

Ray Lockhart

Hard work and computer smarts made this former Nebraska farm boy into a radio millionaire.

See Page 4

Global Reach

Alan Haber on getting the most from your Web listeners.

See Page 51



Radio World

The Newspaper for Radio Managers and Engineers

September 16, 1998

INSIDE

NEWS

▼ Hundreds of new Flash Comm affiliates will receive their gear this month. What is Flash Comm and what do they want from you?

See Page 12

▼ A look at Chancellor's alliance with Grupo Radio Centro of Mexico.

See Page 14

GM JOURNAL



▼ Market Watch: New York, the Biggest Apple of Them All

See Page 35

▼ In the wake of cuts at Westwood One.

See Page 35

STUDIO SESSIONS

▼ Fidelipac's digital DCR 10 goes three ways: floppy disk, ZIP drive and MO. A pair of reviews.



See Page 55

ENGINEERING

▼ Mario Hieb ponders his new Aphex on-air processor.

See Page 26

▼ When this satellite is turned off, will it cost you money?

See Page 32



Check out RW Online at www.rwonline.com

IBOC DAB Process Moves Ahead

by Leslie Stimson

SAN FRANCISCO After a few false starts, Digital Radio Express has conducted tests of its prototype FM in-band, on-channel digital audio broadcasting system on KSAN(FM) in San Mateo, Calif.

All three IBOC DAB proponents are conducting tests in order to submit results to the National Radio Systems Committee and eventually prepare rulemaking requests to the FCC. The DAB subcommittee of the NRSC hopes to have test guidelines in place for the latest generation of IBOC DAB research in time for The NAB Radio Show next month.



On the broader IBOC landscape, radio receiver makers are beginning to show more interest in the development of IBOC research. And the marketing competition between proponents is heating up, as they jockey to position themselves as radio's best bet for a digital future.

AM yet to come

After its California test, DRE President Norman Miller said the company was "more than satisfied" with the performance of its FM system, and the company will now focus on development of its prototype AM IBOC DAB system. It was unclear at press time if DRE would conduct any more FM tests on KSAN.

For a few hours on Aug. 19, DRE engineers combined DRE's digital IBOC FM signal with KSAN's analog signal. The analog and digital signals were simulcast and the digital signal was encoded with MPEG AAC audio

See IBOC, page 16 ▶

Stock Deal Creates \$17 Billion Chancellor

Meanwhile, CBS Brings Back Infinity Name

by Lynn Meadows

In the new world order of radio ownership, Chancellor Media Corp. will be the largest United States radio group in both revenue and station count. And CBS Radio will have a new name and slide into second place in terms of revenue.

Going strictly by the numbers, the marriage of Chancellor Media Corp. and Capstar Broadcasting in a stock transaction announced last month, valued at a reported \$2.3 billion, is huge. Executives of both companies estimate the value of the merged company at

See DEAL, page 8 ▶

Chancellor MEDIA CORPORATION	RADIO'S NEW TOP 5	CAPSTAR BROADCASTING PARTNERS
	Stations	Est. 1997 Revenue
Chancellor	471	\$1.58 Billion
CBS/Infinity	162	\$1.49 Billion
Jacor	205	\$ 613 Million
Clear Channel	219	\$ 478 Million
ABC	38	\$ 327 Million

Source: BIA

The Next Generation Digital Console



Harris DRC 2000 Digital Radio Console

Harris is proud to introduce the next generation Digital Radio Console, the DRC 2000. Features include a new low profile design that emulates familiar analog consoles, minimizing operator training and on-site installation costs. The DRC 2000 is the world's most advanced digital radio on-air console. Yet, it provides the simplicity of the analog console operation. Best of all, it's ready to ship!

Harris Corporation Broadcast Division

1-800-622-0022
FAX: 765-966-0623
www.broadcast.harris.com



© 1997 Harris Corp.

NEWSWATCH

Pirates Numbers Shrinking?

About 80 radio pirates are on the air now throughout the United States, according to the FCC. That assessment follows a large shutdown of unlicensed operators in Miami and another in Cleveland.

In the Miami area, FCC and United States Marshals Service personnel shut down 15 unlicensed operators in late July. Equipment seized ranged from homemade transmitting components to professionally manufactured equipment

illegally imported from foreign countries, the FCC said.

The equipment seized included two 2 kW transmitters.

FCC Chairman Bill Kennard called the Florida actions by the Compliance and Information Bureau its "most successful, large-scale, enforcement action against unlicensed operators to date."

The commission identified the illegal broadcasters by frequency. Most were in Miami: 104.1, 99.5, 97.7, 95.3, 91.7 and 89.1 MHz. Others identified by the FCC were on 94.5 and 88.7 in North Miami; 107.1 Miami Beach; 90.3 and 90.9 Homestead; 101.1 and 92.7 Coconut Grove; and 104.7 Hialeah and 90.9 Davie.

Other agencies that assisted the FCC included the U.S. Coast Guard, Customs, the Drug Enforcement Administration, the U.S. Attorney's Office and local law enforcement officers.

Federal authorities shut down four unlicensed operators in Cleveland in August.

Political Burden May Be Eased

WASHINGTON In order to ease what the NAB says would be a paperwork burden for stations during upcoming federal elections, NAB has asked the FCC to

delay implementing part of the changes to the public file regulations.

The commission has decided to allow stations to keep public files in their main studios, wherever that may be (RW, Sept. 2). The changes are likely to take effect later this month. For the first time, the commission has required stations to respond to telephone inquiries about the contents of their public file and to provide callers with requested material by mail.

See NEWSWATCH, page 3 ▶

Index

AES/SBE SHOW PREVIEWS

AES in Frisco: Latest and Greatest
by Alan R. Peterson 17

Engineers, Spectrum Are Top Issues for SBE Brass
by Alan R. Peterson 17

Sessions Abundant at SBE Show
by Alan R. Peterson 21

Teen Talks Web Radio
by Alan R. Peterson 24

FEATURES

Digital Mics and the Cable Question
by Steve Lampen 25

Aphex Takes Different Approach
by Mario Hieb 26

Workbench
by John Bisset 28

Tropical-Band Radio on Decline
by Hans Johnson 29

Old Satellite, New Receivers?
by Bill Sepmeier 32

GM JOURNAL

New York Radio: Times and Trends
by Christine Burke 35

WW1 Mixes the NBC/Mutual Deck
by Randy Stine 35

Filling the Bill at K-Earth 101 FM
by Sandy Wells 46

Students to Benefit From Bayliss
by Sharon Rae 47

Listeners Talk, Are You Listening?
by Mark Lapidus 49

Wedded Bliss: Where's the Ring?
by Alan Haber 51

Hail to the Staff: Unsung Heroes
by Harry Cole 52

STUDIO SESSIONS

ZIP-py Fidelipac DCR 10 Deck
by Jeff Johnson 55

DCR 10 Tested for Network Use
by John E. Hingsbergen 55

Yamaha Fits Eight Tracks Onto MD
by Michael Parks 56

Voice-Overs and the Internet
by Travis 56

Ring Mod Chip for Alien Effects
by Alan R. Peterson 57

Audio Reference Book: Get Smart
by Gowan Grey 58

Travel Show Wins Radio Honor
by Douglas Roycroft 59

Beyer Ring-and-Spring Mic Has Nostalgic Flair
by Tom Vernon 63

Take a LOOK at THIS:



Then look at our competition.

OF COURSE many stations are cost-conscious these days—just remember why you wanted a new console in the first place: to **UPGRADE**.

The **R-60** has what's needed, with all the right features: our **SIMPLE PHONE®** module for easy error-free talk segments; twin six bank preselectors, so you won't run out of input capacity; onboard machine control panel, clock, timer, a well-designed cue system, and a truly effective control room and studio monitor interface. And because it's totally modular, service is easy—even while you're on-the-air! Documentation: this can determine whether you have an installation day or an installation *week*. We've done it right to guide you through. And **PERFORMANCE?** Of course we've handled that; simply compare our specs.

DON'T MISS your opportunity to upgrade. Choose the R-60 radio console from **AUDIOARTS**.

FREQUENCY RESPONSE

Line (10Hz-20KHz) ±1/10dB

Mic (20Hz-20KHz) ±1/10dB

THD+N (20Hz-20KHz)

Line, +4dBu .005%

Mic & Line, +16dBu .005%

IMD (SMPTE)

Mic & Line, +4dBu .004%

DIM

Mic & Line, +16dBu .005%

DYNAMIC RANGE

Line 114dB

Mic 98dB

HEADROOM

ref +4dBu 24dB

OFF & ASSIGN ISOLATION

1 KHz -110dB

20 KHz -105dB

BUS CROSSTALK

1 KHz -100dB

20 KHz -75dB

600 Industrial Drive, New Bern, NC, 28562
tel 919/252-638-7000 / fax 919/252-637-1285
E-mail: email@wheatstone.com



AUDIOARTS ENGINEERING

'Bubba' Too Hot for AM Drive

by Leslie Stimson

WASHINGTON WXTB(FM) in Clearwater, Fla., may have gone too far in the FCC's eyes when it aired local personality "Bubba the Love Sponge" on two occasions in morning drive in June in 1997.

At the time, the Jacor Communications station was owned by Citicasters, and the FCC has addressed an indecency fine to that company.

more than one complaint that includes tapes of the broadcasts. The burden of proof, as the legal eagles say, is up to the person making the complaint. In order for the commission to investigate a complaint, the complainer must submit a tape or a transcript of the allegedly indecent broadcast, along with the date and time and the call letters of the station.

If you're curious, you can cruise "Bubba's World" on his Web site

mission would do with the information, or if it has the authority to change any advertising practices.

Catherine Sandoval, director of the FCC Office of Communications

Information is being gathered from broadcasters, advertisers and ad agencies.

Another complaint being investigated is whether ad agencies or their reps demand discounts, reportedly ranging from 10 to 25 percent, when they do buy ads on urban or Spanish formats.

Advertisers have disputed suggestions of discrimination, telling the FCC that they try to reach the largest number of potential product buyers for the least amount of money.

Sandoval made clear this is a "study," not a more formal Notice of Inquiry, the preliminary step towards a rule making. The commission staff would evaluate the results and then decide what to do with the information.

If you own a station, you have two more days to pay annual regulatory fees for Fiscal Year 1998.

But because Jacor now owns the station, Jacor must decide how to handle the penalty.

The commission in August fined the station \$4,000 for airing allegedly indecent passages of "Bubba." The commission considers material to be indecent when sexual or excretory functions or organs are described in "patently offensive terms." The commission considers the Bubba passages legally actionable because they aired in morning drive, when the commission believes children may be listening. The so-called "safe harbor" for indecency, when such programming can air, is from 10 p.m. to 6 a.m.

The FCC found six Bubba bits to be indecent. One involved eating, sex and an air gun. Another was for "No Panties Thursday," involving a caller from Lucent Technologies.

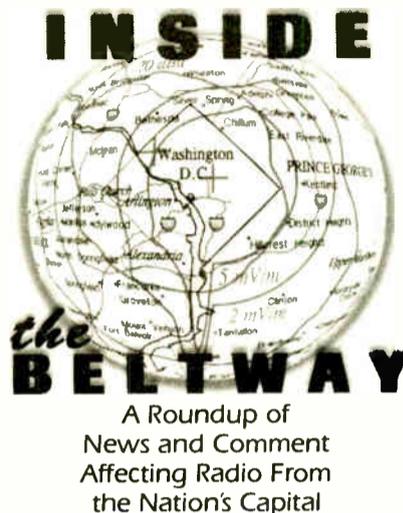
The investigation was prompted by

(www.btls.com). He claims to be "the most controversial, no holds barred, say it like it is, radio personality working today."

Jacor had 30 days to decide whether to appeal the fine. A spokeswoman said the case was under review and that was the extent of the company's comment. Calls to the station for comment were not returned.

Advertising study

Meanwhile, get ready for more debate on the hot-button issue of advertising discrimination. The FCC hopes to release later this month the results of a year-long study on advertising. Specifically, it wants to know whether advertisers discriminate against stations that are owned by minorities or targeted to reach minority listeners. It's unclear what the com-



Opportunities, said the commission has heard complaints from the National Association of Black-Owned Broadcasters, for example, about advertisers or their rep firms dictating that a particular ad buy not include urban or Spanish-format stations. The issue gained the attention of the industry after a memo from Katz Radio Group surfaced this spring, recommending that clients not buy time on both formats. Katz has apologized for the memo.

Regulatory fees due

If you own a station, you have two more days to pay annual regulatory fees for Fiscal Year 1998. If you are paying electronically, you must make sure that Mellon Bank receives it no later than Sept. 17. Fees not paid electronically must be in by Sept. 18. The government want it all at once; no installment payments will be allowed this year. Earlier this year, the commission changed the way the fees are calculated, to be based on station class and station's city strength service contours instead of protected field strength signal contours (RW, July 8). Stations serving higher populations pay higher fees.

For the scoop on what you owe, call (888) 225-5322.

NEWSWATCH

► NEWSWATCH, continued from page 2

"NAB believes that stations will be faced with repeated requests from the most active candidates during election seasons," stated the association in its filing to the FCC. Currently, NAB said, a candidate can access a station's public file to keep up on how much air time is devoted to their competitors without much assistance from station staff. The FCC had not responded to the request by press time.

FM Technical Changes Scrutiny

WASHINGTON Members of an ad hoc engineering group pulled together by NAB to study proposed FM technical rule changes plan to meet again Sept. 18 before they finalize their comments to the FCC. The group of engineers, attorneys and consultants from NAB and major broadcast groups, has been looking at two of the proposals in particular to determine the potential impact on stations.

Commenting on the proposal to allow stations to negotiate their own

interference protection agreements in some cases, NAB Science & Technology Vice President, Technical Conferences, John Marino, said, "We're looking at the proposals from a technical perspective ... to make sure stations won't be in a compromise situation for engineering agreements." The group is also looking at the proposal to divide the existing Class C into two subclasses — Class C and Class C0 (or C zero) — to study the potential impact on the FM band.

Three Units for Chancellor

DALLAS Chancellor Media Corp. has created three operating units (radio, TV and outdoor) and named presidents for each. Chancellor Chief Operating Officer James de Castro heads the radio division. Gary Chapman, president and chief executive officer of LIN TV Corp., which Chancellor agreed to acquire in July, leads the TV group while James McLaughlin heads the outdoor division.

WHAT COMES AFTER DIGITAL?

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

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

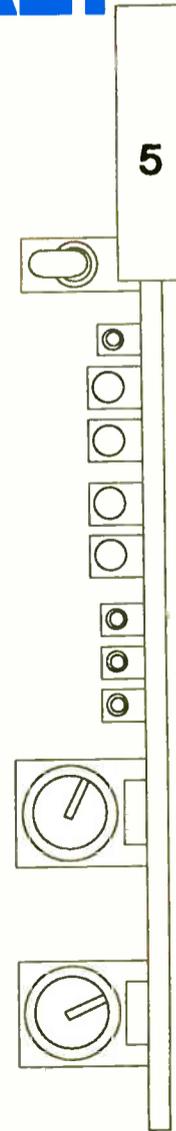
Digital audio is also not a terminal technology. It is simply where we are now.

Want to know what comes after digital? Call (724) 772-2310 and ask for our white paper "Artificial Intelligence, It's What Comes After Digital". While you're at it, you could also ask for a no-obligation, 10-day demo of COBALT BLUE™, the world's first Neural Network audio processor.

CLARK COMMUNICATIONS

221 Commerce Park Drive,
Cranberry Township, PA 16066-6403
(724) 772-2310 Voice (724) 772-4770 FAX

5



Lockhart's Hall of Fame Career

Do you immerse yourself in radio? Ray Lockhart does.

Lockhart is on my mind because he was inducted recently into the Nebraska Broadcasters Hall of Fame. The career of this personable and soft-spoken man crosses borders that usually separate radio managers, TV managers, folks who make equipment and those who make national broadcast policy. He has taken a role in each of these disciplines over four decades, and he has succeeded, often in spectacular fashion, at several of them.

His unique perch gives him an unusual perspective on our industry.

Preference for radio

If you work in radio in Nebraska, you may know Ray as a competitor, the guy who grew up on a farm, took a sales job at KNOP-TV in North Platte in 1959, and soon heard the call of radio.

"We put on a (new) radio station. They asked me to go down and shepherd the sales effort," Lockhart said. The station was KNOP(AM). "I found that I liked radio better. I liked the creativity."

In 1967, he moved 50 miles to Ogallala, to become GM of a 500-watt AM day-timer, KOGA. His future, it turned out, was in ownership. He purchased a piece of KOGA in 1969 and became sole owner five years later. The station subsequently increased power and added night service. Lockhart started KOGA-FM in 1978, then purchased KMCX(FM) in 1991, both in Ogallala. Those stations are 100 kW.

Today, KOGA-FM programs AC; KMCX(FM) is mainstream country; KOGA(AM) is adult standards. The three-station group, Ogallala Broadcasting Co. Inc., has been acquired by Capstar in a deal expected to be consummated this month. Over the years, Lockhart has also owned all or part of six stations in Arizona and Colorado.

That's the local side of Lockhart, now 61. His face also is familiar to folks who set policy and who lobby Congress. He has served four terms on the NAB board; and he worked as a legislative liaison, helping broadcasters get their views across to elected officials.

But Lockhart's career took an unexpect-

ed — and profitable — turn in the 1980s.

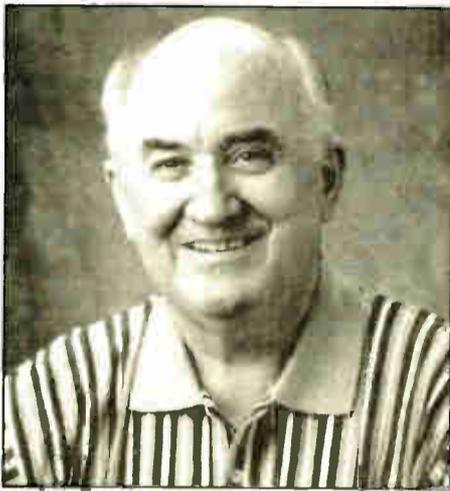
Like other radio owners, Lockhart was running automation systems at several stations. But there was a problem.

"They were wearing out, and no one was supporting them anymore," he said. "I wondered, 'What will happen when they finally give up the ghost, and parts wear out?'"

Computing power

Lockhart thought he knew the answer: computers. But few other radio people were thinking that far ahead.

"People said, 'What are you, nuts?' They said you can't do the digital convergence, but we knew you could. CDs were already a reality. So we started looking around. My son Kevin was a crew chief in helicopters, and he worked



Ray Lockhart

with computers. When he came out of the military, we said, 'Let's start working toward this.'"

Several years of experimentation resulted in a DOS-based computerized automation/live assist system. His stations served as a test site. The Lockharts put the system on the air. It didn't take long before radio people who visited began to ask if they could buy one, too.

Lockhart knew a business opportunity when he saw it. Ray and Kevin founded Prophet Systems in 1989 to meet demand. In 1993, they converted their product to a Windows-based system, now

known as AudioWizard, and expanded its audio storage capabilities. The company has since carved out an important niche in a highly competitive marketplace.

"I call it my brainchild," he said, and I could tell he was smiling on the other end of the phone line. "Some people say it was a nightmare."

You and I should have such dreams.

"It has grown so rapidly in the last couple of years," Lockhart said. "How many users? Well, we don't count workstations like some companies do, just locations; but we're probably in 300 to 400 locations, including users abroad."

Eye-catching growth

Capstar Broadcasting Group, its biggest customer, bought Prophet earlier this year for \$25 million in cash and stock for Ray, Kevin and Chief Programmer Georg Joutras. Ray now serves as a consultant to Capstar; Kevin works as president and general manager of Prophet. Ray calls his son "the driving force" of the computer company.

Among industry insiders, the buyout raised questions, and I pursued them with Ray. I asked why a potential Prophet client would want to purchase a critical piece of their air chain from a supplier owned by a competing radio owner.

"Capstar, bless 'em, are realists," he replied. "They said, 'We want to own you, but we don't want to change anything. You go ahead and operate it.' ... We can assure any business that wants to deal with us that, while we may be a division of Capstar, we are quite autonomous."

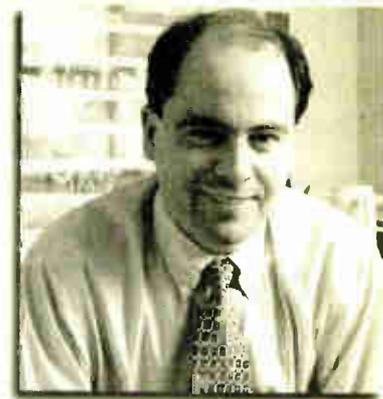
Prophet passed a big test this summer when it announced that Jacor had committed to use Prophet Systems throughout its chain. "The quality of the product won out," Lockhart said.

Will we see more radio groups buying their suppliers?

"It makes sense. It's a good relationship for a large group. If they're going to embrace a technology, they want to assure themselves that they will have access. ... Groups are doing this to protect their supply lines," he said.

I wondered how Ray feels about developing technology that might reduce

From the Editor



Paul J. McLane

jobs. His own staff is down to 13 from 25 in 1991, thanks to Prophet Systems.

"Generally, the people that should be in the business stay in the business, and we can hold them with higher salaries," he said. "The folks that are marginal go somewhere else. ... We probably have lost the training ground aspect (of radio). But I think technology has probably been the salvation of the broadcast industry."

And what is the future of that industry?

"I still find the radio business vibrant, alive, creative. We probably don't get quite the flow of talent into the business that we did years ago, but others have that problem too. TV struggles with it. Cable and entertainment and sports soak up people who would have been stars in broadcast."

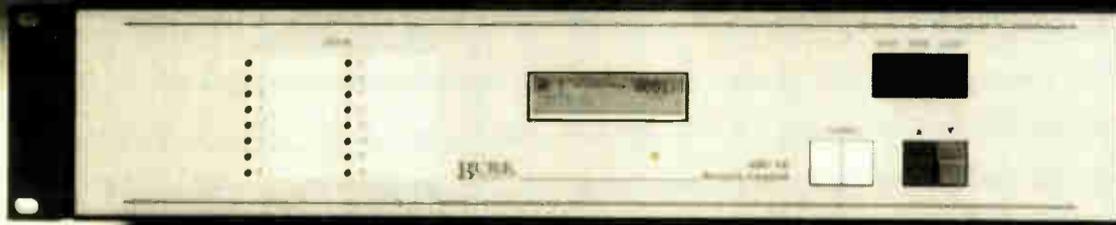
Lockhart reminded me that the death knell of radio has been announced before.

"We keep hanging in there and getting stronger. We have operators who are becoming smarter. They're not just selling spots, they're marketing. ... Good front-line people are out there marketing radio. RAB is doing an excellent job. People are opening their eyes to what a great buy radio is. It bodes well."

Radio's biggest challenge, Lockhart said, will be finding an in-band, on-channel DAB solution — as much for its potential of multiple channels as for better quality. This, he said, will help radio compete with satellite.

"We'll have a number of channels coming out of the sky, (and) localism will be the all-important thing. That's the thing radio does better than anyone on earth."

Burk puts you in control.



**ARC-16: The industry standard
for multi-site transmitter remote control.**

BURK
TECHNOLOGY

Toll Free 1-800-255-8090 • email: sales@burk.com

With
NEW
AutoPilot
FOR WINDOWS

*"It's almost like
standing in front of
the transmitter!"*

◆ READERS FORUM ◆

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

Voice-over votes

Dear RW,

I just wanted to pass along my appreciation for running articles from "Travis, the V/O Guy." I especially appreciate his ability to communicate in a real way the experiences he has had in the V/O field.

Travis' articles continue to be a real help to me as I continue to grow in this work. Thanks for including him in RW.

Ron Maxwell
Fort Myers, Fla.

Sign language

Dear RW,

This letter is in regards to the recent article by Harold Hallikainen on tower signs (RW, Aug. 5).

I manufacture and sell ASRS, or

Antenna Structure Registration Signs. You may have seen our ads; ID-ER Antenna Products sells tower site ID products.

Some years ago we consulted with the FCC in the design of a tower sign and called it an FCC Antenna Structure Registration Sign. The sign must be readable from about 75 feet.

Knowing what the FCC has in mind for tower identification, I instruct my customers to post the sign where one would see it approaching the tower. This could be on the tower, tower fence, transmitter building or on your gate if you have a long driveway. Some customers order two signs to be safe. This number is also a good way to be found to lease tower space.

The 75-foot readable distance is the distance the FCC thought a registration sign should be readable. My sign was designed with numbers large enough to be read at 75 feet-plus. The design of my sign was determined in conversations with the FCC.

Tom Moyer
Owner
ID-ER Antenna Products
Glenmoore, Pa.

Digital delivery commitment

Dear RW,

Broadcasters need to do some serious research when considering the purchase of digital audio delivery systems.

In the past few years, stations have moved to computer-based audio delivery and those that have not are considering it. When it comes time to shop, there is plenty to look at. It seems everyone has the sure-fire solution for your station. Every manufacturer has the features you need and the reasons you should avoid the competition.

The vendors are focused on making the sale. That does not mean they are as well-focused on product development and, even more important, support after the sale.

The most important feature for your station when selecting a system should be consistent 24-hour support. Look for this "feature" first when selecting a system, then worry about bells and whistles. When you call a station using a specific system, ask them about the technical support. Do they stand behind the system?

You are doing a lot more than "moving to the digital age" when installing a digital audio delivery system. You are also putting all your eggs in one basket with only one place to go for help when the basket breaks. Do they really care if you are off the air after the bill is paid? Is your system really that redundant? Maybe you bought the mirrored server but what about the on-air workstation or network, what if it fails? What if your vendor doesn't win the battle and isn't around to support you at all two years down the road?

Digital delivery is a huge commitment, not just more broadcast equipment. Do your research, take your time, choose wisely and put the heat on the manufactures to offer good products and good support.

Aaron White
Chief Engineer
KEEY-FM, KFAN-FM, KXBR(AM)
Minneapolis

How About Some New Blood?

At the upcoming NAB Radio Show in Seattle, the association will again select one of radio's most well-known voices as its Network/Syndicated Personality of the Year. In our view it's one of the most important awards in the business.

We only wish radio had some new names to choose from in 1998.

Not that there's anything wrong with the people nominated. In fact, they make up a veritable radio hall of fame. But maybe the Radio Hall would be a better place for the names on this year's list.

The nominees are Paul Harvey, Don Imus, Tom Joyner, Rush Limbaugh and Howard Stern.

Love 'em or hate 'em, these are fabulous talents, and each has made a great impact on our business.

(We have a special fondness for Joyner and Harvey, who demonstrate daily that radio can be great without raunch.)

Yet these five men have been making their impact for years.

Let's look back. Who has been nominated for this award in recent years?

In 1997, the nominees were Joyner, Dr. Laura Schlessinger, Stern, Art Bell and The Fabulous Sports Babe.

In 1996, the nominees were Harvey, Imus, Dr. Laura, Karl Haas and John Boy Isley & Billy James.

In 1995, the list was Limbaugh, The Sports Babe, Joyner, Dick Bartley and Rick Dees.

Every name on these lists is that of a winner. But most of them have been around a long time. And with one or two exceptions, these are predictable nominations (and renominations). In 1998, there is not a single new nominee. Maybe NAB should rename the category Legendary Personality of the Year. It would be a better fit.

We wonder why there aren't more fresh names. Is it the selection process? Or is it because radio is not generating new and interesting national talent? That would be a shame, particularly in light of the trend toward syndication. We need more fresh, exciting voices on radio.

It would also be nice if more of the nominees showed up at the Marconi event this year, to show appreciation for such an honor from their peers.

— RW

Radio World

Vol. 22, No. 19 September 16, 1998

telephone: (703) 998-7600
editorial fax: (703) 820-3245
e-mail: radioworld@imaspub.com
Web site: www.rwonline.com

The editor's list may be found in the phone extension listed below.

Paul J. McLane ext. 117	Editor
Sharon Rae ext. 126	Managing Editor
Alan Peterson ext. 135	Technical Editor
Leslie Stimson ext. 129	News Editor/ Washington Bureau Chief
Brian Galante ext. 146	Assistant Editor
Thomas R. McGinley	Technical Advisor
Stevan B. Dana	Publisher/CEO
Carmel King ext. 157	Chief Operating Officer
Robert "Skip" Tash ext. 160	Associate Publisher
Marlene Lane ext. 128	Editorial Director
Alan Carter ext. 111	Editor in Chief (International)
T. Carter Ross ext. 137	Editor (International)
Christine Joaquim ext. 138	Managing Editor (International)
Rogelio Ocampo ext. 121	Latin America Managing Editor
Marguerite Clark	European Editor
Linda Sulten ext. 141	Editorial Assistant

Contributors: W.C. Alexander, James Careless, Harry Cole, Troy Conner, Ty Ford, Alan Haber, Harold Hallikainen, Mario Hieb, Peter King, Mel Lambert, Mark Lapidus, Dee McVicker, Lynn Meadows, John Montone, Rich Rarey, Bob Rusk, Randy Stine, Tom Vernon.



Radio World (ISSN: 0274-8541) is published bi-weekly by IMAS Publishing (USA), Inc., P.O. Box 1214, Falls Church, VA 22041. Phone: (703) 998-7600, Fax: (703) 998-2966.

Periodicals postage rates are paid at Falls Church VA 22046 and additional mailing offices. POSTMASTER: Send address changes to Radio World, P.O. Box 1214, Falls Church VA 22041. REPRINTS: Reprints of all articles in this issue are available. Call or write Giselle Hirtenfeld, P.O. Box 1214, Falls Church, VA 22041; (703) 998-7600; Fax: (703) 998-2966. Copyright 1998 by IMAS Publishing (USA), Inc. All rights reserved.

—PRINTED IN THE USA—

Next Issue of Radio World
September 30, 1998

Where will we be in 2003?

Dear RW,

This is in response to Mario Hieb's article "Get Out Your Radio Crystal Ball" (RW 1998 Transmission Sourcebook).

Unfortunately for radio, I believe that the technical transmission modus operandi will be very similar to what we have now.

Radio seems stagnant at reinventing itself as it once did to survive the introduction of television, as movies are doing

5.1 audio every time their HDTV is turned on. A television tuner will be the center of the audio excitement in America.

Radio is locked in an uninspired paradigm that can be compared to a drug-induced stupor.

— David Solinske

By then, a creative person at CD Radio may realize the radio industry is locked in an uninspired paradigm, one that can be compared at best to a drug-induced stupor. Working with large record companies that are more than willing to remix to boost their dismal sales figures with complete catalog resales in DD 5.1 on DVDs, CD Radio by that time may simply throw a switch on "the bird" to present the source of 5.1 digital audio for the home ... a satellite tuner that feeds the HDTV system. Discrete 5.1 surround sound will replace L/R F/R faders, filling the inside of new cars that have a two-inch antenna flat on their roofs.

And just maybe, in most houses, off in a corner of a bedroom, will sit a little three-inch speaker inside a clock that will wake people up with an IBOC digital signal which, everyone agrees, will sound as good as FM.

David Solinske
Broadcast Engineer
Largo, Fla.

Write to Us

RADIO WORLD
READERS FORUM

P.O. Box 1214
Falls Church, VA 22041

radioworld@imaspub.com

now (IMAX, THX) and as they did then to survive television, and now as television is doing via HDTV against satellites, laser disks, and itself.

Radio, with a continuing deficit of creative and visionary leaders, will continue on the unguided journey that led to the major disasters of the industry, demonstrable by the number of original spec AMAX receivers, AM stereo receivers, NRSC receivers, the pathetic state of music sales and the demise of home "centerpiece" radio-based stereo systems.

Come 2003, consumers will be surrounding themselves with Dolby Digital

GUEST COMMENTARY

Frank Foti: Harris Got It Wrong

by Frank Foti

The writer is president of equipment manufacturer Cutting Edge.

The July 8 issue of *Radio World* provided an interesting point-counterpoint set of articles about a digital multiplex interface that our company has created, Digital Composite Enabling Technology, abbreviated D/CET. In the Harris response, there are some claims that I feel must be addressed.

Demo not flawed

Harris claims that we set up our D/CET demonstration at NAB '98 so that part of our D/CET signal would mix into the exciter's signal path and degrade audio performance whenever the AES3 mode was selected, thus rendering the A/B comparison invalid.

What's surprising about this claim appearing in print is that I personally spoke with Geoff Mendenhall, Harris vice president of engineering, about this exact question after NAB. I informed him that we "muted" our D/CET output signal whenever the Harris DIGIT default AES3 stream was activated so as to not cause the above described problem. Hence, there was no flaw in our demonstration, and this is a non-issue.

Intra-sample peaks

Harris is correct when they point out that intrasampled peaks may be missed in generic digital systems. But when they go on to say that overshoots in the Harris exciter are caused by Omnia's 48 kHz sampling rate, they are confused. Why would a 48 kHz system have this problem, while a 32 kHz system would not?

The theory actually specifies the opposite: that a system using a higher sampling rate will have fewer overshoots. Following the equation in the article, a 32 kHz system will have less than 10 per-

cent level acquisition, or 90 percent detection error of a 15 kHz peak, sampled halfway between two samples. A 48kHz system, meanwhile, yields 55-percent level acquisition, or a 45-percent error. In our virtual 192 kHz sampling method, there is 97-percent level acquisition, which generates only 3-percent error. All of this assumes a digital signal processing (DSP) system with a textbook truncation clipper. The problem here is that the DSP portion of the system is not considering what the reconstruction filter — which normally is an external analog circuit — will do to the signal after the clipping function is performed.

What we have proposed is the digital equivalent of a composite MPX input to the digital exciter.

But nothing like this happens in the Omnia! A properly designed integrated digital peak limiter/filter as we have implemented will tightly control peaks, and nothing will "slip between the samples." We don't want to give away all of our secrets, but one key to the Omnia's rock-solid peak control is that we upsample to 192 kHz in the clipper section. We also carefully take into account the ultimate effects of the reconstruction filter in our digital clipper design.

The real problem

We've chosen a 48 kHz sampling rate in the Omnia for an important reason: In a dynamics processor, even though the input low-pass filter restricts audio com-

ponents to below the Nyquist frequency, some components are created which are above the original limit. This is a process similar to what happens when audio modulates an AM carrier: sidebands are created. When these components fall above the Nyquist frequency, they rollover (alias) down into the audio band.

In a 32 kHz system, there is such a small guard band (only 1 kHz!) that significant distortion energy is created. This is one cause of what is often perceived as "digital grunge." With our 48 kHz sampling, the area of protection is 9 kHz wide, effectively eliminating the problem. (If you want more detail on this sub-

ject, please visit our Web site at www.nogrunge.com for technical papers, or call me directly.)

Now let's look at what happens when this signal reaches the exciter. An exciter that uses a 32 kHz sampling rate must have very steep low-pass filtering, with full attenuation at the Nyquist frequency, 16 kHz. Any audio energy that exceeds 16 kHz will cause overshoots in these low-pass filters.

Harris suggests that the Omnia is the cause of this problem. We think they have it backward: Why should we be forced to use an inferior sampling rate to accommodate the exciter? It should use 48 kHz sampling. There will then be no problem with 48kHz processors — and in case a lower sampling rate processor is used, there is no problem with overshoots because any filtering that has already been performed in the 32 kHz sampled domain fits well within the Nyquist restrictions of the 48 kHz sampled system.

The required filters in a 32 kHz system also contribute to unwanted and unnecessary delay. The filter passband must be flat to 15 kHz, and stopband must provide 96 dB of rejection at 16 kHz. To achieve filter of this magnitude, along with phase-linear group delay, an FIR filter is generally necessary. An equiripple style of filter is suited for the job. Unfortunately, this filter will require 119 taps to create the required tight slope. A filter of this length will create 1.8ms of throughput time delay.

By contrast, the same 15 kHz low-pass filter designed to provide the same 96 dB stopband rejection at 19 kHz to protect the pilot, and operating at 48 kHz sampling, requires only 47 taps. This generates a throughput time delay of only 0.47ms, almost four times less than the filter described above. When we consider that time delay in digital transmission systems is a cumulative function, every millisecond saved is important and beneficial. It is our feeling that is unnecessary to add further delay, as it can add to the comb-filter effect that air talent hear when monitoring themselves off the air.

It should be pointed out that the 32 kHz sampling rate is not any kind of standard. It was chosen by some manufacturers at a time when DSP processing power was more expensive than it is today, and the 48 kHz rate had not yet become standard for professional studio work. There is no compelling reason why exciter manufacturers cannot or should not support 48 kHz.

The proof is in the pudding, as they say. The Omnia is now on-air worldwide at hundreds of radio stations, and there have been zero complaints about lack of peak control. When the analog multiplex (MPX) input is used, there are no overshoots — an unambiguous demonstration proof that our clipper system is capable of absolute peak control. But when our customers try to use the AES3 input of the DIGIT exciter, overshoots do occur.

Composite clipping

It is long been known that composite clipping adds loudness and punch to the sound of a station. I would guess that 75 to 85 percent of FM radio stations in the United States employ composite clipping. The complaint about it has been the clipper MPX artifacts that throw harmonic trash into the SCA region. That is true, and we have done something about it. The Omnia.fm processor employs a user-selectable composite clipper that provides the loudness and punch that program directors and general managers love, but it also has a phase-linear low-pass filter in the upper SCA spectrum that will suppress clipper artifacts by at least 60 dB. That allows SCA services to operate without interference, and assists with efficient modulation.

The D/CET interface allows our digitally based composite clipping and filtering method to be used. Another major advantage of this interface is that it is connected directly to the digital modulator section, bypassing all of the conversion functions and low-pass filters associated with the AES method.

The benefit here is that peak control is absolute! There is no chance of overshoot errors due to peaks "slipping between the samples," or ring from low-pass filters in the left/right audio domain. The numeric peak level provided at the output of the D/CET interface is precisely what is modulated! In an all-digital system, without a composite interface like D/CET, composite clipping is not possible in the audio processor.

Response to objections

1. Harris claims that the D/CET interface would require making changes to their circuit board, and attaching wires, as if we were suggesting that potential users have to perform a "hack job" to the exciter. Not so. We will manufacture our own module that will connect directly to the DIGIT backplane, in the same fashion that the Harris Digital Input Module currently does. There will be no "tacked-on wires." What was shown at NAB '98 was a prototype for demonstration purposes only.

2. Harris comments that "timing and operational considerations" need to be fully tested to guarantee the proper operation of the exciter. We have already done this. Our intention is not to alter the RF generation of the DIGIT exciter, or any other manufactured exciter, but to provide the broadcaster with an alternative interface that will improve a radio station's performance.

I have been a chief engineer. I was
See FOTI, page 14 ▶

So Many Watts

So Little Space



300 W model XT 301 pictured

The high power exciters from Bext:
Practicality, Efficiency, Performance,
Reliability & Built-In Stereo Gen. Option
all in one small 5 1/4" unit (3 rack spaces)

Call for your BEXT catalog with FM Antennas, Exciters, Amplifiers,
Transmitters, Translators, Boosters, STL's, or view it on-line!

BEXT The Low Power Leader
619-239-8462 • FAX: 619-2398474
www.bext.com • mail@bext.com

LOOK.



VECTOR
POTS CODEC
15 KHZ TWO-WAY AUDIO
ON ONE STANDARD PHONE LINE.

NOW SHIPPING.



Comrex Corporation, 65 Nonset Path, Acton, MA 01720
Te: (800) 237-1776 Fax: (978) 635-0401 Fax-on-demand: (978) 264-9973
Email: info@comrex.com www.comrex.com

COMREX

Circle (157) On Reader Service Card
World Radio History

Chancellor Nears 500 Stations

► DEAL, continued from page 1
more than \$17 billion. But in the radio financial world, the deal was expected, given that the largest shareholder in both companies is the private investment firm Hicks, Muse, Tate & Furst Inc.

On Aug. 27, executives of Chancellor Media Corp. (NASDAQ: AMFM) announced Chancellor will merge with

advertising businesses. Up to 20 percent of the new Infinity Broadcasting will be offered for sale in an initial public offering. The proceeds will be used to fund more growth. CBS Corp. will own at least 80 percent of Infinity shares. The IPO is expected before the end of the year.

Peter Handy, managing director of

Chancellor/Capstar merger is complete, the latter group will become the largest in the country by all popular means of measuring size.

After Capstar is digested and all other pending deals and LMAs are counted, BIA reports that Chancellor Media will operate stations that had a 1997 revenue total of \$1.585 billion. CBS, with 162 stations, had a 1997 revenue total of \$1.49 billion. The strength of CBS revenue comes from its big-market profile; it has 80 stations in the top 20 markets.

In a press release, Thomas O. Hicks, chairman of both Chancellor and Capstar, stated that it had been his long-term professional and personal goal "to create the nation's largest radio broadcasting entity by all measures."

With the newly combined company, he will realize that goal. A CBS spokesman brushed aside questions about being number two, noting that Infinity is out to make sure "that we are providing value to our shareholders." He added that the CBS restructure "unlocks the power of our radio group."

Communication stocks, like most others, were shaken by market turmoil in August. CBS watched its price slip steadily. CBS stock was worth more than \$33 a share on July 1. On Aug. 31, it closed at 25-3/4.

No surprises

In shock value, the Chancellor/Capstar deal rates low, because Hicks, Muse is

regulatory review, it is unlikely that the Justice Department will have grounds for much interest. Chancellor reported it will not violate local ownership limits in any market, even with the addition of Capstar.

One of the primary reasons the new company will not have to divest itself of any stations is that the acquisition philosophies of Capstar and Chancellor are so different. Capstar, founded by Hicks, Muse in 1996, focuses on stations in mid-size markets. Chancellor owns stations primarily in the largest markets in the country.

Foreman noted these different focuses as an advantage for the combined group. There are few groups, he commented, that are active in major, medium and smaller markets. The combined group will have a presence in approximately 105 markets.

Asked if small-market station owners should be worried about a deal that puts them up against the Chancellor giant, Foreman said the transaction could bring added opportunities for stations in mid-markets. The large group will be able to maintain strong rate credibility, said Foreman, which will help its competitors' advertising rates.

Handy said the only surprise in the Capstar/Chancellor merger was the downward pressure on the two companies' stock prices which could not be explained away by the stock market drop. Chancellor shares, which opened the third quarter at about \$50 each, closed out August at 35-11/16. Capstar closed out August at 16-15/16. Capstar had started the summer with an initial

Capstar Broadcasting Corp.	Chancellor Media Corp.
Founded: 1996 by Hicks, Muse, Tate & Furst Inc.	Founded: 1997 by merger of Chancellor Corp. and Evergreen Media
Chairman: Thomas O. Hicks	Chairman: Thomas O. Hicks
President/CEO: R. Steven Hicks	President/CEO: Jeffery A. Marcus
Stations: Owns more than 255 stations in 83 mid-sized markets	Stations: Owns 108 stations in 22 large markets
Employees: About 4,000	Employees: About 4,400
HQ: Austin, Texas	HQ: Irving, Texas

Capstar Broadcasting (NYSE: CRB) in the second quarter of 1999. Capstar is valued at \$4.1 billion and the combined group will control more than 460 stations in the United States. Hicks, Muse owns approximately 15 percent of Chancellor and 59 percent of Capstar.

That same day, CBS (NYSE: CBS) announced plans to separate the CBS radio division from the rest of the company and revive the name Infinity Broadcasting for the new company. CBS purchased the old Infinity Broadcasting group from Mel Karmazin two years ago. Karmazin came to CBS with the sale and served as chairman and CEO of CBS Radio.

Karmazin will continue in the same capacity at the new Infinity, which will incorporate the CBS radio and outdoor

Star Media in Dallas, said he thinks that "CBS is recreating Infinity so as to create a vehicle that can better participate in the next stages of consolidation." With its new structure, he said, Infinity will have a small amount of debt relative to cash flow, which will allow a lot of money for acquisitions.

Handy said that while CBS Corp. would be able to handle the next phase of consolidation without the split, separating the television and radio businesses will make it easier for investors and analysts to figure out what is going on in each business.

We're No. 1

New money from the IPO may help CBS/Infinity grow its radio business, but according to BIA Consulting, once the

Will a CBS/Infinity buyout of Jacor, Citadel, Cumulus or another radio group be next?

the largest shareholder of both. Broker Gary Stevens called the merger a book-keeping and housekeeping matter. Making two public companies one means less paperwork, he said. Public companies must be accountable to shareholders and that means doing quarterly reports and SEC filings.

"Everybody knew they were going to do it," said Stevens of the merger.

Broker Richard Foreman, president of Richard A. Foreman and Associates, also said he thinks the merger was inevitable given the Hicks Muse connection between the companies.

The stock-for-stock transaction values Capstar Broadcasting at \$4.1 billion, which is roughly 15.5 times 1999 projected broadcast cash flow. Each share of Capstar common stock will represent 0.48 shares of common stock in the combined company. As a result of the merger, the new Chancellor Media Corp. will have approximately 237 million common shares outstanding, and the name Capstar Broadcasting will be retired.

Having been already approved by the board of directors of both companies, the merger is expected to be consummated in the second quarter of 1999. While the merger will undergo typical

public offering price of around \$22 per share.

Handy said that in the long term, he expects the Chancellor management team will produce great results with its critical mass.

The Capstar deal was one of many announcements by Chancellor Media during its summer buying spree. In July, Chancellor announced plans to purchase privately held Primedia Broadcast Group in Puerto Rico. After that, it announced it would acquire a 50 percent interest in Mexico's Grupo Radio Centro (see page 14).

Then came the announcement that Chancellor would buy LIN Television from Hicks, Muse for \$1.6 billion. Also in August, Chancellor said it would purchase Whiteco Outdoor Advertising for \$930 million. The group also owns advertising firm Katz Media. Board members hope these related assets will lead to substantial synergies and growth opportunities.

The race for the top position among radio groups is unlikely to stay still for long. Industry watchers say a CBS/Infinity buyout of another group, such as Jacor, Citadel, or Cumulus, could change the competitive balance again.

Instant RDS Analysis



Inovonics' 510 is a self-contained and comprehensive RDS Decoder/Reader. Connect it to your Modulation Monitor or off-air receiver to read data from all the common RDS groups. Get an instant data readout on the front-panel LCD screen, or feed data to the serial port of any PC for a more detailed analysis and message archiving.

- Supports both CENELEC and NSRC standards.
- Identifies which groups are being transmitted.
- Built-in "glossary" defines RDS terms
- Easy-to-read 80-character lighted display.
- RS-232 computer interface; analysis software provided.
- Precise digital readout of RDS subcarrier injection level.

MODEL 510 RDS DECODER / READER — \$1950

Inovonics

1305 Fair Ave. • Santa Cruz, CA 95060
TEL: (831) 458-0552 • FAX: (831) 458-0554

www.inovon.com





Zephyr Is Everywhere

Look around. Everyday, there are more signs that Zephyr is everywhere. So, if you've ever thought about remote broadcasts or linking up with other studios, there's never been a better time to act than now. Zephyr has quickly become the standard, with many thousands already in use.

Zephyr is number one among radio stations and studios. It is the best sounding, lowest cost way to send high-quality audio over ISDN. Once programmed, anyone can Auto Dial ISDN calls. Not sure what to do next? Press the help button for simple instructions.

Zephyr is full-duplex for two-way transmission. And you don't have to worry about what codec is on the other side — with Layer 3, Layer 2, and G.722, Zephyr can adapt to any place you want to send your audio. With Zephyr, the whole country—even the world—is your studio. Just look for the signs...



