize and thank Mr. Halberstam for his cooperation.



David J. Halberstam (really!)

Visit Radio World on the Web!



The Industry's Online Resource

Read weekly updates in the Newsroom!

Find trade shows and meetings in the Calendar of Industry Events

Look up associations and regulatory groups in the Broadcast Organization Directory

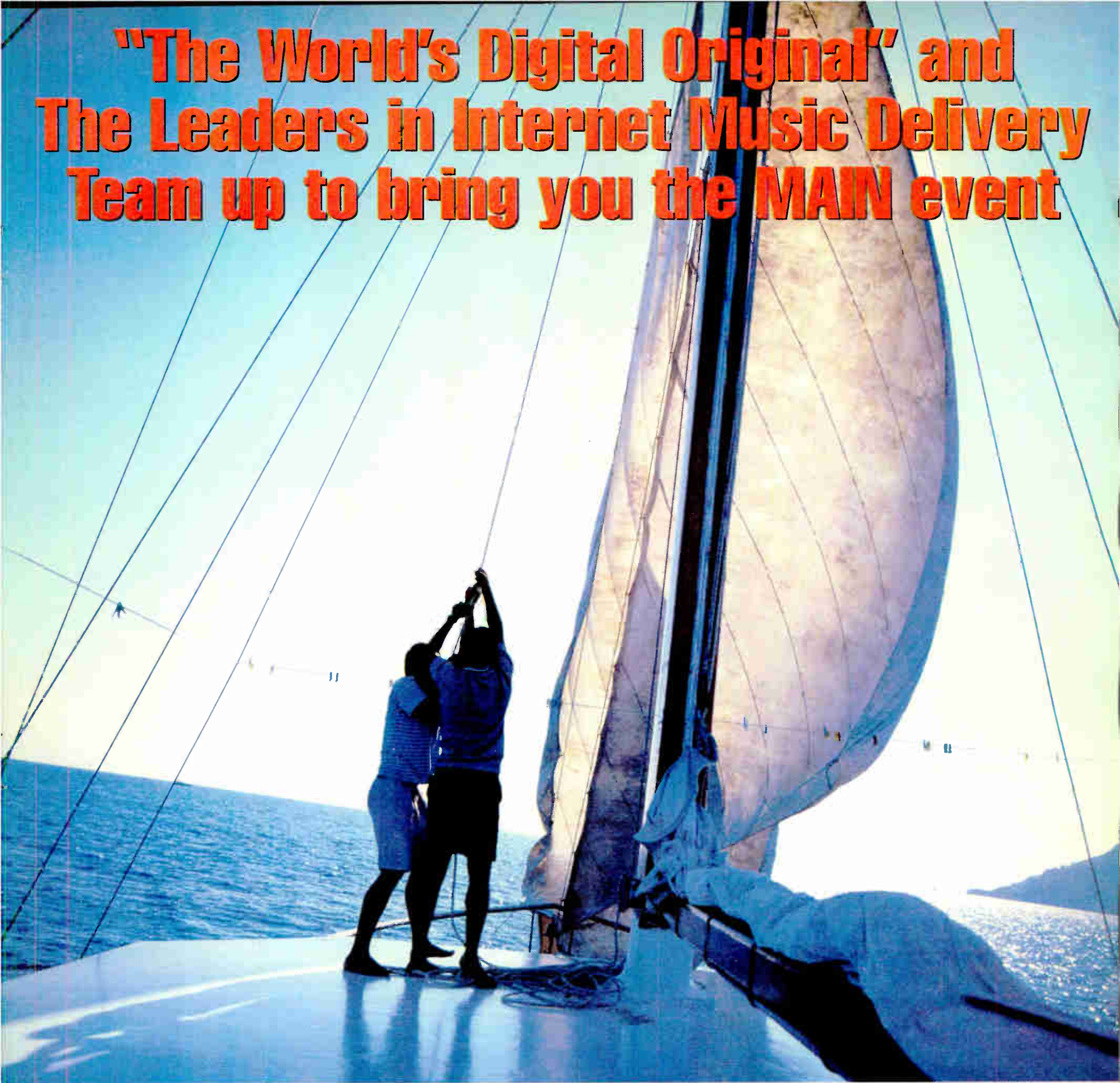
Find the equipment you need in the searchable Vendor & Product Directory!

Plus,
Guy Wire's exclusive column,
Reader Subscription Services
and more!

<http://www.rwonline.com>

For advertising information, contact
Richard Farrell at 703-998-7600 x115 or rfarrell@imaspub.com

**"The World's Digital Original" and
The Leaders in Internet Music Delivery
Team up to bring you the MAIN event**



**MUSIC • AUTOMATION • INTEGRATION • NETWORKING
Not just pushing the limits of radio, but breaking them.**



www.omt.net



www.musicmusicmusic.com

SEE THE MAIN EVENT AT NAB 2000 - BOOTH R374

World Radio History

MANAGEMENT CORNER

Leverage Assets and Reap Growth

Vincent Ditingo

For the year 2000, the emergent financial buzzword is "leveraging."

Yes, the term has been bandied about in radio and other media circles for years, but now it is a driving force behind radio's new growth strategies.

No matter how small or large the radio group, maximizing individual asset values of the core business (station equipment, programming product, on-air talent, etc.) is "the" operational paradigm today. And for an increasing number of station owners, non-core business assets too are leveraged.

Indeed, an examination of the radio business financial fundamentals of the past six months shows the industry's strategy for future expansion: to leverage inherent asset values to allow for what can best be described as "synergistic" acquisitions.

That typically leads to greater operating income or leverage — the amount of sales in excess of the cost of doing business — in the media marketplace.

A bump

While the focus of many critical business and trade articles recently, Clear Channel Communications still represents the best example of a successful radio group: one that properly managed and leveraged its existing assets over the years to advance beyond its core operations.

The San Antonio-based company's 20-plus years of financially cautious, steady growth has become the model for radio broadcasters who wish to build a brand name in related media areas.

Take, for example, Clear Channel's announced purchase of SFX Entertainment in March for a staggering \$3.3 billion.

SFX, headed by former radio group operator Robert F.X. Sillerman, is one of the nation's leading concert producers, ar-

na owners and sports promoters. Clear Channel's apparent concept is to extend the reach of the company into related business areas, like music concerts, and in doing so, to aggregate large numbers of consumers for advertisers.

financial coffers?

A number of radio operators view diversification as a way to remain competitively viable in a demanding advertising arena, usually through Internet marketing deals and start-up services.

Several other groups, such as Indianapolis-based Emmis, are involved in magazine publishing.

Outdoor

Clear Channel and CBS/Infinity are the leading broadcast concerns that also operate outdoor advertising companies.

However, more small- and medium-market groups need to consider the purchase of not only other stations, but also local, related or ancillary businesses, such as weekly shopper guides, to build their asset portfolios.

There is no time like the present for station group owners to take advantage of radio's current economic boom and broaden their demographics even further to build their value to advertisers.

To radio's benefit, operational expenses tend to remain relatively fixed, especially when spread across local radio station clusters.

The radio station business has the potential to achieve sound double-digit profit margins. And its current favorable circumstance positions the industry for future mergers and acquisitions.

However, a word of warning: Only if a station's core operation sales projec-

tions are surpassed will the broadcaster be prepared to enter into multimedia deals, including the Internet, direct mail, publishing and/or other entertainment-oriented ventures.

A solvent radio station track record is the prerequisite to establish respectable, if not high, credit ratings from financial lenders.

Remember that a relevant acquisition or start-up to the radio advertising business will create greater inventory leverage — yes, there's that buzzword again — for marketing to advertisers.

Meanwhile, there continues to be a bright financial horizon for the core business of radio groups poised to expand into new territory.

According to RAB President Gary Fries, radio has finally broken the 7-percent "glass ceiling" it has languished at for many years, garnering 8.2 percent or \$17.7 billion of the 1999 total ad business.

The Wall Street investment firm Prudential Securities cites three factors that will foster a robust radio advertising environment in 2000: political and issue-related presidential election-year advertising, growth in "dot.com" advertising, and summer Olympics spending.

Hidden values

Aside from revenue growth strategies, radio operators can also leverage the "hidden" or forgotten values of core assets against their operating expenses, to create additional income. This could include leasing production studio time to outside vendors or local ad agencies.

And, according to Pete Bowman, partner in Cole & Bowman, a Herndon, Va.-based broadcast valuation and consulting firm, for a number of local station operators who own their broadcast towers, there are ample opportunities to lease space to a plethora of new wireless paging and other personal communication services (PCS).

"Tower leasing is a good example of vertical integration in which broadcasters can control the supply (space) and distribution of their asset," Bowman said. "It's a great way to supplement income."

Market Group	Duopoly Stations Average Revenue/Station (in \$000)	Non-Duopoly Stations Average Revenue/Station (in \$000)
Top 10	9,254	2,683
11-20	4,765	1,633
21-30	4,278	851
31-40	3,106	876
41-50	2,711	576
Top 50	5,422	1,439
51-100	1,482	339
101-150	1,068	484
151-200	746	351
201+	636	289
Total	2,523	722

Source: BIA's MEDIA Access Pro™

Clear Channel music stations will be able to promote concerts and tours for its venues, not to mention advertisements on its outdoor billboards. The businesses will overlap with each other, thereby creating large audience awareness.

Good fit

Any proposed new deal boils down to the synergistic value that the newly purchased or merged properties will have with the existing business. If the company brings other stations or radio groups to the table, owners need to ask how the new acquisitions will fit into the programming and managing schemes of their local markets.

And if a non-radio business is purchased, how will the components of that business add to the parent company's

BIA Financial
fn network

Products & Services Showcase

New! DigiStor II is here!

An all new digital audio recorder!

DigiStor II is ideal for network news delay, traffic reports, translator ID and local inserts, weather reports, call-in telephone info lines, message-on-hold, news & actuality lines, "travelers info" radio, sound effects...

DigiStor II has all the features of the "original" DigiStor, and more!

MORE MESSAGES...8 messages with random access
MORE TIME...8 or 16 minute recording capacity
MORE AUDIO...6.5 kHz B/W, 60dB S/N, 1% dist
MORE USES...with auto-answer telco coupler



DigiStor II is IN STOCK!

HE HENRY
ENGINEERING

HENRY ENGINEERING
TEL: 626.355.3656
FAX: 626.355.0077

www.henryeng.com

Fax-on-demand: 626-355-4210; Document #123

World Radio History

Radio World
Attention Advertisers!

RADIO WORLD's
Products & Services Showcase
provides a perfect medium for test
marketing your products and services.

It's an efficient, effective and
affordable advertising option!

For more information including rates and deadlines,
fax Simone Mullins at 703-671-7409 or call
703-998-7600, ext. 154

Products & Services Showcase

*Celebrating 60 Years
of Quality Rebuilt Tubes
1940 - 2000*

Freeland Products, Inc.

75412 Highway 25
Covington, LA. 70435 U.S.A.
1-800-624-7626
www.freeland-inc.com
Email freeland-inc.com@freeland-inc.com



ULTRA-CLEAN PROCESSING



The Ultramod FM is a self contained split-band stereo FM processor, with an input AGC, a split-band compressor-expander and an ultra transparent digital stereo generator. Also included is a built-in composite compressor. Designed to help you compete in your market at a price you will like. Contact us for details or call your dealer.

www.broadcasttech.com

Broadcast Technology Company
P.O. Box 751 • Lamar, CO 81052 • (719) 336-3902 • Fax: (719) 336-9473

WATTCHEMAN® TRANSMITTER PROTECTION SYSTEMS




WATTCHEMAN protects your transmitter and transmission line system. A permanent 19" rack installation used with any dual socket line section 7/8" through 6 1/2" and elements (additional) to monitor CW, TV, and FM power. Model 81070 features two easily read meters to monitor both forward and reflected power. Abnormal conditions quickly cause transmitter shut down.

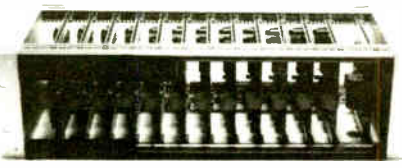
TERMINATING LIQUID/AIR LOADS
(84000/85000 series) available to cover CW power ranges of up to 10,000 Watts over a frequency range of DC to 2.4 Ghz. All models are available with optional thermal overload switches to interface with the user's interlock or warning circuit.

NEW

COAXIAL DYNAMICS, INC.
15210 Industrial Parkway
Cleveland, Ohio 44135 (216) 267 2233
Toll Free 1 800 COAXIAL (262 9425)
FAX (216) 267-3142
Web Site <http://www.coaxial.com>
Email: coaxdal@apk.net
Come see us NAB Booth R2668



The CircuitWerkes AC-12 Telephone Autocoupler Bay



Get up to 12 couplers in a neat, compact chassis

- Auto answer & disconnect.
- 2 audio busses for mass feeds.
- Individually card selectable buss or auxiliary audio I/O.
- LED indicators for ring, clipping, power & online.
- Ring counter answers on user set ring number.
- Momentary or latching dry contact outputs at pickup.
- Remove & install cards without affecting the rest.
- The aux. audio jack is ideal for multiple IFB feeds, etc.
- Check out our www site for more info and tech manuals.

The AC-12 rack-mounted coupler bay is the best way to eliminate a wall or cabinet full of yesterday's couplers. Our unique dual audio busses eliminate the tedious and messy wiring associated with networks and other mass feeds. Each card can also individually either send or receive telco audio. Best of all, a fully loaded AC-12 lists for under \$175 per coupler.

CircuitWerkes
3716 SW 3rd Place
Gainesville, Florida 32607
(352) 335-6555 / fax 380-0230
<http://www.circuitwerkes.com>

The New Standard in Studio Installation

RDA Systems

Technical Leadership in
an Industry of Change

Call: (888) 616-7980 In Missouri: (314) 872-8222
<http://www.rdasystems.com>

Shively Labs

Reach for Ratings!
Shively Antennas Deliver
Coverage!

Visit Us At NAB Booth #R1074!

- Superior Engineering
- Multistation Solutions
- Filters & Combiners
- Translators
- Reliable Pattern Studies
- Coax

**FM & TV Antennas
and Related RF Equipment
because ... it pays to be heard!**

P.O. Box 389, Bridgton, ME 04009 USA
Tel.: (207) 647-3327 FAX: (207) 647-8273
1-888-SHIVELY e-mail: sales@shively.com
Web: www.shively.com
An Employee-Owned Company

NANOAMP SERIES™ Problem Solvers STEREO HEADPHONE AMPLIFIERS



- FIELD OR STUDIO USE • LOW NOISE & DISTORTION
- COMPACT • DESK OR RACK MOUNT KITS
- Drives 32 to 600 Ohm Headsets
- Bridging Balanced Loop-through Inputs
- High Output Levels to 120dB SPL
- Front Panel Stereo/Mono Switch

HDA100
• UL & CE 24VDC remote power supply

HDA100-BAT
• Two 9V Battery Powered

Free Brochure Available Upon Request
<http://www.atiguys.com>
328 W. Maple Avenue • Horsham, PA 19044
800-959-0307 • 215-443-0330 • Fax: 215-443-0394

AT AUDIO TECHNOLOGIES INCORPORATED

Come see us at NAB Booth #L5211

WEBCASTING MADE SIMPLE.

So your station wants to stream audio on the Net and it's up to you to make it work. You've heard the horror stories of unfriendly software, unreliable PCs, noisy audio cards and the dreaded 3am lock-up. There's got to be an easier way.



Relax. You've got Audioactive—the reliable, one-box solution for webcasting. From the company which pioneered MP3 streaming, this is the real-time audio encoder over IP that's the choice of the world's most demanding webcasters. With Audioactive, you'll be reaching new listeners with the latest technology in no time at all.

Simple. Professional. Reliable. Finally, there's a webcasting solution designed by people who understand what's important to broadcasters. Visit our website for more information.



AUDIOACTIVE.COM

2101 SUPERIOR AVENUE CLEVELAND, OH 44114 USA
TEL: +1 (216) 241-7225 FAX: +1 (216) 241-4103
E-MAIL: info@audioactive.com
www.audioactive.com

AUDIOACTIVE.COM EUROPE

JOHANNISSTRASSE 6 D-85354 FREISING GERMANY
TEL: +49 81 61 42 467 FAX: +49 81 61 42 402
E-MAIL: europa@audioactive.com
www.audioactive.com

The Audioactive logo and Telos are trademarks of TLS Corporation.

WEB WATCH

Web Watch items are collected and written by Carl Lindemann.

FIMC Creates Turnkey Service With RPC

What's the best way for stations to generate revenue from their Web sites?

First Internet Media Corp. believes their acquisition of Radio Profits Corp. makes a winning combination.

Stations can use FIMC's services to create their Web site and then generate revenue with the RPC system of telemarketing sales tools. The acquisition went into effect March 1.

FIMC's CEO Chad Meisinger, said a turnkey solution makes working the Web a simple, moneymaking proposition. He believes stations that have generated revenue with the Radio Profits' program will realize higher returns with the FIMC tools.

For RPC President Alan Fendrich, even modest revenue projections are impressive.

"The potential of this combination is staggering. Altogether we're working with stations in 141 markets — if each market does a reasonable job and gener-



Chad Meisinger



ates just \$200,000 in annual billing using the FIMC Web site tools and

the Radio Profits telephone sales program, that's over \$28 million in new Internet billing for radio," he said.

Radiowave.com Gathers Money and Momentum

Radiowave.com's recent alliances and investors have positioned them to become a major player in the Webcasting world.

The Chicago-based company creates customized interactive audio players that

coordinate graphics, interactive advertising and e-commerce with streamed audio. Radiowave.com began as a wholly owned subsidiary of Motorola.

In February, Susquehanna Radio Corp. announced a strategic alliance with Radiowave.com.

Shortly afterward, Susquehanna upped the ante with an undisclosed but "substantial" investment in the company, according to Susquehanna spokesman T.J. Synder.

Close on the heels of these announcements, the company announced that it had secured an additional \$20.5 million in its first round of private financing and had signed a non-exclusive agreement with EMI to create online channels around the U.K. recording giant's stable of artists.

Jim Smith, Radiowave.com's director of sales, said the relationship with Susquehanna has been developing steadily since developing a downloadable, branded player/tuner for KKZN(FM), Dallas, in October 1998.

"We added additional stations for Susquehanna in '99. Then, they asked us to build an embedded player (streams music without downloading a plug-in) when they refashioned KKZN into KKMR-FM 'Merge 93.3.Net' last fall. After we added KSAN(FM) in San Francisco, and were talking with additional Susquehanna stations in Atlanta and Houston, it made sense to form this alliance, and then invest in the company," Smith said.

"We know that a key to servicing our



listeners in the future is, like so many other industries, on the Internet. Our investment in RadioWave.com is one more step in our commitment to better our stations' services to and relationships with their local communities," said Dan Halyburton, senior vice president/general manager, group operations, Susquehanna Radio Corp.

Warpradio.Com Joins Across Media Networks

WarpRadio.com and Across Media Networks L.L.C. have formed a strategic relationship to offer a suite of services to radio stations.



Greg Liptak

According to James Comstock, WarpRadio.com's president, the company provides 24-hour, seven-day-a-week audio streaming to more than 170 radio stations in exchange for two minutes of advertising inventory per day. The Across Media Networks affiliation will provide a whole new dimension and revenue opportunity for WarpRadio's

See WEB WATCH, page 51

Barnesandnoble.com Adds Internet Radio

Barnesandnoble.com launched bnRadio in February. According to company officials, this is the first Internet radio service linked to an e-commerce company.

The new service was created in partnership with RadioAmp, a full-service Webcasting firm.



Daniel Blackman

The Web site offers 25,000 songs in 16 music formats as well as a book "channel" offering clips from audio books.

For Daniel Blackman, director of music, video and software for Barnesandnoble.com, the strategic partnership was the easiest and best way to extend the brand.

"They're providing the content, the hosting, and the delivery of the content.



BNRadioTuner

We bring them the traffic," he said.

After the first month online with bnRadio, initial results were positive, according to Blackman.

"We have had tens of thousands of radio launches," Blackman said. "There's also been an impact on sales, though we haven't broken out those figures as yet," Blackman said.

The ultimate value of the service may go beyond whatever sales can be directly attributed to it, said Blackman.

"This gives people yet another reason to interact with our brand. They can be on our Web site, or working on a spreadsheet or e-mail with the tuner running. Either way, they retain a connection to Barnes and Noble. That's the real power of an Internet radio station."

Turn Audiences
 WITH NO COST, NO RISK
 WEBSITE TRAFFIC
 & REVENUE SOLUTIONS

Your On-Air Into On-Line Profits

BuySellBid.com multimedia on-line classifieds, auctions, personals & shopping will drive new & repeat traffic to your website 24 hours a day, 7 days a week producing substantial new non-traditional revenue from both your audiences and your advertisers. You can be a major portal in your market and cash in on the Internet, with BuySellBid no cost content.

