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The Crossed-Field Antenna

Could this antenna revolutionize the science of AM?

See Page 26

KSDO.com

In San Diego, this Jacor station is going after Internet business with a vengeance.

See Page 103

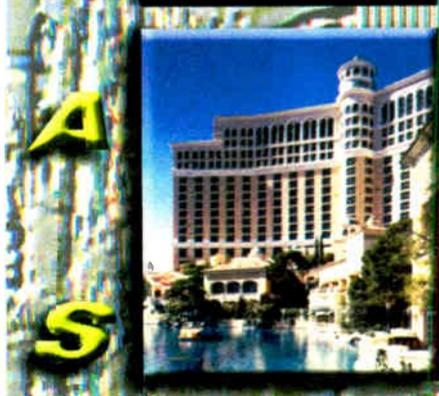
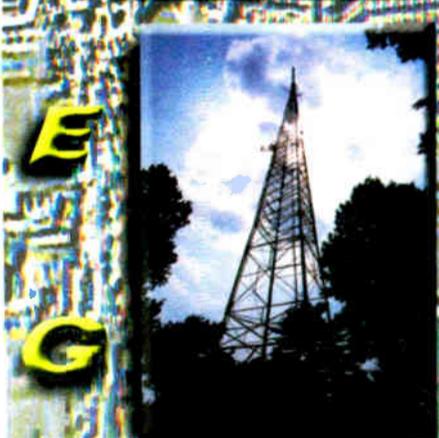
Radio World

The Newspaper for Radio Managers and Engineers



March 31, 1999

NAB99



DAB, Poised for 2000

by Leslie Stimson

As the industry pauses for NAB99, its largest annual convention, where does digital radio stand?

Efforts to develop an in-band, on-channel digital audio broadcasting system for the United States in the past year have produced a sense of momentum. The pace of that development may quicken further in coming months as the three IBOC DAB proponents begin to field test their systems and gather data to submit for formal evaluation by the end of 1999.

Patent dispute

At the same time, the two companies licensed for satellite-delivered digital radio now are involved in a patent lawsuit. At least one of them has announced satellite launch delays, and both SDARS licensees face a potential new competitor.

The problems of the SDARS companies may indirectly help IBOC proponents and broadcasters gain consumer acceptance for terrestrial DAB. As the service plans for SDARS slip into the fourth quarter of 2000 and later, observers say, IBOC proponents have a chance to place the new technology into the marketplace around the same time — or possibly earlier — than satellite radio. If that happens, consumers could hear digital radio from conventional stations before SDARS pay radio services begin.

Last year at this time, the DAB subcommittee of the National Radio Systems

Committee had recently been reactivated, and the announced IBOC proponents were USA Digital Radio and Digital Radio Express. Also early last year, Lucent Technologies and USADR ended their joint development agreement. Last spring, Lucent formed Lucent Digital Radio to pursue an IBOC DAB system on its own.

Now, the NRSC, which will evaluate data gathered from the upcoming field tests, has developed field test guidelines and is preparing system evaluation guidelines. The NRSC previously developed lab test guidelines (RW, Jan. 6).

NAB Senior Engineer David Laver said the evaluation guidelines may be the hardest to compile because the process involves getting a majority of committee participants to agree on the most important aspects of IBOC systems.

"We're tackling a job that, perhaps, has never been done before ... trying to decide what characterizes AM and FM services ... and how much better do the digital services have to be (over analog) in order for broadcasters and receiver manufacturers to decide this is something we want to endorse," Laver said.

As system proponents have to make

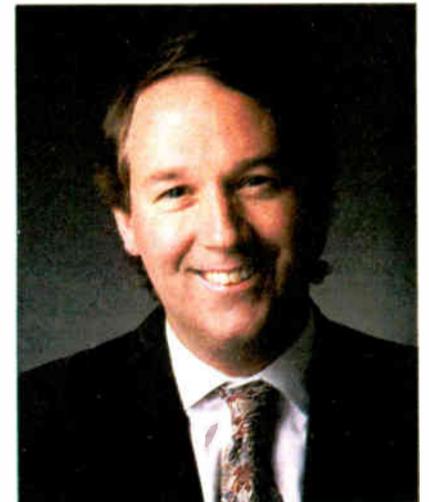
See DAB, page 8 ▶



NEWS MAKER

'Smitty': A Radio Career

EAST BRUNSWICK, N.J. Milford Smith, vice president of radio engineering for Greater Media Inc., oversees the technical operations of 14 radio stations. Thanks to his involvement in industry standards groups, he also has a



Milford Smith

front-row seat to the development of a digital audio broadcast system for the United States.

The man known to friends and See SMITTY, page 14 ▶

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◆ NEWSWATCH ◆

FCC Fines WAPB \$11,000

WASHINGTON The FCC has stood firm on an \$11,000 fine against WAPB(AM), Murfreesboro, Tenn. The FCC alleged the station did not "power down" until an hour after it was supposed to when an Atlanta field agent monitored the station. The FCC said the station was also missing its public inspection file, had no EAS equipment and no required annual equipment performance measurements. Michael Leahy, president of station owner Hemmingford Media, refuted the FCC's allegations. He said the failure to

reduce power on time was an isolated incident, the station did have an inspection file but it was mislabeled and that it had EAS equipment on order. The FCC said the station could not produce documentation for its arguments, and it reaffirmed the fine.

New Chancellor Sales Position

Chancellor Media has created a new sales position — regional vice president of sales for the company's 33 radio stations.

Erik Hellum, former director of national sales for the radio division of Chancellor, will be responsible for maximizing Chancellor's cluster sales strategy and revenue opportunities.

NAB Offers EEO Option

WASHINGTON NAB said in comments to the FCC that the commission's proposed broadcast Equal Employment Opportunity rules are unconstitutional because, among other things, "they are

not narrowly tailored." NAB opposes the FCC proposal to reinstate the filing of annual employment reports because the documents would include hiring information on minorities and women. NAB said the FCC has not guaranteed the information would not be used against a station because its "numbers" are low.

NAB stated: "In order to comply with See NEWSWATCH, page 3 ▶

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AETA Eyes the U.S. Marketplace

ROCKAWAY, N.J. French manufacturer AETA wants to pursue more business from broadcasters in the United States.

The telecommunications equipment maker is best known here for its Scoop Reporter line of telephone codecs. Now the company has opened a U.S. subsidiary. It will set up a network of dealers, and plans to roll out several products in coming months, all aimed at the remote broadcast market.

"The timing couldn't be better to open a U.S. subsidiary," General Manager Bertrand de Fleurieu said in a statement. "Now that we are firmly established in European markets, it is time to re-focus our distribution in the United States."

The headquarters is in Rockaway, N.J. Mark Kaltman is the president of AETA Audio Corp., the new U.S. subsidiary. Kaltman is known to radio equipment buyers in this country. He has worked as national sales manager for Denon Electronics and Wheatstone Corp. Kaltman appointed David T. Antoine as

national sales engineer and technical support.

Kaltman described the AETA Audio operation as more than a simple sales office.

"The U.S. operation is going to be service center, tech support, all the administrative — it is a U.S. corporation," he said. "Research and development work will be done here,

and in about eight months we plan to add final assembly and quality control."

Now that we are firmly established in European markets, it is time to re-focus our distribution in the United States.

—Bertrand de Fleurieu



Mark Kaltman, president, AETA Audio

and in about eight months we plan to add final assembly and quality control."

The first offering, Kaltman said, is an improved version of the Scoop Reporter

introduce a rack-mount studio version of that codec.

A third new product is the HIFIScoop 3, an ISDN codec with multiple algorithms and that is capable of six "B" channels, due to ship in late April.

AETA, the parent company based in France, recently purchased high-end audio manufacturer EAA. Kaltman said that product line fits well with AETA's strengths in remote broadcast equipment. He said AETA plans to introduce some of those products to the U.S. market, including a remote mixer and a portable mic preamp suit-

able for use with consumer DAT machines.

In the past, the Scoop Reporter was sold to U.S. buyers by Harris Corp. Kaltman indicated that AETA Audio plans to establish a broader dealer network in coming months.

AETA was founded in 1978. It is a privately held company with 90 employees, and sells to the broadcast, telecommunications and military industries. Kaltman said about 5,000 AETA codecs are in use globally.

—Paul J. McLane

NEWSWATCH

▶ NEWSWATCH, continued from page 2

NAB's proposed rule, stations with 5 or more full-time employees must certify every 2 years that they have either: complied with the Office of Federal Contract Compliance Program EEO regulations as a covered federal contractor; or complied with their state broadcaster association's "broadcast career" programs or complied with NAB's general or specific outreach initiatives of the station's choosing."

Feds Push Ad Code

NEW YORK Advertising industry executives and government officials met in February to discuss how to minimize advertiser discrimination against minority-owned stations. Vice President Al Gore and FCC Chairman William Kennard proposed a voluntary code of conduct. The proposed code urged businesses and the government to promote fair competition and expand opportunity for all Americans.

"The American way has always been that if you work hard, if you are the best, you will be fairly rewarded," said Kennard. "In radio, this means that if you have more listeners, you will have more advertising dollars.

Sadly, the FCC found that this is not the case for minority broadcasters."

Gore said federal officials, from the FCC, the Department of Justice, the Federal Trade Commission, the Small Business Administration and the Department of Commerce, will cooperate in looking into ad discrimination. The meeting was prompted by the release of an FCC study in January that said minority-owned stations experienced "no buy" dictates from ad agencies and had to discount its ads more than majority-owned stations.

Umansky Leaves NAB

WASHINGTON After 20 years, NAB Deputy General Counsel Barry Umansky planned to leave the association for a private law firm here. Umansky planned to join Vorys, Sater, Seymour and Pease LLP effective March 15. At NAB, Umansky's responsibilities included radio and TV new technology and spectrum allocation issues, broadcast deregulation, station license renewal, state and local broadcast regulation and other issues. Prior to joining NAB, Umansky was an FCC attorney, specializing in broadcast and cable regulation and policy.

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WHAT COMES AFTER DIGITAL?

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

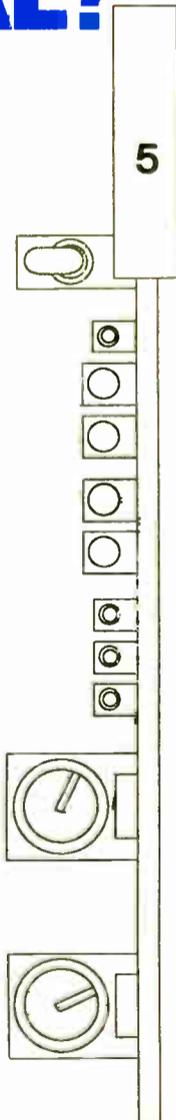
Certainly the stone wheel must have looked to the caveman to be the greatest discovery that ever could be. And to the simple farmer of the 1800's, the steam engine was the most modern contrivance that his mind could imagine. But neither was a terminal technology. Both have been replaced as time marches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

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

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Tea Leaves and Transmitters

NAB99 Is a Good Time to Sort Through Supplier News, Seeking Higher Meaning

NAB99 is upon us.

RW is pleased to devote almost 50 pages to helping you get the most out of the massive convention. Turn to page 25 and delve into the sessions, exhibits and headlines of the industry's largest trade show.

The subject of our front-page interview in this issue is a man known universally by his nickname, "Smitty" can only be Milford Smith, vice president of radio engineering for Greater Media.

Not only is he a broadcast veteran and a participant in important radio working groups; he also has a front-row seat to the digital audio broadcasting debate. He will chair the panel "DAB: The Global View" on Sunday, April 18, at NAB99.

In an interview with RW News Editor Leslie Stimson, Smitty talks about the changes he has witnessed in the industry, about projects underway at his company and about the impact of the death of Greater Media's Radio Division President, Tom Milewski.

★ ★ ★

The low-power radio issue is likely to be the buzz in sessions at the show in Las Vegas. But on the exhibit floor, there are more immediate concerns: the implementation of digital, the integration of the Internet, and gossip among suppliers about who's zoomin' who.

People like me love to sift through news from equipment suppliers. Like fortune-tellers looking at tea leaves, we divine meaning from this tidbit or that press release.

It's not a meaningless exercise. Radio managers need a healthy supplier marketplace, a good selection of tools and vendors, and competitive pricing. Decisions about how products are made and sold affect you.

The story on page 10 is an example. Wheatstone, under the firm hand of founder Gary Snow, made its first acquisition when it purchased Auditronics, a

console maker that has been around even longer than Wheatstone.

On its face, the deal makes sense. Snow reduces his competition, wins a bunch of new dealers and picks up an established product line with some very loyal customers.

If you've been paying attention to the supplier scene, you know that Auditronics had been sold before, just last year, to Broadcast Electronics. BE subsequently sold it back to its owners months later. Why?

Radio managers need a healthy supplier marketplace, a good selection of tools and vendors, and competitive pricing.

The switch probably says more about BE than about Auditronics. BE has been through changes of its own. The company was sold to Hoak Communications in 1997. The management team subsequently replaced President Jack Nevin with John Pedlow. It cut back staff recently, blaming problems in the Asian economy. And it reversed the purchase of Auditronics.

All this suggests changes in direction. Insiders tell me BE business is picking up now, and that morale is good.

BE is worth watching. It is a leading manufacturer of two critical pieces of radio gear — transmitters and audio delivery systems. And any radio-specific supplier with 225 employees is an important piece of the vendor puzzle.

I'll have more about John Pedlow and BE in an upcoming column.

★ ★ ★

In this issue we also read that Orban has decided to exit the business of making on-air delivery systems (page 83). A winner in

this deal seems to be its former competitor Enco Systems, which not only obtains the rights to sell certain popular features of the Orban AirTime, but also reached agreement with Harris Corp., which becomes Enco's exclusive dealer globally.

Harris has a strong relationship with Orban, and apparently played an important, if quiet, role in these decisions.

The Harris deal disenfranchises a lot of former Enco dealers, and you can expect Enco's competitors to scramble to set up relationships with them.

One company to watch is Arrakis. Having exited a 17-year relationship with Harris, the company isn't sitting still. As reported on page 10, Arrakis is reorganiz-

ing its distribution and aggressively adding dealers. It should find fertile turf, in the wake of Enco's move.

The shuffle of supplier relationships goes on all the time. But I detect an increasing amount of it, driven in part by changes in how radio groups buy equipment, and in part by decisions made behind the scenes.

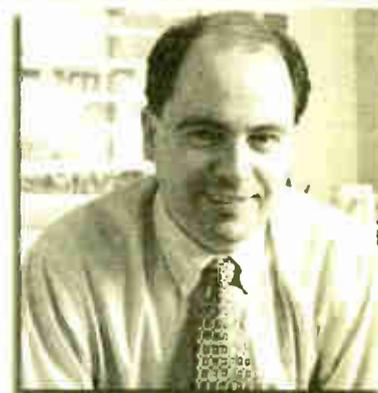
Companies like Harris, with substantial distribution arms, must choose between trying to carry as many lines as possible — the so-called "grocery store" approach — or focusing their efforts on a fewer number of product lines that their salespeople can understand and really sell.

Harris seems to be moving in the direction of the latter. That may be smart business for them. But it also could mean real opportunities for other vendors. Keep an eye out.

Meanwhile, there's no shortage of supplier news.

Harris bought Intraplex recently and is now promoting that division heavily:

From the Editor



Paul J. McLane

what does that mean for its relationships with suppliers that compete with Intraplex?

French companies AETA (see page 3) and Netia Digital Audio, as well as German supplier Klotz Digital Audio, have opened U.S. offices.

LPB Communications has a new owner, as we reported Feb. 3.

It's all worth watching, and the floor of NAB99 no doubt will have plenty more news to keep our attention. RW will keep you informed about the companies that make up your critical supply lines.

★ ★ ★

Since the earliest days of the Internet revolution, long before other publications were paying attention, RW has reported on how radio is putting the Net to work.

Starting in this issue, you will find a page dedicated to that topic. News, analysis and high-profile interviews will appear there in rotation.

Look for the *Internet Radio News* logo in our *GM Journal* section, on page 103 of this issue.

★ ★ ★

And last: One person whose efforts appear regularly in RW is graphic designer Alex Frosini. He put together the eye-catching artwork on page 1 and the page banners within our NAB show preview section. Thanks, Alex, for your constant good work.

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◆ READERS FORUM ◆

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Atmospheric concerns

Dear RW,

I finally got around to reading Paul McLane's editorial in the Dec. 23, 1998, issue ("What Went Wrong in Ohio?") where he asks if the atmosphere is already gone. Unfortunately, I believe he's right!

After over 30 years in radio, I've taken my talents elsewhere. With all the mega-mergers and acquisitions, radio stations that once were a town's pride and joy have become mere game pieces to be traded.

I became tired of being just another low-paid easily replaced cog in a giant mechanism, trying every day to plug more holes in the dike with less and less support from corporate headquarters.

Finally, I couldn't take it any more and moved myself out of radio.

I'm now happily employed at Marti Electronics, where I have become the RPU guru, an awesome position to have, as I'm counted on by broadcasters all over the world to keep their RPUs up and running. I also moonlight weekends at Broadcast.com.

I'm very grateful to have gotten in and out while the getting was good. At the same time, I feel deep sorrow for those now just getting into broadcasting, as they'll never know what marvelous fun it was being part of a broadcast "family," not just a time-clock number.

*Dave Hallow
RPU Technician, Marti Electronics
Analog Technician, Broadcast.com
Cleburne, Texas*

Write to Us

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READERS FORUM

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Forgotten expressions

Dear RW,

Rich Rarey's article "Pop Quiz: 1941 Broadcast Terms" (RW, Feb. 17), reintroduced some almost-forgotten expressions.

NAB: Low power is dangerous

Radio World's endorsement of the FCC's low-power radio plan ("Bring On Low Power," March 3) represents a frontal attack on the thousands of stations throughout the U.S. providing Americans with a free, locally-based communications medium that is the envy of the world.

You claim that "new stations will serve listeners better." How so? By adding interference to a radio band that is already heavily congested?

You assert that "dissatisfaction with our product is increasing." If that's true, then why do Americans continue to listen to their hometown radio stations on average more than three hours per day?

You suggest that "formulaic programs with sound-alike liners make it easier for the listener to push radio into the background of their lives." The simple, undeniable fact is that radio program diversity has never been greater!

Look at the facts: There are nearly 13,000 radio stations in the U.S., 3,500 of which have launched since 1980. These stations offer formats from children's to classical, from rap to gospel, from country to Korean. There are now more than 500 all-Spanish stations in the U.S., the most ever. Perhaps Radio World editors believe Don Imus, Dr. Laura, Tom Joyner and Rush Limbaugh are "formulaic," but I doubt your readers would agree.

Lessons of the Greaseman

The furor over the Greaseman incident retains important lessons for radio managers. Doug Tracht played part of a song by black artist Lauryn Hill, then said, "No wonder people drag them behind trucks." The reference to the 1998 murder of James Byrd Jr. in Texas cost Tracht his job at Infinity station WARW(FM) in Washington the next day.

The station did the right thing.

Tracht apologized — in fact, practically groveled — immediately after, and his contrition seemed sincere. But what he said was offensive. Whether or not *he* is a racist, his remark was. One local religious leader was quoted in news accounts describing Tracht's comments as "venomous, wicked, racist rhetoric."

Off the record, some in radio defended Tracht, if not his comment. The remark came out in the rush of a frantic morning show, they said, and he hardly had time to think. Anyway it was nothing worse than Richard Pryor ever said.

We've seen Tracht do his shift, and indeed he worked his board and his callers like a dervish. But Tracht is a professional who was *paid* to think, no matter how fast-paced his show was. He was not a standup comic in a nightclub. And he presumably knew how to push the big button on a delay.

Managers, pay attention. Does your station have a printed policy about what can be said on the air? Does your team have a plan to handle such a crisis?

Anticipate problems. Appoint a crisis manager with authority to speak for the station or group. Refer all press calls to that person, and make sure he or she is available. Bad information breeds in a vacuum.

At the same time, be conscious of the important legal implications of what you say. Do you have a good relationship with an attorney? Is he or she available when needed?

Don't tolerate special rules for high-priced talent. No listener or client should be left to wonder if Howard Stern, for example, would have lost his job over the same flap. Treat all staff the same.

Last, is there an experienced finger on the button behind your controversial morning talent?

Your station's standing in the community may depend on the answers to these questions.

— RW

Veteran CBS engineers will remember "Round Robin" as a one-way, loop-type audio delivery system. Participating stations received programming from the previous station in the loop, tapped into it for their own use, and fed it to the next. Amplification took place either at the station or local Telco office.

If a station was scheduled to originate

programming, it broke into the loop and started feeding the next station. The next fed the next, and so on. Upon completion, the loop was restored and another location duplicated the process.

An interesting phenomenon occurred when the previous feed was quick to restore the loop and the next was slow to open it. A vast, 3,000-mile feedback loop would occur, resulting in an unmistakable "whosh, whosh" sound.

Actually, there was a "North Round Robin" and a "South Round Robin," sometimes referred to as "Top Side" and "Bottom Side." These covered most of the Eastern portion of the United States.

Another audio delivery method not mentioned in the quiz was the "Midwest Reverse." When it was necessary for Chicago to feed Los Angeles or vice versa, a series of audio amplifiers and equalizers was arranged so the inputs and outputs could be reversed by relays. If a feed direction needed to be reversed, battery was applied and the amplifier direction was changed 180 degrees. The whole process usually took about seven seconds.

*Bob Caithamer
Director of Engineering
Moody Broadcasting
Chicago*

Corrections

The Feb. 17 issue included incorrect contact information for Broadcast Richmond. The company is located in Indiana and can be reached by phone at (765) 966-6468.

In the EAS patent article in the same issue, the date that signed license agreements were due back to Quad Dimension should have read Feb. 24, 1999. QDI was informed that the FCC, not the National Weather Service as reported, would be revamping the Emergency Broadcast System. Also, the article did not make clear that representatives from MTS and QDI did speak in a phone call.