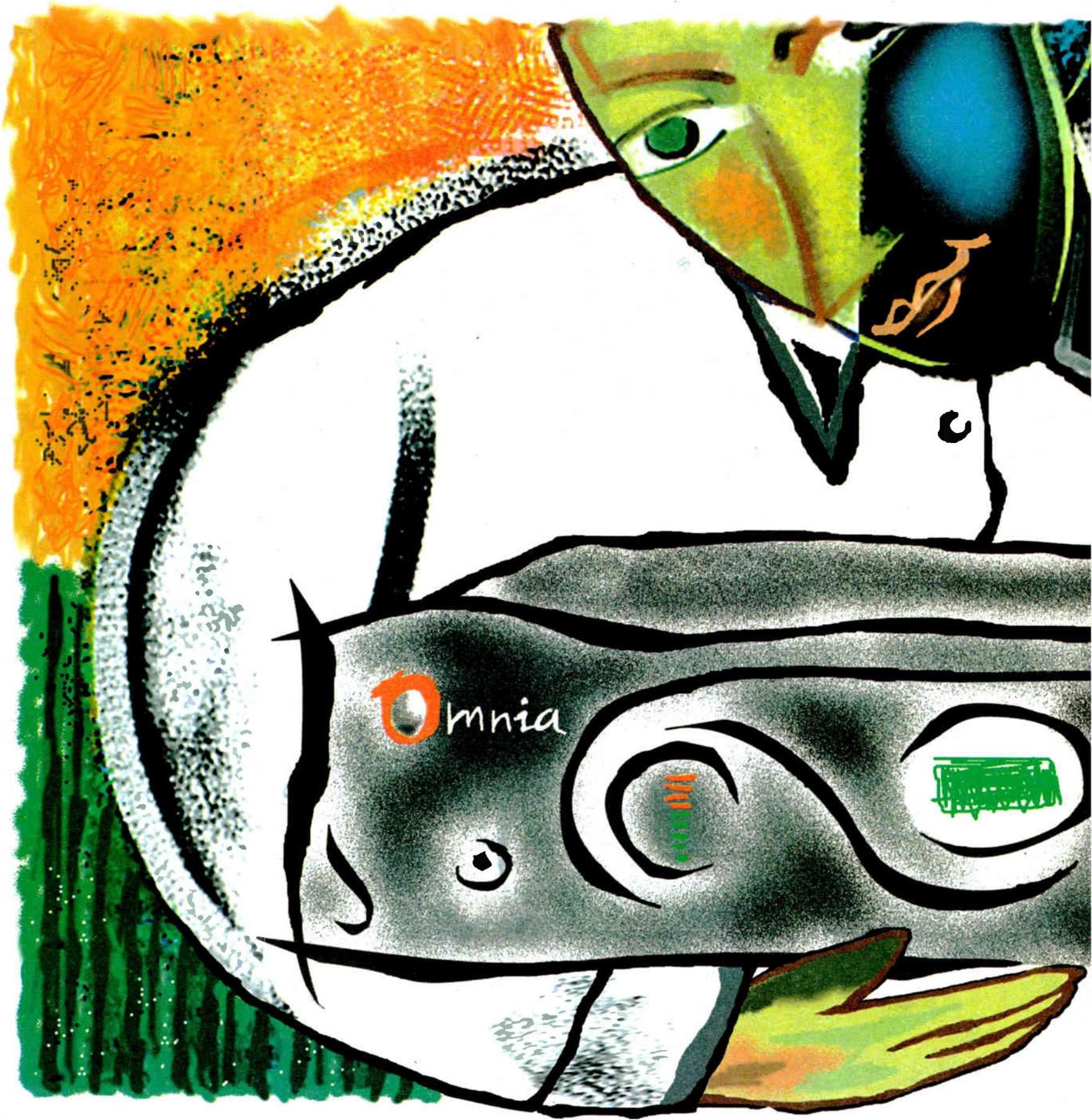
- The ideal solution for remote mixing and broadcasts, ad hoc networks, recording sessions, voiceovers, distribution of commercials, backup to satellite and microwave links, and many other applications.
- Designed by Telos specifically for broadcast audio applications over ISDN.
- Optional AES/EBU digital audio input/output module with sample rate conversion.
- Clean, uncluttered front panel for simple operation. Full metering, call duration timer, headphone jack, and mic/line inputs.
- Built-in input protection limiter. When your talent screams, your audio doesn't distort.
- Zephyr has an integrated ISDN terminal adapter designed for the non-technical operator. You can even place a standard voice-grade call to a Plain Old Telephone Service (POTS) telephone.

Telos Zephyr: The Best Way to Hear from There™



Telos Systems • 2101 Superior Avenue • Cleveland, OH 44114 • Tel: +1.216.241.7225 • Fax: +1.216.241.4103
E-Mail: • info@telos-systems.com • <http://www.telos-systems.com>

Telos Systems, the Telos logo, Zephyr, and The Best Way To Hear From There are trademarks of TLS Corp. Other trademarks are the property of their respective holders.



- Audio Broadcast Group 3685 Roger B. Chaffee Boulevard Grand Rapids, MI 49548 Tel: +1 (616) 452-1596 Fax: +1 (616) 452-1652 e-mail: support@abg.com
- Bradley Broadcast Sales 7313G Grove Road Frederick, MD 21704 Tel: +1 (800) 732-7665 Fax: +1 (301) 682-8377 e-mail: info@bradleybroadcast.com
- Broadcast Supply Worldwide 7012 27th Street West Tacoma, WA 98466 Tel: +1 (800) 426-8434 Fax: +1 (800) 231-7055 e-mail: info@bswusa.com
- Crouse-Kimzey Company P.O. Box 155999 Fort Worth, TX 76155 Tel: +1 (800) 433-2105 Fax: +1 (972) 623-2800 e-mail: sales@proaudio.com
- Radio Communications Unlimited 5509 Barrington Ooltewah, TN 37363 Tel/Fax: +1 (423) 396-3743

LISTEN

The first time you hear the Omnia.fm processor from Cutting Edge, you'll hear sound that's fuller, richer and louder than

anything you've ever heard before: Clean, crisp highs. Tight, thundering bass that really rocks. Warmth that puts vocals and other musical elements right out there. You'll hear digital precision that's as smooth and fluid as analog, and absolutely no digital grunge.

COMPARE

When you compare the Omnia to other processors, it's not apples to apples.

Why? Because the Omnia is designed to put you way ahead of today's competition—and includes the features you'll need tomorrow, like 20kHz bandwidth capability, an extra slot for more DSP horsepower, and an easily upgradable PC card.

Unlike other systems, only the Omnia offers a 48kHz sampling rate. Outdated 32kHz processors have a Nyquist rate that's too low for clean dynamics processing, which creates aliasing distortion. But the Omnia solves this problem by combining 48kHz sampling with 192kHz virtual-upsampling and an anti-aliasing final limiter. The result? Awesome loudness, rock-solid peak control and positively no grunge. Only the Omnia provides a digital stereo generator with a built-in composite clipper for even more loudness and a low-pass filter for subcarrier protection. Plus, the Omnia interfaces with D/CET™, the world's first digital composite interface.

DECIDE

The Omnia allows you to create a sound that's like nothing else on the dial. Your competition will wonder how

you're doing it and your listeners will hear a dramatic difference. The Omnia gives you the competitive edge you've been looking for and the sound that tunes in and turns on your listeners. And you're the hero.

On top of the Omnia's unmatched sound and technical support, we sweeten the pot with a no-risk, money-back, 60-day guarantee*. So, choosing the Omnia is pretty much a no-brainer. Wouldn't it be cool if all your decisions were this easy?

Omnia. The promise of digital...*delivered!*



CUTTINGEDGE

2101 SUPERIOR AVENUE CLEVELAND, OH 44114 TEL: +1 (216) 241-3343 FAX: +1 (216) 241-4103 E-MAIL: INFO@NOGRUNGE.COM WWW.NOGRUNGE.COM

*Contact your dealer for details on this demo program. Demo requests must be accompanied by a purchase order so our dealers know you're really serious about some serious sound.

See Us At AES Booth #485

Circle (2) On Reader Service Card

World Radio History

Flash Comm Network Ramps Up

by Bob Rusk

MELBOURNE, Fla. Flash Comm Inc. has signed leases with more than 250 FM radio stations in the United States to use the 57 kHz subcarrier of the stations to transmit out-bound messages, a key element in its nationwide two-way tracking and messaging Radio Data System network.

Most of the stations were scheduled to start joining the network this month, when the first shipments of new equipment were to be delivered, according to Bill Marriott, Flash Comm Director of FM Subcarrier Operations. Flash Comm contracted with the German electronics firm Rohde & Schwartz to manufacture a next-generation RDS Controller with features that include EAS connectivity and onboard receiver for monitoring and self-calibration. The receiver allows the controller to continuously monitor the injection level of the station and can dial out an alarm should the injection level change.



Flash Comm dish (small) at WOIK-FM, Jacksonville, Fla.

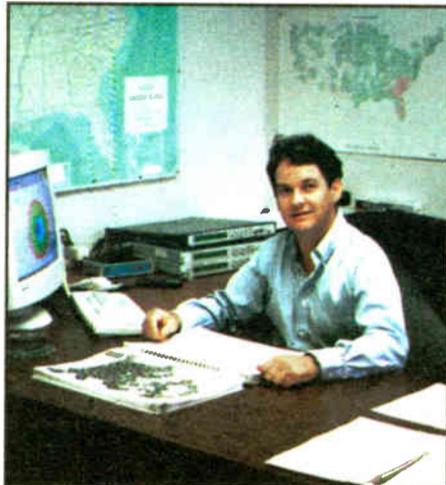
The 30 stations that had already joined the network also will receive the new equipment. The equipment package for all stations includes a free alpha-numeric pager and an ADS Cadet PC-card RDS radio.

"This is equipment that most radio stations would like to have," Marriott said. "We're giving it to them for free and are paying them, too." Monthly lease payments per station, he said, will range from \$300 in a non-Arbitron rated market to \$10,000 in New York City.

"For the majority of our leases," Marriott said, "the payments will start after we have commenced commercial service."

The target date for beginning service with transportation companies is Nov. 1.

Stations have the option to use the equipment to broadcast a text display of call letters to Smart radios.



Bill Marriott

Flash Comm uses the datacasting capabilities of RDS for real-time messaging and tracking of trucks, trailers and railcars. Vehicles communicate back to base using Flash Comm technology to bounce a low-power HF signal off the upper atmosphere. The range of this signal is more than 1,000 miles, so a few receive sites that can cover the entire country, Marriott said.

Major groups

Many of the Flash Comm affiliates are owned by major station groups. "We have deals at the corporate level with Jacor and Clear Channel," said Marriott. "Each has signed one station with us in almost every (U.S.) mainland market they are in."

Among smaller groups that have signed with Flash Comm are Sunbrook Communications, Withers Broadcasting and several noncommercial statewide public networks. By the end of 1998, Marriott said, the network is expected to grow to about 500 stations, which will put RDS into nearly every market in the United States.

WWDM(FM), the top-rated Clear Channel station in Columbia, S.C., has been leasing subcarrier space to Flash Comm for about six months. "They are a good tenant," said station vice-president and general manager Steve Patterson.

Sunbrook Communications President and CEO Larry Roberts said, "Knowing

that both Jacor and Clear Channel had already signed with Flash Comm gave me greater confidence in doing a deal." Flash Comm will be using three Sunbrook stations in Montana.

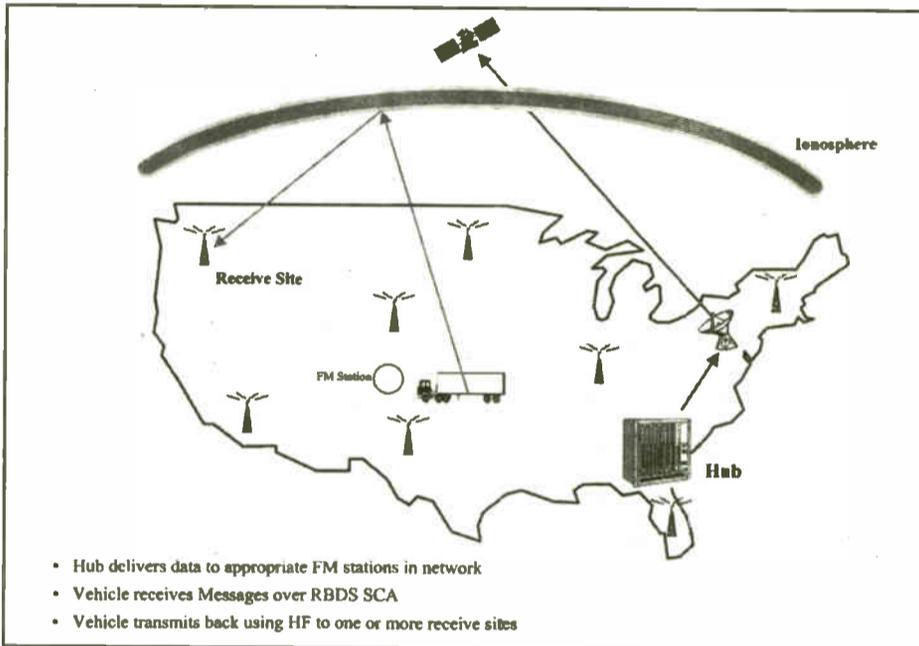
Roberts also sees the Flash Comm lease, which typically runs 10 years with a renewal option, as a way to generate non-traditional revenue. "Leasing your subcarrier doesn't take any inventory," he said. "Somebody listening to your station would never know the difference. This is an opportunity to add revenue with no expense."

Jon Roberts, director of engineering at Flash Comm affiliate WAOA(FM) in Melbourne, Fla., said, "The service that they are providing is very unobtrusive to the radio station. Any of the technical concerns that people may have are not an issue."

Flash Comm Fact File

Company: Flash Comm
Ownership: Privately-owned, formed in 1994 by Harris Corp. employees to implement communications technology developed by Harris for military use.
HQ: Melbourne, Fla.
Employees: 30
Current leases: About 270
Business goal: To provide a nationwide two-way communications system.
Information: Call (407) 752-3000 or look at the company's Web site at www.flashcomm.com

can bring your total modulation up to 105 percent. In the worst-case scenario, you're losing 5 percent of your total modulation.



Flash Comm RDS Network

Roberts continues to use his 67 kHz subcarrier for remotes and has not had a problem with Flash Comm using the 57 kHz subcarrier. "Neither one has been affected one way or the other," he said. "I don't use the 92 kHz frequency for subcarrier, but have no reason to believe that I couldn't use it in an effective manner."

If there is a concern, Roberts said, it is with the 10-percent subcarrier injection level that Flash Comm uses. "You have to decide if you want the full injection for your own use," he said. "If they want 10 percent injection, you

"There may be people who say they want every ounce of carrier that they can have ... but I have found that the difference is minuscule. We still have the loudest signal on the dial in this market," Roberts said. "We do it through effective processing."

Since GEM Broadcasting's WAOA began leasing its subcarrier to Flash Comm, Roberts has found that the system requires virtually no time to maintain. "Once the system is in and set, you don't do anything," he said. "You just rake in the bucks."

PORTABLE ONE

DUAL DOMAIN

True Dual Domain Audio Testing at an Attractive Price Point

- Comprehensive analog audio analyzer
- True digital domain analyzer with -140 dB residual noise
- Independent analog & digital audio generators and analyzers
- Generate and measure interface jitter
- Digital interface analyzer
- View AES/EBU status bits
- Loudspeaker monitor for digital & analog signals
- Internal save and recall of 30 test setups

Audio Precision
 PO Box 2209
 Beaverton, Oregon 97075-2209
 Tel: (503) 627-0832; Fax: (503) 641-8906; US Toll Free: 1-800-231-7350
 Email: techsupport@audioprecision.com; Web: www.audioprecision.com

DELAY



STUCK IN THE RF JUNGLE?

Cut a Path Through with the **BE** DSTL®.

THE BEST COMPRESSED DIGITAL STL

- Highest system gain in class
- Unmatched path protection
- Tightly controlled spectrum
- Exceptional interference immunity

CALL (217) 224-9600 TODAY!

Need Solutions?

www.bdcast.com



*Solutions for
Tomorrow's Radio*
Circle (54) On Reader Service Card

NEWS ANALYSIS

Chancellor Media Looks South

U.S. Group to Take 50-Percent Interest In Large Mexican Broadcast Operation

by Lynn Meadows

MEXICO CITY Grupo Radio Centro, one of the most listened-to radio groups in Mexico, and U.S.-based Chancellor Media Corp. have formed an alliance in which Chancellor will acquire a non-controlling 50-percent interest in the Mexican company before the end of the year.

What they get

The future partners highlighted different advantages in assessing the deal. Jeffrey Marcus, president and CEO of Chancellor Media, outlined the expectations Chancellor has for the Mexican market.

He listed the "young, fast-growing population with large households" as the first of several assets found in Mexico. Other pluses, he said, are deregulation of key industries like telecommunications and financial services, the increasing democratization of Mexico, and the expected recovery of consumer spending combined with increased availability of consumer credit.

"Due to these factors, we believe that, over time, Mexican advertising revenues will grow faster than U.S. advertising revenues," he stated, "and Chancellor will, through this investment, participate in this higher growth."

The deal, expected to close in the fourth quarter, is worth approximately \$237 million (RW, Aug. 19). Chancellor plans to pay \$81.5 million in cash to the Aguirre family, which has a controlling interest in the group. Chancellor will also issue shares of common stock worth \$116.5 million to GRC and invest \$39 million in cash in the radio group.

GRC owns and/or operates 15 radio stations in Mexico, 13 of which are located in the capital, Mexico City.

According to a Chancellor press release that accompanied the announcement, GRC has been the leading radio broadcaster in terms of audience share in Mexico for approximately 30 years, and it is Latin America's largest, most successful and most profitable radio company. In 1997, GRC generated \$82 million in revenues.

In addition to its own radio stations, GRC operates Organización Impulsora de Radio (OIR), which acts as national sales representative for the group and provides programming to more than 90 affiliates in 57 cities throughout Mexico.

Once United States and Mexican antitrust authorities and the Mexican Foreign Investment Commission approve the deal, the Aguirre family will still control GRC. Chancellor will be able to appoint three of the nine members on the GRC board of directors.

Adrián Aguirre, whose father Francisco started the radio group in 1942, will continue to serve as president and CEO for GRC.

According to Mexican law, a foreigner cannot have voting rights in broadcast entities. Chancellor will own "Series A" shares in trust, which allow for limited rights and some veto power. It will also own CPO shares (certificates of ordinary participation) which are non-voting shares.

Chancellor is not the first radio group to look abroad for deals. Clear Channel Communications, which owns more than 200 radio stations in the United States, has interests in Australia and New Zealand radio stations. Clear Channel also is active in Mexico, holding a 40-percent share of the Grupo ACIR, which operates 164 radio stations throughout the country.

Emmis Communications, another leading U.S. radio group in terms of revenue,

has radio interests in Budapest, Hungary. Similarly, the French broadcast group EDI has stations and interests throughout Europe and Asia, and the Daily Mail Group from England has interests in stations in a number of nations.

Richard Blackburn of the brokerage firm Blackburn and Company said radio groups "can make at least as attractive an investment internationally as nationally."

Blackburn said that many such investments are prompted by the desire to become "international" media companies and by the fact that there are fewer opportunities at home.

"I think expanding into Mexico, or wherever, gives broadcast groups better opportunities to expand into other media in those places too." Blackburn cited cable television as an example.

Another possibility is that Chancellor Media may see some synergies between the GRC investment and its \$25 million investment — announced in June — in Z Spanish Media Corp., which owns 22 Latino-oriented radio stations in the United States.

Chancellor Media also announced in July it plans to purchase eight-station Puerto Rican radio group Primedia Broadcast Group. The group may see synergies with GRC there.

Alfredo Azpeitia, financial project

manager and investor relations for GRC, said his company had talked with other United States companies in the past about forming partnerships. GRC used to own the international "Spanish Coast to Coast" network, but sold it to Heftel Broadcasting in 1994. From then until 1997, GRC supplied Heftel with some music programming for the network.

Matching philosophies

Azpeitia said the philosophies of GRC and Chancellor Media match well and that both are interested in growing internationally. He also noted the growth of the Spanish-speaking population in the United States in terms of revenue and purchasing power.

Pedro Beltrán, director of finance and administration for GRC, said, "For 1999, we will be in position to enter markets like Dallas, New York City, Los Angeles, Miami and Chicago."

The United States Census Bureau reported in August that there are 29.7 million people of Latino origin living in America today and that more than half were born in the United States.

Azpeitia said GRC believes it can export its own programming to the United States, although he admitted that some programming might have to change depending on the tastes and national origin of the local population.

Gabriel Sosa Plata contributed to this report.

Digital Multiplex Interface Counterpoint

► FOTI, continued from page 6

constantly trying to find ways and means of getting that "extra" dB of performance on the air. I would never negatively alter the performance of any equipment I was trying to improve. The same applies here.

3. We do not accept the claim regarding FCC-type notification. Type notification is voluntary and we would make sure that FCC-type notification remains in effect for the D/CET module and DIGIT exciter. We are not altering the RF generation portion of the exciter. We are "slaving" the audio processor off the exciter so that the "timing and operational considerations" will remain intact.

4. The claim that the Omnia processor must remain at the transmitter is a limitation that will very probably go away in the future. We are in talks with two STL manufacturers who say that they will be able to transport the D/CET interface, which would allow the Omnia.fm to be located at the studio site. Even if the processor is located at the transmitter, the Omnia has remote computer access as standard capability.

5. The article states that hundreds of digital audio processors with 32 kHz sampling rates and DIGIT exciters are on-air without any overshoot problems, that the need for D/CET is not required for tight overshoot control. We have no argument with the first part of that statement. But, again, our view is that 48 kHz processors should be properly supported by exciter manufacturers.

Our D/CET proposal solves the problems outlined above completely, and adds important additional capability. D/CET works and makes sense:

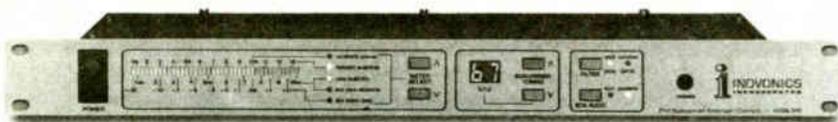
- It avoids the overshoot problem entirely, as it bypasses the 32 kHz input and sample rate conversion sections of the exciter.
- It eliminates the unnecessary propagation delay caused by additional up/down conversions.
- It allows the use of digital composite clipping.

What we have proposed is the digital equivalent of a composite MPX input to the digital exciter, just as there is a broadband composite BNC input on an analog exciter. That system configuration has been widely adopted and works well. We are convinced that it should be made available in the digital domain, too.

Why does the landscape for processor and exciter interfacing change for the digital path as compared to the analog path? The analogy to this dates back to the mid-1970s when early attempts at aggressive audio processing caused a similar problem. And it is interesting to note that Harris participated some years back in some ad hoc meetings among broadcast equipment manufacturers who were attempting to establish ... a digital composite standard! Now that we have taken the bull by the horns and are offering just that, why the resistance?

RW welcomes other points of view.

FM Subcarrier Monitor/Demod



Accurate measurement of SCA, RDS and the new high-speed data subcarriers. This precision monitor/demod is the ideal companion to any FM Mod-Monitor. Check these features:

- Dual-conversion design with precise digital tuning. Covers 54kHz to 99kHz in 1kHz steps.
- Displays subcarrier injection level in percent and in kHz-of-deviation.
- Demodulates audio SCAs, shows subcarrier deviation and audio level. Balanced SCA program output.
- Optional RDS decoder plug-in comes with software for complete radio-data analysis.

MODEL 540 — \$1150

Inovonics, Inc.

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

www.inovon.com



SONY MINIDISC JUST CAPTURED SOME AMAZING SOUNDBITES.

Sony's MiniDisc has knocked the seen-it-all, heard-it-all experts at Radio World right on their ears. They've called it a "serious contender" and "clearly superior to tape." And they've recommended MiniDisc for applications ranging from news and documentary recording to client voice tracks, phone calls, traffic reports and airchecks.

Sony created MiniDisc with an unequalled combination of advantages. It's digital. Recordable. Portable. Instantly accessible. Easily editable. Virtually unshockable and incredibly durable. And Sony offers MiniDisc in everything from super-small field recorders to multi-track machines and professional MD cart recorders.

So do yourself a favor. Call 1-800-635-SONY, extension MiniDisc. And find out why the radio industry is tuning in to Sony MiniDisc.



SONY

www.sony.com/proaudio

© 1998 Sony Electronic Inc. All rights reserved. Reproduction in whole or in part without written permission is prohibited. Sony and the MiniDisc logo are trademarks of Sony. All quotes from the December 24, 1997 and January 7, 1998 issues of Radio World. Reprinted with permission.



MDM-X4MKII Multi-Track Recorder

Sony's MDM-X4MKII Multi-Track Recorder is the digital studio-in-a-box with phenomenal editing, layering and track-bounce capabilities.



MDS-B5 Recorder

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



MDS-B6P Player

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



MZ-B3 Portable Recorder

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



MZ-R30 Portable Recorder

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



MDS-JE520 Recorder

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



MDW-74 and the PRMD-74

Nothing beats the Sony MiniDisc.

DAB Group Eyes the Next Step

► IBOC, continued from page 1

compression. The engineers drove the DRE test van through multipath environments to gather data; they wanted to see how they could receive analog and digital audio signals in a mobile environment. The van is equipped with a forward-looking camera and real-time spectrum analyzer so the engineers could record both the analog FM and IBOC DAB signals (RW, July 22).

The test was meant to be a shakeout of the equipment for DRE's internal use. The test results will not be made public.

DRE encountered several delays before achieving what executives said was a successful test. One delay occurred when DRE's Special Temporary

Authorization, granted by the FCC to conduct the test, expired before the test could be completed. DRE had to apply for another, longer-term authorization.

DRE Vice President, Engineering, Derek Kumar said equipment headaches on two occasions included power inverter problems and an overheated video cassette recorder, used to capture data.

Other IBOC proponents acknowledged that testing can be complicated.

USA Digital Radio Engineering Director Glynn Walden said, "Testing is a time-consuming process. In order to install equipment, we have to shut down a station. If you need more than three or four hours to set up the equipment, you

may have to wait until the weekend."

USADR is preparing for field tests for both AM and FM IBOC DAB in several cities. The first market would be Baltimore/Washington, chosen because USADR is based there, and because the company can test for adjacent channel interference in the crowded urban area.

Other test markets are Boston and New York.

"The purpose of testing in different cities is to test every possible terrain," Walden said. USADR engineers also want to test using both duplex and directional antennas. USADR wants to see if any of these elements might impose problems its engineers have not anticipated.

Houston also is a planned test market for USADR, using a suburban station with signal coverage into a downtown area. The situation is reversed in Chicago, where USADR plans to test on a station that has a high-powered transmitter downtown and signal out to the suburbs. Philadelphia is another planned site. USADR has not finalized western testing sites, although possibilities include Los Angeles, San Francisco and Seattle. The latter two cities have particularly notorious terrain.

In order to conduct its tests, USADR must train several two-person crews to set up the tests for each location, and transport the equipment to each site. Equipment that must be shipped to each site includes a power combiner, a DAB transmitter and exciter, and a mobile receiving lab in a test van. USADR is building approximately 22 receivers and 12 exciters to have enough equipment to set up at both the tests sites and have spares in its lab in Columbia, Md.

The third announced IBOC proponent, Lucent Digital Radio, is focused on its FM system. President Suren Pai said the company planned field tests later this year but did not want to announce sites yet.

Asked if the presence of two other IBOC proponents is affecting Lucent strategy, Pai replied, "We don't think we need competition to keep us on our toes. ... Does competition help us move faster? ... I don't believe so."

Doing the dance

Although proponents tend to downplay the effect of competition on their strategies, the fact remains there are now three companies jockeying for position in the minds of broadcasters and regulators for acceptance of IBOC DAB. The proponents sniped at each other publicly at NAB '98, and statements to influence industry opinion leaders have continued.

In an interview with RW Aug. 5, USADR President Robert Struble quipped of DRE, "I find it hard to believe a few guys in a garage are going to change that kind of industry."

In reply, Dwight Taylor of Bridgegate Signal Communication, an investor in DRE, said, "We're all aware of how much the world has been changed by a handful of guys, even in garages in Silicon Valley. ... We are a small company, and we don't consider it a weakness."

Bridgegate is a New-York-based firm investing in wireless systems and DRE. Taylor, affiliated with DRE since the NAB '98 show, said, "Size doesn't count, because we're talking about a breakthrough in technology."

All three proponents are taking part in the DAB subcommittee of the National Radio Systems Committee. The committee has told proponents it wants them to submit a package of AM and FM IBOC test data, so the systems can be evaluated all at once.

After its Aug. 13 meeting, NAB staff liaison for the committee, David Layer, said the subcommittee hoped to have test guidelines finalized by the next meeting, planned for Oct. 17 at The NAB Radio Show.

Representatives for receiver manufacturers attended the last meeting, to gauge timetables for IBOC DAB. They included Sony, Clarion, Thomson, Fujitsu and Pioneer.

Members of the FCC's International and Mass Media Bureaus also attend the meetings as observers. Keith Larson of the Mass Media Bureau said the FCC wants to facilitate the development of IBOC DAB by processing experimental licenses or STAs for measurement tests quickly.

Shaping up your vocals is a snap



with the 528E!

- Boost low level mic signals
- Curb uncontrollable signal peaks
- Trim wide dynamic ranges
- Pump up whimpy tone quality
- Shed unwanted sibilance

Noticed a lack of energy and punch on the air? Need some extra vitality and zip in your sound? Check out the Symetrix 528E.

With a complement of features such as a studio grade mic pre, compressor/limiter, downward expander and parametric EQ, the 528E has everything needed to get your vocals in shape! Don't let the competition kick sand in your face - buy the Symetrix 528E, on sale now, from BSW.

Equipment Solutions To Keep You Number One

BSW

BROADCAST SUPPLY WORLDWIDE

7012 27th Street West Tacoma, WA 98466 USA

Phone: 800 . 426 . 8434

Fax: 800 . 231 . 7055

Website: <http://www.bswusa.com>

Seattle

SBE

San Francisco

AES

Convention Previews

AES in Frisco: Latest and Greatest

Digital Audio, Internet and New Audio Products Dominate the AES Convention in City by the Bay

Alan R. Peterson

The latest equipment, the newest technology and a well-known keynote speaker set the stage for the 105th Audio Engineering Society Convention, with one of the world's most picturesque cities as the backdrop.

This year's convention is slated for Sept. 26 through 29 at the Moscone Convention Center in San Francisco, with many workshops and special sessions devoted to new developments in digital audio. A special keynote speech by record producer and artist Alan Parsons will be the centerpiece to the opening ceremonies.

Included in the convention, 14 workshops, 120 technical papers, seven technical tours and even an organ concert. And of course, hundreds of manufacturers showing off the very latest audio products.

The 105th AES Convention opens Saturday with the keynote address by

Alan Parsons; well-known for his work with the Alan Parsons Project and his engineering credits with the Beatles, Hollies and Pink Floyd. Parsons was nominated for 10 Grammy awards and helped create the European cable television service, "Music Box."

Interesting papers

Among the technical papers being offered at the AES Convention, several are of interest to radio broadcasters.

Saturday, Sept. 26, chairman Rob Maher of EuPhonics hosts "Desktop Computer Audio," featuring segments on New Sound Technology for PCs and Integrating Audio and Communication. Also on Saturday, Timothy B. Thompson of Young Chang Research and Development Institute presents a talk on "Building an Audio Wide Area Network."

Workshops on analog audio start the day on Sunday, Sept. 27. Marshall Buck of Psychotechnology chairs "Analog

Signal Processing for Audio," with a segment on transformerless ground loop isolating preamplifiers. Ground loops are the bane of any analog installation, as they create hum in places that are often difficult to isolate.

As radio comes to terms with compressed digital audio and the coming MPEG-4 standard, a technical paper session on Monday, Sept. 28 called "Low Bit-Rate Audio Coding" is appropriate to attend. Chaired by Louis Fielder of Dolby Laboratories, the session discusses the "Integrated Filter Bank-Based Scaleable MPEG-4 Audio Coder" and an "MPEG Audio Layered Transcoder."

Digital technology is given a second day

to sink in with "Digital Signal Processing for Audio" on Tuesday, Sept. 29. Two significant papers given in this session include "Digital Watermarking and Its Influence on Audio Quality," and "Implementing ISO/MPEG-2 Advanced Coding in Real Time on a Fixed-Point DSP."

Tune the room

For anyone who has ever wrestled with studio acoustics, a session titled "Sound Reinforcement and Room Acoustics" is worth attending to hear Ernst-Jo Voelker of the Institute for Acoustics and Building Physics talk about "Acoustics in Control Rooms — That Recurring, Burdensome Subject."

For the broadcaster whose interests range from field recording to Internet audio, a series of long-form workshops

See AES, page 20 ▶

Engineers, Spectrum Are Top Issues for SBE Brass

Alan R. Peterson

The Seattle area, famous for alternative rock, latté and Dr. Frasier Crane, plays host to the 1998 national meeting of the Society of Broadcast Engineers, as part of the SBE Chapter 16 annual conference and convention.

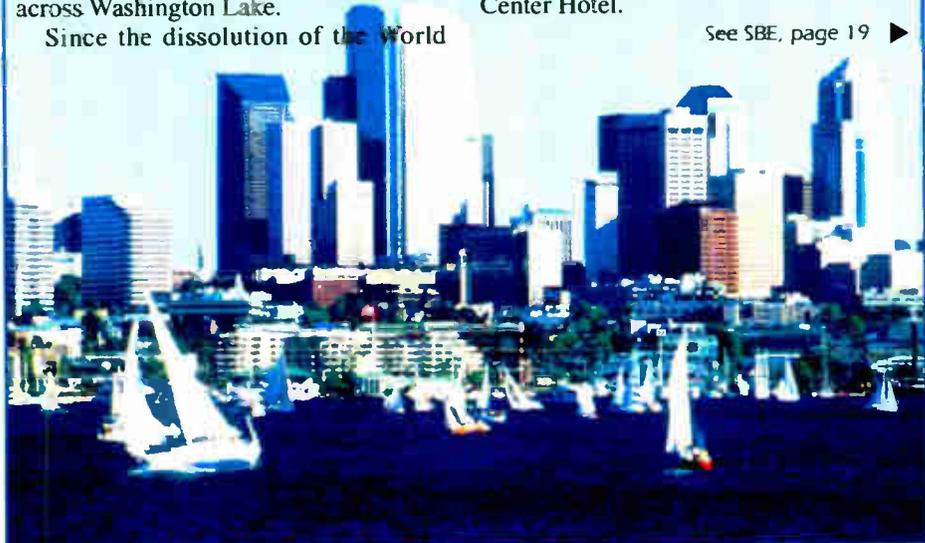
The event takes place Oct. 28 and 29 in the Meydenbauer Center in nearby Bellevue, Wash., to the east of Seattle across Washington Lake.

Since the dissolution of the World

Media Expo in 1996, the SBE has held its national meetings in conjunction with local and regional shows. Last year, central New York was the location of choice. This year, the SBE annual meeting coincides with the Seattle chapter's Electronic Media Expo '98.

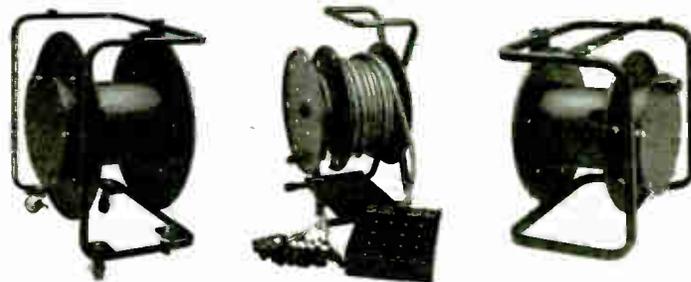
The SBE national meeting actually takes place the evening before the show, across the street from the Meydenbauer Center at the Doubletree Bellevue Center Hotel.

See SBE, page 19 ▶



CABLE REELS

It's a Whole New Spin on the Broadcast Business!



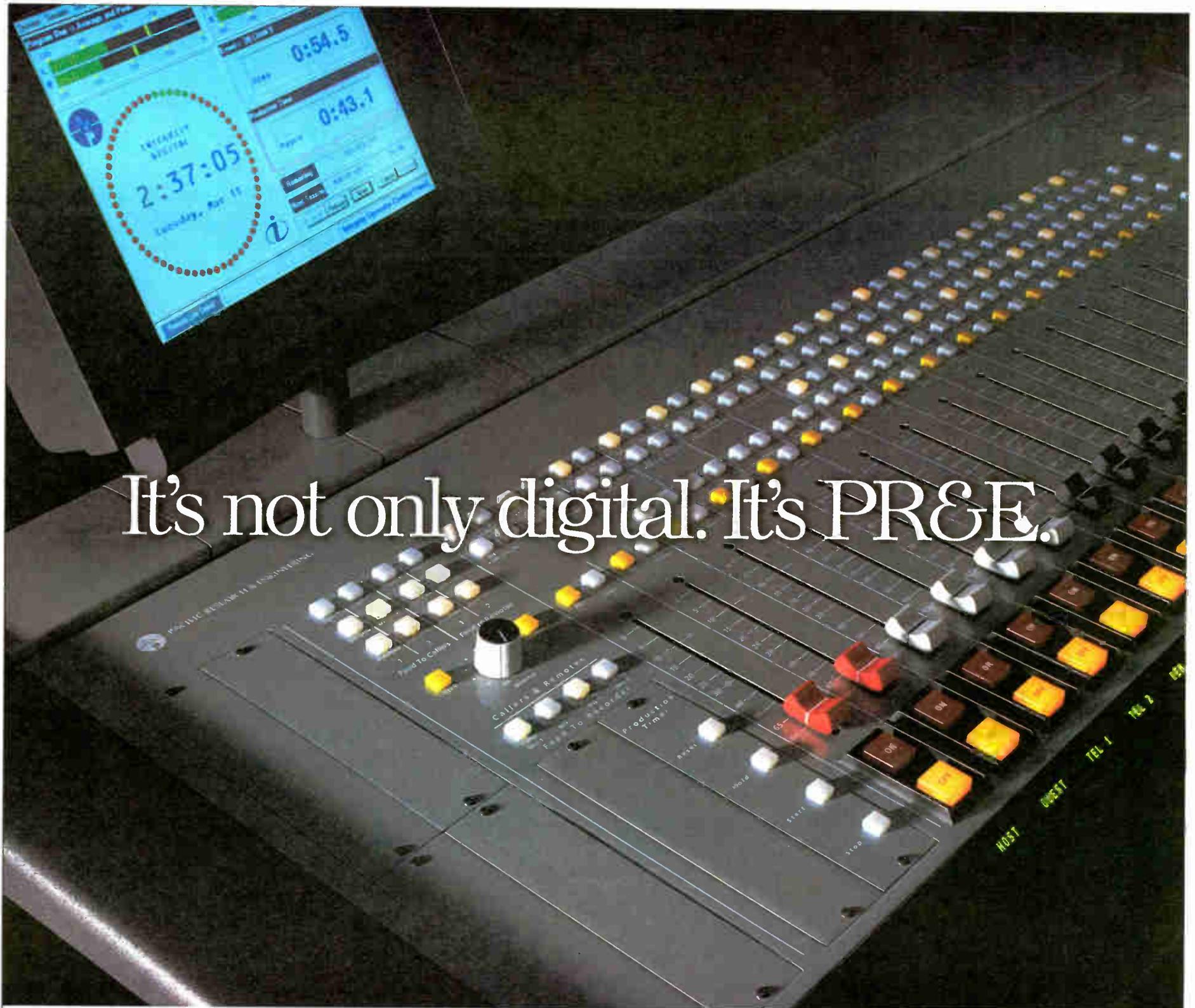
Hannay reels, a better way to work.

What's our spin on things? How about the fact that we offer a faster, easier, and cleaner way to work! Whether you have various setups at one location, or you're all over town - we'll keep you rolling! TV, radio, satellite, cable and mobile production facilities all benefit from Hannay's better way to work. We meet the need! We'll save on expensive cable replacement and keep everything neat with compact storage. Call today for a Hannay Reels dealer near you: 518-797-3791.

 **Hannay Reels**
The reel leader.

BUILT TO LAST

553 State Route 143, P.O. Box 159 • Westerlo, NY 12193-0159 • Fax: 1-800-REELJNG • www.hannay.com



It's not only digital. It's PR&E.

Now you can get digital technology and PR&E reliability in the same console. Integrity.™ It's the first digital on-air board that also speaks fluent analog. All 16 inputs can handle analog signals. Ten can also accept digital inputs at any sample rate. So you can deal with the hodge-podge of equipment in real-world studios. A unique architecture also guarantees a level of reliability other digital consoles can't match. So you can rest assured your signal will stay on the air.

What's more, you get on-board DSP voice processing, remote or local configuration controls, and channel-specific remote control connections. And you can set, save and recall each board configuration at the touch of a button for seamless transitions from show to show.

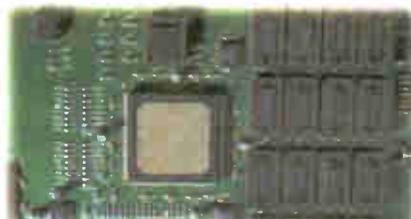
For a brochure, call us at 760-438-3911, visit www.pre.com or e-mail sales@pre.com



The LCD displays audio levels, time-of-day clocks, session status and event timers with a Windows® interface to powerful configuration management and session-based features.



Integrity's difference is more than just digital. It also offers four special-purpose buses to provide automated mix-minus for telephone and remote feeds, each with IFB.



Integrity uses an array of state-of-the-art floating-point digital signal processors to perform its mixing, routing and other functions.



Each fader has a 10-character alphanumeric display. The display changes when another audio source is assigned, which can happen either manually or at a preassigned time.



PACIFIC RESEARCH & ENGINEERING

Circle (158) On Reader Service Card
World Radio History

SBE Looks at Exams, Jobs

► SBE, continued from page 17

"We will actually have our meeting the night before, on the 27th," said SBE Executive Director John L. Poray.

There is no shortage of topics on the agenda. To begin with, new board members will be welcomed, following the Sept. 17 elections.

"This won't be much of a cliffhanger," said Poray, "as most of the candidates are running unopposed. There are however, 11 people running for six board seats."

Eligible SBE voters consist of full members and representative companies. Student members and associate members are not eligible to vote. "Still, this represents about 4,800 eligible voters," said Poray.

Among the topics certain to generate in-depth discussion is the potential loss of the 2 GHz broadcast auxiliary spectrum or BAS.

Poray said, "Congress told broadcasters, 'Give it up or pay fees for use of the spectrum.' They can take any part of the auxiliary spectrum and give or auction it to cellular services. Should the SBE continue the charge to preserve the BAS spectrum?"

Television is affected more by this issue than is radio. Losing the 2 GHz spectrum might mean a loss of live pictures relayed as they happen.

"We would lose helicopter video coverage, live pictures from the White House at 9:15 p.m. and even those little cameras in race cars," Poray said. "All they would be able to do is put up still pictures. The TV people are looking at this one very closely."

Radio would be affected, but in more

general ways, Poray said.

"AM news/talk stations and remote broadcast transmissions would be affected by this loss," he said. "There would also be the issue of all the 2 GHz broadcast equipment that would be obsolete by this decision."

Poray hopes to get the support of other organizations that may stand to lose out from rationing of BAS. Among those he is hoping to gain cooperation from is the Radio-Television News Directors Association, which would certainly stand to lose a lot should the decision go through.

Among other agenda items is a report from the Certification Committee on the feasibility of test preparation guides.

By the book

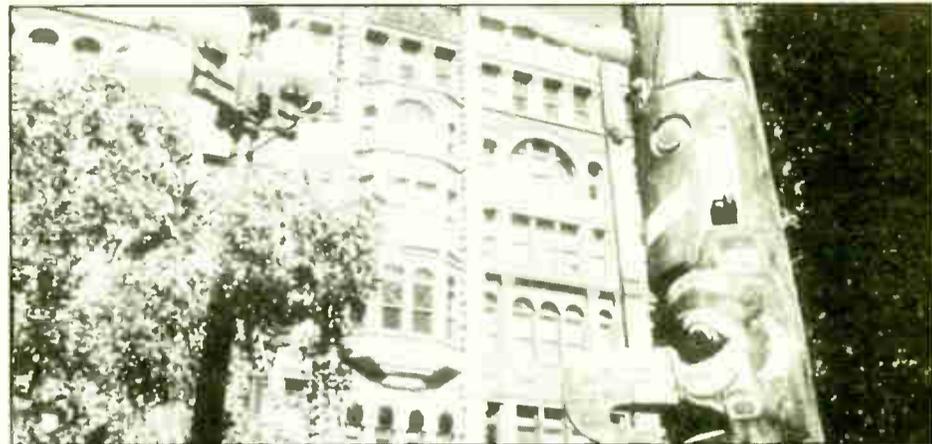
"We are looking at proposals to create books to prepare for exams," said Poray. "We have done them before as study guides on diskette but are looking at this."

Poray stressed that the book would not volunteer the answers to test questions, but would rather prepare students for what to expect on such a certification test. It would explain where to find information helpful to preparing for tests and would include a sample exam.

The new youth program proposed by the SBE is "starting up real well," according to Poray. The SBE sent 345 mailings to high school radio stations across the United States a few months ago, in hopes of inspiring young, technically minded students to consider a career in broadcast engineering.

"Our hope is that teachers will share the brochures with students, now that the school year has started up again," he

The event would take place on Groundhog Day, 1999, and is hoped to involve as many as 500,000 students nationally in a variety of job situations. The SBE must decide by an October deadline if the event is worth endorsing and participating in.



Pioneer Square: Popular Spot in Seattle

Photo Credit: Seattle-King County News Bureau

said. "And we hope to make a big impact with 'Student Night' at local chapters."

Another decision the SBE must consider is participation in "Groundhog Job Shadow Day."

According to Poray, "This is in conjunction with America's Promise: The Alliance For Youth, headed up by Gen. Colin Powell. What we do is have a student 'shadow' someone at work for a day. This would happen on a large, national level."

"It is a perfect complement to engineering," said Poray. "The skills needed are exactly what is being taught in school. You need English to communicate and speak clearly; math and, of course, science."

Also part of the SBE national meeting will be discussion of electronic filing of frequency coordination. "The FCC wants electronic filing. The SBE would bring in better and quicker methods," Poray said.

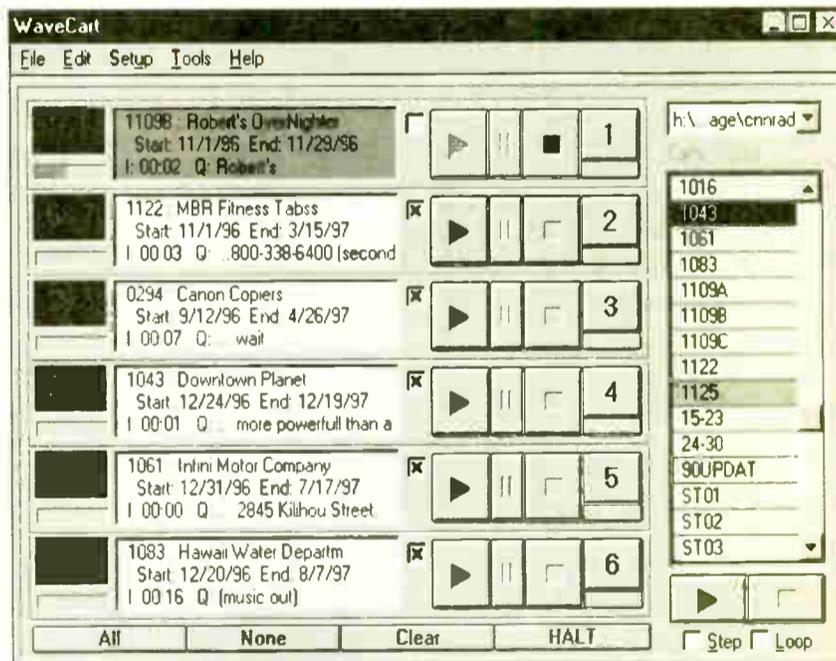
SBE Exhibitor List

The following companies have been confirmed as exhibitors at the 1998 SBE Show in Bellevue, Wash. as of press time.