Visit www.buysellbid.com or call 800-320-7870 Today.



www.classifind.com



www.buysellbid.com



www.datechannel.com



www.inxsys.com

ACEN Targets Unrated Markets

► ACEN, continued from page 37 at six to eight times cash flow. And instead of paying cash, he hopes that station owners will agree to take at least some of their proceeds in ACEN stock.

"These sellers are going to be partners; they're going to become stockholders of ours," he said.

In a market fixated on "dot-com" stocks, Schult said ACEN will offer investors its own Internet component. Each ACEN station group will also function as a local Internet Service Provider, offering local advertisers an ACEN-created Web presence along with radio spots.

Winning strategy

In doing so, said Schult, "We're not going after other radio stations — we're going after the local newspaper."

Consultant Walter Sabo said that's a winning strategy.

"In every single market with a daily newspaper," he said, "the newspaper outbills every radio station in the market combined."

Broadcaster Dennis Jackson, who owns four stations in unrated Northeast markets including WQQQ(FM) in Lakeville, Conn., agrees that addressing advertiser Web concerns is important.

"We know from our Q103 that the advertisers feel they're losing business to Web retailers," he said.

Beyond the Web, though, Schult is paying close attention to the traditional

business of broadcasters: the on-air product.

"We're not changing calls and formats when we buy stations," he said.



CEO Dain Schult (right) with partners Hap Hedges, chief operating officer and John Saunders, acquisition analyst, at KXYL-AM-FM in Brownwood, Texas.

In addition to keeping local morning shows, there's another rule Schult said is sacred, at least in Texas: "You don't mess with high school football. It's good busi-

ness, good money, and if we didn't, we'd be lynched."

In the hours outside morning drive and Friday nights, though, Schult said he's

taking advantage of another benefit of consolidation.

Instead of plugging into a satellite service, ACEN stations will use hard-drive

automation. Content will come by way of voicetracks sent by satellite, ISDN or the Web to each station, where local elements like traffic, weather and local news can be added.

"Our talent doesn't even have to be here," Schult said, referring to ACEN's home in Austin. "Today they can be anywhere."

The benefits Schult sees from consolidation extend to sales and marketing as well.

Virtual rep firm

While ACEN might not be any more fortunate than other radio groups in landing business from Wal-Mart itself, Schult said national and regional advertisers who can't be bothered buying tiny stations individually will be more interested in buying time on hundreds of those stations with a single phone call to what he calls ACEN's "virtual rep firm."

But Jackson points to the glut of existing ad time on larger networks as a drawback to ACEN's scheme. "There's a lot of inventory already going begging," he said.

Before ACEN can offer advertisers hundreds of stations, though, it has to buy hundreds of stations, a task that will keep Schult, chief operating officer Harry "Hap" Hedges and chief marketing officer Bob Ringle busy for several years.

In addition to the Brownwood group, ACEN has a letter of intent to buy two more stations, and verbal commitments to buy almost 40 additional stations in Mississippi, Wyoming, Texas, Arizona, New Mexico, Oklahoma, Georgia.

See ACEN, page 49 ►

DJ Dave... I am sorry to bother you at home, but I've detected a fault in spot number 321. It may be missing. Perhaps you should look into it.

WaveStation 3.0 with WebConnect
www.bsiusa.com

► ACEN, continued from page 48
Arkansas and Virginia.

Buying small stations from "mom and pop" owners, some of whom have been in the business all their lives, takes a set of skills that might be unfamiliar to

The Final Order Worth The Wait

► COLE'S LAW, continued from page 42

But if that's the case, you say, why bother with the "finality" language at all? The answer is that, while that language may ultimately prove to be of no consequence, it still may be useful to have it in.

For example, suppose some serious but unexpected opposition to the deal is filed — opposition which the bureau might be willing to ignore, but which the full commission or the court might not.

In such a case, one party to the deal might prefer to close right away, while the other understandably might want to sit tight to see what happens. If you happen to be the latter, you would definitely be happy to see the "finality" provision in your agreement.

Ultimately, the question of awaiting finality reduces to a business judgment involving risk/benefit assessment: What benefits will be available if you close before finality, and what risks do you run if you do close and then the deal has to be unwound down the line?

These are determinations which tend to differ from party to party and from deal to deal, and while they often may be made after consultation with counsel, they ultimately tend to be based on business, as opposed to purely legal, considerations.

If you have any questions about the matters covered in this column, you should consult your communications counsel.

Harry Cole is a principal in the Washington-based law firm of Bechtel & Cole, Chartered. He can be reached at (202) 833-4190 or via e-mail at coleslaw@erols.com

the big groups.

"I haven't worn a suit in a year," said Schult. "You cannot come into these markets in a fancy suit with your hair slicked back and expect to be taken seriously," he said.

Instead, he's hoping to make buyers comfortable with ACEN's approach, in part by reassuring them that the company won't make drastic changes to their stations, and in part by selling them on the value of ACEN's stock.

"We're dealing with people who have not had any real contact with a stock market of any kind," he said.

By sticking to established stations with positive cash flow and avoiding startups and turnaround situations, Schult said ACEN is playing things safe financially.

"We're living within our means," he said. Will Wall Street agree? Since ACEN

stock began trading in November 1999, it's ranged from 25 cents a share up to \$9, settling at press time in the \$3 range. Obtaining the financing to build his group will be Schult's next big challenge.

A group about nothing

"Right now, to paraphrase Jerry Seinfeld, we're a group about nothing," said Schult. As ACEN begins to buy stations and to implement its consolidation strategies, he's hoping to show investors that sticking with small markets can work.

It's an experiment worth watching, said Sabo. "He is to be commended and applauded for trying something new," said the veteran consultant.

And just in case ACEN's small-market strategy isn't new enough for investors, the company has one more venture in the

works. It's partnering with Sino Marketing of Columbus, Ohio, in a venture to market radio and Internet programming in mainland China — a market even Wal-Mart itself has yet to enter.

The idea, Schult said, is to bring some of the programming he's developing for U.S. listeners to English-speaking audiences in Asia.

"This offers us an opportunity, a window to the Far East to provide specialty programs like 'South of the Border Saturday Night' and 'Hillbilly Heaven' to markets where there are large numbers of people who speak English and want to hear American programming," Schult said.

Scott Fybush is the editor of NorthEast Radio Watch when he's not reporting for Time Warner's R News cable channel in Rochester, N.Y.

Crown was there... where were you?

Five Crown Broadcast FM30 Transmitters were the backbone of the nearcast network at the biggest sporting event on the planet.



the best in low power

Crown transmitters are the standard for many LPFM and FM nearcast applications throughout the world with power levels and flexibility to meet any broadcast requirements. Crown Broadcast transmitters are designed and engineered to the same reliable performance standards known worldwide as the hallmarks of all Crown products.

Enjoy on-air confidence with compact transmitter designs that integrate audio processing, stereo generation and RF amplification. Choose from custom configurations for innovative solutions to

meet any broadcast needs. And, be confident in your choice, with service from some of the finest talent in the industry.

Call us, visit our web site, or send us e-mail for more information about the versatile transmitters from Crown Broadcast. Phone: 800-294-8050; Fax: 219-294-8222 Email: broadcast@crowintl.com www.crownbroadcast.com

NAB Booth #R984



Crown International Inc. ■ 1718 W. Mishawaka Road ■ Elkhart Indiana ■ 800-294-8050 ■ www.crownbroadcast.com

RAB's Sessions At NAB2000 Change

Here are late changes to a few sales sessions at NAB2000 show in Las Vegas, as reported last issue:

The Radio Advertising Bureau announced that Dave Gifford's session at the Sales and Marketing Conference at will take place Wednesday, April 12, at 9 a.m.

"Giff's" session is flipping time and day with a Mike Mahone/Dave Casper session, "E-Commerce Can Mean Big Bucks for Your Station." This session will be presented Monday, April 10 at 2:30 p.m.

RAB also said Gary Fuller's session, "Show Me the Money: Collections," is cancelled.



1200 Console

- NEW - redesigned in 1999
- 5, 10, or 15 channel models
- Fully DC controlled for reliability
- Ultra high audio performance
- Easy connectorized installation
- Modular internal electronics
- Mix minus phone interface



Standard Configurations

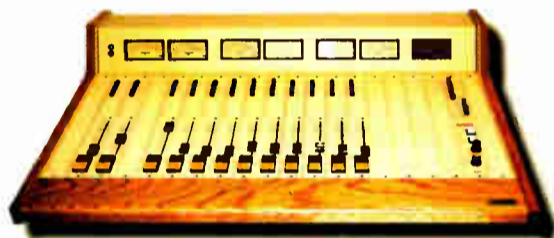
1200 - 5S	5 channels	\$2,295
1200 - 10S	10 channels	\$3,495
1200 - 15S	15 channels	\$4,495

(call factory for options)

A rugged design with heavy aluminum panels, solid oak trim, 5M operation On/Off switches and full DC control, the 1200 is ideal for On Air, Production, or News applications.

12,000 Console

- NEW - redesigned in 1999
- 8, 18, or 28 channel models
- Fully modular design
- 3 stereo output buses
- VCAs remove audio from faders
- Telephone talkshow module option
- Monitor for control room & 2 studios



Standard Configurations

12K8 - 6	6 channels	\$4,350
12K18 - 12	12 channels	\$7,075
12K18 - 18	18 channels	\$8,755

(call factory for options)

Modular, reliable, flexible, and powerful, the 12,000 is found around the world from Tokyo to Paris to New York. The 12,000 is perfect for any size market or any radio application.

Digital Console

- NEW - Revolution Series
 - Digital & Analog Radio Console
 - Console, Touchscreen, or Mouse Control
 - 3 Program & 2 Telephone Mix (-) outputs
- | | |
|---------------------|----------|
| • 12 CH, PC Control | \$3,995 |
| • 12 CH Console | \$7,995 |
| • 18 CH Console | \$12,995 |



A breakthrough in features, performance, and price, this is a black box digital audio console controlled by a familiar Console -or- PC computer. Powerful, flexible, and designed for ease of use, installation, and service, the Revolution is a Colorado Digital Product.

Available April
See Us At NAB Booth # R1574

World Radio History

How to Buy

Domestic Dealers:

BSW
(Broadcast Supply Worldwide)
(800) 426-8434

CROUZE-KIMSEY
(800) 433-2105

BGS
(Broadcasters General Store)
(352) 622-7700

SCMS
(Southern Coastal Marketing)
(800) 438-6040

BRADLEY BROADCAST
(800) 732-7665

CONTINENTAL ELECTRONICS
(800) 733-5011

RF SPECIALITIES
(contact their regional offices)

For more complete information on any Arrakis product visit our website at:

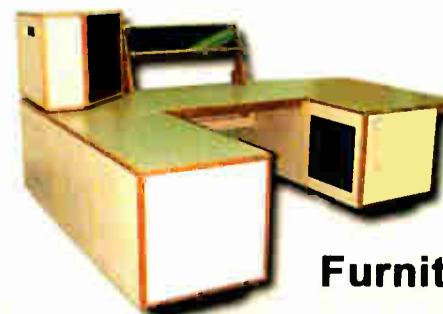
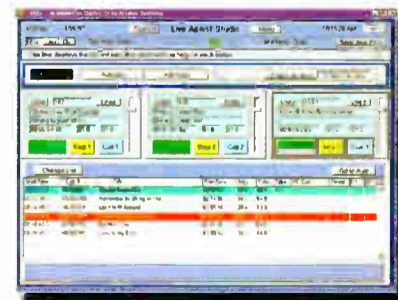
www.arrakis-systems.com

-or-

email to:
sales@arrakis-systems.com

Other Products

Digital



Furniture

WEB WATCH

► **WEB WATCH**, continued from page 47 affiliates, according to Comstock.

Across Media Networks builds local community Web sites as well as local cable television community channels in more than 80 markets.

"Working with WarpRadio.com, we'll build genre-specific, branded Web sites for radio stations," said Gregory J. Liptak, AMN CEO.

"Why should City Search or the local newspaper be the only people with a local information site on the Web? Why can't a radio station do that? We've done this already for cable, and now seek to build rich, locally targeted content for radio stations."

According to Liptak, a key ingredient is bringing local merchants online. This opens a new revenue stream. How do they make money for the free service? Their take is a split of the local advertising fees.

Air Force Flies With BroadcastAmerica

BroadcastAmerica.com announced on Feb. 17 that it had received approval from the Department of the Air Force to broadcast its Air Force News Service programming.

The content will be streamed live, and will be placed on a new channel located at *BroadcastAirForce.com*

An archive of this material will also be available at the site. The two-year agreement puts the Air Force programming on the Internet at no charge to the government.

"We know from our database that we

have a large military audience and we wanted to find a way to provide them more relevant and more interesting programming," said John Brier, president of BroadcastAmerica.com

"An arrangement with Air Force News Service seemed like a logical choice. We're just providing visitors to our site a new and more convenient way to access their favorite AFNS shows."

According to the Air Force, AFNS already reaches an audience of 21 million weekly worldwide — both on Air Force

bases and on selected cable stations nationwide.

Adding BroadcastAirForce.com will make the programming available to millions more.

"We're excited that a larger group of people will now have access to see and listen to our programming, both internally and externally," said B. Kim McDonald, director of Air Force News Service. "Our customers win because they get to see and hear the Air Force story in new dynamic, content-rich ways at no cost to the government."

NetRadio Hops Over to iBeam

NetRadio.com announced a streaming media distribution agreement with iBeam Broadcasting Corp. on Feb. 23. iBeam's distribution model utilizes a hybrid satellite and fiber network to stream media to the edges of the Internet.



Ed Tomechko

For NetRadio.com, that means their listeners will access Webcasts with less congestion and delays.

"We are continuing to take advantage of the best technology available to distribute our audio content to our listeners," said Ed Tomechko, CEO of NetRadio.com. Tomechko said the addition of iBeam's broadcast distribution capabilities to their platform will deliver high-fidelity sound to NetRadio's customers.

Rick Hailey, NetRadio's chief technology officer, sees a vast improvement in moving from a centralized distribution scheme to iBeam.

"Most Internet providers use a 'hot potato' routing method — if the signal is not destined for a user on their network, they pass it off at the very first place — and that

isn't necessarily to the end-user's provider.

"We started with a centralized strategy using six T3 lines and four co-location centers from New York to San Jose. What we found in our tracing routes was that the average signal 'hopped' 17 times getting to the end user.



"Now, 'hops' have been reduced 50 percent. Before, when you logged into NetRadio, you had a 60-65 percent chance of acquiring that signal at the first try without getting a buffering problem. Now, we're at over 85 percent. This is definitely the way to go."

Offshore Rebroadcasts Stir Reaction

It's legal in Canada — that's what iCraveTV said about its unauthorized rebroadcasts of content from U.S. television stations. Making this material available worldwide on the Web triggered an outcry from a loose association of broadcasters, movie giants and professional sports interests.

As legal action against iCraveTV gathered momentum, the company ceased its rebroadcast efforts. But the questions raised linger.

In February, Congressman Billy Tauzin (R-La.), chairman of the subcommittee on Telecommunications, Trade and Consumer Protection, convened a hearing to sift through the issues.

Though the focus of the hearing was the iCrave television rebroadcast, the

legal issues are likely to affect the entire Webcasting industry.

Ken Johnson, Tauzin's communications director, said it's too early to tell how it's going to play out.

"Webcasting is inevitable, and the big question is, are we going to put restrictions on it, or let Wild West mentality to take over.

"There was a consensus at the hearing among Webcasters, the entertainment industry and political leaders that we need to take a wait-and-see attitude."

Johnson said that while this specific case is resolved, it points to a need for industry and legislative foresight.

"Fortunately, in the iCraveTV case, the courts intervened quickly to protect America's intellectual property. But it's a problem that's going to resurface time and time again. Congressional leaders including Congressman Tauzin want to take time to develop a sound policy for Webcasting.

"The starting point is developing voluntary cooperation between the various industries — Webcasters, Hollywood, broadcasters and the professional sporting leagues. Then, we have to expand the net as far as to include international treaties," said Johnson.

The problem for legislators, Johnson said, is keeping pace with the new media.

"Technology is evolving so rapidly that it is outpacing the federal government's ability to not only regulate it, but to develop sound policy. It's been just a few years since the Telecommunications Act — a revolution over the laws that had been on the books since horse-and-buggy days. But the Internet is only mentioned casually in it. Today, in a way, the Internet is driving the American economy."



John Brier

Sonic Foundry New Partners

Sonic Foundry is set to become a full-blown Internet media company through its acquisition of STV Communications Inc., a streaming media service provider. Incorporating STV's capabilities will add production, encoding, Webcasting and hosting services to Sonic Foundry's line of audio production software.

The companies announced in late February that they had entered into a letter of intent for Sonic Foundry to acquire STV in a stock-for-stock transaction valued at \$66 million. This preceded the March 9 announcement that Time Warner will take part in a new \$18.5 million round of private financing for Sonic Foundry.



Rimas Buinevicius

Time Warner will take an undisclosed stake in Sonic Foundry in exchange for space and time on two of the media giant's Web operations, Warner Bros. Online and Entertaindom.com.

Sonic Foundry had recently formed a Media Services Division to provide turnkey media services.

STV's 80 employees will join forces and be marketed as part of this new division. The acquisition will bring the headcount of the company to more than 300.

Rimas Buinevicius, chairman and CEO of Sonic Foundry Inc., thinks that the merger is a good fit.

"The combined entity will create a single-source bridge to all content owners who desire delivery of media over the Internet."

STATION/STUDIO SERVICES

LA PALMA BROADCASTING

- Consulting services at affordable prices for small markets. Barter is available.
- Quality Adult Contemporary programming with all AC formats available.
- Song-by-song music logs.
- Image production & sweepers.
- Complete format packages.
- Background checks on prospective employees.

714/778-6382 lapalma@pacbell.net

765 HIT SONGS OF THE '80S-\$499!

1229 hit songs from 1954-1969
 545 hit songs from the '70s
 817 Kickin' Country Hits on CD for Only \$699 each
(per set plus shipping)
 For complete tracklistings **NOW** go to web site: radio-mall.com or Email: mediamall@aol.com or Phone or FAX Ghostwriters at 1-763-522-6256
For radio broadcast only!

URBAN NEWS PROGRAMMING



- AM & PM drive reports
- Targeted latest news
- ISDN delivered
- Customized for your station
- Bartered and market exclusive!

954.735.4070

630 Sound Effects-\$99
120 Production Effects-\$99
Buy-Out Production Music starting at \$39 a disc!

Over 65 products to choose from. Call 763-522-6256 or get full details and hear on-line demos at our web site:

<http://radio-mall.com>

ATTENTION PROVIDERS!

Promote your services to **Radio World's** 15,000+ readers. Reach Radio Station and Recording Studio owners/managers and engineers with your message. For information on affordable advertising call **Simone** at **1-800-336-3045, extension 154.**

The Sound Of Broadcast Professionals Worldwide

Shure microphones and circuitry products are used extensively throughout the world by broadcasters who demand nothing but the best.

Robust mixers designed for the rough and tumbled world of life on the road.

Microphones that cater to all kinds of voices in all kinds of settings. When thousands of listeners and (your career) are on the line, settle for nothing less than.....Shure.



SM7A



SM2

SHURE

FP22



M367



FP33



FP42



FP410

SM58



KSM32



SM57



VP64A



SM63LLC



**To Order Call BSW 1-800-426-8434
or Visit www.bswusa.com**

BSW is open from 6:00 AM to 6:00 PM Pacific Time.
You can also fax us anytime using our toll-free number
(800-231-7055) or better yet email us at info@bswusa.com.

* Call or see www.bswusa.com for details.

NEW

Call or Visit Online for Your Free
176-page BSW 2000 Catalog

Studio Sessions

Product Guide



See Page 60

Radio World

Resource for Radio Production and Recording

April 12, 2000

PRODUCER PROFILE

KVIL's Robbins Corrals the Spots

Ken R.

If Texas is a football state, then Dallas is the 50-yard line. The Dallas Cowboys are serious business and the team's broadcasts command a big part of the resources at CBS-owned KVIL-FM.

That's why, between July and January, the production department cranks out as many as 25 spots a day.

Chris Robbins is the production director for KVIL-FM. Robbins came to Dallas after bouncing around Oklahoma City, Corpus Christi, Texas, and Nashville, Tenn., as a jock.

In 1993, he sent an aircheck to Bill Curtis, then as now the program director at KVIL-FM, and Robbins went on the air part-time.

He moved up from weekends to overnights. When the production director's job opened up in 1994, he got it.

Curtis said, "Chris has been here seven years and he's truly one of the workhorses at the station. He's very talented, very committed and certainly not afraid of hard work."

Chris Robbins made the transition from air talent to behind-the-scenes work without losing his energy, according to Curtis.

"A production director is an unsung hero. There's no spotlight shining on him, he's not on a billboard and the jingles don't sing his name," said Curtis.

"But Chris doesn't need that. We have a big load here and I don't mind telling you his job is harder than many because we have such high standards and we're very glad he's here."

The sales staff writes most of the commercials heard on KVIL-FM.