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**Next Issue of Radio World
April 14, 1999**

GUEST COMMENTARY

Y2K: The Marketing Bonanza

by Guy Wire

The question of Y2K continues to rankle a lot of people.

In our March 3 issue (Readers Forum, page 5), Tom Becker, president of The RightTimeClock Company, took exception to earlier comments about the Y2K problem. Those comments had been made by masked engineer Guy Wire in his online column, and quoted in print by the editor of Radio World.

Guy Wire fired back with a deconstruction of Becker's argument. Given the importance of the Y2K debate, we thought it worth printing.



Award and AMI BIOS in fact do. I personally did test the 28-year rollback technique (27 was an unfortunate typo) on a Pentium II 350mmx which was fully Y2K compliant and supported the rollback date of 01-01-1972.

His presumption that I not only didn't try it, but didn't even think about it is hooey. He obviously hasn't tried it on a late-model machine or thought about it quite enough himself.

This technique has been suggested in the PC trade mags as an option in situations where the hardware can support 1972, but the software is non-Y2K compliant. A

very large media company's own Y2K project office actually lists it as a valid option under special circumstances in its suggested Y2K remedies list.

Sensitive software

I doubt anyone would seriously contemplate using it for date sensitive software applications like station logs, as Mr. Becker blithely suggests. But it might be acceptable with an application in which date years are not critical, but the work it does is still quite valuable.

Mr. Becker also writes:

"Mr. Wire also talks about usually benign business desktop application suites like Microsoft Office. Many stations will surely be unaffected by the date-handling flaws of many of these applications, but more sophisticated spreadsheet and database users will experience genuine date calcula-

tion errors that might cause business difficulties."

First, did Mr. Becker miss the fact that I most certainly did point out that such program suites did have a few Y2K "black holes"? Their authors have identified most all of them, and have already offered fixes via patch software available on their Web sites.

If there are truly "sophisticated spreadsheet and database users" working in a radio station as Mr. Becker suggests, they most certainly are Y2K-aware and will likely upgrade their suites before the end of this year to the 1999 versions, which include the Y2K patches. Some have no doubt already checked into them after reading about it in my online column.

The unsophisticated users, which account for the vast majority, do the meat-and-potatoes departmental budget spreads and other straightforward

Moving forward, Mr. Becker writes:

"He also does not discuss the machines that run the station: the automation, remote control, security, voice-mail and employee time-and-attendance systems, which are much more likely to present compelling problems."

Other systems

Wrong again, at least in part. Automation and remote control systems specifically were addressed in the online article, which was referenced in the quotations that appeared in print.

Obviously the best resource for Y2K fixes — on both the hardware and software platforms that run these functions — come from their manufacturers. All of the more popular systems have made Y2K fixes their top priorities, and have already released Y2K-compliant versions of operating software. Most do charge a nominal fee for them, but some provide them for free.

Any station that relies on such systems to "run the station" will most certainly ask their vendors about Y2K compliancy and software or hardware upgrades at

In his March 5 letter,

written in reply to my online article about Y2K, Mr. Becker said my opinions and suggestions cannot be supported with fact.

He wrote to us:

"The most blatant is the summary: 'just set your PC's RTC back exactly 27 years.' (Guy Wire's) intent is to take advantage of our calendar's 28-year repetitions," Mr. Becker wrote. "There exist two facts that indicate Mr. Wire has neither tried that technique nor thought much about it before advising it: first, the cycle is 28 years, not 27, and secondly, it is not possible to set the clock back 28 years on the PC until the year 2008, since the PC cannot represent any date prior to 1980."

Allow me to comment. While most PCs do not support dates in their BIOS prior to 1980, many Pentium II motherboards sold within the past year with

The 'Y2K Crisis' has done more to promote business opportunities for selling software and hardware upgrades than fixing mission-critical problems. Period.

financial apps, which merely need to add and total columns of data. Almost all database applications used at radio stations are lists of clients, advertisers or listeners, with simple name, company, address, and/or phone number data fields. Using recent versions of the "big 3" office suite packages for this stuff, according to at least three Y2K resource centers I've seen, will be just fine for Y2K.

some point this year, unless of course they are indeed living under a rock.

As far as security systems are concerned, the majority that I have seen that include real-time functions are like thermostats and do not rely on dates, but rather on day of the week and time of day to control them. More sophisticated ones used in major stations might be RTC/computer-based, but most are likely to be of rather recent vintage, with Y2K capabilities already built in.

Common sense only dictates that if you have such a system, call the vendor to check on it. If you use a computerized employee time and attendance system, the same would apply.

I will grant Mr. Becker that I did not specifically address telephone or voice-mail systems. Space limitations did not allow the piece to be exhaustive or all-consuming regarding everything in a radio station that might be Y2K sensitive.

Telephone systems

In hindsight, I should have addressed telephone systems. They are indeed a major artery, supplying business blood and connectivity for any station, or any other small business, for that matter. It is conceivable that PC or small computer-based phone and voice-mail systems that are not running on Y2K-compliant hardware or software could stop operating at the turn of the millennium, if totally ignored.

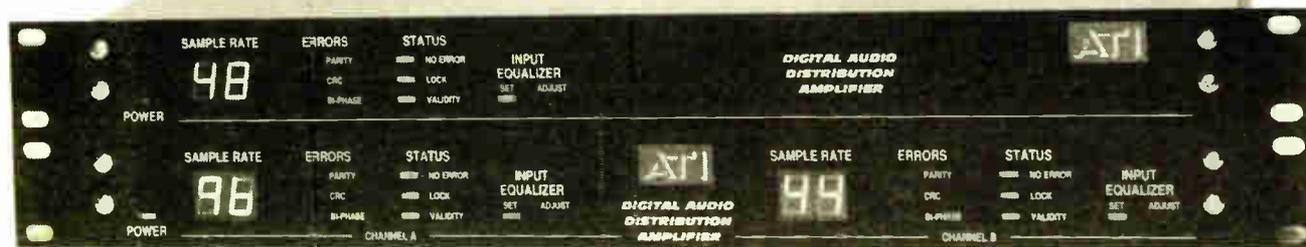
The more likely result would be that the LCD display on phone sets would not display the correct date when folks came back to work on Jan. 2, or voice-mail messages would have an incorrect date stamp on them, whenever a user checked to see when the message came in.

See Y2K, page 12 ▶

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NAB's New Spectrum Task Force

WASHINGTON The NAB has named the members of its new Radio Spectrum Integrity Task Force.

The group was established by the association's Radio Board with the goal of working with the FCC to ensure that new services will not harm the quality of existing radio in the United States. Among the proposals cited by the association as areas to study are IBOC digital radio, low-power radio and streamlining of FCC technical rules.

Managers and engineers

NAB officials and Bruce Reese, the chairman of the new task force, have said the group will oppose pro-



Bruce Reese

posals it believes would hurt spectrum integrity.

The members of the task force are Reese, president and chief executive officer of Bonneville International Corp.; Raymond Benedict, director of spectrum engineering and regulatory compliance for CBS; Michael Carter, president and general manager of Carter Broadcast Group Inc.; Ed Christian, president and chief executive officer of Saga Communications; Diana Coon, vice president and general manager of WMAN(AM), WYHT(FM) and WSWR(FM) in Mansfield, Ohio; Richard Ferguson, vice president and chief operating officer of Cox Radio Inc.; Joe Field, chairman and chief executive officer of Entercom Broadcast Group; and Bert Goldman, vice president of engineering, radio division, ABC Inc.

Also on the panel are William L. McElveen, executive vice president, Bloomington Broadcasting Corp.; Randy Michaels, chief executive officer of Jacor Communications Inc.; Randy Odeneal, general partner of Scornix Broadcasting Co.; J. William Poole, general manager of WFLS-FM and WYSK-AM-FM in Fredericksburg, Va.; McHenry Tichenor, president and chief executive officer of Heftel Broadcasting Corp.; Bayard Walters, president of The Cromwell Group; Richard Weening, executive chairman of Cumulus Media Inc.; and Lawrence Wilson, president and chief executive officer of Citadel Communications Corp.

BUSINESS DIGEST

BE Adds RF Reps

QUINCY, Ill. Customers of Broadcast Electronics in the northeastern and western regions of the United States have two new sources for BE transmitters.

The manufacturer announced the addition of Technet Systems Group and BroadcastSystems as transmitter representatives.

Technet will be BE's exclusive RF rep for 13 states, extending from Michigan to Maine and south to Maryland. BroadcastSystems is the new rep for eight states: California, Washington, Oregon, Montana, Idaho, Utah, Arizona and Nevada.

"Steve Vanni at Technet Systems

Group and Chip Morgan at BroadcastSystems have built organizations of highly skilled broadcast sales and engineering professionals," said Tim Bealor, manager of RF representatives for BE.

Technet Systems Group is a division of Steve Vanni Associates. BroadcastSystems is a division of CMBE Inc.

Andrew Sales Were Off

ORLAND PARK, Ill. Andrew Corp. saw its sales drop 5 percent in its first quarter to \$218.6 million, compared to the same period the year before. Net income dropped 18 percent and orders

were down 19 percent. The company noted that the same period a year earlier was its highest order quarter ever.

The company is a global supplier of communications systems equipment, including transmission products. Its first fiscal quarter ended Dec. 31, 1998.

"Wireless infrastructure sales continued weak in the United States and Asia," Chairman Floyd English stated, "but we continued to see strong growth in China, Europe and Latin America."

He said Andrew's broadcast and government markets enjoyed strong growth in the quarter, but its common carrier and private microwave business was down. Andrew is an S&P 500 company traded on NASDAQ.

— Paul J. McLane

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DAB: Where Is It?

► DAB, continued from page 1

design tradeoffs, he said, so will the NRSC, as it decides what is most and least important in the IBOC systems.

The NRSC also could decide not to endorse any system.

"If they're not ready for prime time, somebody's got to say the emperor has no clothes," said DAB subcommittee participant Andy Laird, Director of Engineering, Radio, Journal Broadcast Group. "We're hoping to be stunningly impressed."

Mobile environment

DAB subcommittee members hope to have some information about the evaluation guidelines to show proponents at NAB99. "We think it's important for the proponents to know how that will proceed," Layer said.

In the meantime, the new field test guidelines advise proponents to collect most of their field test data from a mobile platform, because the mobile environment offers some of the most severe interference conditions and because so much radio listening occurs in the car.

The guidelines ask proponents to record IBOC digital audio and analog host audio simultaneously, using at least two different receivers.

"These recordings should be done so that it will be possible, after the fact, to time-align individual recordings (for example, the IBOC digital audio and one of the analog host audio recordings) and

analyze their performance under similar reception conditions," the guidelines state.

The recommended auto receivers are the Delco model 16192463 and Ford model F4XF-19B132-CB, the same receivers used in previous EIA DAB tests. The NRSC recommended their use again because of "their large consumer populations and because of their dramatically different stereo-to-mono 'blend' implementations."

The NRSC said these receivers also showed high adjacent channel rejection.

To observe "real-world" channel

Proponents must determine how the FCC's LPFM proposal could affect their systems.

impairments in the received IBOC and host analog audio, proponents are asked to listen to "an audio signal for undesirable sounds (not part of the original audio program), or no sound at all (i.e. a muted condition) or artifacts (such as can occur in perceptually coded audio, or in the case of analog, such phenomena as blend to mono), caused by problems with reception

of the audio signal's radio source."

On-air processing systems can become a distraction when the goal is to compare the performance of analog and digital audio systems for a particular station. The NRSC said the test would be more meaningful if the test station agrees to use, for its analog signal, a processor with settings "matched" to the processor and settings used for the IBOC digital signal path during the tests.

Low power

IBOC proponents also must determine how the FCC's low-power radio proposal could affect their systems. In its proposal to create a new class of low-power service, the commission has said it believes FM channel interference protection standards can be relaxed to accommodate new stations on the FM band. Specifically, it has proposed eliminating third-adjacent channel protection standards and possibly eliminating or at least relaxing the standards for second-adjacents (RW, March 17).

NAB has formed a spectrum integrity task force (see story, page 7) to study the technical implications of the LPFM proposal and the FM technical streamlining proposal.

The FCC has extended the comment and reply, comment deadlines on the LPFM proposal to June 1 and July 1, respectively. In requesting an extension, NAB said it would study the characteristics of various FM receivers, and use that information to determine the potential interference impact on stations and their listeners. The North Carolina Association of Broadcasters and the Virginia Association of Broadcasters are assisting NAB in that effort. The Consumers Electronics Manufacturers Association also has begun a receiver study.

The receiver study is vital, said Bert Goldman, vice president of engineering for the radio division of ABC Disney, and a member of the spectrum integrity task force.

Channel spacing changes

"We need to have a basis by which to determine whether if, how much, and whether the proposed changes will affect receivers. Changing spacings between FM stations doesn't affect the FM stations. The transmitter doesn't care. What it affects are the receivers."

He said the study should help determine "how much interference and overloading on adjacent channels a receiver can tolerate before it begins causing objectionable interference or substantially degraded audio." Goldman said some receivers are not affected by such conditions, but others are dramatically affected.

The IBOC proponents are preparing for field testing in different cities and different stations, and under several types of interference conditions.

Lucent Digital Radio has chosen to begin its field tests at two New Jersey stations, near its Warren headquarters: WPST(FM), Trenton, owned by Nassau Broadcasting, and non-commercial WJJB-FM, Lincroft, licensed to Brookdale Community College.

"These are stations that offer us a diversity of environments, a diversity of equipment configurations and clearly have different needs," said Lucent Digital Radio President Suren Pai. He said Lucent would be testing a hybrid digital signal, transmitting both an analog and a digital signal through the station, and using a prototype DAB receiver to



USADR's Patrick Malley

receive the signals. Pai said the Lucent platform was being prepared to become integrated into both station's facilities.

WJJB is a National Public Radio member station. In comments to the FCC on the USADR Petition for Rule Making on IBOC DAB, NPR said IBOC may not be the best means of implementing digital radio in this country.

Of the Lucent testing, NPR Vice President and Chief Technology Officer Don Lockett said, "The adoption of a DAB standard will require a concentrated effort on the part of Lucent and other proponents to deliver a system that provides robust digital audio quality and significant scalable data capacity."

Single standard

Pai said the next main hurdle for the adoption of IBOC is not developing the technology, but the selection and adoption of a single standard.

"The question is how quickly the regulatory process moves along to get a standard established and put in place ... because ultimately, standards are a key gating factor in the deployment of IBOC."

At NAB99, Lucent Digital Radio will share booth space with Lucent Digital Video. The company planned a listening demo with its patented PAC compression algorithm technology, showing the difference between analog audio and Lucent's hybrid multi-streaming IBOC DAB technology. In Lucent's multi-streaming approach, the IBOC signal is split into two streams and coding and modulation techniques are used to resist interference.

Another IBOC proponent, USA Digital Radio, is preparing for field tests. USADR has hired Patrick Malley, formerly an engineer with Chancellor Media station WWDC-FM in Washington, D.C., as manager of field support. The company also has "DAB Rover 1" and "DAB Rover 2" as mobile field test vehicles.

Glynn Walden, USADR director of engineering, said the vans would be equipped with spectrum analyzers, analog receivers, prototype IBOC test receivers and other equipment to record both analog and digital audio. He said USADR wants to monitor simultaneously the signal strength of the desired signal and its adjacent channels.

Walden is now wearing a USADR-only hat, after performing USADR duties in addition to his CBS responsibilities for approximately the past two years. The change was expected and became formal recently when USADR completed its incorporation details. USADR employees are no longer on the CBS payroll.

USADR announced its board members: James E. de Castro, president, Chancellor Media Radio Group; Daniel S. Ehman, Jr.,

See DAB, page 12 ►

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Wheatstone Acquires Auditronics

Deal Combines Two Big Console Names;
BE Held Auditronics for Less Than a Year

by Paul J. McLane

NEW BERN, N.C. Broadcast console manufacturer Wheatstone Corp. has acquired Auditronics Inc., a long-time competitor. Terms of the deal were not revealed. Auditronics becomes a product line within Wheatstone.

"We're going to retain the products, and continue the name and business relationships between Auditronics dealers and the company," Wheatstone President Gary Snow said.

This is the first time Wheatstone has acquired another company.

Second sale

Snow bought Auditronics from Steve Sage and Stovall Kendrick. It is the second time in less than a year that Auditronics has been sold. In May of 1998, the company was purchased by Broadcast Electronics, but that deal was reversed less than eight months later.

"BE had a change of direction ... more toward hard-disk storage and transmitters," Sage said, declining further comment.

In an earlier interview with *RW*, John W. Pedlow, the new president of BE, said Auditronics had been purchased by the prior management group, who felt it would be a good business fit.

"As we got into the business, there were

some realities that surfaced," Pedlow said. "Their single largest distributor (Harris Corp.) had a competitive situation with us; it didn't really fit the sales model." Pedlow also said BE did not find an easy way to integrate the manufacturing of Auditronics products into the BE lineup.

Sage and Kendrick become consultants to Wheatstone; Sage will be acting CEO of the Memphis operation. "There are only a few who know how to make consoles in this industry," Snow said of Sage. He said customers can continue to call Memphis for sales and service.

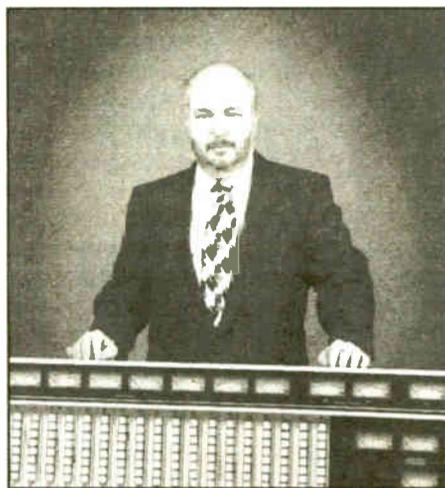
"We're in the process of hiring everybody who wants to take a job," he said. In the long term, Snow said, the company will consolidate to North Carolina, but he said there was no timetable for that. Snow will keep the Auditronics product name, which he called a strong brand.

Sage said clients will benefit from the sale. "We'll have more inventory, we'll have better stock," he said.

Snow said the deal makes sense.

"By acquiring the product line, we reach other customers in other market areas," he said. "For instance, Auditronics has 15 domestic and at least 30 overseas distributors that we do not do business with — 45 new accounts ... without disrupting existing relationships."

Snow plans to apply Wheatstone tech-



Gary Snow

nology to his new line.

"Especially in smaller consoles, Auditronics has a high-volume line that would benefit from surface-mount technology," he said. "They're hand-stuffing resistors and capacitors on circuit boards."

By comparison, Wheatstone can process up to 8,000 components per hour at its new plant in North Carolina (*RW*, June 24, 1998). Snow said Wheatstone can ship subassemblies from New Bern to the Memphis plant.

Snow said the two product lines are complementary.

"I'm particularly interested in the NuStar," Snow said of the Auditronics digital console. Its design, with electronics separate from the control surface, is different from Wheatstone's. Snow said.

"They're both stable platforms, but they're different products. That gives the client a good product choice," he said.

Auditronics products will be on hand in the Wheatstone booth at NAB99.

Auditronics, founded in 1964, has approximately 25 employees. It introduced the first modular, all-solid-state consoles in the 1970s, according to the company. Popular products have included the 210 and 801 series radio boards.

Wheatstone, founded in 1975, has approximately 100 employees. It will introduce five products at the show, including the D-600 digital console and the A-5000 analog console, which can be upgraded to digital. It also will introduce a new Audioarts console, called Sparky.

"We believe all the radio stations over the next seven years are going to commit to digital technology," Snow said. "Between the NuStar, the D-500, the D-600 and the Sparky, there will literally be a family to choose from."

Need it now

Snow said the deal is good for console buyers in the post-consolidation era.

"You get a big group and they need 15 consoles sent to them in two weeks," Snow said. "We can ship 100 Audioarts consoles today. And when we're done, Auditronics will be in a similar position."

"Groups ... are in a hurry. We've got the critical mass to do that."

Wheatstone will pick up Auditronics' support and warranty obligations.

"If there's one thing I want to convey to our Auditronics clients, it's that there is stability here," he said.

Snow's business strategy for Wheatstone relies on growth. He expects more acquisitions. "This is not going to be the last," he said. "The whole industry is in consolidation mode, and the future belongs to the big."

Arrakis Reorganizes Distribution

FT. COLLINS, Colo. Arrakis Systems Inc. has reorganized and expanded its distribution network.

The manufacturer of consoles and audio systems announced distribution agreements with a number of dealers, including Broadcast Supply Worldwide, Crouse-Kimzey, Broadcasters General Store, Bradley Broadcast Sales and Southern Coastal Marketing Service (SCMS).

Arrakis products will no longer be available from Harris Broadcast.

"These improvements in distribution are in response to the recent business changes in radio," Arrakis President Mike Palmer said. "Even 17-year relationships such as between Arrakis and Harris' distribution unit (previously Allied Broadcast) have changed dramatically as each company has positioned itself to better meet its customers' needs."

"For Harris, this has recently meant a change from representing multiple digital audio manufacturers to a focus on a single digital audio product line," Palmer said.

A Harris spokesman said the Arrakis statement was accurate.

For Arrakis, Palmer said, these changes in radio have led to expanded distribution. "For the customer, this ultimately results in improved products and services," he said. He said customers would receive support from the "largest team of independent broadcast dealers in the world."

One new dealer is Broadcasters General Store.

"We're pumped about them, their digital products in particular," Dave Kerstin, president of Broadcasters General Store, said. "Also their new products coming at the show, the quality of their consoles and their furniture."

At NAB99, Arrakis is introducing a digital audio console. The mixer itself is a rack-mounted box, expandable in units of four input channels. It can be retrofitted to Arrakis 12000 series consoles, to upgrade them to a digital or analog/digital configuration.