- A & V Tapehandlers
- Acrodyne Industries
- American Production Services
- Anchor Audio, Inc.
- Andrew Corp.
- Aspen Electronics
- Audio Accessories Inc.
- Audio Video Systems
- Avid Technology
- Band Pro Video
- Bexel Corporation
- Broadcast Supply Worldwide
- Burk Technology
- Canon USA Inc.
- Cartoni USA
- Chatani Enterprises, Inc.
- Chimera
- Clear-Com Intercom Systems
- Comark Communications, Inc.
- Communications Specialties Inc. (CSI)
- Computer Concepts Corporation
- Daniels Marketing
- Dielectric Communications
- Digital System Technology Inc.
- DNF Industries
- ECHOLab Inc.
- EEV, Inc.
- Fast Multimedia US Inc.
- FAV Marketing
- Fisher Communications Inc.
- For.A Corporation
- Freeland Products
- Fuji Photo Film, U.S.A., Inc.
- Fujinon, Inc.
- Gepeco International Inc.

- IDX Technology
- Image Associates
- James Grunder & Associates
- JVC Professional Products
- Le Blanc Broadcast Inc.
- Leitch
- Mackie Designs
- Marketec
- Martin & Ziegler
- Maxell Corp. of America
- Media Tools LLC
- Microwave Radio Corp.
- Modulation Sciences
- Panasonic
- PESA Switching Systems
- Premiere America
- Premiere AVD Corp
- Pro/Four Video Products
- Pro-Bel America
- Professional Video & Tape, Inc.
- Proline Industries Inc.
- Quantel Inc.
- RF Specialties
- Scala Electronic Corp.
- Sigma Electronics, Inc.
- Sony Electronics, Inc.
- Sony Pro Media
- Sparling
- Spectral Multimedia Inc.
- Synctrix, Inc.
- Tekskil Industries Inc.
- Tektronix Inc.
- Telect, Inc.
- Telex Communications, Inc.
- TRON-Tek Inc.
- Vibrant Technologies
- Westlake Electronic Supply, Inc.
- Winsted
- Wohler Technologies
- ZERO Stantron

On-Screen Cart Machine



Yes... it's true. An easy-to-use on-screen digital cart machine that runs on a regular PC. WaveCart uses standard or compressed WAV files. Thanks to our exclusive RapidFire® technology, playback is instantaneous. Rotating cart & overlap capability. WaveCart comes with its own digital audio editor. Up to ten on-screen decks. Windows 3.1 or 95.

**24 HOUR
FREE
TECH SUPPORT**

888-BSIUSA1

Only

\$249

Try Before You Buy.

Download the Actual Software!

www.bsiusa.com

BSI
Broadcast Software International

Circle (184) On Reader Service Card

DVD, Internet Audio Big at AES

► AES, continued from page 17

will address these topics and others.

Saturday, Sept. 26, Amy Hunter of the Nature Sound Society heads up "Field Recording in the Wild," with panelists discussing challenges and experiences of capturing sounds from around the world.



Two Internet workshops — "Internet Audio Systems" and "Internet Audio Production" — take place all day Sunday, Sept. 27, discussing the different audio encoding schemes used by the most popular Internet audio systems and techniques to avoid the side effects brought on by lossy low bit rate encoding.

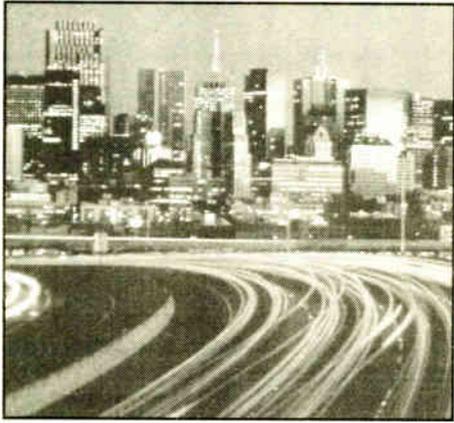
Also on Sunday, "Audio on DVD," addressing the differences in formatting and function of audio on DVD, compared to earlier systems.

For anyone interested in studio design, Russ Berger of the Russ Berger Design Group chairs "Nuts & Bolts of Studio Design" on Monday, Sept. 28 from 9

a.m. to noon. And on Tuesday, Sept. 29, Eddie Ciletti of Manhattan Sound Technicians conducts a workshop on "Workstation Control Surfaces."

A series of technical tours will take convention-goers to seven unique audio-intensive locations.

One bus trip stops at George Lucas' Skywalker Ranch for a look at one of the world's top audio-for-film facilities. Mixing stages, sound design rooms and the scoring stage are included in the trip.



Nighttime on the Bay Bridge

as well as a screening of one reel from a major Skywalker production.

A Sunday trip will take audio pros to several Bay Area music recording studios, including The record Plant and Tarpan Studios.

The DigiDesign company facility plays host to a third tour, while the fourth bus heads over to Sonic Solutions for a demonstration of DVD authoring.

Audio-for-post-production is the subject of the fifth tour to Russian Hill Recording/Crescendo studios, a prominent post-production house in San Francisco. Tour No. 6 goes to Meyer Sound Laboratories for a facility tour and sound demonstration with large- and small-format systems.

The final tour visits Dolby Laboratories in its Potrero, Calif. location, as well as the

manufacturing facility in Brisbane, Calif.

SBE conventions always include the tradition of an organ recital at a prominent local church or cathedral in the city of choice. This year, Graham Blyth of Soundcraft Electronics presents a concert on the Aeolian-Skinner Great Organ of Grace Cathedral in San Francisco. According to an AES press release, the 1934 organ consists of 123 ranks, or more than 7,200 individual pipes.

Even though the show is geared mostly toward audio technology for recording studios, multimedia producers, television and film production, hundreds of products on the exhibit floor will be of interest to radio broadcasters and radio production professionals.

While AKG rolls out its C3000 Pro large-diaphragm condenser mic and reacquaints everyone with its Solid Tube mic, Neumann will observe its 70th anniversary with the 24-karat U87 Gold mic, available in single or stereo combinations. Watch for affordable new condenser microphones to come from Audio-Technica and Audix. Helping make mics sound better will be the PreSonus VXP Dynamic Voice Processor, combining a preamp with a compressor/expander, a de-esser and EQ section.

Digital mixers continue to roll out. Italian manufacturer Generalmusic debuts the low-cost Falcon and high-end Eagle digital mixers. Spirit by Soundcraft will have its Digital 328 digital mixer, which was also shown at NAB '98 in Las Vegas. Mackie Designs will hit town with the Digital 8•Bus mixer, while Tascam intends to show off its new 16-channel TM-D1000 digital mixer. Calrec will be back with the broadcast-specific T-Series digitally-controlled mixers and the X-Series of production consoles.

By the way, Tascam still trusts in analog tape, as the new 130 cassette deck

and CD-A500 combined CD/cassette deck will prove.

Effects are big. TC Electronic will display a pre-release version of the M3000 Processor and the TC Reverb. DigiTech has two new effect boxes to introduce: The Quad 4 with four independent



Up Hyde Street in a Cable Car

processors and the S200 dual-engine multi-effect processor.

DigiDesign has the Project Studio 24-bit audio card for PC or Mac, while Yamaha shows off a card of its own: the DSP Factory for PC-based recording and editing.

Watch for new studio monitors from Genelec, Tannoy and Westlake Audio.

360 Systems heads into the Moscone Convention Center with its Instant Replay version 2.0, originally shown at NAB '98. The enhancements allow use of an external drive and improved transfer of audio files.

Probably one of the biggest digital recorders to be seen at the AES show will be the Otari RADAR II. This 24-bit multitrack recorder goes beyond typical PC-based workstations, with a 9 GB hard drive and 48-track capacity. Similarly powerful is the SADiE 24-96 digital audio workstation, with its 24-bit, 96 kHz sampling rate. In anticipation of future developments, the 24-96 is upgradable to a 192 kHz sample rate.

What: 105th Audio Engineering Society Convention

When: Sept. 26 through 29, 1998

Where: Moscone Convention Center, Howard Street, San Francisco. Go to www.aes.org/events/105 to obtain directions from all major highways and landmarks.

Registration Information: (212) 661-8528. Online registration for all workshops and links to hotel reservations can be found at www.aes.org/events/105/registration.cfm

The Wizard™ has gone STEREO!

The new **DIGITAL** FMSA-1 gives The Wizard System unmatched stereo monitoring capabilities. . .



Superlative stereo performance. Linear-phase filters that reveal the true performance of your audio processing. The stability of digital stereo demodulation. The sophisticated graphical presentation of The Wizard. And—with the RS-232 port—operation on site or off.

Contact Belar today for more details on what should be your next modulation monitor

BELAR ELECTRONICS LABORATORY, INC.
119 LANCASTER AVENUE • P.O. BOX 76 • DEVON, PA 19333-0076 USA
(610) 687-5550 • FAX (610) 687-2686
Call, write or FAX for more information on Belar AM, FM, Stereo, SCA, and TV monitors.

Here is a listing of companies exhibiting at the 105th Annual Audio Engineering Society Convention in San Francisco:

A

Aardvark
AB International Electronics
ACO Pacific
Acoustic Sciences
Acoustic Systems
Acoustic, a division of Samick Music
Acoustical Solutions Inc.
Acoustics First
Akai Musical Instrument
AKG
AKM Semiconductor Inc.
Alcorn McBride
Alesis
Altec Lansing
Amek/Harman
AMS Neve
Analog Devices
Anamir Electronics
Antares Systems
Aphex Systems
API
Apogee Electronics
Apogee Sound
Applied Research & Technology
APRS
Arboretum Systems
ARIS Technologies
ASTATIC Microphone and Installation Accessories

Athan
ATI (Audio Toys Inc.)
ATI Audio Technologies Inc.
ATM Fly-Ware
ATR Service Co.
Audex Assistive Listening Systems
Audio Accessories Inc.
Audio Amateur Corp.
Audio Engineering Associates
Audio Independence Ltd.
Audio Ltd.
Audio Precision
Audio Processing Technology Ltd.
Audio-Technica
Audioactive
AudioControl Industrial
Audiomate
Audix
Avalon Design
AXI / Audio Exchange International
Bag End Loudspeakers

B

Balboa Capitol
Baltic Latvian Universal Electronics
BASF/EMTEC Pro Media
BEC Technologies
Belden Wire & Cable
Bellari
Benchmark Media Systems
Berklee College of Music
Beyerdynamic
BGW Systems Inc.

See EXHIBIT, page 22 ►

Sessions Abundant at SBE Show

Alan R. Peterson

As Chapter 16 of the Society of Broadcast Engineers ramps up for its annual conference and convention in Bellevue, Wash., organizers have made sure there will be something there for everybody.

In addition to 204 eight-by-10-foot booths on the exhibit floor of the Meydenbauer Center, "Electronic Media Expo '98" will feature several levels of workshops and sessions — both local and brought in by the national office — ranging in subject matter from lightning protection to the latest developments in digital radio and HDTV.

These workshops are to be held on the fourth floor level of the Meydenbauer Center.

Ennes workshop

As part of the national office's presence in Bellevue, the all-day SBE National Ennes Workshop lineup takes place Wednesday, Oct. 28. A \$49 registration fee is required to attend (\$65 for non-members).



Pat Reed of Northern Technologies gets the workshop underway at 9 a.m. with "Power Quality in Digital Broadcast Facilities and Grounding," and will tackle the issues of construction of a site ground system, methods for grounding equipment and entire structures and methods of measuring resistance.

Speaking for Northern Technologies, Applications Engineering Manager Jim McDonald explained why Reed's session is important. "Lightning grounding is the most basic protection necessary," he said. "Grounding high-frequency pulses is very different from the 'green-wire' grounding we do inside our components. Lightning likes straight paths to ground, so we need to consider corners and angles that occur in any grounding system."

Power

The topic of power management continues at 10:45 a.m. with "Power Conditioning and Lightning Protection," discussing the differences and effects of surges, sags, outages, harmonics and transients; and the proper treatment using harmonic filters, isolation transformers, regulators, UPSs and surge suppressors.

After a 12 noon lunch, the afternoon sessions continue with "Destination HDTV, Parts 1, 2 and 3." Panelists scheduled for the afternoon include Gary Stevens of Leitch Corporation, Jay Adrick of Harris and Nigel Spratling of nVision Corporation. Definitions of terms, operation of encoders and decoders and analyses of facility designs will all be covered.

Deadline for registration for the SBE National Ennes Workshop is Oct. 16 at the locations shown in the box elsewhere in this section.

A series of no-charge seminars and

papers are also scheduled, presented by SBE Chapter 16, Seattle. These are non-commercial in nature and are open to anyone.

Up in the sky

Wednesday, Oct. 28 at 9 a.m., "The Next Millennium in Business Communications" will address video conferencing, integrated e-mail and voice/video mail, and integration into existing computer networks.

The session, "Solar Cycle 23: Impact on Satellite and Communications," is bound to draw interest from radio engineers affected by the recent failure of the Galaxy IV satellite. This session will discuss sunspot cycles, their

impact on satellites and several possible solutions.

J.B. Brown, director of engineering for Audiotronics, will conduct "Installation Requirements for Digital Radio Stations" at 1 p.m. Topics include routing requirements, hard disk and console requirements, and the issues facing today's stations that have already migrated to digital.

Steve Lampen, RW columnist and technology development manager for Belden Wire and Cable, takes the floor at 3 p.m. for "The Future of Broadcasting Wire and Cable." In a talk he has presented in the past to several local SBE chapters, Lampen will discuss the differences between analog

What: Seattle SBE Chapter 16 Electronic Media Expo '98 and SBE National Meeting.

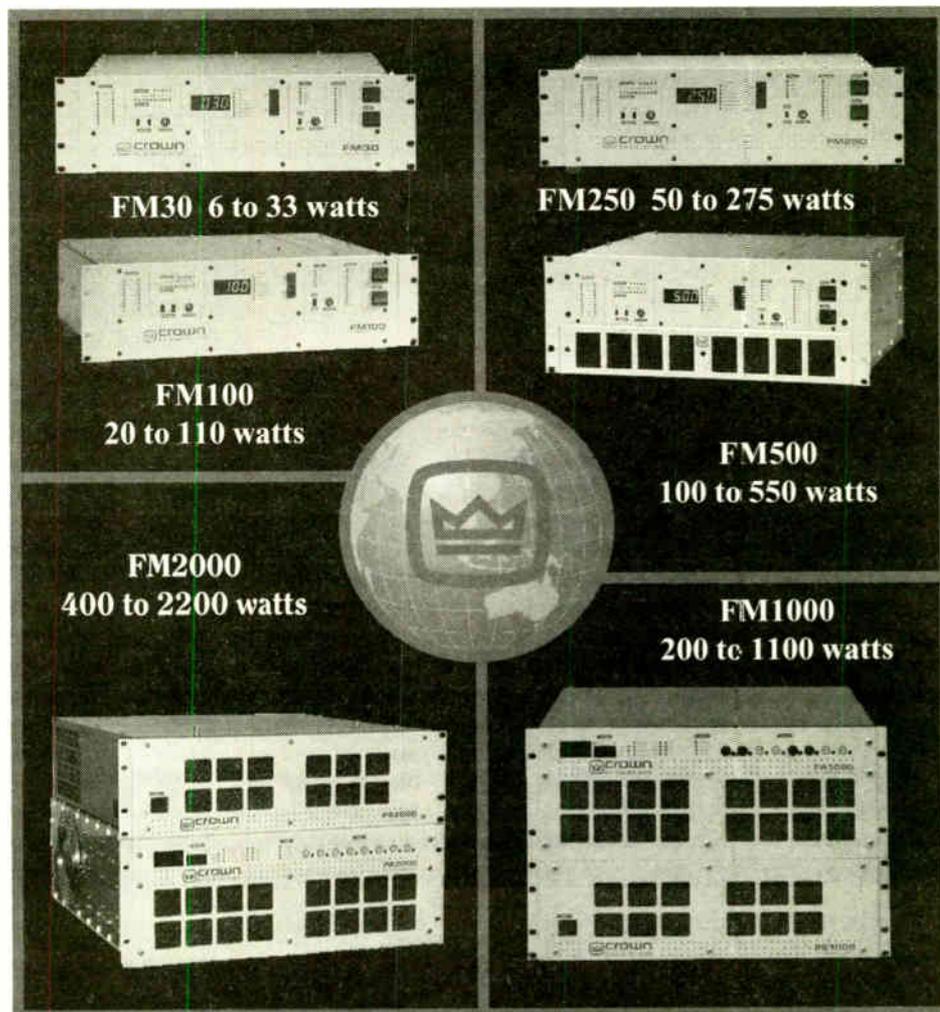
When: Oct. 28 & 29, 1998

Where: Meydenbauer Center, N.E. 6th Street, Bellevue, Wash. Just east of Seattle on the other side of Lake Washington, the center is a few blocks from the Northeast 8th Street exit of Route 405.

Registration Information: (425) 271-6855. Online registration for all workshops and links to hotel reservations can be found at www.emexpo.com

See SESSIONS, page 22 ▶

A World of Possibilities. . .



- Fully integrated, **solid-state** transmitters, exciters, translators, and satellators engineered to provide broadcasting **confidence**.
- Highly **efficient** and **reliable** power amplifiers **innovatively designed** to be lightweight and compact.
- Custom configured** and **delivered within days!**

Give Us a Call When Your World Depends on Ours!

CROWN
broadcast
Innovative Technology for Broadcast Confidence

1718 W. Mishawaka Road, PO Box 1000, Elkhart, Indiana, U.S.A. 46515-1000

Phone: 800-294-8050 or 219-294-8050; Fax: 219-294-8222

Email: broadcast@crowntnl.com; Internet: www.crownbroadcast.com

Hot Products at AES Convention

► EXHIBIT, continued from page 20

BIAS (Berkley Integrated Audio Software)
Blackbourn Media Packaging
Brainstorm Electronics
Brauner of Germany / Transamerica
Bryston Ltd. / PMC Monitors
BSS
Burr-Brown

C

CAD Professional Microphones
Cadac Electronics Ltd.
Cakewalk Music Software
Calrec Audio Ltd.
Carver Professional div. of Phoenix Gold
Cases by MASCO
CB Electronics
CBSI / Custom Business Systems
Cedar Audio Limited
Cedar Audio USA
Celestion / Group One Ltd.
Cerwin-Vega
Circuit Research Labs
Clear-Com Intercom Systems
Cliff Electronic Components
CM Automation
Coffey Sound
CommScope
Community Professional Loudspeakers
CopyPro
Countryman Associates Inc.
Crane Song Ltd.
Crest Audio
Crown International
Crystal Semiconductor
Cutting Edge Technologies
Cyberlogic

D

D.A.S. Audio
D.W. Fearn & Associates
Dan Dugan Sound Design
Data Conversion Systems (dCS) Ltd.
dB Technologies
DDA
Demeter Tube Amplification
Denon Electronics

Developing Technologies Distributors
Digidesign Development Partners
Digidesign, a div. of Avid Technology Inc.
Digigram
Digital Audio Labs
Digital Audio Research Limited
Digital Theater Systems
DigiTech
Disc makers
Dolby Laboratories
Doremi Labs
Dorrrough Electronics
Drawmer
Drawmer / Transamerica Audio Group
DSP North America, Ltd.
Dynaudio Acoustics / Munro Associates

E, F

E-mu Systems / Ensoniq
Earth Works
Eastern Acoustic Works
EDnet Inc.
Electro-Voice
Empirical Labs
Equi=Tech
ETA Systems.
Euphonix
Event Electronics
Eventide
Fairlight ESP Pty Limited
Fairlight USA
Ferrofluidics
Focusrite Audio Engineering
Fortress
Fostex
Francis Manzella Design Ltd.
Fraunhofer Institute Integrated Circuits (ITS)
Furman Sound

G, H, I

G PRIME Limited
Gefen Systems
GenelecOY
Generalmusic
Geoffrey Daking & Co.
Gepco International
Glyph Technologies
GML Inc.

Gold Line
Grace Design
Graham-Patten Systems
Group One Ltd
H.L. Dalis Inc.
Hafler Professional
Hardware Research Inc.
Harrison by GLW
HHB Communications Ltd.
Hosa Technology
Independent Audio
Industrial Acoustics Co.
Innovative Electronic Designs
ITW Switches
JBL Professional

J, K, L

Jensen Music Industries
Jensen Transformers
Joemeek / PMI
John Hardy Company, The
Josephson Engineering
JRF Magnetic Sciences
JVC Disc America Co.
Klark Teknik
Klein + Hummel GmbH
Knightek Software Solutions

KRK / Group One Ltd.
Kurzweil Music Systems/
Young Chang
Lake DSP Pty Ltd.
Lawson Inc.
Lectrosonics
Leitch
Level Control Systems
Lexicon
Liquid Audio
Location Sound
Logitek Electronic Systems
Lucid Technology

M, N

Mackie Designs
Magma
Manley Laboratories
Marshall Electronics
Martech
Martin Audio / T.G.I. North America
Martinsound
MC Squared Audio
Mediaform
MetaLithic Systems
Metric Halo Laboratories
Meyer Sound Laboratories
Microboards Technology
Midas
Miles Technology

See EXHIBIT, page 24 ►

Papers and Seminars

► SESSIONS, continued from page 21

and digital audio cable, installation questions for the broadcast facility of the future, and the possibility of using one type of cable for both analog and/or digital use.

The seminars and papers continue on Thursday, Oct. 29, again with J.B. Brown from Audiotronics, leading off "Nyquist and Broadcast of Digitally Sampled Audio." This 9 a.m. session defines and explains Nyquist's theorem (*a complex analog signal must be sampled at a rate at least twice that of its highest frequency component —Ed.*) and how

it applies to audio for broadcast.

Two concurrent DTV workshops commence at 10 a.m., along with other sessions on television technology. At 1 p.m., Madison Batt of Tower Consulting Engineers conducts a tour of the combined FM/TV facility at the nearby West Tiger transmitter site.

At 2 p.m., Daniel Taylor and Associates present a paper on "DTV/Radio Technical Facility Design Case Studies," examining transmitter facility layout, plant programming and power requirement calculations, installation of critical systems and system control approaches.

Products & Services Showcase

For more information on the products shown below, circle the appropriate Reader Service No.(s) on the enclosed Subscription/Reader Service card or contact the advertiser directly.

WEATHER RADIO Model CRW



Price \$540.00

Sensitivity .28 microvolts for 12 dB quieting. All 3 frequencies. Alert tone demutes receiver, closes relay and gates audio to 600 ohm rear terminals. Another set of rear terminals has continuous 600 ohm audio output. Double conversion crystal controlled, crystal filter in first I.F., ceramic filter in second I.F. Dual gate MOS FET front end. 50 ohm coaxial input. Adjacent channel (j25 kHz) down to 70 dB. 19" rack mount, 3 1/2" H, all metal enclosure. In stock—available for immediate delivery.

GORMAN REDLICH MFG. CO
257 W. Union St. • Athens, Ohio 45701
Phone 740-593-3150 • FAX 740-592-3898

READER SERVICE NO. 78

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



2198 Hubbard Lane, Grants Pass, OR 97527

(541) 471-2262

READER SERVICE NO. 99

Attention Advertisers!

Reach **18,000+**
broadcasting professionals!

**RADIO WORLD'S Product
Showcase** provides a perfect
medium for test marketing
your products and services.

**It's an efficient, effective &
affordable advertising option!**

For more information, including
rates and deadlines, fax

Christopher Rucas at

415-922-5597

or call

415-922-5595

THE CLEAR SOLUTION IN CELLULAR REMOTES

from MARTI® - The Remote Experts

When you can't use your POTS or line of sight technology, you could be "cell casting" with the MARTI™ cellular remote products.

Cellular remotes give you the flexibility to set up a remote instantly any where there is cellular coverage. The Cellcast® has a full 3 watt cellular transceiver for those hard to reach spots. The lightweight Talk★Port™ is portable and ideal for the reporter covering that fast breaking story.

Better Remote Mixing



For superior mixing on site, the remote mixer features

4 mic channels and 2 aux inputs, peak limiter, and squelch/ mute switching, plus a lot more. AC or battery powered for up to 10 hours.

MARTI®



FREE Shure® BG1.1 Mic with purchase!
Call Now to Order 1-817-645-9163
Or contact your favorite MARTI distributor.

Guaranteed Next Day Shipment



Cellcast
Remote Broadcast Studio

Talk★Port
Micro-Cellular Link

Need Solutions?
www.bdcast.com



Solutions for
Tomorrow's Radio

Circle (29) On Reader Service Card

© 1998 Broadcast Electronics, Inc. BE system, MARTI and Cellcast are registered trademarks of Broadcast Electronics, Inc. Talk★Port is a trademark of Broadcast Electronics, Inc. All other trademarks are the property of their respective owners. Free Shure BG1.1 Mic offer good through October 31, 1998.

New Gear at AES, From A to Z

► EXHIBIT, continued from page 22

Millennia Media
Miller & Kreisel Sound
Minnetonka Audio Software
Mohawk / CDT
Monster Cable
Motorola Inc.
Musgrave Design Labs M.A.D. Labs
Music Industries Corp
Music Producers Guild of the Americas
MUSICAM USA
Mytek Digital
N.A.R.A.S.
Nady Systems
Nagra USA
National Semiconductor
Nemal Electronics Intl.
Neotek

Teen Talks Web Radio

Imagine being invited to participate in an AES workshop at the ripe age of 15, especially when the party extending the invitation is Microsoft.

This was the offer made to Daniel Anstandig, a high school student who operates Internet radio station DAER out of his bedroom at his father's penthouse apartment in Cleveland. Microsoft requested Anstandig's presence at the AES show as a representative of the future of Internet broadcasting.

Internet radio station DAER is more than just "a kid playing deejay." Anstandig's operation has attracted considerable attention with its professionally produced jingles, computerized storage and playback, nationally syndicated programming and a Cutting Edge Omnia.net audio processor for high-quality Internet audio.

DAER recently did a live Webcast from the Rock and Roll Hall of Fame and has agreements with ASCAP and BMI for music usage. The date and time of the Microsoft event at the AES show had not been scheduled at press time.

— Alan R. Peterson

Network Music
Neumann USA
Neutrik Instrumentation
Neutrik USA
Non-Stop Music
Norris-Whitney Communications
NVISION

O, P

Opcode Systems
Oram Pro Audio
Otari
Pacific Microsonics
Panasonic Broadcast & Digital Systems
Peavey Electronics
Pelonis Sound and Acoustics
Pendulum Audio
Penn Fabrication
Penny + Giles
Plitron Manufacturing
Pre Sonus Audio Electronics
Precision Earmold Laboratories
Prism Media Products
Pro Audio Review
Purple Audio Inc.

Q

QSC Audio Products Inc.
Quantegy Inc.
Quested Monitoring Systems

R

Radial (A Division of CableTek)
RADIANT Audio Engineering Inc.
Radio World
Ramtech Industries Inc.
Rane
Rapco International
RDL Radio Design Labs
RealNetworks
Renkus-Heinz
Retrospec
Rohde & Schwarz
Roland
Rolls
Rorke Data
Royer

S

Sabine

SADIE
Samson Technologies
Sascom Marketing Group
Schoeps/Posthorn Recordings
SEK'D America, Ucik
Selenium Loudspeakers
Sellmark Electronics
Sennheiser Electronics
Shep Associates Ltd.
Shure Brothers
Solid State Logic
Sonic Foundry
Sonic Science
Sonic Solutions
Sonifex Limited
Sonus
Sony Electronics
Sound Ideas
Soundcraft
Soundelux Entertainment Group
Soundelux Microphones
Soundfield Research / Transamerica
Soundscape Digital Technology Ltd.
Soundtracs
SPARS
Spirit by Soundcraft
Stage Accompany
Steinberg N. America
Stewart Electronics
Storm Audio Systems
Studer North America
Studio Technologies
Summit Audio
Superscope Technologies / Marantz
Professional Products
Switchcraft
Symbolic Sound
Symetrix
Sysid Labs
Systems Development Group

T

TACT Audio
TAD - Technical Audio Devices
TASCAM
TC Electronic A/S
TC Works
Tektronix
Telex Communications
Telos Systems
Testa Communications
TGI North America
THAT Corp.
Thinkware
Third Wave Media
TOA Electronics
Toroid Corp. of Maryland
Tracer Technologies
Transparent Cable
Tripath Technology
Tube Tech
Turbosound

V

Vergence Technology
Virtual Mixing Co. / Calif. Recording Institute

W, X

Wave Distribution
Wave Mechanics
Wave:Space
WaveFrame
Waves
Wenger
West General Associates
Westlake Audio
Whirlwind
White Instruments
Wireworks
XTA Electronics / Group One Ltd.
XWire

Y, Z

Yamaha Corp. of America
Yorkville Sound
Zack Electronics
Zonal Ltd.

Analog & Digital A2-D The affordable instrument
Audio Measurement System Designed to meet the challenges
of tomorrow's testing needs

- Analog & Digital Generator and Analyzer
- User friendly front panel
- Stand-alone or remote control via RS-232 or IEEE-488
- Portable

We set the standard in making audio testing AFFORDABLE

NCI Liechtenstein
Division of NEUTRIK AG
9494 Schaan
Phone +41 75 237 24 24
Fax +41 75 232 53 93

NCI GmbH
93051 Regensburg
Germany
Phone +49 941 920 57 0
Fax +49 941 920 57 57

NEUTRIK Instrumentation Inc.
Montreal
Canada/USA
Phone +1 800 661 63 88
Fax +1 514 344 52 21



NEUTRIK CORTEX INSTRUMENTS
AUDIO ANALYZERS+PSYCHOACOUSTICS

WIRED FOR SOUND

Digital Mics and the Cable Question

Steve Lampen

The first three parts of this four-part series are available on the web at www.rwonline.com

Let's pursue our discussions about choosing microphone cable.

Did you know that there are digital mics out on the market? And I mean microphones that have an output that is AES/EBU? Beyerdynamic has one, and there were a couple of other microphone manufacturers making digital noises at the last AES show.

I think one of the things some microphone manufacturers may have forgotten about was the cable. Because now you're into digital, at bandwidth around 3 MHz, you're going to need very low capacitance to pass those ones-and-zeros. The AES/EBU standard calls for a cable of 110 ohm impedance. Well, hold on a minute. What were the impedances of all those cables we talked about in the last three columns? Can we use those for analog and digital?

Well, yes and no. To understand the limitations of any particular cable design, you must first consider the impedance of the cable.

Cable impedance

If I had a dime for every person who asks me for 150-ohm (or 50- or 600-ohm) cable, I would be a rich man. You see, everyone knows that you have to use 75-ohm coax on your TV or video system, and you have to use 100-ohm twisted pairs on your computer (or 50-ohm coax in the old days of computers). So where's my 150-ohm microphone cable?

Every cable has an impedance. The question is, does it matter what the impedance is? And this is a question of wavelength. Ask your friendly ham radio operator, "When is the wavelength of a cable important?" and he will tell you:

"When the cable is one-quarter of a wavelength at the frequency you are running, the impedance of the cable becomes important and you have to match the cable to the system you're running."

OK, so back in analog we were running 20 kHz. And the formula says:

$$W = \frac{300,000,000}{F}$$

W is the wavelength in meters, and F is the frequency in Hertz. So 20 kHz has a wavelength of ... 15,000 meters, or nine miles! And one-quarter wavelength is 3,750 meters, or 2-1/3 miles. And you have to derate this by the velocity of the cable (PVC, one of the lowest performance plastics, has a velocity of around 50 percent). So we are at a length of just over one mile.

Do you have a microphone cable one mile long? I don't think so. So what is the impedance of the cable? *It doesn't matter* what it is. In truth, most of the analog mic cables out there are around 30 to 40 ohms.

On the other hand, look at AES/EBU digital audio. It has a bandwidth of 3 MHz (or around there, depending on

which sampling rate you choose). That means a wavelength of 100 meters, or 328 feet. And one-quarter wavelength is

you have a cable 41 feet long? Sure could! So the impedance at digital is important (not critical, just important).

Can you use a digital mic cable for analog? Of course. It is, in fact, the best performance analog cable ever made.

82 feet. And if we had a PVC cable (50 percent velocity) it would be 41 feet. Can

Therefore, you will have to have cable with an impedance around 110 ohms.

Can you use 40-ohm constructions? Sure, but you will have reflections of signal ("structural return loss") because the impedance is wrong. And the high capacitance will round off those square-wave ones-and-zeros pretty quickly. If you have 50 pF/ft, you probably can't go very far at all. If you have 30 pF/ft, or 25 pF/ft mic cable, maybe 20 feet, maybe 50 feet. But nothing as far as cable made for AES/EBU (110 ohm, 12.5 pF/ft).

Can I use a digital mic cable for analog? Of course. It is, in fact, the best performance analog cable ever made because of the low capacitance. So you can wire for analog today (and get superior performance) and be ready for digital tomorrow.

The other factor to consider is resistance. Large-gauge wires have lower resistance. But compared to capacitance, resistance is definitely number two. The

See LAMPEN, page 30 ►

GLOBAL BROADCASTING EXPERIENCE

For over 50 years Continental Electronics has been building the most powerful transmitters for broadcast and communications installed throughout the world. Power levels from 50 watts to 2000kW, longwave to shortwave.

- Consoles
- CD Players
- Cassette Decks
- Audio Storage Systems
- Digital Audio Workstations
- Microphones



We can assist you with Engineering, Designing and Commissioning your Studios and Transmitter Facilities.

- Transmitters
- STL
- Remote Control
- Monitoring
- Towers
- Antenna
- Transmission Line



Celebrating 50 years of continuous service

www.contelec.com



Continental Electronics Corporation

4212 S. Buckner Blvd., Dallas, TX 75227

214.381.7161 • 800.733.5011 • Fax: 214.381.4949

PRODUCT EVALUATION

Aphex Takes Different Approach

The FM Pro 2020 On-Air Processor Aims to Blend the Best of Digital and Analog

Mario Hieb, CPBE

The Aphex FM Pro Model 2020 is a unique audio processor, a hybrid of digital control and precision analog components. This unit is chiefly an analog box, with digital circuitry reserved for control systems and A/D-D/A options. Designed by a team led by Donn Werrbach, inventor of the Aphex Compellor, Dominator and Digicoder, the FM Pro utilizes 10 of Aphex's 25 patented circuits.

Philosophically, the FM Pro 2020 is far different than DSP-based audio processors. Aphex believes that analog

processing still sounds better than DSP-based processing, and that the chief advantages of digital signal processing remain its consistency, relative ease of manufacture and natural interface to computer control. Aphex also believes



Product Capsule:
Aphex FM Pro Model 2020

Thumbs Up

- ✓ Clean, transparent processing
- ✓ Versatile control of audio parameters
- ✓ Good value

Thumbs Down

- ✓ Front-panel display too small
- ✓ Adjusting processing from front panel difficult
- ✓ Must remove from rack to clean air filter

For more information from Aphex, contact the company in California at (818) 767-2929; send e-mail to sales@aphexsys.com or circle Reader Service 87.

"I Won the Marconi with Scott"



"I do like to give credit where credit is due and acknowledge Scott Studios as a major player in my daily broadcasting battle. The time I now have to devote to preparation, and the ease of operation of the Scott System, has helped me increase show professionalism."

Bill O'Brian - KRKT, Albany, Oregon
Marconi Small Market Personality of the Year - 1997

that DSP algorithms now available are relatively crude compared to the art of analog processing.

The FM Pro is a modern, sophisticated audio processor. The Leveler uses the Frequency Discriminate Leveler and Dynamic Verification Gate circuits from the Compellor, along with two new circuits: Sticky Leveler and Jump Ahead.

The Sticky Leveler is a new Aphex invention that keeps the Leveler's gain frozen until the input signal amplitude changes by more than a certain amount.

The Jump Ahead circuit detects if the Leveler's output has jumped out of bounds and rapidly attacks the Leveler gain down to avoid any overload. When the Jump Ahead correction brings the gain within 3 to 6 dB of the corrected level, the Jump Ahead detector drops away and the leveler continues correcting normally.

The four-band compressor uses the Wave Dependent Compressor circuit from the Aphex Easyrider and Expressor units. It has adjustable crossovers so that it can be set up as a four-, three-, two- or even one-band processor. The lateral (left to right) linking may be set to off (independent), hard or elastic. Perhaps the most powerful circuit in the unit is the split-band clipper with a distortion canceled bass clipper.

Optional features include an AES3 I/O option that utilizes a patented, 20-bit drift stabilized A/D converter, a Digicoder type PPDM generator, and a pre-emphasis processor.

"We Won the Marconi with Scott"

The 1996 winner of the Marconi Major Market Air Personality of the Year Award *also* uses Scott Studios' touchscreen digital audio system! Still another Scott Studios user won the Country Music Association "Station of the Year" award in 1997! The Scott System can help *your* stations sound better!

Mac Hudson & Irv Harrigan - KILT FM, Houston, Texas
Marconi Major Market Personality of the Year - 1996



"Scott has Improved our Product"



"We were very eager to 'go digital' last Fall, and compared different systems. Our decision to go with the Scott System was one we *all* felt good about. I'm confident knowing the comfort level of our different departments who use the system is high. Our Scott System has improved our efficiency and the quality of our product."

Michelle Mercer, PD - KPWR FM, Los Angeles

Tom Koza, Chief Engineer, top rated afternoon personalities "The Baka Boys" surround Program Director Michelle Mercer

User feedback

The Aphex FM Pro 2020 has some great features. The graphic user interfaces on the PC software are cool and give the user good feedback on what's happening to the audio. Unlike the Orban 8200, with which it will inevitably be compared, the crossover points on the multi-band processor are user-definable and infinitely adjustable. This gives the user a great deal of control over the sound and feel of the processed audio. Another nice feature is a front-panel headphone jack with selectable monitoring of processor in and out. Too bad off-air audio isn't included.

I love the Split Band Bass Processor/Limiter. Low frequencies are split into Warm Bass and Sub Bass with separate processing controls. After

See APHEX, page 27 ▶

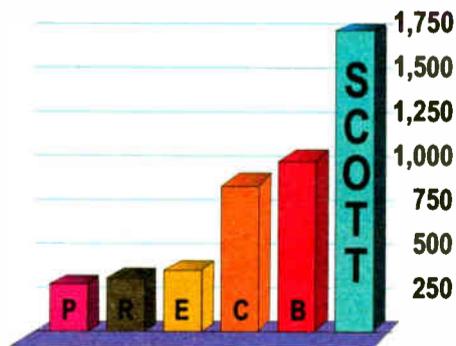
More Stations got Scott Systems in the past 12 months than bought most other systems in the past 4 years!

Most managers, air personalities, program directors *and* engineers prefer the Scott System. That's why *more* radio stations get Scott Studios' than any other digital audio system!

It's a fact: over 1,700 radio stations have 3,800 Scott digital workstations, including *major* groups like CBS, Chancellor, Disney/ABC, Clear Channel, Emmis, Citadel and many more.

Scott Systems are best due to:

- the friendliest user interface;
- uncompressed digital audio;
- 3 products--Good, Better & Best.



Scott Studios corp.
13375 Stemmons Freeway, Suite 400
Dallas, Texas 75234 USA
(972) 620-2211 FAX: (972) 620-8811
(800) SCOTT-77

► APHEX, continued from page 26
installing the FM Pro, I heard bass detail in music that I never heard in two years of Orban 8200 use. The result is a "punchier" sound that, to me, sounds louder.

On the subject of loudness, using the Belar Wizard modulation monitor I was able to achieve the same peak-to-average ratios as with the Orban 8200, but with a clearer, more open sound. I'm impressed that, despite the number of active circuits, the FM Pro sounds transparent. This is a tribute to the design skills of the Apex team.

The Apex Pro produces transparent highs, clean midrange and virile bass with excellent loudness control; it sounds "loud and clean." Another nice thing about the FM Pro is the price. There's a lot in this box for the money. The basic unit lists for \$4,995. Digital I/O is \$500; the high-frequency limiter is \$500. High-frequency limiter and stereo generator are \$2,000. So fully loaded, the box is around \$7,500.

Don't overdrive

The FM Pro is not without negatives. I had to crank down internal pots on the FM Pro A/D converter to avoid overdriving the AES3 input on my Dolby DSTL digital studio-to-transmitter link. This was a problem because the DSTL has a fixed, AES3 input. Apex has told me that the DSTL is the only STL with this problem. I should add that I did a demo with the Harris CD Link and had no trouble with AES3 levels. Also, the FM Pro sounded better with the CD Link than with the Dolby DSTL.

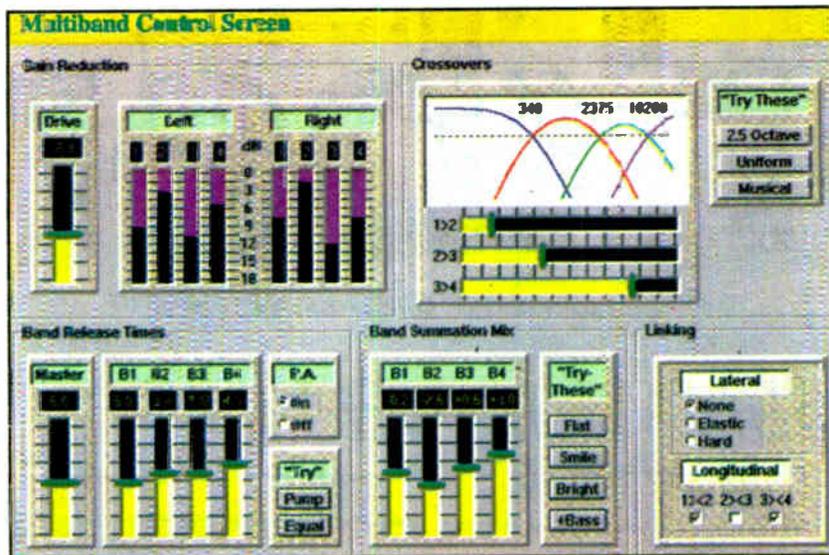
Philosophically, the FM Pro 2020 is far different than DSP-based audio processors.

I found the LCD screen too small and too dim; it's hard to see off-axis. The front-panel menus are cumbersome; I found it difficult to adjust the processor without using the PC software.

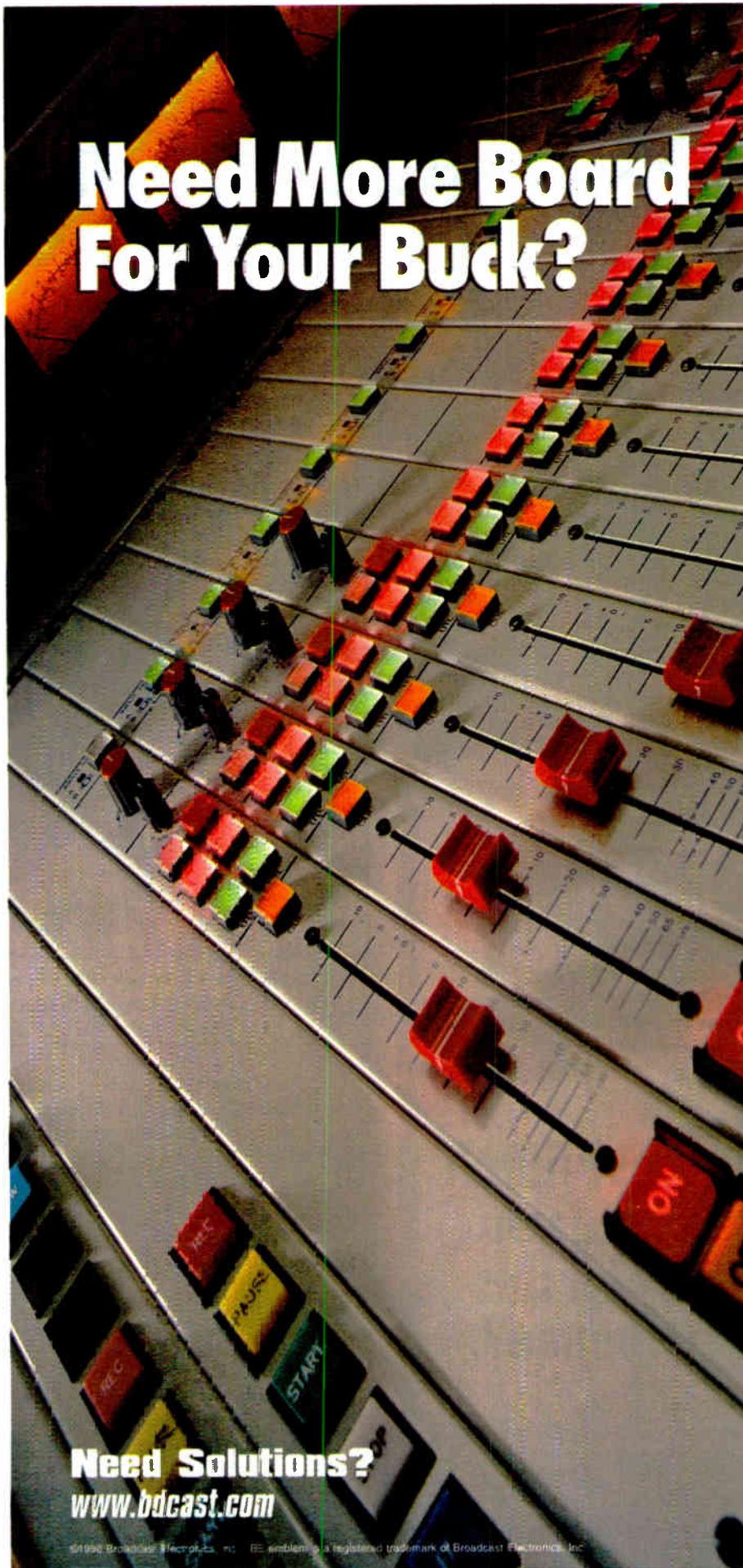
Physical service is awkward. The fan is located on the side of the unit; you must remove the unit from the rack to clean the air filter. You can't get to cards from the front or back of the unit, you must open the top, which requires removing the unit from the rack. The top cover is held on by 13 screws, located on the front, back, top and sides.

Although the crossover points of the multi-band filter are user-definable, the crossover filters are fixed at 6 dB/octave for a higher integrity sound. Some stations like more consistency from cut-to-cut, and this requires steeper filters. I think my Orban 8200 does a better job of achieving a homogenized sound.

Typically, I worry about drift due to component aging in analog audio processors, stereo generators and exciters. According to Werrbach, "Drift is inappreciable. The capacitors used are 2 percent tolerance polypropylenes, resistors 1 percent metal film, and tuning is by 8-bit digital precision. The



FM Pro Multiband Control Screen



long-term drift of the crossovers is of the order of 1 percent for life."

Summary

The Apex FM Pro 2020 is a unique broadcast audio processor. I think it is best suited for stations that prefer clean, transparent, audio with musicality, as opposed to an homogenized sound.

This is the kind of sound I prefer, and am glad our industry is moving in this direction. I recently returned from vacation, and upon hearing my station for the first time in a week I thought to myself, "Man ...we sound good!"

■■■

Mario Hieb, CPBE, is chief engineer for KXRR(FM) in Salt Lake City and consults for various clients. He holds a Bachelor of Science degree in Electrical Engineering.

Auditronics is Back!

with a

NEW ANALOG CONSOLE

Introducing the COMET

State of the Art Analog For State of the Art Radio

- Lowest Price in Class
- Superior Audio Performance
- Latest Technology
- 8 Output Buses
- Durable, Diamond Glaze Finish
- Forward-Facing Cue Speaker
- Differential Busing for Near Zero Crosstalk

**CALL TODAY!
(901) 362-1350**



Solutions for Tomorrow's Radio

Circle (133) On Reader Service Card

Workbench

Radio World, September 16, 1998

Label Your Cables With Brady

John Bisset

The studio construction projects just keep on comin' — and you're probably pretty tired of hand-lettering cables. Maybe you have given up, and are not numbering cables or labeling anything. With the pressures today's engineer must endure — move this studio in a weekend, you know the routine — you need a buddy.

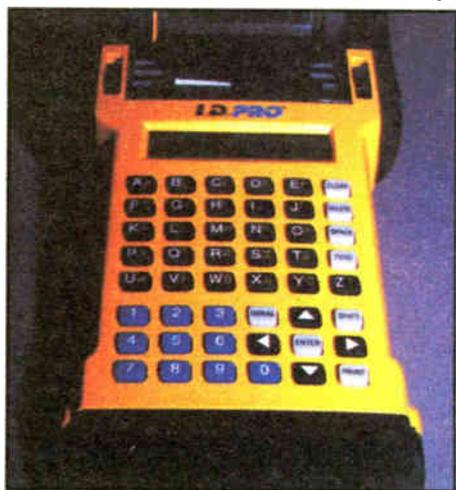


Figure 1: Brady's new ID Pro prints professional cable ID labels that are self-adhesive.