"If the copy is good, we cut it as is. Otherwise, we do a slight rewrite as necessary," said Robbins.

The station has a checklist for salespeo-

ple to complete when they turn in their ideas for those all-important spec spots.

"That way we don't goof up the basics like the client's address. We all wear a lot of hats here. We've gone out on a lot of sales calls so our batting average on spec spots is pretty good," Robbins said.



Chris Robbins poses in the production room.

"Most of our larger advertisers and Cowboys clients use advertising agencies. We usually work directly with the rest," said Robbins. "Small retailers find agencies can often be very expensive and won't understand their needs."

No phone numbers

KVIL also tries to keep its smaller clients from using telephone numbers and other complicating information in their radio spots.

"I've never heard a commercial where I wanted to write down the phone number," said Robbins.

Chris Robbins is excited about the new digital technology.

"We just installed ProTools 24 and we love it," he said of the editing package from Digidesign.

"Look out, because when I learn how to work this stuff I'm going to be dangerous," Robbins said.

KVIL-FM recently made the transition from a Roland DM80 workstation. "It was better than analog, but now that we have the budget, this is much better," said Robbins.

KVIL-FM has two ProTools systems — one in the production room and one in an adjacent dubbing facility separated by a cubicle wall. There are four studios in all, including one for sports and one for station voice John King to record his promos. The dubbing area also has a table and multiple mics for talk programs.

"There's actually no production control board as such," said Robbins. "We have a digital router designed by our engineer Don Stevenson. The mics at the station are Electro-Voice RE27s and the effects are generated within the workstation. We use flanger, reverb and phase. We just pull up what we need."

When the station engineer does not want the staff tweaking a particular piece of equipment, the key controls are covered

See KVIL, page 59 ▶

PRODUCT EVALUATION

Audix CX-211 Condenser Mic for Radio

Ty Ford

The latest offering from Audix is the CX-211 front-address FET condenser mic, which lists for \$599. The mic has a 12 dB per octave 150 Hz rolloff, 10 dB pad and transformer output.

It comes in a small but sturdy lunchbox road case and includes a light-duty foam pop filter. Other options include the larger WS101 windscreens for \$16.50.

Small mixer owners take note — the CX-211 requires 48 to 52 VDC phantom supply for best results. Audix offers the APS-2, a two-channel 48 to 52 VDC phantom-power supply, for \$119 retail.

Radio marketable

Audix Marketing Vice President Cliff Castle said, "From the results on our CX-111 side-address 1-inch condenser microphone, it was obvious that a front-address mic based on the CX-111 would be marketable to the radio market and for voice-over work."

"When you have a front-address capsule, the physical characteristics have to change a bit and that changes the sound. So, the CX-111 and CX-211 don't sound alike. The CX-211 also has some applications for the live-sound market for live-stage vocals."

See AUDIX, page 61 ▶

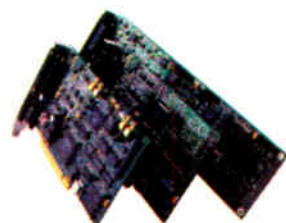


ANTEX
digital
AUDIO

betterwebcasting.com

Streaming or broadcast, Antex has you covered.

The LX series of sound cards are ideal for web audio, with 20-bit digital sound quality, highly stable Windows 95/98/NT/2K software, and up to 4 inputs and 4 outputs. To find out more, visit antex.com (or betterwebcasting.com) today or call 1-800-338-4231.



PRODUCT EVALUATION

Plextor Creates a Burning Desire

Read G. Burgan

I wrote an article for *RW* (May 26, 1999), reviewing the Plexwriter 8/20 CD recorder. I indicated the only thing that burner lacked was the ability to record on CD-RW discs.

Now Plextor has a new CD recorder that includes the ability to use CD-RW discs — the Plexwriter 8/2/20. I am currently using two 8/2/20 Plexwriters.

The 8/2/20 is essentially the same as the old 8/20 model. It writes CD-R discs at 8x, CD-RW discs at 2x and can read at 20x. Like the 8/20, it has a 4 MB buffer and uses a SCSI interface.

The 8/2/20 includes one CD-R disc and one CD-RW disc. It also includes a new Plextor utility, with the Adaptec Easy CD Creator and Direct CD software that I discussed in the previous article.

Check for upgrades

Usually when I install a Plextor product, it performs flawlessly from the beginning, but not this time. As with the previous unit, I teamed the 8/2/20 with an UltraPlex Wide CD-ROM player. Both make an effective CD duplicating set.

When I went to duplicate the first CD using the Plextor MP 2000 DiscDupe utility, the record session failed, ruining a blank CD. Looking for answers, I went to the Plextor Web site.

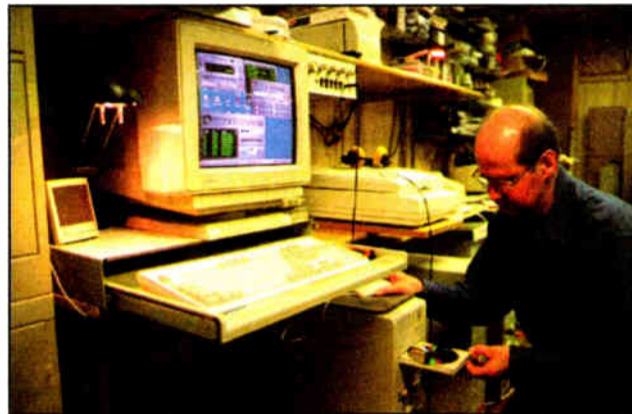
There were several firmware upgrades for both the 8/2/20 and the UltraPlex Wide, and a software upgrade for MP 2000. One of the firmware upgrades addressed the problem of duplicating CDs with more than 15 tracks, which is what I had been attempting.

After downloading and installing the firmware upgrades for the two CD units and the software upgrade for MP

2000, I set out to duplicate my CD again. This time, it performed flawlessly.

The moral is the same when installing any kind of computer component: Check with the manufacturer for firmware upgrades or new drivers. It can save a lot of hassles.

Further tests of recording and dupli-



The author inserts a disk into the Plexwriter.

cating both audio and data on the 8/2/20 went without incident. In all cases, the 8/2/20 recorded at the maximum 8x speed and the results were fine.

I also tested its ability to record on CD-RW media. Again, it performed without any problems. I recorded both data and audio CDs and successfully erased and re-recorded on the same disc without a hitch.

Third-party software

A warning for using third-party software for creating CDs: Be sure it supports the drive you want to purchase. I assumed that, because CD Architect from Sonic Foundry supported the 8/20, it would also support the 8/2/20, at least in the 8x mode. In this case, I assumed wrong.

Fortunately, an e-mail to Keith Bieneman, marketing product manager

at Sonic Foundry, elicited the good news that SF would soon have an upgrade supporting the 8/2/20. Within a few days, I had the beta version and all was well again.

In my last Plextor review, I noted that the Adaptec CD Copier Deluxe software, included as a part of Easy CD Creator package, would not allow duplicating a CD at faster than 4x without first creating an image of the CD on a hard drive.

New version

The new version included with the 8/2/20 permits duplicating a CD at 8x without this bother. However, it also adds a two-second pause between tracks, whether you want it or not.

Plextor includes its own set of utilities called Plextor Manager 2000. While based on the earlier Plextor 96 Manager, the new version is a considerable improvement and contains several new and useful features.

Plextor now supports drives made by other companies as read-only.



the two-second pause was by using the disc-at-once mode.

Even there, I found CDs burned without pauses between the tracks often had the starting point of each track shifted slightly from the original.

The CD-to-CD mode in PM 2000 uses the session-at-once mode for duplication that creates bit-for-bit identical duplicates. In copying CDs without pauses between tracks, I find that this new utility keeps the starting point of each track exactly as the original — a great improvement.

Copying

The CD-to-Image mode copies the CD to the hard drive and the Image-to-CD copies that image to the new CD. Under "options," use-temp-image is similar, except it copies the CD to hard drive and burns the CD in one operation. If the system is without a separate CD-ROM, it enables copying a CD with just the Plexwriter.



However, the drives must be MMC compliant and also must support the "Read CD-DA is accurate" feature.

If you choose to install PM 2000, it will load as an icon at the bottom of the Windows task bar. Double clicking on the icon gives a choice of three menus: MVP 2000, DiscDupe 2000 or Audio Capture 2000.

Although the DiscDupe CD copying utility is in both PM 96 and PM 2000, there are differences in the user interface and how the utilities work.

Under PM 96, there are four choices: normal, for writing on-the-fly; safe, which reads to the hard drive and then writes to CD media; test mode, which emulates writing; and disc-at-once, for single sessions only.

PM 2000 has two categories of selections: select operation and options. Under the first category there are three choices: CD-to-CD, CD-to-Image or Image-to-CD.

PM 96 "Write On-the-Fly" mode automatically inserts two-second pauses between each track. If duplicating a CD that already has two-second pauses between the tracks, the copy has four-seconds between tracks.

The only way to get a copy without

Verify Disc compares the copy with the original. Currently, it only works with data discs. The emulate/test mode allows for testing the record process without actually burning a disc.

Audio Capture 2000 extracts audio tracks directly from a CD to the hard drive. Each track is displayed on-screen and the user can select which track to be extracted.

The sound quality of the final file can be specified from 44.1/16 down to 11/8 resolution. In addition, Windows Media Audio formats of 128 and 64 kbit can be selected.

According to Plextor, enabling 100-percent error correction slows down the extraction speed, but I did not notice a difference between 0 and 100 percent.

In most extraction modes, the extraction rate was between 18 and 22x speed. However, extracting to Windows Media Audio at 128 kbits resulted in a maximum transfer rate of 5x.

When playing a disk with both Audio Capture and MVP 2000 and if the computer is linked to the Net, the program automatically goes to the CDDB Web site, a database of audio CD information. The program down-

See PLEXTOR, page 55 ▶

GET YOUR SOUND TOGETHER: STEREO MAXX PROCESSING FOR THE NEW RADIO



Problem: How to consolidate existing studios or equip your new ones yet still keep the power of each station's unique signature sound.

Solution: STEREO MAXX from Modulation Sciences, the Processing Authority

Radio consolidation calls for rapid-fire decisions for all studio needs. StereoMaxx enlarges stereo separation, giving each station a powerhouse of dial presence. It maximizes your competitive sound whether your format is dance, rock, oldies or anything in between.

STEROMAXX features Modulation Sciences' quality design, meticulous engineering and processing made to meet the challenges of the real world of radio. It's simple to set-up and easy to operate. And you needn't worry that it's a budget breaker when your group is set for multiple buys.

STEROMAXX means one more tool for success and one less headache in a frantic industry where things change overnight.

Call now for information about StereoMaxx, or any of our rock-solid radio line.

12A World's Fair Drive Somerset, New Jersey 08873

Voice (732) 302-3090 Fax (732) 302-0206 Toll-Free (800) 826-2603



► PLEXTOR, continued from page 54 loads the album name, artist and song titles. The information is stored locally on the computer and is displayed every time the disk is played.

Also, extracted or encoded files will include this info. For example, WMA files use the information as the file name and save the artist, song and album names inside the WMA file.

When playing the same WMA file in a player that supports this feature, the name of the song, artist and album appears.

MVP 2000

The third part of the MP 2000 is the MVP 2000, which stands for Music Video Producer 2000. Depending on how you look at it, it is two or three

the tracks appear as WAV files, they can be dragged and dropped to the hard drive as WAV files.

The files can be opened from a CD into a digital audio editing program as WAV files without using separate ripper software. This is a real time-saver that I like.

Once again, Plextor has created an exceptionally versatile CD recorder. The 8/2/20 is a fast, well-built, easy-to-use CD recorder with lots of useful features and utilities.

There are four versions of this product available: as an internal mounted drive for \$399 list, as an internal mounted drive with controller card for \$449 list, as an external standalone unit with software for \$469 list and with a controller card added to the external drive and software which sells for \$529 list.



Read Burgan is a free-lance writer and a former public radio station manager. Reach him via e-mail to rgb@bresnanlink.net

Product Capsule:
Plextor Plexwriter 8/2/20 CD Burner

Thumbs Up

- ✓ Records 8x CD-R Discs
- ✓ Records 2x CD-RW Discs
- ✓ Plays at 20x
- ✓ Includes great utilities for duplicating, ripping and extracting

Thumbs Down

- ✓ Ripper program does not support RA files
- ✓ Cannot burn RA files to CD

For more information, call Plextor in California at (408) 980-1838 or visit the Web site at www.plextor.com

utilities in one.

In the basic mode, the MVP 2000 is an audio/video CD player. The user interface includes a typical transport panel with on-screen buttons for Record, Play, Pause, Stop, Track/Item Back or Forward, Skip Back or Forward and Eject. I do not have any video CDs, but the audio CDs played fine.

Virtual switch

There is a virtual switch on the screen that toggles between playing a CD/DA disc to playing digital audio/video from a playlist of individual files.

What is interesting is that MVP 2000 lets you build a playlist from MPEG-3, Windows Media Audio, WAV files and CD audio tracks that can consist of any combination files. The software acts like a jukebox that can be saved and played directly from the computer. I created a file intermingling all of these formats, and MVP 2000 played it flawlessly, but there is still more.

With the exception of Windows Media Audio, the software automatically rips the files to the proper format and burns them to a CD. Again, I created a file with all three of these file types, and MVP 2000 flawlessly created a CD for me.

All that is missing is the ability to rip RealAudio files and use those files for burning a CD.

Audio FS

MP 2000 has one other feature that deserves mentioning. When installing MVP 2000, it applies a utility called "Audio FS" to the Plextor drives.

It causes any CD/DA format discs to appear as WAV files on the Windows 95 and 98 Explorer. Because

everybody wants to look good!

AudioSonix makes it easy!

Internet Based Audio Delivery

AudioSonix is the easiest, fastest and most affordable way to send audio or video across town or around the world.

Using AudioSonix, you can send broadcast quality audio or video to one station or to one thousand stations with the click of a mouse. Visit us at the NAB, booth number MI722 in the Multimedia and Internet building at the Sands.

Download our FREE software at <http://www.audiosonix.com>



AudioSonix • 3625 Queen Mary Drive • Olney, Maryland 20832 • 802-476-0625 • Fax 520-752-4184

See Us At NAB Booth # MI722

Products & Services Showcase

DIGITAL ANTENNA MONITORS

Come see us
at NAB Booth
#R3388

In-Stock-Available for
Immediate Delivery



Price US\$2700.00 2 Towers
Will operate with any remote control equipment.



Price US\$2100.00 2 Towers
For AM directionals with studio located at transmitter site.

These monitors are state-of-the-art instruments of unequalled accuracy (.5% or better on ratio and .5° or better on phase) and stability. With typical modulation the true ratio readout of these monitors is a factor of 10 more stable than instruments that measure normalized amplitude, and their phase readouts are rock solid. Phase sign is automatic, no extra operation. In addition to the analog DC outputs for remote control the Model CMR has a multiplexed BCD digital output which can be used to drive the Remote Indicator Model CMR-1. RF inputs have dual protection. Gas discharge tubes across the sample line terminations plus relay protection.

GORMAN REDLICH MFG. CO.
257 W. Union St. Athens, Ohio 45701
Phone 740-593-3150 • FAX 740-592-3898
www.gorman-redlich.com/jimg@gorman-redlich.com

CABLE X-PERTS, INC



HELIAX® LDF series coaxial cable from



- Premium electrical performance
- Excellent RF shielding.
- 50 Ohm Impedance.
- Low Loss Foam Dielectric.
- Easy to install connectors.
- Cable cut to your specific length.
- Complete product line stocked.
- Related products too.



800-828-3340 * Fax 847-520-3444

<http://www.cablexperts.com>

416 Diens Drive Wheeling, IL 60090



Composite Distribution Solutions for Every FM and TV Application ...



Use The CDS-200 for switching two composite feeds to up to three different exciter.



Use the CDS-200A when you need only to distribute a composite stereo, SCA, SAP or RBDS signal.

Broadcast Devices, Inc.

5 Crestview Avenue
Cortlandt Manor, NY 10567

Tel. (914) 737-5032 Fax. (914) 736-6916

Website: www.Broadcast-Devices.com



Econco REBUILT POWER TUBES



Approximately One Half
the Cost of New

3,000 Hour Unconditional Guarantee

Call for Our Price List

Econco 1318 Commerce Ave. Woodland, CA 95695
Phone: 530-662-7553 Fax: 530-666-7760 Telex: 176756
Toll Free: 800-532-6626 From Canada: 800-848-8841

SIX MILLION
THUNDERSTORMS HIT
PLANET EARTH EVERY YEAR!
IT TAKES ONLY ONE TO
PUT YOU OFF THE AIR!



The STATI-CAT LIGHTNING PREVENTION SYSTEM provides a continuous, low-resistance discharge path for the static electric charge on tall structures. Dissipation points are 1/8" stainless steel rods.

This affordable and rugged system has proven itself in the field for over 15 years.

Cortana
Corporation Inc.

Write or call for a free brochure and design
P.O. Box 2548, Farmington, N.M. 87499-2548
Toll Free Ph: 888-325-5336 • Fax: 505-326-2337

OUTSTANDING Outstanding specifications and pricing on professional quality receivers for EAS, monitoring and "translator" service.

The AFC3 is a three receiver rack mount that is configured to your EAS or monitoring specific application. Each receiver has internal frequency selection (PLL) switches, front panel controls and indicators, and rear panel connections.



Price: Approximately \$1000 (depending on receiver choice)

Select three receivers from our FM or FM/SCA, NOAA Weather, Public Service and/or AM Monitor/Receivers. All receivers are PLL (synthesized) designs using the latest state of the art components and are available as stand alone receivers as well as in AFC3 combinations.

Quality Receivers Designed and Manufactured in the USA since 1980

DAYTON INDUSTRIAL CORPORATION

2237 Industrial Blvd., Sarasota, FL 34234 Tel. (941) 351-4454
Email: SCARadio@aol.com WebSite: www.DaytonIndustrial.com

Would you believe that you can visit a dozen markets in an hour without leaving your desk?



If you have the TeleRadio from CircuitWerkes at your stations, you can listen to every radio station in each of your markets.

Old-fashioned air-checks are okay, but they have some real drawbacks. Among them are:

1. You have no control over what is recorded on an air-check. You may be hearing only what someone else wants you to hear.
2. Your own air staffs usually know when they're being recorded and react accordingly.
3. By the time you get an air-check in the mail, it may be too late to respond to the competition.

The TeleRadio beats those problems by letting you listen to both your station and the competition in real-time. If you have a TeleRadio, you simply dial it up from any phone. As soon as it answers, the internal radio begins playing down the phone line to you. You can control the radio by using the buttons on your phone. It's just like being there!

The TeleRadio even has a DTMF selectable external audio connection so it can be used as a standard telephone coupler too. An optional call progress decoder is available for using the TeleRadio on PBX analog lines and in areas that don't support CPC.

CircuitWerkes - 3716 SW 3rd Place, Gainesville, FL 32607
(352) 335-6555 / fax 380-0230 - www.circuitwerkes.com

Switcher tools

Designed by broadcast engineers for broadcasters, our audio and digital audio switchers offer excellent sonic quality, removable I/O connections, contact closures and serial remote control capabilities and flexible mounting accessories.



SS 12-4

Active crosspoint switching/routing with 12 stereo inputs and 4 stereo outputs.



10X1

Passive switching/routing with 10 stereo inputs and one stereo output or vice-versa.



SS 8.2

Active crosspoint switching with 8 stereo inputs, 2 stereo plus 2 mono outputs.



8x1 DAS

Routes any one of eight AES/EBU digital inputs to split outputs.



8X2D

Active crosspoint switcher with 8 stereo inputs, 2 stereo and 2 mono outputs



6X1G

Passive switching/routing with 6 stereo inputs and one stereo output, or vice-versa.



3X2B

Active crosspoint switcher with 3 stereo inputs and 2 stereo outputs.



SS 3.1

Passive switching/routing with 3 stereo inputs and one stereo output or vice-versa.



SS 2.1/BNC

Passive switching/routing with 2 composite audio, video, or AES/EBU inputs to 2 composite audio, video, or AES/EBU outputs, or vice-versa.



SS 2.1/TERM

Passive switching/routing with two stereo inputs to one stereo output or vice-versa.

Check out our web site for
product information, list pricing
and a list of distributors!

Internet: www.broadcasttools.com E-mail: bt@broadcasttools.com

Voice: 360 . 428 . 6099
Fax: 360 . 428 . 6719

BROADCAST
t o o l s . **inc.**

NEWS MAKER

Radio College in Session Online

Carl Lindemann

Looking to learn the ropes of being an independent radio producer? You can spend time and tuition for a trade school. Or the Radio College Web site at www.radiocollege.org might be the thing you've been looking for.

The online resource has information and training help to support and encourage independent producers for public radio. Most postings on the site are "how-to" articles and opportunities to interact with established professionals.

Information ranges from choosing equipment to fundraising. The focus is on producing journalistic pieces, but radio theater also is represented.