The company also has added major features to its Digilink 4. Automation software for Windows 95/98/NT computers now supports full satellite automation and digital transfer capability to produce audio files on a standard PC and transfer them digitally to the DL4 workstation.

Arrakis also will display an interface between its On Air Digilink Windows software and Digigram audio boards for use in On Air radio. This will allow the user to select the hardware platform of their choice, either a DL4 workstation or a Digigram-equipped PC.

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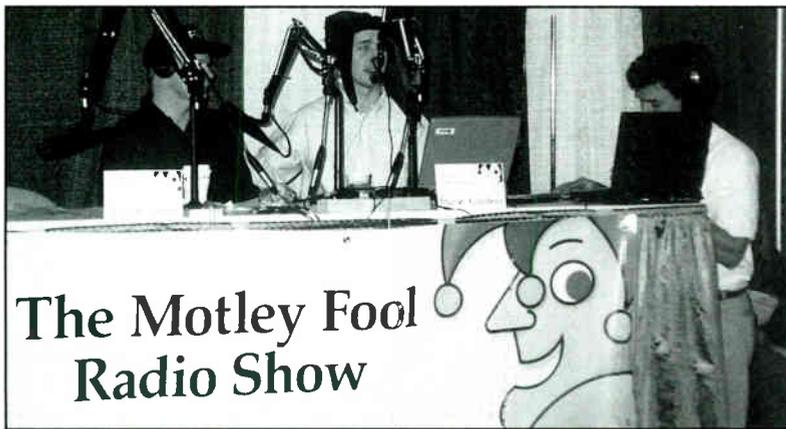
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Talbert uses The Motley Fool Radio Show as an excellent example of Telos technology at work from a production perspective. The weekly remote broadcast show, featuring hosts David and Tom Gardner, originates from Arlington, Virginia – otherwise known as Fool HQ. Host audio is backhauled to Atlanta via ISDN. Assistant Producer provides call prompting, hybrid control and text communication between the show's Atlanta and Arlington producers. "The combination of Telos Zephyr and Assistant Producer makes for a clean, quickly deployable and seamless remote talk show with only four pieces of equipment: Zephyr Express, a notebook PC, headphones and a microphone," Talbert says. He adds

"An equipment complement that fits neatly into a talk show host's home office without upsetting the décor."

When speaking engagements take the "Fools" away from Fool HQ, the backhaul arrangement stays the same," Talbert says. "Having the same Assistant Producer screen and functionality, whether on the road or in the studio, gives us something very significant: familiarity. Remote broadcasts are stressful enough. Having a familiar call screening, control and communication system that mirrors the equipment in the studio allows everyone to focus on the show content rather than the technical logistics of broadcasting from an unfamiliar, and often less-than-ideal, environment."

The Judy Jarvis Show's "Assistant Producer"

Telos Systems Assistant Producer software has given The Judy Jarvis Show an extra edge in production. In fact, it's become executive producer Jason Jarvis' Number One assistant, so to speak.

The Judy Jarvis Show, produced in Hartford, Connecticut, runs up to five hours a day, five days a week. Led by Emmy award-winning TV host, and long-time journalist, Judy Jarvis, the show is well known for its open forum for debate on hot news events. The show is carried on more than 50 stations around the United States. And, quite often, the charismatic host takes her show on the road with remotes at various affiliate stations and special events, including the NAB fall radio show in 1998.

Executive Producer Jason Jarvis, the host's eldest son, says Assistant Producer has streamlined the

entire production process, whether it be in-studio or on-location.

Before using the new program, they had used a DOS-based call screener. While

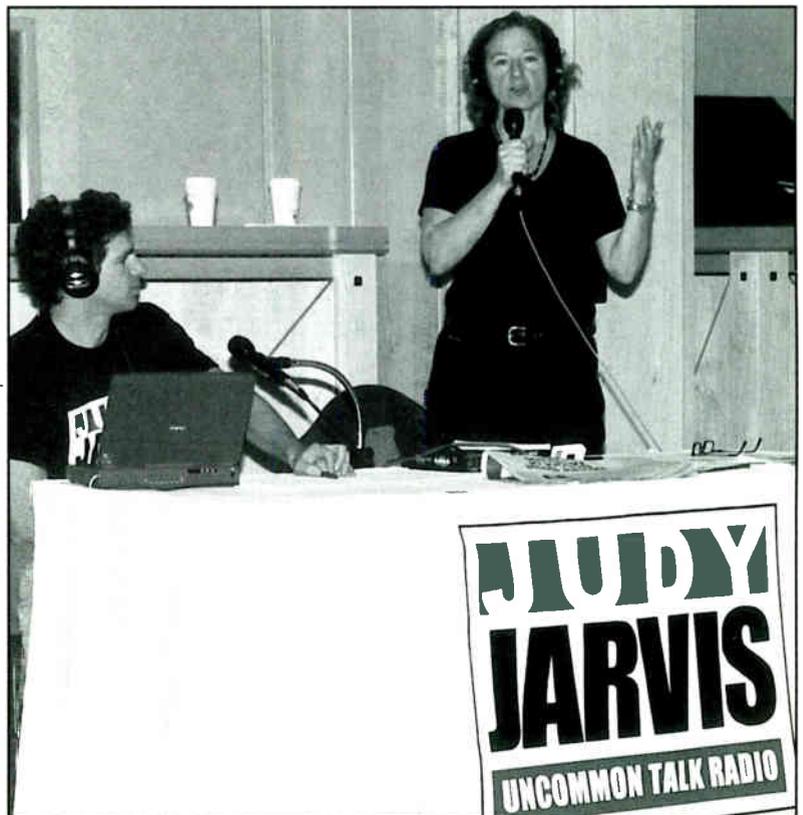
the system served their basic needs, it was found lacking.

"The biggest problem was the inability to type long messages between the talent and producer during a broadcast," Jason Jarvis says. Assistant Producer's Windows-based platform was a big selling point to Jarvis. He also appreciates the program's ability to send unlimited messages between the talent and the producer.

"And, it uses a neat Internet interface for our remote situations," he points out. "When we use that and Zephyrs on remote, we've found it to be quite reliable."

The Judy Jarvis Show has been hooked up to its newest "Assistant Producer" since September, 1998. The system, according to Jason Jarvis, has "proved very effective."

"If you're going to invest in the Telos hardware, the Assistant Producer software is a foolproof interface," Jarvis says. "It allows your host and producer to quickly and efficiently exchange information about callers and show timing." ~



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Using Assistant Producer "On The Road" Just Got Easier!

Assistant Producer clients in remote (off-site) locations can use the call screener program simply by dialing directly into the Assistant Producer computer.

This task has gotten MUCH easier since the introduction of Dial-Up Networking 1.3 from Microsoft. Most users are aware of Assistant Producer's abilities to allow access to your phone lines and caller information via the Internet. While this feature receives rave reviews from many a remote broadcast producer, there are users out there who would rather have a "closed" network where their computer(s) are not "exposed" to the Internet. Dial-Up Networking 1.3 is an easy way to do this!

When we wrote the Assistant Producer manual, there was a different version of Dial-Up Networking out there, and it was cumbersome to use. Here's the latest scoop on a better version that will make your life easier!

How Assistant Producer talks to "remote" (off-site) clients.

Assistant Producer can establish a remote network connection in one of two ways.

- 1) By using a modem connected to the TeloServe PC.
- 2) By making the TeloServe PC accessible via the Internet.

In this article, we're focusing strictly on the direct dial-in modem method. For more information on using the Internet for this purpose, consult your Assistant Producer manual, or call us at Telos Systems to ask for our fax instruction sheet.

What you need:

Believe it or not, you don't need much. There is no special software or hardware. All you need is Windows 95 / 98, Assistant Producer Client, and Dial-Up Networking v. 1.3. (DUN 1.3)

Windows 98 users:

*Windows 98 already has a version of Dial-Up Networking 1.3, so do not install it onto your Windows 98 computer! The Windows 98's dial-up networking application works similarly to Dial-Up Networking 1.3, so these instructions will also be valid for your Windows 98 dialer. The Windows NT's dialer is somewhat different: Consult your Windows NT manual for further installation and usage information.

After you have installed the DUN 1.3 application on your computer, there are a couple of things you need to know about TCP/IP addresses and Dial-Up Networking 1.3.

1) DUN 1.3 will assign 192.168.55.2 as the IP address of the dial up client, so make sure you do not assign an address to the remote computer.

2) The IP address the dial-in Assistant Producer client needs to use to contact TeloServe is now 192.168.55.1 (regardless of your in-house network IP address).

This means that the TeloServe IP address - when going through the dial-up modem connection - will be 192.168.55.1. The Dial-Up Server function of DUN 1.3 automatically assigns this number, so you don't need to set it up in the Networking control panel. It is highly advised that you DO NOT assign 192.168.55.1 or 192.168.55.2 to ANY adapters on your computers.

Now, all your remote personnel have to do is to connect the remote laptop PC (or whatever) to a phone line at the remote site. They will then dial your studio using a Dial-Up Icon. This works in just the same manner as if they were to log into the Internet, except the laptop is now calling the Assistant Producer computer "back home." It won't seem any different.

After the laptop connection is established, start up Assistant Producer, log in with your password, and you're all set!

The First time setup of Assistant Producer requires the entry of "192.168.55.1" as the Remote Server IP address.

All the user functions of Assistant Producer will function as they would back in the studio. It's that simple! ~

Telos On Tour '99

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Telos

DIRECT CONNECTION

NAB '99 Reveals New ISDN Phone Gear

The spring NAB convention will bring the unveiling of a new ISDN-based multi-line on-air phone system and a new ISDN hybrid from Telos. The revolutionary new products are based on Telos' industry-standard telephone hybrids.

"These new products present broadcasters with options they've never had before but have always told us they wanted," says John Grayson, US sales manager for Telos.

"The move to all-ISDN systems is the next progression for broadcasters who use our products," says Steve Church, president of Telos Systems.

Kevin Nosé, chief engineer for Telos Systems, says, "To the talent, the new ISDN products will perform in much the same way our current hybrids do, but the technology behind the scenes will be significantly more sophisticated than anything that has come before."

The multi-line phone system is capable of handling up to 24 lines (PRI or multiple BRI) expandable to 96. The all-digital system has an open-ended architecture for easy system changes and upgrades. The system is flexible, for example permitting program producers to

switch specific lines to any switch console. Line status is easily identified from the switch console or from Assistant Producer call screening software.

In a stand-alone installation the ISDN hybrid can support two lines simultaneously, and will feature an internal mix-minus bus, caller equalization, dynamics processing of caller audio, and will support S and U interface.

The audio interface will be expanded to include both analog and digital (AES/EBU) formats. Analog inputs will accept microphone and line-level signals, and mic inputs can support phantom power.

"The new ISDN hybrid will provide twice the functionality of our existing hybrids," says Nosé. The ISDN system will help broadcasters expand their ability to fully utilize ISDN, adding a real performance advantage in audio quality, ease of use, and cost.

"We will be beta testing the new products in mid-1999," says Grayson. "In fact, interest in our new products has been so intense, we're having a hard time keeping the beta test sites to just a select few." ~

d.c. 21
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1999

Inside:

Assistant Producer Makes On-Air Traffic Control A Breeze

The Motley Fool and Assistant Producer

Judy Jarvis and Assistant Producer

Customer Support with Rolf and Corny

Telos At Trade Shows in the U.S. and Europe

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SNEAK PREVIEW

Cleveland Rocks With Zephyr

When radio stations really want to Rock and Roll they go live from the Rock and Roll Hall of Fame and Museum in Cleveland, Ohio. Thanks to the Telos Zephyr hundreds of radio stations from around the world have done remote broadcasts from the Rock Hall's fully equipped radio studio.

Dave Hintz, radio coordinator at the Rock Hall, says the sound quality from the Zephyr is hard to beat. "It doesn't have the breakouts and holes like satellite," Hintz says. "And, with Zephyr and ISDN, you have talk-back communication. The DJ in our Cleveland studio can hear the on-air signal back home, and the producer can talk to him or her in a cue between sets. It's much more efficient than satellite."

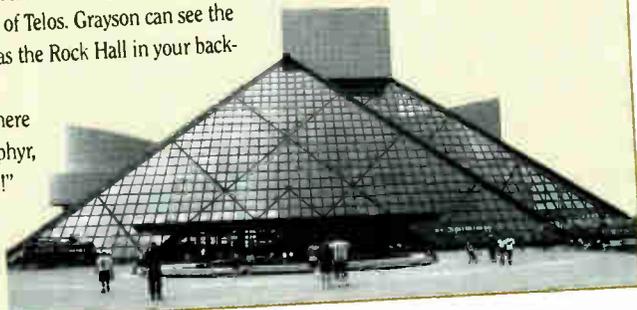
Plus, ISDN costs less than satellite. A lot less, he notes. With Zephyr a station pays little more than a long distance phone bill. In 1998, 135 different stations broadcast from the Rock Hall's studio. Hintz says the museum averages about three stations a week. Most of the stations originate from the Rock Hall for several days and some return more than once a year.

Since opening in 1995, the studio has hosted more than 400 on-air shifts. In March of this year alone, Hintz says, 13 different stations are slated with multiple broadcasts scheduled. Regardless of whether they come from Anchorage or Miami, London or Sydney, they're all using Telos Zephyr.

"We're proud to have our gear at the Rock Hall," says John Grayson of Telos. Grayson can see the Rock Hall from his office window. "When you have something as cool as the Rock Hall in your backyard, you do your part to participate in its success."

"Zephyr is enabling radio stations from around the world to come here to Cleveland," says Grayson. "It's a fun place to visit and, thanks to Zephyr, radio stations sound great when they're on the air from the Rock Hall!"

Listen in on a live broadcast. Visit <http://www.rrhofm-radio.com>. This new Internet site puts the Rock Hall studio broadcasts live on the Internet. ~



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Chaos From Y2K Seems Unlikely for Radio

► Y2K, continued from page 6

I doubt these flaws would cause the kind of chaos some would lead you to believe will occur with non-Y2K compliant systems. Most such systems installed after 1995 already had basic Y2K compliancy built in, from what I have been told by tech support folks at various major system vendors.

Again, there are a few minor "black holes" that have since been identified, and are easily fixed with software patch upgrades. All a station has to do is call the vendor, order it, and schedule an installation before the end of the year.

I did call a well-known telephone systems company and asked what would happen if I did not upgrade the system software to their latest Y2K-compliant version. Even after referring me to several tech support people, they couldn't say exactly what would happen, but strongly advised me to do the upgrade anyway just to be safe — all for the price of \$4,500.

This left me wondering how many less-than-scrupulous companies are using Y2K as a windfall opportunity to sell upgrades that may not have any meaningful impact on Y2K functions at all. The more likely explanation is that when software authors released products without Y2K compliancy after the introduction of Windows 95, they obviously counted on the Y2K fix

being part of a future upgrade so they could have at least some improved feature to justify charging money for it.

My GM just showed me a flyer from some Y2K company. It promotes the fact that "Windows 95 is not Y2K compliant." They're trying to sell a two-day Y2K workshop for \$695 per person.

He wondered if this was a big red flag, pointing to the need to upgrade every machine to Windows 98. That bug has gotten plenty of ink in the PC trade press and consists of incorrect dates possibly showing up on file details in the File Find Tools section. Not the kind of thing that will likely keep him from making budget. The fix is a simple Web site download to a floppy, executed in every Windows 95 machine, taking at most about three minutes.

Let's face it, Mr. Becker. The "Y2K Crisis" has done more to promote business opportunities for selling software and hardware upgrades than fixing mission-critical problems. PERIOD. It's an automatic marketing bonanza. The temptation to over-dramatize its likely fallout is just too great for those in the business who can easily profit from it.

You can read the regular comments of masked engineer Guy Wire on our Web site, www.rwonline.com

RW welcomes other points of view.

IBOC, SDARS Systems

► DAB, continued from page 8

vice president, Gannett Co., Inc.; Mel Karmazin, president and chief executive officer, CBS Corp. and Infinity Broadcasting Corp.; Al Kenyon, vice president, engineering, Jacor Comm.; Alfred C. Liggins, III, president and chief executive officer, Radio One Inc.; Robert J. Struble, president and chief executive officer, USADR; and Farid Suleman, executive vice president and chief financial officer, Infinity Broadcasting Corp.



SATELLITE RADIO

Struble remains in charge of the company's day-to-day operations. He said he was pleased that some of the "best names in the industry" have chosen to take an active role. All board members are from companies that have invested in USADR. USADR has another investor, ABC Inc., bringing the total number to 15. The change means USADR now has all of the top 10 radio groups as investors.

USADR planned to exhibit at NAB99 as well.

Digital Radio Express has moved out of the TriTech Microelectronics building to another building in Milpitas, Calif. Vice President of Engineering Derek Kumar said DRE needed more space, which included a garage for its field test van. At press time, DRE had not decided if it would exhibit in Las Vegas.

SDARS license-holder CD Radio expects to delay the beginning of its pay radio satellite-delivered DAB service about three months, to the fourth quarter of 2000. The company cited delays in availability in Proton rockets for pushing back the satellite launch schedule. The first of its satellites will be in orbit and tested in June 2000, rather than in March.

Chip set costs

CD also said it expects to pay about \$27 million, rather than a previously estimated \$9 million, for integrated circuits or "chip sets" from Lucent Technologies that will be used in the wireless antenna and the "plug-and-play" adapters that consumers can use to receive the CD Radio signals in current car receivers. CD Radio cited higher-than-expected engineering design costs for the increase and estimated the total cost of the delay at \$175 million.

CD also is suing XM Satellite Radio, alleging patent infringement, and seeks an injunction to prevent XM from building its current system. "They can build whatever system they wish. They simply can't infringe on our patents," said CD Radio Chief Executive Officer David Margolese. XM said the suit is without merit.

According to Margolese, the suit involves CD patents for time diversity and space diversity. "Using more than one satellite to provide an SDARS service is a patented configuration of ours. We stagger the signals in time and then we use a memory buffer in the radio so that when you go under an overpass, for example, if all the signals from the satellite are blocked, you are listening

to the signal through the memory buffer for three or four seconds, and then you come back to the satellites. ... The multiple satellite architecture covers more than just two satellites. It's anything more than one satellite up there to provide an SDARS service."

An FCC source familiar with DARS technology said launch delays for a new service are not unusual. Others contacted for this article agreed.

"A one-month delay in the beginning can lead to a six-month delay at the end, particularly when you're manufacturing the chips from square one. It's not like CD Radio can go to IBM and pull some chips off the shelf and build the receiver the way they want to build it," said the FCC source, who spoke on condition of anonymity. "They have to start from the design stage and tell the manufacturer how the chip needs to look and what it needs to do."

A third company has an application before the FCC to provide SDARS service. Called WCS Radio Inc., the company is a consortium of 10 regional wireless service license holders that want to try their hands at an SDARS service by using the wireless spectrum it already won at auction. WCS obtained twice the spectrum — 25 MHz vs. 12.5 MHz — as each of the two SDARS license holders. But there are gaps in that spectrum that would need to be alleviated before it could provide a national service.

Terrestrial repeaters

Also, the FCC must determine how many terrestrial repeaters SDARS providers would be able to place and how they would be operated. CD has experimental licenses from the FCC to test repeaters at different power levels in San Francisco.

CD amended its technical plan, changing from a geostationary to a non-geostationary satellite system at a higher orbit. The higher elevation means that CD would need fewer repeaters than it originally thought necessary, for a total of about 100, for its signal to be received in urban areas.

Both CD and XM plan to offer subscription services of 100 channels each, which would cost the consumer about \$10 per month and be split between talk and music formats. They predict their national service formats will sound better than analog radio, and draw listeners unserved by existing formats.

CD Radio needs about one million subscribers "to achieve cash flow break-even," said Margolese. XM Satellite Radio said its research showed both services could attract between 15 million to 20 million subscribers each.

CD Radio recently opened an office in Detroit to further relationships with car companies. XM Satellite hired LCC International to perform preliminary RF design, site acquisition, zoning and construction analysis for an initial 30 cities for XM's planned terrestrial repeater network. It plans to deploy repeaters in 70 cities, for a total of about 2,000 repeaters.



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without the inevitable flaws of 32kHz systems. Check out the oscilloscope graphs to the left and see the results for yourself.

And to make your decision even easier, contact your Omnia.fm dealer for a no-risk, sixty-day demo and money-back guarantee*.

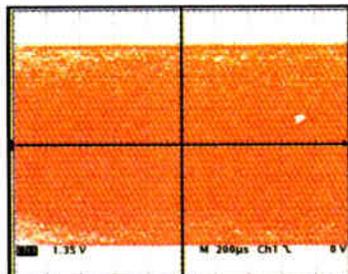
Here's how: Using program material, the Omnia.fm was set to process aggressively. Programming with substantial low frequencies and clean high frequencies was used to provide a good challenge for the control of overshoots. The analog Left Channel output was connected to a Tektronix TDS-744A digital storage oscilloscope, which was set to the infinite persistence mode. Each waveform was stored for at least one minute so that the display "fills in" with traces of audio waveforms.

The "flat" lines along the top and bottom of the filled in section represent clipper performance. Any "dots" that exceed the reference level of 0.650 volts are overshoots. The lower left graph shows "blips" representing overshoots 15 to 20 percent beyond the reference peak level of

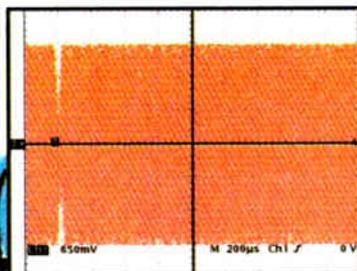
± 0.650 volts. The Prediction Analysis Clipper reduces overshoots in the sample-rate-converted signal path to an insignificant three percent.