Brady, the wiring company, has a slick tool that will make your wiring problems disappear. It's called the I.D. PRO. It prints multiple-line wiring labels on adhesive plastic that wraps around the wire.

The labels get done a lot quicker, and



Figure 2: Cover cabinet access holes with attractive, removable octagonal panels for easy access to equipment.

the self-adhesive tape eliminates the need to place clear shrink over the numbers. Check it out at any electronic parts or telco/data parts supplier.

★ ★ ★

Last issue, Dave Bowling from WPTG(FM)/WMBG(AM) in Williamsburg, Va., shared an inexpensive method of mounting sound-deadening foam panels. Dave has another neat idea for those building their own console furniture.

Figure 2 shows desk support pedestals that Dave had a local kitchen cabinet-maker build. To provide engineering access to the equipment, each support

pedestal has an octagonal section cut from each side. A decorative trim hides the edges of the panels. When equipment access is needed, the panel is pulled off (note the side of the left pedestal in Figure 2). Kitchen cabinet spring-clasp fasteners are used to anchor the octagonal panels in place.



Figures 3 & 4: Left: RTV compound plugs the entrance of this PVC pipe used to protect ground wires. Right: The PVC pipe also works well at the base of a tower, protecting ground wires.

Because Dave's pedestals are deep, equipment access is simplified by entering from either side. Construction is simpler, too; once the first pedestal is built, clones are easy for the cabinetmaker to recreate.

★ ★ ★

Engineers are in charge of everything, it seems. This includes crowd control at station events. If you have an interest in public safety, request a copy of the GALL'S Inc. catalog.

In addition to a variety of items for emergency personnel, this Kentucky-based company sells many products that are useful for the broadcast engineer. A spotlight with 1 million candlepower, powered by your cigarette lighter, is ideal for entering dark transmitter sites, checking out your tower at night or providing

adequate lighting when no AC is available for the traditional trouble light. Safety cones, first aid supplies, and a variety of flashlights fill the catalog pages. Call (800) 477-7766 for a copy of their catalog, or look them up on the Web. Their address is www.gallsinc.com

★ ★ ★

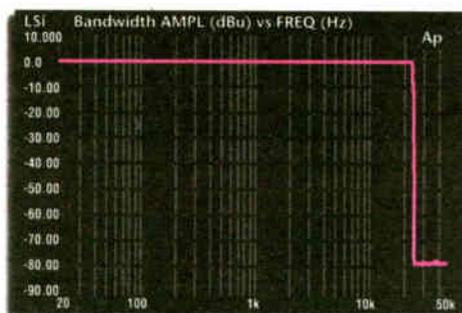
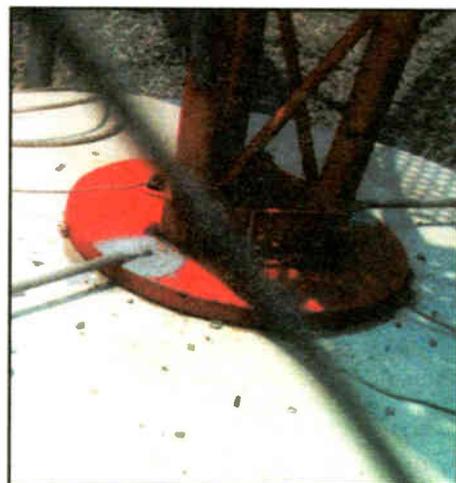
As many of us prepare for winter weather, it is time again to check our tower sites. Adequate grounding of the tower is imperative. But how do you handle the bonded ground wires that run across the tower base? Try running them inside PVC pipe.

Figure 3 shows how the cable buss bar is grounded. The white substance is RTV, which seals the PVC pipe end, to prevent water from entering.

The same idea is used in Figure 4. Anyone walking inside the tower fence is less likely to break off the ground wires by stepping on the PVC pipe.

★ ★ ★

In a similar vein, it won't be long before static trouble starts, as air conditioners give way to heat pumps! With more and more stations relying on com-



How much would you pay for this response?

>100dB S/N • 2.5 mile line driver • Ground/Lightning isolation
90-day satisfaction guarantee. 3 year parts and labor warranty.
2 channels for less than \$1,650.

www.kci-dfw.com

Knight's Communications Inc., 2219 West Broadway,
Fort Worth, Texas 76102 800-880-5061



Circle (82) On Reader Service Card

INTERNATIONAL UPDATE

Tropical-Band Radio on Decline

Growth in FM Stations, Better Communications Networks Leading to Less Use in Latin America

Hans Johnson

The bottom of the shortwave band is growing increasingly quieter.

Long an important medium for communications in the tropics, tropical-band radio is seeing a steady decline in listenership as FM radio and improved telephone services grow throughout the region.

Occupying the lower portion of the shortwave spectrum, the tropical wave bands — 2300 kHz to 2495 kHz, 3200 kHz to 3400 kHz and 4,750 kHz to 5060 kHz — are used for domestic broadcasting by a number of stations in Africa, Asia, Australia, the Caribbean and Latin America.

The benefits of the bands include a short skip distance of 2 MHz to 4 MHz, making them ideal for broadcasting locally. Moreover, international regulations prevent megapower international broadcasters from using these frequencies.

Steep decline

But despite its benefits, tropical-band activity has declined dramatically in some South American countries, such as Venezuela and Columbia.

The demise of the tropical band in Latin America is not a reality yet, but experts agree it is coming.

“(These) countries used to be hotbeds of tropical-band activity,” said Don Moore, a professor at Marycrest International University in Davenport, Iowa, and author of several works on Latin American broadcasting.

“Big stations used the band as an extra service, usually for rural (areas),” Moore said. But growth in FM services and other media outlets have led a number of tropical-band stations to shut down due to a lack of funding and interest.

“Thanks to microwave relays, some Bolivian provincial towns can now hear Radio Fides from La Paz via local FM stations,” said Takayuki Inoue Nozaki, a shortwave monitor who tracks radio in Latin America.

Moore said that commercial FM stations have attempted to fill the vacuum left by the tropical-band outlets, but the new stations have struggled.

“These commercial stations are smaller (than the better established tropical-band stations) and are less well off in terms of cash flow, equipment and trained staff,” Moore said.

Changing scene

Despite these advantages, the better fidelity of FM broadcasting and an improving telecommunications infrastructure throughout Latin America are leading to a decline in tropical-band listenership.

Moore said that tropical-band radio in Peruvian Andes has thrived for more than two decades because listeners use it to have paid *comunicados* (personal announcements) read over the air. *Comunicados* represent much of the income for these stations.

During a trip to Ecuador late last year, Moore monitored the tropical band and noticed that telephone communications were improving in northern Peru.

“Telephone service has reached

towns such as Chota and Cutervo, with stations (broadcasting) their phone numbers on the air,” Moore said. These were remote, isolated communities just a decade ago.

However, telephone service in these towns will decrease the need for *comunicados*, which will mean a corresponding decrease in station revenue.

Remote areas

Although the demise of the tropical band in Latin America is not a reality yet, experts agree it is coming. Harald Kuhl, a writer and researcher specializing in international media issues, said he agrees

with Moore’s assessment that tropical-band stations will continue to serve remote areas in the Amazon and the Andes.

“Outside these areas, a time is coming when only religious stations will use these bands for reaching indigenous people,” said Kuhl. “In 10 years, commercial tropical-band stations outside of Peru and Bolivia will be exceedingly rare.”

In the future, Kuhl speculated that alternative methods of communications will become more popular. “The next step will be new systems like digital shortwave or direct-broadcast satellites, such as WorldSpace,” Kuhl said.

■ ■ ■

Hans Johnson is a shortwave enthusiast who reports on the industry from Conroe, Texas.

The Best Digital Audio Delivery System Just Got Better

More Powerful, Less Cost!

Make the **EZ** Selection

<p>Library & Playlist Modification Module EZ-LIB Great For PD's, MD's, Traffic... Multiple Cart Walls Module EZ-ARRAY Unlimited Instant Access-Customize Each User Automated or Live Assist Player Module EZ-PLAY Up to 4 Available Per Workstation MasterLog Live Assist Player Module EZ-MLOG Second Generation Interface for Advanced Users Quad Player Module EZ-QPLAY Multi-Deck Cart Player Enhanced Quad Player Module EZ-4PLAY Multi-Deck Player With Scheduling</p>	<p>Tracker 2000 Module EZ-TRKR The Easiest & Most Powerful Voice Tracker Available Recording & AutoRecording Machine Module EZ-REC Up to 4 Available Per Workstation Graphic Waveform Cut & Paste Assembly Editor Module EZ-EDIT Fast Non-Destructive Editor Script Display Module EZ-SCRIPT Prompting Display With Embedded Audio Wire Capture & Editing NewsDAD32 Complete News System Spectral Express Multitrack Editor EH-SPEX Transparent Interface to DAD</p>
--	--

The **DAD_{PRO32}** Digital Audio Delivery System already has a widely established and enviable reputation as the most versatile and reliable system on the market. Now configuring a DAD System

is as easy as picking your favorite tunes. New **EZ Modules** permit selection of only the features and functionality required for optimization of any Workstation, typically at a significant cost savings.

LAN or WAN - LIVE ASSIST or AUTOMATED MAJOR or SMALL MARKET
DAD_{PRO32} DELIVERS WHAT OTHERS ONLY PROMISE

Applicable Play and Record DSP boards will need to be added depending on module selected. The full DAD_{PRO32} system is recommended for operationally intensive facilities. For more information on EZ Modules and other DAD products, contact your nearest ENCO dealer, or call

ENCO SYSTEMS, INC.
24555 Hallwood Court, Farmington Hills, MI 48335 USA
Tel: 800-362-6797 or 248-476-5711
Fax: 248-476-5712 • www.enco.com

Digital Audio Raises Mic Cable Questions

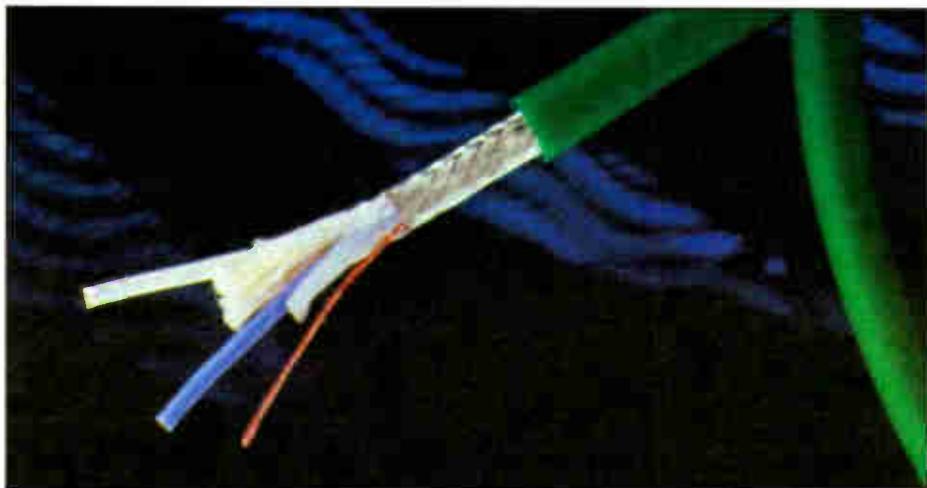
► LAMPEN, continued from page 25

reason is simple: resistance is linear over frequency. That is, resistance affects all frequencies equally. So, while it may allow you to run your microphone a little farther, it will not affect one frequency more than another, like capacitance.

Resistance, or more correctly gage size, does have one indisputable benefit: ruggedness. And this brings us full circle to our original subject four columns ago. If you want a rugged cable, a larger gage will last longer than a smaller gage. For example, a 22

AWG cable will withstand 40 percent more pulling strength before conductor elongation than a 24 AWG construction. But a 22 AWG cable will be bigger, more expensive (more copper), and stiffer, all other things being equal.

However, if there is an industry trend, it is toward smaller gages (moving from 22 AWG to 24 AWG) where the cables are smaller, more flexible, less expensive, with a loss in basic ruggedness. Perhaps the audio application world is getting easier on cables, or the improve-



Audio cable makers are responding to the need for AES/EBU-appropriate cable. Shown: Belden's new 1800F, suitable for digital and analog work.

what have you done for me lately?

Prophet Systems—
what have you done for me lately?

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

First, Prophet Systems signed a huge contract with Capstar.

Then we joined them as their first non-station acquisition.

Recently, Prophet Systems closed a major deal with Jacor.

But what does that mean for you?

ments in jacket ruggedness are making up for the smaller conductors.

There are many paths that microphone technology is following. Wireless mics are, of course, a major industry. The cables they require include RF cables, which is a whole column in itself.

Miniature microphone require extremely small cables, of tiny gages.

If there is an industry trend, it is toward smaller gages.

Such cables exist but can be very expensive because of the difficulty in manufacturing such small designs. There are even sub-miniature star-quad designs for low noise. Some sub-miniature quad designs use special bronze alloys to increase the strength of the conductors since the gage sizes are so small. One actually silver-plates the bronze alloy to bring the resistance up to that of regular copper and yet retain added conductor strength.

In our next column we will look at line-level cables and similar install-only designs, the next step in the audio chain.

■■■
Stephen H. Lampen is the author of "Wire, Cable and Fiber Optics for Video and Audio Engineers" (McGraw-Hill) and is the technology development manager at Belden Wire and Cable. Contact him via e-mail to steve.lampen@belden.com

Latest and Greatest Technology

We have the experience, the people and the financial backing necessary to take a great product line and move forward in great leaps. Take the AudioWizard CFS32™ out for a test drive at the Fall show in Seattle and you'll see our point. This 32-bit Graphical User Interface combined with our powerful database engine and WAN capabilities makes for one authoritative digital audio system.

Tech Support

Our superior tech support has actually been the deal-maker in some recent contracts. You can count on us. (You can check out our client list at: www.prophetsys.com)

Your bottom line

Let us show you how you can recoup your investment, just like the big boys.

Productivity

Our systems are user-friendly—you can probably be up and running in a matter of days. But to show you all the power and flexibility, we've created the PSI Training Academy, a state-of-the-art educational facility. Get hands-on experience under the supervision of broadcasters who have relied on the AudioWizard for their bread and butter.



Together, let's make great radio.



Sales: (800) 658-4403 Support: (308) 284-8450 Sales & Support Fax: (308) 284-4181 E-mail: sales@prophetsys.com

Circle (211) On Reader Service Card

World Radio History

COMING SOON

Coming in
Radio World

- Our NAB Radio Show Preview
- What is LINUX and why should you care?
- RW reviews the Belar FM5A-1

Optimize Your CD Control With Denon

■ Control Terminals
RS-323C/422A,
D-Sub 9 pin, D-Sub 25 pin

■ Programmable
Play Mode
■ Pitch Control

■ Auto Space
■ Auto Cue
■ Jog/Shuttle Wheel



■ Auto Edit
■ Index Search



Professional audio applications require professional tools—particularly in demanding digital studio environments. The Denon DN-C680 CD player is engineered to provide the *ultimate* in flexibility and performance for broadcast and post production facilities. Offering a multitude of features, including programmable play mode, jog/shuttle wheel, auto edit, auto space and optional **SMPT** kit, the DN-C680 provides the optimum solution for programmable CD playback.

Denon Electronics, 222 New Rd., Parsippany, NJ 07054, (973) 575-7810
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

Circle (30) On Reader Service Card
World Radio History

DENON
The First Name in Digital Audio

SATELLITE NEWS

Old Satellite, New Receivers?

*The Expiration of Satcom C5 in 2001
May Result in Costs to Radio Stations*

Bill Sepmeier

For about a year now, we suspect, some of the country's big radio networks have been trying to figure out how to write a press release, and having no luck at it. Why? Because no one wants to put a negative into a press release. But there doesn't seem to be a way around it, given the news to be announced.

You see, within a couple of years these networks will have to move to a new satellite, when Satcom C5, the old

"Network Neighborhood" bird at 139 degrees west, reaches its end of life. That 139 west slot has faithfully carried most of Alaska's telephone calls, as well as Paul Harvey, Rush Limbaugh and Art Bell, for about as long as most of today's radio people can remember.

But according to GE, when C5 runs out of juice in early 2001, it won't be replaced in-slot. Alaska is already dealing with the situation, and it's about time you give it some thought, too.

Most radio stations will have to move

their really old and not two-degree-compliant antennas to some yet-to-be-determined location in the sky where the major networks will probably have established their new satellite feeds on new DVB addressable-digital-format carriers that — and here's the part the PR people hate — require new receivers.

Costs to come

New receivers? New digital transmission format? So long, SEDAT. So long, DATS. Hello, DVB/MPEG! Oh and, Hello, Mr. and Ms. Affiliate? You need a new satellite receiver! That's right, and that will be about \$2,500 to \$3,000

please. You say that old antenna won't point at the new satellite location? No problem — another \$2,000 or so to purchase and install a new one, please!

Now, how do you make this sound like a good deal? (Well, you could present the option of all the networks choosing different satellites and transmission formats, rather than agreement on the "Network Neighborhood" of same satellite and receiver. Yikes!)

DATS is truly ancient uncompressed PCM full-T1 audio technology. It is a power and bandwidth pig, and nobody really supports the uplink gear anymore. It's like that huge old 36-story-tall Saturn 5 rocket down at the Cape — it's intact, and it would fly if you stood it up and filled it up LOX and Kerosene, but it would be a bugger to build more of them, or to get parts for the one that's left.

It's too bad, too, because in many ways DATS could continue to do a good job shoveling audio. The problem is that 1970s-vintage shovels don't have enough finesse for the spoon feeding required by today's demographically-aware programmers and sales departments.

SEDAT never took off the way ABC and Scientific Atlanta thought it should have, and then SA sold its audio division to Starguide Digital, who would admittedly rather sell its newer DVB/MPEG-flavored multiple channel per carrier (MCPC) receivers than extend the life of the old S.A. designs forever.

I can't blame them. SEDAT is not much more capable of spoon feeding than its predecessor DATS. It's just a slightly more efficient shovel.

Virtual networks

Now today's DVB/MPEG MCPC, the latest thing in satellite "front-end loader technology," can be addressed to the individual decoder card, of which several can be located within one receiver. Implemented properly, with the right amount of smarts in the traffic and billing, scheduling and network control software, "virtual networks," unique to the individual affiliate, can be created and scheduled, with regional and local advertising tailored by the network operator, which increase network availabilities, and therefore revenues, by several times.

DVB/MPEG is a spin-off from the Direct-to-Home (DTH) satellite industry. Most people are already aware of the pay-per-view capabilities of DTH, especially if you are one of the many millions who watch it every night. Now, converge digital audio and Internet technology into the perfect broadcast medium, satellite, and get ready to rumble, because the possibilities are unlimited.

You've got your shovels, your spoons, tweezers, your direct-to-disk file delivery systems, streaming IP multicast audio, real time, faster-than-real time, cached programming, MPEG video, text, multimedia and don't forget the Internet — all in the same little box.

As my daughter would say, "Shuduuuuup!" (That's a modern term for "cool.")

With consolidation of network content ownership and some cooperation between the networks not commonly owned, and new digital MCPC technology, it will be technically possible to have, for example, a receiver at one station that presents a program lineup that might be completely different than the same receiver at another station, and the two

See SATELLITE, page 33 ►

Affordable Digital Consoles

Logitek digital with a better difference!

3320 Bering Drive, Houston, TX, 77057 e-mail info@logitekaudio.com
Voice: North America 800.231.5870 Fax: 713.782.7597 Others 713.782.4592

Visit our home page at www.logitekaudio.com for more information

► SATELLITE, continued from page 32
lineups might change day to day, and neither station would have to manually change channels or make adjustments to the physical receiver.

In fact, because the new receivers will have multiple decoders, it would be possible to have several custom blends playing simultaneously from the same receiver. Each would be different than the receiver across town — "Custom Network Radio," if you will — assembled from many sources, perhaps even different networks, all delivered in a "pay-per-view" environment. Stations might be selecting from a large content menu and receiving only the programming they want to clear. Stations would get a more specific and tailored stream of what they want, while networks increase spot avails and at the same time contain unauthorized use of popular content.

DVB is a really nice way to deliver content that will make life easier for a lot of people, if the complexity issues involved in "3D database" management, traffic, billing and scheduling can be solved. And they will be, in time.



Satcom C5 is a GE American Communications satellite.

There's just that one little glitch — stations must buy the new receiver package. Which is not trivial at a couple of grand, even though it is a lot less expensive than the \$12,000 we had to pay for DATS gear back in 1979 (\$25,000 or so, in 1998 dollars).

But if you depend on network programming, what can you do? What can the networks do? That's one approach, actually: the "what can you do" approach. It is the reason the tobacco industry invented PR writers. (Well, they *did* invent them!)

As Julie Andrews once sang, "A spoonful of sugar helps the medicine go down." The networks might provide the hardware at a highly subsidized price reduction in exchange for ad time at every station accepting the deal. The station would receive a brand-new satellite system in exchange for a couple of minutes of air time per week, which would be sold by the network to recover the substantial costs incurred by providing the gear.

Breathe deeply, and remember that outfitting up to 10,000 radio stations with a new "free" receiver could cost as much as \$50 million, when antennas and other support costs are figured into the equation. Really. That's enough to make the low-power FM people very happy. They believe network radio is evil and that all programming should be live and local. The networks would simply not be able to continue operations long if they are given that type of non-recovered expense.

So if the networks can recover the costs over a few years with "barter spot revenue," what's wrong with that? Well, there are substantial costs involved in building and maintaining "virtual" or "barter networks," for one thing, as well as the development of the business to actually do the

bartering and placements. It's just never easy. I haven't run the numbers, but if the return on investment is not there, welcome to Business 101, otherwise known as "What can you do?" After all, those old receivers are, well, old.

Other variables may have the network operators worried, and therefore, unwilling to get on with a big news release, such as the potential for terrestrial interference when all of those old antennas are repointed and are tuned to new frequencies at new orbital point locations.

Can the old antennas, which have been looking at the same spot since 1979, even be repointed, or are there physical obstructions? Will the older noncompliant reflectors pick up interference from adjacent satellites? (Probably.) And, who's going to take all of the calls from stations all over the

country when things don't work? Will GE replace C5 in-slot? GE has been saying "No way."

Maybe that shovel vs. spoon-feeding thing needs another look. Can somebody please tell Pandora to close that damn box? I mean, these 20-year-old receivers are sounding better every day, aren't they? Kind of like the way tubes are popular again for home stereo amps. DATS is uncompressed — no transcoding artifacts! It's better than new! Yeah!

About the only thing known for certain is that, if it survives the upcoming Leonid meteor storms, Satcom C5 will go dark in 2001. By then, all the networks on it today will have found new homes, perhaps on the same satellite and capable of co-existing on the same receiver, and they will have found a way to make the affiliates feel loved and

Satcom C5 Specifications

- 139 Degrees West Longitude
- 10-Watt Transponder Power
- Solid-state Amplifiers
- 8-for-6 Redundancy in Power Amplifiers
- 4-for-2 Redundancy in Communication Receivers
- Redundant Command Receivers
- Coverage: CONUS, Alaska, Hawaii
- Launched: May 29, 1991



Source: GE American Communications

appreciated, and like they are being kissed during this exercise.

■ ■ ■

RW welcomes other points of view.

While broadcast and video production environments have changed over the years, your need for a Shure mixer has remained.

First the Shure M67 and then the Shure M267 became industry standards, taking their place in the most demanding broadcast applications and setting new levels of ruggedness, reliability, and versatility.

Now there's the Shure M367. Since its recent introduction, the M367 has found its way into the hands — and hearts — of audio professionals.

Just as versatile and reliable as its predecessors, the M367 includes a list of impressive new features — like low-noise circuitry making it quiet enough for digital formats, input peak LEDs, 12- and 48-volt phantom power to handle a wide variety of condenser microphones, two XLR outputs, an easy-access side battery compartment, a headphone monitor circuit with monitor in function, and a detachable power cord.

Your audio needs may continue to change, but there is one product you can always count on: your Shure mixer.

For the Shure M367 Dealer Nearest You, Call 1-800-25-SHURE.

New Faithful



Shure M367 Professional Mixer

The Sound of Professionals...Worldwide.

SHURE

Products for the Radio Broadcast Professional

Mail info and photos to: RW Marketplace, P.O. Box 1214, Falls Church, VA 22041

LoadGuard Filter System

Current Technology offers the LoadGuard series-connected suppression filter system for protection of sensitive electronic equipment from damage or downtime due to routine, internally generated electrical transients.

With a maximum surge capacity rating of 65,000 A, the LoadGuard Modular Series Unit safeguards motor starter units, programmable logic controllers and other electronic equipment. LoadGuard is designed to fit into low-profile areas and may be installed within or adjacent to the desired equipment. The unit is available in various configurations.

LoadGuard MSU has been tested to industry standards. The unit is housed in



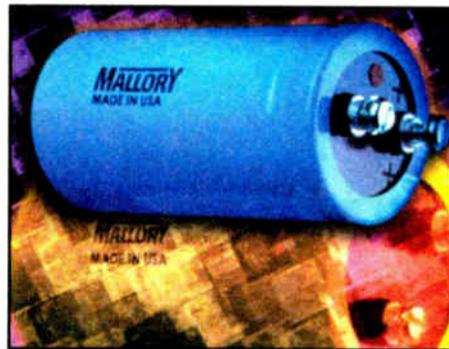
a rugged polycarbon enclosure and backed by a five-year product warranty.

For more information, contact **Current Technology in Texas** at (214) 252-4400; (214) 252-7705 or contact **Reader Service 163**.

Electrolytic Capacitors

North American Capacitor Co. (NACC) announces six new series of Mallory large-can aluminum electrolytic capacitors, available in numerous voltage ratings to 500 VDC.

The CGS Series of caps is designed for a wide variety of power supply, filtering and energy storage applications. They are available in values ranging from 75 to 1,500,000 μ F, with maximum working voltages of 6.3 to 500 VDC.



The CG Series offers high reliability and long life. Values range from 40 to 160,000 μ F, with maximum working voltages of 10 to 450 VDC. Another line of caps is the CGH Series, offering high ripple current capability, high reliability and high voltage ratings. Capacitances range from 350 to 22,000 μ F, with maximum working voltages of 250 to 500 VDC.

The other three series are the CGO Series, the CGR Series, and the HES Series. All offer different capacitance values and voltages for specific applications.

For more information, contact **North American Capacitor Co. in Indiana** at (317) 273-0090; fax (317) 273-2400 or circle **Reader Service 189**.

Surge Suppressors

New Frontier Electronics has added two new models to its Surge-X family of surge suppressors: SX-908 and SX-1808.



Both models meet government purchase specifications for powerline surge suppressors. The units offer protection from destructive spikes, surges and inductive transients. Both models features six switched and two unswitched grounded AC outlets.

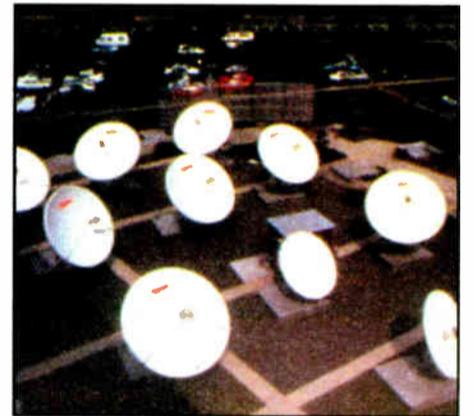
The Series Mode technology featured in the Surge-X products protect against surges of up to 6,000 V and unlimited surge current without producing any ground contamination. Other features include a magnetic shielding steel enclosure and a 6-inch grounded, three-wire No. 14 line cord.

For more information, contact **New Frontier Electronics in Pennsylvania** at (215) 862-9344 or circle **Reader Service 215**.

CE Certified Antennas

The line of Earth Station Antennas from **Andrew Corp.** including motorized and active electronic components, has been CE certified.

The Conformite European mark certifies the antennas meet stringent health, safety and environmental regulations as set by the European Union. Available in a range of sizes, Earth Station Antennas can be used in areas such as corporate networks, independent broadcasting, broadcast network distribution and satellite carrier services.



The European Union member countries are France, Germany, Italy, Belgium, the Netherlands, Luxembourg, the United Kingdom, Ireland, Denmark, Greece, Spain, Portugal, Austria, Sweden and Finland.

For more information, contact **Andrew Corp. in Illinois** at (708) 349-3300; fax (708) 349-5222 or circle **Reader Service 8**.

Audio Patch Panels

The Umbilical Cable Harness Audio Patch Panels from **Telect** are ideal for users looking for remote access to the front and back of their patch bays.

The new line of panels handle both analog and digital signals in the same panel. All feature high-quality jacks and cabling components to ensure reliable performance. Each system is backed with a lifetime warranty.

Users can maximize application space and gain rear access with the panels. These units are appropriate for use in mobile truck environments, post-production studios, entertainment systems or anywhere remote access is needed. The front and rear of the panels are designed as individual units connected by a cable harness. The cable allows users to place the front and back of the panel atop one another or in separate locations to gain access to both sides of the unit for easier wiring.

For more information, contact **Telect in Washington** at (509) 926-6000; fax (509) 926-8915 or circle **Reader Service 34**.

To grow in broadcasting you need time, money, guts, and Intraplex.



Your new acquisition is finally signed, now you need to operate profitably. Consolidate your program audio, LAN/WAN network, phones, faxes, traffic and billing on one single high quality digital line. The Intraplex STL PLUS gives you integrated two-way transmission over any distance, over any terrain at a fraction of the cost of individual communications links. It's bi-directional, so you can receive audio backhaul at the same time. What's more, you can stay in touch without running up the long distance phone bill. That's why more groups choose Intraplex than any other digital transmission solution.

Call us at 1-877-INTRAPLEX or visit our web site at www.intraplex.com.

The STL PLUS T1 System transmits program audio for STLs, TSLs and inter-city links, data for remote control and LANs, and voice for off-premise extensions and intercom.



Intraplex

Intraplex, Inc.
3 Liberty Way
Westford, MA 01886
978.692.9000
978.692.2200 fax
<http://www.intraplex.com>

MARKET WATCH

New York Radio: Times and Trends

*The Big Apple Radio Market Is Diverse, Robust ...
And Not Always What You Think It Is Like*

Christine Burke

New York City is fathoms-deep in radio legend. It's the city where DJs "Cousin Brucie" Morrow and Scott Muni hung the microphone over the side of the Beatles' hotel balcony and broadcast the screaming throng live on WABC(AM), just hours before the Fab Four's appearance on "The Ed Sullivan Show."

At the time, the top 40 station's on-air nickname was "W-A-Beatles-C." Today, it is the news/talker from whose studios Rush Limbaugh broadcasts his conservative banter over more than 650 affiliate airwaves.

It's the city that gave birth to America's first pop star, Frank Sinatra. The man who sang of New York, "If you can make it there, you can make it anywhere," rose to superstardom via live performances on WNEW(AM) in the 1940s.

When Sinatra died this year, he had survived his launching pad station by half a decade. In 1992, media mogul Mike Bloomberg bought WNEW(AM) and changed it to "Bloomberg Business Radio" WBBR.

Capital of the world

Most people think they know New York City, self-named "Capital of the World." They've seen a computerized Godzilla trample the Empire State Building (from which 16 FM radio stations broadcast their signals). They've seen Dustin Hoffman in *Midnight Cowboy* slam the hood of a car while he jaywalks, shouting, "I'm walkin' here!" Now they're watching Mike Myers and Sela Ward recreate the 1970s debauchery of *Studio 54*.

That's New York: touristy, loud and abrasive, decadent and trend-setting. Right?

Misconceptions about New York City

— and in particular, New York radio — could fill a book.

Rona Landy, general manager of New York's top-rated, Chancellor-owned WLTW(FM), said, "Often when people speak of New York — and I fall into this trap, too — they think, 'The City.' But

tow-headed toddler is practically a requirement for residence, to Brighton Beach, which is experiencing such a massive influx of immigrants from the former Soviet Union, it has gained the nickname "Little Russia."

Further, New York radio covers the white- and blue-collar suburbs of northern New Jersey, gritty cities like Newark, parts of Connecticut and middle-class

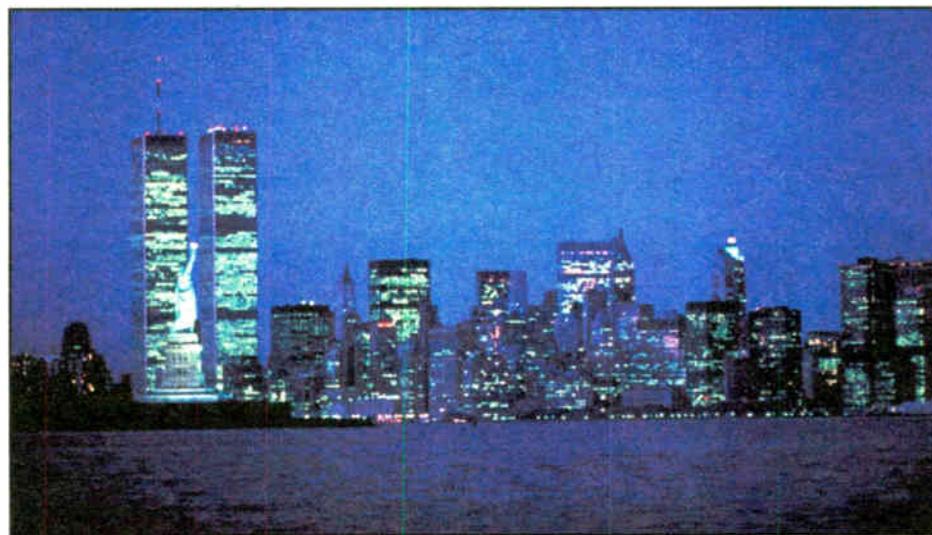


Photo by New York Convention & Visitor's Bureau

the most difficult thing about programming a New York radio station is you're dealing with so many different areas that are everything but homogeneous."

Manhattan is synonymous in most people's minds with New York City, but there are four other, diverse boroughs: The Bronx, Brooklyn, Queens and Staten Island. And even within each borough, there's no homogeneity.

Compare Manhattan's Lower East Side neighborhoods, like Chinatown and Little Italy, to the millionaire- and billionaire-infested Upper East Side, where Jackie O. used to live and where Woody Allen and Mia Farrow have penthouse apartments facing each other across a corner of Central Park.

Compare Brooklyn's yuppie Park Slope neighborhood, where pushing a stroller containing a Gap Kids-attired,

New York suburbs like Westchester and Nassau counties.

"It's comprised of so many different groups of people, with so many different lifestyles, it's hard to reach everybody in a way that's most meaningful for them," said Landy.

According to Arbitron, the market's Total Survey Area (TSA) includes more than 17.5 million persons 12+.

Universal appeal

This could account, in part, for the position of "Lite-FM" WLTW atop the Arbitron ratings. A soft AC may be the only format with universal appeal to a population as widespread and eclectic as New York's.

Nonetheless, New York City radio is booming. Annual total revenues exceed

See MARKETWATCH, page 43 ▶

NEWS ANALYSIS

WW1 Mixes The NBC/ Mutual Deck

Randy Stine

In a move to eliminate job overlap among producers, anchors and correspondents from its news operations, Westwood One cut nearly 50 positions in its Arlington, Va., NBC/Mutual News operation. The move, which grabbed the attention of the radio journalism community in the nation's capital, was effective



Aug. 31. At least a dozen of the displaced workers have accepted similar positions elsewhere in the company.

The Westwood One consolidation is viewed by the company as a way to eliminate duplicative functions of news bureaus in Washington, Los Angeles and New York. The Washington/Arlington bureau will remain open, but strictly as a news-gathering and reporting center. All NBC and Mutual newscasts will originate from New York with CBS Radio News supplying the anchors.

Westwood One markets and sells CBS Radio News, CNN Radio, NBC Radio News and Mutual News. Westwood One purchased Mutual in 1985. It bought NBC Radio News in 1987. CBS Corp. owns nearly 25 percent of Westwood One.

The job cuts do not affect NBC/Mutual's talk programming, which includes Larry King and Bruce Williams. Sports programming also is unaffected. The 1,200

See WW1, page 38 ▶

Give them what
they want
to hear



Shaping Knowledge™

UPI Broadcast

Flexible for broadcasters. Tailored for listeners.

- Funny, Ready-to-air Morning Show-Prep
- State News
- Local Weather
- Sports
- Breaking National and International News
- Business and Consumer News

Everything you need for all the formats you feed.

800.503.9993

bavery@upi.com www.upi.com

UNITED PRESS INTERNATIONAL

Worldwide News, Inc. a UPI

STOP . . . LOOK . . . & LISTEN TO THE FUTURE OF RADIO . . . ARAKIS SYSTEMS INC.



Technology and Price Breakthrough

NEW- Your Complete Digital Solution!!!

Perfect Cart machine replacement: play, stop, pause, loop, link . . .
 Perfect for Live Assist: Jingle Box, Phoner Editor, & much more . . .
 Perfect for Automation: Voice Over Recorder, Segue Editor, & more . . .
 From the #1 manufacturer of Digital Workstations in Radio !!!

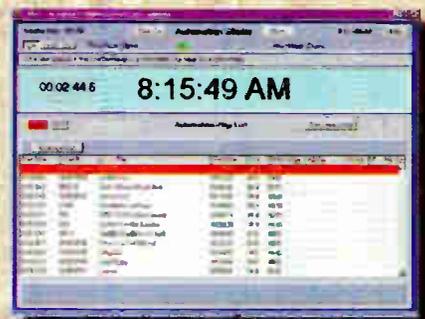
**Live On Air
\$495**



Live Assist \$1,995



**Hard Disk Automation
\$2,995**



(includes Live Assist software)

**Cart Machine Control
\$750**



Optional Front \$495

Triple Play & Record



**Jingle Box Control
\$1,195**



DL4 Digital Audio Engine

\$2,995 (24 hrs ~2,000 spots) \$5,295 (105 hrs ~ 2,000 songs)

The DL4 is a technology & price breakthrough !!! More reliable and 1/4 the price of comparable products, the DL4 is NOT a PC computer with sound card in it. The DL4 is in fact a digital audio appliance that is controlled by Arrakis LCD control panels, jingle boxes, and Windows 95 PC computers. If the PC fails, your audio library is still available !!! Expandable from 3 Plays & 1 Record to up to 96 Plays & 32 Records, the DL4 fits any size station's needs. You can even use your favorite PC based digital editor for production with the DL4 On Air !!! Call TODAY to find out how little it will cost for you to SAVE money and move into the 21st century !!!

Arrakis Systems inc. (970) 224-2248 www.arrakis-systems.com



In the Wake of Cuts at WW1

► WW1, continued from page 35
network affiliates that carry either NBC or Mutual News have continued to receive their news feeds on the same satellite channels with no interruption of service.

Westwood One VP/News Bart Tessler said the broadcast giant made the moves for obvious reasons. "We did this because we had people doing the exact same job in Washington, New York and Los Angeles. We had a lot of redundancy. It doesn't matter if people cut the tape here or there, it sounds the same."

Tessler said Westwood One would like to create a "super-Washington bureau" in Arlington, one that would concentrate solely on news gathering and reporting.

"We want to eventually beef up the reporting staff of the Washington news bureau. We may even add a few key hires as correspondents," he said.



Thirty-two of the NBC/Mutual News employees laid off were members of the American Federation of Television and Radio Artists. Pat O'Donnell, executive director of the AFTRA Washington/Baltimore local, said it is the largest single layoff in the D.C. broadcast industry in 25 years.

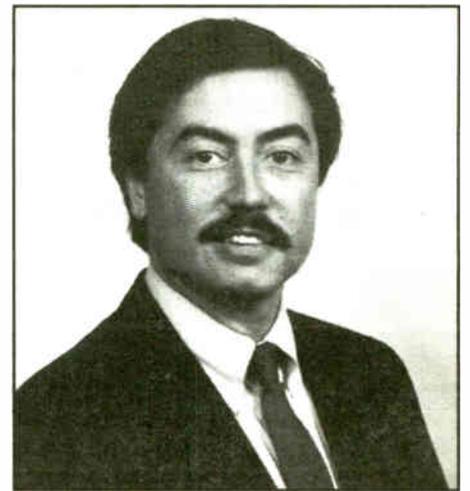
"It's a big hit for our members. That's

a lot of lives thrown into turmoil. When you have someone like anchor Dick Rosse thrown out after 30 years with the company, you can see just how heartless so-called consolidation can be," she said.

The laid-off NBC/Mutual News employees working under the AFTRA agreement will receive severance and free health insurance for 15 months.

Competition hurt?

What does that mean for the competitive nature of the news business? "I don't believe it hurts competition," Tessler said. "Like a team in the NFL, we want to put the best team we have on the field. Our competition comes not only from other radio news sources, but also televi-



Holland Cooke

sion and newspaper."

Veteran news programmer Holland Cooke, news/talk specialist for McVay Media in Cleveland, agreed.

"Just as the banking and airline industry has gone through consolidation, so is the radio news business," Cooke said. He compares the Westwood One cuts to radio owners in local markets that have five stations under one roof. "How many receptionists and engineers do you really need doing the same job?"



Cooke, who was program director at all-news WTOP(AM) in Washington for seven years, doesn't think it necessarily hurts competition when eliminating job repetitiveness among employees.

"I think with these moves, WW1 is basically redistributing some of its resources," he said. "Some of the savings will go to the bottom line, I'm sure. But, you can just as easily anchor all of the newscasts from New York, using whomever. Which leaves the Washington bureau to just cover the news."

As a result of the NBC/Mutual News reorganization, Cooke believes Westwood One will provide more customized reporting for local affiliates. "ABC radio has been the forerunner with that. Customized work for affiliates and doing Q&A from where the news is breaking is hot right now," he said.

Steven Lacy, professor and acting director for the school of journalism at Michigan State University in East Lansing, Mich., said consolidation is anti-competition. "The natural trend is for concentration, not competition, when looking at what is happening in the radio industry. Financial considerations usually win out over competitive practices."

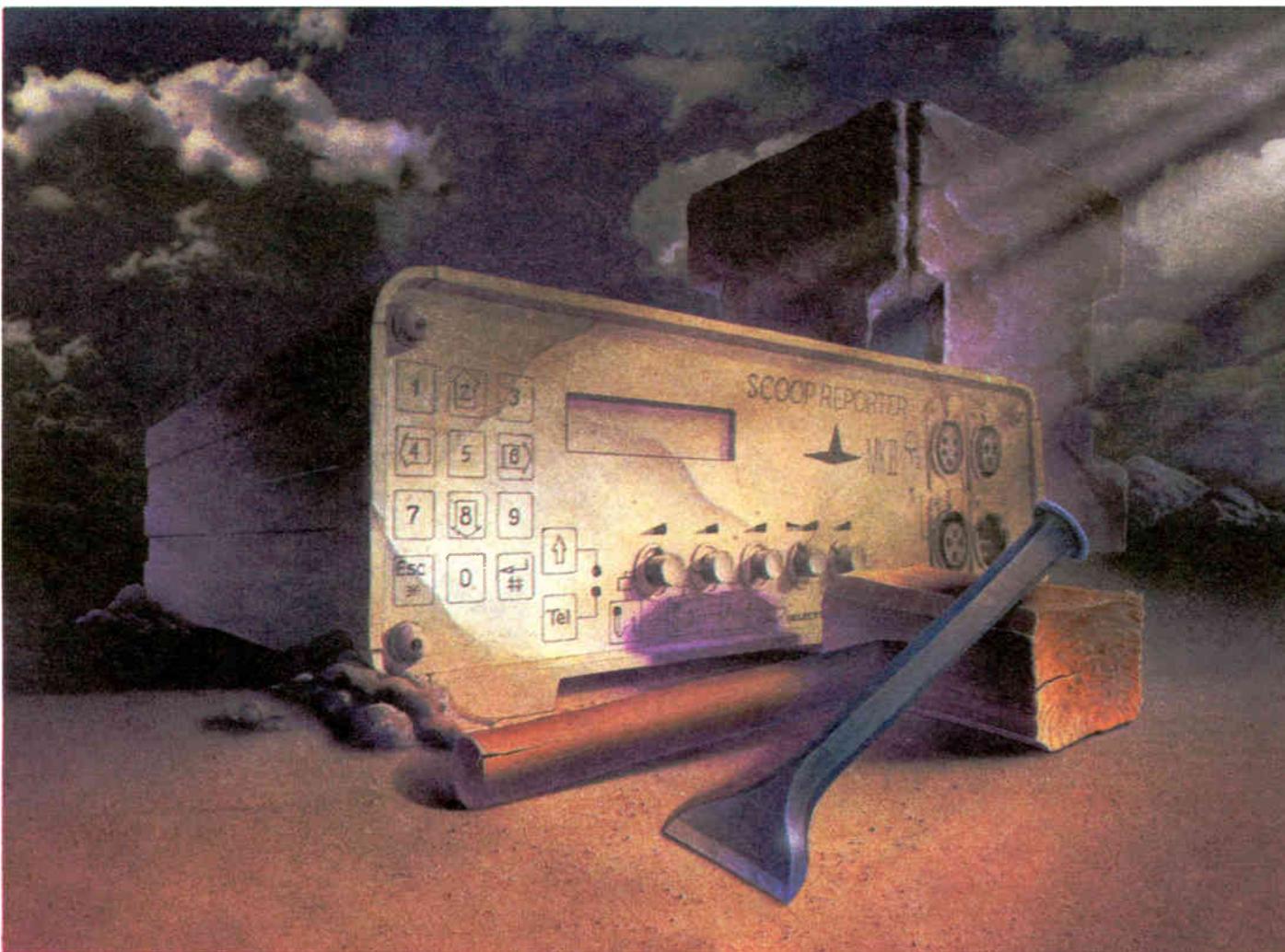
Lacy thinks the spirit of the Telecommunications Act of 1996 is being violated. "The original intent was to spur competition. The opposite has happened. You can see this from what's happened in small radio markets, all the way up to the broadcasting giants," he said.

Tessler defended the move.

"Mel Karmazin ordered the reorganization and cuts, only because of the job duplication among the three bureaus. It's not just the bottom line. Mel and the company would not be afraid to add the right people to make our news organizations better. We view this as a building process," said Tessler. Karmazin is CEO and president of Westwood One and CBS Corp.

Tessler wouldn't say how much money Westwood One expects to save as a result of the consolidation.

A.E.T.A. SCOOP REPORTER MKII P.O.T.S. CODEC



Rock Solid Remote Connections.

Are your remote connections important? You bet they are! Keep your live feed active with the highest standards possible. Use the new Scoop Reporter MKII manufactured by A.E.T.A. This new generation of P.O.T.S. (Plain Old Telephone Standard) codec supplies rock solid quality to all of your remote connections.

Tired of long delays in your remote? User-selectable delay modes down to 150 ms that are a standard feature on the



The Scoop Reporter MKII by A.E.T.A. available exclusively from Harris.

Scoop MK II offer you a choice when it comes to bidirectional communications.

When news feed and remote broadcasts are important to your organization, get the Rock Solid

Solution. Why risk it? Try the Rock Solid A.E.T.A. Scoop Reporter MK II codec today.

Call Harris for information and special pricing.

**HARRIS CORPORATION
BROADCAST DIVISION**

TEL: 1-800-622-0022
FAX: 765-966-0623

www.broadcast.harris.com



A new world of broadcast solutions

DOS AMIGOS

The AMIGO series from CRL is your answer when you want great sounding processing at an affordable price.



AMIGO FM

- A Complete Processing System Including AGC, Multi-Band Limiting, and Stereo Generator
- Dual Band AGC with more than 25 dB of Range
- Tri-Band Pre-Emphasis Limiting with High Protection Low-Pass Filters
- Digitally Synthesized Stereo Generator with more than 50 dB of Separation
- Includes Both L/R Audio and Low Z Stereo Outputs

The AMIGO FM is a compact but powerful FM Stereo processing system. The AMIGO FM has a wide range dual band AGC, followed by a full tri-band Limiter. Precise high protection audio low-pass filters ensure excellent cross-talk immunity. The digitally synthesized stereo generator provides over 50 dB of drift free separation. Selectable bass boost and stereo sound-field enhancement circuitry are included.