The site was launched in January 1999. It is a collaborative effort between independent producer Robin White and Western Public Radio based in San Francisco. Recently, the National Endowment for the Arts awarded a \$10,000 grant to expand Radio College.

Robin White started as a volunteer at a public radio station. After a career in the visual arts, he pursued free-lance work in public radio as a way to express creativity, reach a wide audience and make a decent living. **RW** asked him about his career choice and how his experience shapes Radio College.

RW: How did you make your way from visual artist to public radio producer?

White: For years I worked in mixed media — photography, painting and photocopy art. I was doing pretty well, getting pieces in museum shows, but it just didn't seem like it was going to be a viable way to make a living.

I found that public radio was a more viable way, and actually, I think it's very viable. There are people out there who are making very decent money doing this. But you have to know how to do it, and I don't think people often share that information. That's where Radio College comes in. It's a way to share that information.

Producers and programs

RW: Like in any other free-lance business, you establish relationships with producers and programs. Most people in that position zealously guard those contacts and how they got them.

White: I don't give away my contacts, but I do really believe in giving away the know-how. I feel that the more people we have in the business, the better. With more successful free-lancers, we become more viable as a group.

There are an endless numbers of stories out there that need to be reported, and a lot of hungry shows looking for stories.

RW: So far, the site is primarily text-based. What are your plans for exploring the Web's multimedia potential?

White: It's a measure of success that we've got funding from the NEA. There will be other funding to follow.

We have a lot of different things we're planning to do with it — online classes, more interactive areas, particularly online business skills and online production skills.

We have an extensive three-year plan. We're going to be adding audio, upgrading the software for the message board area, doing marketing and outreach.

Part of the problem that we're finding

is it's not easy to reach newcomers. If you want to get into radio, where do you go?

We need to be doing much better mar-

sage board area.

We have people from the Corp. for Public Broadcasting coming in to talk about applying for grants with them and people with new shows coming on to pitch their shows to free-lancers.

We also have people who extend the reach of their work beyond radio — people producing things for cassette and for school curricula. Each week will be a different theme or institution.

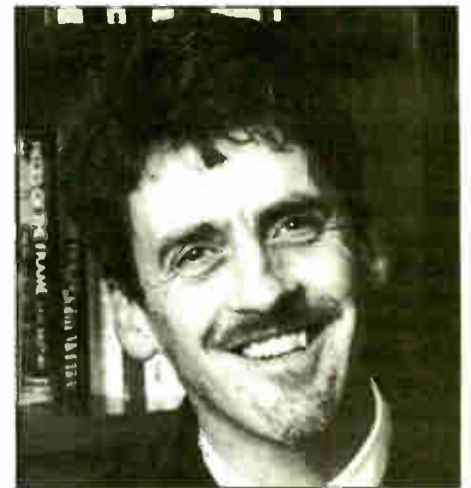
We're also going to launch our first online business skills class. Karolyn van Putten (president of Western Public Radio) is hosting a series of guest teachers.

RW: Will you offer a structured curriculum and charge for attendance?

White: Perhaps. Figuring out how to fund the site in the long run is something that we're still scratching our heads about.

There are lots of different ways to go, and at the moment we are beyond step one. But, we do need more foundation money in the next couple of years.

That money will allow us some time to



Robin White

think about sponsorships and think about ways to get people to pay for what they're getting. We're offering valuable information, and I think there's a lot of goodwill toward us.

RW: Thus far, Radio College is your brainchild — but it is just a sideline. Do you see yourself leaving free-lancing to pursue this full time?

White: No. As we get funding, we will hire someone to do the administrative work and training work. I'm going to stick with producing, because I love producing and want to do more of it.

More information is available at www.radiocollege.org

R A D I O



C O L L E G E

keting and outreach to stations in the public system — that's where these people show up. That's where volunteers are and that's where we need to be. When people get directed to us, they develop skills beyond volunteering at the local station.

RW: Who comes to the Radio College Web site? What's a typical profile?

White: They're very diverse. They are from all kinds of different backgrounds. About 9 percent are from outside of the United States, too. Usually, they are people in some kind of transition — going from working at a station toward working as a free-lancer. Or, they're just starting out in some radio theater company.

RW: Do you see any listeners who want to get into the act?

White: A couple of times. If somebody comes up with an idea they have for a show — "I'm interested in pursuing it and I don't know anything about radio" — it's a long process. If they stick around Radio College and ask for it, they get a lot of help.

RW: For most, NPR is synonymous with "public radio." Is that a good place for independents to get established?

White: The typical first-time producer is drooling to get their work on NPR. I think that's probably not a great place to start.

It has prestige but you might even get paid better at other shows and may even have a better experience. NPR is such a big shop — you're more likely to have a more individualized experience if you go to (PRI's) "Marketplace."

RW: How does your collaboration with Western Radio work?

White: At this point, I've provided all of the content. This is through my connections — material that I've written and material that I've gone out and found. Western Radio has put up the money.

As we go into the second year, it's a closer collaboration than it has been. With the new funding, we have various projects coming up.

The Radio College Speaker Series invites people from various parts of the industry to come online for a week. Whoever is the speaker of the week will post some kind of statement and then be available to answer questions in the mes-

Broadcast is a Contact Sport

Combining the great features of our original RemoteMix 3, with a third mic input, a third headphone output, and a host of other new goodies, our new RemoteMix Sport Hybrid Mixer is your best choice for professional sports broadcasting. Its compact design and combination phone line/universal handset connection provide unparalleled freedom and ease of use. Simply plug it into any analog line or a digital PBX or ISDN phone and begin the play-by-play.

the NEW RemoteMix Sport

make contact with the RemoteMix Sport

JK Audio

REMOTE BROADCAST GEAR

Toll Free (USA & Canada): 800-552-8346 • NAB Booth R3659
Tel: 815-786-2929 • Fax: 815-786-8502 • www.jkaudio.com

PRODUCT EVALUATION

Preamps Silence the Competition

Carl Lindemann

Mackie has been continually improving its portable mixing boards, despite their popularity in broadcast and other pro applications.

This is from using bifilar-wound DC pulse transformers with high-permeability cores. Also, this cut comes from direct-coupling the circuit from input to output and using pole-zero cancellation constant current biasing.

but it was there.

After a lot of tinkering, I found the source of the interference — the power supply of the PC. The mic preamps brought that into the mix. Again, it was imperceptible, but it was annoying to see the meters responding in a quiet, sound-proofed studio.

Big brother vs. little brother

Testing the upgraded 1402 board against my older 1202 VLZ was not scientific. First, I turned up all the pots on the mic preamps with nothing connected.



The Mackie 1402 VLZ

The latest upgrade to the 1402 VLZ is a redesign of the preamp, which Mackie calls XDR for eXtended Dynamic Range. I wanted to test this upgrade against my older 1202 VLZ that lacks the XDR preamps.

Mackie believes these "premium" preamps meet the need of users using high-resolution sampling. They are noticeably quieter than the equipment they replace.

The result is a 0.0007-percent THD with over 130 dB dynamic range and a +22 dBu line handling capability.

Familiar board

Many radio users are familiar with the 1202, the 1402 and/or the 1604. I have used a 1202 VLZ since 1997.

As with many computer-based producers, I do not use the board for mixing. I leave all of the levels flat. The board



Mackie 1202 VLZ

The volume LED on my 1202 VLZ climbed up four notches to -7 dB, a fair amount of hiss. The 1402 VLZ Pro showed *half* that at -20 dB. The Pro was not dead quiet with the volume maxed, but it was quieter.

In fact, this comparison may be misleading. According to Mackie, the XDR preamps have a higher output — 10 dB hotter. So it was quieter even though putting out greater gain.

Snap, crackle, pop

Another test was listening to how much pop the boards picked up from turning on the computer. Again, the VLZ Pro did not remove it completely, but it was a greater difference than I would have guessed.

Patching the VLZ Pro into my setup removed the low levels of noise that always annoyed me. Using a low-output mic line, the EV RE20 was not a problem

even though levels on the board had to be pushed past the midlevels marks. The signal stayed crisp and clean.

Are these changes significant enough to trade in your old Mackie board for the new preamps? For those looking for a quiet, portable mixer, Mackie is raising the standards.

Given that a significant number of radio producers work near towers and transmitters, and their boards suffer from a barrage of RFI in the studio, the VLZ Pro is a welcome improvement. Even for those away from 50 kW sticks, the rising flood of RFI from electronics is a major issue.

The XDR preamps can clean things up and the \$629 retail price of the new 1402 VLZ Pro boards make it an irresistible combination.

■■■

Carl Lindemann is a frequent contributor to RW.



The Rear of the Mackie 1402 VLZ

Much of the improvement is in filtering out radio frequency interference (RFI). Radio producers working in RF-noisy environments will benefit.

The company literature says the accomplishment in the XDR preamp is cutting the RFI without ruining the high-frequency response.

serves as a conduit for the audio going in and out of the soundcard.

The control in the editing software does the actual mixing, effects and EQ. In this setup, the chief virtue of the board is transparency. Noise always showed up on the software's meters using the 1202 VLZ. It was not audible,

For all your audio & audio-for-video needs:

BROADCAST

www.BRADLEYBROADCAST.com

PRO AUDIO

800-732-7665

Local Phone: 301-682-8700 • Fax: 301-682-8377 • Address: 7313-G Grove Road, Frederick, MD 21704

See Us At NAB Booth # R2657
World Radio History

Big D's Tale of Cowboys and Copy

► KVIL, continued from page 53 with a plate for safety.

"I have an assistant named Mike Logan who voices some spots, I voice some spots and we run the board for our announcers who come in to cut commercials too. The other guys never touch anything except their scripts and headphones," Robbins said.

The digital workstation serves as a master converter for various commercial formats that come to the station.

"We get a lot of stuff on cassette and sometimes even on cart," Robbins said. The station also receives spots digitally via DGS that is wired directly into ProTools.

After production is completed, finished work is transferred to one of two

Broadcast Electronics AudioVault systems for broadcast. The material in the workstation is backed up to DAT once a month.

The secret production weapon at KVIL-FM might be 30-year morning man and Dallas legend Ron Chapman.

"I've worked with guys at other stations who are mean to the account executives. Then, they wonder why they don't get along well.

"If you treat people the way you want to be treated, it makes your station a better place to work," said Robbins. "No one can always be perky, but it really helps if you keep your ugly side to yourself. Bill Curtis and I really agree on this one."



KVIL Program Director Bill Curtis

"If I ever read a spot in a big hurry, Ron catches it instantly. He'll tell me to recut the spot, put more effort into it and try to sell the product, rather than just reading the words," Robbins said.

"Pleasing the advertisers is of huge importance to KVIL-FM. There is big-time quality control around here."

Chris Robbins has a philosophy, which makes his stay at KVIL-FM more pleasant.

"KVIL-FM now has 20 sales people and there are others who sell the Dallas Cowboys broadcasts exclusively," said Robbins. "We are sold out most of the time which means there are constant deadlines. It's easy to 'lose it' in the heat of the moment and that's when a little common courtesy makes all the difference."

Chris Robbins is married to the program director of a local TV station and is the proud father of a two-year-old daughter.

Saying No to an Advertiser ... Gently

Howard Stern may revel in discussing his bodily functions during his syndicated morning show, but that's just one of the taboos you will never hear on KVIL-FM, Dallas.

"That also goes for screaming car dealer spots and raunchy promos TV stations are so fond of running during sweeps," said Production Director Chris Robbins. "When an advertiser objects to our suggestions saying everybody else runs our spots, we just politely say we're not everybody else."

The ultimate judgment calls come to Program Director Bill Curtis who believes that in the long run, the high standards at KVIL-FM help advertisers reach their target more effectively.

"We're not suggesting we don't want to work with advertisers. We value them but we have a clear understanding of our audience," said Bill Curtis. "We're in the business of trying to get results and if the commercial is a tune-out, two things happen.

"First the listener turns off the radio, which isn't good for anyone. Secondly, the advertiser will not get good results. The schedule won't work and we'll end up in a conversation about why the station didn't pull well."

Keeping radio's house in order

Bill Curtis believes in being a "long-term" player.


"We don't take the quick buck. We allow 12 units per hour here, and that makes up a big portion of our day. If we have a lot of annoying commercials, it's like playing three bad songs in a row," said Curtis. At first our clients may not like our suggestions, but in the end they come to appreciate what we're trying to do for them. We have no trouble getting and keeping advertisers."

Robbins said, "Sometimes we will offer to recut a terrible spot that comes in the door. Other times we'll try to edit out the offending portions."

Bill Curtis sees a dangerous trend in our industry.

"Radio today has an eroding cume. Some of that is due to other things to listen to, but I think it also speaks to the product. Too many companies are interested in a good quarter or a good year, but in three to five years when consolidation is completed, only the best products will remain standing," said Curtis.

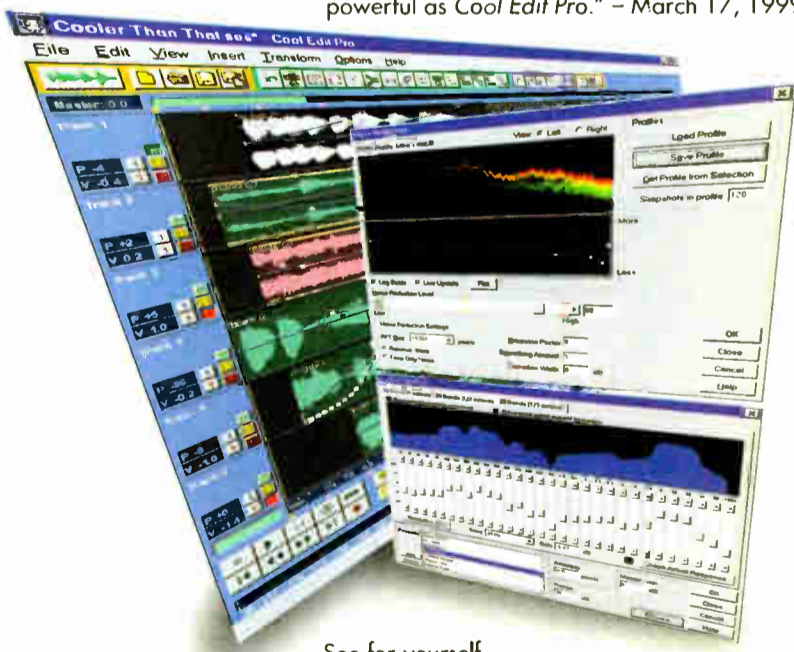
"What a great time this is for stations to make sure their houses are in order. Radio is cannibalistic, eating its own product. We can't stop fragmentation, but we certainly don't have to hurry it along," Curtis said.



Perhaps you've heard the buzz around Cool Edit Pro, the complete software multitrack recording studio. Why is it so popular?


It's so easy to use!

As one user said in Radio World, "When it comes to broadcast production, it is doubtful you will find an easier interface that is as inexpensive yet as powerful as Cool Edit Pro." - March 17, 1999




See for yourself. Download a demonstration version from <http://www.syntrillium.com>, or just give us a call and we'll send you a free demo/tutorial CD. Give Cool Edit Pro a try- you'll be amazed at what you can do!

...good sound stuff!



P.O. Box 62255
Phoenix, AZ 85082-2255 USA
cepro@syntrillium.com
+1-480-941-4327
1-888-941-7100
(toll-free sales, USA and Canada)
Fax: +1-480-941-8170



Syntrillium
SOFTWARE CORPORATION

try to control yourself...



Remote Facilities Controller
control transmitter from any telephone
8-64 channels of telemetry and control
programmable control by date and time
optional printer and modem adapters
programmable telemetry alarms
full-featured, affordable, reliable
integrated rack panel

model rfc-1/b



Intelligent Rack Adapter
parallel printer interface
internal modem for data
front panel status indicators
battery backed power supply
rack mountable chassis (1U)

model rak-1



Dual Channel Audio Failsafe
provides contact closure on loss of audio
adjustable from 7 seconds to 4.5 minutes
monitors two audio channels
integrated rack panel
cost-effective, reliable

model afs-3

innovative solutions  **Sine Systems**

nashville, tennessee • 615.228.3500 voice • 615.227.2393 fax-on-demand • www.sinesystems.com

◆ PRODUCT GUIDE ◆

Products for Radio Production

Mail info and photos to: RW Product Guide, P.O. Box 1214, Falls Church, VA 22041

Doors Are Finishing Touch



Acoustic Systems makes panelized studios and plug-in doors and windows for broadcast and recording applications.

A standard 3-foot by 7-foot STC 48 door with a 20-inch by 60-inch centered window with dead-bolt and custom plate lists at \$2,845 plus freight. The company can build custom sizes and higher ratings up to STC 53. STC stands for Sound Transmission Class. The higher the rating, the more efficient the construction of the door for reducing sound transmission.

Standard finish is a powder-coated platinum with other colors available, but the finishes can be designed to accompany the studio's facade. Laser etching metal or glass, special handles or hardware options are available.

For more information contact the company in Texas at (800) 749-1460 or visit www.acousticsystems.com



Warm Tubes — Reasonable Price

The Silver Series 386 is a two-channel tube mic preamp with analog and digital AES and S/PDIF outs.

The front has +48V phantom power, 20 dB pad, phase invert and 75 Hz low-cut filter switches. The input has 60 dB of gain. Separate attenuators for analog and digital output give another +/- 15 dB of gain.

The product has a 12-segment LED meter, and a 1/4-inch line-level input, also on the front of the unit.



The digital outputs are selectable between 44.1, 48, 88.2 and 96 sampling rates; 16-, 20- and 24-bit word lengths and three dither or noise shapes. It has word clock sync input and output.

The tubes are 12AU7s. It retails for \$569.

For more information contact dbx in Utah at (801) 568-7660, or visit the Web site at www.dbxpro.com

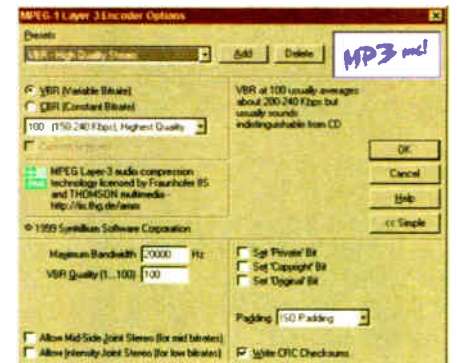
Update MP3 Plug-In for CE Pro

Syntrillium Software released a new version of the MP3 Plug-In for Cool Edit Pro. It enables the editor to read and write MP3 files directly.

The new version supports variable bitrate (VBR) data, performs nine times faster than the previous release and has an easier-to-use interface.

Syntrillium offers a demo version on its Web site at www.syntrillium.com

Users can also buy and download the full version of the software online for \$29. There is a free upgrade available if the user already owns the plug-in.

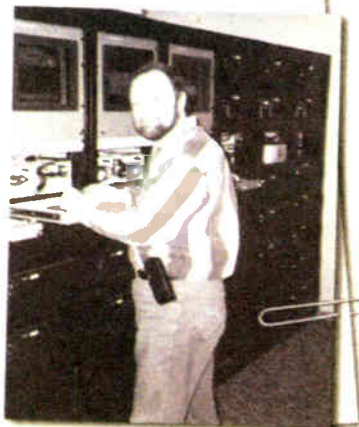


Radio's Most Wanted

PROFILE: David Hood

Chief Engineer / AudioVAULT Supervisor
Emmis Communications / WTLC AM & FM
Indianapolis, Indiana
Radio World reader since its inception (1977)

Hometown: Elwood, Indiana
School: Purdue University, BS/EET
Favorite radio format: Old radio mystery programs and Imagination Theatre
Favorite radio stations: All the Emmis Stations in Indy
Favorite color: Blue & green
Favorite piece of equipment: My good ole Tektronics scope!
Hobbies: Reading tech manuals, World War II history, and Sherlock Holmes
Coffee: With Sweet & Low
Proudest moment: Getting my first class radiotelephone while a sophomore in high school
Favorite Section in Radio World: Workbench, everything else - I even like the ads!
Reads RW because: Radio World is my main source for broadcasting information, especially news about DAB!



Here at Radio World, we strive to deliver the information that helps you, our readers, deliver the goods that make you the most wanted people in the industry. We salute you all, and thank you for reading Radio World.

Tell us why YOU read RadioWorld!

Send your answers to the above questions and anything else you'd like to share to: hhorris@jmacpub.com, or fax us at 703-998-2966 attn: H.Horris. Include your contact information, and we'll get back to you.

Wink Brings World Music To Your Station

Wink Music/World Sounds Music Library released a CDR series of "world music" production beds to help radio producers reach different ethnic groups.