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

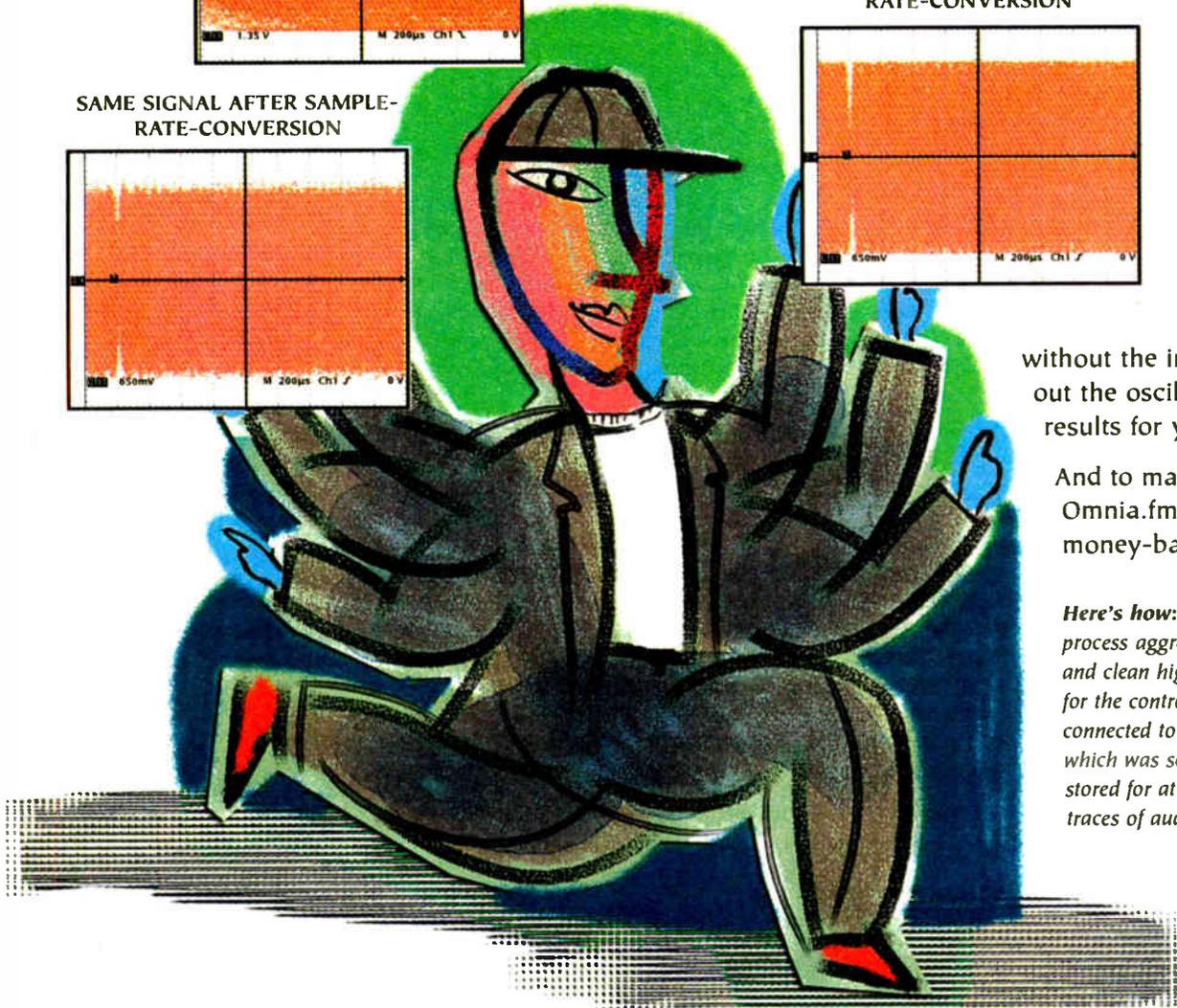
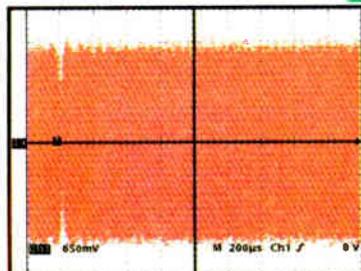
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World Radio History

Smith: Digital Transition Critical

► SMITTY, continued from page 1

colleagues as Smitty has held his current position with Greater Media for 15 years. For the preceding 11 years, he worked in a similar position for radio group owner First Media Corp. He also spent several years with Tribune Broadcasting in New York.

Smith, 50, started in the business as a disc jockey and "techie" more than 30 years ago in Vermont. He now is at the forefront of radio technology. He has been involved in the effort to develop an in-band, on-channel digital audio broadcasting system from the beginning, and has been a proponent of radio data system receiver technology.

As chairman of the National Radio Systems Committee DAB subcommittee and a member of DAB-related working groups, Smith says he is committed to seeing radio make the transition to a digital medium.

Smith spoke with *RW* News Editor/Washington Bureau Chief Leslie Stimson about a range of regulatory issues facing radio, including DAB, low-power radio and receiver trends. He spoke about the challenges of being a radio group engineer as the industry continues to consolidate, and called for an industry effort to standardize audio file formats used in digital audio editors and delivery systems.

RW: What are the important new technologies for radio now?

Smith: Certainly the transition to a digital transmission system of some sort has got to be right up there — IBOC, if you will. That has got to be number one on the list. We are rapidly turning into one of the last remaining analog-only media out there, in terms of an entertainment medium. ...

(Also) the continued migration of stations to a computerized or digital system of storing and playing information.

'The real question here is not what (DAB) system is best, but are any of them good enough.'

RW: As chairman of the DAB subcommittee of the National Radio Systems Committee, tell us how the challenge of guiding the development of the new technology is progressing.

Smith: The work of the subcommittee is actually going very well. This is sort of our second incarnation of trying to find an IBOC system that works. We didn't find one the first time. (Smith refers here to the earlier EIA tests involving both IBOC and non-IBOC

DAB systems. — Ed.)

I was chairman of the test report working group, and of course we never really got to write one. But, on the other hand, I don't look upon that first effort as anything other than a positive.

What it did was identify what the real problems were, number one, and number two, I think was a little bit of a reality check as to what a tremendously difficult task developing a workable IBOC system is. It's anything but trivial. It's an incredibly difficult endeavor

to try to fit this digital energy into an analog spectrum that is already darn full of stuff.

RW: Where do you see the development process headed in the next few months?

Smith: The subcommittee has already approved the laboratory test guidelines. The field test guidelines will be offered up for the subcommittee's approval next week. (They were approved. — Ed.) It is likely, if things go well, that both documents will be released to the proponents very shortly thereafter, probably about NAB time.

This is a voluntary process. No proponent has to submit anything to the NRSC. However, if they choose to do so and choose to have the NRSC consider their submissions, we are asking that they do it using the procedures and the formats that are in these test guideline documents.

I think a big vote of thanks go to Andy Laird, who does what I do for Journal Broadcasting. He chaired the working group that got those documents together and he did a marvelous job.

We are just now forming an evaluation working group to decide what we should do with this data coming back from the proponents, assuming there is some data coming back from their tests of their systems. The job of that group is to make recommendations to the subcommittee as to exactly how it should be evaluated ... and possibly whether a recommendation should or should not be made in terms of any particular system.

DAB submissions

RW: You said that it is voluntary. To whom would the proponents give the data, if they did not give it to the NRSC?

Smith: Conceivably, and this is merely a hypothetical, they could choose to submit it directly to the FCC. They could release it to the public.

RW: Isn't the FCC looking to the NRSC to do this work?

Smith: I wouldn't want to say that. It is to the industry's benefit if the industry can see its way formulating a solution to "How do we do digital radio?" As far as the obvious place for that to happen, probably the most obvious, would indeed be the NRSC. And

yes, I think the commission would welcome the NRSC ultimately recommending a system or systems to it, although we have not decided to do that yet.

RW: The NRSC at this point hasn't chosen to select a single system.

Smith: That is correct. That is work yet to be done. ... Assuming that we do get some test data back from the proponents, I think the evaluation of that will tell a lot as to the further direction of work that the group should be.

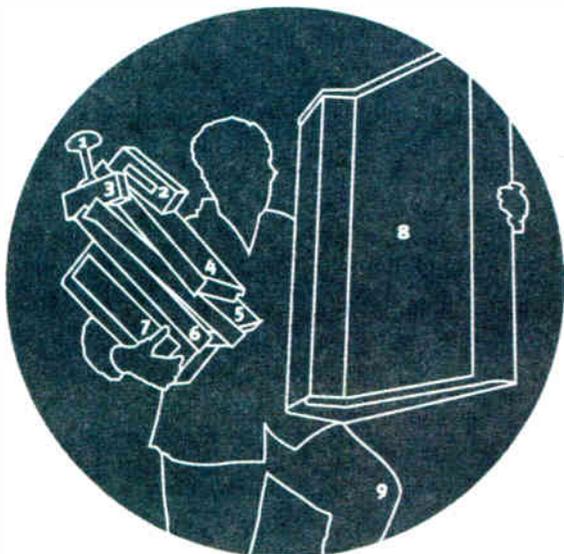
RW: All of the proponents expect to be field-testing soon. When would they be submitting the results to the group?

Smith: ... We have some indication that at least some of the proponents will have their tests completed and material to the group by sometime toward the end of '99.

RW: If we get to the end of '99 and there is no one system that stands out, do you think the FCC might cherry-pick from all three? Or tell the proponents to work together in an alliance?

Smith: The commission can choose to do anything it wants. They would probably

See SMITTY, page 16 ►



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Where Is IBOC DAB Headed?

► SMITTY, continued from page 14

love to avoid doing that. They would love to have a system delivered. I don't see any evidence at this point of any Grand Alliance type among the proponents. They all seem to be strong proponents and quite confident in their technology.

The real question here is not what system is the best, but are any of them good enough. They weren't the first time, unfortunately. The goals and objectives of the DAB subcommittee is that this should be something that is demonstratively better than the existing AM and FM service. At the same time it (should) not cause undue degradation or interference of the existing analog

service. That is really the big hurdle.

RW: How far away are we from IBOC

'I don't see any evidence at this point of any Grand Alliance-type among the (DAB) proponents.'

in reality? Where is IBOC going to be a year from now?

Smith: I would hope a year from now

and possibly less that we will have at least an answer as to whether IBOC, in its second incarnation here, is going to

be a viable path to a digital radio service across the country. If it appears to be, I think you will see a very rapid

embracing of the technology by the regulatory people and a pretty darn rapid roll-out by the broadcasters.

RW: Not all industry observers are convinced that IBOC is the best way to go DAB for this country. There are still some Eureka-147 supporters out there.

Smith: From a strictly technical standpoint, Eureka at least seems to work reasonably well. It may be the right system for a lot of countries that don't have the kind of commercial broadcasting infrastructure that is here. It seems to be the wrong system for a lot of reasons for the U.S. ...

The system of broadcasting in this country is comprised of entrepreneurs with a lot of different facilities, from very big and powerful to very small. To a certain extent this mix is what has made broadcasting fly in this country. Eureka, if implemented in the conventional manner, just totally levels the playing field, as far as the various broadcasters are concerned.

RW: The commission has decided to explore formally the creation of a low-power service. It's a decision that could greatly affect IBOC development.

Smith: That's putting it mildly. I was a little surprised that the first formal document from the commission on this was an NPRM rather than a Notice of Inquiry. This seems to be a push on the part of the regulators to get on with this.

RW: USADR has requested a slight tightening of the emissions mask for AM and FM stations operating in the hybrid and all-digital modes. In the LPFM proposal, the commission has also suggested a tightening of the emissions mask for FM, to allow more stations in the band.

At the same time it is suggesting channel protection be eliminated for third-adjacent channels and either eliminated or at least relaxed for second-adjacent channels. The FCC is assuming that digital energy would be contained in the channel by tightening the mask. Do you think that could work?

Smith: I am not sure at this point, although I am not overly optimistic ... how any of the proponents at this point would really further scale back their occupation of spectrum in a meaningful manner that would tend to mitigate this.

This is a pretty alarming proposal to many of us in the business. This (LPFM) represents that the commission basically has decided to implement a new broadcast service, if you will, be it a low-power or not, that basically proposes to take spectrum from existing operations to make these low-power operations viable through doing away with the 3rd- and possibly 2nd-adjacent protection requirements.

I know how hard all of these proponents have worked to get the amount of RF energy that they need to have safely ensconced somewhere in the analog channel that, one, doesn't interfere with existing analog and, two, has minimal interference effect with other co- and adjacent channel, both analog and potential digital operations.

It's all based on the long-standing protection requirements existent in the rules. Now, all of a sudden, here at the

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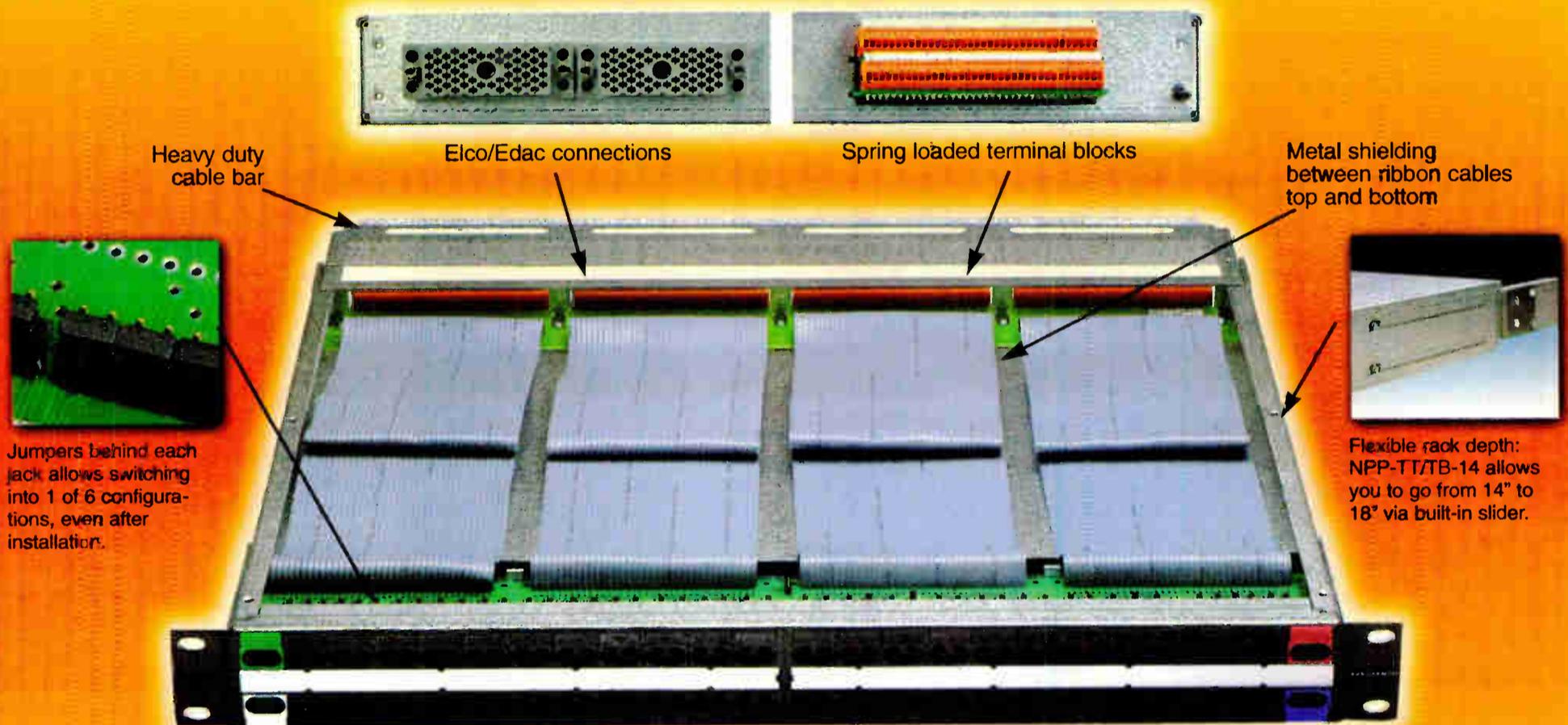
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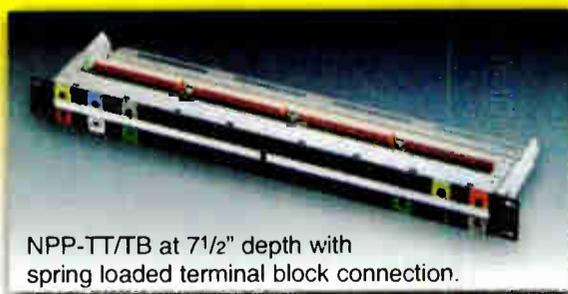
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Smith on Effects of LPFMs

► SMITTY, continued from page 16

eleventh hour, it would seem that the commission is interested in changing those requirements. I know the proponents ... are scrambling in terms of research efforts to see exactly what this means to them.

Secondary services?

RW: Would it be easier if all of the LP1000's, the LP100's and the "micros" were licensed as secondary services rather than as primary services?

Smith: In terms of the IBOC considerations, I'm not sure that would make too much difference. That would certainly

aid full-power operations in terms of facilities changes that they might have to make down the road.

As you pointed out, the LP1000's, or whatever they are called, would at least tentatively be allocated as a primary service, and in the case of a full-power operation needing to make a site change for whatever reason, the impact of that facility would be just as great as any other facility they might have to deal with from an allocation standpoint.

The critical thing is that there would be additional potential energy from these stations that would be present in quantities not anticipated now because

of this loosening of the protection requirements. That would unfortunately be the case whether it was a secondary authorization or not.

RW: How could new LPFMs affect existing full-power stations?

Smith: In many instances, and never more so than the last couple of years, the DTV build-out requirement (meant) a lot of us have had to re-site existing facilities. We have literally been thrown off television towers that now need their tower space back to implement the DTV.

When one has to make a geographic move like that, basically you are chang-

ing the allocation situation for your operation. Wherever you are moving it to, assuming you can do it at all, you have to take into account the various spacings of the stations that you are protecting from that new site.

Every time there is a new potential operation added, it's one more potential station that has to be taken into account (in) a re-siting effort like that. It's very difficult, particularly in the more populous parts of the country now, to re-site anything. The band becomes even more cluttered with these additional facilities. It's only going to make that situation worse.

RW: The commission is assuming that 3rd-adjacent channel protection requirements can be dropped. Can we assume that?

Smith: I do not think we can. It's very likely that some broadcasting companies will be conducting studies or resurrecting studies that have already been done in other years to assess the effects of this — what happens at the listeners' receiver, as opposed to any sort of theoretical estimates we might make in terms of desired/undesired interference ratios and that kind of stuff.

The question is, what happens when you compromise the existing protection requirements, what happens at the receiver? Does that listener's receiver suddenly become more prone to interference? Based on my understanding of the receiver universe, there are some receivers that perform just fine in such a situation, and there are other receivers that would not perform well at all. You are talking millions of both kinds. ...

To make the assumption that you can eliminate any of the existing protection requirements, without getting a good handle on the receiver universe and what is out there right now in terms of performance, is a little premature.

RW: Will the advent of satellite digital audio broadcasting have much effect on how consumers respond to IBOC?

Smith: There is really no model for SDARS that we can point to and say, well, it worked this way before so we think it will work this way this time.

The closest thing you had to it, and it's not that close, has been the various efforts over the years to do cable-delivered audio. That has been attempted for 25 years in some form or another. What it always came down to was that very few people wanted to pay to listen to the radio on the cable. Those who did, didn't listen to it very long. So in terms of the pay-for-play model, in terms of radio, that is a real question mark.

Pay for the radio

RW: Convincing people they really need to pay \$10 a month ...

Smith: Or whatever, and considering the fact that for the last 80 years or so, that they have had an absolutely free service available to them that did not cost them a nickel.

Number two are the various propagation issues. These SDARS people have come up with very creative solutions to try to achieve a relatively seamless service. It remains to be seen if that will, in fact, be the case.

See SMITTY, page 19 ►

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► SMITTY, continued from page 18

Most listeners now are used to being able to punch on a radio station and largely carry it to where they are going in a mobile environment and carry it back home again without too many interruptions. That can sometimes be a challenge with a satellite-delivered signal.

Number three is the receiver issue. The receiver manufacturers always love to make new receivers that they can sell, because that is their business. The real question is whether listeners and purchasers of automobiles are going to be interested in paying the few bucks more for the ability to receive this, at least in some cases, subscription satellite-delivered radio service.

RW: Say that SDARS does work. Then the receiver manufacturers would build new product for them because they to get new products to consumers. Eventually, wouldn't they build one receiver that can receive both IBOC and S-band DAB signals?

Smith: I am sure they would. I am sure that if the demand is there, there will be an integrated receiver that conceivably, my guess, would do everything — AM,

FM, IBOC, SDARS, what have you.

RW: How far away are we from that integrated receiver?

Smith: That is hard to say. It could be a relatively short time cycle. If there were a service out there that was perceived

'I can remember when we built stations that were 6,000 or 8,000 square feet. Now it's 40,000 or 50,000.'

by the receiver manufacturers to be one that listeners would be interested in. I think you would see integrated receivers.

I am not necessarily talking about one that is all four services, but perhaps an AM-FM-IBOC receiver or AM-FM-SDARS or something like that in a relatively short period of time. ...

The receiver manufacturers have

probably looked carefully at how to do this, and I suspect most of them probably have prototypes already. If there was money to be made, I am sure you would see those receivers in a relatively short period of time.

RW: You have been active in the effort

now or very shortly.

RDS clock complaints

RW: We've heard complaints about stations not setting their RDS clocks.

Smith: That has been one of the unfortunate side effects of the lack of interest in this. As the lack of interest continues, the number of receivers did not increase.