The value packed AMIGO FM is a popular replacement/upgrade for the 8000, and 8100 processors. The AMIGO FM is easy to set up, and works great on any format.



AMIGO AM

- A Complete Processing System for AM Stereo and Mono Applications
- Dual Band AGC with more than 25 dB of Range
- Full Tri-Band Matrix Limiter with Mono Gain Support, and NRSC-1 Audio Filtering
- Stereo Sound-Field Enhancement Circuitry
- Dual Outputs: One Stereo, One Mono

The AMIGO AM is a complete processing system for mono and stereo stations. The AMIGO AM contains a dual-band AGC followed by a tri-band Matrix Limiter. Our exclusive mono gain support circuitry provides up to 6 dB better envelope modulation for stereo broadcasts. Full NRSC-1 Audio Low Pass filtering is included. The AMIGO AM also includes bass, midrange, and high equalizers, plus our exclusive stereo sound-field enhancement circuitry.

The AMIGO series offers your station a great sound at a great price.
Contact your CRL Systems Dealer or us for more information



CIRCUIT RESEARCH LABS, INC. 2522 West Geneva Drive • Tempe, Arizona 85282-3192 • U.S.A.
Tel: 602.438.0888 • Fax: 602.438.8227 • Web site: www.crlsystems.com
Toll Free: 800.535.7648 • E-Mail: sales@crlsystems.com

CRL SYSTEMS (EUROPE) Suite 208, Archer House, Britland Estate, Northbourne Road, Eastbourne, East Sussex, BN22 8PW, UK
Tel: +44 (385) 332 752 • Fax: +44 (1323) 722 723 • E-Mail: crl_uk@ibm.net

ZEPHYR EXPRESS IS

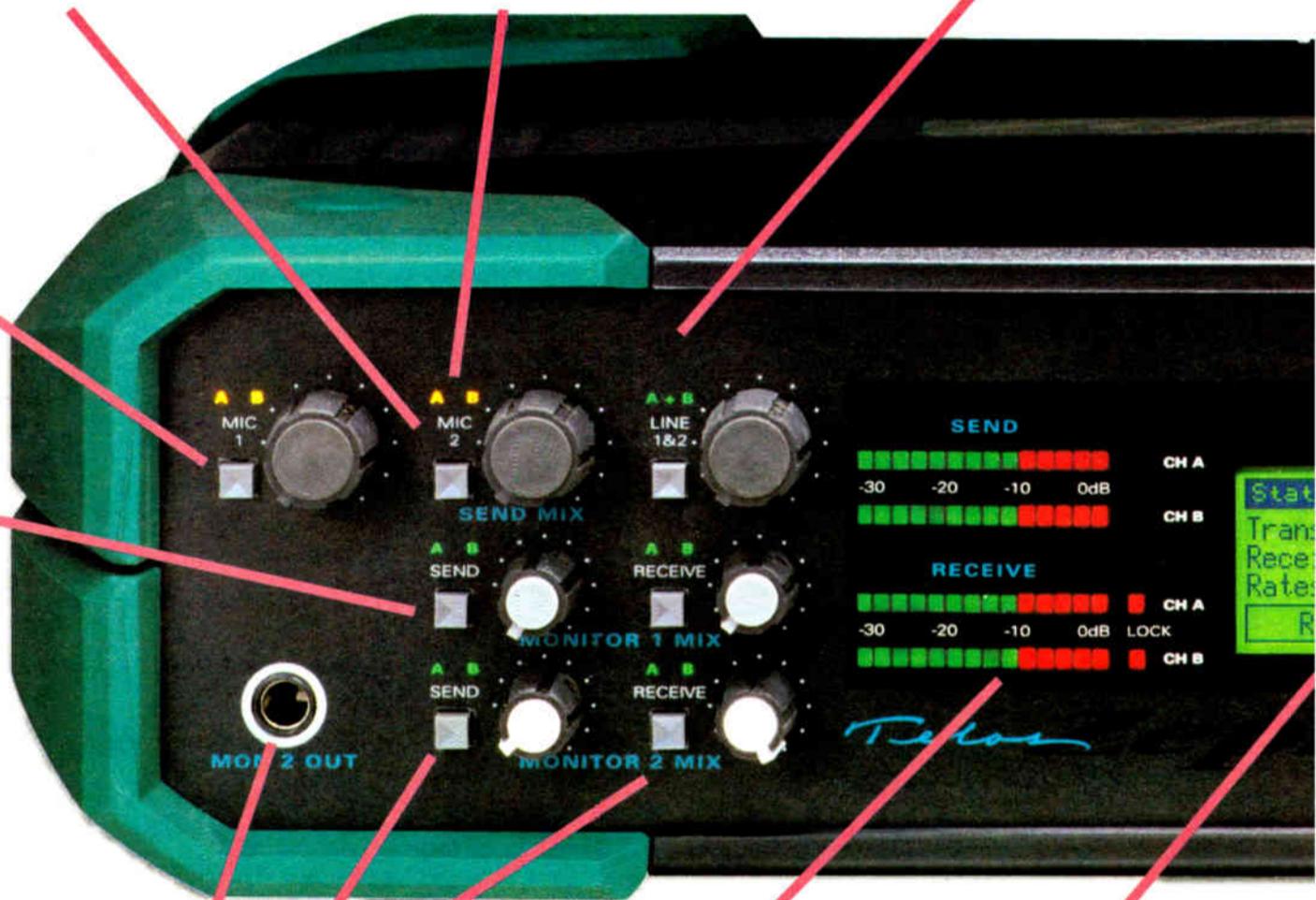
Careful analog design helps to ensure superior sound. Thanks to the mic input audio limiter, your audio won't distort when your talent screams.

Each mono input can be assigned to channel A, B, AB, or muted (with no assignment). The stereo line inputs are either routed as a stereo pair, summed to mono, or muted.

Test tone generator is included for ease-of-setup. Now you can instantly verify levels and signal integrity.

Onboard 48V phantom power and highpass filters come standard on both microphone inputs.

Flexible channel source selection and panning are all available at the touch of a button. Monitor mixer configurations can be customized, saved and recalled using the LCD and EDIT knob.



Headphone jack can receive independent levels of both send and receive audio.

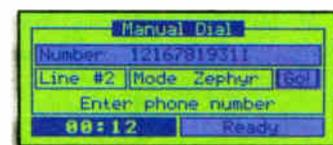
Full metering of send and receive audio levels for both channels provided.

Call out timer.

The only fully portable, stereo transceiver around, the ZephyrExpress lets you hit the road without leaving quality audio behind.



Regardless of where you are, if you can grab an ISDN line, you can get your full-frequency audio to the world. Embodying the spirit and technology of the famous Telos Zephyr, the new ZephyrExpress is a compact, full-featured portable ISDN transceiver/mixer. Rather than merely offering a handful of traditional transceiver functions in a portable chassis, ZephyrExpress provides no-compromise performance and functionality. It incorporates three digitally-controlled stereo mixers, a built-in ISDN terminal adapter, MPEG Audio Layer 3, Layer 2, and G.722 coding, an innovative interface with graphical displays that are easy to read and navigate, and much, much more—all in a road-worthy unit based on the most widely-used ISDN transceiver in the world. So now, when you hit the road, you no longer have to leave your Zephyr behind.



EVERYWHERE

ELSE!

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

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

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



shown at actual size

Easy-to-read LCD display is adjustable for various viewing angles when ambient light in the field makes reading difficult. Menus are organized in logical order and are easily navigated via EDIT knob.

Online HELP includes comprehensive documentation and step-by-step, how-to instructions.

The ISDN terminal adapter is built-in and is compatible with US and Euro-ISDN systems. Everything required for the ISDN connection is included.

Molded chassis absorbs the bumps of the road.

The Best Way to Hear from There™



Telos Systems • 2101 Superior Avenue • Cleveland, OH 44114 • Tel: +1.216.241.7225 • Fax: +1.216.241.4103
E-Mail: • info@telos-systems.com • <http://www.telos-systems.com>

Telos Systems, the Telos logo, Zephyr, ZephyrExpress, and The Best Way To Hear From There are trademarks of TLS Corp. Other trademarks are the property of their respective holders.

◆ STATION SERVICES ◆

Programs and Services for Radio Stations

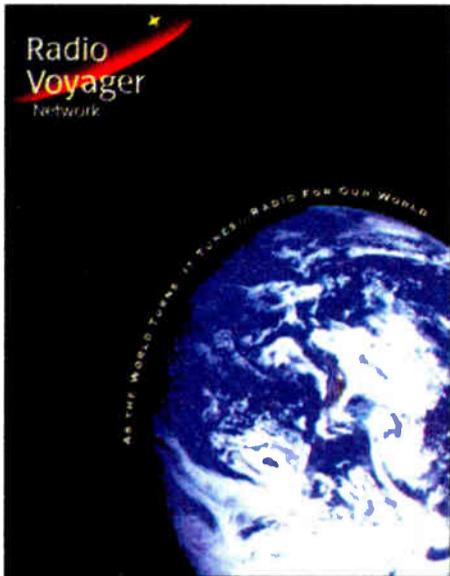
Mail info and photos to: RW Station Services, P.O. Box 1214, Falls Church, VA 22041

Global Network Set to Launch

Radio Voyager Network, a new global live satellite English-language radio network, was set to launch on Sept. 15 from Washington, D.C.

According to producers, Radio Voyager will be the industry's first radio network to broadcast live simultaneously in Europe and the United States.

The network will offer a contemporary music mix with international news and a series of hourly features covering timely issues.



The Radio Voyager Network is aimed at listeners aged 18-34. In order to attract these listeners, RVN plans to recruit celebrity endorsements from the fields of art, entertainment, sports and education to appear in live and pre-recorded hourly spots.

For more information on Radio Voyager Network, contact Jennifer Bottar in New York at (315) 233-3000 or circle Reader Service 139.

Series Ties Faith, Value to Family

The practical beliefs of applying religious values to every-day family challenges are highlighted in a new series of public affairs radio and television programming.



The 14 half-hour documentaries demonstrate the role religion and belief can play in family life. These documentaries were produced by The Church of Jesus Christ of Latter-day Saints as a public service.



The series, entitled "The Faith and Families Report," is being distributed to radio and television stations.

"The Faith and Families Report" Producer Arnold R. Augustin stated that the series of programs was designed to be "uplifting, educational, inspiring and meaningful."

For more information on "The Faith

and Families Report," contact Don Russell in Utah at (801) 240-4377 or circle Reader Service 165.

Studio 1800 Features for Radio

Studio 1800, a division of Montgomery Zukerman Davis, Inc. Interactive Publishing, is marketing entertainment features and information programs to U.S. radio stations. The programs are one to four minutes long.



Reid Duffy tapes his daily radio features at Studio 1800.

The features will be available in two packages, one providing one minute of material with space for a 60-second commercial, and the other providing three to four minutes of material with room for one or two 60-second commercials.

Studio 1800 will give a program in exchange for a minute of commercial time. Program materials are produced at Studio 1800.

For more information on Studio 1800, contact Maria Miller in Indiana at (317) 554-6364 or circle Reader Service 36.

Singleton Launch Set

Maurice Singleton III, former director of urban programming for MJI Broadcasting, is set to launch a new service for radio called Broadcast Entertainment Services.

Original programs for radio syndication have been developed by the



Maurice Singleton III

company and they plan to produce two weekly series — one daily show and a newly developed full-time format.

Maurice Singleton has been recognized as a major force in urban radio by several industry organizations and publications.

For more information on Broadcast Entertainment Services, contact Angelo Ellerbee in New York at (212) 757-2669 or circle Reader Service 191.

In Touch Networks Reaches Out

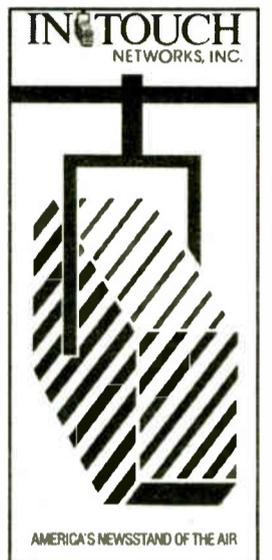
In Touch Networks is a nonprofit radio network for blind, visually impaired and print-handicapped individuals.

The network broadcasts throughout the United States and Canada over closed-circuit secondary band FM receivers or through cable TV SAP channels.

In Touch Networks' signal is beamed to satellite and rebroadcast by other radio reading services.

The network's audience is estimated to be somewhere over 10 million listeners.

For more information on In Touch Networks, contact Gail Starkey in New York at (212) 769-6270 or circle Reader Service 10.



The Smooth Jazz Countdown

"The Smooth Jazz Countdown," featuring Michael Bryant Butler, is available for syndication. The one-hour program is offered through Broadcast Central Media.



Butler, whose voice has been compared to that of James Earl Jones, has a résumé featuring interviews with New York Governor Mario Cuomo, Jesse Jackson and Spike Lee. Butler's voice-over commercial credits include work for IBM, Comcast Cable, Hair Color USA and American Home Health Care.

For more information on "The Smooth Jazz Countdown," contact George Garrity in Connecticut at (800) 978-6269 or circle Reader Service 217.

Think of Them as Reference Monitors You Can Wear

When you need to hear exactly what you've recorded... nothing more, nothing less... then only Sennheiser's HD 25 SP will do. Excellent isolation, with clear, accurate reproduction are the trademarks of these reference-quality headphones. Plus, they're MUCH more comfortable than wearing speakers.

Your project studio is incomplete without the HD 25 SP. Check them out today at your local Sennheiser dealer.



HD 25 SP



SENNHEISER

4 VISTA DRIVE, P.O. BOX 987, OLD LYME, CT 06371
TEL: 860.434.9190 • FAX: 860.434.1759

IN CALIFORNIA: 4116 WEST MAGNOLIA BLVD., SUITE 100, BURBANK, CA 91505 • TEL: 818.845.7366 • FAX: 818.845.7140
IN CANADA: 221 LABROSSE AVE., PTE-CLAIRE, PQ H9R 1A3
TEL: 514.426.3013 FAX: 514.426.3953

Circle (113) On Reader Service Card

NYC's Booming Radio Business

▶ MARKETWATCH, continued from page 35 half a billion dollars, growing an average 8 percent per year, according to New York Market Radio, or NYMRAD, a trade organization of ad agency and radio sales execs. Most licenses have been price-tagged at well over \$100 million. However, radio execs in this market aren't convinced consolidation is the knee-jerk cause of any of this.



Except for one year during the recession in the early 1990s, New York radio revenues have increased annually over the last quarter century, according to Sandy Josephson, president of NYMRAD. He said, "When agencies complain that consolidation is causing revenues to rise unfairly, that simply isn't true."

About 10 group owners have disappeared from the market just since 1995: Bonneville, Tribune, Viacom, Park, Shamrock, Broadcast Partners, Evergreen (which merged with Chancellor), Group W (which purchased CBS, then took its name) and Infinity (which merged with CBS).

New York media execs now speak of radio ownership in terms of the "Big Three": CBS, Chancellor and Emmis. Also with a major presence are SBS (Spanish Broadcasting System),

GM before, and they still do today. In our world you don't really deal with the corporations, you're dealing with stations."

Indeed, Herman is one of the few



In the Studio at WCBS



Disney/ABC, Buckley and Inner City.

Despite corporate consolidation, though, not much streamlining has occurred at the management level.

"It's really business as usual," said Scott Herman, general manager of CBS stations WINS(AM) and WNEW(FM). "Every station had a

GMs running more than one station, along with Judy Ellis of Ennis' WQCD(FM), WQHT(FM), and WRKS-FM; John Fullam of Chancellor's WHTZ(FM) and WKTU(FM); and Mitch Dolan of WABC(AM) and WPLJ(FM). Most stations still have their own program directors and sales managers, too.

Sinatra could have sung about New



York radio, "If you can make it there — stay."

Chancellor-owned WBIX(FM) GM Bennett Zier, who returned to his native city several months ago after 12 years managing radio stations in other markets, found many of the same people managing the same stations. To name four: Maire Mason of WCBS-FM, Joel Hollander of WFAN(AM), Tom Chiusano of WXRK(FM), and Rona Landy of WLTW(FM), all of which are CBS-owned stations.

"And a lot of the same people are in the ad community, so it was kind of like coming home," said Zier.

Kathy Stinehour, who came to New



York to manage Chancellor's WAXQ(FM) less than a year ago, found this consistency affects how business is done. "The importance of continuity between ad executives and radio station sales personnel is a very serious one. They don't like changes."

See MARKETWATCH, page 44 ▶

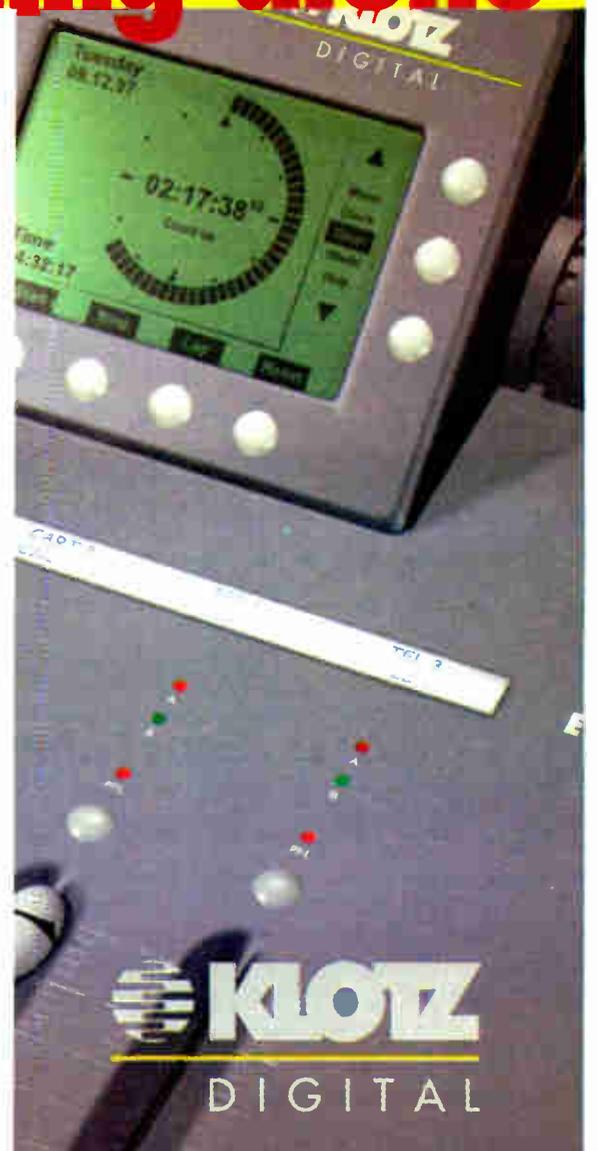
digital consoles — standing-alone

KLOTZ DIGITAL presents the new PARADIGM digital console

Not a \$ 10,000 toy — but a \$ 6,000 tool!



KLOTZ DIGITAL — the inventor of audio network systems for radio stations



KLOTZ DIGITAL Audio Communications GmbH

Hans-Stiessberger-Str.2a • D-85540 Haar • Germany • Phone: +49-89-46 23 38-0 • Fax: +49-89-46 23 38-18 • e-mail: klotz_digital_sales@compuserve.com

In the US contact: voice 770-729-6811, fax 770-449-9236

Circle (57) On Reader Service Card
World Radio History

See Us At The NAB Radio Show Booth # 738

Loyal Listeners in the Big Apple

▶ **MARKETWATCH**, continued from page 43
New York may have a reputation for trend-setting, but Stinehour was surprised to find listeners here "extremely loyal" to the radio stations they grew up with.

"They seem a bit hesitant about experimentation," Stinehour said. "I think Los Angeles is much more affected by trends and youth. I guess New Yorkers are much more secure in themselves: 'Hey, I don't need it.'"

Hence, the long-standing success of Lite-FM and oldies WCBS-FM. And WXRK's Howard Stern, whose ranking fluctuates in Los Angeles, is number one in New York book after book after

book, with all-newsers WINS(AM) and WCBS(AM) not far behind.



But there has been a recent shake-up in this "extremely loyal" market. In the Spring 1998 Arbitrons, a Spanish-language station became number one. Granted, "Mega" WSKQ-FM, which launched a salsa and merengue music format only about a year ago, was tied with Lite-FM for the slot, but it is significant. Further, WSKQ's morning show has unseated the all-newsers to come within two share points of Howard Stern.



Spanish Broad-casting Vice President Carey Davis, who manages WSKQ and WPAT-FM, believes Hispanic media, and in particular Hispanic radio, will remain a force to be reckoned with because of the Latin population's skyrocketing growth.

"While the New York population over the past 10 years has remained relatively flat, the demographic composi-

tion of the market has changed tremendously," Davis said. "Now a majority of people in the metropolitan area are minorities, and the Hispanic population has surpassed the African-American population."

He said, "We are at 18 months and counting until the census comes out, and the headline is going to be Hispanic. They're going to move into majority positions in many areas."

Group owner Heftel's timing may have been perfect. It closed on its \$115 million purchase of WCAA(FM), and launched Hispanic "Caliente" — also salsa and merengue — over Memorial Day Weekend. Recent Arbitrends show this new station picking up listeners even as WSKQ's numbers continue to rise.



There are two streets in Manhattan guiding radio ad sales: Wall Street and Madison Avenue.

Wall Street, banking and the financial

services are the major drivers of economic conditions in New York City, according to WLTW's Landy.



And because the stock market has been so bullish in recent years, she said, "Law firms are doing better now. Printers are probably doing better because there are more (trade) issues being printed up. That spending impacts real estate, automotive. We know retail sales are up, so that would also impact spending on radio."

Further, while national business accounts for about 35 percent of the business in other markets, it only accounts for about 15 percent in New York. Since Madison Avenue, American advertising's "Main Street," cuts up and down Manhattan, about 85 percent of New York radio's ad revenue comes from local contracts.

Radio revenue makes up more than 15 percent of the total New York media

See MARKETWATCH, page 45 ▶

New York Radio Snapshot

Market Rank: 1
Revenue Rank: 2
Number of FMs: 24
Number of AMs: 30

Estimated Revenue:
1994- \$429 million
1995- \$462 million
1996- \$499 million
1997- \$552 million
1998- \$593 million

Revenue Growth:
1991 - '96: 7.4%
1997 - '01: 7.2% projected

Local Revenue: 80%
National Revenue: 20%

1996 Population: 16,805,000
Per Capita Income: \$18,896
Median Income: \$41,196
Average Household Income: \$52,204

Source: BIA Research

New York Radio Market Overview

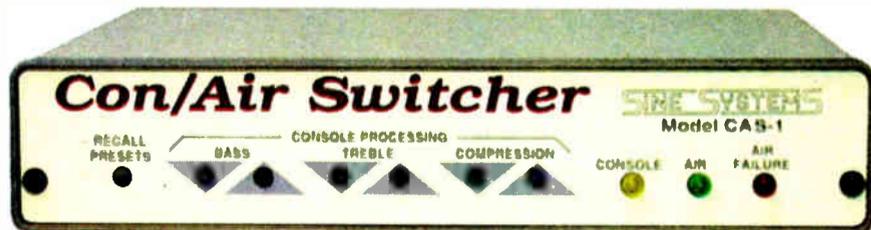
Stations	Owner	1997 Est. Station Revenue in \$mil	Format	Winter 1998 12+
WLTW(FM)	Chancellor Media	37.9	Lite AC	6.6
WSKQ-FM	Spanish Broadcasting System	20.7	Spanish	6.1
WQHT(FM)	Emmis Communications	26.6	Urban Rap	5.5
WHTZ(FM)	Chancellor Media	15	CHR	4.7
WCBS-FM	CBS	32.7	Oldies	4.6
WXRK(FM)	CBS	37.3	Rock	4.3
WRKS-FM	Emmis Communications	26.7	Rhythm/Blue	4.2
WKTU(FM)	Chancellor Media	34.3	CHR/Rhythm	3.8
WINS(AM)	CBS	36.5	News	3.6
WPAT-FM	Spanish Broadcasting System	10.6	Spanish	3.5
WQCD(FM)	Emmis Communications	21.2	NAC/Jazz	3.2
WOR(AM)	Buckley Broadcasting	21.9	News/Talk	3.1
WABC(AM)	ABC Radio Incorporated	14.2	Nws/Tk/Spts	3
WQXR-FM	New York Times Co	13	Classical	2.9
WCBS(AM)	CBS	30.9	News	2.8
WPLJ(FM)	ABC Radio Incorporated	27.4	AC	2.6
WBLS(FM)	Inner City Broadcasting	14.4	Urban	2.5
WADO(AM)	Heftel Broadcasting	6.8	Spanish	2.4
WFAN(AM)	CBS	47.7	Sports	2.2
WQEW(AM)	New York Times Co	4.5	Adlt Stndrd	2
WAXQ(FM)	Chancellor Media	14.5	Clsc Rock	1.5
WNEW(FM)	CBS	13.4	Clsc Rock	1.5
WBIX(FM)	Chancellor Media	9.3	Hot AC	1.5
WLIB(AM)	Inner City Broadcasting	3.4	Talk	1
WFME(FM)	Family Stations Inc	NA	Christian	0.6
WCAA(FM)	Heftel Broadcasting	NA	Spanish	0.6
WHUD(FM)	Albany Broadcasting Co	5.5	AC	0.5
WBBR(AM)	Bloomberg Comm. Inc	2.5	News	0.5
WWRL(AM)	Unity Broadcasting Network	2	Urban/Oldies	0.5
WWXY(FM)	Big City Radio	3.2	Country	0.5
WMCA(AM)	Salem Communications	NA	Christian	0.4
WFAS-FM	BBR	2	AC	0.3
WWDJ(AM)	Salem Communications	NA	ChrsContemp	0.3

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



Headphone Delay Problem

SOLVED



Switches headphone monitor between AIR and CONSOLE automatically
Internal processing on CONSOLE audio simulates AIR audio quality
Correlation circuit gives operator warning if AIR audio fails
Desktop chassis--rack mounting kit available
Easy to install--uses MIC relay to activate
Balanced audio input/output



voice: (615) 228-3500
fax-on-demand: (615) 227-2393
web: www.sinesys.com

► **MARKETWATCH**, continued from page 44 pie, taking in \$530 million of the total \$3.45 billion, according to Duncan's Radio Market Guide. Television takes in the most — 41 percent or \$1.4 billion. Next is newspaper — 37 percent or \$1.3 billion. Radio is third, with out-

York Post last fall, waking up to all-news radio is "a habit that we're efforting to break."

CBS and its honcho, Mel Karmazin, also own the outdoor company TDI. And WBBR owner Mike Bloomberg heads Bloomberg Business News,



Hispanic radio has insiders talking in New York.

door (4 percent) and cable (2 percent) sweeping up much of the rest.

Consolidation doesn't appear to have changed the percentages, either. "Radio



in New York has paid only lip service to going after other media," said WSKQ's Davis. "They talk the talk but they don't walk the walk. They continue to fight each other."

Newspapers in the market include the New York Times (which owns



WQEW(AM) and WQXR-FM), the Daily News and The Post, as well as Newsday on Long Island and numerous suburban dailies and neighborhood weeklies.

ABC and CBS both own broadcast TV stations in New York along with their radio stations, and there is cross-promotion. WCBS-TV/Channel 2 debuted locally the new TV program, "The Howard Stern Radio Show," on Aug. 22.

Further, WCBS-TV alternates weekly an announcement at the end of its 11 p.m. newscast for viewers to set their radio dials and wake up to either WINS or WCBS(AM) for all the morning's headlines.

The all-newsers have a more direct competitor on cable: New York One,



which televises local news 24 hours a day with a programming clock much like newscast. The cable channel's VP Steve Paulus unabashedly told The New

York Post last fall, waking up to all-news radio is "a habit that we're efforting to break."

Also competing with radio are local magazines. Both The New Yorker and New York Magazine are issued weekly. There's also the monthly Time Out New York, which lists the goings on about town.

Time Out sells a rather telling T-shirt on the last pages of each issue. On the back is its logo. On the front it says, "Welcome to New York. Now get out."

Christine Burke is the radio columnist for The New York Post. Reach her via e-mail at radioburke@aol.com

RAB, BMI Partner for New Radio Campaign

In a joint effort to generate advertising revenue, the Radio Advertising Bureau is working in cooperation with Broadcast Music Inc. (BMI) to distribute a new CD-ROM as a part of the RAB September sales and marketing kit.

The CD features a collection of

said RAB President/CEO Gary Fries. "We are particularly delighted to have a partner like BMI on board to help promote and celebrate the unparalleled power of radio."

To encourage stations to air the promos, BMI is giving away a pair of



radio sales success stories along with a series of 30-second promotional spots from BMI artists, including Scott Stape (Creed), Isaac Hayes, Duncan Sheik, Faith Evans and Rosanne Cash.

"We are happy to deliver this powerful marketing tool into the hands of radio sales professionals everywhere,"

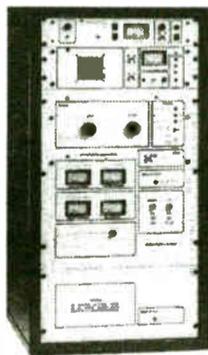
tickets to the Grammy Awards in Los Angeles on Feb. 24, 1999. Stations can enter the contest by airing the spots between now and January and sending BMI proof of performance in the form of an affidavit and aircheck.

— Sharon Rae

Superior Broadcast Products

Quality Products 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

1,000 watt	\$5,990.00
2,500 watt	\$11,990.00
5,000 watt	\$19,990.00
10,000 watt	\$22,990.00
15,000 watt	\$27,990.00
20,000 watt	\$32,990.00

20 Watt Solid State Exciter - \$995.00

Solid State FM Transmitters with Digital Exciter

120 watt	\$2,500.00	2,000 watt	\$12,900.00
300 watt	\$2,990.00	3,000 watt	\$19,990.00
1,000 watt	\$7,990.00	5,000 watt	\$29,990.00

FM AMPLIFIERS

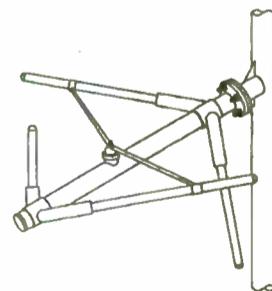
100 watt.....	\$ 995.00
300 watt.....	\$1,790.00
500 watt.....	\$2,990.00

FM STL

Both Transmitter and Receiver
\$3,500.00

FM Antennas

All Power Levels 500 watts to 20,000 watts per bay



Single Bay as Low as \$395.00

- * RF Coaxial Patch Panels
- * FM Combiners

FREQUENCY AGILE

FM TRANSLATOR
\$2,500.00

17194 Preston Road, Suite 123-297 • Dallas, Texas 75248 • Ph: 972/473-2577 • 800/279-3326
Fax 972/473-2578 • 800/644-5958 • E-mail: sbp@pulse.net • web-site: www.sbpjj.com

Filling the Bill at K-Earth 101 FM

Sandy Wells

It may have been the ultimate radio contest: East Coast icon Dan Ingram in competition with West Coast legend Charlie Van Dyke for the coveted morning man position at K-Earth 101, KRTH(FM). Last spring, the Los Angeles oldies station auditioned a number of radio notables to replace the late Robert W. Morgan.

Besides Van Dyke and Ingram, there was Charlie Tuna, the "World Famous" Tom Murphy and Dave Diamond. Tuna even resigned (temporarily) from his gig at Orange County's KIKF(FM) to make himself available for the opening of a lifetime.

KRTH General Manager Patrick Duffy said that it finally came down to choosing between Ingram and Van Dyke.

"Dan Ingram is very talented," Duffy said. "But he didn't sound as much like K-Earth. His deal is word play and clever intros."

Top jocks

In New York, Ingram was a top-rated afternoon top 40 DJ on WABC(AM) throughout the 1960s and '70s. In L.A., Van Dyke made his name as a morning man on KHJ(AM) in the '70s.

Deciding between Ingram — now a weekend talent on oldies WCBS-FM — and Van Dyke — the morning man at Phoenix's '70s and '80s rock KGLQ(FM) — put two different styles of radio in a head-to-head contest.

Both KRTH and WCBS are heritage stations whose successes are based partly on identification with each outlet's top 40 AM antecedent: KHJ in L.A. and WABC in the Big Apple.

"There was a time when WABC was leading the parade on the East Coast and KHJ was doing the same on the West Coast," Van Dyke said.

It was programming consultant Bill Drake's style of top 40 that ruled in Los Angeles from the mid-'60s through the mid-'70s. WABC Program Director Rick Sklar developed his own highly successful combination of personality radio within a tight music format.

who inspired me to get into radio. He had that ability to create pictures. I have tremendous respect for him."



Charlie Van Dyke

Van Dyke joined the famous Texas top-40 outlet when he was just 19. Two years later, he was the program director and ready to move on to fame at Detroit's CKLW(AM).

"Charlie has one of the greatest voices in radio," KRTH Program Director Mike Philips said. "He brings tremendous talent to K-Earth 101 and a very familiar voice back to Los Angeles."

Actually, K-Earth listeners have heard Charlie Van Dyke on station promotional announcements, and at the top of the hour, proclaiming, "And now ladies and gentlemen, from the entertainment capital of the world, Johnny Hayes!" etc.

"You walk down the halls of K-Earth and you get a rush," Van Dyke said. "I think Los Angeles is the most vibrant

radio market in the world."

Ingram also was impressed with the K-Earth mystique during his guest shot. "I think KRTH is one of the best-sounding stations I've ever heard," he said. "They treat you very nicely. I don't think I've ever been treated better. They've got a great staff there. They've got a producer, Mitch Lewis, who's top-drawer."

Still, Ingram wasn't above doing a little mischief when he took an on-air shot at K-Earth's notoriously small rotation. "When you hear the 'Same Old Song,'" he announced over the introduction to the Four Tops classic, "You know you're listening to K-Earth one-oh-one."

Maintain the Morgan magic

Ultimately, K-Earth went with the man they believed could maintain the Morgan magic. "We need to have a morning show that's contemporary and that deals with what's happening; to be mainstream and fun and nothing like Howard Stern," Duffy said, alluding to his station's appeal to the many children who listen with their parents while riding in the car.

As for the New York challenger, Duffy said, "Dan Ingram is more of an afternoon jock. (But) I'd love to have him on our air."

Van Dyke joined newscaster/sidekick Joni Caryl for Van Dyke's Los Angeles return on Aug. 31. Interim morning man Jim Carson returned to part-time status.

■ ■ ■

Sandy Wells is editorial coordinator for Los Angeles Radio Guide and writes the weekly radio column for the San Gabriel Valley Newspaper Group, including the Pasadena Star-News.

He is also a news/traffic anchor at Metro Networks Los Angeles. Reach him via e-mail at KPWR14a@prodigy.com

AES/EBU?



....DSA-1

The Prism Sound DSA-1 AES/EBU interface test system provides *unique generator and analyser capabilities* enabling the *most comprehensive assessment* of AES/EBU interconnections.

For example, the DSA-1 can measure differences between *source and cable jitter*, or it can *simulate* either sort with its *signal generator*.

To find out more, call or fax us now for a full information pack, or look up the latest DSA-1 V2.0 specification at our web site.



BA YERBISCHER BUNDFUNK, MUNICH, GERMANY



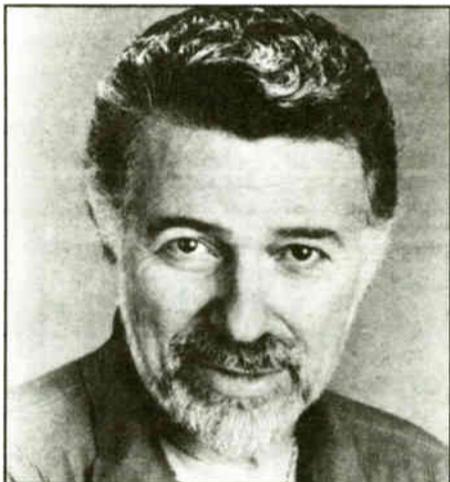
CHANNEL 4 TELEVISION, LONDON, UK



TOKYO BROADCASTING SYSTEMS TOKYO, JAPAN



SPACE FACILITIES LONDON, UK



Dan Ingram

"Drake and company came to WOR-FM," Ingram recalled. "They put the format on the air and they sounded damn good. Really good. Tight, energetic, all the good stuff. But they didn't reckon with the fact that WABC was such a monster and that it was going to take a long time to blow them out of the water. Management decided to stop throwing money down the tube and they changed the format."

The schism seems to have stuck. The difference between the KHJ style and the WABC sound reverberated through time affecting the recent decision to choose Van Dyke over Ingram.

"Rick Sklar made (WABC) loud and brassy to rise above the cacophony of New York City," said Van Dyke. "West Coast radio is a little more low-key."

Coincidentally, both personalities spent their formative years in Dallas radio: Ingram at famed KBOX(AM) and Van Dyke at KLIF(AM).

"I used to listen to Dan Ingram on K-Box when I was in high school," Van Dyke said. "He was one of the guys

STATION/STUDIO SERVICES

Sound Effects Production Effects Buy-Out Production Music!

Over 50 products to choose from. Call 612-522-6256 or get full details and hear on-line demos at our web site:

<http://radio-mall.com>

Dave Dworkin's Ghostwriters
2412 Unity Ave N., Dept RW,
Minneapolis, MN 55422

READER SERVICE 20

1012 hit songs from 1980-1995
1229 hit songs from 1954-1969
545 hit songs from the 70's
819 Kickin' Country Hits
on CD for Only \$499 each
(per set plus shipping)

For complete track listings

NOW go to web site:

<http://radio-mall.com> or

Email: mediamall@aol.com or

Phone or FAX Ghostwriters at

1-888-852-4747

For radio broadcast only!

READER SERVICE 125

Radio

Satellite Delivered Radio Programming

Tel: 954-735-4070

Fax: 954-735-0370

READER SERVICE 46

Are you reading someone else's copy of Radio World? If so why not apply for your personal subscription?

Simply complete the subscription card & return it to us! You'll never have to risk missing an issue of

Radio World

ATTENTION PROVIDERS!

Promote your services to **Radio World's** 18,000+ 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.



PRISM MEDIA PRODUCTS INC
21 PINE STREET
ROCKAWAY
NEW JERSEY 07866 USA
TEL: 973 983 9577
FAX: 973 983 9588
E-mail: saas@PrismMPI.com
Web: www.PrismMPI.com

Circle (140) On Reader Service Card
See Us At AES Booth # 1910

Students to Benefit From Bayliss

Sharon Rae

Twenty college and graduate-level students are getting a head start this fall thanks to The John Bayliss Broadcast Foundation.



"This is the first year we have been able to award a full \$100,000 in scholarships to 20 different students," said Kit Hunter Franke, Bayliss Foundation Executive Director. "That breaks down to \$5,000 per student for the 1998-1999 academic year."

National representation

The students, who represent 17 colleges and universities around the country, are pursuing goals relating to the radio industry — programming,

announcing, engineering, broadcast journalism and station management.

1998-99 Bayliss Broadcasters

- Jesse Abdenour, Ohio Univ.
- Christine Allen, Menlo College
- Mary Baird, Univ. of Texas
- Jamie Bastin, Lindenwood Univ.
- Kenya Denea Friend, Syracuse Univ.
- Chris Joeckel, Univ. of Colorado
- Oswaldo Gonzalez, Calif. State Univ.
- Allison Priebe, Univ. of Georgia
- Nathan Rittenhouse, John Brown Univ.
- Robanne Robin, Calif. State Univ.
- Paul Scarafone, Temple Univ.
- Adam Schein, Syracuse Univ.
- Amy Schiefelbein, Univ. of Wisconsin
- Cynthia Seiss, Lindenwood Univ.
- Robert Stevens, Southern Methodist Univ.
- Dong Wang, Columbia Univ.
- Dwuan Watson, Xavier Univ.
- Tiffany Webber, Iowa State Univ.
- Samantha Wiedmann, San Francisco State Univ.
- Amber Winans, Calif. Polytechnic State Univ.

schedule."

The Bayliss Foundation was established in 1985 to honor the life and work of John Bayliss, a leading radio industry executive. To date, 184 outstanding radio industry candidates have become Bayliss Broadcasters.

Scholarship recipients will be introduced at the 13th Annual Bayliss Media Roast to be held Oct. 27 at The Pierre Hotel in New York City. Jacor Communications CEO Randy Michaels is slated to be the distinguished roasteer (RW, July 8).

"The Media Roast is our major fundraiser for our scholarship program," said Franke. "We certainly welcome donations."

For more information on the John Bayliss Broadcast Foundation, write P.O. BOX 221070, Carmel, CA 93922.

"These are eager students," said Franke. "Students who are passionate about radio."

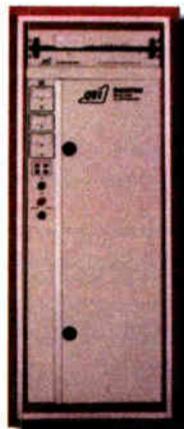
Industry advancement

According to Franke, students selected for the Bayliss Scholarships must have a 3.0 grade point average or better, be involved in extracurricular radio activities and have a desire to contribute to the overall advancement of the radio industry.

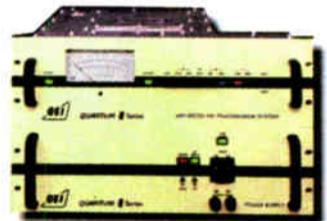
"For many of these students, financial consideration is extremely important," said Franke. "Many of these students are doing work-study programs along with maintaining a full academic



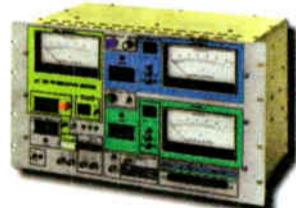
And You Thought You Knew Us.....



Solid-State and Single Tube Transmitters



Low Power Transmitters



Modulation Monitors



Digital STL / TSL Systems



Pre-Built Modular Transmitter Sites

For More Information Call Us Toll-Free At (800) 334-9154

QEI Corporation
One Airport Drive, P.O. Box 805
Williamstown, NJ 08094
e-mail: qeisales@qei-broadcast.com

Toll-free Sales (800) 334-9154
Fax (609) 629-1751
Emergency Service (609) 728-2020
Web Site: <http://www.qei-broadcast.com>

COMMSCOPE 4000 SERIES

Broadcast Quality Audio Cables



So Installer-Friendly, They Almost Install Themselves

High quality audio performance is just the beginning. With foil shields, tight stranding, alphanumeric and color-coded pair jackets, plus ease of stripping—CommScope's MultiPair Audio Cables are installer preferred for their ease of installation. Overall jacketing is matte-finish TPE for flexibility over a wide range of temperatures. Rugged interpair jackets with 100% coverage foil shield on each pair reduces cross-talk. Foil shields are bonded to jackets to improve flex-life of shield and stripability.

Plus tight-lay stranding makes for an extremely flexible cable that resists fraying. Paired conductors and drain wires of the same size for consistent termination add to the ease of installation of these audio performers. For even more advantages of these installer-friendly cables, contact CommScope today. And hook up with MultiPair Broadcast Analog Audio Cables that almost install themselves!



For information call 1-800-982-1708 or 828-324-2200.

Products & Services Showcase

For more information on the products shown below, circle the appropriate Reader Service No.(s) on the enclosed Subscription/Reader Service card or contact the advertiser directly.

The HSA-100 Series High Performance Headphone Amplifiers for Demanding Applications



The HSA-100 Series Headphone Amplifiers

Drives 8 ohm loads, even small speakers
Mounts easily above or below counter top
Accepts **balanced or unbalanced** inputs
Accepts -10, 0, +4 and + 8dBm input levels
Short Circuit Protected Outputs



Broadcast Devices, Inc.
5 Crestview Avenue
Peekskill, NY 10566

Tel. (914) 737-5032 Fax. (914) 736-6916
Email: Broadcastdevices@Worldnet.att.net

READER SERVICE NO. 26

1000 HITS FOR ONLY \$495!

Don't waste time dubbing music!

Halland will dub your choice of 1,000 tracks for only \$495! "HitPick" software lets you pick the songs! We'll dub them to your drive in ONE DAY.

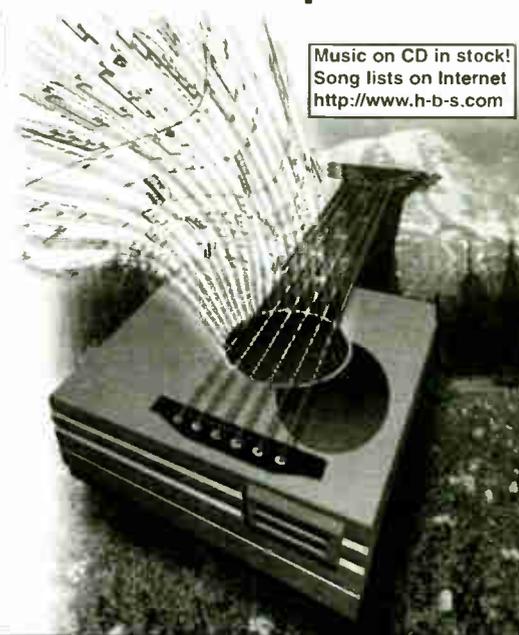
MPEG .WAV files compatible with Arrakis, BSI, Enco, Prophet, Pristine, Smarts, B.E. Audiovault, Register Data, Mediatouch, and others.

Music files can be dubbed to your hard drive, Iomega "Jaz", Syquest "SparQ" or 2.6GB M-O disc.



Let us take the hit!

800.425.5263 TEL: 626.963.6300
FAX: 626.963.2070 www.h-b-s.com



Music on CD in stock!
Song lists on Internet
<http://www.h-b-s.com>

READER SERVICE NO. 104



If lightning strikes on your tower are causing equipment damage and lost air time - the cost of a Stati-Cat system may be recovered during your first lightning season.

**AFFORDABLE - RUGGED
LIGHTNING PROTECTION**

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 (not wires) ground to needle sharpness.

Cortana
Corporation Inc.

Write or call toll free for a free brochure!
P.O. Box 2548, Farmington, N.M. 87499-2548
888-325-5336 FAX 505-326-2337

READER SERVICE NO. 52



Econco REBUILT POWER TUBES



Approximately One Half
the Cost of New

3,000 Hour Unconditional Guarantee

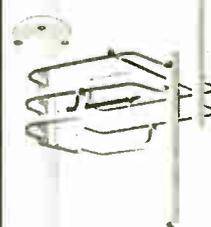
Call for Our Price List

Econco 1318 Commerce Ave. Woodland, CA 95695
Phone: 916-662-7553 Fax: 916-666-7760 Telex: 176756
Toll Free: 800-532-6626 From Canada: 800-848-8841

READER SERVICE NO. 73

Shively Labs

Signal and Coverage
Are What It's All About.
Be Sure With Shively!



- Superior Engineering
- Multi-Station Solutions
- Filters & Combiners
- Translators
- Reliable Pattern Studies
- B-LINE Coax
- NEW Lindenblad Antenna

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) 647-3273
1-888-SHIVELY e-mail: sales@shively.com
Web: www.shively.com
- An Employee-Owned Company -

READER SERVICE NO. 25

REMOTE JACKPOT

with a COMREX HOTLINE

Uses one plain old telephone line - no antennas to set up and no digital lines to install.

Save on staff - even a weekend board-op can use a Hotline. It's that easy!