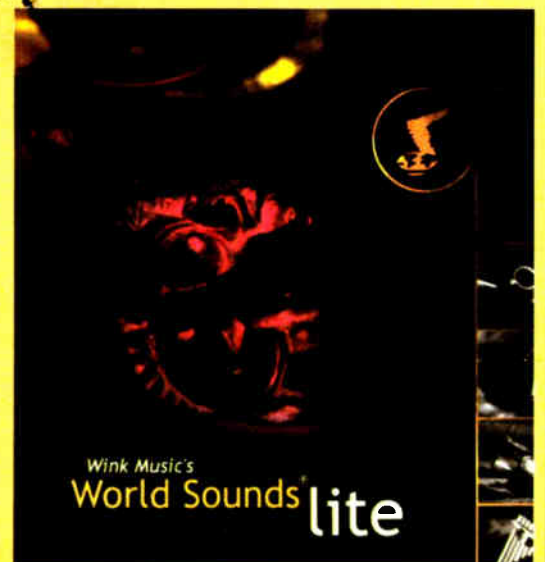
The production features music by 40 master musicians from 20 countries including Africa, Thailand, Spain and the East Pacific Islands. Sounds range from African drums to Brazilian Samba.

The set is royalty-free and available in WAV, AIF and standard-audio formats. Six libraries are available from \$229 to \$299. The "Lite" CD, not intended for broadcast use, is available for \$24.95.

Wink has recently released four new libraries of music, including Real Chicago Blues, Tex 'n Mex, More Smokin' Funky Beats and Planet Rhythm.

The discs are priced at an introductory rate of \$199 for each library.

Download samples at www.winkmusic.com For more information contact the company at (800) 501-2328.



CX-211 Smooths Out the Rough Edges

► AUDIX, continued from page 53

Parts and sub assemblies of the CX-211 are made in China and assembled at the home of Audix in Wilsonville, Ore.

The body and integral mount is of the Shure SM7 style with a yoke attached to the body shell. Handling noise and thumps to the boom and stand were minimally audible, indicating better-than-average capsule isolation.

The CX-211 has a 6-micron, gold-sputtered front membrane and a clear, non-conductive back membrane on a dual-chambered capsule.

TLM 103 for the U 89 in the cardioid position.

Hunting around for the right spot on each mic, I was able to find a similar darkness, but there were more differences than similarities.

The U 89 is thicker in the upper bass and low mids. Without that thickness, the CX-211 pokes through a bit more. The CX-211 has about 5 dB more output than the U 89. It also has a bit more self-noise.

After adjusting the preamp for equal loudness, I listened for self-noise. The self-noise of the CX-211 is listed at 18 dB-A and the U 89 lists a 17 dB-A figure. To my ear, the U 89 was quieter by at least 3 dB than the CX-211.

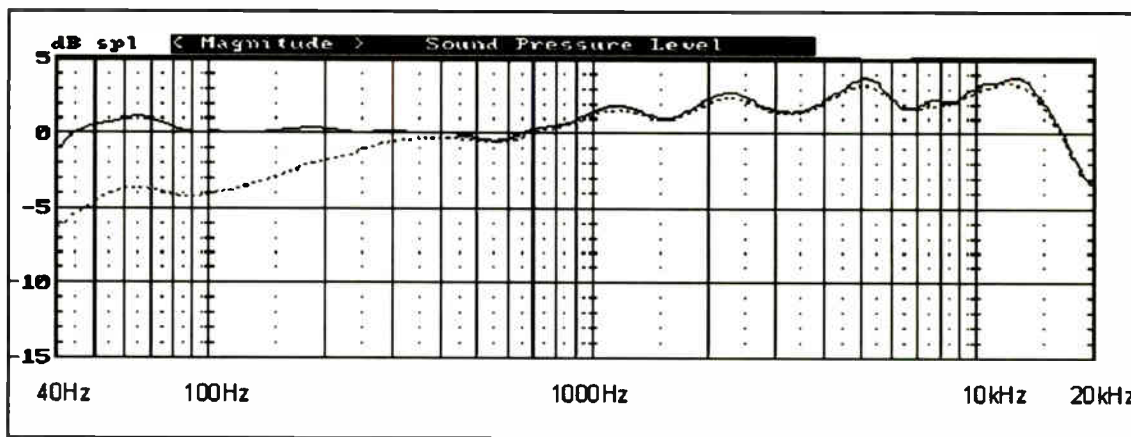
In a quiet recording studio and with quiet sound sources, this noise may become a problem. However, in a noisy radio studio with computer fans and drives, it would be hard to notice.

Pickup and rolloff

At 125 Hz and 12 dB per octave, I would have expected the low-frequency rolloff to have more effect on my voice. This is either a mild filter, or it is doing more work below 80 Hz than at 125 Hz.

The front of the CX-211 pattern is fairly tight, getting phasey about 40 degrees off-center. Moving around a lot will cause the talent to slip out of the sweet spot. The rejection is good from 90 degrees off-center around to the back, making this a good mic to use as back-to-back pairs.

The proximity effect of the CX-211 is



Audix CX-211 Condenser Broadcast Microphone Frequency Response Graph

Product Capsule:
Audix CX-211 Front-Address Condenser Mic

Thumbs Up

- ✓ Fairly thrifty
- ✓ Tuned for voice ranges

Thumbs Down

- ✓ Noticeable self-noise
- ✓ Not very open sounding

For more information contact
 Audix in Oregon at
 (800) 966-8261 or visit the Web site
 at www.audixusa.com

The capsule is mounted on an open metal basket, which is attached to a metal stem. The stem is shock-mounted and attached to a metal plate at the top of the body frame. A conical plastic diffuser encircles the shaft, presumably to improve

The mic appears to have a slight presence boost in the 1 kHz to 3 kHz range, which should appeal to on-air talent.

the acoustics inside the headgrille.

The headgrille uses a sturdy, thick outer wire mesh and a finer inner wire mesh. While not overly pop-sensitive, the mic can be popped.

Two small circuit boards are attached to the metal rails of the body frame. The output transformer is housed in a metal enclosure at the bottom of the rails, which mates to the XLR output.

As with many high-end mics, Audix put the pad between the capsule and impedance converter. That created a cleaner signal because a pad at that point keeps loud passages from distorting the impedance converter.

Self-noise

I first compared the CX-211 to a Neumann TLM 103 through a GML pre-amp. The CX-211 was darker, sort of cloudy, and had about 5 dB less output. When adjusted for equal loudness, the CX-211 had noticeably more self-noise.

The darker tone, also sometimes described as less "air," reminded me vaguely of a U 89. So, I swapped out the

moderate. A jock can eat this mic without overly distressing the diaphragm. If the jock rages at an inch or less, it gets ugly. The spec sheet indicates the mic is capable of handling over 145 dB SPL, presumably with the 10 dB pad in.

At a distance of about two-inches, the CX-211 has a nice thick sound. The mic appears to have a slight presence boost in the 1 to 3 kHz range, which should appeal to on-air talent. I would also try using it on voices with minor sibilance problems and quirky peaky voices.

I would also suggest using the mic for edgy instruments — plinky acoustic guitars, yank-me/crank-me electric guitar amp cabinets, violin or five-string banjo.

The CX-211 may not sound as pretty as some higher-priced mics. However, if an RE20 is starting to bore you and you do not like the RE27N/D, the Audix CX-211 is worth a listen.


Technique Inc. Copyright 2000. Ty Ford's e-mail address, equipment reviews and V/O files can all be found at www.jagunet.com/~tford

Flex-Studio

- One Size fits all modular design
- Highest quality laminates & wood
- World famous Modulux cabinetry
- Assembles quickly & easily
- In stock for immediate delivery
- Only \$4995 complete !!!

The Flex-Studio is a complete, modular furniture package that can be assembled in dozens of different ways to meet nearly any studio design. As a standard Modulux product the NEW Flex-studio features solid oak trim, high pressure laminate table surfaces, complete laminate finish inside and out. Modulux is the #1 selling studio furniture system with nearly 2,000 sold worldwide.

Arrakis Systems inc.
 web: arrakis-systems.com phone: (970) 224-2248



The AT4047/SV. For a Cold, Cruel, Digital World.

The full, articulate sound of the AT4047/SV might just start another argument about the cause of global warming.

That's because it provides the distinctive, warm sound of classic F.E.T. studio microphones.


Broadcast professionals will appreciate its elegant design: the exceptionally low self-noise, transformer-coupled balanced output, high SPL capability, superior mechanical isolation and fail-safe reliability. But most of all, they'll appreciate its

impeccable performance, so critical for today's digital production and transmission technologies.

Whether the task is a simple voice-over or a complex live feed, the AT4047/SV is the perfect solution in a cold, cruel, digital world.



AT4047/SV Cardioid
Capacitor Microphone

 **audio-technica.**

Buyer's Guide



**beyer's
Vocal
Effort
Page 64**

Radio World

Microphones & Monitors

April 12, 2000

USER REPORT

MXL Mic Is a Hit With KACD

by Dana Puopolo
Chief Engineer
KACD(FM)

LOS ANGELES My first experience with Marshall MXL condenser microphones began not long ago when I needed a 26-pair audio snake for Studio C, KACD(FM)'s live performance studio.

Mogami immediately came to mind and because Marshall Electronics is but a few miles from our Santa Monica studios and is also the Mogami importer, we contracted them to build the snake for us.

Eric Whited, our contact at Marshall, was a regular 103.1 listener and especially enjoyed our Studio C live-music broadcasts. He told me that Marshall was coming out with a new series of affordable (under \$250) condenser microphones and asked me if we wanted to try a couple.

When I mentioned the subject to our program director and air staff, the response was not positive. They had used those "big fat" microphones before and no one liked them. But they were willing to try them and humor me.

Eric delivered two MXL-2001 mics and they looked a lot like the much more expensive German microphones. I installed one in the air studio just before afternoon drive.

Nicole Sandler, our afternoon announcer, groaned when she saw the mic. Could it be that it reminded her of a similar looking one she had used at another station?

One break later she was smiling. These mics sounded great. They had a nice smooth sound with an ever-so-slight presence-lift that pushed her voice "out there."

Next thing I knew, I was installing the second one in our voice tracking room. Eric left with a smile and a purchase order in his briefcase.

I, however, was not a happy camper. I had hoped to try the mics in Studio C and now could not.

A few days later Eric called and told me of Marshall's new mic, the MXL-2003, that would soon be available.

This mic differed from the 2001 in several ways.



MXL 2001

For one thing, its capsule diaphragm was half as thick (three microns) resulting in greater transparency. Also it had a transformerless output. Finally, it has a low cut and pad switch. Unfortunately, it also costs a bit more.

The mics were delivered and immediately put into service. What Eric had told us was true — these mics simply sounded "right."

A third one was purchased for our production room as well. All three microphones have performed flawlessly for

several months now and have made believers out of all here at channel 103.1, including the skeptical on-air staff.

The 2001s are used in Studio C almost every day where many acts have used them including Tori Amos, Sting, Susan Tedeschi and Warren Zevon. Needless to say, we're keeping our MXLs.

As a postscript, I just received a sheet on the next mic in the MXL series, the MXL V-77 tube.

It uses a 6072 tube instead of FETs for an amplifier. I cannot wait to hear this one.

For more information contact Marshall Electronics in California at (800) 800-6608, fax (310) 391-8926 or visit the Web site at www.mars-cam.com

More Mics and Monitors

This Buyer's Guide presents a look at microphones, headphones and monitors of interest to radio professionals. In addition, many recent issues of RW have featured *Studio Sessions* articles and reviews in this category. Here's a quick overview.

The March 15 issue included reviews of the beyerdynamic MCE 58 and M-99 microphones and the Hayes Spatial One monitor.

The Feb. 2 issue looked at Hafler TRM6 monitors and TRM10s subwoofer and Sennheiser HD 270 headphones.

The Jan. 19 issue discussed the Shure SM7A microphone.

Our Dec. 22, 1999, issue featured the AT 4047 mic and an article about polarity by Bruce Bartlett.

The Nov. 24, 1999, issue included a wrap-up of microphones at the AES show.

The issue of Oct. 27, 1999, included the Neumann KM 180 microphone, and the Oct. 13 issue featured a story by Bruce Bartlett on understanding polar patterns.

The Audix CX-211 mic is discussed in this issue. Upcoming reviews include the AKG C3000B.

Got a story to tell about a new product you like? Let us know via e-mail to bcx@imaspub.com

—Bernie Cox

USER REPORT

FET Microphone Fits the Format

by Russ Long
Owner/Producer/Engineer
The White House, The Carpet
Recording Studios

NASHVILLE Audio-Technica's AT4047/SV is one of the first microphones designed to capture audio in the sonic tradition of classic field effect transistor (FET) mics, such as the famous Neumann FET47.

This is not the microphone you would want to put in the main studio for day-to-day use by air talent. This is, however, the microphone you will want to take out and plug in whenever live musicians perform on the air or in the production room.

The 14.5-ounce mic,

AT4047/SV, (\$695) is a large-diaphragm, capacitor microphone with a frequency response of 20 Hz to 18 kHz. The microphone's non-glare, satin-silver finish fantastic and is reminiscent of microphones of yesteryear. It requires 48 V phantom power.



AT4047/SV

The mic has a cardioid polar pattern and a maximum input sound level of 149 dB SPL. Its typical self-noise is only 9 dB SPL (A-weighted) so at maximum SPL it has a dynamic range of 140 dB.

A pair of switches engages the 10 dB pad and the 12 dB/octave, 80 Hz low-cut filter.

I used the AT4047/SV in a variety of circumstances, yielding some

See AT4047, page 65 ▶

"David-II" ...FM Simplified



Common sense tells you that even a "giant" of an FM audio processor can't guarantee market dominance. Day after day, hundreds of "David-II" users prove that a strong-yet-clean, non-fatiguing sound is an ideal companion to creative programming.

Inovonics' "David-II" combines rock-solid PWM audio processing with true digital synthesis of the FM composite baseband signal. Elegant in its simplicity, "David-II" more than holds its own against the more complex and far more expensive FM processing alternatives.

But don't take our word for it, your preferred broadcast equipment supplier can arrange a demo at your own station. Phone, fax or check our website for complete technical details.

"DAVID-II" (Model 716) — \$1985

Inovonics, Inc.

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

www.inovon.com



USER REPORT

Engineer Explores Well-Behaved Mic

by Loren Alldrin
Project Studio Editor
Pro Audio Review

CHICO, Calif. The MCE 90 is side-address studio vocal/instrument mic, part of beyerdynamic's new, affordable 90 Series microphone lineup. Folks on a tight budget will be happy to learn that the MCE 90 represents beyerdynamic's venture into a lower price point for this type of microphone.

If your thing is more musical than radio production, you may have more success with this mic than the typical announcer would.

The MCE 90 is a compact, sturdy-looking mic roughly the same size as a Neumann TLM 103 or an AKG C3000.

A large slot, which runs all the way around the belly of the mic, locks it into the supplied shock-mount basket. Undemeath the mic is a pair of recessed switches.

One switch engages a 15 dB pad and the other kicks in a low-cut filter that slopes off below 100 Hz. This low-cut switch also engages a 3 dB lift affecting frequencies above about 2 kHz.

I've seen the MCE 90 mistakenly touted in certain catalogs as being a large-diaphragm condenser mic — it really has

more of a midsize diagram (roughly five-eighths-inch).

After polling a number of engineers and manufacturers, it seems that three-fourths-inch is considered the border between mid and large. One person polled even called five-eighths inch a small diaphragm.

Overall character

The MCE 90 is also an electret design, with a permanently charged backplate. Historically, this has been a less-expensive way to build a capsule. Though electrets used to be found primarily in very cheap (and often bad-sounding) mics, the

technology has come a long way — electrets are now capable of turning in excellent sound.

After auditioning the MCE 90 on a variety of instruments and voices, I would describe its overall sonic character as smooth.

The microphone doesn't have tons of



beyerdynamic MCE90

high-end sheen, nor does it have the strong upper-mid bite of some comparable microphones. Nor does it sound particularly dark. Its sound is balanced across the frequency range.

I found that its real strength lay in instrument miking. The MCE 90 captures a natural sound, one you can bump in any direction desired with just a few dB of EQ.

Its upper-mid and treble response is pure, without any of the phase anomalies the ear sometimes perceives as a pinched or smeared sound.

The microphone was full and warm on acoustic guitar and its performance on a snare drum's top head was excellent — fat and snappy. For recording percussion, the MCE 90 was detailed but not too bright.

The MCE 90 wouldn't be my first choice for vocals, although it does have potential. Compared to a few mid-priced large-diaphragm microphones, the MCE 90's sound just isn't as open or exciting — it simply doesn't have the top-end boost and resonance that sounds so great on vocals (and so bad on many instruments).

For a very bright- or thin-sounding voice, however, the MCE 90 may be perfect.

Proximity effect of the MCE 90 is strong but not overwhelming. I found the mic sounds best 12 inches or more from the sound source.

The mic's low-frequency rolloff is said to kick in at 100 Hz, but I heard its effects well in the male vocal range. The effect of this switch was too much in most cases — it really thinned out the sound. Add the treble boost on top and the MCE 90 suddenly has an overly

See BEYERDYNAMIC, page 65 ▶



PMD340

Marantz Professional understands the bond that can develop when your equipment does everything you need it to do. If you're in the market for a new CD player, consider the professional features we've built into the rugged and reliable PMD331 and PMD340.

- Fully programmable operation
- AutoCue on tracks or by index
- CD-Text display
- Plays CD-RW discs
- Balanced and unbalanced analog
- XLR, coaxial, and optical digital
- Pitch control & search jog wheel

We've built a
CD PLAYER
with
broadcasters
in mind.

marantz
PROFESSIONAL

the
PMD331
PMD340

Brought to you by
Superscope Technologies, Inc.
Phone: (630) 820-4800
Fax: 630.820-8103

www.superscope-marantzpro.com

► BEYERDYNAMIC, continued from page 64 bright, brittle character. I found few instruments or voices sounded good with the switch in this position.

The MCE 90 has a nearly textbook-perfect cardioid pattern. Rearward rejection stays strong at both frequency extremes and high-frequency pickup doesn't get overly tight out front, which is nice.

The shock-mount basket feels secure enough, although it's made entirely of plastic. My only concern with the ultra-stiff elastic bands that hold the inner mount in place is that they don't feel supple enough to dampen vibration.

Its upper-mid and treble response is pure, without any of the phase anomalies the ear sometimes perceives as a pinched or smeared sound.

In my real-world tests (banging, tapping and stomping), the microphone picked up some low-frequency mechanical noise. On the other hand, it's pretty nice to get a shock-mount basket thrown in with a \$699 microphone.

Control the rolloff

The MCE 90 is remarkably similar to Audio-Technica's 4033. They both have midsize, electret capsules with fixed cardioid patterns and their physical construction and grille assemblies are similar. One difference is that the MCE 90 benefits from pad and bass rolloff

switches.

I think the bass rolloff is heavy-handed for most applications, however, and its effects are only made worse by the treble boost.

In several miking applications, I found myself wanting the treble boost without the low-frequency rolloff. I would gladly pay another \$50 to have these two filters on separate switches and I think many MCE 90 owners would agree.

My only other complaint with the MCE 90 is with its switches. They sit in a recessed ring beneath the microphone and the switches themselves are also recessed. They're tiny, stiff and virtually impossible

to move. You can forget toggling them with fingernails or keys — a thumbtack or other pointy object is necessary.

The MCE 90 is a well-behaved, smooth-sounding electret condenser mic that works great for most instrument applications. It's not a first-pick vocal mic to my ears, but it does the job for vocal recording. Only slightly flawed by a heavy-handed bass rolloff filter and hard-to-flip switches, the MCE 90 is worth a closer listen.

For more info contact beyerdynamic at 800-293-4463, fax (631) 293-3288 or visit the Web site at www.beyerdynamic.com

TECHNOLOGY UPDATES

SOUNDELUX

The Soundelux Microphones R-1 broadcast mic features a large-diaphragm condenser for recording studio or broadcast audio environments.

The R-1 utilizes one-inch diaphragm transformerless FET and gold-on-Mylar diaphragm. It has an SPL capability of 138 dB, sensitivity of 20 mV/Pa, low self-noise of 9 db-A, power consumption of 1.31 milliamps and an internal windscreen with metal casing. A metal shock mount is available as an option and broadcasters receive a five-year unconditional warranty on every model.

The suggested retail of the Soundelux R-1 is \$599.

For more information contact Soundelux Microphones in California at (323) 464-9601, fax (323) 463-2881 or visit the Web site at www.soundelux.com



ELECTRO-VOICE

The Electro-Voice model RE20 is a dynamic cardioid microphone for recording, broadcast and sound reinforcement applications requiring essentially flat response over a wide frequency range.

The RE20 features a built-in continuously variable-D microphone, which reduces bass-boosting proximity effect when used up close. A "bass tilt down" switch corrects spectrum balance for use in long-reach situations, or other applications where bass attenuation is needed.

The RE20 offers greatest rejection at 180 degrees off axis — directly to the rear of the microphone. Directional control is so effective that the frequency response is independent of angular location of sound source, creating no off-axis coloration, yet providing rejection of unwanted sounds.

An integral blast and wind filter covers each acoustic opening on the RE20. Part of the filter also shock mounts the internal microphone element, reducing the transfer of vibrations from external sources.