It almost fell into disuse when stations would leave their encoders on but would not be particularly careful about some of it in dynamic parameters. That is a common complaint we have heard — "This guy's got RDS on, but his clock is eight hours off!"

If you are going to provide the service, you have to have a somewhat believable product there.

RW: You are the vice president of engineering for Greater Media. What changes have been brought by the recent death of Greater Media's Radio Division President, Tom Milewski?

Smith: It hasn't changed things for me a whole lot, but it has changed things somewhat in the company. Our long-time Boston cluster manager, Peter Smyth, who has been with Greater Media almost as long as I have, was just recently appointed group vice president for the radio division. ...

Of course, Tom was much more than that to Greater Media. He had

See SMITTY, page 21 ►

What Smitty's Peers Say

I've known Smitty for 15 years through our NAB committee work. He's a very fair and open person. He really solicits ideas and has been a great chairman of the DAB subcommittee.

He can listen. He can hear the threads of thought ... when you have a bunch of people talking ... he's able to distill it and either develop a consensus or pass it on for further thought without causing animosity. He has a great sense of humor and that drives a lot of it. He's held in high regard.

— Andy Laird
Director of Engineering, Radio Journal Broadcast Group

He's certainly out front on doing the right thing for broadcasters. He's been an instrumental, guiding force in industry decisions, looking after the interest of broadcasters on issues such as RDS and AM improvement.

I've been working with Smitty going on 14 years on industry issues. He's also done some outstanding things as far as optimizing things at Greater Media. He's done a lot of creative and inventive things, including moving transmitters, to get the best signal he could for his company.

— Glynn Walden
Director of Engineering
USA Digital Radio

He's brilliant. I've worked with Smitty 13 years. He is a gentleman in every sense of the word.

He has incredible intellectual capabilities and he deals in solutions vs. problems. He understands where the technical revolution is going. There's an old expression in hockey: You want to be where the puck is going, not where it is.

I challenge anybody to meet us on the technical field. He has an incredible ability to be able to take his depth of engineering knowledge and communicate that to our local managers and engineers. That's an incredible asset to have.

He's always available. It doesn't matter if it 3 p.m. on a Saturday, there's Smitty. He's also a great friend of mine. I've learned a lot from him.

— Peter H. Smyth
Group Vice President, Radio Greater Media

I've known Smitty since the mid-'80s through NAB meetings. The one issue we've spent the most time on is DAB.

We went to France to see the first formal introduction of the Eureka-147 system to regulatory folk like us.

He should be roasted! He's got a such a good sense of humor. He's always in a good mood. He keeps things under control and tries to keep the meetings interesting. And he's a good diplomat.

— Bert Goldman,
Vice President, Engineering, Radio ABC Disney

I can't think of any negatives except he likes to spend a lot of money. Smitty likes to do things top-drawer and only top-drawer. He is a delightful fellow, gregarious, insightful intelligent and funny. I inherited his job in 1984 and I got to follow what he had built here. For the budget under the old First Media regime he had, it was a work of art.

— Tom McGinley
Chief Engineer
WPGC-AM-FM and WARW(FM)
Washington, D.C.
RW Technical Adviser

to popularize radio data system receivers.

Smith: We've have RDS on just about all of our stations for a long time — some of them doing some real creative stuff with it, like scrolling song titles and promos, and others doing it more simply with call letters and fixed messages. ...

The receivers just were not there for the last few years. Now it seems, according to our colleagues on the automobile manufacturing side, that there will be an increasing number of them as standard equipment in the cars, right



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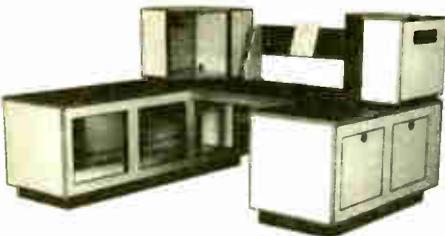


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Smith and Construction Projects

► SMITTY, continued from page 19
 been with Greater Media for over 25 years and had served in many posts within the company, most recently as general council, executive vice president of the entire Greater Media organization and, of course, president of the radio division. Tom is going to be greatly missed.

RW: As Peter Smyth has been promoted, will he still be based in Boston?

Smith: Yes, he's planning on working out of Boston and occasionally making a full ride to the corporate office here (in East Brunswick, N.J.). He still has responsibility for five radio stations up there.

On the block?

RW: We've heard rumors of Greater Media possibly being sold. Is that correct?

Smith: Most people at this point would think of Greater Media as a radio company. But Greater Media was involved in television and in publishing and some other businesses as well. Just recently — and this is not a surprise to any of us here at Greater Media, because this has been anticipated for several years — Greater Media did sell its cable division to other companies, Comcast Corp. and Charter Communications. I think that has fueled speculation that the entire company was on the block. ...

As a matter of fact, I think the converse is true. We anticipate some growth in the radio area. ...

The cable industry these days has undergone consolidation that makes radio consolidation look minor in comparison. The judgment was made — and I think it was a good one — if you want to be a real player in the cable area these days, you have to be much larger than we were at the time we decided to sell.

RW: How is the engineering division of Greater Media organized?

Smith: We have adopted a cluster model in response to consolidation in the various cities.

We have one very strong chief engineer in each of the markets. They have anywhere from two to five engineers on their staffs at the various locations. It generally works out that there's a chief and one engineer additional per station in a market, more or less. ... My interaction, generally speaking, is with the station engineers and station general managers from this office.

RW: What are their duties?

Smith: They are responsible for all aspects of the day-to-day technical operation of the station, which is maintenance, compliance, project planning, budgeting, hiring of staff engineers, those kinds of things. ...

This particular year, with some of the projects that we've had going on, has been far and away the largest year in terms of capital spending in the history of the radio division by a margin.

RW: What kind of projects?

Smith: With the acquisition of additional properties, particularly in Philadelphia and Boston, the decision

was made on the part of the company to pull these properties together and integrate them into a common facility.

We've just completed construction of a roughly four-or five-thousand-square-foot stand-alone studio complex. There are roughly 22 radio studios and, of course, a lot of office space. ... That was pretty much a ground-up build. We're doing a project of similar size, albeit in a lease-space situation, in Philadelphia. We're pulling the four stations that we own in Philadelphia together into one space.

Those, in addition to some RF-related projects that serve to perform similar consolidation functions in those two

markets, have resulted in a very capital-intensive year for us.

RW: What is your role in a construction project?

Smith: In Boston ... and in Philadelphia too, these were very large projects. These are multi-million dollar builds. ... These involved processes from the conceptual stage, where you try to collect the information from everybody who should be and might want to be involved to the development of the plans, to the actual implementation of the project itself, to finishing the thing off.

I've spent every Tuesday for the last

year-and-a-half in Boston watching that exercise up there.

RW: What is the status of your major rebuilds or consolidation projects?

Smith: The Boston one is almost complete, or close to it. We're about 40 percent through the Philadelphia job — which I would say is somewhat similar. That is about a 35,000-square foot job. We're pulling four stations into one space, which involves a lot of office and studio construction.

At the same time, on the RF side of things in Philadelphia, we have tried to the extent possible to cluster the transmitting facilities of some of the stations, which has resulted in significant projects involving multiple-user antennas, combining systems and that

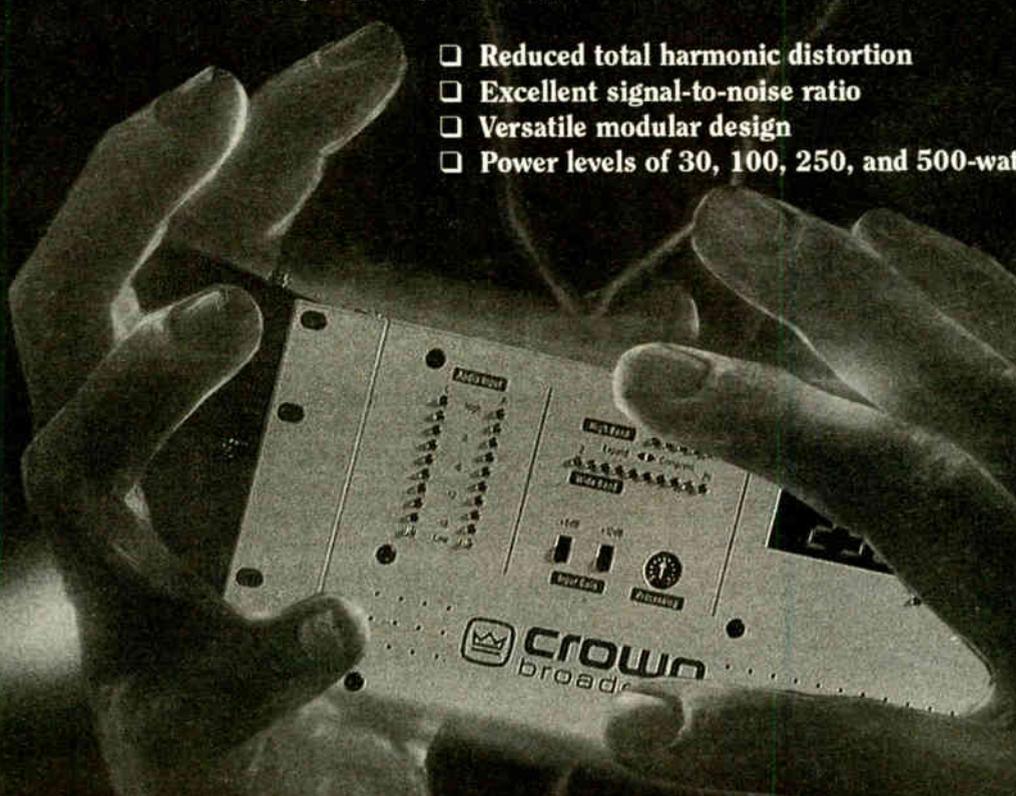
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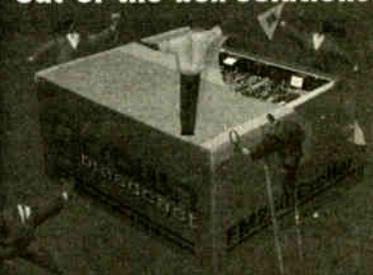
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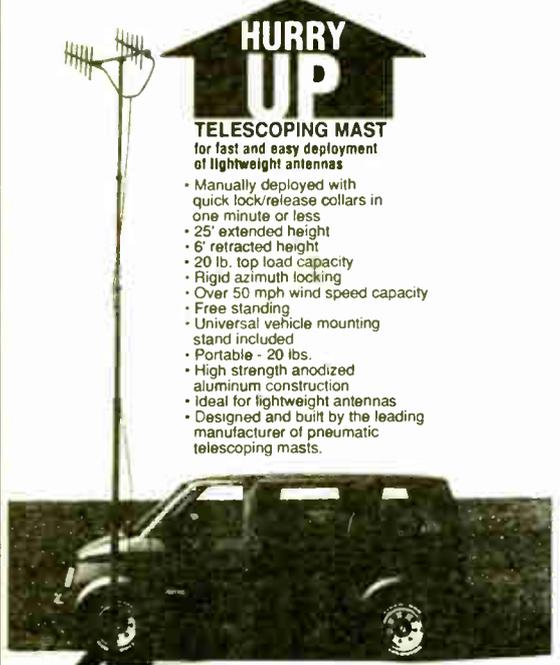




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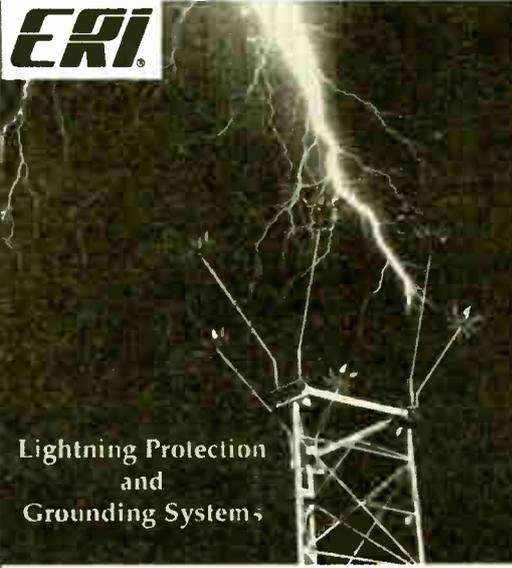


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Model TM4013 Tri-Maze

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The DTMF-16 is perfect for interfacing networks to your automation, controlling remote satellite receivers, repeaters, etc. Connect it to an audio source and its outputs will operate whenever there's a tone. With a list price of only \$199, the compact & rugged DTMF-16 can be put almost anywhere to provide the remote controls that you need. For more info, contact us or your favorite broadcast supplier.

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READER SERVICE NO. 43

Future RF Build in Detroit

► **SMITTY**, continued from page 21
kind of thing. That has been the case in Boston also, as we've tried to reduce the number of individual sites that are involved in the operation of multiple stations.

RW: Do you have any other build-ups coming up?

Smith: The major projects down the road, I think, include a large RF build in Detroit. That's already underway, again having to do with the consolidation of some of these transmitting facilities and stations. We have another large RF project that we're anticipating in Philadelphia, probably the last half of this year, involving our AM station there.

Construction on a landfill

RW: Name one or two of your favorite projects at Greater Media in the past 15 years.

Smith: Building the new 50 kW site for KRLA(AM) in Los Angeles, that was a lot of fun, totally a ground-up build of an old top 40 station rich in heritage. It was a neat project and very challenging.

Since it was constructed on top of a

'We are rapidly turning into one of the last remaining analog-only media out there.'

closed landfill, we got into all sorts of interesting structural considerations. ... Whatever you did you sure had to be cognizant of all the environmental considerations. In some situations we did not get very far because all of the towers had to be supported by piles that were driven 240 feet into the ground to get into some solid ground underneath this landfill. (This station subsequently was sold. — Ed.)

Back in the early '90s we did a construction of a new master antenna system on the Prudential Tower building in Boston which involved just a whole lot of coordination and work: five FM stations, a TV station and a whole new massive antenna-system combining (system). That was a pretty interesting exercise, particularly in terms of keeping everybody on the air at the various stages of the project.

RW: How are equipment purchase decisions handled? Do the engineers at the stations sign off on that? Do they have to go through you?

Smith: There's a budgeting process that goes on in this company annually. It is basically two different tracks. One track is the ongoing day-to-day operational expenses at the locations which would include salaries and maintenance items, relatively small capital items.

Those budgets are developed by the station, ultimately approved by the

management of the radio division. At that point, those are largely implemented with little involvement from this end.

In terms of any capital projects, that is a separate budgeting track. Each location brings a wish list of capital projects forward every year. That is reviewed on a company basis and the decisions are made as to which projects are valuable and that we believe need to be done. I am more involved in terms of the implementation of the various projects, be that getting involved in equipment selection or contractor selection and monitoring the project as it goes along.

RW: How many people do you have under you company-wide?

Smith: There are probably 20 or 22 engineers at Greater Media at this point.

We are always looking for good people. As a matter of fact we have an opening or two at the staff level at a couple of the stations as most people in this industry are finding that it is getting tougher every day to find and recruit good people.

RW: How do you recruit engineers?

Smith: ... We try, whenever possible to make positions available to less-experienced people if we can, but that is not always possible. Many times, when you

are doing a hire you need to bring on somebody who is up to speed and can hit the ground running. ... The few new young guys that I have been able to recruit, I've largely done so from areas other than broadcast radio.

Square footage

RW: This leads into how consolidation has changed your job and the basic engineer's job.

Smith: The facilities that our people are charged with taking care of are much more complex than was the case in the past.

They are much larger, too. I can remember when we built radio stations that were 6,000 square feet or 8,000 square feet. Now it's 40,000 or 50,000 square feet. That would be four or five

See SMITTY, page 24 ►

Comrex Covers the World

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Cash™

The name tells you what it makes.



Cash, from Prime Image. You don't need one unless you want to make some.

With Cash™ radio broadcasters can create additional commercial time. Which creates additional revenue.

Cash doesn't reduce program content. Listeners won't even notice it. Yet it allows broadcasters to add 60 seconds of commercial time or more every ten minutes. Without audio artifacts. Without affecting pitch or creating a "chipmunk effect." And it works in real time, right on the air.

Features:

- Real-time, on-air operation.
- Variable selection – add from zero to four minutes, within ten minutes to two hours.
- Doesn't reduce program content.
- Undetectable process doesn't affect pitch.
- No digital artifacts.
- Models available for mono or stereo broadcasts.

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INPUT Level	0, +4 dBm 600 Ohm or H1Z Bal or Unbal, XLR
OUTPUT Level	0, +4 dBm 600 Ohm Bal or Unbal, XLR
Variable Level	± 16 dBm (clips @ +20 dBm)
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S/N (A-wt-filter)	86 dB
THD	.04%
Additional Commercial Time	2 Sec. - to - 4 Min., Mono
	2 Sec. - to - 2 Min., Stereo
Variable Commercial Time	0.1 Sec. Steps

Note: Unit does not use data compression

OPERATIONAL CONTROLS

Enable Button	Enables each of the other buttons
Start Button	Starts Commercial Insertion Time
Hold Button	Stops Time Reduction (pass real time information)
	Returns output to Real Time
Stop Button	Move forward or reverse in menu
2 Mode Buttons	Increase or Decrease menu selection level or setting
2 Set Buttons & Knob	Push to enter Level menu
Level Button	Push to enter Time menu
Time Button	F1, 2, 3, 4, Preset up to 4 events
4 Preset Buttons	

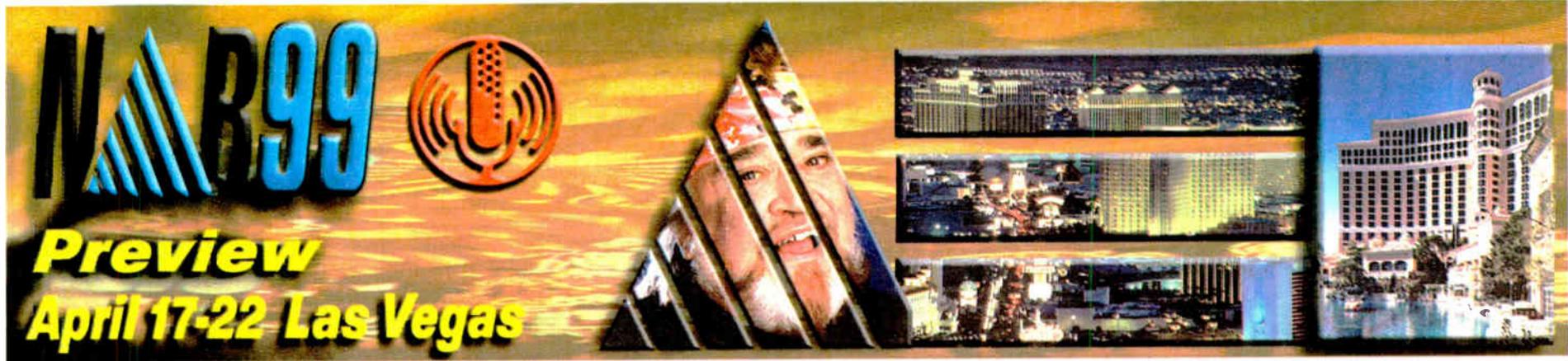
ENVIRONMENTAL

Operating Temperature	+32°F (0°C) to 113°F (45°C)
Operating Humidity	10% to 95%, RH, Non-Condensing
Power Supply	117 VAC ± 10%, 60 Hz or 220 VAC ± 10%, 50 Hz or 60 Hz
Power Dissipation	50 Watts Max
Height	1 U, 1.75 Inches (4.44 cm)
Length	19 Inches (48.3 cm)
Depth	12 Inches (30.5 cm)
Weight	20 lbs. (9.1 kg)

OPTIONS

Rack Mount remote	R-A
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**Prime
Image**



LPFM Likely to Be Hot at NAB99

While Radio Consolidates, It Also Faces Technical Hurdles, Competition From New Media

Leslie Stimson

Radio, now a \$15.4 billion industry according to recent annual sales figures, has continued interest from advertised Wall Street investors as consolidation helps make the industry larger and stable.

But with NAB99 set to open in April, radio managers expect increased competition for ad dollars and listeners among radio and other media, while the pace of consolidation continues.

Structural change may be coming from within, particularly in proposed changes to the FM band. Proposals before the FCC may permit hundreds of low-power stations to be added. That regulatory change is likely to be among the most pressing at the show.

Let the competition beware

Pay radio, or satellite-delivered digital audio broadcasting services, will vie for the attention of traditional radio listeners in the car.

Radio will have more exhibit space to fit 200 or so radio/audio companies that plan to exhibit. New construction at the convention center allowed NAB to put these booths together in the North Hall.

Some exhibitors said they are excited about the new space and find the expenses associated with the show worth the effort.



William Kennard

"It's the only place where I can speak to the worldwide broadcast market," Amy Huson, vice president of marketing for Orban, said.

"In that context, you're paying a few dollars for an audience that is usually diverse and hard to address. I believe it's efficient from a marketing budget point of view. Almost more important, it's time for many people in our company to speak directly to our customers."

Dave Scott, president of Scott Studios, said he finds Las Vegas conducive for business because the convention center, hotels and restaurants are close together.

Tim Schwieger, president of dealer BSW, said the spring show is one of the largest marketing expenses his company has each year, but that it is worth the expense.

"The show gives us an opportunity to meet with customers that have audio-based interests ... audio for video, multimedia and other industries that are not necessarily radio. This one of the few conventions where we can meet such a variety of customers."

He predicted attendees walking through the exhibit areas would have interest in digital equipment, including editing, transmission and audio consoles, as these digital products become more affordable.

Plan your week

The All-Industry Opening Ceremony on Monday, April 19, will feature keynote speaker Howard Stringer, chairman and chief executive officer of Sony Corp. of America.