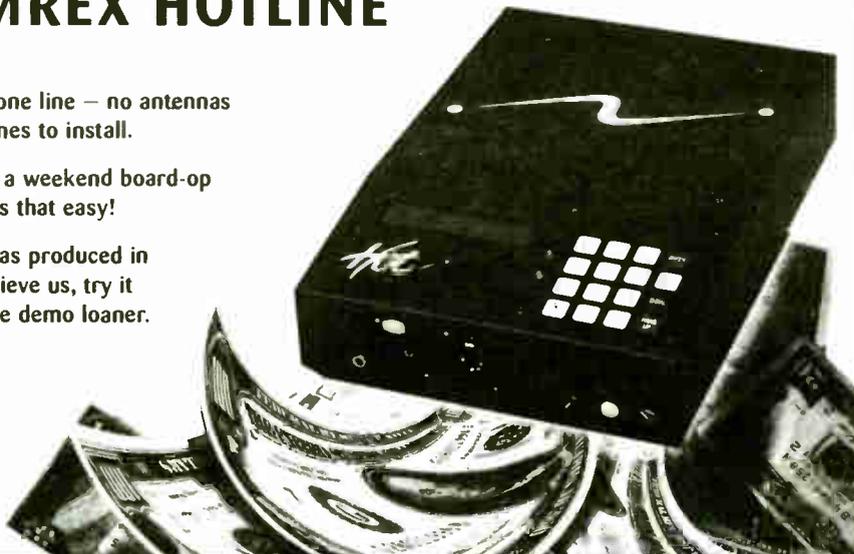
Sounds amazing, like it was produced in the studio - but don't believe us, try it for yourself! Call for a free demo loaner.

COMREX
We make great connections

800-237-1776
<http://www.comrex.com>

COMREX Corporation, 65 Nonset Path, Acton, MA 01720 USA Toll-free: 800-237-1776 in North America email: info@comrex.com Fax-on-Demand: 978-264-9973

READER SERVICE NO. 130



AM is Dead, Is Dead

If you think your AM is dead or on life supports ...

Think Again!!

Southern gospel music is the ER for your AM station

- A growing format (check out *USA Today* April 7, 1998)
 - Amazingly loyal listeners (Adults 25-54)
 - Provable Arbitron Success
 - Built-in Advertiser Demand

Solid Gospel is southern gospel music satellite programming offered 24 hours 7 days per week. We can save your station from death.

Call our ER specialists today!
(800) 742-3969

Cash and/or Barter



A Quality Music Service of Reach Satellite Network

READER SERVICE NO. 51

PROMO POWER

Listeners Talk, Are You Listening?

Mark Lapidus

Research may be the best way to learn about the perceptions listeners have regarding your radio station, but it is not the only way you can obtain regular feedback about your status.

Free stuff

What do your listeners ask you in public? "Got any free T-shirts?" If this is the most common question you receive when you're in the public eye, consider it a wake-up call.

The people who continually ask that question think of your radio station as a source of free stuff. Is that bad? It wouldn't be, except that they probably consider every radio station a source of free stuff. If you've ever worked at a station with extraordinary personalities, exceptional music and unusual contests, you know that typical listener questions will be about those elements and not about free T-shirts.

The free T-shirt question, followed by a blank stare when you say "no," should tell you that you're not making much

impact on this person's recall. If your first question asked is "Is Howard here?" followed by an inquiry about free clothing, I wouldn't be concerned. At least you know that "Howard" is what they're

your station is meeting average expectations; has a small cume; or is dead. You may have to rely on your DJs to filter this information to you during your weekly one-on-one meetings, but I also highly recommend a special voice-mail box or answering machine promoted especially for listener comments. A side benefit is being able to use the best of these on-air for self-promotion.

Every station in the country has at least a dozen wackos who call the radio station non-stop.

All-Sports Radio Scores In New Interep Study

Tara Pettigrew

If you are going to play in the major leagues, you have to have a good game plan. According to a new study from Interep Research, all-sports radio appears to be a winning game for radio programmers.

Since its beginning in 1987 on now CBS-owned station WFAN(AM), all-sports radio has developed into a big-league contender around the nation. The format is now found in 24 of the 25 top radio metros. Between 1994 and 1997, sports radio has grown 129 percent, according to Interep. There are now 220 all-sports stations in the country.

It's entertainment

Sports radio is no longer just play-by-play coverage, it is also a major entertainment source. Although call-in show topics are usually based on sports, it is not unusual to hear opinions on other male-oriented subjects.

"We tell stations they need to create a show that's like a sports bar where opinions are flying around," stated Rick Scott, a Seattle-based sports-radio consultant.

Sports radio is also focusing on the ability to deliver up-to-the-minute news. "If there's a big story at three in the afternoon, we have it first," stated Chris Russo, co-host of "Mike & the Mad Dog" on WFAN(AM). "You can talk about it for 12 hours before the newspapers print the story on it. We have the immediacy of the event."

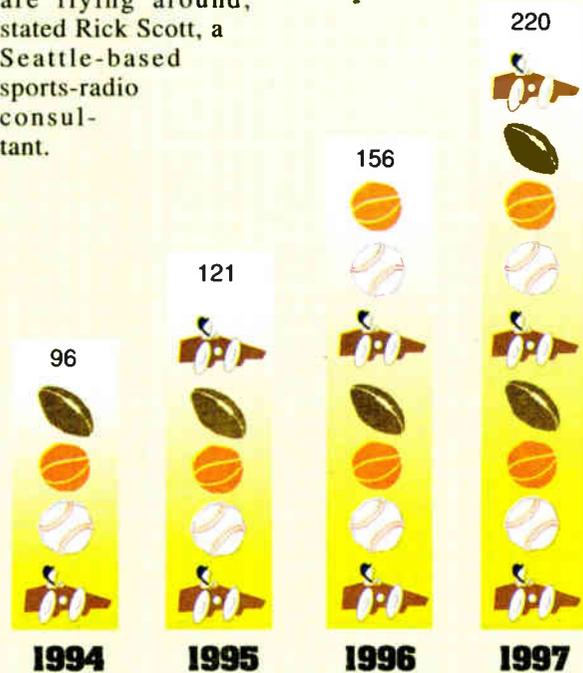
A win-win situation

The all-sports radio format also attributes its success to big wins with the advertisement industry. Doug Catalanello, an Interep Research Analyst, found that, "The sports format has gained the respect and interest of advertisers by consistently delivering strong ratings and an exceptional qualitative profile. Sports is also a natural draw to advertisers because of its emotional appeal and the loyalty of its listeners."

Last year, 70 more stations began programming an all-sports format partly due to the advertiser appeal.

All-sports radio is hitting home runs with the 25-54 demo that makes up 70 percent of its listening base. Not surprisingly, 75 percent of its audience is male.

This format's fans are educated and affluent; almost one-half of these listeners have a college degree or better, they are 98 percent more likely than the average person to have a household income of more than \$75,000 a year, and 99 percent more likely to hold a professional or managerial position. These fans are turning to all-sports formats partly because they do not always have the time to watch sports on television.



According to the M Street Journal, the number of stations programming all-sports has more than doubled over the last four years.

associating most with your identity.

What do listeners say when they phone your station? It's easy to assume that anyone who calls a radio station is nuts. After all, every station in the country has at least a dozen wackos who call non-stop. This doesn't mean that you should discount everyone else who phones with a comment.

What you're looking for are emotional trends. When dozens of people are calling every week because they "love this" or "hate that" you've hit a nerve. Either emotion could serve you well. No emotion means there's nothing going on beyond the average. Few calls means

By the way, a Caller ID Log can easily tell you how many unique calls you're receiving weekly. You may even wish to block a few callers who pester your talent. Isn't it also time to set up an auto answer for any caller that rings more than ten times in the control room? Better they should leave a message than never reach anyone. During the day, calls could be routed to your switchboard. Yes, I know this idea will raise concern about clients not getting through, or a receptionist becoming too busy. Does this common argument translate to viewing listeners as pests? Listeners are customers that

See PROMO, page 53 ▶

RELIABILITY WITH LIFETIME WARRANTY

EDUCATIONAL CIRCULAR SERIES

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

LOW POWER CIRCULAR SERIES

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

MEDIUM POWER CIRCULAR SERIES

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

The antenna array... please, make the... frequency. For powers up to... the specific configuration...

OMB also Manufactures: OMB America
 FM transmitters 3100 NY 72 Ave #112
 TV transmitters Miami, Florida 33122
 FM and TV Links Phone: 305-477 0974
 TV antennas Fax: 305-4770611
 Medium power FM antennas Toll free: 888-OMB4USA



Products & Services Showcase

For more information on the products shown below, circle the appropriate Reader Service No.(s) on the enclosed Subscription/Reader Service card or contact the advertiser directly.

S.C.M.S., Inc. Charlotte, N.C.

Low Prices – Experienced Staff
New and Re-built R.F. and Audio

THIS MONTH'S SPECIAL
THE MOST POPULAR BROADCAST
CONSOLE AVAILABLE, THE
WHEATSTONE-AUDIOARTS R-60
WITH EVERY 18 CHANNEL
MAIN FRAME PURCHASED IN
SEPTEMBER, RECEIVE A FREE
LINE SELECT WHEN YOU
MENTION THIS AD!

You Know We Know Radio —
Toll-Free 800-438-6040
FAX 704-889-4540

READER SERVICE NO. 49

"Portable Matchbox"

NEW!



It's PORTAMATCH, the Matchbox that runs on batteries!
Great for remotes, field recording, ENG, or anywhere you don't have AC power.
Just add two 9-volt batteries and go!



"So cool it doesn't need a slogan."

HENRY ENGINEERING
TEL (626) 355 3656 FAX (626) 355-0077
FAX-on-Demand Doc #125 (626) 355-4210
<http://www.henryeng.com>

READER SERVICE NO. 102

SOUND GREAT — INSTANTLY!

- Eliminate flanging (hollow room) effect
- Eliminate bad room acoustics
- Hold absolute levels
- Correct voice symmetry

AIRcorp 500PH Microphone Processor



- Front panel input level select +4 to -50 dB
- Three section variable boost and cut equalization
- Compander/Expander cross coupled for maximum punch
- Built-in earphone jack
- DE-ESSER designed to protect pre-emphasis curves
- Simultaneous mic level and line level outputs
- Internal 48 Vdc Phantom Supply

AIR corp

Call your dealer

or call 972-304-0455 or fax: 972-304-0550

READER SERVICE NO. 101

LEASING

START UPS
TURNAROUNDS
\$100,000
TO
\$1,500,000

CALL TODAY..617-267-2900

BOSTON FINANCIAL & EQUITY CORP.
20 OVERLAND STREET
BOSTON, MASSACHUSETTS 02215

READER SERVICE NO. 75

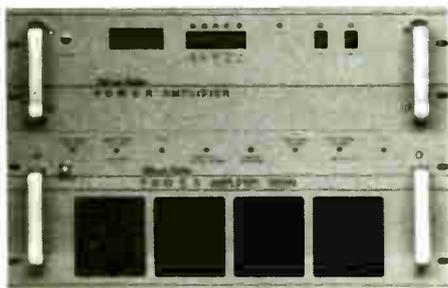


Silicon Valley
POWER
AMPLIFIERS

The RF People

FM Broadcast Power Amplifiers

Designed for reliability, durability, & efficiency.



Models from 165 watts to 2.4 KW

- | | |
|---------------------|-----------------------|
| Solid state. | Frequency agile. |
| VSWR foldback. | Digital display. |
| Remote operation. | Easy installation. |
| Full documentation. | Modular construction. |

1-800-986-9700

www.svpa.com e-mail: sales@svpa.com Fax 1-408-986-1438

READER SERVICE NO. 22

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.



2X1

Passive switching/routing for 2 stereo inputs and one stereo output or vice-versa with full remote control/status. Screw terminal connections.



6X1G

Passive switching/routing for 6 stereo inputs and one stereo output, or vice-versa. Programmable power-up selection, safety lock out, output muting remote control/status, RS-232 serial port and pluggable screw terminals.



8X2D

Active crosspoint switcher for 8 stereo inputs, 2 stereo and 2 mono outputs, 3 switching modes, I/O trimmers, internal silence monitor with SPDT relay, remote control/status, multi-drop RS-232 serial port, pluggable screw terminals and input expansion port.



SS 3.1

Passive switching/routing for 3 stereo inputs and one stereo output or vice-versa with remote control, multi-drop RS-485 serial port and screw terminals. May also be configured as a 2x1 switcher.



10X1

Passive switching/routing for 10 stereo inputs and one stereo output or vice-versa. Programmable power-up selection, safety lock out, output muting remote control/status and RS-232 serial port.



SS 12-4

Active crosspoint switching with 12 stereo inputs and 4 stereo outputs, rotary encoder knob with LCD display for user descriptions, three switching modes, I/O trimmers, multi-drop RS-232 and RS-485 ports, optional full-function remote control.



3X2B

Active crosspoint switcher for 3 stereo inputs and 2 stereo outputs, input expansion port, dual switching modes, remote control/status, RS-232 serial port and pluggable screw terminals.



SS 8.2

Crosspoint switching/routing for 8 stereo inputs, 2 stereo plus 2 mono outputs. 3 switching modes, I/O trimmers, internal silence sensor, selectable headphone and powered speaker level controls and outputs. LED meter, 16 input digital port, 8 relays and 8 open collector outputs. Multi-drop RS-232 and RS-485 serial ports, internal clock/calender, pluggable screw terminals and input expansion port.

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
tools inc.

READER SERVICE NO. 127

Wedded Bliss: Where's the Ring?

Alan Haber

Business. That dreaded eight-letter word has been mucking up the Internet ever since regular people like you and me realized there was money to be made in cyberspace.

Except who's making money in cyberspace? And who's doing business in that nebulous arena for any other reason than it's cool and you gotta be there, yadda, yadda, yadda?

Get a clue

Sadly, that's what you hear all too often when you talk to folks trying to make a go of it on the Net. Seems all kinds of folks — radio folks included — are alternately unsure and sort of clueless about how to make their cyber-business pay off.

Not that I've tried to become a millionaire on the Internet just yet. It's too early in the game — you hear *that* a lot, too.

They're all excuses, folks, and don't let anybody tell you otherwise. I think radio managers hold too many meetings to discuss their Internet plans and spend too little time implementing ideas that may (or may not) pay off as far as the bottom line is concerned.

They're letting business get in the way, and that's never a good thing. Business is important, make no mistake about it, but it's separate from the creative end of the bottom line equation. And that's something a lot of people don't understand until it's too late.

Getting it

Some people get it right away. I had the great pleasure of listening recently to some of the most commanding radio I've heard in years, on the Net or off. Seems that one day a single woman called the CBS-syndicated "Don and Mike Show," wondering if the hosts would be willing to get her a husband. The plan was for her to marry live on the show.

It all started innocently enough, with a simple phone call, but soon escalated to soap opera-ish proportions when the

woman suddenly (or perhaps not so suddenly) backed out a couple of days later. Two more women, hoping to get hitched on the radio, to perfect strangers picked for them by the comic twosome, also went south on the deal.

About two weeks after the first woman heard wedding bells, and after a Friday wedding had been scheduled, Don and Mike declared that there was going to be a wedding on their show, no matter what. A female listener from California called in, saying she wanted to tie the knot; Don and Mike had her flown in, hooked her up with a local Northern Virginia car salesman, and — *viola* — wedding bells.

I can just imagine the water cooler talk

the United States as it does in foreign climes. If the wedding broadcasts *had* been heard on the Net, I bet a lot of long-distance listeners would have been drawn in.

Mover and shaker

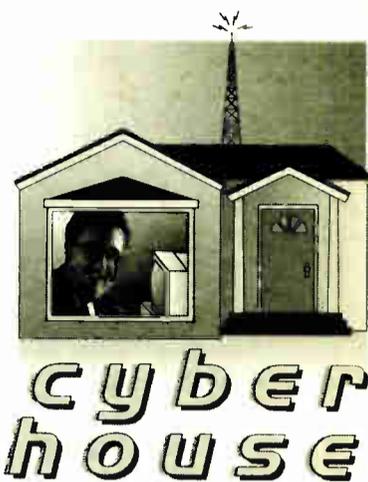
Commanding, creative radio is a key mover in your station's race to pump up its cyber bottom line. When your air talent is really and truly "on" and listener-ship is up, your advertisers commit to longer schedules. When your advertisers commit to longer schedules, you're more successful.

Just think what you could do with an event such as this, especially if you're a Webcaster? You could tie in with flower

don't matter. They don't matter in the ratings. My advertisers don't try to reach them."

Uh-uh redux.

I cannot emphasize this enough:



every listener counts, whether they're in your local coverage area or in Japan. I don't know the answers yet. Who does? But in the same way you reach your local audience and draw advertisers, there must be a way to reach the world. And be successful. And pump up the bottom line.

Because, you see, the relationship between radio and the Internet is a marriage of sorts. And the only way to make a marriage work is to, well, work at it. You put in some effort, the Net puts in some effort, you connect with listeners all around the world and ... the sky's probably the limit. About the only thing that's different between the radio and Internet marriage and the more traditional kind is there are no rings. Except for the ones coming out of your phone when your advertisers call to extend their buys.

Our happy couple, by the way, decided to put the kabosh on their union, choosing annulment over long-term bliss, thanks in part to a negative reaction from the bride's family. Live and in-person in the studio on the Monday after the wedding, the bride spoke to her husband on the air. They said they were going to stay in touch.

■■■

Alan Haber's Cyber House column appears here regularly. RW welcomes other points of view.

Every listener counts, whether in your local coverage area or in Japan.

about this bit: "Will she or won't she?" "Even if they get married, will the bliss last?" "Is this for *real*?"

It really didn't matter. It was great radio, perfectly orchestrated. All sorts of characters entered center stage along the way: an ex-boyfriend, people volunteering their professional services for the wedding — including a person who offered a free honeymoon in Mexico, etc. It all was absolutely gripping, funny, and, yes, a bit sad. After all, who gets married to a perfect (or imperfect) stranger?

And who cares? The whole deal may have fallen into Don and Mike's laps, but the afternoon team took the wedding cake and ran with it, and I hope their ratings reflect their commitment.

And, by the way, none of this was heard on the Internet. A real shame. Water cooler talk works just as well in

shops worldwide and run spots. You could tie in with jewelry stores. Any kind of retailer that ships gifts worldwide. You could spruce up your site, decorating it with special wedding bliss. And, of course, "decorate" your site's pages with bottom line-upping ad banners.

Better keep the creative quotient at your station as high as you can. Remember, everything that goes out over your air goes out over the Net — provided, of course, you're not having to substitute programming because of copyright issues. The more creative your programming — the more commanding your programming is — the more successful you will be with your Webcasts.

"Look, I'm a local radio station," you say. "I'm just Webcasting because my competition is Webcasting."

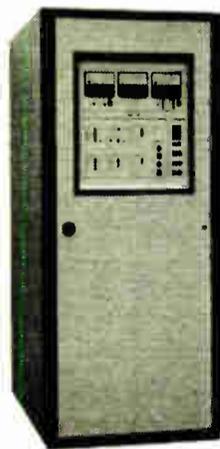
Uh-uh.

"The people who listen worldwide



NAUTEL offers solid state AM broadcast transmitters from 1,000 watts to 300,000 watts and higher, solid state FM broadcast transmitters from 3,500 watts to 20,000 watts and a digital FM exciter. NAUTEL AM and FM transmitters offer high overall efficiency, unique redundancy and reliability features and over 27 years of solid state design experience.

ABG is proud to represent NAUTEL Solid State Transmitters.



**XL12
12kw AM
Transmitter**



**FM-5
5 kw FM
Transmitter**



In the Great Lakes Region:

JACK CONNERS

Toll Free: 800-999-9281

FAX: 616-452-1652

E-mail: jconners@abg.com

In the Southeast Region:

JOHN GEORGE

Toll Free: 800-951-7443

FAX: 803-951-3123

E-mail: jgeorge@abg.com

For a quotation or additional information about our solid state AM and FM transmitters and digital FM exciter, please contact Jack or John today.

COLE'S LAW

Hail to the Staff: Unsung Heroes

Harry Cole

WASHINGTON Tradition (or perhaps legend) has it that, in August, all the point-headed bureaucrats at the FCC flee Washington, shutting down the regulatory process until their return (tanned, rested and ready) around Labor Day. While there may be some very limited anecdotal evidence supporting that notion, the fact is that the FCC's mills continue to grind, day-in and day-out, all year long.

In fact, it's probably time for us to bring up the spotlight and call for a hearty round of applause for the often unsung folks who push the paper necessary to keep the radio business cruising along. We are talking here about the staff of the Commission's Audio Services Division.

Radio industry realities

You have probably run into one or more of the ASD staff at one time or another. They are the ones who tend to appear on technical panels at conventions. Not the "Breakfast With the Commissioners" or "This Year on the Eighth Floor and on Capitol Hill" or the like, mind you — but the panels with far more mundane topics likely to hit closer to home for many radio operators. Perhaps you have seen their signatures on your recently issued construction permit, or on the grant of your latest assignment application.

The ASD is the point at which the regulatory machine of the FCC routinely butts directly up against the realities of the radio industry. Want to modify your facilities? The ASD is where you go. Want to sell your station, or buy the station next door to you? Same thing. Who you gonna call when you want your license renewed? The ASD.

Suffice it to say that the ASD deals with a flood of paper every day, week in, week out. The remarkable aspect of the ASD's performance is the fact that, in the vast majority of situations, that flood is well-managed and smoothly directed once it reaches the commission. The

result is that processing times on virtually all routine applications have become predictable and, happily, relatively short.

Phenom

Of course, this phenomenon is partly attributable to the overall streamlining of the FCC application processes over the last several years. But it's also largely attributable to competent staff people who approach their work with a professional and cooperative attitude. Those staff people are accessible, helpful and responsive, and will often initiate

imagine. Yet the commission appears to be moving in the direction of adopting both proposals, probably safe in the assumption that the ASD will be able to handle it. So let's take our hats off to the ASD in thanks for helping minimize the muss and fuss of dealing with the regulatory end of things.

Changing subjects, we at Team Cole's Law continue to hear that our recent column about the FCC policy on "enhanced underwriting" on noncommercial stations may have frosted a few cookies in the non-commercial universe. It seems that some

Want to modify your facilities?

The ASD is where you go. Want to sell your radio station, or buy the station next door? Same thing.

inquiries by phone to expedite the resolution of any problems that might arise.

And lest you think that the staffers responsible for the smoothness of the ASD operation are all young punks who have squeezed out the lame old guard, think again. One of the folks most responsible for moving things along is Dennis Williams, a veteran engineer of more than 25 years who is credited with, among other things, development of the successful process for fast-tracking minor mod applications.

It is probably an indication (however indirect) of the commission's own recognition of the ASD's performance that the commission is considering both the creation of a new low-power FM service, and the adoption of negotiated interference rules for full-service FM. Either of those proposals would almost inevitably increase the burden on the FCC's resources exponentially. The practical double whammy that both of those proposals, if adopted, would cause is hard to

folks read that column as a kind of blanket indictment of noncommercial underwriting practices and as a suggestion that commercial broadcasters should form roving lynch mobs to, er, address the problem.

Within the limits

The fact is that, from our own observation, the vast majority of noncommercial operators diligently stay well within the noncommercial limits, as difficult as that is sometimes. And because of those limits, it is not really likely that commercial operators will lose much business to noncommercial.

But our point was that, in some instances, some noncommercial operators choose to ignore the limits. When that happens, commercial operators may be justifiably upset. Our goal was to lay out what the limits are (so that likely violations could be identified) and what to do about any apparent violations that do pop up.

Noncommercial licensees do not have

an easy life. Often grossly underfunded, working with less than state-of-the-art hardware, relying on volunteers, they still provide the public a valuable alternative to most commercial radio fare. We certainly don't want to make their lot any harder than it already is.

Okay, guys, there's my *mea culpa* — can I have my tote bag and coffee mug now?

■ ■ ■

Harry Cole is a principal in the Washington-based law firm of Bechtel & Cole, Chartered. He can be reached at (202) 833-4190 or on the Internet at coleslaw@erols.com

RW welcomes other points of view.



McCoy Tapped as VP/PD WCBS

Joe McCoy of WCBS-FM has a new title. He has been promoted to the position of vice

president/program director for the New York City-based radio station.



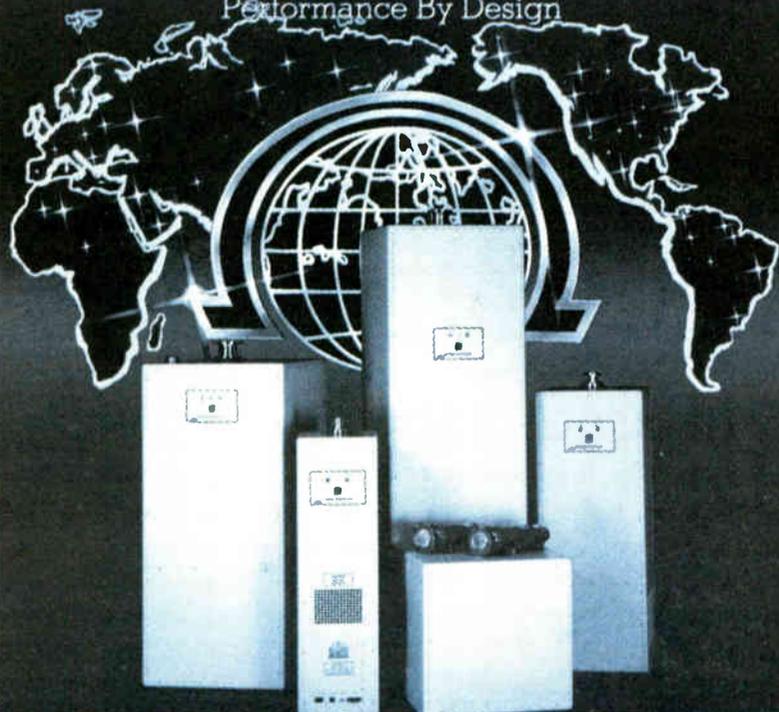
Joe McCoy

McCoy has been with WCBS since 1981 — under his programming leadership, the station has reached the number one position in the Arbitron ratings five times. McCoy has kept WCBS in the top 5 (25-54 demo) for 17 years

WCBS is celebrating 26 years as New York's Oldies Station.

ALTRONIC RESEARCH INC.

Performance By Design



MANUFACTURER
OF RF COAXIAL LOAD RESISTORS.

DUMMY LOADS FROM 1 KW TO 1500KW,
AVAILABLE IN AIR, WATER OR SELF
CONTAINED HEAT EXCHANGERS.

HIGH POWER NON-REACTIVE CERMET
RESISTORS FROM 1 OHM TO 20 MEGOHMS.



ALTRONIC RESEARCH INC.

P.O. Box 249 • Yellville, Arkansas 72687 870-449-4093 • Fax: 870-449-6000
E-mail: altronic@mtnhome.com Web Site: http://www.altronic.com



Cozad Joins Dielectric

Kerry Cozad has been appointed to the post of vice president, advanced



Kerry Cozad

broadcast operations for Dielectric Communications.

Cozad joins Dielectric after a ten-year stint with Andrew Corporation. He also worked with Harris Corporation, broadcast division in Quincy, Il.

Cozad has been a featured speaker at NAB, SBE and IEEE Broadcast Symposiums.

Dalet Hires Sokusky

Dalet Digital Media Systems has named Anna Mae Sokusky to the position of president. The appointment is a part of a company reorganization to highlight Dalet's growing presence in the U.S. marketplace.



Anna Mae Sokusky

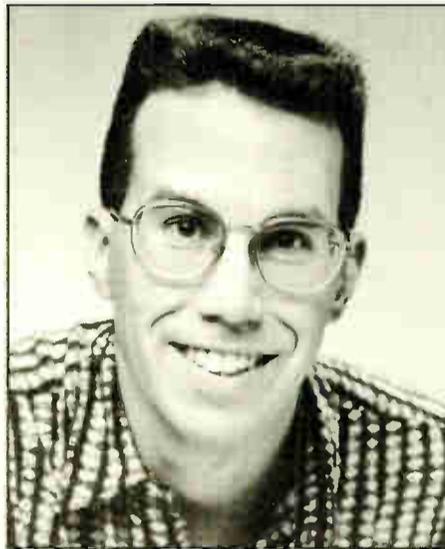
In her new position, Sokusky will be responsible for the company's U.S. operations, including sales, marketing, and technical support and administration.

Former president Stéphane Guez

assumes the role of chairman CEO of Dalet Digital Media Systems.

Jones Taps Steele

Jones Radio Network has announced the addition of Jonathon Steele to its Adult Hit Radio full-time, on-air staff.



Jonathon Steele

Steele, who has been working in radio since 1993, is slated to host the evening show from 6 p.m. to 11 p.m. and on Saturdays from noon to 4 p.m.

Davicom Opens U.S. Office

Davicom Technologies Inc. is announcing the establishment of Davicom Technologies Ltd. (DTL), a subsidiary of

the Canadian-based company.

DTL is located in Egg Harbor Township, N.J. and is headed up by Donna Detweiler. Detweiler is a 15-year radio industry veteran. Her new responsibilities include support of dealers and customers, order processing, trade show logistics and office management. She will also assist in the company's marketing and selling functions.



Donna Detweiler

Detweiler organized and ran the recent ARMA convention in Atlantic City, N.J.

Davicom Technologies manufactures remote monitoring and control systems for transmitter and site management; antennas and RF products for low-power FM applications and the SCIENTEL line of signal detection and control equipment for audio, video and satellite feeds.

Radio Station Clients Invest in Success

► PROMO, continued from page 49 should not be ignored. A good receptionist can fine-tune the blend of patience and efficiency needed to deal with "wackos" and regular callers alike.

Are you asking any questions on your Web site? I regularly surf station sites and I'm constantly amazed about how few ask for listeners' comments. Having the station e-mail address posted will help, but specific questions with occasional incentive will greatly

Entertainment that doesn't stimulate laughter, anger or enjoyment is just average.

increase response levels. When a site visitor does respond, are you prepared to start a dialogue? At the very least, people who respond should get an auto return e-mail thanking them for their input and asking if they'd like to receive regular e-mail newsletters or join your frequent listener club.

What do your clients say about your station? Every client is investing in your success. They're paying you because they believe you can drive business or help create the image they desire. Clients are happy to pass along comments they hear from their customers about you. They will always have personal opinions that are worth hearing. Salespeople may hear these comments more often than you think, but usually don't say anything (especially when it's bad news) because a PD never asks them. Clients can also be a great source of competitive information. Most air spots on several stations and are not shy about explaining perceived differences.

Those who aren't continually gathering information are bound to be surprised at the annual perceptual presentation. A PD gathering information from these various sources regularly will learn that he's dealing with emotions. Entertainment that doesn't stimulate laughter, anger, or enjoyment is just plain average. Go for emotion and win!

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

AM transmitters

Digital Solid State

Every day we live up to promises we made 10 years ago...

"It's basically done everything you said it would. The transmitter is paying for itself all of the time...we're mighty thrilled!"

"Factory support for any product is very important to me and I could not have asked for better support. They are exceptional!"

"That little box outperforms my most optimistic expectations!"

"The move to the Omnitronix solid state transmitter has resulted in a significant decrease in the cost of power, has produced much higher quality broadcast signal, and this has taken away many of our worries of staying on the air."

"IT WORKS GREAT!...We are the loudest and cleanest sounding AM radio station in Atlantic City. I guess you can add us to your long list of satisfied customers."

"There is no question, you folks go the extra mile to see that your customers are satisfied."

... We invite you to join our Fan Club.

10
Years

OMNITRONIX INC

Fresh Ideas, Smart Design.

e-mail inquiries: info@omnitronix-inc.com

113 DICKERSON RD, N WALES, PA 19454 • (800)446-6648 • (215)699-2400 • FAX(215)699-2323

Products & Services Showcase

For more information on the products shown below, circle the appropriate Reader Service No.(s) on the enclosed Subscription/Reader Service card or contact the advertiser directly.

KINTRONIC *KTL* LABS INC.

FOR AM EXPANDED BAND OR IBOC / DAB SYSTEMS FOR THE 21st CENTURY



5-TOWER 50KW-U DA-2 DIRECTIONAL ANTENNA SYSTEM FOR KYTA LOS ANGELES, CA

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: www.kintronic.com

MasterCard

READER SERVICE NO. 77

REMOTE MONITORING AND CONTROL FOR ANY SIZE SITE

Davicom systems provide all the automated monitoring, reporting and control functions you need to keep your site(s) operational and legal. Our systems are practical: they are sized for every type of operation from small AM sites to large TV facilities, with set-up and operational software that even casual computer users can understand.



Call us today for more information!
 Toll Free : 1.877.DAVICOM
 3 2 8 4 2 6 6

READER SERVICE NO. 24

VACUUM CAPACITORS



- Variable or Fixed Types
- Capacitance Ranges from 3pF to 6600pF
- Peak Test Voltages to 100kV
- Current Ratings to 1000 Amperes

Ideal for Semiconductor Fabrication, Broadcasting, RF Heating/Drying, Medical (MRI), Avionics, Scientific, and other RF power applications.

COMET North America, Inc.
 89 Taylor Avenue, Norwalk, CT 06854 USA
 Phone (203) 852-1231 Fax (203) 838-3827



READER SERVICE NO. 50

SAVE \$ ON THE BEST LINES OF Audio Processing, Consoles, STL... FOR NEW & EXPERIENCED

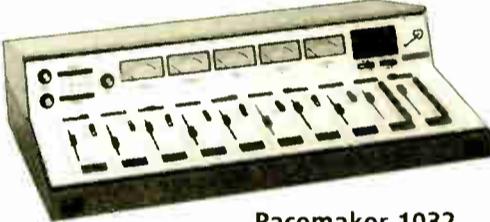
BROADCAST RICHMOND

WE CARE ABOUT YOUR BUSINESS

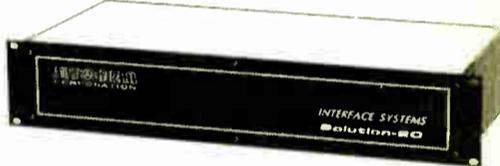
Tel 765-966-6468 Fax 765-966-5505
 E-mail: broadcast@infocom.com
www.broadcast-richmond.com

READER SERVICE NO. 129

A Perfect AUTOGRAM Combination



Pacemaker
RTV
Mini Mix
?



Solution 20

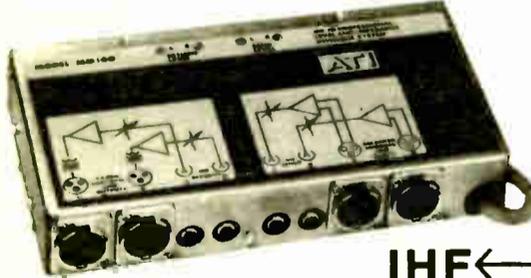
Console Accesories All In ONE Package:
 Distribution Amp Card • 10 Watt Stereo Amp Card
 Relay Card • Microphone Processor Card

AUTOGRAM CORPORATION

Plano Texas
 1-800-327-6901 FAX (972) 423-6334
 E Mail: info@autogramcorp.com
www.autogramcorp.com

READER SERVICE NO. 103

Match-Maker™



Disc-Patcher™



IHF ↔ PRO
Level and Impedance Converters

BI-DIRECTIONAL FOR

- Reel to Reel and Cassette Recorders
- Graphic Equalizers and Noise Reducers
- Audio Effects Processors and Digital Reverb
- Dual Line Amp, DA, Splitter or Combiner

UNI-DIRECTIONAL FOR

- Digital Compact Disc Players
- ENG Cassette Dubbing
- Off-Air Monitor Tuners
- Console Audition Outputs

Interface consumer/industrial IHF (-10db) stereo source equipment and signal processing devices into professional studio +4dBm, 600 ohm systems without loading distortion, crosstalk, hum, response roll-off or RF pick-up.
 True transformer output isolation, balance and protection with less than .01% THD even at 20Hz and +22dBm peak output!
 102 db dynamic range...greater than a Compact Digital Disc system!
 Self contained power supply, Velcro™ and dual rack mounting.
 Free Detailed Brochure and Specifications Available

AUDIO TECHNOLOGIES INCORPORATED 

328 Maple Avenue, Horsham, PA 19044, USA
 (215) 443-0330 • FAX (215) 443-0394

SEE US AT AES BOOTH #143

READER SERVICE NO. 129

Automating Programs? No Problem!



The NEW SUB-03a Subaudible Tone Decoder

You can use the Sub-03a to automate your network feeds or take the guess work out of when to cut away from networks. The decoder listens to your audio source and gives you dry contact closures from any service that sends subaudible tones, including satellite receivers, RPUs and POTS frequency extenders. The decoder's relay contacts interface easily with your automation system. The Sub-03a is a reliable and inexpensive problem solver. The Sub-03a can be ordered set for 50/75Hz operation. Rack mount option (as shown) available. List Price only \$329.00
 Check our website for more info or to download the latest manuals.

The Sub-03a's features include:

- Interlocked, dry relay closure outputs for 25, 35 & combo.
- Balanced or unbal. audio input.
- Provides filtered, balanced out.
- Indicators for all three tones, audio level setting & power.
- Enable input lets you (or your automation) prevent closures.
- Uses standard 1/4" TRS (head phone style) jacks for all audio.
- Db-9 and screw terminal outs.

Circuit Werkes
 3716 SW 3rd Place
 Gainesville, Florida 32607
 (352) 335-6555 / fax 352-380-0230
<http://www.circuitwerkes.com>

READER SERVICE NO. 23

Studio Sessions



Patricia,
Princess of
'Whales'
Page 59

Radio World

Resource for Radio Production and Recording

September 16, 1998

'ZIP-py' Fidelipac DCR 10 Deck

Jeff Johnson

It is not often Studio Sessions runs two reviews on the same product, but the impressions of two engineers who examined the Fidelipac DCR 10 Digital Recorder/Player are worth comparing. We have included them side-by-side.

The impetus to replace those looming cart walls and whirring stacks of players has resulted in numerous solutions based on newer technology.

Fidelipac, whose products have long comprised those very walls and stacks, offers a much more compact and versatile alternative: The Dynamax DCR 10 Digital Recorder/Player.

The DCR 10 is in essence a dedicated purpose computer utilizing APT-X compression technology and a variety of removable storage media. Housed in a well-made 2RU case, it is sized so that two units may share a rack shelf.

The unit is solid, its sound consistent with digital technology.

On the rear there is a connector for the internal power supply — no dreaded wallwart here — connections for remote operation and tallies, an RS-232 port and XLR connectors for analog and AES/EBU digital signals.

The front panel incorporates the display, a media drive slot, a rotary search wheel, keyboard connector, level LEDs and control pushbuttons. The unit is rugged in all details and should stand up well to the self-proclaimed "zoo" environments of many

air studios.

Pick your media

Three types of computer-style media drives may be installed in the DCR 10: a floppy disk with 2 to 4 MB capacity; a ZIP drive with 100 MB storage space; and magneto-optical (MO) with a 640 MB capacity. Sample rates of 22, 25.75, 32, 44.1 and 48 kHz are available.

The 100 MB ZIP drive that was installed in our review unit was expected to yield 58:30 storage time at 32 kHz stereo, but in practice came to 57 minutes. The media drives are SCSI-based and should be easy to upgrade.

Audio quality is perfectly fine, consistent with APT-X encoding and the data rate chosen. A 32 kHz rate yields 15 kHz or so, which is all that is required for FM.



The newest member of the Fidelipac DCR family is the DCR 10, shown here outfitted with an Iomega ZIP drive.

DCR 10 Tested for Network Use

John E. Hingsbergen

The Fidelipac DCR 10 unit was installed in our X-Star Network uplink studio to test its suitability for service as a digital replacement for the cart machines at our seven satellite stations.

We use three of the "old-timers" at each station for insertion of legal IDs and localized station promos. The cart decks are triggered by closures from the digital stream of our satellite feed. Secondary tones at the ends of the cuts allow a smooth return to satellite programming provided by our flagship station, WVXU(FM).

The cart machines work well but with a few drawbacks. There is the tendency of carts to wear out and jam, requiring our engineers to put in some "windshield time," driving round trips from 200 to 1,000 miles to service the decks. There is the need to re-record an entire

cart when an outdated cut needs to be dropped from rotation and the lack of programmability for increasing rotation of cuts.

From our point of view, seven satellite stations, three carts per station and at least one backup cart for each original puts us in the range of some serious numbers.

The DCR 10 looked like an attractive alternative, thanks in part to its numerous features: namely secondary and tertiary cue tones, built-in clock/calendar to support logging and kill date checking, and the ability to set up rotations, chains and loops.

Other operational features of the DCR 10 include digital quality audio, the LCD display of cut titles and outcue information up to 24 characters long, and display of time remaining, time recorded and operational mode.

From an operational standpoint, the

AM stations can get by with the 22 kHz rate for more storage time.

To record cuts, a standard computer keyboard (not supplied) must be plugged into the front of the unit. I think a wireless remote would be preferable, but this is not available. Using the keyboard as a safety interlock for recording or modifying a disk is a good idea. It keeps the recording medium safe from erasures and over-recording by careless operators.

Cuts may be recorded, trimmed, chained, labeled and looped. Any other sort of production or editing, such as splicing or removing pops, should be done by other means.

Features

Record-On-Audio with adjustable Start threshold level is available and is a nicely functioning feature. Secondary and tertiary tone functions are implemented should they be necessary for network rejoin or similar purposes. This is

See ZIPPY, page 65 ▶

DCR 10 performed well in the testing we did. Despite the incomplete and confusing users manual we received, recording and playback of tracks was easy. I was up and running in about five minutes after a quick scan of the manual.

The DCR 10 will not automatically advance tracks while in the record mode. Once a cut has been recorded, you had better be vigilant in advancing the counter, or your next cut will replace existing audio. If you have ever used MiniDiscs, you already know MD recorders advance and create new tracks every time the Record capability is activated. Do not expect the DCR 10 to behave the same way.

Of course, this weakness becomes a strength if you tend to need multiple takes while recording. Just be careful once you get the good take down.

The unit, as shipped, was supplied

See NET, page 65 ▶



MACKIE®

Professional Audio Systems

www.mackie.com

Yamaha Fits Eight Tracks Onto MD

Michael Parks

Yamaha describes its new MD-8 eight-track digital MiniDisc recorder/editor as, "all the advantages of digital recording made easy."

Well, the MD-8 definitely has some advantages, but being easy was not necessarily the case — at least not at first for the production crew here at the Dame Media stations in Harrisburg, Pa. When our MD-8 arrived, we immediately unpacked the unit and stuck in one of our MiniDiscs. Nada.

While T-Bone the engineer and midday talent Andree turned knobs and pushed buttons and tried to figure out why it would not work, I was reviewing the manual and came to the part that pointed out the MD-8 needed a Data MD to function. T-Bone and Andree both asked, "A what MD?"

Different from a regular MiniDisc, a Data MD is what drives the popular four-track personal MD decks you may have already seen. The Data MD is formatted to create eight-track recording on the MD-8. So why didn't Yamaha include a Data MD with the unit?

Thirty dollars and one Data MD later, we were ready to rock and record on all eight tracks.

Tour the panel

Yamaha was the first to come out with a MiniDisc multitrack recorder with eight tracks. At this writing, all other MD decks made by Sony, Tascam and Yamaha have been limited to four.

Like its competitors, the Yamaha MD-8 has a built-in mixer with slide pots. The

design is very straightforward. There are eight mono inputs, two stereo inputs and four groups. Channels 1 and 2 are on balanced inputs.

The MD-8 has a three-band EQ with sweepable mids; not that I needed to use them for my purposes, but they do come in handy. The MD-8 has what Yamaha calls

accessed by holding down Button "A" while pushing Button "B." Obviously, after some time and use, this becomes simple. But having only a few weeks to work with it, I did not get to try out every one of the features.

The MD-8 has a Jog/Shuttle wheel that allows fast-forward-



Yamaha MD-8: Finally, eight tracks on a MiniDisc.

"flip" switches that instantly convert inputs to returns.

Anyone who has used a MiniDisc device knows how neat they are. You can cut, copy, paste, and title your tracks, and the MD-8 allows you to actually bounce all eight tracks onto a single track. It simultaneously plays back and records.

This machine has tons of features. But because it is so compact, actually finding and using them all will take some time. The people at Yamaha are marketing the MD-8 more intentionally to musicians rather than broadcast production folks, and assume the user will take the time to read the manual cover-to-cover before giving it a workout.

A lot of features must be

ing and rewinding at half-speed, two-, four-, eight-, 16- and even 32 times normal play speed.

This is a little touchy at first: To achieve certain speeds, you have to turn the wheel all the way in one direction, then back one-half turn. For us, this made scrubbing audio an exercise in finesse.

One nice feature was the Last Record Search. After recording a piece, press Stop, then hit Last Record Search. The MD-8 immediately takes you back to the point where you started recording that segment. There are also markers you can drop in to help spot regions or edit points in the tracks during recording. Other helpful features include Manual and Auto Punch In and Punch Out.

The display for audio levels, though small, was bright and very easy to read. The sound was clean and clear, to which we now can say, "Duh, it's digital," or in other words, you are quite unlikely to find a bad-sounding digital device today.

What to do?

The MD-8 is a sharp-looking and very versatile piece of recording gear. Would it be worth your while to buy one? That depends on your needs. Read on.

The Yamaha MD-8 lists for \$1,399 in a musician's catalog I subscribe to, but can be had for a street price of little more than \$1,200. There are some other decks on the market I would likely check out before actually settling on a Yamaha MD-8 for my own, even if they are only four-track machines.

Admittedly, I was surprised at the fact that Data MiniDiscs are sold for about \$30. A Data MD provides only up to 18 minutes of simultaneous eight-track recording. If you record only four tracks, the total time increases to 37 minutes, then 74 minutes for two-tracking and a full 148 minutes of mono recording.

This wrinkle in logic inspires the question: Why would I record in mono on a \$30 disc, when a regular five-dollar MiniDisc does the very same function?

In fairness, it should be pointed out that the Yamaha MD-8 can play and record on that regular five-buck MD, but only on two tracks or in mono.

Now say that you recorded something on a regular available-anywhere MiniDisc deck. You can still edit that disc on the

MD-8. However, if you recorded a track from a commercial CD, forget it bucko: you are locked out due to SCMS, the same digital roadblock that prevents multiple digital copies we first heard about when DAT came out.

The six Dame Media stations here use MiniDiscs quite extensively. Some folks have bad-mouthed them and hoped that they would go the way of Beta home VCRs. I think MDs have quite a future in the broadcast industry.

To sum things up, the Yamaha MD-8 gives you your money's worth. If you want to use it as a production machine at the radio station, plan on building around it. I was able to rig it through our production console, but I had to slap on plenty of adapters to do it.

The MD-8 may be good as a home production machine. You can hook up a mic, CD player, DAT machine and begin to produce some good stuff in a fairly short time. When you start hooking up a processor or an effects unit, things may get a little complicated.

Look through those music catalogs or broadcast supplier bulletins you get in the mail, or stop by a Yamaha dealer to check out the MD-8 multitrack MiniDisc recorder. It offers the sound quality that Yamaha is known for in a versatile piece of gear, complete with enough features, bells and whistles to keep you busy and productive for a long time.

■ ■ ■

For information, contact Yamaha in California at (714) 522-9011 or circle Reader Service 60.

Michael Parks is production director for the Dame Media radio stations in Harrisburg, Pa. Reach him c/o RW.

NEMAL
Cable & Connectors
for the Electronics Industry

Authorized
Distributor of
**RFS Cablewave
Systems**

Complete line of **FLEXWELL®** Coaxial Cables,
Waveguide, Rigid Line, Connectors and
Accessories

**EXTENSIVE INVENTORY
SWEEP TESTING TO 18GHz**

Please call or fax for our latest catalog

800.522.2253 • FAX 305.895.8178
INTL. 305.899.0900

e-mail: info@nemal.com www.nemal.com

No minimum order on standard products.
Quick delivery on cable assemblies.
Over 3,000 cable & connector products in stock.

NEMAL ELECTRONICS INTL.
12240 N.E. 14 Ave., North Miami, FL 33161

Circle (110) On Reader Service Card

Voice-Overs and the Internet

Travis

Well, it has been a good month. One of the things that helped to make it a good month is that I actually landed a voice job through my Internet Web site. The site has been up for about three years and, until now, I have not picked up any work through it.

I have received about 70 inquiries, mostly from high-school students who wanted to know more about voice-over as a career. I also have had four inquiries from potential "clients" who were hoping to get my services for free or close to it.