For more information contact Electro-Voice in Minnesota at (800) 667-3968, fax (612) 884-0043 or visit the Web site at www.electrovoice.com



AT4047/SV Mic Serves Up Winning Sound

► AT4047, continued from page 63 fantastic results.

As a vocal microphone, the AT4047/SV is wonderful. Like any high-end microphone (although it lacks the price tag of most high-end mics), it works better with some voices than with others. While working on Jody Davis' (guitarist for Newsboys) solo project, I found the AT4047/SV to be the perfect tool for capturing his vocal performance. We used the microphone to record both lead and backing vocals with no equalization and minimal compression.

I found that using minimal or no equalization in most circumstances results in full and rich vocals. Occasionally, more often with female vocalists, I found myself boosting the high end — usually 1 to 3 dB between 8 and 14 kHz.

I recorded a string trio recently and used a pair of 4047/SVs for stereo ambient microphones with impressive results.

I typically use a pair of Neumann U 67s for this purpose and I found the 4047/SVs worked every bit as well. I also had several opportunities to use the 4047/SV to close-mic cello and violin. The microphone proved excellent in both circumstances, capturing the body

and warmth of the sound without ever sounding harsh or brittle.

I also used the microphone on acoustic and electric guitars, percussion, piano and drum overheads and had positive results.

The mic is excellent for guitar amps and with the pad engaged it handles up to 159 dB SPL without overload. This is an impressive feat for a microphone with the sensitivity to capture the precision of a violin performance or the subtleties of a vocal performance.

Tight fit

My only complaint with the microphone is purely mechanical: It is difficult to take in and out of the shock-mount. I wish Audio-Technica had designed the case so the microphone didn't have to be removed from its shockmount to be placed in the case.

The Audio-Technica 4047/SV is a versatile microphone that is a true bargain at a retail price of only \$695. It sounds natural, warm and smooth without the high-end boost typical of many of today's microphones.

For more information contact Audio-Technica in Ohio at (330) 686-2600, fax (330) 686-0719 or visit the Web site www.audio-technica.com



For small, medium, large or even jumbo networks ... NewsBoss fits. As THE leading newsroom system for radio, NewsBoss will make your newsroom run more smoothly and efficiently, no matter what the size.

Functional and flexible, NewsBoss gives your newsroom wire capture capabilities, a built-in word processor, direct to air presentations, with audio editing and WAN connectivity. It's all here and has everything you need to improve your productivity and get news to air faster than any other available news system.

With NewsBoss, you can capture wires and network audio, write, rewrite and

edit news stories, as well as record, edit and link audio cuts directly to the story. All text and audio is immediately available at all workstations, including the on-air studio. Because NewsBoss is Windows® based, it's easy to learn, use and runs with other PC applications.

For more on how NewsBoss will fit your station's needs, contact your Broadcast Electronics representative at 888-232-3268 or log on to www.bdcast.com.



The Leading Newsroom System For Radio

Need Solutions?

www.bdcast.com

OR (888) 232-3268

©1999 Broadcast Electronics, Inc. The BE Emblem is a registered trademark of Broadcast Electronics, Inc. NewsBoss is a trademark of Desktop Technologies PLLC.



Leaders Look to BE

What they hear will determine your destiny

Made the old fashioned way,

Master craftsmen and tech-

the AKG legendary sound

your success, it's an invest-

SOLIDTUBE. Made with

detail that has earned



one-at-a-time in Austria.

nicians who understand

is not just assurance for

ment in your future. The

the same commitment to

us our legendary status.

SOLIDTUBE

a hand-crafted masterpiece

©1999 AKG ACOUSTICS, U.S. 1449 Donelson Pike Nashville, TN 37217, USA
Tel (615) 360-0499 Fax (615) 360-0275
email address akgusa@harman.com / <mailto:akgusa@harman.com>
Visit our website at www.akg-acoustics.com / <http://www.akg-acoustics.com>



H A Harman International Company

◆ TECHNOLOGY UPDATES ◆

AKG

The AKG model C 577WL and CK 77WL are omnidirectional lavalier microphones designed for use by actors and speakers who need freedom of movement on stage, in the studio or in broadcast environments.

Both microphones feature a frequency response that extends from 20 Hz to 20 kHz, providing the operating engineer with a neutral sound that can be equalized as needed.

Both units also use modular back-to-back active dual diaphragms with horizontal passive diaphragm design and provide an Omni Polar Pattern.

The C 577WL's dynamic range is 104 dB. It can handle sound pressure levels of 130 dB with only 1-percent THD and operates with phantom powering over the range from 9 to 52 VDC.

The dynamic range of the CK 77WL is 92 dB. The microphone can handle sound pressure levels of 118 dB-SPL with only 1-percent THD and operates with powering over a range from 1.5 to 12 volts, making it suitable for use with a wireless microphone transmitter.

Both microphones are shipped with a matching color windscreen, H40/1 dual microphone tie clip and a H41 dual microphone tiepin.

For more information contact AKG Acoustics, U.S.A. in Tennessee at (615) 360-0499, fax (615) 360-0275 or visit the Web site at www.akg-acoustics.com



MBHO

The MBNM-608 from MBHO is a triple-patterned condenser microphone for use in broadcast environments.

The multipatterned large-studio condenser mic features a pattern switch and a double diaphragm with a gold-sputtered brass back-plate capsule design. It offers a frequency response of 5 to 20,000 Hz in an omni pattern with 130 dB SPL.

The pattern switch produces three patterns: omni, cardioid and figure-eight. The selectable patterns are independent of the frequency.

For more information contact MBHO/MTC in New York at (718) 963-2777, fax (718) 302-4890 or visit the Web site at www.mbho.de



SENNHEISER

Sennheiser's redesigned studio condenser microphone MKH80, now christened the MKH800, boasts a frequency response extending up to 50 kHz and a dynamic range of 126 dB at a self-noise of only 10 dB (A).

The existing mechanical and electrical design of the MKH80 allowed for a frequency response above 20 kHz. In developing the MKH800, Sennheiser engineers were able to minimize sound field interference at high frequencies by keeping the microphone dimensions small and by redesigning both the capsule and parts of the housing.

A frequency range of 30 Hz to 50 kHz is captured with a single wide-band transducer operating on the push-pull principle for low distortion. The result is a compact studio microphone designed to capture characteristics of traditional high-end microphones with specifications for use in future high-fidelity storage mediums.

For more information contact Sennheiser USA in Connecticut at (860) 434-9190, fax (860) 434-1759 or visit the Web site at www.sennheiserusa.com



NADY

The Nady Systems 760 UHF wireless system includes many of the features of Nady's 950 GS.

The 760 UHF is a half-rack unit with 160 frequency-synthesized, user-switchable UHF channels (on both the receiver and transmitters) in selected 20-MHz-wide groups between 686 and 950 MHz. Up to 20 systems can be operated within each group simultaneously.

The half-rack receiver features two-color, five-segment LED bar graphs for audio and RF levels, an LED warning for low-transmitter battery voltage, and rear-mount antennas.

Optional transmitter models include the choice of an all-metal handheld mic and lavalier/instrument body pack transmitters with all-metal housings.

The company says the 760 delivers audio performance with hardwire transparency and a 120 dB dynamic range. Its operating distance typically is 250 feet and up to 500 feet line of sight.

The suggested list for 760 HT (handheld system) is \$1,149.95 and for 760 LT (lavalier system), the price is \$1,029.95.

For more information contact Nady Systems in California at (510) 652-2411, fax (510) 652-5075 or visit the Web site at www.nadywireless.com



RODE

The RODE Broadcaster is a large diaphragm condenser microphone designed for broadcast applications.

The Broadcaster features a cardioid polar pattern with 180-degree rejection and a voice-tailored high-pass filter. It also features an "On Air" indicator and a flush-mounted LED that provides the announcer with a visual indication of the microphone's active status.

A custom connector allows the mic to be interfaced with a console-mounted announcer-controlled mute button. An internally shock-mounted capsule and built-in pop filter reduces popping and other undesirable noise.

The microphone has a frequency response of 20 Hz to 20 kHz, a low self-noise of 14 dB (A), sensitivity of 18 mV/Pa and a maximum SPL of 135 dB. It features a high-pass filter of 75 Hz at 6 dB per octave and an output impedance of 200 ohms.

The RODE Broadcaster's list price is \$599.

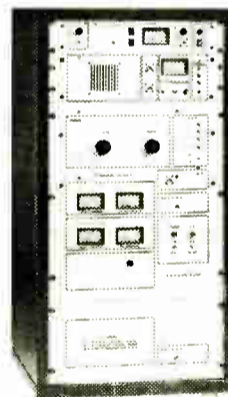
For more information contact Event Electronics in California at (805) 556-7777, fax (805) 566-7771 or visit the Web site at www.event1.com



Superior Broadcast Products

Quality Transmitters and Antennas at Reasonable Prices

FM Transmitters



High Performance Solid State Exciter
Solid State IPA Amplifier
One Year Limited Warranty
Factory Service
On site check out by factory
personal available

1,000 watt	\$5,990.00
2,500 watt	\$11,990.00
5,000 watt	\$18,990.00
10,000 watt	\$24,990.00
15,000 watt	\$34,990.00
20,000 watt	\$37,990.00

20 Watt Solid State Exciter - \$995.00 Solid State FM Transmitters with Digital Exciter

120 watt	\$2,800.00	2,000 watt	\$12,900.00
300 watt	\$3,500.00	3,000 watt	\$19,990.00
1,000 watt	\$7,990.00	5,000 watt	\$29,990.00

FM AMPLIFIERS	FM STL Both Transmitter and Receiver
100 watt..... \$995.00	\$3,500.00
300 watt..... \$1,790.00	
500 watt..... \$2,990.00	

FM Antennas

All Power Levels 500 watts
to 20,000 watts per bay

As low as.....\$395.00 per bay

FREQUENCY AGILE FM TRANSLATOR \$2,500.00	* RF Coaxial Patch Panels *FM Combiners
--	--

Superior Broadcast Products

Contact **Jimmie Joynt** 17194 Preston Road, Suite 123-297 • Dallas, Texas 75248
Ph: 972/473-2577 • 800/279-3326 • Fax 972/473-2578 • 800/644-5958
Email: sbp@pulse.net web site: www.sbpjj.com

USER REPORT

Powered Monitors Going Digital

by Loren Alldrin
Project Studio Editor
Pro Audio Review

CHICO, Calif. If you thought the self-powered closefield was a giant step toward the ultimate one-box monitoring solution, behold the digital self-powered closefield monitor.

The new 2029A Digital closefields from Genelec offer a digital input for direct patching into a digital mixer or audio workstation.

The 2029A Digital monitors are identical to the analog-only 1029As in most aspects. The 2029A Digitals (\$1,325 per pair) have a five-inch woofer and three-fourths-inch metal dome tweeter, each driven by a 40 W power amp. The drivers are well-shielded, making them suitable for use near video monitors.

The right speaker (yes, they're labeled) has an S/PDIF digital input in addition to its XLR and quarter-inch analog inputs.

When the monitor detects a valid digital input signal (sampling rate between 22 kHz and 55 kHz, 16 to 24 bits), its front-panel LED turns from green to yellow. The internal crossover is then switched to the output of the Genelec's internal D/A converter, and the monitor's XLR input becomes an output. This output now carries the left monitor signal in analog form, which gets to the left 2029A monitor through the supplied male-to-male XLR cable.

In digital mode, the right monitor's level control adjusts the volume of both speakers. This is handy indeed, a thoughtful touch on the part of Genelec. In analog mode, one must adjust the monitors individually.

Setting the tone

Each monitor has a set of tone controls in the form of a deeply recessed Dip-switch block. With a pointed implement it is possible, but not easy, to access the switches to dial in bass reduction of 2 dB, 4 dB or 6 dB, bass rolloff and treble reduction of 2 dB.

The bass reduction settings compensate for monitor placement (against a wall, for example), and the treble reduction primarily appeals to personal tastes.

The bass rolloff should be engaged when using the Genelec 1091A eight-inch subwoofer (\$699). This compact sub extends the system's bass response to 38 Hz, well beyond the 2029A Digital's low response spec of 68 Hz.

The 2029A Digitals have no heat sink *per se* — the metal back and speaker enclosure serve to dissipate heat and keep the speakers running cool.

This all-metal construction also gives the Genelecs a solid feel. Even the metal grilles covering the high- and low-frequency drivers feel indestructible.

There are several ways to mount the 2029A Digitals besides just putting them on top of a console. Three metal brackets on the back of each monitor make for easy wall-mounting with screws. The Genelecs also have holes for the Omnimount system.

Finally, the monitors have a threaded hole on the bottom for attaching them to a microphone stand. Very clever.

Though the manual suggests rolling off some bass when used near a wall, I first listened to the 2029As flat. I was

immediately impressed with the smooth, open sound and sizable bass coming from such a small cabinet.

The bottom end was a little tubby, so I tilted the low frequencies out as the man-

setting a second listen.

The Genelecs won't rock the house down, but they put out quite a respectable volume of sound. The manual says they're capable of 110 dB at a lis-



Genelec 2029A Digital Monitors

ual suggests. This made bass response a bit weak for my tastes, so I split the difference. The Genelecs then rewarded me with excellent sound on every type of program material I threw at them.

These monitors put out some beautiful top end — bright and open without being harsh or fatiguing. I was so enamored with the high-end response of the monitors, I never even gave the treble-reduced

tening distance of about three feet. That's plenty of sound for most recording applications.

Is the digital input simply a convenience, or does it truly improve the sound of the monitors? To be honest, it was hard to tell the difference between the analog and digital inputs. The digital input seemed to deliver a slightly more natural top end than the analog input, but all I was

really comparing in this test were the D/A converters in the Genelec and the Yamaha 01V. At any rate, the 2029A Digital's D/A converter sounds very good.

It feels a bit strange attaching a pair of monitors directly to the digital output of a recorder, mixer or digital audio workstation.

Once I got a taste of the convenience, however, I quickly became used to it. The only trick comes when using equipment with just one digital output to feed monitors and other digital gear.

Daisy-chaining the other equipment into the monitors or purchasing a digital signal distributor of some kind are your only options.

No accident

It's no accident that Genelec has legions of devoted engineers using their monitors. These folks know how to make a monitor both accurate and pleasing to the ear, knowledge that they successfully apply all the way down to their smallest models. Genelec monitors aren't the cheapest you can buy, but they're certainly among the best.

If you're in the market for a compact closefield and the digital input appeals to you, definitely take the 2029A Digitals for a spin. If you don't need a digital input, the analog 1029As are well worth a listen.

Whether you're using the digital or analog inputs, there's nothing small-sounding about these small monitors.

For more information contact Genelec Oy at Massachusetts in (508) 652-0900, fax (508) 652-0909 or visit the Web site at www.genelec.com

TECHNOLOGY UPDATE

HAFLER

The TRM6 Active Monitor and the TRM10s Trans•ana Active Subwoofer by Hafler are designed for use in studio or broadcast environments.

The TRM6 is magnetically shielded and is based on Hafler's Diamond topology Trans•nova amplifier technology. The monitor is a bi-amped, two-way system offering a free-field frequency response of 55 Hz to 21 kHz, plus or minus 2 dB. The peak acoustic output per speaker pair using music as a sound source at one meter is 120 dB or greater, accommodating the dynamic range needs of digital audio playback.

The TRM6 incorporates a one-inch soft-dome tweeter high-frequency driver and a 6-1/2-inch polypropylene cone low-frequency driver.

The front panel includes a power/clip/thermal LED display. The rear panel has RCA inputs, an unbalanced/balanced DIP switch, input sensitivity DIP switches, tweeter/woofer mute DIP switches, bass and treble shelving DIP switches and IEC standard line input, AC line fuse.

The TRM10s is a combination of Hafler's class G Trans•ana amplifier circuitry coupled to a 10-inch subwoofer and is manufactured by Hafler and the Rockford Acoustic Design Division.

The TRM10s features a MOSFET output stage and class G Trans•ana topology with a one-cubic-foot vented

enclosure. The unit has a 200-watt amplifier and oversized power supply for wide dynamic range.

The superwood cabinet has an export for low-frequency extension. The TRM10s has an adjustable input sensitivity, an adjustable crossover of 24 dB per octave Linkwitz-Riley with 40 Hz to 110 Hz range and is complete with balanced XLR and RCA stereo inputs and has selectable phase control.

The M5

The M5 is Hafler's passive nearfield monitor.

The magnetically shielded M5 is a fourth-order Butterworth-vented, two-way loudspeaker designed to work alone or in conjunction with Hafler's line of amplifiers. The M5 has been designed to work with the TRM10s active subwoofer.

The M5's five-eighths-inch thick MDF cabinet has an internal volume of 5.3 liters and a front firing slotted port tuning the system to 70 Hz. Small panel size and internal bracing reduce wall flexing and mid-band resonance while cabinet rigidity also improves low-frequency mid-bass coupling.

The M5 tweeter uses a proprietary 25-millimeter silk dome and exponential horn waveguide combination and is the same unit as found in the TRM6 active monitor. The exponential horn loading

provided by the waveguide sets the width and depth of the soundstage. The M5 waveguide also provides a rocker switch that will allow the user to select between 0 (flat) and a -3 dB control in-tweeter output.

The 5.25-inch (133-millimeter) mid-bass driver provides low-frequency damping and uniform piston control while minimizing inter-modulation distortion (IMD) components. High magnetic linearity is achieved

by using a long 1.25-inch (32-millimeter) diameter voice coil set in a computer optimized magnet structure.

The mid-bass driver is designed and constructed to be both thermally and mechanically capable of handling the 200-watt system power rating.

The M5 crossover uses a symmetrical fourth-order (24 dB/octave) Linkwitz-Riley passive filter set at 3.2 kHz. This all-pass type of filter will sum both high- and low-pass filter sections to a flat magnitude response and allows both drivers to be wired in the same polarity.

The high-pass section of the crossover uses two user-selectable L-pads to set tweeter gain. M5 system inputs are via five-way gold binding posts.

The M5 has a suggested retail price of \$299.

For further information contact Hafler at (888) 423-5371, fax (480) 894-1528 or visit www.hafler.com



TRM10s



TRM6

USE HAFLER

GET IT

RIGHT.



TRM6



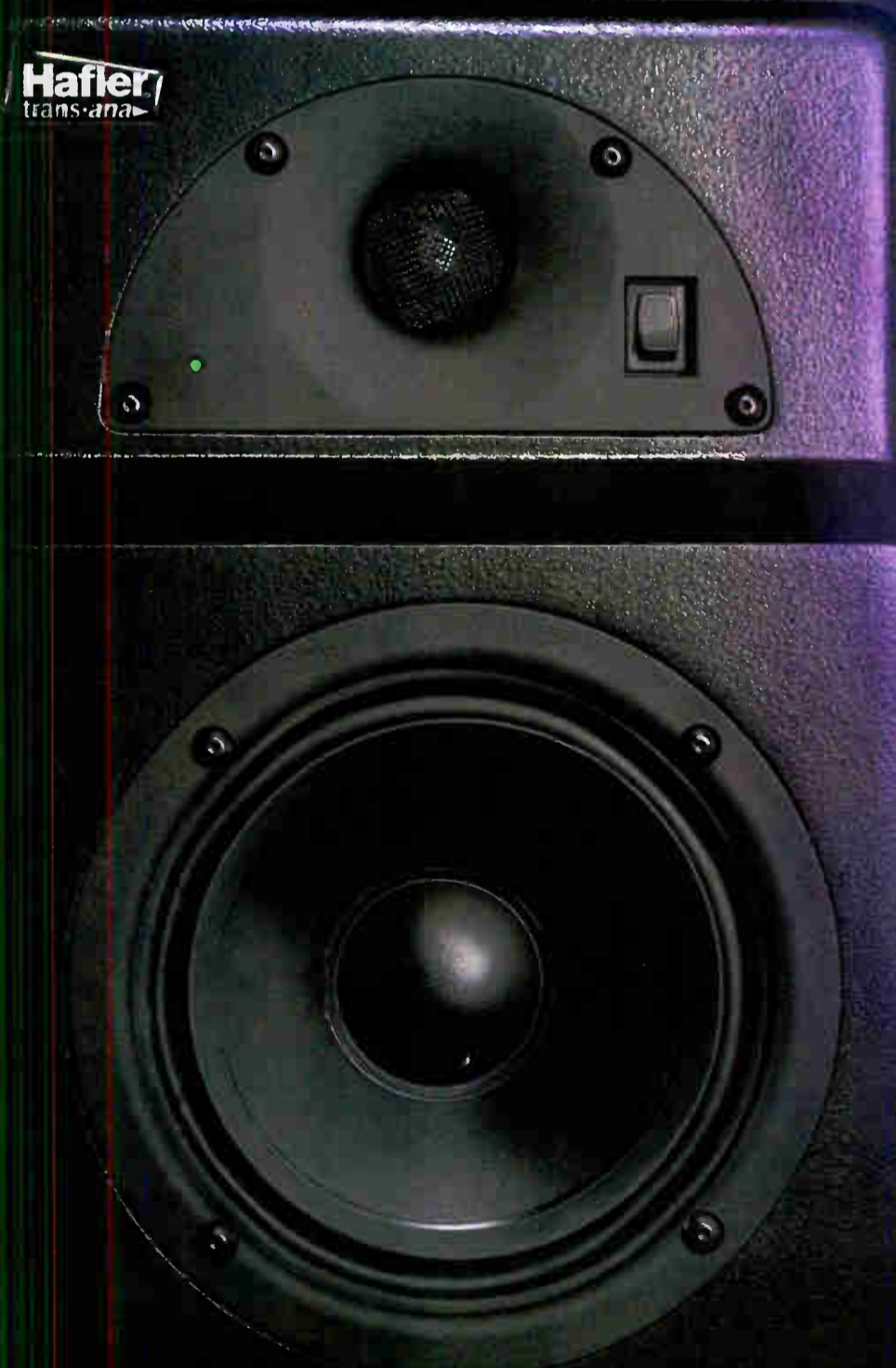
TRM8



TRM10s



TRM12s



Hafler®

the standard

Products & Services Showcase

REMEMBER THE *CORTANA* FOLDED *UNIPOLE* ANTENNA? WE STILL MAKE IT WITH THE SAME HIGH QUALITY MATERIALS AND WORKMANSHIP. IT FEATURES...