This year the NAB has created several "Super Sessions" to draw attention to specific headline-type issues. For instance, at Monday's "Y2K — The Final Checklist," FCC Commissioner Michael Powell, who co-chairs the telecommunications portion of the President's Council on Year 2000 Conversion, will keynote.

Another new Super Session is "Where Is Wall Street Finding Value: Broadcasting, Multimedia, Satellite/Telecommunication," on Wednesday,

See OVERVIEW, page 30 ▶

NAB99: The Convergence Marketplace

When & Where

Conference: April 17-22

Exhibits: April 19-22

Venues: Las Vegas Convention Center, Sands Expo Center, Las Vegas Hilton

How to Register

Web site: www.nab.org/conventions/

Fax: (301) 694-5124

Mail: NAB99, P.O. Box 3379, Frederick, MD 21705

Phone: (888) 740-4622 or (301) 682-7962

Phone (more info): (202) 429-4194 or (800) 342-2460

How Much

Full Convention, Member: \$495, by April 14, or \$580 on-site

Full Convention, Non-Member: \$825 by April 14, or \$880 on-site

Spouse: \$100

Production Workshop Package: \$375 by April 14, \$425 on-site

Exhibits Only: \$150 by April 14, \$200 on-site

Radio World At NAB99

You will have ample opportunity to meet **Radio World** editors and contributors during NAB99.

RW Editor Paul J. McLane will provide opening remarks for the session "Digital Audio for Broadcast



Paul J. McLane

Engineers," Wednesday, April 21, at 9 a.m. McLane, a former radio journalist and broadcast equipment sales manager, will discuss his outlook for radio engineers

in the year 2000 and beyond.

Tom McGinley, technical adviser to **RW**, will moderate two panels: "Radio Transmission Systems — Digital and Analog" on Monday, April 19, at 1 p.m., and "Digital Radio Production" on Tuesday, April 20. McGinley is chief engineer of WPGC-AM-FM and WARW(FM) in Washington, D.C.



Tom McGinley

Technical Editor Alan R. Peterson will participate in the radio production panel on Tuesday. Peterson oversees the *Studio Sessions* section of **RW**.



Al Peterson

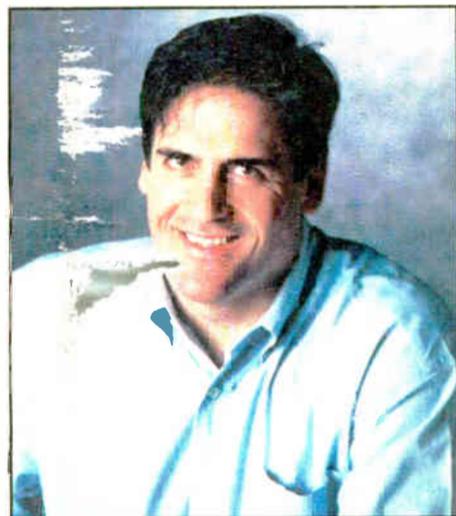
Cris Alexander, a regular contributor with a special interest in AM, will speak at the radio transmission session. He is director of engineering for Crawford Broadcasting.

Workbench columnist John Bisset will take part in the session "Communicating With Your Engineer," intended to bridge the gap between management and the "black magic" of engineering on Tuesday, April 20, at 1:45 p.m. Bisset is a district sales manager for Harris Corp.



John Bisset

Contributor Don Elliot takes part in the session "Does Your Production Sell Your Station's Image?" on Wednesday, April 21, at 10:30 a.m.



Mark Cuban

Competing for the listener's attention in the car are other media, including CD, DVL and, eventually, the Internet. The Internet also continues to chip away at radio's market share for those seeking new entertainment-programming at home and in the office.

In addition, there are now fewer people in the younger demographics that traditionally flock to new technology, according to the Consumer Electronics Manufacturers Association.

This factor could become critical as radio owners consider the possibilities of terrestrial digital audio broadcasting more closely. It is hoped that DAB will help radio remain competitive by improving the audio quality to at least equal that of CD and other digital-quality media.

Is This AM Antenna for Real?

Engineers Wonder if the Crossed-Field Antenna Could Revolutionize the Science of AM Radio Transmission

W.C. Alexander

Imagine an AM antenna one-fiftieth of a wavelength long, that needs no radial ground system, occupies a small parcel of land, produces little or no RFI, has great bandwidth and performs better than a full-sized vertical radiator.

Does this sound like a fantasy?

Until recently, it would have been. Now, working models of such an antenna exist in the Middle East, and at NAB99, Brian Stewart from the Department of

Engineering at Glasgow Caledonian University will present a paper on what has been patented as the Crossed-Field Antenna.

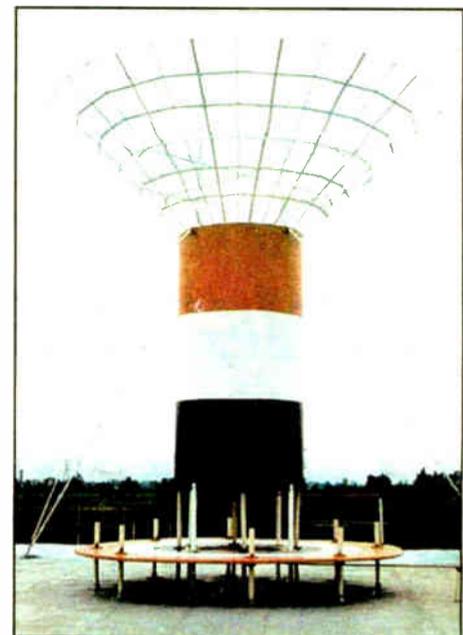
Synthesized field

Most of us have known since early in our electronics training that any conductor in which a radio frequency current flows can be an antenna.

When an RF current flows in a conductor, an electric (or E) field and a magnetic (or H) field are produced. These two

fields are in quadrature with one another, and at some distance, presumably $\Delta/2\pi$ combine into an electromagnetic field, which is the desired element. A conventional antenna, be it a dipole, a vertical radiator over a ground plane, a long wire or anything else, works on this principle.

More than a decade ago, Maurice Hately, a college professor in Scotland, along with his then-student, Fathl Kabbary, began work on a completely different antenna design. The basic premise of this radical design is that a magnetic field can be produced without current flow in a wire. Hately and Kabbary claim that using the reversed



The Crossed-Field Antenna

form of Maxwell's fourth equation, they were able to prove that a magnetic field does exist between two capacitor plates to which an RF voltage has been applied.

From this beginning, Hately and Kabbary report they were able to produce direct synthesis of the electromagnetic field using two large capacitor plates and two large cylinders of short length. The capacitor plates, called "D plates" for the term "D" in the Poynting

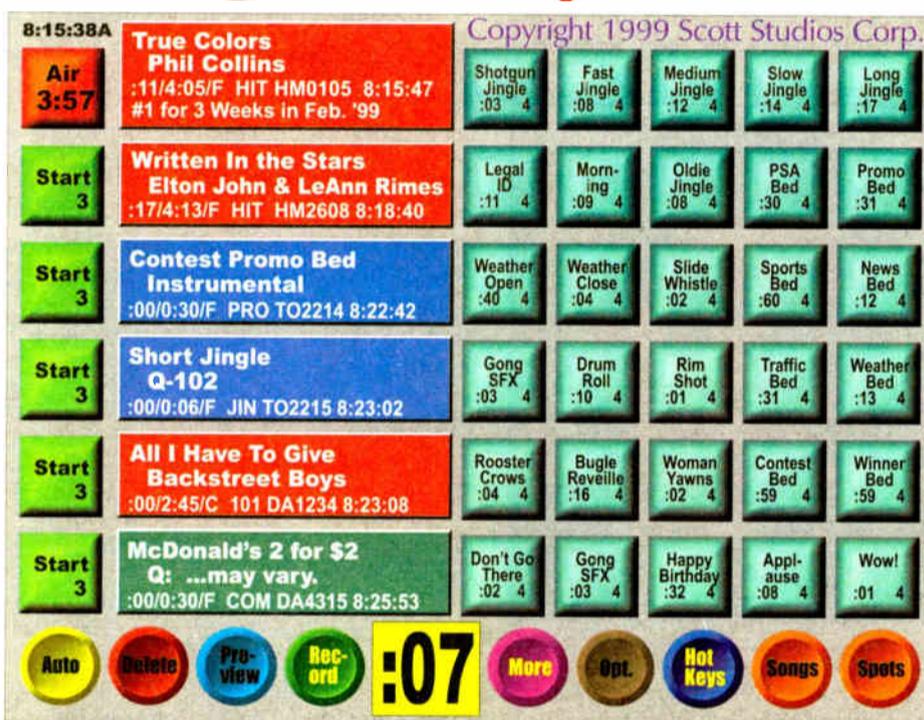
The Best Digital Systems

It's a fact: *More* U.S. radio stations choose Scott Studios' than any other digital system! 2,025 U.S. stations use 4,600 Scott digital workstations. One reason is that the Scott System is the *easiest to use*. It's simple, straightforward, intuitive and powerful!

And Scott Studios' audio quality is the *very best!* You choose from new 32-bit PCI cards by Digigram, Audio Science or Antex. Scott Studios is famous for our *uncompressed* digital systems at a compressed price, but we also work well with MPEG. Scott software can record and play our audio files on a laptop and home PC.

Scott computers are industrial quality in 19" racks, but *not* proprietary; functional equivalents are available at most computer stores. You get 24x7 toll-free phone support. You also get new software features *free* for years from Scott's Internet site.

Scott Studios offers *three* different systems in *three* price ranges to suit *any* budget.



This is the user-friendly Scott 32 System, with 30 sets of 30 hot keys, phone editor and all songs and spots on line for instant play! It seamlessly mixes uncompressed and MPEG digital audio!

Good Spot Box



Scott's Spot Box delivers the *simplicity* of a triple-deck "cart" player plus *compact disc quality* digital sound.

Spot Box has only the one screen, so announcers always know what's playing. On the left of the screen, three digital players have clear labels on each spot. VU meter bars show levels. Buttons show countdown times and flash as each recording ends.

At the right of the screen, "Cart Walls" let you pick and play any recording by name, number or category. Or, number keys at the bottom load spots quickly from your log.

Scott's Spot Box includes a recorder and costs as little as \$5,000. Options include log imports from traffic computers and music on hard drive.

Better AXS 2000+



AXS[®] (pronounced ax'-cess) 2000+ is radio's premier digital audio system for automation and live assist. AXS[®] 2000+ is fully featured, with 99 sets of 28 instant play Hot Keys, log editing in the studio, live copy on-screen, big countdown timers and can include a production or phone recorder.

You also get auto-fill of network breaks to cover missing spots, a Real Time Scheduler, unattended net recording, timed updates, macros and optional time announce and WAVE file imports.

For stations with large CD music libraries, AXS[®] 2000+ can also control inexpensive consumer CD multi-pack and 300 CD juke box players.

See Scott Studios at NAB Booth L11890 in Las Vegas, April 19-22

Best Scott 32 System

The Scott 32 System (pictured at the upper right) is the most powerful digital system in radio. Your log is on the left side of the screen. Everything plays at your touch. On the right, 30 sets of 30 Hot Keys play any spur-of-the-moment jingles, effects or comedy. You also get 10 "Cart Walls" with 1 or 2 second access to *any* recording. A built-in recorder quickly and easily edits phone calls, spots or pre-recorded Voice Trax.

Scott 32 options include recording Voice Trax while hearing surrounding songs and spots, time or temperature announce, *Invincible* seamless redundancy with self-healing fail-safes, newsrooms, 16-track editors and auto-transfer of spots and voice trax to distant stations via Internet.

Contact us to see how one of Scott Studios' three digital systems can be tailored to *your* needs and budget.

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 Dallas, Texas 75234 USA
 (972) 620-2211 FAX: (972) 620-8811
 8 0 0 7 2 6 8 8 7 7
(800) SCOTT-77

Visitors to NAB99 will have a chance to hear details about the patented antenna.

theorem. were positioned parallel to one another to form a capacitor. The cylinders, called "E plates," were positioned one above and one below the "D plates." When the cylinders were driven by an RF power source, they produced high-frequency E-fields, thus the designation "E plates."

Crossing effect

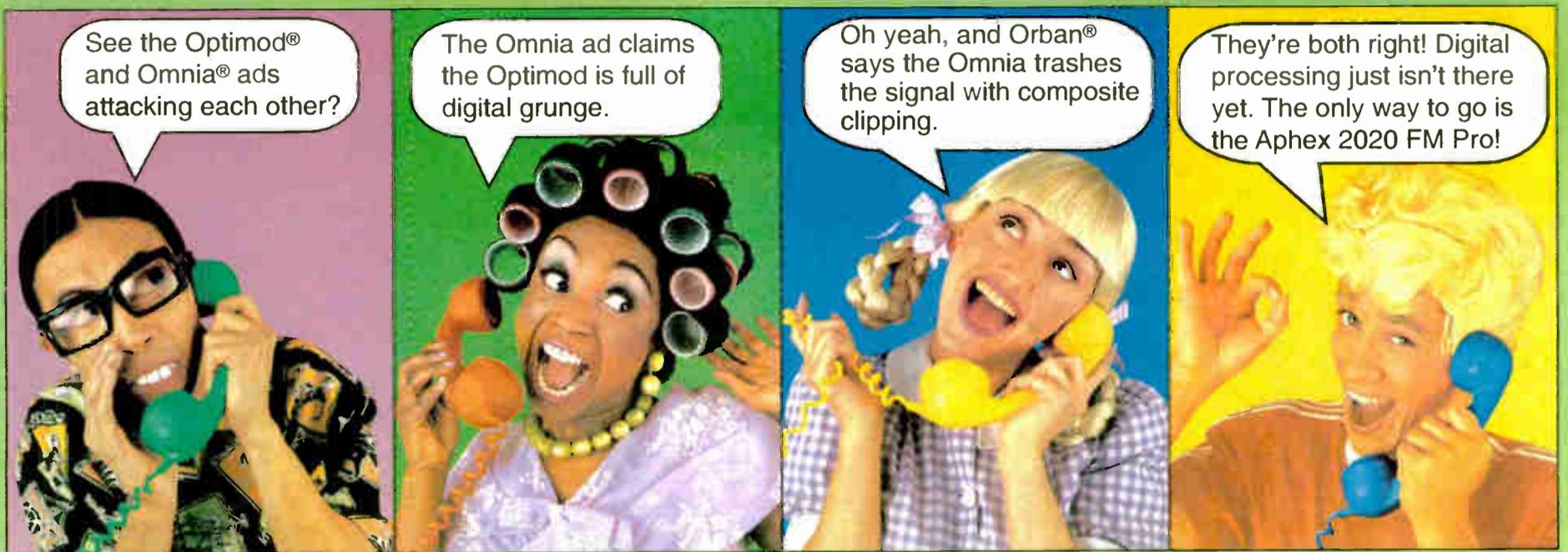
To synthesize the electromagnetic wave, RF power is fed through a power divider/phasing network to the D and E plates. The resulting electric and magnetic fields are cross-stressed in phase to synthesize the Poynting vector and produce radiated power within the small area surrounding the antenna. This effect is what gives the Crossed-Field Antenna (CFA) its name.

Several variations of the Crossed-Field Antenna were developed and tried. The barrel-shaped CFA was first; it featured the same radiation pattern as a dipole. The next evolution removed one of the cylinders and one of the plates, substituting a ground plane instead.

Later, Kabbary returned to his native Egypt and continued experimenting with a ground plane antenna for broadcast. He successfully built and tested a couple of different configurations, settling on a design only 12-feet high over a ground

See CFA, page 29 ▶

Truth in Advertising



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

The Aphex 2020 FM Pro offers the purity of an all analog signal path with the power of digital control. Through its use of 11 patented circuits, the 2020

achieves the greatest possible loudness while retaining musicality and naturalness.

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

Contact Aphex today for a demonstration, and we'll show you there *is* truth in advertising.



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Circle (197) On Reader Service Card

World Radio History



A digital PR&E console
starting at just \$11,010*
(So advanced, even the price is digital.)

Airwave™ Digital. Three program busses. Two mix-minuses. One remarkable board.

\$11,010. Now there's a string of binary code anyone can understand. So if you're budgeting to go digital—and running tight on budget—take a close look at a 12 or 20 input Airwave Digital on-air console. Its familiar layout flattens the digital learning curve. And with 3 program busses, talent can be playing Madonna, time shifting a Dr. Laura feed, and laying down voice tracks—all at the same time. So you can squeeze more production out of your payroll.

Airwave's flexible, too. One or two telco modules and B-side logic are among a host of available options. And unlike some digital consoles, you can reconfigure input modules from analog to digital—or vice versa—at your studio, just by changing a card.

Best of all, Airwave Digital comes with that “no-need-to-rationalize-to-anyone” PR&E quality. Want to know more? Call 760-438-3911, visit www.pre.com or email sales@pre.com.



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*12 input, mainframe, standard clock/timer, monitor and output modules, standard 5-mic preamp module, 3 mixing inputs, 4 digital inputs and one 16-line input/Analog module.

Circle (133) On Reader Service Card

World Radio History

Paper on CFA to Be Presented

► CFA, continued from page 26
plane of only 10 square meters. He has documented the successful testing of this antenna on 1161 kHz at a power level of 60 kW.

In 1995, Kabbary made some radical design changes to the antenna, adding a funnel-shaped top (see photo). This design reportedly produced the same inverse distance field with 30 kW as the conventional one-quarter wavelength vertical it was intended to replace produced with 100 kW. The funnel-top CFA used in Egypt is only 21 feet tall.

Advantages of the CFA are in its size, efficiency, bandwidth and induction field.

less than 0.025 wavelengths long. The vertical antenna it replaced was 211 feet long. Test results show up to a 9 dB advantage over the one-quarter wave vertical.

Reported advantages of the CFA over conventional radiators include:

- Very small size, typically around a one-fiftieth wavelength
- High efficiency, with a 6 dB gain typical relative to a conventional one-quarter wavelength vertical radiator
- Little induction field, which produces very little coupling between adjacent antennas
- Broad bandwidth

Today, four such antennas are reported on the air and operating in broadcast service in Egypt. Two are at Tanta, operating from a rooftop at 22 kW and 100 kW respectively and separated by less than 20 feet. One is in operation at Barnis at 110 kW, and the other operates in Halaieb at 5 kW.

If the Crossed-Field Antenna proves to be everything the inventors claim, it could revolutionize the state-of-the-art in AM transmission systems, which has changed little since the days of Marconi.

The paper is part of the session "Radio Transmission Systems — Digital and Analog." 1-5 p.m. Monday April 19, at the Las Vegas Convention Center.



Cris Alexander is director of engineering for Crawford Broadcasting and a regular contributor to Radio World.

Crystal Award Finalists

The Crystal Radio Awards will be announced on Tuesday, April 20, at the NAB Radio Luncheon at NAB99.

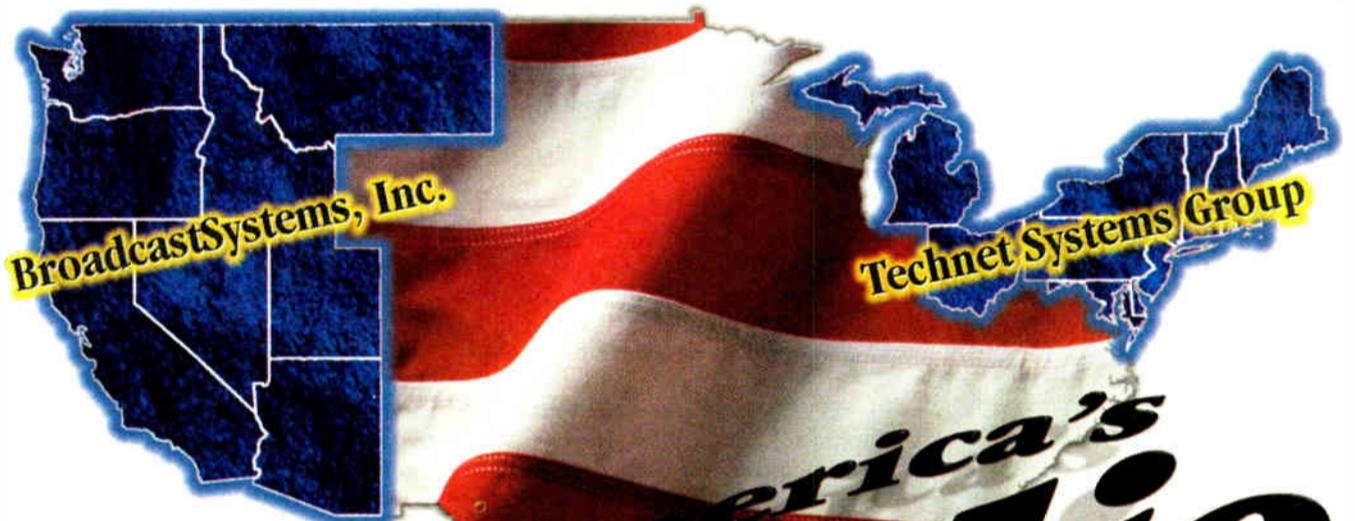
Since 1987, the awards have recognized stations for outstanding community service efforts. Here are the 45 finalists:

- KABC-AM, Los Angeles
- KBHP-FM, Bemidji, Minn.
- KBHR-FM, Big Bear City, Calif.
- KCDZ-FM, Joshua Tree, Calif.
- KDFC-FM, San Francisco, Calif.
- KELO-FM, Sioux Falls, S.D.
- KGFM-FM, Bakersfield, Calif.
- KGUM-AM, Agana, Guam
- KKCS-FM, Colorado Springs, Colo.
- KLOS-FM, Los Angeles

- KNX-AM, Los Angeles
- KOIT-FM, San Francisco
- KRKT-FM, Albany, N.Y.
- KSL-AM, Salt Lake City
- KTRH-AM, Houston
- KUDL-FM, Westwood, Kan.
- KUEL-FM, Fort Dodge, Iowa
- KWOA-AM, Worthington, Minn.
- KZLA-FM, Los Angeles
- WBBF-FM, Rochester, N.Y.
- WCBC-AM, Cumberland, Md.
- WDBO-AM, Orlando, Fla.
- WDEL-AM, Wilmington, Del.
- WEGR-FM, Memphis, Tenn.
- WENS-FM, Indianapolis
- WEZN-FM, Bridgeport, Conn.
- WGMS-FM, Washington

- WGOH-AM, Grayson, Ky.
- WHUR-FM, Washington
- WJBC-AM, Bloomington, Ill.
- WJBR-FM, Claymont, Del.
- WJYJ-FM, Brainerd, Minn.
- WKDZ-FM, Cadiz, Ky.
- WLTE-FM, Minneapolis, Minn.
- WMAL-AM, Washington
- WNND-FM, Chicago
- WPEG-FM, Charlotte, N.C.
- WQRB-FM, Eau Claire, Wis.
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Profitable Groups Ask What's Next

► OVERVIEW, continued from page 25

April 21. This will help attendees figure out how to best position their companies to take advantage of media convergence. The newsmaker there is Mark Cuban, president and co-founder of Broadcast.com, who will give the keynote.