I have not been disappointed. I had set up the site as more of an experiment than anything else so I had no real expectations. Others I know who were expecting to "get rich quick" from the Internet have been disheartened.

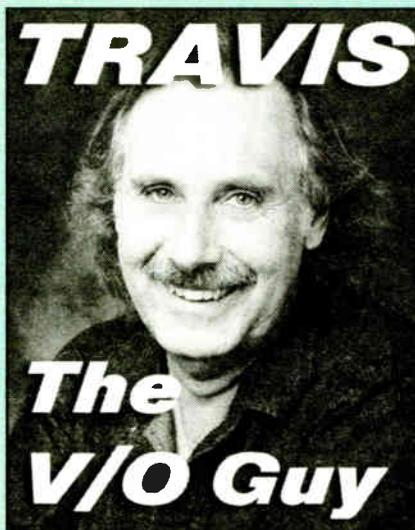
I have three Internet providers: CompuServe, Pacific Bell and America Online. Each provides me with something that the other two do not.

For example, CompuServe has some excellent forums, which, in the past, have been quite useful in my career. Pacific Bell provides a speedy, reliable Internet connection — something I have found to be less than satisfactory with the other two providers, although they are improving.

Having three providers also allows me a backup. If two services go down, I still have a third I can log onto. This has happened to me twice in the past six months, as I lost two providers simultaneously during critical times when I needed to get scripts. I was extremely grateful to have the third service up and running.

I keep my AOL account for two other reasons. First, I have several clients who use AOL to send

See TRAVIS, page 63 ▶



TECH TIPS

Ring Mod Chip for Alien Effects

Alan R. Peterson

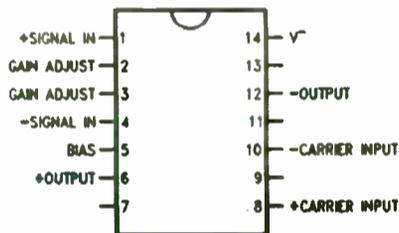
One audio effect that has been around for years is the ring modulator, or balanced modulator. It adds unnatural overtones to natural sounds and was an early audio effect used to alter the human voice into something sinister or alien.

The original design used a pair of transformers and a ring of diodes, hence the name (or so the tale is told). Music hobby books have shown how to construct a ring modulator using the common 565 phase lock loop IC. However, National Semiconductor has an inexpensive analog chip, the 1496 balanced modulator, that offers a lot to creative tinkerers.

National also offers a similar chip, the 1596. For the most part, the specifications are similar and nearly interchangeable.

Two tones, no waiting

Here is how a modulator works. Two audio sources are input to the modulator, normally a constant-frequency carrier signal and a variable source such as voice. Rather than output a combined signal the way an audio mixer would, a ring modulator would output a signal that is the sum and difference of the original inputs.



Pinout for the National Semiconductor 1496 Balanced Modulator Chip

If a 500 Hz signal and a 3,000 Hz signal were sent through a ring modulator, the output would consist of 3,500 and 2,500 Hz tones. If the same frequency is applied to both inputs, the result is the frequency doubled, or one octave higher.

On voice, a ring modulator shifts the pitch both up and down simultaneously. With judicious selection of a carrier frequency, the effect is very much like monster or outer-space voices from 1950s "B" movies. Shortwave listeners and amateur radio operators hear it all the time when listening to detuned single sideband (SSB) communication.

Early Devo recordings had guitar solos driven through ring modulators. If you have heard the closing theme to the cable TV cartoon show "South Park," you have heard ring modulation in action.

Fistful of resistors

A stroll through a used music store may turn up a used modulator from companies such as Maestro or Electro-Harmonix. The effect recently has been included in digital processors and can be emulated in software. But anyone with a soldering gun and a fistful of resistors and op amps could pick up a 1496 chip and create a respectable ring modulator for the production room or for on-air effect. And with the chip's 300 MHz bandwidth, there is

room to be extremely creative.

National calls this type of modulator a "suppressed carrier modulator" in the fact sheet, but the effect is still popularly called a ring modulator, which is how it will be referred to here.

Demands

Because everybody will have their own ideas about circuit design and what they want a device to do, an actual schematic is not represented here. An Adobe fact sheet complete with basic schematic diagrams can be downloaded from the National Semiconductor Web site.

It is a given that if a mic is to be used as the modulated input source, an op amp should be used up front to present the proper impedance to the mic and to provide a boost in level to the 1496 chip. Likewise a second op amp with a pot should be used at the output of the 1496 chip to ride the output level to the input of the mixer, recorder or amplifier.

Should the carrier source be a simple variable audio frequency oscillator, another op amp forced into oscillation could be used. Save space by using a quad op amp such as a TL084 or a pair of 1458 dual op amps; each

costing less than a dollar.

The 1496 is anything but a power hog. The chip pulls only 33 mW when running at full bore. Maximum applied voltage is listed as 30 V, but you will likely wish to run a modulator at 9 to 12 V, allowing the use of a commercially available wallwart power supply.

Carrier suppression is listed at 65 dB with a 500 kHz carrier. Although this is well beyond the audio frequency range, suppression figures are likely to be similar when pulled down below 20 kHz. This means minimal carrier leak-through at the output.

Ring modulation is still a neat production trick. If you have a little free time and a tendency to tinker, check out www.national.com and type "1496" in the Search box to download the fact sheet.

MASTER CONTROL

The world's finest on-air system.



Take the RCS challenge!

Ask any software or hardware company how much combined RADIO EXPERIENCE is on their staff. We guarantee nobody comes close to the wide radio backgrounds of RCS people. We've been where you are...station ownership, management, engineering, programming, production, on-air. Experience in ALL facets of radio is curiously absent from other digital computer companies. Plus, RCS uses industry-standard components including Digigram audio cards. Rarely do you make such an important decision...Make this the right one. Get Master Control NT from RCS.

Want a free video?

Put your name and address in this box and fax to 914-723-2258. We'll rush you your video and more info on Master Control NT.

Name: _____
 Station: _____
 Address: _____
 City: _____ State: _____ Zip: _____
 Tel: _____ Fax: _____



Radio Computing Services, Inc.

E-mail: info@rcsworks.com
www.rcsworks.com



BOOK REVIEW

Audio Reference Book: Get Smart

Gowan Grey

There comes a point in the production director's career when he or she wants to know more about the science and technology driving the studio: Why certain stereo mic arrangements sound the way they do, what goes on inside a panpot under the mixer surface, why analog tape behaves the way it does and what the heck *hysteresis* means.

An understanding of decibels helps when figuring line and mic level signals. And while there is nothing quite like dropping "inverse square law" into casual party conversation, it will not move anyone ahead in their comprehension of audio technology.

Heavy duty schooling is always an option, but if all you need is a handy source book to open up and flip through for an answer, look into the "Audio Engineer's Reference Book," edited by Michael Talbot-Smith and published by the Focal Press division of Butterworth-Heinemann.

This is not a textbook from which to study and learn audio engineering, but it is an inclusive collection of terms and topics to thumb through when you need to know an answer.

Math alert

Consider it fair warning to say there is considerable math and more than a handful of graphs in the Audio Engineer's Reference

Book. Lots of production pros will not even give these a second look — who needs to know about forces corresponding to pressure gradients on a mic diaphragm when the job consists only of cutting promos? But someday there will be more to life than the next car dealer commercial and a fundamental understanding of audio technology may help move you ahead.

A few surprises turn up throughout the Audio Engineer's Reference Book.

From the very start of the Audio Engineer's Reference Book (Chapter One: Basic Principles) the text delves into the kind of math we all learned in the 11th grade and how it applies to audio — remember how we all thought we would never use what they taught us? After that, the book essentially goes where you need it to go.

In Chapter Two, the book gets into Acoustics and Acoustic Devices, including room analysis and the absorption coefficients of different building and fur-

nishing materials. If you ever wanted to know how a full brick wall or common ceiling tiles behave in an acoustic space, page 2.9 shows you how. There are no brand name recommendations for treatment (one well-known text drones on about Owens-Corning 703 Fiberglas) but there are plenty of references to original sources of information. The reader is left to make his or her own decisions based on knowledge gained by some actual research and footwork.

Chapter Three contains plenty of references to analog tape and tape recording, which makes sense. Tape will still be around for a few more years and the Audio Engineer's Reference Book is helpful in this regard. Here you will find information on standard equalizations in IEC, NAB and AES standards, an understanding of head track formats and a capsule description of noise masking and reduction systems. And if you really need some new casual party words, drop "anti-saturation" or "spectral skewing" into a conversation and watch what happens.

Stay with Chapter Three for a few more pages and you will read everything there is to know technically about DAT machines, CD players and rumble weighting curves.

A few surprises turn up throughout the Audio Engineer's Reference Book, such as the odd schematic diagram showing how to construct a direct injection (DI) box, a passive mic splitter, active anti-

hum circuits and even something called a "Baxandall tone control." While not intended as a series of how-to-build-it circuits, they are nonetheless helpful for the tinkerer to understand what goes on inside mysterious black boxes.

Note that the book was edited and published in the United Kingdom, and there are plenty of instances of the "British" way of doing things. For example, a broadcast console or mixer is called a "desk" and there are numerous references to "centre frequency" and "colour." Schematic diagrams are shown in the style common to European design, such as a cylindrical resistor in place of the domestic zigzag line component.

It is likely that one or two topics have been missed or ignored in the Audio Engineer's Reference Book, but an all-inclusive book would be quite huge and expensive. Talbot-Smith's efforts cover basic audio math and physics and move ahead well into digital technology. As he put it himself in the book's preface, "There is enough here to fill a significant gap in the currently available literature."

Besides being a handy reference guide, there might be enough in the Audio Engineer's Reference Book to give the curious production person an insight into audio technology and perhaps provide some inspiration to learn more.

■ ■ ■

For information, contact Butterworth-Heinemann in Massachusetts at (800) 366-2665; Web site www.bh.com or circle Reader Service 88.

Gowan Grey is an occasional contributor to *Studio Sessions*.

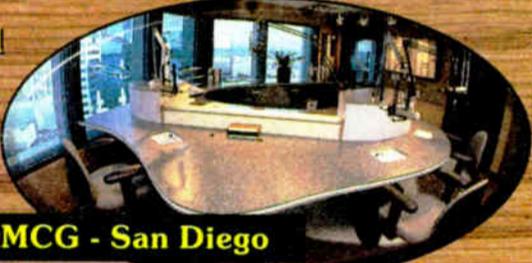


MAGER SYSTEMS

The Best in Sound Furniture

Designed, Fabricated, Delivered and Installed

21602 N. Central Ave., Suite 1
Phoenix, Arizona 85024
TEL: 602-780-0045
FAX: 602-780-9860



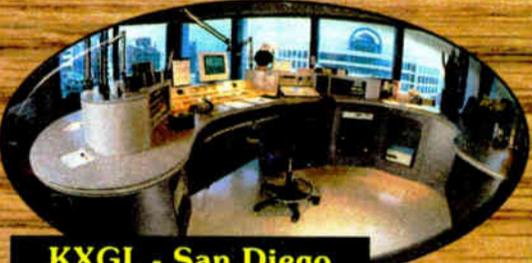
KMCG - San Diego

TIRED OF THE SAME OLD STUDIO FURNITURE?

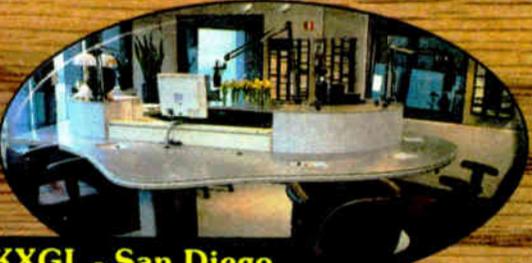
For over 18 years Broadcasters nationwide have come to Mager Systems for our exquisitely designed studio furniture. Our unique construction, along with solid wood and quality materials, means your furniture is built to last. In fact, we've made the design and construction of studio furniture as much an art form as it is a business. Every installation is backed by a 10 year warranty. Our quality is affordable and can accommodate every budget from economy to showplace. Call today and discover why Mager Systems is the best in Sound Furniture.

AVONITE®

Mager Systems is very proud to offer Avonite Solid Surface. Avonite is a non-porous solid surface material with depth and richness of stone in an easy-to-care for composite surface. Avonite is available in over 60 natural looking colors. Highly stain and scratch resistant, it boasts durability with confidence of a full 10 year warranty.



KXGL - San Diego



KXGL - San Diego



KOOL - Phoenix

Circle (188) On Reader Service Card

World Radio History

Travel Show Wins Radio Honor

Douglas Roycroft

On March 13, Patricia Lawrence, producer of the radio travel show "Innocents Abroad" (now called "Travel Radio") received the National Federation of Community Broadcasters Golden Reel Award for a show she produced about a scientific research team that is studying the California gray whale.

This was a personal achievement for Lawrence and confirmation of the wisdom of a technical production decision made less than two years ago.

The tale began in the spring of 1991 when the late Stanley Barr, an award-winning travel writer and globetrotter, decided to produce a radio show. He named it "Innocents Abroad" in homage to Mark Twain, and subtitled it, "Explorations Into Destinations Around the World." This was to broaden its scope beyond the usual I-went-there-and-I-saw-that format of many travel shows. To Stan, the word "destination" implied a state of mind as well as a sense of place.

One of the many friends Barr recruited to help produce the shows was Patricia Lawrence. Lawrence, who worked as a bookkeeper, was enthused at the opportunity to explore the world and learn new skills, especially audio editing.

Neither knew anything about audio production. They enrolled in the local Regional Occupational Programs (ROP) Audio Lab, bought a copy of "AudioCraft" by Randy Thom, and together learned the nuts and bolts of basic audio engineering.

First "Innocents Abroad" was produced once a month. The first interviews were recorded at the audio lab using the ROP equipment. In the fall of 1991, Barr and Lawrence purchased an Otari 5050 reel tape deck for their studio and a Marantz PMD222 cassette deck for the field.

The shows were aired on KZYX(FM), a public radio station in Mendocino county. In the fourth quarter of 1992, "Innocents Abroad" became a weekly show.

The engineering department acquired another Otari 5050 deck to create reel-to-reel dubs from the master recordings for the Public Radio Satellite System (PRSS). Cassette copies were dubbed using the Marantz PMD222 for subscribers who preferred to air shows in cassette format.

More gear

At this time, the Innocents team obtained another PMD222 to be used as backup equipment and as supplementary recording equipment for field use.

The Marantz tape decks have proven themselves as low-maintenance, high-performance units that have been reliable everywhere in the world that the Innocents production teams have taken them, from the jungles of Borneo to the Montreal Jazz Festival. The decks have required little attention beyond the routine maintenance any prudent professional gives heavily used equipment that receives arduous service far from service facilities.

Reel-to-reel editing was minimal, partly because Barr would plan each interview with a beginning, a middle and an end, exactly as he had previously plotted articles for the print medium. Lawrence would then splice in an intro, break, outro and music. She would cut out any egregious mistakes and trim the show to fit the time limitations and that was that. Raw material from cassette was mixed with incidental

music using a Mackie 1202 mixer and dubbed onto reel-to-reel tape.

In 1992, the show made its international debut on Radio For Peace International, a shortwave station broadcasting from Costa Rica. In June 1994, the Armed Forces Radio/Television Satellite added Innocents' "Audio Journeys" to their weekly broadcast. In December 1994, the Innocents team broadcast its first special



Photo by Douglas Roycroft

on PRSS, a production titled "Traveling With Disabilities."

Barr and Lawrence were excited by the breakthroughs in digital audio editing technology as described in *RW* and other publications. Late in 1995, they decided that it was in their best interests to switch from analog to digital editing.

This would improve the show by offering the ability to edit out false starts and space fillers of colloquial conversation — "errs" and "umms" — with ease. The new technology would also let them produce more sophisticated and technically challenging shows using on-location recordings.

With that, Innocents Abroad Radio Productions obtained a non-modified Gateway2000 Solo notebook computer with a factory soundcard. Lawrence tried several digital audio editing programs, finally settling on Samplitude from SEK'D in January 1996.

This German-made program was one of the first commercially available PC-based

multitrack recorder/editors. The newest version — Samplitude 24/96 — is capable of 999 tracks of 24-bit, 96 kHz audio. Lawrence chose an earlier version of Samplitude to capture all raw material directly to the hard drive. Editing is done and undone with a mouse. The program creates a virtual project of the raw material which can be recalled if the editor decides to use something previously cut.

From left, Research Assistant Tim Morrison, Producer Patricia Lawrence and Research Assistant Steph Dutton waiting for the whales.

The first digitally edited "Innocents Abroad" broadcast aired early in June of 1996. Lawrence originally recorded all audio at a 22 kHz sample rate. Lacking sparkle and presence, it was rerecorded at 44.1 kHz, which is how all Innocents shows now are sampled into the computer.

Stan Barr died in August 1996, and Patricia Lawrence became the show's producer and audio engineer. Despite the sadness and turmoil in the wake of Barr's unexpected death, not a single show was missed. For the next six months, Lawrence produced new shows from the interviews conducted by Barr and entered into her role as producer/host by conducting new interviews.

By January 1997, Lawrence found she could approach the editing process without the feeling of dread which accompanied her

earliest efforts. She produced the first show which included ambient sounds, a guided tour through a rain forest in Costa Rica.

Two months later, Lawrence was in a sea kayak with a research team on the Pacific Ocean in an effort to get close to and capture the sounds of California gray whales on their annual migration from Baja, Calif., to the Bering Sea. The Marantz PMD222 and a Shure VP64 omnidirectional microphone rode with her.

I was in the motorized support vessel with the other Marantz PMD222 and a Shure M-56 unidirectional microphone to record his observations and give another perspective to the event. The kayak intercepted a pod of eight gray whales. Lawrence recorded the encounter with these 40-foot long, 80-ton giants from only 20 feet away.

"It was amazing," said Lawrence, "as if the whales knew I needed those sounds. It was pure bliss when we saw those whales lining up to cross the bay. The power and connection I felt with them will stay inside me forever."

Rustic recording

The raw audio was edited on the Gateway2000 Solo computer, sitting on an old kitchen table in the Innocents Abroad studio: a rustic cabin overlooking a wooded canyon. Because the studio is "off the grid," electricity is provided by a bank of 12 V batteries charged by a Makita generator. A DC-to-AC inverter provides AC power for the equipment.

Lawrence attributes her ability to produce an award-winning show to the editing power of the Gateway2000 Solo computer and the Samplitude software. The project was marked from beginning to end by serendipity and synchronicity. Several friends were responsible for the show being entered as a candidate for NFCB awards. Without their urging, it would not have happened.

"Innocents Abroad" underwent a name change and has been called "Travel Radio" since May. The program is heard on 30 public radio stations and vision-impaired reader services, and on the Armed Forces Radio Network. The show has a potential audience of about 4 million listeners worldwide.

CLONES & DRONES

HIGH SPEED SOLUTIONS

CD2CD Manual CD-Recordable Copier

For one-button cloning of your CD titles, nothing beats the new MediaFORM CD2CD copier. The standalone system houses the MediaFORM smart controller, which identifies and copies complex formats (ISO, CD-Audio, Hybrid, Mixed Mode and HFS.) on the fly, and without the use of an internal hard drive. Support for up to three 4X recorders, and MediaFORMS CD-Autoloader is available. Audio users can take advantage of CD2CD's unique track extraction feature, where tracks from various discs can be mixed and recorded for specific jobs.



CD-2001 Automatic CD-R Duplicator

Want to automate? The MediaFORM Standalone CD-2001 delivers both simple one button operation and unattended duplication at 4X speed. The system provides separate accept and reject bins, making identification of successfully recorded media easy. Among the new high performance features offered are batch copy mode, audio track extraction, and connectivity to an external tower of up to three 4X recorders. For applications that require direct connection to your mastering software, MediaFORM's CD-2500 Autoloader offers direct connection to your PC or Mac.



MediaFORM • 400 Eagleview Boulevard • Suite 104 • Exton, PA 19341
 Phone: 610-458-9200 • Fax: 610-458-9554 • Toll Free in the USA 800-220-1215
 email: info@mediaform.com • web: http://www.mediaform.com

CD2CD and CD-2001 are trademarks of MediaFORM, Inc.
 All other trademarks remain the property of their respective companies

Circle (11) On Reader Service Card

◆ PRODUCT GUIDE ◆

Products for Radio Production

Mail info and photos to: RW Product Guide, P.O. Box 1214, Falls Church, VA 22041

Crate Taxi Amplifier

You can take a Taxi to your next remote.

Crate Amplifiers has rolled out the Taxi, a portable, battery-powered amplifier.



The two-channel amp has an "A" channel optimized for high-impedance microphone use, while the "B" channel includes three-band EQ and a gain-boost feature suitable for

overdriving musical instruments. With a small mixer plugged into the "A" channel, the Taxi amplifier can function as a small public address system for live remotes.

The rechargeable battery pack provides up to eight hours of operation on a single charge. The amplifier puts out 30 W RMS into an 8-inch speaker. A quarter-inch stereo Insert jack functions as a Line In/Out connection and a set of LEDs indicate charging and operational status.

The floor monitor-style case is covered in high-visibility "safety yellow" Tolex vinyl and the speaker is protected by a black metal grille. The Taxi amplifier retails for \$299.99.

For information, contact Crate in St. Louis at (314) 727-4512 or circle Reader Service 164.

Spacewise Rotary CD Rack



Spacewise Broadcast Furniture has created the CD-240 Orbiter, a lazy Susan-style CD carousel sized to fit in active studios.

The carousel holds 240 CDs with jewel cases in eight vertical columns. CDs are canted back 15 degrees. The overall size is 26 inches high by 26 inches in diameter; it can fit on a standard studio surface top.

The CD-240 Orbiter is constructed of oak-finished plywood and solid oak front trim, with space available to label each column.

For information, contact Spacewise Broadcast Furniture in Arizona at (800) 775-3660; Web site www.spacewise.com or circle Reader Service 190.

BST PR 136 Turntable

The BST America division of Ultrak announced the availability of the PR 136 quartz direct-drive turntable for studio and club use.

The PR 136 turntable has a large LCD display to show pitch-and-play status, speed (45 or 33) and quartz lock Zero pitch information. A sturdy platter and curved tonearm complement the top surface layout.

A pop-up target light and stroboscopic speed light are located toward the operator, while a 12 V BNC connector toward the rear can be used for a gooseneck light to illuminate the entire table surface.

On the underside, a remote-start jack and "beat output" connectors augment the RCA cartridge connections and ground post.

For information, contact BST in Texas at (888) 277-0014 or circle Reader Service 216.



Fostex, Syquest Agreement

Fostex Corp. has announced that SyQuest "ezFlyer" removal external drive and media — compatible with the Fostex FD-4 digital multitrack recorder — will be made available at all Fostex dealers.

The FD-4 is a four-track digital multitrack recorder and mixer that uses compatible external media systems of the user's choice, such as magneto-optical or Iomega ZIP. The FD-4 also uses factory-installed internal 2.5-inch E-IDE hard drives; a 2.1 GB drive provides up to 78 minutes of uncompressed digital audio.



The agreement allows ezFlyer drives and cartridges — normally available from computer dealers — to be made available at authorized Fostex dealers. A typical 230 MB SyQuest cartridge offers 42 minutes in Mastering Mode and 78 minutes in Extended Play Mode.

For information, contact Fostex in California at (562) 921-1112 or circle Reader Service 9.

DOD VoTEC Voice Processor

The DOD VoTEC is a floor-controlled multi-effect processor for voice processing.

The VoTEC allows real-time manipulation of mic signals via four pedal switches and an optional continuous controller pedal. Effects offered include a standard complement of delay, reverb, compression and EQ. A modulation section offers chorusing, flanging, phase shift, pitch shift and tremolo.

Special effects include Pixellator, Ring Modulation, Telephone and Megaphone emulation. Envelope filtering and vocal



See PRODUCT GUIDE, page 61 ▶



THE PRE-PRODUCED VERSION OF THE LONG RUNNING LIVE BIG BAND SWING SHOW IS NOW AVAILABLE ON CD! THE CD VERSION OF THE SHOW IS A FOUR-HOUR FORMAT WITH STAND ALONE HOURS SO THAT YOU CAN PROGRAM EACH HOUR INDIVIDUALLY OR TOGETHER WHERE YOU NEED THEM OR RUN THEM AS OFTEN AS YOU LIKE! THE MAIN PROGRAMMING DIFFERENCE FROM THE LIVE SHOW IS THAT THE CD SHOW LEANS TOWARD THE NEWER AND MORE UPTEMPO SOUNDS OF THE CLASSIC BIG BAND SWING AND JUMP SONGS.

EXAMPLES OF ARTISTS FEATURED ALONG WITH THE TRACKS FROM MILLER, BASIE AND JAMES: BIG BAD VOODOO DADDY, SQUIRREL NUT ZIPPERS, BRIAN SETZER, MICHAEL CIVISCA, CHERRY POPPIN' DADDIES, GEORGE GEE AND HIS MAKE BELIEVE BALLROOM ORCHESTRA, ETC.

The mix is like no other, and who better equipped to make it for radio than the hottest swing host in America... not only are we hip to the new bands and material, we know where it came from and have those original songs too!!!

BIG BAND SWING ON CD

WEBSTER AUDIO PRODUCTS, INC.
6635 S DAYTON ST. SUITE 290
GREENWOOD VILLAGE, CO 80111
PH: 1-800-757-9464
FAX: 1-303-790-8543
WWW.WEBSTERAUDIO.COM

Tons of fun... expand your audience... you would be surprised at all of the nostalgia listeners who want to hear the new big bands and vocalists too. We have over 4,000 CD's in our library and can bring your listening audience a variety of new releases and new artists.



IF YOU HAVE BEEN WAITING TO PROGRAM BIG BAND SWING, BUT WERE NOT ABLE TO TAKE IT LIVE, OR IF YOU ALREADY CARRY IT LIVE AND WANT THE DIVERSITY OF THE NEWER MUSIC - GET ON BOARD TODAY. THIS PROGRAM IS PROVIDED ON A MARKET EXCLUSIVE BASIS AND IS A BARTERED PROGRAM.

DON'T LET THE SWING AND JUMP CRAZE PASS YOU BY. THE LISTENING AUDIENCE FOR THIS PROGRAM IS CATERED TO THE 18 - 65 PLUS DEMO, OPENING THE DOORS TO A VARIETY OF ADVERTISERS.

Circle (214) On Reader Service Card

◆ PRODUCT GUIDE ◆

Products for Radio Production

Mail info and photos to: RW Product Guide, P.O. Box 1214, Falls Church, VA 22041

► **PRODUCT GUIDE**, continued from page 60 distortion add to the range of tools offered by the VoTEC processor.

Suggested price of the DOD VoTEC is \$199.95.

For information, contact the DOD division of the Harman Music Group in Utah at (801) 566-8800 or circle Reader Service 35.

Audix Capsule Mics

Two new large-capsule condenser microphones from Audix Corporation offer high performance at approximately one-fifth the price of other large-diaphragm mics costing \$2,500 or greater.

The Audix CX-101 and CX-111 (shown) microphones are constructed with a one-inch gold vapor diaphragm, brass housing and black satin finish. Both are single-pattern cardioid mics and require external phantom power of 48 to 52 volts.

Both mics are considered appropriate for recording vocals, woodwind and acoustic instruments. The CX-111 is identical to the CX-101 with the addition of a -10 dB pad and a bass roll-off switch.

The CX-101 is priced at \$499, the CX-111 at \$599. Both mics come equipped with a shockmount mic stand adapter and sturdy aluminum carrying case. A two-channel phantom power supply is an optional accessory available for either model; otherwise, either CX model microphone can be powered from the console phantom source.

For information, contact Audix Corporation in Oregon at (503) 682-6933 or circle Reader Service 192.

BSI Stinger Audio Player

Broadcast Software International has Stinger 2.00, a PC-based "instant playback" software package for studio use.

Up to 288 audio cuts are instantly available for playback via touch-screen, mouse or PC keyboard. Microsoft DirectSound support allows Stinger to play multiple files simultaneously or in overlapping segues with a conventional PC soundcard. Stinger 2.00 is a full 32-bit application, running under Windows 95, 98 or NT. Screen and button dimensions can be resized and entire sets of sound events can be saved. Stinger includes a licensed copy of Cool Edit two-track recording/editing software from Syntrillium Software.

Stinger is available for \$199. A time-limit demo can be downloaded from the BSI Web site.

For information, contact BSI at www.bsiusa.com or circle Reader Service 166.

Verbatim CD-RW Package

Verbatim Corp. has introduced a plug-and-play solution for PC-based record-

able/rewriteable compact disc authoring.

The Verbatim package consists of a platform-independent Mitsubishi Chemical 2x2x6 CD-RW SCSI drive, Adaptec CD Creator and DirectCD software, five Verbatim CD-R discs and one CD-RW disc. The drive provides 2X writing to CD-R and CD-RW media and 6X read performance from CD-ROM, CD-R and CD-RW.

The package takes advantage of random erase technology, the ability to erase individual files as if on a floppy disk or hard drive. Previously, CD-RW media had to be entirely erased in order to

rewrite one or more files. The drive also provides a transfer rate of 5 MB/sec at



the SCSI interface and includes a 1 MB buffer to prevent data transfer underruns.

The software allows drag-and-drop writing to CD-RW, as well as renaming, moving and deleting files on the fly. Files can be saved to CD-RW with the standard Windows "Save As" command. For Mac users, the Verbatim package includes Adaptec Toast software.

The Verbatim CD-RW storage solution is priced at \$599 for the internal PC version and \$699 for the external kit.

For information, contact Verbatim in North Carolina at (704) 547-6500 or circle Reader Service 61.

Which would you rather carry on your next Remote?

ALL THIS



ROADRUNNER



Your one box remote broadcast solution!

When you're rushing off to your next remote, you don't want to lug around a lot of equipment.

RoadRunner from MUSICAM USA gives you:

- A 3-channel mixer
- Built-in ISDN Terminal Adapter with integrated NT-1
- MUSICAM MPEG Layer II, Layer III and G.722 for total compatibility
- Internal power supply or external battery

All in one box.

See Us at AES
San Francisco

Performance, price and portability — RoadRunner outdistances the competition every time



MUSICAM USA

MUSICAM USA
670 North Beers Street, Building 4, Holmdel, New Jersey 07733 USA
Tel: 732/739-5600

Fax: 732/739-1818 • Fax On Demand: 732/935-2777

Email: sales@musicamusa.com

Internet: <http://www.musicamusa.com>

Prices shown are published manufacturer's list prices as of 3/1/98

For what you'd pay for a day
in the recording studio...



You can own the studio!



Imagine having the mixing power of the acclaimed Yamaha 02R and 16 tracks of tape-less recording inside your computer. Under the control of popular recording software, the DS2416 digital mixing card—the star component of Yamaha's DSP Factory—gives you 24 mixing channels, more than 100 bands of parametric eq, 26 dynamics processors and two effect processors operating simultaneously with no strain on your computer's CPU.* Plus 16 tracks of tape-less recording. All for less than you'd pay for a day in the studio. The Yamaha DSP Factory—a virtual studio inside your computer.



Visit our Web site @ www.yamaha.co.jp/product/proaudio or call us at 800-937-7171 ext. 683 • ©1998 Yamaha Corporation • Yamaha, DSP and DS2416 are registered trademarks of Yamaha Corporation. *Not all software supports all of DS2416's features.

Circle (187) On Reader Service Card

World Radio History

Use Internet to Promote V/O

► TRAVIS, continued from page 56
me scripts and other information. I have found AOL internal e-mail to be quite good, but the Internet e-mail performance has been less than satisfactory. If I want to be sure an AOL client gets my e-mail, I need to send it from my AOL account.

The second reason: AOL hosts my Internet Web site. Much the same as any other Internet service provider, America Online includes personal Web space as part of its basic service package.

If you check out <http://members.aol.com/travis749> you will find a collection of short audio clips and a shortened version of my voice-over demo. From the moment I heard Internet audio, I realized this would be an excellent place to demo my work — eventually.

How to do it

When I first set up the site, the only reasonable way to get audio of decent quality through the Net was by allowing

the visitor to download an audio file, prepared in one of a number of different formats. Each format had its advantages and disadvantages. When I was first setting up my site, I went with the WAV format because the vast majority of browsers could play it.

You see, at that time, the typical Internet surfer was likely to have either a 28.8 or 14.4k modem. It would take too long a time to download a full-length demo. So I decided to allow guests at my site to download short snippets taken from my demo. Three commercial segments and three industrial/narration clips were placed on my site, each less than 20 seconds long. I attempted to present the site attractively by including appropriate graphics, as well as instructions for downloading and playing files.

Most of my original site setup exists today. The WAV files are still there, and may be played by just about anyone with an ISP connection and a soundcard.

However, there is a fairly recent addition to my site which has dramatically changed its nature: I am now using the Progressive Networks RealAudio system.

Even though RealAudio has been in use for about three years, a lot of folks in my line of work still do not use it to its full advantage. It allows for real-time streaming of reasonable-quality audio through a 28.8k modem. An Internet site visitor can immediately hear audio of any length without having to download a file first.

The RealAudio system is not the only functional Internet audio compression and transit system out there — Telos Systems' Audioactive, licensed and based on Fraunhofer MPEG technology, is another name to be aware of. But so far as I can tell, RealAudio is the most popular performer out of them all.

The folks at Progressive Networks appear to realize the state of technology changes almost daily — every few months, new versions of the RealAudio player are released with major improvements in sound quality. Also, in order for RealAudio to succeed, the technology must be made easily available. To that end, the RealAudio player can be downloaded for free. So for zero money, one can play RealAudio programming from the Internet.

Whip it up

Now, on to preparing actual audio programming for your own Web site.

Readying your site to play RealAudio is not especially easy, but the Progressive Network folks will provide you with a program (for a price) that they claim will help you create a RealAudio Web site.

If you enjoy tinkering with a Web site, you may be able to include RealAudio material on your site for free, but plan on taking a few extra hours to do it.

The latest version of RealAudio is called G3. It is still in beta test mode as of this writing, but in my opinion, it sounds good.

The audio quality at 28.8k is slightly

better than typical AM radio quality. At 56k — or actually 43k, the usual actual speed of my 56k modem — the quality is significantly better, approaching the company's claim of FM radio quality. In either case, the quality is good enough to provide a potential voice-over client with a good idea of what I might sound like on their project.

The implications provided by this technology for people in the voice-over field are intriguing. Not only do we have a new way to demo ourselves, but we also have a new medium which can benefit greatly from our services.

Although it appears that satisfactory real-time Internet video is at least a few years off, high-quality audio on the Internet is a reality today. And some Internet sites are already making good use of professional voice talent.

It is entirely possible that the Internet could eventually become one of the biggest employers of voice talent.

Click here to send

The Internet has recently become a reliable way to transport audio. Already this year, I have worked on five projects where my voice track was e-mailed from the recording studio to its destination.

In one case, a DAT was first shipped overnight, but the client never received it. The recording engineer still had my tracks on his computer, so he compressed the file using MPEG-3 compression, then e-mailed the audio directly to the client on the other coast.

The engineer says the client has decided that, from now on, all audio for 30- and 60-second spots and short projects will be sent as e-mail over the Internet.

Although predicting the future in areas involving technology — especially the Internet — is risky, it certainly appears that some exciting changes are occurring for those of us in the voice-over field, due to recent advances in Internet technology. In one way or another, this will affect our careers in very important ways. Get ready.

■ ■ ■

"Travis the V/O Guy" writes from California. Reach him at ttravis@pacbell.net

SHORT TAKE

Beyer Ring-and-Spring Mic Has Nostalgic Flair

Tom Vernon

It seems that one current trend in microphone design is retro. Now beyerdynamic has rolled out a microphone reminiscent of an even earlier era.

Although not an exact replica, the beyerdynamic M 8000 somewhat resembles the Western Electric carbon microphones of the 1920s, or perhaps a European counterpart (the beyerdynamic mic was designed in Germany). Even though the official model number is M 8000, it is remembered more easily by its nickname "ring-and-spring," referring to the vintage shockmount design.

Philosophy of design

Beyerdynamic has designed the M 8000 for vocals, more specifically, the announce applications in broadcast and recording environments. Through the use of rare earth magnetics, light coils can be designed, resulting in a faster transient response than with traditional materials.

The M 8000 dynamic mic capsule is of modern design, with a hypercardoid pattern and frequency response of 30 to 18,000 Hz, with a slight rise at the low end. The mic has a black satin finish with gold inserts around the edge of the shockmount, and gold springs. Very spiffy.

A lockable On/Off switch is mounted on the shaft. Supplied accessories include a sturdy wooden case and mic clamp. Whether designing cars or high-end audio gear, German engineers just seem to do things right. The mechanical engineering, fit and finish of the M 8000 are all flawless.

The design criteria for the beyerdynamic M 8000 ring-and-spring mic was to build a cost-effective moving coil mic with condenser mic performance. Our dedicated World Cafe torture-testers set out to see how well beyerdynamic succeeded.

We evaluated the M-8000 with both male and female voices, and found it to be a pleasant-sounding mic, very similar in performance and sound to the Shure SM-58. It did seem more prone to popping Ps, even when announcers kept their distance.



WXPN(FM) morning show host Michaela Majoun ad-libs a spot with the beyerdynamic M 8000 microphone.

While the sonics were good, it did not rival the sound of a condenser mic, in our judgment. Due in part to its classic looks, I would envision the M-8000 as an ideal mic for live broadcast situations for stations with a nostalgia or adult standards format. The beyerdynamic M 8000 lists for \$699.

Special thanks to World Cafe producer Joe Taylor Jr. for assistance with this evaluation.

■ ■ ■

For information, contact beyerdynamic in New York at (516) 293-3200 or circle Reader Service 112.

Tom Vernon is a multimedia consultant in Philadelphia. Reach him at TLVernon@aol.com or at (717) 367-5595.

"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



Products & Services Showcase

For more information on the products shown below, circle the appropriate Reader Service No.(s) on the enclosed Subscription/Reader Service card or contact the advertiser directly.

PTEK

LOW COST FM TRANSMITTERS & POWER AMPLIFIERS



Exciters/Transmitters
10W
25W

Power Amplifiers
150W
300W
500W
1000W

**CALL 888-411-5174
FOR DETAILS**

1814 SCHOOLDALE DRIVE, SAN JOSE, CA 95124. 408-448-3342 FAX 408-448-5951

READER SERVICE NO. 126

A Broadcast Industry

BEST BUY

Cartridge Reproducer

Mono Play

Stereo Play

\$1050 \$1150

(F.O.B. Factory - U.S. \$)

**RELIABLE / RUGGED
PROFESSIONAL DESIGN**



DL Series

AUDI-CORD CORPORATION

1845 West Hovey Avenue
Normal, Illinois 61761 USA
Phone 309-452-9461
Fax 309-452-0893

Available Through Your Regular Distributor

READER SERVICE NO. 100

**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 ISOCOUPERS** 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

READER SERVICE NO. 48

Fits In Even "STINGY" Budgets!



DOZENS
SOLD!

The hot new "DELUX"™
quality built
SPACEWISE system!
BASIC SYSTEM \$1555!
FULL SYSTEM \$2840!

GENERAL FEATURES: Basic system consists of main counter top and two PC system pedestals ... then you add on what you need from there, such as racks and shelf wings or talk table wings for a full system.

USER FEATURES: Two PC system base pedestals ... heavy rack rail systems with easy access standard ... passive ventilation systems throughout ... adjustable shelves ... wiring block backplane ... customizing ... quick installation.

DURABILITY BUILT IN: Top counters are two ply 1 1/2" thick with quality name brand laminate with protective 1 1/2" solid wood trim raised on the outside perimeters. Plus ... generous vertical and horizontal solid wood trim and recessed kickboards.

SPACEWISE® Broadcast/Furniture

CALL 800-775-3660

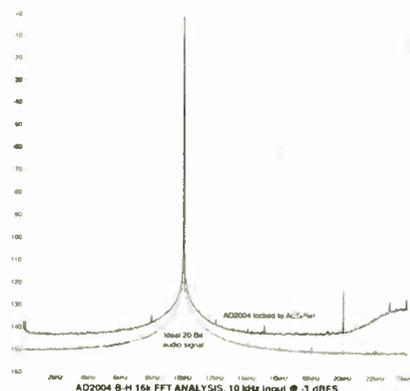
Visit our web catalog: www.spacewise.com

"The Broadcasters Furniture Store"

READER SERVICE NO. 74

The Perfect Digital Console Interface

The AD2004 A-to-D converter is the cleanest, quietest, most neutral sounding converter available! It was designed for the 20-bit multichannel user who insists on the very finest performance. This device introduces ground breaking improvements in A to D conversion. Analog preprocessing significantly reduces distortion products, while a custom phase lock loop IC all but eliminates jitter induced sidebands, under all operating conditions. The graph shows an FFT analysis with virtually no jitter induced sidebands. Best of all, the AD2004 comes in at the most affordable price of \$2200 for four channels. And now the eight channel AD2008, housed in a full width 1 RU chassis, is available for \$3950. Protect your investment: get next generation performance today with the BENCHMARK converter series. Call Rory Rall today!



Now recording at: The San Francisco Symphony, Telarc Records, Enoore Recording, and other notable facilities.

Benchmark
the measure of excellence™

BENCHMARK MEDIA SYSTEMS, INC.
800-262-4675, 315-437-6300, <http://www.benchmarkmedia.com>

READER SERVICE NO. 128

Excalibur Electronics HC-1 Handi-Coupler



Here is the simplest, quickest, most convenient way to connect audio to a telephone. The HC-1 connects in series with the handset of any phone using modular connectors. No connection to the phone line is needed. Press the front panel button and external audio is available on separate send and receive 1/4" TRS jacks on the rear panel. Release the button and the handset is once more connected for normal use of the phone. Nothing could be simpler!

You can find many uses for the HC-1 around your station: on-air studio, production room, newsroom, sales office, field news kits, sports remotes, etc.

EXCALIBUR ELECTRONICS, INC., CHANTILLY, VIRGINIA
Please circle our bingo number for a data sheet and a dealer list

READER SERVICE NO. 47

PC Drive Makes DCR 10 Unique

► ZIPPY, continued from page 55
one feature not available on other types of media devices such as MiniDisc.

It can be seen that, for each shift, an air talent could enter the studio with a ZIP disk or two, prepared with that day's spots, sounders, hot cuts, liners, drops, bits and beds in one hand. Stuff a ZIP into the DCR 10 and it's show-time.

For automated use, such as local break fill while the station is on the bird, the remote start can be connected with the sec tone output triggering a network-rejoin function, just like a cart.

There is no facility for the start of differing types of breaks, such as a spot set or a legal ID. It would be handy to perhaps set up three rotations, selectable from different remote start inputs. This feature is, however, not available.

A desirable option is the custom 50-key "Instant Access" mini-keyboard. With this keyboard, any of 50 cuts can be played quickly one after another. A complete stop break need be nothing more than a few button pushes. Cuts may not be overlapped, but each one begins to play instantly in any order, regardless of the cut number. Without the keyboard,

Product Capsule:
Fidelipac DCR 10
Digital Recorder/Player

Thumbs Up

- ✓ Successfully replaces cart technology
- ✓ Versatile features, tailored to expected usage
- ✓ Solidly made, digital sound quality

Thumbs Down

- ✓ Poor manual
- ✓ No wireless remote

For more information contact Fidelipac in Philadelphia at (215) 464-2000 or circle **Reader Service 138**.

removed since the previous play. Theater mode cues to cut No.1 initially and then cues sequentially thereafter. Obviously, thought has been given to varied use of this equipment.

nience, versatility and audio quality. Alternatives include MiniDisc, DAT and full audio-on-hard-drive automation.

Fulfills goal

The DCR 10 is less expensive than conventional cart machinery, has better sound, is more versatile and much more compact. MiniDisc has the durability, versatility, and compactness desired, but lacks secondary and tertiary tones and does not have instant access to cuts. (Ed. Note: at least one MD model, the Denon DN-1100R, offers "hot keys" to permit this). DAT is fragile and is limited to linear access to cuts. Hard drive automation

is able to satisfy all requirements, but is a much more sweeping solution than mere cart replacement.

The DCR 10 does fulfill its designed goal of sweeping away any need for carts. Hint: Keep a few old carts by your box of tubes for nostalgia purposes only!

The DCR 10 lists for \$2,345, plus \$150 for the 100 MB ZIP drive. ZIP cartridges are approximately \$15.

Jeff Johnson is the network engineer for the X-Star Radio Network, based at WVXU(FM), Cincinnati. Contact him at jeff.johnson@goodnews.net

The author recently completed a series of articles in RW aimed at helping you to keep your DAT machines in good working order. See them at www.rwonline.com

The DCR 10 is less expensive than conventional cart machinery. It has better sound and is more compact.

cuts are selected with the front panel rotary knob.

Pick your mode

A nifty feature is the ability to set each disk to one of three modes: Manual, Cart, or Theater. Manual mode cues to cut No.1 automatically on insertion of the media and may be cued to play any cut manually.

Cart mode cues to the next cut in a rotation even if the disk has been

The manual may unfortunately be best described as a work in progress. It is incomplete and misleading, and lacks a schematic and index.

Overall, the unit is solidly made, its sound is consistent with today's digital technology and it functions quickly and reliably.

Is the DCR 10 the cart replacement technology it is intended to be? The toughness, simplicity and redundancy of the conventional cart must be offset in other technologies by superior conve-

Using the DCR 10 in Network Control

► NET, continued from page 55
with a standard 100 MB ZIP disk drive. This arrangement allows a maximum of about 57 minutes record/play time at 32 kHz stereo. This is not quite enough to hold a one-hour program at 58:30, but certainly adequate for a set of station IDs, promos or — for us — underwriter mentions.

The controls are easy to operate with a professional feel. The DCR 10 requires a standard PC/AT keyboard for entering text for titles and outcues as well as numerous record and editing functions.

For those stations ready to move away from analog cart machines, but

with a reluctance to adopt "a consumer format" such as MiniDisc, this digital cart machine should do the job. It should be noted, however, that the MiniDisc incorporates a similar set of use and editing features while providing 74 minutes of storage time on less costly and more compact media.

Our situation mandates that any cart machine replacement decision we make must keep the cost per unit well under \$1,000 per machine. Current list price for the DCR 10 is \$2,345.

John E. Hingsbergen is director of network relations for the X-Star Radio Network.



Quality Selection Service Price

USED EQUIPMENT

Buying, Selling or Trading

When you call Harris used equipment department, you get the same great service that you've come to expect from the nation's leading supplier of broadcast equipment.

Harris has the largest inventory of used equipment worldwide.

Each piece of used equipment is thoroughly inspected by Harris' knowledgeable, factory-trained service staff (who have a combined experience of over 30 years) to insure that it meets factory specifications.

And, of course, all used equipment from Harris comes

with a warranty to insure your complete satisfaction.



Mike Smith,
Used Equipment Specialist
Over 10 years of audio experience.

And with Harris' low prices, you can be sure to get the most value for your money.

Whether you're buying, trading, or selling, call Harris for quality, selection, service and price.

HARRIS CORPORATION
BROADCAST DIVISION
TEL: 800-300-0733
FAX: 765-962-8961

See a complete listing of our used equipment at <http://www.broadcast.harris.com/usedeq/index.html>

 **HARRIS**

A new world of broadcast solutions.

© 1998 Harris Corporation

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

ACOUSTIC FOAM

Broadband Absorbers • Modular Systems
Sound Barrier • Diffusers • Bass Traps & More!

- ★ Consistent Pattern...No Innies & Outies!
- ★ Long-Lasting...Won't Crumble Like Other Brands!
- ★ 1", 2", 3", 4" & 12" Thicknesses In Stock!
- ★ 12 Vivid Colors In Many Cool & Effective Styles!
- ★ Highly Flame Retardant: Passes California Fire Code!
- ★ Absorbs 60% Better Than More Expensive Brands!
- ★ Best Value By Far! We Double Dare You To Compare!
- ★ Available Through All Major Broadcast Suppliers!

Vibrant New Colors: Teal & Burgundy!

Auralex
ACOUSTICS

Circle (234) On Reader Service Card

Stanton 310 & 310B (2), stereo in gd cond, \$75 ea +shpg. G Gibbs, 712-258-5595.