- **BROAD BANDWIDTH** for better sound,
- **GROUNDING ANTENNA** for lightning & static electricity,
- **ELIMINATES ISOCOUPPLERS** in VHF & UHF antenna lines,
- **BEST ANTENNA FOR DIRECTIONAL ARRAYS.**

Also
DETUNING SYSTEMS FOR ANYTHING THAT DISTORTS YOUR AM COVERAGE PATTERN: TOWERS, POWER LINES, TANKS OR ANY METAL STRUCTURE.


FOR INFORMATION CALL, FAX OR WRITE:

nott ltd.
 4001 La Plata Hwy
 Farmington, NM 87401

phone 505-327-5646 fax 505-325-1142

Silicon Valley POWER
 AMPLIFIERS
 The RF People

FM Broadcast Power Amplifiers
 Designed for reliability, durability, & efficiency.



Models from 165 watts to 3 KW
 ask us about LPFM at
NAB Booth R2697
1-800-986-9700

www.svpa.com e-mail: sales@svpa.com Fax 1-408-986-1438

S.C.M.S., Inc.
 Charlotte, N.C.

Low Prices - Experienced Staff
 New and Re-built R.F. and Audio

THIS MONTH'S SPECIAL

USED FM TRANSMITTERS FOR SALE

- B.E. FM-3.5B
- B.E. FM-5B
- B.E. FM-30
- (TWO) CCA FM-25000G
- HARRIS FM-20K
- GATES FM-20H 3
- (TWO) GATES FM-2.5H3
- RCA BT-20E1

ALL UNITS MAY BE PURCHASED WITH OR WITHOUT WARRANTY, TUNED AND TESTED WITH WARRANTY, OR AS IS.

CALL FOR DETAILS AND PRICING

You Know We Know Radio -
 Toll-Free 800-438-6040
 FAX 704-889-4540

THE COST EFFECTIVE ALTERNATIVE TO MANUFACTURER SERVICE

SERVICE, REPAIR & CALIBRATION

- STL's • RPU's • TSL's
- Exciters • Optimods
- AM/FM Monitors
- Remote Control Systems

SPECIALIZING IN EQUIPMENT BY

- Belar • Marti
- Moseley
- McMartin
- TFT
- And others...


WE ALSO PROVIDE

Free, over-the-phone technical assistance
 STL loaner/rentals
 PCL 505 Certification

TECHNICAL SERVICE

2198 Hubbard Lane, Grants Pass, OR 97527
(541) 471-2262

Excalibur Electronics
CDA-1
 Composite Distribution Amplifier



This 1 in, 3 out distribution amplifier allows you to distribute stereo composite and/or subcarrier signals as easily as audio.

- ◆ DC-100 kHz frequency response
- ◆ 90 dB signal/noise ratio
- ◆ +6 dB to -20 dB gain range
- ◆ Individual 20-turn output trimmers
- ◆ 1 1/4" rack mount enclosure

EXCALIBUR ELECTRONICS, INC., CHANTILLY, VIRGINIA

1,200 Hits on HARD DRIVE for \$795!

FREE HitPick software lets YOU create a custom format!

5,000 songs available!
 Go to www.h-b-s.com for song lists

HBS HALLAND BROADCAST SERVICES, INC. Just call our name
800-HALLAND
800-425-5263


1289 East Alosta Avenue
 Glendora, CA 91740 USA
 PH 626-963-6300
 FX 626-963-2070
www.h-b-s.com

CD libraries ONLY \$695

Come see us at NAB Booth #R3389

VIDEOQUIP AES/EBU Digital Audio
 RESEARCH LIMITED


RS-88AES 8x8 Routing System
 8 Input, 8 Output AES/EBU Audio Router



RS-88AES and RS-64AES features:



- External AES/EBU Digital Sync Input
- Integral FrontPanel Local Controls
- RS-422 Serial Remote Control Ports

RS-64AES 64x64 Routing System
 64 Input, 64 Output AES/EBU Audio Router



Available in 1RU and 2RU packaging

DDA-104 1x4 Distribution Amplifier
 1 Input, 4 Output AES/EBU Distribution Amplifier

- Reclocked outputs for reduced jitter. Cable lengths to 200 meters.

RS-41DA 4x1 Routing System
 4 Input, 1 Output AES/EBU Audio Router

- Clock recovery and regeneration, reclocked output
- Local pushbutton or Parallel remote control

Phase 3 half-rack products are ideal for desktop or rackmount use. Broadcast quality throughout. No AC Adapters. No compromises.


Videoquip Research Limited
 Phone: (416) 293-1042 Toll Free: 1-888-293-1071 Fax: (416) 297-4757 www.videoquip.com

Professional AES/EBU Serial Digital Audio Products.

The Optimod® FM 8200 sounds BIG and is BIG... in EVERYTHING.

Sound Quality (just listen)
 Features (too many to list)
 Physical Size (4 rack spaces high)
 Price (just under 10 Grand list)
 Warranty - One Year

NICOM
 5 Band Digital Stereo Generator / Audio Processor / Limiter / Stereo Enhancer



The POSEIDON sounds BIG and is BIG... in Everything...except Size & Price.

Sound Quality (just listen)
 Features (too many to list)
 Physical Size (only 1 rack space high)
 Price (\$3790. list, various discounts available)
 Warranty - Two Years

Contact us for distributor information
 Tel: 619.477.6298 • Fax: 619.477.6296
 2626 Southport Way Ste B • National City, CA 91950
www.NicomUSA.com • info @NicomUSA.com

Come See Us At NAB Booth # L9653

◆ TECHNOLOGY UPDATES ◆

EVENT ELECTRONICS

Event Electronics' Project Studio series bi-amplified direct field monitors are designed for use in project and home studios as well as in professional broadcast, recording and post-production facilities.

There are three models offered.



The PS5 monitor features a 5.25-inch polypropylene low-frequency driver and 25-millimeter silk dome neodymium high-frequency driver.

The PS6 features a 6.5-inch polypropylene woofer and one-inch silk dome tweeter.

Finally the PS8 features an eight-inch polypropylene woofer and one-inch silk dome tweeter. All are bi-amplified with a 70-watt amplifier for low frequencies and a 30-watt amplifier for high frequencies.

The components for the PS5 and PS6, including the transducers, amplifiers and active crossover circuitry, are custom designs made for the series.

Crossovers on the PS6 and PS8 models are asymmetrical fourth-order. The PS5 uses an asymmetrical second-order crossover. All three models are magnetically shielded.

The suggested retail price for the PS5 is \$599 per pair, PS6 is \$699 per pair and the PS8 is \$849 per pair.

For more information contact Event Electronics in California at (805) 556-7777, fax (805) 566-7771 or visit the Web site at www.event1.com

YAMAHA

Yamaha, expanding on its nearfield monitors, has introduced the MSP10 studio monitors and SW10 powered subwoofer system.

The MSP10 bi-amped monitor speaker has been designed for use in professional recording, post production, broadcast and project studio markets.

The MSP10 features an eight-inch long-throw woofer housed in a bass reflex design cabinet. Its one-inch titanium dome tweeter with wide dispersion waveguide horn provides a high-frequency response up to and beyond 40 kHz. The unit is bi-amped featuring a 120-watt amplifier for low frequencies and 65-watt amp for high frequencies.

The monitors feature magnetic shielding designed to eliminate stray radiation to allow positioning near sensitive recording equipment and media. The monitors also include balanced XLR inputs.

Although designed to complement the MSP10, the SW10 powered subwoofer can be used with the Yamaha MSP5 speakers or other compact systems.

The 10-inch long-stroke subwoofer features a 180-watt power amplifier. A variable low-pass filter from 40 Hz to 120 Hz allows compatibility with any main speaker system. A built-in phase switch enables phase reversal without cable or connector modification. Three balanced XLR inputs and outputs allow the SW10 to be integrated into studio audio systems. As with the MSP10 monitors, the SW10 provides magnetic shielding.

The MSP10 powered monitors are now available in a Maple Sunburst color (MSP10M). The MSP10 has a suggested retail price of \$749, the MSP10M (with the maple sunburst finish) is \$799 and the SW10 subwoofer is \$849.

For more information contact Yamaha Corp. of America, Pro Audio and Combo Division, in California at (714) 522-9011, fax (714) 522-9522 or visit the Web site at www.yamaha.com/proaudio



KRK SYSTEMS

The V6 active studio monitor from KRK Systems features two amplifiers and an electronic crossover so that power output and frequency is matched to each driver — 60 watts to the woofer and 30 watts to the tweeter — for maximum SPL.

The V6 includes a six stroke polyvinyl woofer with an anti-resonant frame, Neutrik combo XLR connectors and video shielding. The cabinet is cross-braced to improve low-frequency linearity.

The V6 has a suggested retail price of \$799 per pair.

For more information contact KRK in California at (714) 373-4600, fax (714) 373-0421 or visit Web site at www.krksys.com



TELEX

Telex's PH-44 and PH-88 headphones are modified versions of the company's PH-4 and PH-8 headphones.

The PH-4 is a lightweight, dual-sided headset featuring high-quality monaural dynamic earphones with dynamic noise-canceling microphone on an adjustable boom.

The PH-8 is a lightweight, single-sided headset, featuring a monaural dynamic earphone with dynamic noise-canceling microphone on adjustable boom that can be beat to suit users' needs.

For more information contact Telex Communications Inc. in Minnesota at (612) 884-4051, fax (612) 884-0043 or visit the Web site at www.telex.com

SYSTEM WIRELESS

The System Wireless AIS-800 ISO Modification of the HM Electronics (HME) RW 800 Wireless Intercom System provides multi-channel communications and interfacing to external intercom systems.

This modification permits three talk paths from each of the wireless belt-packs — two paths can be directly connected to an external intercom system while the third path can be used for interface to paging systems, studio announce or two-way radios.

The AIS-800 uses a redesigned intercom interface, which connects directly to all popular two- and four-wire systems. Level controls and mode switching are accessible for setting system parameters. Additionally, relay closures are provided on the rear panel for custom applications.

For more information contact System Wireless Ltd. in Virginia at (800) 542-3332, fax (703) 437-1107 or visit the company Web site at www.systemswireless.com

Save Your Issues of Radio World in Style



Now there's an easy way to organize and protect your copies of Radio World, the industry's best read newspaper, keeping issues readily available for future reference.

Designed exclusively for Radio World, these custom-made titled cases provide the luxury look that makes them attractive additions to your bookshelf. Each case is sized to hold a year's issues (may vary with issue sizes), and is made of reinforced board covered with durable leather-like material in blue, with the title hot-stamped in gold. Cases are V-notched for easy access and free personalization foil is included for indexing the year.

Cases
1-\$8.95 3-\$24.95 6-\$45.95

Call Toll Free
7 days, 24 hours
1-800-825-6690
Charge Orders (Minimum \$15):
AmEx, Visa, MC, DC accepted.

Jesse Jones Industries,
Dept. 95RW
499 East Erie Ave.
Philadelphia, PA 19134

Allow 4 to 6 weeks for delivery
SATISFACTION GUARANTEED

Add \$1.50 per case for postage & handling.
Outside U.S. (including AK & HI) \$3.50 per case
(U.S. funds only).
PA residents add 7% sales tax

◆ TECHNOLOGY UPDATES ◆

HAYES

The Hayes Spatial One is a studio monitor designed with a 6.5-inch woofer combined with Hayes' FSS tweeter system.

A 4-kHz notch has been filled but the overall tweeter level reduced slightly, result-



ing in the brightness being "tuned out." The immediate noticeable effect is an increase in bass without sacrificing any clarity. Also, a 200-Hz bump has changed by decoupling the enclosure.

The speaker features a frequency response of 55 Hz to 20 kHz; audio sensitivity of 88 dB at 1 watt, 1-meter; impedance of 6 ohms; a Philips 1-inch fabric dome tweeter; a SEAS 6.5-inch polypropylene woofer cone with 1-1/2-inch voice coil and phase plug and MDF construction with 6 mm soft-metal cross brace.

The Spatial One's reflector design is based on prime number 7 and focused to 35-millimeters acoustic center. The diffusion ranges between 90 degrees perpendicular 1.5 kHz to 15 kHz, 45-degrees 2.2 kHz to 20 kHz and 135-degrees 1 kHz to 12 kHz.

The wavelet is a transient bi-orthogonal spline wavelet with 7 kHz dilatation at 90-degrees perpendicular and the wavelet scale factor changes with angle of reflection.

The Hayes Spatial One speakers suggested retail price is \$695 per pair.

For more information contact LPB Communications Inc. in Pennsylvania at (610) 644-1123, fax (610) 644-8651 or visit the Web site at www.lpbinc.com

FOSTEX

The NF-1A from Fostex is a powered version of the NF-1 nearfield studio monitor.

The NF-1A is bi-amped with two proprietary 60-watt amplifiers and features balanced XLR and unbalanced phone inputs. In order to match the response of different rooms, the units have adjustable boost/cut filters at 60 Hz and 10 kHz and a 3-dB attenuator at 3 kHz to help reduce the possibility of ear fatigue. The tweeter level is adjustable plus or minus 3 dB.

The NF-1A's 6.5-inch HP (hyperbolic parabolic) woofer design adds more strength than a conventional cone and contributes to a wider horizontal dispersion and low distortion.

Additionally, the cone material uses a combination of wood and banana pulp fibers.

The URD tangential diaphragm edge and push-pull damper provide linearity and responsiveness. The tweeter uses a polyurethane film-laminated cloth diaphragm (soft-dome) that provides frequency response up to 40 kHz.

The woofer operates from 50 Hz to 10 kHz. A simple network ensures a seamless transition between components without the distortion associated with a conventional LC crossover.

The time-aligned enclosure features a baffle shape to minimize reflective frequencies and has internal HP sound reflectors. The enclosure employs magnetic shielding for use in close proximity to CRT video monitors.

The Fostex NF-1A Powered Studio Monitor lists at \$899 each or \$1,598 per pair.

For more information contact Fostex Corp. in California at (562) 921-1112, fax (562) 802-1964 or visit the Web site at www.fostex.com



MILLER & KREISEL PROFESSIONAL

Based on the MPS-2510, the MPS-2510P bi-amplified monitor from Miller & Kreisel Professional has a wider dynamic range and higher output because of the elimination of signal losses that occur in passive crossover networks.

The MPS-2510P monitor uses the same woofer and tweeter drivers as the MPS-2510 in a cabinet that is only slightly larger. Like the standard version, it features user-selectable vertical directivity for optimization in various monitoring environments.

The MPS-2510P features a 180-watt amplifier for the low-frequency transducers and the high-frequency transducers.



Miller & Kreisel MPS-2510P

Optional surround speaker

The MPS-2525 passive speaker features proprietary Tripole surround-speaker design. Users can compare the sound of a direct radiating speaker to the sound of a dipole by using a switch on a remote speaker switcher.



MPS-5310

The MPS-5310 amplified subwoofer rounds out the monitoring system and provides a full-range (20 Hz-20 kHz) frequency response.

It features push-pull dual-driver technology to eliminate even-order harmonic distortion, revealing low-frequency details that may be masked.

The MPS-5310 also features Miller & Kreisel's Headroom Maximizer circuit, which lets the uncompressed dynamics of the mix to be heard up to the subwoofer's full capacity, while preventing amplifier clipping and distortion.

The subwoofer features a Deep Bass sealed-box design and produces an in-room response from flat down to frequencies below 20 Hz.

For more information contact Miller and Kreisel Professional in California at (310) 204-2854, fax (310) 202-8782 or visit the Web site at www.mkprofessional.com

TANNOY

The Proto-J nearfield monitor from Tannoy features an extended low-frequency response, controlled dispersion and dynamic character.

The system has a 6.5-inch mid/bass driver and a three-fourths-inch high-frequency unit placed in a front-ported reflex enclosure. Each cabinet employs integral threaded inserts (Omni 50 series spacing) on its rear for wall mounting if desired.

The suggested list price for the Proto-J is \$229 per pair and the units are finished in black ash laminates.

For more information contact Tannoy/T.G.I North America Inc. in Ontario, Canada at (519) 745-1158, fax (519) 745-2364 or visit the company Web site at www.tannoy.com



DYNAUDIO ACOUSTICS



Dynaudio Acoustics' BM15A nearfield audio monitor is a two-way active system.

The monitor comprises a 200-watt low-frequency amp, 100-W high-frequency amp, large 10-inch woofer, a special version of the Dynaudio ESOTEC one-inch soft-dome tweeter and an electronic phase-aligned crossover, which feeds the built-in dual MOSFET amplifiers.

Its ESOTEC high-frequency driver provides headroom through its nine-inch bass driver and four-inch aluminum alloy voice coil. The BM15As electronics offer protection circuitry helping to prevent accidental damage to the drivers while providing transient response. The monitors are front-ported to deliver low-frequency response and air movement.

The suggested retail price of the BM15A is \$3,599 a pair.

For more Dynaudio Acoustics information, contact TC Electronic in California at (805) 373-1828, fax (805) 370-2648 or visit the Web site at www.tcelectronic.com

Radio World

Broadcast Equipment Exchange

"Broadcast Equipment Exchange" accepts no responsibility for the condition of the equipment listed or for the specifics of transactions made between buyers and sellers.

ACOUSTICS
WANT TO SELL

AcousticsFirst
888-765-2900

Full product line for sound control & noise elimination.
www.acousticsfirst.com

AMPLIFIERS
WANT TO SELL

Crown D150 stereo, \$225; Crown stereo power line amp, \$275. J Price, 214-321-6576.

Radio Systems DA16 in gd cond, \$150. J Felz, Music of Your Life, 4605 Lankershim Blvd, North Hollywood CA 91602. 310-546-6451.

WANT TO BUY

Tube pre amps, mixers, compressors, etc by Gates, RCA, Altec. E Davison, 561-287-8832.

**ANTENNAS/
TOWERS/CABLES**
WANT TO SELL

S.W.R. FM Antennas

Great Antenna Great Price!

HALL Electronics (804) 984-4255

ERI 6 bay high gain 105.5 MHz, gd cond, \$2000. F Willis, 850-653-3648.

Transmitters, Antennas, STL Systems
superiorbroadcast.com
contact Jimmie Joynt 800/279-3326 Fax 800/644-5958
SEE US at N A B Booth R 1487

Phelps-Dodge 4 bay FM w/heaters, 98-101MHz, gd cond, \$2000; Shively 3 bay FM w/radomes, 99-100.5 MHz, very gd cond, \$1500; Mark 9A72GN STL dish antenna, 6" 940-960 MHz, like new w/mounting hardware, \$750. A Fromm, Jalco Comm, POB 3334, Bartlesville OK 74006. 918-335-5093.

TOWER SITE COMPLIANCE

Custom FCC-OSHA Signs
Tower Site Products
www.antennaid.com
610-458-8418

Coax patch panel, 3-1/8" - 7 pole, 3 U-clips. Continental Communications, 800-664-4497.

ROHN 340 Foot Model SSV
Three legged self support tower. Excellent condition w/drawings. Circa 1971. Located in Arlington Hts, IL. Formerly used by WYLL. Soon to be dismantled. Make an offer. Salem Comm Antenna Site Management office 610-260-9881.

WANT TO BUY

Self-supporting or guyed tower, 320' to 340' w/42 to 48" face at the tower top & in gd to excel cond. Joel or Bruce, 414-764-4953.

AUDIO PRODUCTION
WANT TO SELL

52 point 1/4" patchbay, 1 space rack mount, multipin connectors on rear, manufactured by Special Products Co, gd clean cond, \$100 ea or trade for old bdct gear. markhugh@aol.com, M Hughes, 301-962-6823.

API 550A EQ, needs repair, BO. A Polhemus, 212-302-9010.

Audiometrics voice over booth on wheels w/XLR/Phono inputs, 60x42,30, \$1275 +shpg. J Baltar, 207-623-1941.