As a practical concern, radio continues to evolve. Three years have passed since Congress relaxed radio ownership limits through the Telecommunications Act. Consolidation has abated somewhat in the large markets, and this year continues the trend of transactions in the middle to smaller markets.

Overall, group ownership seems to be in a state of flux, said John Pelkey, a partner in Haley Bader & Potts P.L.C.

"We're still seeing the large owners in a position where they are still trying to absorb the acquisitions that they have made over the last couple of years," Pelkey said. "People are now having to make some of the hard decisions about whether ... the stations they have purchased actually fit in with their business plans."

Small spins

He said there may be some spinoffs this year in the smaller markets, as large group owners decide whether they want to retain stations in those markets.

In the meantime, the management of large station clusters continues to be a challenge.

"Many radio station owners are adjusting to new management styles and associations with larger public companies," said Senior Vice President, NAB Radio, John David. "These changes require the integration of different corporate cultures. In some cases, former competitors must work together, and some general managers, program directors and sales managers who once operated one or two stations are now operating several."

A session on Tuesday, April 20, is geared toward managers who must consolidate stations is "Communicating With

Your Engineer." This session is designed for managers who want to get the most out of their engineering staff and who are now operating several instead of just one station.

Wednesday management highlights include "Future Trends — 21st Century Radio," a look at new products in development, and "Getting Pharmaceutical Dollars," a new ad category for radio after federal regulations governing product information for broadcast prescription drug ads were relaxed.

Wolfman honored

The NAB Radio Luncheon, also on Tuesday, will include the announcement of the NAB Crystal Radio Award winners, and the induction of the late Wolfman Jack into the Radio Hall of

"New Directions for the New Media Convergence" is the keynote address theme on Saturday, April 17, for the New Media Professionals Conference. Sessions of particular interest to radio are Tuesday's "Digital Asset Management: Maximizing the Value of Digital Content" and Wednesday's "Streaming Media over the Internet."

Another technical evolution is the expected transition of radio to digital broadcasting. Three proponents in the United States are in various stages of developing an in-band, on-channel DAB system. All plan to conduct field tests at stations this year to see how well their systems will perform in real-world interference conditions.

One of the IBOC proponents, USA Digital Radio, has a petition in front of

We're still seeing the large owners in a position where they are trying to absorb the acquisitions that they have made.

— John Pelkey, Haley Bader & Potts

Fame. Sen. John McCain, R-Ariz., Commerce Committee chairman and possible presidential candidate, will speak.

The Internet is an integral theme. The Internet Technologies and Applications Conference includes two Super Sessions of interest to radio attendees: Tuesday's "Electronic Commerce: An Emerging Multi-Billion Dollar Industry" and the Wednesday's "Webcasting and IP Multicasting: Competition or New Revenue Generators."

"Whether through creative content creation, efficient new delivery options, streaming media and webcasting opportunities, radio stands to benefit from convergence," David said.

the FCC urging it to move ahead with DAB. But in Europe and other parts of the world, the Eureka-147 system is in various stages of evolution. Attendees will learn more in the Sunday session, "DAB: The Global View."

Danger from the sky

Terrestrial U.S. broadcasters face pending competition from satellite-delivered DAB. Two companies developing this technology, CD Radio and XM Satellite Radio, now project "soft rollout" dates in the fourth quarter of 2000 or early 2001.

CD Radio has announced satellite launch delays and cost overruns. The company blamed a change in its launch

provider and delays in receiving the chip sets being developed by Lucent Technologies.

CD also is suing XM Satellite, alleging patent infringement, and seeks an injunction to prevent XM from building its system. XM said the suit is without merit.

Technical challenges also must be worked out before the satellite providers can sell their services. For example, the FCC is still developing rules governing the number and location of FM terrestrial repeaters. CD and XM have said they need such repeaters for their signals to be heard throughout urban areas.

A third company, WCS, has an application pending before the FCC to provide a satellite radio service. WCS is a consortium of 10 regional spectrum holders. There are gaps in that spectrum that would need to be alleviated for WCS to provide a national SDARS service.

XM Satellite, WCS and Worldspace, the company providing SDARS technology to emerging countries, will take part in "DARS: Pioneering a New Satellite Service." This Tuesday session is part of the "Uplink: Satellite Operators and Users Conference." CD Radio was invited, but declined to take part.

Another technical session promises to cover the nuts and bolts of engineering for stations clusters, including equipment procurement and maintenance. It is Tuesday's "Radio Consolidation: Real World Experiences."

Wednesday's "Digital Audio for Broadcast Engineers" will provide an overview of AES for broadcast systems, discussions of computer networking, and lessons about building a digital facility. RW Editor Paul J. McLane will open that session with remarks about the engineering profession in the new millennium.

The latest on technical issues being considered at the FCC, including the proposal to streamline FM technical rules, low-power spectrum interference protection changes and new broadcast and non-broadcast services will be addressed in "Technical Regulatory Hot Topics for Broadcasters," also on Wednesday.

Technical changes ahead

The new commission has been busy implementing changes in its technical rules in the past year, and FCC staffers are poised with more ideas for paring down rules.

One proposal to streamline the FM technical rules is said to be close to final action by the commission. The proposal would allow stations to negotiate their own interference agreements under limited conditions, and divide Class C stations into two subgroups, so that those who are fully protected at full-power levels but don't want to actually transmit at those levels can be downgraded.

Potential interference problems, from the streamlining proposals to the possible creation of a new low-power service, will be addressed at Monday's "Radio Station Improvements: Making Sense of Streamlining."

The FCC Chairman's Breakfast kicks off the Tuesday action for this conference. Chairman Bill Kennard will share his perspective on station ownership, EEO, low-power and other issues during his address.

In addition, Tuesday's "Radio and TV Ownership: A Contemporary Guide" will help attendees navigate significant recent ownership changes and how they affect broadcasters' business plans.

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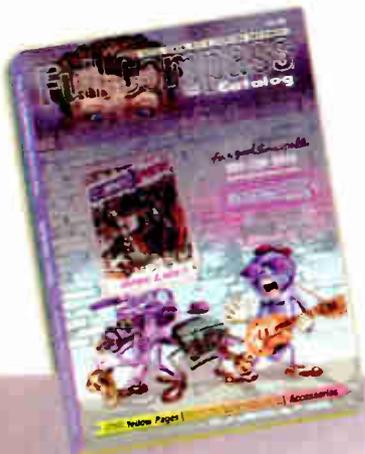


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World Radio History

Low-Power Heats Up the Debate

EEO, Y2K and Technical Streamlining Are Also Among the Regulatory Issues at Hand at NAB99

The top regulatory issue on the minds of radio attendees at NAB99 is likely to be the FCC's interest in creating a new class of low-power FM radio stations.

But there are many other important issues percolating on the regulatory side right now.

The Business Law and Regulation conference will seek to answer many questions and likely will raise others. A highlight of the show agenda is the "FCC Chairman's Breakfast," on Tuesday, April 20.

"William Kennard will lay out his regulatory plan for broadcasters through 1999 and beyond," said Barry Umansky, former deputy general counsel for the NAB, who recently joined the law firm Vorys, Sater, Seymour, and Pease LLP.

According to Umansky, the chairman's topics will include the debate over low-power radio.

New sub-class

This will also be one of the topics discussed during the session "Radio Station Improvements — Make Sense of Streamlining," on Monday, April 19. Umansky will serve as moderator.

Generally an FM station is protected from interference to its maximum height and power classification, whether it intends to upgrade or not. The FCC has proposed dividing the Class C stations into two subclasses, to allow expanded or new entrants into the FM band. Stations that failed to upgrade to the new minimum would be reclassified as Class C0.

As part of its 1998 biennial regulatory review, the FCC is attempting to streamline various broadcast applications, rules and processes in an effort to eliminate unwarranted regulatory burdens. Streamlining generally is taking two forms: the use of electronic filing for many applications and the use of certifications rather than substantive

have required the RF exposure study be submitted along with the application. Now the study must only be submitted if it determines the station would have significant impact.

When society crumbles

"Y2K — the Final Checklist," on Monday, April 19, will address the



The U.S. Capitol

expected computer problems that may occur when 2000 arrives.

"We'll have several keynote speakers from the government to address the concerns of the problem specifically for the broadcast industry," said session organizer Rick Ducey, senior vice president of the Research and Information Group at NAB.

"A main concern is the preparedness of the Emergency Alert System and how stations may be affected," he said.

FCC Commissioner Michael Powell will deliver opening remarks at the Y2K session. Powell co-chairs the telecommunications portion of the President's Council on Year 2000 Conversion.

The session also will focus on how broadcasters are preparing for 2000. "We'll have CEOs and corporate engineers from

er stations and IBOC," said Umansky.

"Radio and TV Ownership: A Contemporary Guide," on Tuesday, April 20, lets owners hear the latest on duopoly, TV/radio cross-ownership and station ownership by local newspapers.

"Will the regulations change to allow newspapers to own radio and TV in the same market?" Umansky said. "In some cases it has been grandfathered, but there have been laws on the books for many years prohibiting that. Some people feel

that topic could be up for FCC discussion this year."

Wrapping up a day of regulatory discussion on Tuesday will be a "Regulatory Dialogue" session, moderated by Richard Ferguson, vice president and chief operating officer of Cox Radio and chairman of the NAB Joint Board of Directors.

"This is an opportunity for the commissioners and the NTIA to talk about the most important topics of the day," said Umansky.

Consolidation, ownership and local marketing agreement issues will top the agenda.

Violations of FCC rules and regulations can cost thousands of dollars in fines and attorney fees. For example, ignoring the public inspection file rule could result in \$10,000 in fines.

The session "FCC Enforcement — Fending Off Fines and Forfeitures," on Tuesday, April 20, takes a closer look.

Stations that run contests also need to be aware of potential fines. According to NAB staff attorney Lori Holy, who will serve as the session moderator, station personnel should be careful when holding a contest.

"It's not an easy thing to do," Holy said. "There are a lot of things that need to be considered before you do a contest. Sometimes a station will set up a contest and not realize that it is essentially a lottery."

The session comes at a time when the Supreme Court has agreed to hear a case on casino gambling broadcast advertising. The highest court agreed to decide the case of *Greater New Orleans Broadcasting Association vs. the FCC*. Broadcasters argued that a statute prohibiting broadcast casino advertising in New Orleans was unconstitutional. The lower courts upheld the statute and now the Supreme Court will hear the appeal.

With the closing of several FCC field offices in recent years, enforcement has changed somewhat, but personnel still visit stations and follow up on complaints, according to Holy.

See REGULATION, page 35 ▶

Wolfman To Be Honored

Wolfman Jack will be inducted posthumously into the NAB Broadcasting Hall of Fame at the NAB99 Radio Luncheon on Tuesday, April 20.



Wolfman Jack

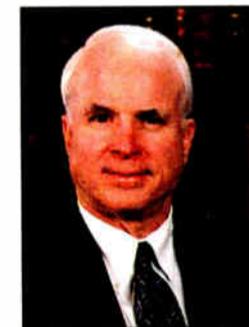
The event also features a keynote address by Sen. John McCain, R-Ariz., and the announcement of the winners of the NAB Crystal Radio Award.

The Wolfman, born Robert Weston Smith, joins a long list of Hall of Fame inductees including Harry Caray, Don Imus and Wally Phillips. Wolfman Jack's widow, Lou Lamb Smith, will accept the award.

"Wolfman Jack is an icon in the radio business," said John David, executive vice president of radio at NAB. "He had a unique style. He created a lot of interest in radio for a lot of the young announcers."

David said the Wolfman "was one of the first guys who really sounded like he was having fun on the radio."

Smith said her husband "was a passionate person and loved life and loved to live.



Sen. John McCain

"He reached middle America, from the farmer to the truck driver to the bikers," she said, "and they loved him and then he loved them." While

he connected with the average American, Smith said, he was able to strike a chord with his peers as well.

Keynote speaker

McCain is considered a possible candidate for president. He was a naval aviator, serving in the Navy until 1981. He was shot down over Hanoi in 1967 and was a prisoner of war in Vietnam for more than five years.

He holds the Silver Star, Bronze Star, Legion of Merit, Purple Heart and the Distinguished Flying Cross. In 1997 he was named one of the 25 most influential Americans by Time magazine.

He served two terms in the House of Representatives. He is in his third term in the Senate, and is chairman of the Commerce, Science and Transportation Committee. He also serves on the Armed Services

See LUNCHEON, page 35 ▶

Given his stand on low-power radio, FCC Chairman Bill Kennard's appearance is likely to be well-attended.

exhibits.

"We'll look at both technical and non-technical streamlining, such as benefits to broadcasters and whether broadcasters will be prepared when electronic filing begins, as early as later this year," said Linda Blair, chief of the FCC's Audio Services division of the Mass Media Bureau and a session panel member.

Certifications in broadcast applications have been present in some form for several years. For example, station license renewal forms have a box to check yes or no, indicating whether a station would have "a significant environmental impact, including exposure of workers or the general public to RF."

Previous commissions would probably

several major radio groups address the specifics of how their companies are dealing with the problem," Ducey said.

Spectrum integrity

The issue of "spectrum integrity" is likely to be discussed at many of the sessions. The NAB is framing its positions on several regulatory issues within this context. It recently established a task force, headed by Bonneville International Corp. President Bruce T. Reese, to evaluate and comment on various FCC proposals that might affect the spectrum and the signals of existing licenseholders.

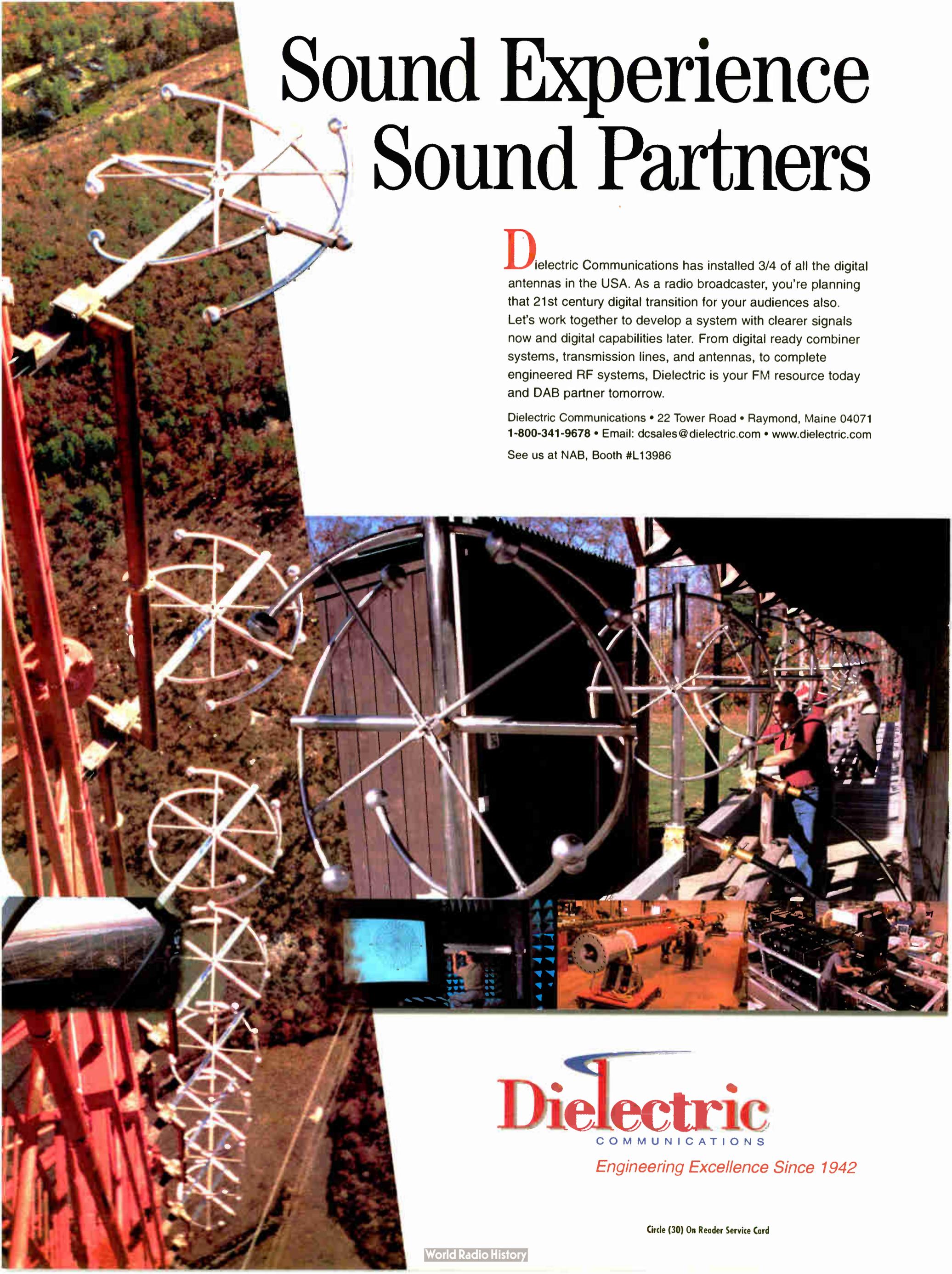
"Much of the focus will be on FCC commissioners and the chairman to see if they are sensitive to broadcasters' concerns over the newly proposed low-power

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World Radio History

Law and Regulation at NAB99

► REGULATION, continued from page 33

Another issue to be discussed is the FCC's crackdown on unlicensed operators.

"As far as pirate broadcasters are concerned, enforcement is very strict," said Holy. She said the topic likely will be discussed at the session, but also encouraged people with questions about pirate broadcasting to attend the "Radio Rally Session — Ensuring Radio Spectrum Integrity: A Public Mandate," to be held the following morning.

Scrambling

The 1998 federal court ruling in *Lutheran Church-Missouri Synod vs. FCC* that declared FCC affirmative action rules unconstitutional left broadcasters and federal regulators scrambling to understand the implications.

The new legal dynamics of employ-

ment law issues as they relate to broadcasters will be the focus of "EEO and Employment Law — The Evolving Rules," on Tuesday, April 20.

How should stations proceed in light of recent developments in EEO?

One panel will discuss the issue.

Holy also will moderate this session. She said the panel will cover EEO responsibilities and the legal considerations when hiring, firing or disciplining workers, as well as shed light on some of the "dos and don'ts" in employee relations.

In the past year, policies governing

EEO recruitment obligations for broadcasters have been under review, stemming largely from the *Lutheran Church* decision. The FCC has proposed new

rules; the NAB and many state associations have offered to assist broadcasters in their recruiting practices.

"It is incumbent upon the broadcast industry to insist that the FCC, as it considers any new EEO regulations, meet the letter and spirit of the *Lutheran Church* case decision," said panelist Richard Zaragoza of the law firm Fisher Wayland Cooper Leader & Zaragoza L.L.P., which represented the Lutheran Church in its challenge.

Panelist Joseph Di Scipio, an attorney with Cohn and Marks, questions the authority of the FCC to implement new regulations and does not think the FCC can constitutionally require broadcasters to meet certain outreach standards.

"I am not convinced such a proposal is good public policy considering the number of other EEO and nondiscrimination rules that broadcasters must comply with, which the proposed FCC rules would duplicate," he said.

However, the FCC is not the only authority regarding employment laws affecting broadcasters. A variety of federal, state and local regulations affect broadcasting hiring practices.

"Broadcasters need to know where things stand and what they (need to) be doing when it comes to EEO outreach," said Holy.

Another session of note during the Business, Law & Regulation Conference is "Radio Music Licensing — A Dialogue With the Radio Music License Committee,"

on Sunday, April 18, at 3 p.m.

The session promises to review the objectives and status of the committee's negotiations with BMI.

What new research products relating to broadcaster use of music are being developed? Are you confused about the status of use of SESAC music? The session invites attendees to engage in a dialogue on music licensing questions.

If you worry about your talent leaving themselves — and your station — vulnerable to libel or privacy problems, attend "Avoiding Drive Time Libel/Privacy Problems," on Monday, April 19.

"To your on-air talent it's only a joke," the session summary explains. "But to the butt of the joke, you've broadcast a lie, spilled her private life all over the airwaves, harmed her career and driven her into psychotherapy — and the waiting arms of a plaintiff's lawyer."

■ ■ ■

Lynn Meadows, Bob Kapler, Randy Stine, Frank Montero, Harold Hallikainen and Brian Galante contributed to this story.

McCain Keynotes; Honors for Wolfman

► LUNCHEON, continued from page 33 and Indian Affairs Committees.