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

Circle (233) On Reader Service Card

ITC SP-3 R/P, mono, OK cond, \$300 +shpg. G Gibbs, 712-258-5595.

ITC Delta stereo P/B (3), new heads, great cond, \$875 ea. C Guglielmetti, 650-589-3313.

PR&E Tomcats, 3 players in rack mount w/spare set cards & 1 rcd w/o rack cage, all checked out & calibrated, \$1500 +shpg. M Shea, 212-989-2684.

Tapecaster 700RP, like new, BO. Christine Warden, 801-798-3559.

Audicord mono play decks (3), gd cond, \$100 ea. P Wolf, 941-458-3777.

Want to Buy

BE DC-10/30 disc trak. G McClintock, 615-255-1300/1377.

CD PLAYERS

Want to Sell

Audiometrics CD-10E, 4 yrs old, gd cond, \$750/BO. J Davis, 904-672-9210.

CONSOLES

Want to Sell

Altec Lansing 1592B mixer, rack mtg, 4" VU, mono w/5 low imp mike inputs, 600 ohm balance out, vgc, \$250. E Davison, 217-793-0400.

Lightning Got You DOWN??
Get a NEW Budget Conscious 6-18 Channel **DYNAMAX** On Air Console
Next Day Delivery

Mackie 1604 (2) excellent cond w/manuals, \$500 ea. L Josephson, 212-595-1837 or larry@radioart.org.

Peavey XR-800 8 chnl powered mixer w/EQs & 200 W/chnl, stereo, in rugged carrying case, \$375 +shpg; McMartin B501 & B-502, stereo (2), one mono, one stereo, both have 5 chnl w/dual inputs/chnl, line/monitor & cue amps, gd to fair cond, both operational, \$250 & \$350 +shpg; BE 4M50-4 4 chnl 8 input mono, self contained w/program, monitor & cue amps, easy, quick connect 1/4" & RCA jacks, gd cosmetic & operational cond, \$300 +shpg. G Gibbs, 712-258-5595.

BUSINESS OPPORTUNITIES

PRODUCE Host your own 212-760-1050 radio show
Generate hundreds of qualified leads
50,000 W NYC radio station

CART MACHINES

Want to Sell

Yamaha RM-804 compact 8 chnl mixing board, 4 chnl output, gd cond, \$500; Yamaha MR-1642 16 input, 8 output mixing board, gd cond, needs some clean up, \$950. J Taddeo, 217-367-1195.

Arrakis 6 chnl stereo, \$795; Arrakis 12 chnl slider stereo, \$2300; Micro-Trak 5 chnl stereo compact, \$595; Harris Stereo 80, \$1095; Harris Stereo 80 w/o Q amp, \$995; Harris Stereo 80 w/o modules, BO; Collins 212 M-1 8 chnl mono, \$895; Ampro 8 chnl dual mono, BO; Gates Yard 80 mono, bad meter, \$595; BE 8 chnl dual 8BEM150, \$995; Gates Producer, \$595; Gates Stereo Statesman 5 chnl stereo, \$895; LPB Alpha 8 dual stereo, needs work, \$695; McMartin 5 chnl mono, \$595; Gates Executive 5 chnl stereo extender, BO; Ramko DC 38-10M dual mono LED VU, BO; BE 5 chnl mono BE 5 100 M, \$695; BE 8 chnl BE 8100M dual mono, BO; Gates The Yard tube type, BO; package prices available. J Phillips, 419-782-8591.

ITC SP-3 R/P, mono, OK cond, \$300 +shpg. G Gibbs, 712-258-5595.

PR&E Tomcats, 3 players in rack mount w/spare set cards & 1 rcd w/o rack cage, all checked out & calibrated, \$1500 +shpg. M Shea, 212-989-2684.

Tapecaster 700RP, like new, BO. Christine Warden, 801-798-3559.

Audicord mono play decks (3), gd cond, \$100 ea. P Wolf, 941-458-3777.

Want to Buy

BE DC-10/30 disc trak. G McClintock, 615-255-1300/1377.

Audiotronics 218, 2 mic, 11 line mods, beige, timer & clock, \$3000. Evan, 972-495-8122.

Gates Dualux 80 8 chnl mono, gd cond, \$1000. D Atwood, 315-376-7500.

Gates Yard (tube) & Collins 212F2 (tube), Gateway Solid State. B Zellmer, 970-353-6522.

Altec Lansing 1592B mixer, rack mtg, 4" VU, mono w/5 low imp mike inputs, 600 ohm balance out, vgc, \$250. E Davison, 217-793-0400.

CONSOLES

Want to Sell

Mackie 1604 (2) excellent cond w/manuals, \$500 ea. L Josephson, 212-595-1837 or larry@radioart.org.

Peavey XR-800 8 chnl powered mixer w/EQs & 200 W/chnl, stereo, in rugged carrying case, \$375 +shpg; McMartin B501 & B-502, stereo (2), one mono, one stereo, both have 5 chnl w/dual inputs/chnl, line/monitor & cue amps, gd to fair cond, both operational, \$250 & \$350 +shpg; BE 4M50-4 4 chnl 8 input mono, self contained w/program, monitor & cue amps, easy, quick connect 1/4" & RCA jacks, gd cosmetic & operational cond, \$300 +shpg. G Gibbs, 712-258-5595.

Harrison Air-790 13 chnl stereo bdct console w/clock & timer, 4 inputs/chnl, slide pots, excel cond, \$1600. F Willis, 850-653-3548.

Inovonics 716 David II integrated FM audio processor stereo gen, excel cond, \$1100. M Gollub, 410-535-2201.

EXPERIENCED EQUIPMENT

Save \$\$\$ on Excellent Quality Used Consoles, STL, Test Gear...

BROADCAST RICHMOND
Tel 765-966-6468 Fax 765-966-5505
e-mail broadcast@infocom.com
www.broadcast-richmond.com

Harrison Air-790 13 chnl stereo bdct console w/clock & timer, 4 inputs/chnl, slide pots, excel cond, \$1600. F Willis, 850-653-3548.

Inovonics 716 David II integrated FM audio processor stereo gen, excel cond, \$1100. M Gollub, 410-535-2201.

Want to Sell

CRL 3 unit AM system w/APP400, SEP400A, PMC300A, avail 1/99, BO. R Miller, 808-572-5534.

Ramko DC stereo 8/38 (2), \$375 ea. J Lotspeich, 915-533-2400.

MCI/Sony 618, 24x24, \$6.5K; Quantum 24x24, \$4.5K; Soundcraft 600, 32x16, \$5.5K, like new; Model 30, \$295; 512, \$950; 520, \$1450. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

FINANCIAL/LEASING SERVICES

FINANCING

LOANS BY PHONE (800) 699-FLEX

- We finance all types of Broadcasting Equipment
- Flexible Credit Criteria
- Flexible Payment Plans
- No Down Payment, No Payments For 90-Days Available

To apply or request additional information call Jeff Wetter.

FLEXLEASE, Inc.

LIMITERS

Want to Sell

CRL 3 unit AM system w/APP400, SEP400A, PMC300A, avail 1/99, BO. R Miller, 808-572-5534.

AcousticsFirst™
Toll Free 888-765-2900

Full product line for sound control & noise elimination.
www.acousticsfirst.com

standing, \$3500 or you remove, \$2500. G Gibbs, 712-258-5595.

3" HELIAX STANDARD COAXIAL CABLE

50-Ohm, unused, cut to length. Priced below market. Shipped instantly.
Call Basic Wire & Cable (NANCY) 800-227-4292
FAX: 773-539-3500

Yamaha Rev 5, needs some work, \$95. G Wachter, 602-817-1030.

ESE digital countdown timer, gd cond, \$75; Matchbox 2 chnl stereo line mixer, gd cond, \$75; Excalibur dual stereo line amp, gd cond, \$75. P Wolf, 941-458-3777.

Want to Buy

Old tube type broadcast audio equipment. E Davison, 217-793-0400.

AUTOMATION EQUIPMENT

Want to Sell

Management Digital DJ w/8 chnl switcher & spare audio card w/manuals, \$1500. J Moore, 505-685-2098.

ABC Netcuell, gd cond, \$100. P Wolf, 941-458-3777.

TM Century, Sony jukeboxes/UDS interface, TMC 486 DLC33; (5) Sony 006 jukeboxes, \$3000 +shpg. J Lotspeich, 915-533-2400.

BUSINESS OPPORTUNITIES

PRODUCE Host your own 212-760-1050 radio show
Generate hundreds of qualified leads
50,000 W NYC radio station

CART MACHINES

Want to Sell

ITC 3-D triple deck stereo in gd working cond, \$325 +shpg;

AMPLIFIERS

Want to Sell

JBL UREI 6630 amp, \$320. L Glenis, 520-722-9544.

ANTENNAS/TOWERS/CABLES

Want to Sell

Bridge strand, 6 new spools, 1.5", on original spools, in various lengths; 1" bridge strand properly rolled on spools in various lengths. R Butler, 512-837-6550.

Rohn 55g 350' tower, complete package on ground w/Raze light kit & grounding pkg, u-pick up. \$12,900/BO. Robert 940-665-5744.

Rohn SSV Series self supporting 100' tower N-1 through N-5, 11 mos old, \$9000; 4' paraflector Scala STL antenna, 135' 7/8" foam coax, pig-tails, connectors, 11 mos old, \$1200. B Sharp, 316-856-3794.

Utility 380 guyed tower, 150', can be grown to 300', 24" face, solid rod legs, galvanized, no paint/rust, gd cond,

GUY WIRE ID BALLS

Avoid Collision with Guy Wires

Quant 12' Orange Fiberglass with Reflector

610-458-8418
Call for our products price list
Towers Registration Signs

© E.R. Antenna Products
Thomas Meyer 22 Bryan Ward Chambers PA 18343

Jampro CP single bay w/cover, tuned to 99.3, \$2000; Jampro CP single bay tuned to 101.3, \$2000. D Atwood, 315-376-7500.

AUDIO PRODUCTION

Want to Sell

ATI M-1000-2 precision dual mike-pre, as new, \$200. M Shea, 212-989-2684.

Orban stereo reverb unit, excel cond, \$100. J Taddeo, 217-367-1195.

H E HALL Electronics
706 Rose Hill Dr. Charlottesville Va. 22901
804-984-4255 (Voice) 804-984-3299 (Fax)

This Month's Special !!

BSI Broadcast Software International
Broadcast Automation Software
JUST \$999 List
Turnkey Systems Starting at \$2995

Call or visit our web site for your discount price
sales@halls.com www.halls.com tech@halls.com

LIMITERS continued...

Modulation Sciences CP-803 composite processor, gd cond, \$200. J Taddeo, 217-367-1195.

Orban 8100A/1, excel cond, \$3900. C Harris, 719-593-9355.

CBS 410 Volumax. B Zellmer, 970-353-6522.

Optimod 8100A, gd cond, \$3100; 8100A S/T chassis, gd cond, \$495. T Burns, 815-625-2100.

Symetrix 528E mic processors, new cond, \$225; CRL SEP800, SMP-800, SG-800 FM processors, excel cond, \$350 ea or \$850/complete; Orban Optimod 8100A/ST studio chassis, gd cond, \$300. P Wolf, 941-458-3777.

Want to Buy

Orban 8100-A. J Bahr, 340-719-9336.

Teletronix LA-2A's, UREI LA-3A's & LA-4's, Fairchild 660's & 670's, any Pultec EQ's & any other old tube compressor/limiters, call after 3PM CST, 972-271-7625.

MICROPHONES

Want to Sell

EV ND 457, like new, hi-output, \$80. E Davison, 217-793-0400.

Fostex M20RP printed ribbon stereo mic, excel cond, \$650. M Schackow, 605-374-3424.

Peavey PVM 580TN (pr), \$210/pr; Peavey PVM 520TN, \$329. L Glenis, 520-722-9544.

Neumann U47, \$3900; U67, \$3300; U87, \$1800; KM83 or 84 pairs, \$1400; KM88s, \$950 ea; RCA 77DX, \$1200; BK5, \$700; BK1A, \$300. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

Want to Buy

Mic flag for RCA 44BX, need old original iron 3-D heavy curve on top block letter mic flag to reverse engineer for new mic flag. W Cox, 912-638-1100.

RCA 77-DX's & 44-BX's, any other RCA ribbon mics, on-air lights, call after 3PM CST, 972-271-7625.

RCA 77-DX's, 44-BX's, WE KU-3A's On-Air lights, recording lights. Top price paid. Fast response. Bill Bryant Mgmt, 2601 Hillsboro Rd, G12, Nashville TN 37212. 615-269-6131, FAX: 615-292-3434.

MISCELLANEOUS

Want to Sell

Audio/Video TV modulator, VHF channels, \$75. G Wachter, 602-817-1030.

Niche ACM, \$189; JK Audio That-1, \$109. L Glenis, 520-722-9544.

UTC A-21 transformer, highly shielded, new, 6 @ \$20 ea. E Davison, 217-793-0400.

Vodavi Starplus, 1428 digital telephone system, configured to 8 line ports & 16 station ports, maximum expansion 14x28, has 2 digital LCD speaker telephones & 9 digital enhanced speaker telephones, has warranty on parts & labor until 5/99, \$4500. B Sharp, 316-856-3794.

Schafer 800-T controller \$400; QEI 675 manual, \$35. J Bahr, 340-719-9336.

Spare caps & large resistor selection. B Zellmer, 970-353-6522.

ADC TT (Bantam) Patchbays, \$149; TT or 1/4" cords, \$10; new short MRL test tapes, \$229 for 2", 1/4", \$79; Gates dual stereo tube limiter, \$1200; Gates top level, \$595; Allen & Heath GL2 rack mixer, mint, 14x4, \$795; CBS Labs Audimax, \$400 ea; tube pre-amps, \$300-400; MX10 mixers, \$795. W Gunn, POB 2902, Palm Springs CA 92263. 760-320-0728.

Want to Buy

Jazz record collections, 10" LP/12" LP be-bop, swing, dixie, highest prices paid. B Rose, Program Recdgs, 228 East 10th, NNY 10003. 212-674-3060.

RADIO/STUDIO LIQUIDATION! *United States Audio Pay's \$Cash* for Neve's, Pultec's, Fairchild's, Teletronix, UREI, AKG, Neumann, Altec, API, Langevin 5116/5301, consoles & more! Ph 818-887-6600 Fax 818-887-4700.

MONITORS

Want to Sell

JBL 4410 pr studio monitors, \$250/pr. L Glenis, 520-722-9544.

TFT 763 FM mod mon w/optional 764A pre-selector, rcvr needs work, \$750. G Wachter, 602-817-1030.

Moseley AMR1 AM mod monitor. B Zellmer, 970-353-6522.

Used Mod Monitors, McMartin & Belar. Many to choose from, tuned & calibrated on your frequency, full guaranteed. Goodrich Ent. 402-493-1886.

Want to Buy

TFT on sender EAS monitor. J Bahr, 340-719-9336.

RECEIVERS & TRANSCEIVERS

Want to Sell

Comrex 2-line freq extender, xmtr & rcvr, \$1995 for both ends. Steve Kirsch, 90 S Long Beach Rd, Rockville Centre NY 11570. 516-763-1776.

Johnson ST-4A 121 SCA tuners. Must sell immediately. Best Offer for lot. Also a Modulation Science 4 sub-carrier Modulation Sidekick with test monitor. Leave message at 405-722-7272 or write: Dale Leinen at POB 721112, Oklahoma City OK 73172.

SCA DECODER BOARD, 67 KHZ & 92 KHZ. TEL: 818-782-5272, EMAIL: PAR-SI@MSN.COM.

SCA RECEIVERS—ALL TYPES

Will work to meet your receiver needs
Professional / Table / Portable
Field Strength Meters
Reading Service / Ethnic / Data

DAYTON INDUSTRIAL CORP.
2237 Industrial Boulevard
Sarasota, FL 34234-3119
Tel: 941-351-4454 FAX: 351-6081
E-Mail: SCARadio@aol.com

CONSULTANTS

RECEIVERS & TRANSCEIVERS continued

C. CRANE
COMPANYFREE CATALOG
Radio LandWe offer exceptional
radios and receiving
antennas, as well as,
an extensive variety of
radio accessories

WEBSITE: CCRANE.COM

1-800-522-8863

RECORDERS

Want to Sell

Otari 8 track MX-5050 MK-III
and dbx Pro I noise reduction
for 8 channels. Excellent condi-
tion, \$1600/BO. 615-360-
8826.DAT Machine
ServiceFast, expert repairs on all DAT
recorder brands & models
including ADAT and DA-88
Warranty Service on Most Brands

Over 3000 Machines Serviced!

New/Refurbished DATs Available
Compare Our Rates!Pro Digital Inc.
DAT Recorder Service Specialists
(610) 353-2400MCI 110 rec & repro heads in
sets 1/4" 2 trk, \$200/pr; 1/4" 4
trk, \$200/pr; 1" 8 trk, \$500/pr, all
new. M Shea, 212-989-2684.Otari 5050 1/2" 8 trk w/roll
around, logic system needs
repair, \$2500. C Harris, 719-
593-9355.Otari MX5050 MK-III 8 trk,
table top mdl in gd cond,
\$1500 +shpg. G Gibbs, 712-
258-5595.STUDER REVOX
PARTS/SERVICECassette-CD-Open reel
Capstan resurfacing, ALL BRANDS.

JM TECHNICAL ARTS

1515 Elm Hill Pike #203
Nashville, TN 37210 (615) 365-9030Otari MX5050BII r-r, great
cond, \$695. G Wachter, 602-
817-1030.Inovonics 370 electronics;
Ampex ATR-700; Revox A77;
(3) MCI JH-110 R-Rs; (2) MCI
remote controls. B Zellmer,
970-353-6522.LONG-LIFE
HEADScall
SEQUIA
ELECTRONICS
1-(408) 383-1646
FAX 1-(408) 3834-0957Ampex 4 trk tube deck,
\$2500; stereo 351 (recond),
\$1800; Akai Adam, new, digi-
tal 12 trk, \$3500; MM1000-16
w/new heads, \$4500; Otari
MTR10-4, \$3500; Ampex
ATR102s, search to cue,
\$495; Ampex locator for ATR
or 1200, \$895; MCI 110C-8,
\$3.5K; Tascam 85-16 recond
w/dbx, rc & loc, \$3K. W Gunn,
POB 2902, Palm Springs CA
92263. 760-320-0728.

RENT IT HERE!

COMREX
New HotLine
ISDN Coders
Frequency Extenders

TELOS
Zephyr
Digital Phone Hybrids

CCS MUSICAM
Prima Coders

SHURE
FP-410 Automatic Mixers

SCOOP REPORTER
7kHz single POTS line codec

SILVER LAKE AUDIO • 516-763-1776 • FAX: 516-763-1750

CLEAN PATCH BAYS
NO DOWN TIMEVERTIGO BURNISHERS AND INJECTORS
RESTORE ORIGINAL PERFORMANCE
TO YOUR PATCH BAYS

\$34.95 Ea.

VERTIGO RECORDING SERVICES

12115 Magnolia Blvd. #116 818-907-5161
North Hollywood, CA 91607 Fax 818-784-3763Otari MX5050BQII 4 trk,
excel cond, \$900. G Faltus,
860-677-6700.Recordex 330II 1:3 cassette
tape duplicator, mono, music
quality, recently refurbished
w/new heads, \$800. C
Guglielmetti, 650-589-3313.

Want to Buy

Ampex ATR100 tapere-
corders for parts. Circuit
cards, heads, motors,
machine parts, or electronic
parts. Call 818-907-5161.Ampex PR10 tape recorders.
W Gunn, POB 2902, Palm
Springs CA 92263. 760-320-
0728.REMOTE &
MICROWAVE

Want to Sell

Symetrix 8 line on air tele-
phone system, \$475. G
Wachter, 602-817-1030.

WE RENT FOR LESS

Hotlines FM Exciters
Zephyrs STL's
Nexes FM Pwr Amps
Audio Test EquipmentIf we don't have it, we will get it!
SCMS, INC. (800) 438-6040
"You Know We Know Radio"Ericsson AF 738 tiny analog cell
phone w/extra battery & charger,
\$150; (2) Motorola 3 W bag
phones w/extra lead-acid battery
& chargers, \$100 ea; Motorola
RJ11 adapter for bag phones,
\$150. L Josephson, 212-595-
1837 or larry@radioart.org.Gentner Microtel telephone
line mic coupler, gd cond,
\$85. P Wolf, 941-458-3777.

WE RENT

TELOS ZEPHYR
CCS "Prima" Coders
Frank Grundstein
Audio/Video
Consultants
COMREX
3-line extender
610-642-0978Sine Systems TTA-1 Time
Temp Announcer RFC1-B
remote control, new. R Lynn
1-800-951-0815.

Advertise!

Call your advertising representative
703-998-7600
for details & deadlines

Remotes from EUROPE?

WIRED FOR SOUND (London) offers...

EQUIPMENT • ENGINEERS • EXPERIENCE

...and Europe's largest rental stock

Tel 01144-181-442-8900 Fax-8901 www.wiredforsound.co.uk

Want to Buy

Gentner IC-20 intercom sta-
tions, working or in pieces. G
Wachter, 602-817-1030.

Want to Sell

Attention Hispanic &
Portuguese Broadcasters! A
new Southern New England
radio station has broker time
available for as little as \$75
per hour. Call 401-348-9222
for more details.

REPAIR SERVICES

PIKE'S PEAK
SATCOMDart 384
SA7300 (Dat32)
SCPC Receivers
Repair Specialist
Low Rates
Fast Reliable Service
Buy, Sell, Trade
Pike's Peak Satcom
Tel 719-573-0094
Fax 719-573-0095

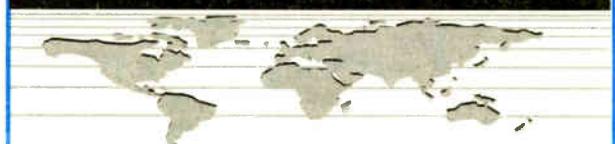
Circle (231) On Reader Service Card

SATELLITE
EQUIPMENT

Want to Sell

Drake ESR1240 1 space rack
mount audio/video C-band rcvr,
\$195. G Wachter, 602-817-1030.BE FS-30, great cond, \$600.
Evan, 972-495-8122.

SATELLITE SYSTEMS



Satellite Equipment for Radio

Off the air?
Looking for reliable
repair service?

Rely on us!

Satellite Systems is respected industry-wide for prompt,
accurate service to radio stations and networks.Whether you have a Dart 384 or Scientific Atlanta 7300/7325
we can repair your equipment.Pre- and post-service technical support, along with a
6-month warranty.Turn to the leader in repair, new equipment, used equipment
and accessories. We can answer all your questions.Celebrating 7 years
of providing reliable repair service

SATELLITE SYSTEMS

615 East Brookside Street, Colorado Springs, CO 80906
Phone: (719) 634-6319 Fax: (719) 635-8151

Circle (230) On Reader Service Card

STATIONS

Start your own commercial
radio station with only
\$5000 or less!Yes it's possible & legal. Part 15 of
FCC rules allows low power AM
radio stations to operate without a
license!! Cover an entire town &
bill \$1500 a month!! It has been
done!! Order the newsletter book-
let that tells you all you need to
know to get started for just
\$29.99. Send check or money
order payable to: WCTD Radio, 4
Canal St, Westerly RI 02891 or
call 401-348-9222 for more info.
FCC Inspected.TAPES/CARTS/
REELS/CD'S

Want to Sell

500 MOR/EZ music carts;
Century 21 CW 10" tapes
(dozens w/lists). B Zellmer,
970-353-6522.Oldies Library, 1000 carts,
like new, 50's, 60's, 70's,
mono, \$1000 +shpg. Bob
Stoehr, 352-867-1607.BROADCAST CARTRIDGE
REBUILDING

10-100 seconds

Scotch/ITC	\$2.75
AA-4	\$2.10
AA-3	\$2.10
A2	\$1.85

CARTRIDGE EXPRESS

11510 N.E. 128TH STREET, #4
KIRKLAND, WA 98034
(425) 814-2672Scotchcart II, 300 3.5 min, in
almost new cond, \$1 ea
+shpg. B Lord, 206-932-4829.

TAX DEDUCTIBLE

1000W AM on 1480 needs
new transmitter, non-profit
community programs, donate
or send info on gd deals.
Christine Warden, 802-798-
3559.Non-profit community station
needs working 7.5" r-r's, tax
ded receipt given. Christine
Warden, 802-798-3559.Christian non-profit, non-
comm new station seeks
donations, equip, used or
obsolete, xmtrs, antennas,
exciters, computers, software,
etc. P Sandau, 250-627-5447.TELEPHONE
EQUIPMENTWE BUY AND SELL BUSI-
NESS TELEPHONE EQUIP-
MENT. DOMINION TELE-
COM. 800-998-3281.

TEST EQUIPMENT

Want to Sell

Fluke 87 true RMS 4.5 digit
multimeter, as new, \$250. M
Shea, 212-989-2684.Tek 465 scope, excel cond,
100 MHz DT, \$350; HP 4815A
vector Z meter for AM & FM
ant measurements, \$750; HP
5245L freq counter w/500
MHz plug-in, \$125; HP 3435A
digital VM, \$75; HP 331A dist,
\$100; HP 651B test osc,
\$125; HP 1200A scope 100
microvolt/cm DT, \$100. E
Luttrell, 606-787-9622.Tek 7903 rackmount 3 space
frame w/500 Mhz scope, vert
& hor modules, \$375; Tek
7633 rackmount 3 space
frame w/scope, no modules,
new, \$275; Tek 7834 bench-
top 4 space frame w/storage
scope no modules, \$275. G
Wachter, 602-817-1030.BW 410 dist meter, like new;
Nems Clarke 120E AM FSM.
B Zellmer, 970-353-6522.General Radio LCR bridge
1650A, gd cond, \$225; H-P
410A VOM, fair cond, \$45,
shipped prepaid. B Lindahl,
503-644-9643, email:
Bob@wegbypsy.net.Johnson Electronics STS 11
field strength meter with
charger and field case. Must
sell immediately, best offer.
Leave message at 405-722-
7272 or write: Dale Leinen,
POB 721112, Oklahoma City
OK 73172.DISTRIBUTOR
DIRECTORYThe following distributors serving the broadcast
industry would be glad to help you with any of
your requirements.CORNELL-DUBILIER
MICA CAPACITORS

FROM STOCK

JENNINGS VACUUM
CAPACITORS

FROM STOCK

JENNINGS VACUUM
RELAYS

SURCOM ASSOCIATES

2215 Faraday Ave., Suite A
Carlsbad, California 92008
(760) 438-4420 Fax: (760) 438-4759...Some people get hooked on
broadcast equipment big
time...they think about it...dream
about it...talk about it all the
time...for example...us...

RADIO! The beat goes on!

CROUSE-KIMZEY
OF ANNAPOLIS

tops in broadcast equipment

1-800-955-6800

ask for Kathleen

kkannapolis@worldnet.att.net

TUBES

Want to Sell

FOR THE BEST PRICE
& 24 Hr service on transmitting tubes & sockets/parts, new & rebuilt call Goodrich Ent. at 402-493-1886 day or night, FAX 402-493-6821.

Many tubes, new old stock in boxes & loose, regular & odd numbers, many Federal, FAA etc, mail needs list. W Cox, WCGA, Rte 9 Box 280E, St Simons Island GA 31522. 912-638-1100.

Stanton 310 TT R/P preamp w/input load matching, mint cond, \$100. M Shea, 212-989-2684.

Technics SL-1200MK-2, OK cond, \$100 ea or \$150/both. P Wolf, 941-458-3777.

Quality Power Tubes



300B (See SV300B)
3CX300A1
3CX400A7
3CX2500A3
3CX2500F3
3CX2500H3
3CX3000A7
3CX3000F7
3CX4500F3
3CX6000A7/YU148
3CX10,000A3
3CX10,000A7

3CX10,000H3
3CX15,000A3
3CX15,000A7
3CX15,000H3
3CX20,000A7
3CX20,000A1
3CX20,000H3
3CX20,000H7
3CX30,000H3
4CX250B
4CX250BC
4CX250BT
4CX250R
4CX350A
4CX350AC
4CX400A
4CX800A

4CPX800A
4CX1500A
4CX1600B
4CX3500A
4CX5000A
4CX5000R
4CX7500A
4CX10,000D
4CX12,000A
4CX15,000A
4CX15,000J
4CX20,000A
4CX20,000B
4CX20,000C
4CW10,000A
4CPW10,000R
4X150A
5CX1500A

5CX1500B
572B
6550C (See SV6550C)
6AS7G
6BM8
6D22S
6L6GC (See SV6L6GC)
6N1P
811A
812A
833A
8161R
8560AS
EF86
EL34
EL509
SV83
SV300B

SV572-3
SV572-10
SV572-30
SV572-160
SV6550C
SV6L6GC
SV811-3
SV811-3A
SV811-10
SV811-10A
TH5-4
TH5-6
TH6-3
TH6-3A
YC130/9019
SK300A
SK1300
SK1320

Watch this list GROW!

• Manufactured in Russia's largest power tube factory • Generous warranty based on high quality • Honest prices based on quality at low cost • Check our Stocking Distributors for best price and delivery

www.svetlana.com

Headquarters: 256-882-1344 Fax: 256-880-8077 • Engineering: 650-233-0429 Fax: 650-233-0439

Circle (229) On Reader Service Card

RF POWER

The Best of Two Worlds!



Svetlana

Se Hable Español
(760) 744-0500 • (888) 744-3500
Fax: (760) 744-1943
e-mail: rfp@rfparts.com



Circle (228) On Reader Service Card

AMPEREX, EIMAC, RCA, SVETLANA 4CX250B, 4CX250R/7580W, 4-400C, 3-500ZG, 3CX3000A7, 807, 811, 833C. Westgate 800-213-4563.

ECONCO

Quality Rebuilt Tubes

Approximately 1/2 the Cost of New

Call for Our Price List

800-532-6626

916-662-7553

FAX 916-666-7760

Circle (227) On Reader Service Card

TURNTABLES

Want to Sell

Rek-O-Kut tonearm, gd cond, less cartridge, \$60. R DeMoors, 222 Lakeview Ave #160-256, W Palm Beach FL 33401.



Where In The World Are You?

Reach radio professionals worldwide by advertising in **Radio World's** international edition.

Call for more information.

703-998-7600

SERVICES

Tower Sales & Erection

Turnkey Site Development
Installation & Maintenance
AM/FM Broadcast, TV
Microwave Systems,
Antennas & Towers



Steve Wall President
Gen. Contractor #25891 Fax (919)781 6454

UTAH TOWER CO.

COMMUNICATIONS CONSTRUCTION AND MAINTENANCE AM/FM CELLULAR, PCS, TV DIGITAL MICROWAVE ANTENNAS & TOWERS

SERVING THE WESTERN U.S.
FAX/PHONE (801) 667-3490
CELLULAR (801) 368-4809

CD CART PLAYER REPAIR



Audiometric Denon Sony MD and Pioneer CD-ROM

Same Day Service - Reasonable Rates

We honor Pioneer & Sony warranties

AUDIO VIDEO SERVICE LABS, INC.

829 Lynnhaven Pkwy, Virginia Beach, VA 23452

800-765-4434

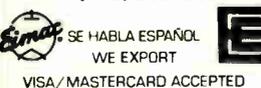
Quality Service Since 1991 - "The Best Kept Secret in Broadcasting"

D And C Electronics Co.

NEW TUBES

We have the alternatives for all your needs, at the lowest prices, direct from OUR STOCK!!!

EIMAC, SVETLANA, PRO-TEK®, EEV and many others.
(352) 688-2374
PH: (800) 881-2374
FAX: (352) 683-9595



VISA / MASTERCARD ACCEPTED

TRANSMITTERS

TRANSMITTERS

Want to Sell

BROADCAST EQUIPMENT

USED: FM/AM Transmitters, RPU's, STL's, FM Antennas, Consoles, Processing, etc. CONTINENTAL COMMUNICATIONS. 3300 Chippewa, St. Louis MO 63118. 1-800-664-4497 FAX: 314-664-9427.

CSI FM 3000E single phase xmtr upgraded to 5 kW in 1993, BE FX-50 exciter, \$10,000/both. B Sharp, 316-856-3794.

Energy Onix SST-30 FM exciter, freq agile, 30 W, \$2650. C Harris, 719-593-9355.

REBUILT TRANSMITTERS

Call ARMSTRONG TRANSMITTERS
Ph: 315-673-1269
Fax: 315-673-9972

Gates BC-10P 10 kW, rebuilt w/brand new Eimac tubes, new meters & many new parts, \$5000 cash w/\$4000 worth of C3X2500 F3 tubes, you haul. W Cox, 912-638-1100.

Marti RPT-15 dual freq xmtr, antenna, cable, excel cond, \$600/firm. J Terry, 940-382-5478.

OFF THE AIR?

EMERGENCY Back-up RENTALS

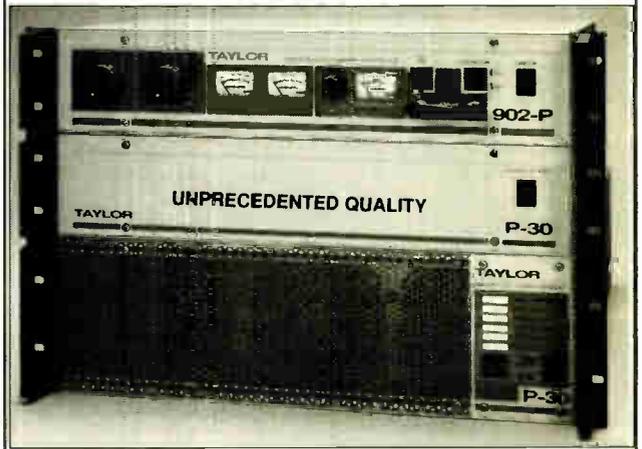
FM Exciters - STLs - FM Pwr Amps - Antennas - Studio & Test Equipment

SCMS Inc (800) 438-6040

"YOU KNOW WE KNOW RADIO"

Nautel Ampfet ND1, 1 kW 3 yrs old, avail 1/99, very clean, BO; Collins 20V-2 in top cond, used as spare, plastic cap, spike kit & solid state HV, avail 1/99, tuned to 1570 kHz plus xtal for 910 kHz, BO. R Miller, 808-572-5534.

INCREDIBLE TRANSMITTERS



TV TRANSMITTERS FM RADIO TRANSMITTERS Including Stereo Encoder

1Watt	\$1,114
2Watt	\$1,664
4 Watt	\$2,138
20 Watt	\$3,880
40 Watt	\$5,046
100 Watt	\$6,206
200 Watt	\$9,874
400 Watt	\$13,171
800Watt	\$18,295
1KWatt	\$22,900
2KWatt	\$38,900

1Watt	\$1,138
30Watt	\$1,499
300Watt	\$3,174
600Watt	\$5,960
1KWatt	\$8,716
2KWatt	\$11,905
4KWatt	\$20,741

TAYLOR The Transmitter People

Taylor Bros. (Oldham) Limited, Lee St. Oldham England. Tel: 0161 652 3221, Fax: 0161 626 1736

Want to Buy

Collins 930D 1 kW xmtr w/Collins exciter w/composite input, working, \$3000/BO. K Kushnir, 707-545-8300.

Collins FM exciter, stereo tuned to 101.3, works gd. D Atwood, 315-376-7500.

Peter Dahl single phase 10 kW plate transformer & chokes to convert 10 kW FM 3 phase xmtr into single phase, \$4800/BO. J Bahr, 340-719-9336.

Used PTEK 500W FM amplifier, \$2950, full manufacturers 2 year warrantee. Other power amps and exciters also available. 408-448-3342.

Solid state FM amp, 250-300 W, any cond. B Rommosky, 618-253-7282.

McMartin AM/FM xmtr, any model, exciter or stereo modules. Goodrich Ent., 11435 Manderson, Omaha NE 68164. 402-493-1886.

Advertise!
Call 703-998-7600 for details

TRANSCOM CORP.

Serving the Broadcast Industry Since 1978

Fine Used AM & FM Transmitters and Also New Equipment

For the best deals on Celwave products, Andrew cable and Shively antennas.

100 W	FM 1985 Harris FM100K	1 KW AM 1979 Harris MW1A
100 W	FM 1985 Harris FM100K	5 KW AM 1978 Collins 828E-1
10KW	FM 1970 Harris FM10H3	50 KW AM 1978 Continental 317C-1
20KW	FM 1977 RCA BTF 20E-1	50 KW AM 1982 Harris MW-50B
25KW	FM 1981 Harris FM 25K	50 KW AM 1981 Harris MW-50B
25KW	FM 1981 Harris FM 25K	
25KW	FM 1984 Harris FM 25K	

2655 Philmont Ave #200, Huntingdon Valley, PA 19006

800-441-8454 • 215-938-7304 • FAX No. 215-938-7361

VISIT OUR INTERNET SITE: WWW.TRCORP.COM
SEND YOUR E-MAIL REQUESTS TO TRANSCOM@TRCORP.COM

Circle (226) On Reader Service Card

EMPLOYMENT

HELP WANTED

CHIEF ENGINEER - Requires expertise in high power RF, STL's and satellite receivers, maintenance and upgrades of studios, digital automation and legacy analog equipment. Extensive knowledge of computers and LANs. SBE certification a plus. Multi-station group in medium west coast market, great family town, close to everything. Immediate opening. EOE. Send resume to: Radio World, POB 1214, Falls Church VA 22041. Attn: Box # 9-16-98-1RW.

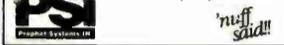
DO YOU HAVE A FACE FOR RADIO?



How about the drive, and technical expertise needed for radio in the next century?

Prophet Systems, the leader in digital audio broadcast systems, may be the place for you. Opportunities for tech support, programmers, engineers and sales. Great salary and benefits.

Check out listings on the web: www.prophetsys.com or call (308)284-3007.



Is Digital Audio your favorite topic? Do you understand live assist, audio compression and PC networking?

CBSI, Custom Business Systems, Inc., the leader in the radio broadcast computer systems industry, has immediate openings for an Operations Manager and for Installation/Training/Customer Service Specialists. Requires intimate knowledge of radio programming operations and engineering functions related to digital audio equipment. Installation/Training/Customer Service Specialists travel extensively and must possess an impeccable work ethic and customer service attitude. Positions are based from Reedsport Oregon on the beautiful Oregon Coast.

Contact HR Manager
PO Box 67 Reedsport OR
97467 or fax 541-271-1401
or E-mail hr@cbsi.org
www.cbsi.org

Seasoned, affordable AT, news anchor, production talent, engineer avail. Alex 513-777-8423.



Where In The World Are You?

Reach radio professionals worldwide by advertising in Radio World's international edition.

Call Simone for more information.
703-998-7600

ADVERTISE!

in **RADIO WORLD'S** **BROADCAST EQUIPMENT EXCHANGE**

CALL **703-998-7600**



ADVERTISER INDEX

This listing is provided for the convenience of our readers. Radio World assumes no liability for inaccuracy.

TECHNICAL OPERATIONS ENGINEER

New York City

The **ABC Radio Network** is seeking an individual to operate backhaul, distribution, automation, and related equipment in our New York Technical Operations Center. You will be responsible for coordinating the set-up and trouble shooting of audio feeds with network, outside client and affiliate station personnel.

Position requires a solid background with ISDN-based broadcast equipment, as well as digital and analog audio production, and storage and distribution systems. Strong interpersonal and customer service skills are essential.

For confidential consideration, please forward resume to:



Employee Relations
ABC, Inc.
Dept. MW
77 West 66th Street
New York, NY 10023

An Equal Opportunity Employer M/F/D/V

GENERAL MANAGER

Are you an entrepreneur-minded, result oriented Sales or Marketing Manager. If so, we would like you to join us and set-up our US subsidiary, recruit support personnel, set up distribution channel and develop our US sales. We are AETA (www.aeta.com), an international leader in Audio compression and data communication technology with a history of industry firsts: first 15kHz ISDN Codecs, first with a 7kHz POTS Codec.

If you have a technical degree and proven sales, marketing and management experience in the field of radio broadcasting equipment, please email your resume in confidence to cosma@neta.com. Excellent compensation package. Location in an East Coast city, to be determined.

To **ADVERTISE:** call **703-998-7600**

POSITIONS WANTED

4-years on-air/Music Dir w/CHR style looking to grow to bigger market & learn it all. Brian, 405-642-3276.

CE/Computer tech w/20+ yrs hands on engineering experience, seeks CE position in a top 100 market, strong audio, computer networking & RF skills. 704-563-8676.

New but exper bdct school grad ready to hit the air waves, on-air, prod, copywriting & board-op exper, will relocate. Chrystal, 405-736-6971.

Hard working, friendly, outgoing CE seeks employment, FT, PT, contract work, Northeast, TV/FM/AM, cable station, exper CET & FCC licensed, avail immed. M Rakoff, 718-969-5224.

Hire young, hot talent very cheap, avail seasoned, believable, affordable jock, news anchor, production talent, engineer. Alex, 513-777-8423.

Charismatic broadcasting grad offering 9 yrs DJ, prod, copywriting & music director skills; possesses keen wit & willing relocate. Trebor, 405-732-7811.

Hard working, friendly, outgoing CE seeks employment, FT, PT, contract work, Northeast, TV/FM/AM, cable station, exper CET & FCC licensed, avail immed. M Rakoff, 718-969-5224.

Page No.	Advertiser	Reader Service No.	Page No.	Advertiser	Reader Service No.
50	Air Corp	101	46	IBN Radio	46
52	Altronic Research	6	8	Inovonics	183
76	AMS Alltronics Inc.	227	14	Inovonics	80
36,37	Arrakis	134	63	Inovonics	59
54	ATI	129	34	Intraplex	159
64	Audi-Cord Corporation	100	22	J Squared Technical Service	99
51	Audio Broadcast Group	213	66	J&I Audio/Video	233
12	Audio Precision	28	54	Kintronic Labs	77
2	Audioarts Engineering	1	43	Klotz Digital	57
66	Auralex	234	28	Knights Communications Inc	82
54	Autogram Corporation	103	32	Logitek	56
20	Belar	210	55	Mackie Design	84
64	Benchmark Media Systems	128	58	Mager Systems	188
6	Bext	131	59	Media Form	11
60	Big Band Swing	214	61	Musicam USA	33
50	Boston Financial & Equity	75	56	Nemal Electronics	110
48	Broadcast Devices, Inc.	26	24	Neutrik Canada	55
13	Broadcast Electronics	54	64	Nott Ltd.	48
23	Broadcast Electronics	29	49	OMB America	161
27	Broadcast Electronics	133	53	Omnitronix	32
54	Broadcast Richmond	-	68	Pikes Peak Satcom	231
19	Broadcast Software Int'l (BSI)	184	18	PR&E	158
50	Broadcast Tools	127	46	Prism Media Products	140
16	BSW	106	30	Prophet Systems, Inc.	211
4	Burk Technology	105	64	PTEK	126
39	Circuit Research Labs (CRL)	186	47	OEI	114
54	Circuit Werkes	23	57	Radio Computing Service (RCS)	62
3	Clark Communications	79	48	Reach Radio Network	51
54	Comet North America	50	69	RF Parts	228
47	Commscope	135	50	S.C.M.S., Inc.	49
7	Comrex	157	68	Satellite Systems	230
48	Comrex	130	26	Scott Studios	107
25	Continental Electronics	81	42	Sennheiser/Neumann USA	113
48	Cortana	52	48	Shively Labs	25
21	Crown Broadcast	3	33	Shure Brothers, Inc.	5
10,11	Cutting Edge	2	50	Silicon Valley Power	22
54	Davicom Technologies	24	44	Sine Systems	83
31	Denon America	30	15	Sony Pro Audio	-
48	Econco	73	64	Spacewise Broadcast Furniture	74
69	Econco	227	45	Superior Broadcast Products	109
29	Enco Systems	185	69	Svetlana Electron Devices	229
64	Excalibur Electronics	47	9	Telos Systems	209
46	Ghostwriters	20,125	40,41	Telos Systems	212
22	Gorman-Redlich Mfg. Co.	78	69	Transcom Corp.	226
66	Hall Electronics	232	35	UPI	108
48	Halland Broadcast Services	104	71	Wheatstone	111
17	Hannay Reels	132	72	Wheatstone	137
1	Harris	53	62	Yamaha Corp.	187
38	Harris	161			
65	Harris	85			
50	Henry Engineering	101			

Production Director	Lisa McIntosh	Marketing Manager	Heather Harris
Production Manager	Jeff Fisher	Production Assistant	Anastacia Stornetta
Publication Manager	Jennifer West	Ad/Classified Manager	Simone Mullins
Showcase Coordinator	Vicky Baron	Circulation Director	Sheryl Unangst
Ad Traffic Manager	Kathy Jackson	Circulation Manager	Robert Green
Desktop Management	James Cornett	Accounts Receivable	Steve Berto

Advertising Sales Representatives

U.S. East: Skip Tash	703-998-7600 ext 160 Fax: 703-998-2966
U.S. West: Dale Tucker	916-721-3410 Fax: 916-729-0810
U.S. Midwest: Sandra Harvey-Coleman	765-966-0669 Fax: 765-966-3289
Southwest Sales: Christopher Rucas	415-922-5595 Fax: 415-922-5597
Other Regions: Stevan B. Dana	703-998-7600 Fax: +1-703-998-2966
Latin America: Alan Carter	+1-703-998-7600 ext 111 Fax: +1-703-998-2966
UK, Ireland: Phil Guy	+44(0)1869-337508 Fax: +44(0)1869-337509
Europe, Africa, Middle East: Raffaella Calabrese	+39-2-7030-0310 Fax: +39-2-7030-0211
Asia/Pacific: Eiji Yoshikawa	+81-3-3327-2688 Fax: +81-3-3327-3010

Free subscriptions are available upon request to professional broadcasting and audiovisual equipment users. For address changes, send current and new address to RW a month in advance at P.O. Box 1214, Falls Church, VA 22041. Unsolicited manuscripts are welcomed for review: send to the attention of the appropriate editor.



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 AMEX.

5827 Columbia Pike, 3rd Floor Falls Church, VA 22041 • PHONE: 703-998-7600 • FAX: 703-998-2966

Select from these categories for best ad positioning:

Acoustics	Consoles	Recorders	Tax Deductible
Amplifiers	Disco/Pro Sound	Remote & Microwave	Test Equipment
Antennas & Towers & Cables	Financial/Leasing Services	Repair Services	Transmitter/Exciters
Audio Production (Other)	Limiters	Satellite Equipment	Training Services
Business Opportunities	Microphones	Software	Tubes
Car Machines	Miscellaneous	Stations	Turntables
CD Players	Monitors	Stereos	Positions Wanted
Computers	Receivers & Transceivers	Tapes, Carts, Reels & CD's	Help Wanted

Classified Advertising Rates Effective January 1, 1998

1-9 col inch (per inch)	1x \$75	3x \$73	6x \$70	13x \$63
10-19 col inch (per inch)	\$70	68	65	58
Distributor Directory	\$115	113	110	99
Professional Card	\$80	78	76	68
Station/Studio Services	\$175			
Classified Line Ad		\$2.00 per word		
Blind Box Ad		\$16 additional		

To compute ad costs: Multiply the number of ad inches (columns x inches) by the desired rate schedule for your per unit cost. Example: a 3" ad at the 1x rate is \$225, at the 3x rate \$219, at the 6x rate \$210, at the 12x rate \$189, etc.

Sometimes
we have to
settle for
what we
need...

Wouldn't
you rather
Get what
you
WANT?

We've taken the very **best** technology, components and field engineering input to make this the **FINEST** console available.

The **A-6000** is engineered specifically for major market stations that demand a lot of function and need to lead with technical excellence. It's based on an open architecture mainframe that lets you change module locations with **no** restrictions, giving layout top priority and allowing easy reconfiguration as format needs change.

The **Wheatstone A-6000** has the appearance, features and power to excite the most demanding program and production staff; its engineering, performance and thoughtful design will help your personnel achieve broadcasting excellence.

 **Wheatstone**

315-452-5000

Circle (111) On Reader Service Card