CASSETTES - CARTS - REELS

J & I AUDIO/VIDEO

A wholesaler in the Radio and Television market.
Now running SPECIALS on audio and video:
**BASF CASSETTES-AMPEX R-Rs
AUDIOPAK, FIDELIPAC & ITC CARTS
DAT & THE NEW R-CD**

For more information call Kris Elliot at 1-800-942-1711 or write to: J&I Audio/Video 20899 Kelvin Pl. Woodland Hills, CA 91367

AXS control room, 2 PB, 1 RP, spt-X card, far & PBR, 4 source stereo audio switcher w/8 I/O & extended software, CDI interface for 16 Pioneer PD-M502 or TM/3 CD players, 486-66 workstation. Pro Digital cut recording system, super log traffic system, music log Ver 5, AXS interface for super log & music, \$5283. F Rainbolt, 580-237-1390.

Sony MDS-JE520 (3), never used, w/rack mount kits, RCA & optical cables, manuals, remotes & batteries, original boxes, never used, \$250 ea or \$625/all. J Williams, Midnight Blue Studios, 12824 Lauran Rd, Hagerstown MD 21742. 301-739-1450.

ANTEX AUDIO CARDS, WILL NOT BE UNDERSOLD. A.s.c. (619) 523-1575.

Urei 565 Little Dipper EQ, \$700; ADC Propatch 1/4" punchblock patchbays, new, \$600 (many); 1.4" TRS patch cords like new, \$15; ADC TT 144 point patch bays, recond, \$149-229. W Gunn, 760-320-0728.

WANT TO BUY

Symetrix 511 single end NR. J LaPrad, Sunspots Prod, POB 403/West Side Station, Worcester MA 01602. 508-885-3926.

AUTOMATION EQUIPMENT
WANT TO SELL

Systemation automation system, call for price. S Fuchs, KAHR, Rte 13, Box 44, Poplar Bluff MO 63901. 573-686-3700.

BUSINESS OPPORTUNITIES
WANT TO SELL

SYNDICATE YOURSELF 1-100 markets US and Caribbean via satellite. Airtime available now! Call Mr. Ferguson, 954-735-4070. www.ibnradio.com.

CART MACHINES
WANT TO SELL

BE 10 Spot, never used, \$1000/BO. J Lalino, WLAL, 319 State Rt 29, Middleville NY 13406. 315-891-3110.

COMPLETE FACILITIES

Picture This:
Your Y2K Complete Equipment Dealer

* Experienced Professionals
* RF and Studio Packages
* Personal Service *
New Stations and Modernization

Atlantic Media Broadcast

* Toll Free *
888-744-6635
email - rick@custone.net

NEW OR USED COMPLETE PACKAGES

STUDIO/STL/TRANSMITTER/ANTENNA OR ANY COMBINATION OF ABOVE
-LEASE OPTIONS-
-EMERGENCY RENTALS-
-REMOTE BROADCAST RENTALS-

SCMS, Inc. (800) 438-6040
"You Know We Know Radio"

CONSOLES
WANT TO SELL

Ampex AM-10 (6) input mono mixer w/master, gd cond, \$250 ea. Bernie, 626-835-1972.

Broadcast Audio Series IV 12 chnl, 36 inputs w/prog, aud, util & cue, full metering, oak trim, \$650. G Hamilton, 301-255-4340.

RCA BC-7A in gd cond, just removed from service, must pick up, BO. J Natoli, 740-922-2700.

VIF
Hold Down Knobs
Pressure Rollers
Motor Rebuilding

SEQUOIA ELECTRONICS
800-948-4428
Now Accepting VISA / MASTERCARD

Ampex AM10 6x2, excel cond, \$295. J Price, 214-321-6576.

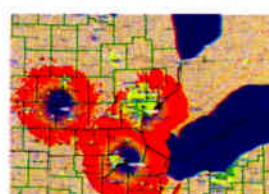
Soundworkshop 30, 12 slot frame, 4 mono, 7 stereo modules, patch bay w/manual, BO +shpg. C Christensen, Black Cat Snd Srv, 10134 Ladybird Dr, Grass Valley CA 95949. 530-268-1620.

Autogram 20 mixer stereo console. Continental Communications. 800-664-4497.

Soundcraft 600, 24x8, \$3900; JL Cooper 16 trk automation, \$1200. W Gunn, 760-320-0728.

BROADCAST ENGINEERING CONSULTING SOFTWARE

Professional software packages for preparing FCC applications and plotting coverage. For Windows and NT.



✓ Create "real-world" coverage maps with Longley-Rice, TIREM, PTP & other models using polygon map features.

✓ Prepare concise FCC model coverage maps and allocation studies using USGS geographic map databases. Census calculations, tower and airport databases.

✓ Search for AM, FM, TV, DTV & LPTV channels with graphics oriented programs and FCC databases.

✓ Plot STL paths in 3-D using NGDC terrain databases... and more!

Soft Communications
800-743-3684

www.v-soft.com
Come see us at
NAB Booth # F2290

MICROPHONES

Neumann U-87 w/jewelers case, shockmount & new windscreen, \$1495/BO +shpg; Sennheiser 416 short shotgun promo mic, phantom powered, w/case, \$725/BO +shpg. J Standefer, 409-295-9171.

EV 666, \$175; EV 6544, \$85; EV 636, \$65; Telex xmtr & mic WT-50, \$125; Telex xmtr & mic WT-200, \$125. J Price, 214-321-6576.

EV 635L mics, \$95; Altec salt shaker mics, \$295/ea. W Gunn, 760-320-0728.

WANT TO BUY

RCA 77-DX, 44-BX, KU-3A's, WE-639's, On-Air & recording lights wanted. 615-352-3456, FAX: 615-352-1922.

RCA 77-DX's & 44-BX's, any other RCA ribbon mics, on-air lights, call after 3PM CST, 972-271-7625.

RCA ribbon mics. W Gunn, 760-320-0728.

EW Online

HALL Electronics

706 Rose Hill Dr. Charlottesville Va. 22901
804-984-4255 (Voice) 804-984-3299 (Fax)

This Months Deal:

Tascam DA-30 MKII
DAT Recorders
Rebuilt \$595.00
w/ 30 day warranty

Lots more Used / Rebuilt gear on our website.

Visit our web site for more information.
sales@halls.com www.halls.com tech@halls.com

Radio World

5827 Columbia Pike, 3rd Floor • Falls Church, VA 22041
PHONE: 703-998-7600 • FAX: 703-998-2966

Call Simone Mullins, Classified Ad Manager,
to reserve space in the next issue.
Use your credit card to pay, we now accept VISA, MASTERCARD
and AMERICAN EXPRESS.

Select from these categories for best ad positioning:

Acoustics	Financial/Leasing Svcs.	Satellite Equipment
Amplifiers	Furniture	Software/Databases
Antennas/Towers/Cables	Limiters	Stations
Audio Production	Microphones	Stereo Generators
Automation Equipment	Miscellaneous	Tapes /Carts/Reels/CDs
Business Opportunities	Monitors	Tax Deductable Equipment
Cart Machines	Receivers/Transceivers	Test Equipment
CD Players	Recorders	Transmitter/Exciters
Computers	Recording Services	Tubes
Consoles	Remote & Microwave	Turntables
Disco-Pro Sound Equip.	Repair Services	Employment

Classified Advertising Rates
Effective January 1, 2000

	1x	6x	13x	26x
1-9 col inch (per inch)	\$83	81	79	76
10-19 col inch (per inch)	\$78	76	74	70
Distributor Directory	\$120	115	110	105
Professional Card	\$90	85	80	75
Classified Line Ad	\$2.00 per word			
Blind Box Ad	\$15 additional			
Station/Studio Services	\$175			

EMPLOYMENT

HELP WANTED



Infinity Radio has openings in both large and medium markets for both Chief and Assistant Engineer positions. If you have a desire to win and have exceptional skills we want you to join our great company. If you're ready for a career. If your ready to step up. Then rush your resume to:

Chuck Herlihy
Infinity Radio
10220 River Road, Suite 304
Potomac, MD 20854-4916
cherlihy@cbsboston.com

Infinity Broadcasting offers Great Benefits, Excellent Pay and Opportunities for Growth...EOE

No Phone Calls Please

AM & FM ENGINEERS WANTED:
Salem Communications Corporation is looking for Engineers to join our fast and strong growing Sixty+ Stations Group. We have openings in several areas of the country. We are an EEO Employer. Bring your resume to NAB and visit our employment suite, it is open Monday, Tuesday & Wednesday from noon to 3PM. Check at the front desk of the Hilton for the room number. You can also mail or fax your resume to: Engineering Dept, Salem Comm, 4880 Santa Rosa Rd., Camarillo CA 93012. Fax: 805-384-4503.

Clear Channel Communications, Inc. is seeking experienced radio engineers for Market Engineering Director Positions in various locations throughout the US. Applicants should have previous engineering supervisory experience, as a station or market Chief Engineer, Engineering Manager, or Director of Engineering. Senior or Professional Level SBE Certification is preferred. Please send a resume and salary history/requirements, to: Mr. Green, 5801 E 41st Street, Suite 715, Tulsa OK 74135. No phone calls please. Clear Channel Communications, Inc. is an equal opportunity employer.

POSITIONS WANTED

30 yrs exper & former owner looking for a new challenge. All positions & locations considered. Ed, 203-874-7263.

Aggressive, motivated, dedicated & willing to travel, 2 yrs PT exper in OKC. Jim, 405-672-6671 or Jwatts4181@aol.com.

CE/Computer Tech w/20+ yrs hands on engineering exper seeks CE position in a top 100 market. Strong audio, computer networking & RF skills. Call 704-563-8676.

Experienced CE seeks FT, PT, Contract, seasonal work in the NE. Friendly, outgoing, looking for radio, AM/FM, TV work. FCC licensed, CET, amateur radio operator, exper in carrier current AM & MDS. M Rakoff, 718-969-5224 RadioMitch@Webtv.net.

Fun-loving & serious broadcasting grad looking for open positions in radio & TV for news & on-air talent. Eager to learn. Elaine, 888-962-4915 (days), 405-567-2745 (eves).

Hardworking, friendly, exper bdcg school grad, dependable & available, will relocate, urban & multicultural interest, will work any format/shift. Chaka, 405-329-8897.

15 yr radio veteran, relocating to PA/MD/DC area in early 2000, primarily news-oriented, seeking FT or PT leading to FT. T/R available: Tory, 207-882-4865.

20 year old rookie, quick at the board, ready to travel, anxious to begin an awesome career at your station. Mike 405-692-3016.

Career minded exper radio personality is wanting you. Hard working, goal setting, willing to travel DJ. Erik. 918-681-1217.

Experienced CE seeks FT/PT/contract seasonal work NE. Friendly, outgoing, looking for radio, AM/FM/TV work. FCC licensed, CET (four options), amateur radio operator, exper in carrier current AM & MDS. M Rakoff either email at RadioMitch@Webtv.net or at 81-12 Roosevelt Ave, #413, Jackson Heights NY 11372. 718-969-5224.

Let my creative entertainment skills go to work for you. I am an energetic graduate of broadcasting school w/radio experience, will relocate. Terry, 405-214-0042.

EMPLOYMENT SERVICES

WE PLACE ENGINEERS

Employer Paid Fees.
20 Years personalized
& confidential service.
All USA States & Canada

MAIL & FAX:

KEYSTONE INT'L, INC.

49 S. Main St., Pittston, PA 18640 USA
Tel: (570) 655-7143
Fax: (570) 654-5765
web: keystoneint.com
Employee & Employer Service
Alan Cornish / Mark Kelly

Radio World

Call Simone to
advertise in
Radio World
and reach
the broadcast
professionals!

703-998-7600, Ext. 154



DON'T GAMBLE WITH YOUR ADVERTISING DOLLARS!

Advertise in
Radio World
and reach the
broadcast
professionals.
Call Simone
TODAY!

(703)
998-7600
Ext. 154

YOU CAN NOW ADVERTISE
YOUR EMPLOYMENT AD ON
OUR WEBSITE FOR ONLY
\$2 PER WORD!

CALL SIMONE FOR DETAILS @
703-998-7600, EXT. 154
OR FAX 703-671-7409

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: Yes No

Are you currently a subscriber to Radio World?
 Yes No

Signature _____ Date _____

Contact Name _____
 Title _____
 Company/Station _____
 Address _____
 City/State _____
 Zip Code _____
 Telephone _____

Brokers, dealers, manufacturers and other organizations who are not legitimate end users can participate in the Broadcast Equipment Exchange on a paid basis. Line ad listings & display advertising are available on a per word or per inch basis.

WTS WTB Category: _____
 Make: _____ Model: _____
 Brief Description: _____
 Price: _____

WTS WTB Category: _____
 Make: _____ Model: _____
 Brief Description: _____
 Price: _____

WTS WTB Category: _____
 Make: _____ Model: _____
 Brief Description: _____
 Price: _____

*Closing for listings is every other Friday for the next month's issue. All listings are run for 2 issues unless pressed for space or otherwise notified by lister.

Broadcast Equipment Exchange

PO BOX 1214, Falls Church, VA 22041 • Tel: 800-336-3045 • Fax: 703-998-2966

ADVERTISER INDEX

This listing is provided for the convenience of our readers. Radio World assumes no liability for inaccuracy.

PAGE	ADVERTISER	WEBSITE URL
66	AKG Acoustics	www.akg-acoustics.com
53	Antex Electronics	www.antex.com
20	Aphex	www.aphex.com
24	Armstrong Transmitters	www.armstrongtx.com
32	Arrakis	www.arrakis-systems.com
50	Arrakis	www.arrakis-systems.com
61	Arrakis	www.arrakis-systems.com
66	ATI	www.atiguys.com
46	Audioactive	www.audioactive.com
55	AudioSonix	www.audiosonix.com
62	Audio-Technica	www.audio-technica.com
2	Auditronics	sales@wheatstone.com
54	Belar	www.belar.com
35	Bext	www.bext.com
58	Bradley Broadcast	www.bradleybroadcast.com
56	Broadcast Devices, Inc.	www.broadcast-devices.com
21	Broadcast Electronics	www.bdcast.com
65	Broadcast Electronics	www.bdcast.com
75	Broadcast Richmond	www.broadcast-richmond.com
48	Broadcast Software Int'l (BSI)	www.bsiusa.com
66	Broadcast Technology Company	www.broadcasttech.com
10	Broadcast Telephone Systems	www.broadcast-telephones.com
56	Broadcast Tools	www.broadcasttools.com
26	Broadcasters General Store	www.bgsfl.com
52	BSW	www.bswusa.com
40,41	BSW	www.bswusa.com
4	Burk Technology	www.burk.com
47	Buysellbid.com Inc.	www.buysellbid.com
56	Cable X-perts	www.cablexperts.com
38	Cartworks/DBM	www.cartworks.com
56	Circuit Werkes	www.circuitwerkes.com
66	Circuit Werkes	www.circuitwerkes.com
66	Coaxial Dynamics, Inc.	www.coaxial.com
7	Comrex	www.comrex.com
1	Continental Electronics	www.contelec.com
56	Cortana	cortana@cyberport.com
49	Crown Broadcast	www.crownbroadcast.com
9	Cutting Edge	www.nogrunge.com
56	Dayton Industrial	NOT AVAILABLE
31	Denon America	www.del.denon.com
14	Dielectric Communications	www.dielectric.com
12	Digigram	www.digigram.com
56	Econco	www.econco.com
70	Excalibur Electronics	Not Available
66	Freeland Products, Inc.	www.freeland-inc.com
22	Full Compass	www.fullcompass.com
56	Gorman-Redlich Mfg. Co.	www.gorman-redlich.com
69	Hafler	www.hafler.com
70	Halland Broadcast Services	www.h-b-s.com
27	Harris	www.harris.com
28	Harris	www.harris.com
29	Harris	www.harris.com
39	Harris	www.harris.com
51	Henry Engineering	www.henryeng.com
10	Inovonics	www.inovon.com
34	Inovonics	www.inovon.com
63	Inovonics	www.inovon.com
70	J Squared Technical Service	jsquared@cdsnet.net
57	JK Audio	www.jkaudio.com
18	Kintron Labs	www.kintron.com
17	Klotz Digital	www.klotzdigital.com
25	Lucent Technologies	www.lucent.com/ldr
64	Marantz	www.superscope-marantzpro.com
43	MediaTouch	www.omt.net
23	Modulation Sciences	www.modsci.com
37	Netia	www.netia.net
33	Neutrik USA	www.neutrikusa.com
70	NICOM	www.nicomusa.com
70	Nott Ltd.	www.tjantenna.com
8	NSN Net	www.nsn.net
11	Orban	www.orban.com
5	Radio Systems	www.radiosystems.com
66	RDA Systems	www.rdasystems.com
3	Richardson Electronics	www.radiotvnet.com
70	S.C.M.S., Inc.	www.scmsinc.com
30	Scott Studios	www.scottstudios.com
66	Shively Labs	www.shively.com
70	Silicon Valley Power	www.svpa.com
59	Sine Systems	www.sinesystems.com
67	Superior Broadcast Products	www.sbpjj.com
59	Syntrillium Software	www.syntrillium.com
16	Systems Store	www.systemsstore.com
13	Telos Systems	www.telos-systems.com
36	Telos Systems	www.nogrunge.com
19	Thum & Mahr	www.yellowtec.de
70	Videoquip Research	www.videoquip.com
79	Wheatstone	www.wheatstone.com
80	Wheatstone	www.wheatstone.com
6	Zephyrus Electronics	www.big-z.com

Reach your internet-savvy clients with RW Online!



The Industry's Online Resource

Newsroom • Vendor & Product Directory
 Calendar of Industry Events • Broadcast Organization Directory
 Guy Wire's exclusive column • Reader Subscription Services

Highlight your listing in the searchable
 Vendor & Product Directory
 or sponsor a section!

http://www.rwonline.com

For advertising information, contact
 Richard Farrell at 703-998-7600 x115 or
 rfarrell@imaspub.com

Everyone Wants to Own a Convertible!

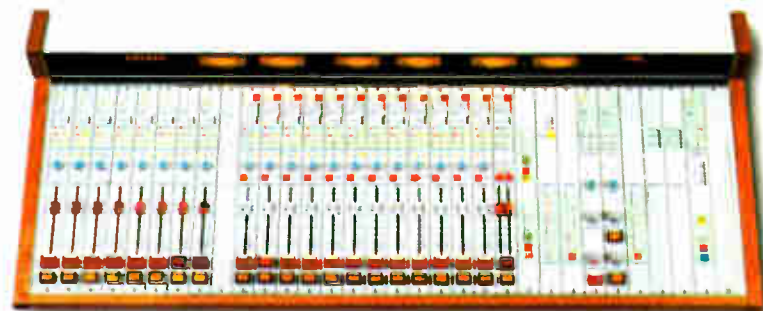


It doesn't matter what's under the hood...

So...How About a Convertible Radio Console?

Our New WHEATSTONE A-5000 gives you the best of both worlds. Order it from the factory now as a topnotch ANALOG on-air console. Then later, when you're ready, switch it out to DIGITAL! That's right, this new design accepts modules from our top-of-the-line D-500 and D-600 consoles, allowing it to be converted from analog to digital in the field!

Think of it: no new studio furniture, *no rewiring*—all your existing studio connections simply replug. And while we're at it, no re-training your staff either. A painless switchover on your own timetable, right in your own facility! If you need a new radio console *now* but aren't quite ready for the Big Switch, then check out our new A-5000—you'll like what's under the hood!



 Wheatstone Corporation

600 Industrial Drive, New Bern, North Carolina 28562 (tel 252-638-7000/fax 252-637-1285/email: sales@wheatstone.com)

See Us At NAB Booth # R2081

World Radio History



The Leading **EDGE**

WHEATSTONE'S D-600 is the **DIGITAL CONSOLE** with the features you **NEED!**

It can control our digital AES routing switcher and display source information right above each fader. It can receive serial commands from your station's automation system, displaying track and cut IDs; it can even store and recall channel setups directly from its control surface—all without the use of an external PC.

Each individual channel can have multiple parametric equalization, limiting, ducking and digital gain settings—complete with preset recall—a great feature for your production suite or demanding on-air talent.

Its LED metering system provides dual readouts showing full scale digital peak *and* calibrated VU or PPM ballistics, so you can derive maximum benefit from its 24-bit architecture. You can even have in-line channel VU and gain reduction metering!

The D-600 allows you to smoothly transition into digital technology without upsetting your entire organization and retraining your whole staff. **THIS IS A TRULY EXCITING CONSOLE!**

ADVANCED TECHNOLOGY, SYSTEM INTEGRATION and HIGH RELIABILITY—WHEATSTONE has the LEADING EDGE!



tel 252-638-7000/fax 252-635-4857
email: sales@wheatstone.com
website: www.wheatstone.com

 **Wheatstone Corporation**
600 Industrial Drive, New Bern, North Carolina, USA. 28562

See Us At NAB Booth # R2081
World Radio History