"Senator McCain has been a powerful ally of both consumers and free market forces in the marketplace ... He has a keen understanding of the issues facing radio broadcasters and has demonstrated an extraordinary ability for getting things done in the Senate," said Rep. "Billy" Tauzin, R-La., chairman of the House Telecommunications Subcommittee.

Tauzin and McCain are among those legislators who have influence

over matters involving broadcasters.

"John McCain is a true American icon," said Jim May, NAB executive vice president, government relations, "a terrific senator. He doesn't mince words, pull punches or violate a deeply held sense of humor and commitment."

May said although some of McCain's views differ from those of NAB, "He has been a friend to broadcasting."

— Leslie Stimson, Alan Haber and Brian Galante contributed to this story

Wolfman's Radio Career

Robert Weston Smith, who was born in 1938 in New York City, began his radio career at a 1 kW black-formatted daytime AM station in Newport News, Va., as Roger Gordon, working a soft jazz/blues format.

Following that stint, he dubbed himself Big Smith with the Records, playing country music in Shreveport, La.

He finally became Wolfman Jack at 250 kW XERF(AM) in Mexico. "Birds would fly around the tower and die, man, that's how powerful it was," the Wolfman said in a *Radio World* profile in July 1994. "If you did the show from the radio station, the RF that drifted around the station, it was like you smoked a joint, you know."

At XERF, the Wolfman served as DJ and salesman, pitching his listeners everything from baby chickens to Wolfman Jack roach clips.

His fame as cultural icon was cemented through his work as emcee of the TV show "Midnight Special" and his appearance in the 1973 film "American Graffiti." He appeared in a number of other films and TV shows.

He died in 1995.

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READER SERVICE NO. 22

Digital Dominates Show Agenda

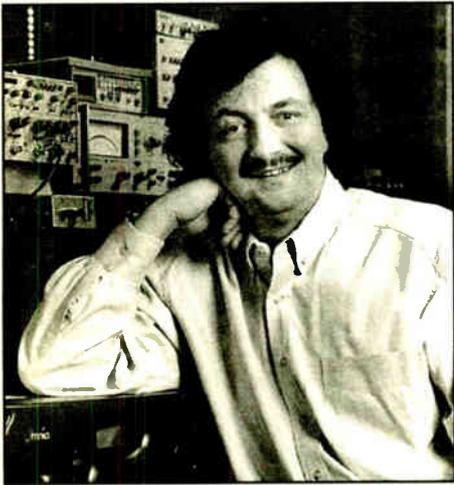
Digital television is on the way with digital radio not too far behind. NAB99 attendees can expect that, whatever the session topic, the discussion will surely turn digital before too long.

John Marino, NAB vice president, Science and Technology, said, "On the radio side, the interest is in the digital technologies that are being tested and developed for digital audio broadcasting."

NAB is also offering several "Super Sessions," which will provide a forum to delve into issues relevant to the radio and television industries.

The session "Radio Transmission Systems — Digital and Analog," Monday, April 19, will be chaired by Tom McGinley, chief engineer of Washington, D.C., stations WPGC-AM-FM and WARW(FM), and technical advisor to *RW*.

Among the topics to be discussed, one has generated disputation between prominent processor manufacturers: digital peak modulation control. Frank Foti, president of Cutting Edge Technologies, said it could result in "a discussion turning into a large debate" on the floor.



Frank Foti

Foti's talk on "Digital Peak Modulation Control — An Alias-Free Limiting/Filtering Method Utilizing 48 kHz Sampling and No Overshoots" is likely to inspire exchanges similar to those in the broadcast press between Foti and other processor manufacturers.

RF issues

Analog issues receive equal billing in this session. David Solt, president of Omnitronix, will discuss a new frequency agile AM transmitter his company designed.

The session also introduces American engineers to the Crossed-Field AM antenna, with performance claims equal to conventional AM radiators at 1/50 the wavelength. Brian Stewart of the Department of Engineering of Glasgow Caledonian University in Scotland presents the talk, with examples of the antenna in use in Egypt.

Natural phenomena, such as lightning, remain a serious concern for broadcasters. Crawford Broadcasting Engineer Cris Alexander, who lost a transmitter to lightning in Detroit, presents a 30-minute talk on new and proven methods of lightning protection.

Bill Gould, broadcast products manager of Harris/Intraplex, will address "ringing the market," a method for extended FM broadcast coverage using GPS-synchronized transmitters. The method is

practiced by stations ringing New York and Los Angeles.

Gould said, "GPS receivers lock the carriers of multiple transmitters together, then add enough delay to the audio so the signals all arrive at the same time."

Other presenters are to include Jerry Brown, senior project manager of digital video products for Alcatel, discussing 64 QAM digital radio propagation; Continental Electronics Engineer Grant Bingeman with a new type of medium-wave urban antenna; and Atsushi Shinoda of Kenwood Corp. with a trial of AM/digital multiplexing transmission.

Radio engineers can get a grasp of networking during "Radio: The Computer Connection," Monday, April 19. Topics include "Averting Obsolescence: How an Open-Platform Architecture Can Foster Compatibility and Greater Development," and "From On Air to On Line: The Internet Provides New Revenues for Radio Stations."

Production

The session, "Digital Radio Production," will be presented Tuesday, April 20.

McGinley, who chairs this session as well, said, "The cost of the hardware and software has dropped so dramatically that powerful audio can be created and turned loose with the only limit being the creativity of the producer."

Presentations will be made by *Radio World* Technical Editor Alan Peterson, Christer Grewin of Swedish public broadcaster Sveriges Radio, Fahti Kbbary of the Egyptian Radio & Television Union, and several manufacturers including J. Brown of Audiotronics, Martin Wolters of Cutting Edge Technologies, and Richard Pierce of Orban.

Wolters will present "State of the Art Speech Processing for Broadcasting," which details the history of speech processing in broadcast and recording environments, as well as what the future holds.

Grewin will discuss the consequences for audio quality when perceptual audio codecs are cascaded, in his paper "Codec After Codec After Codec," while Brown will compare digital audio specifications to analog audio specifications in his presentation and use the comparison to evaluate the latest A/D and D/A converters.

As stations enter the digital production realm, a growing concern is cross-platform compatibility. Pierce will discuss the possible structure and potential benefits of a "universal cart file interface."

Peterson ends the session with "a comparative analysis of existing digital audio workstations now available to the pro broadcaster and what is yet to come," a reference to potential developments in operating systems and studio operations.

Audio issues

The session "Digital Audio for Broadcast Engineers" is presented in cooperation with the Ennes Educational Foundation Trust, the educational arm of the Society of Broadcast Engineers.

This overview of digital audio for radio will be moderated by Richard Farquhar, president and owner of RAF Associates of Ohio and runs on Wednesday, April 21.

"This is where you get the basics, the

benefits, and what goes in," said Farquhar. "It's a good overview, whether you are in radio or in TV."

RW Editor Paul McLane opens the session at 9 a.m. with "The 2000 Engineer."

"The professional demands on engineers have changed," he said. "At the same time, consolidation has had a big effect on how radio engineers feel about their jobs and their profession."

Gary Stephens, national sales manager for distribution channels of Leitch Inc., intends to demystify the processes of synchronous AES, quiet switching and digital audio reference generators.

"Do you go with balanced audio or go over coax?" Stephens asked. "Do you run synchronous or asynchronous signals? These are all things you need to be aware of."

Hot engineering topics include digital peak modulation control and a new kind of AM antenna.

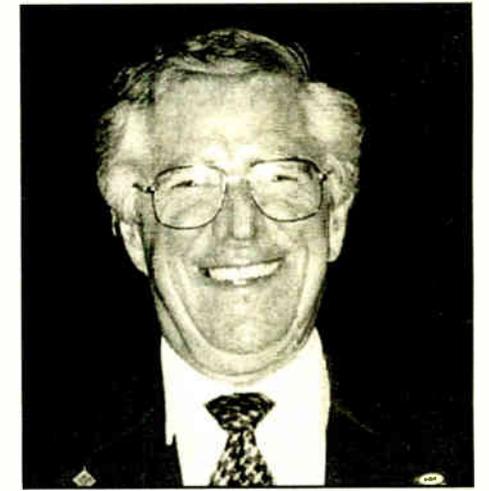
David Baden, engineer for Radio Free Asia, puts the day's work into perspective with "Building a Digital Station."

"It is not what people think," he said. "The return of value investing in digital does not mean a reduction in staff. The reality of digital means the engineer must stop being a broadcaster and start being a net administrator, an IT manager."

Moderator Farquhar hopes that, at the end of the session, "Engineers will go

back to their facilities and know what to do."

Also on Wednesday is "Future Trends — 21st Century Radio." Participating in the session are Skip Pizzi, program manager for interactive television technology at Microsoft; Mark Fuerst, president of Public Radio Management; and Hugh



Rick Farquhar

Panero, president and CEO of XM Satellite Radio.

An ongoing trend on just about every radio professional's mind is the Internet. "The opportunities are too great and the vulnerabilities are too great to ignore it," said Fuerst.

"Even if you cannot, in a short period of time, see the return, if you can't see the numbers of people out there that you'd like to see using your site or listening to your signal ... you just really don't have a choice but to begin the process of a transition into a multimedia company," he said.

Of further interest to radio broadcasters will be the Super Session "Webcasting and IP Multicasting: Competition or New Revenue Generators," slated for Wednesday, April 21. The talk features Real Networks Chairman and CEO Rob Glaser providing the keynote speech.

Val Davis, Jonathan Pegg, Al Peterson and Alan Haber contributed material to this story.

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Radio Seeks Sales Prescription

From pharmaceuticals to a "dot-com" revolution in radio, NAB99 offers sessions of interest to the sales rep, sales manager and general manager.

Radio managers face dramatic changes with issues on the industry forefront such as new advertising opportunities, low-power radio, DAB and the Internet.

Rx for radio

Pharmaceutical ad dollars could be an exciting prescription for radio. Relatively new Federal Drug Administration guidelines allow for drug-makers to advertise on radio. The session "Getting Pharmaceutical Dollars" on Wednesday, April 21 will be moderated by Julie Lomax Brauff, president of Breakthrough Marketing based in Bellevue, Wash.

According to Brauff, radio has seen the number of dollars spent on pharmaceutical direct-to-consumer radio advertisements nearly doubled over the past two years.

"Pharmaceutical advertising is an area that has broken wide open," she said. "Pharmaceuticals are the faster-growing business category in advertising, and there is a tremendous opportunity for radio."

Nationally syndicated radio medical talk-show host Dr. Dean Edell agreed. "Drug companies love pharmaceutical

ads on radio ... it has been shown they get results."

Another influx of advertising revenue is coming from the online arena. According to recent studies on Internet usage, e-commerce and radio from Arbitron/Edison Media Research, radio is poised to earn more from the new media age. Radio is the dominant medium for the majority of computer users, making it the prime marketing outlet for Internet-related services and companies to promote the addresses of their Web sites.

"Radio must invest in quality content providers for Web sites, explore partnerships in e-commerce strategies and add value to advertisers by providing product displays online that match an advertisers campaign," said Radio Advertising Bureau President and CEO Gary Fries.

According to Fries, radio's ability to stream audio and to be the daily, constant companion to listeners indicates a tremendous potential increase in the time radio will spend with the consumer.

More pie, please

Financial experts say consolidation has given radio the heft required to compete with television and newspaper for ad revenue. While newspapers take the biggest slice of the ad revenue pie, radio continues its fight for a larger piece.

George Hyde, RAB executive vice president for training, will address this issue in the session "Winning Big Money From the Newspaper" on Monday, April 19.

The year 1998 saw unprecedented growth in revenue from radio ad sales, according to the RAB. The year topped out at \$15.4 billion, up from \$13.8 billion in revenue in 1997.

Other sessions of interest to radio sales and management professionals include "Solving Radio's Biggest Problem for the Millennium," also on Monday. RAB officials will discuss the rapidly approaching millennium and offer solutions to recruiting, hiring and retaining good people, particularly sales people.

"Have Laptop — Will Travel: Tips and Tricks for Radio Sales People" is scheduled for Tuesday, April 20, and will address the needs of the new technology age. According to the RAB, sales reps have savvy clients today who demand

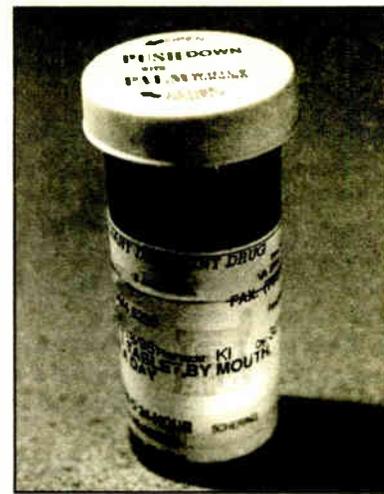


Photo by Alan R. Peterson

DAB continues to make news. USA Digital Radio has requested that the FCC establish rules to make the transition to IBOC DAB, hoping to begin a 12-year transition period to a digital radio future.

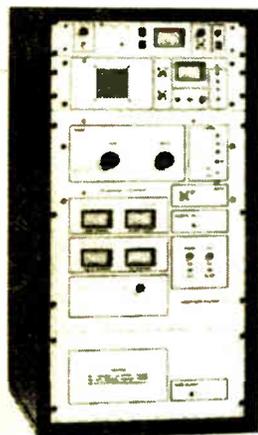
It also announced in January that a dozen radio groups have taken equity positions in the privately held company, which was established in 1991 as a partnership by CBS, Westinghouse Electric and Gannett.

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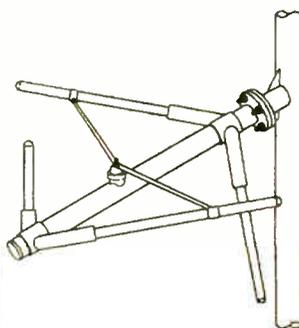
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their reps are informative, knowledgeable and have the ability to sell. This session will help sales people convey a progressive and professional sales presentation.

"The Effects of Consolidation on Traffic Operations" is a session set for Wednesday. It will address concerns of multiple-station operations.

Sharonda White, traffic manager for Fisher Broadcasting which operates three radio stations in Seattle, will moderate the session on ways to cut costs and increase efficiency and profits.

"Consolidation forces radio management teams to take a collective look at their traffic operations," she said. "Many sales managers and general managers are confused and have poor relationships with their traffic departments."

White said high turnover, missed commercials and ineffective management practices are among the "old paradigm." Part of the challenge, she said, lies in the increase in responsibility. Nancy Person, director of operations at Marketron Inc., agreed.

"The sales managers are ultimately responsible for understanding any software that has an effect on inventory, but a lot of the comprehension of maximizing inventory and revenue falls onto the traffic manager."

Low-power concerns

Low-power radio continues as an issue of contention. The FCC issued a Notice of Proposed Rulemaking to explore creating new low-power FM radio stations.

NAB and other opponents argue new low-power stations will interfere with existing stations and with possible future digital audio broadcast signals. This debate is likely to be part of regulatory and technical sessions at the show.

In comments to the FCC, competitors Lucent Digital Radio and Digital Radio Express argue that their systems are better.

■ ■ ■

Lynn Meadows, Laurie Cebula, Bill Mann, Carl Lindemann and Sharon Rae contributed to this story.

You Read It Here



Ten Years Ago

Advances in digital audio and transmission were two among many hot spots of the annual NAB convention and engineering conference ... which drew a record-breaking 50,136 attendees.

News Item
June 1989

An FCC proposal aimed at reducing AM interference by allowing stations to adjust coverage areas or go dark was widely supported by most broadcasters, despite the NAB's continuing criticism that it would promote the controversial concept of "negotiated interference."

"Most Favor AM Plan"
July 12, 1989



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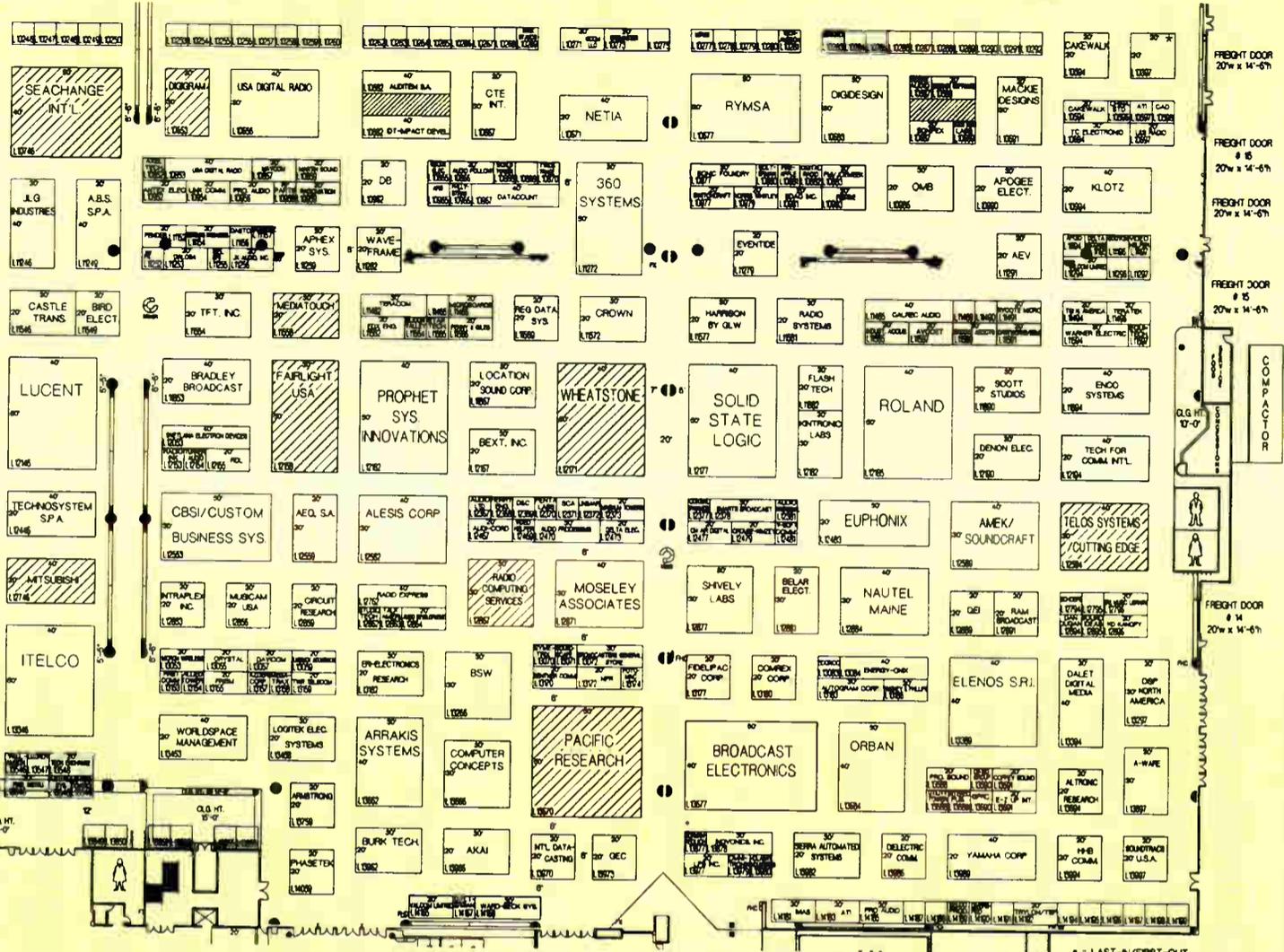
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World Radio History

NAB99 North Hall Map



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NAB 99 Exhibitor Directory

Exhibits: April 19-22

The following is an abbreviated listing of companies exhibiting at NAB99 and the products they intend to show. Product information was provided by the companies; highlights are a paid service.

For late-breaking product news and companies, consult the official on-site directory.

Booth listings preceded by the letter L are located in the Las Vegas Convention Center; those with the letter S are in the Sands Expo Center. Booths with OD are outdoor exhibits.

360 Systems L11272

Intro: TCR4 four-track and TCR8 eight-track digital audio hard disk recorders designed to replace DAT machines in broadcast and production applications, featuring 24-bit audio quality, high-density removable disks, internal hard disk storage, complete time code implementation and VTR emulation; Short/cut '99, newest version of the self-contained two-track cut-and-paste digital audio editor with recording to internal hard disk or external removable media, built-in titling keyboard, speakers, large alphanumeric display, scrub wheel, editing and tape transport controls, new gain edits, fades and crossfades, and file interchange in .WAV, .BWF and .AIFF formats for audio transfers via the Internet or diskette.

Also: DigiCart/ II Plus, Instant Replay 2.0, AM-16 audio crosspoint switcher.

Sandra Inbody-Brick, Corp. Mktg. Dir.
5321 Sterling Center Dr.
Westlake Village, CA 91361
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FAX: 818-991-1360
E-mail: info@360systems.com
www.360systems.com

615 Music Productions Inc. L12796

Intro: 615 Music Library Platinum Series, builds on the Gold Series, adding more themes per disc and a wider variety of fresh sounds.

Also: Custom music scoring services and a 60 CD music library.

A-C

A-Ware Software Inc. L13697

On Display: MusicMaster music scheduling and inventory management software.

A.F. Associates Inc. L21523

A/D Technologies Inc. S527

On Display: Airborne antenna patterns; broadcast equipment integration.

Aardvark S5926

ABS SpA L11249

AccuWeather Inc. L24233, S5816

Acoustic Systems I5660

Intro: Soundsecure Woodies (doors), faux wood grain paint finish over powder coat primer with designer door plates and designer handles, available with 20-by-60-inch vision pane.

Acoustical Solutions Inc. L16542

Intro: Alphasorb fabric-wrapped acoustic wall panels that meet NRC .80 to 1.00 and Class A fire-retardant standards; AudioScaL sound barrier; Alphatec 2x2x2-inch drop-in ceiling tiles that meet STC-19, NRC 80 and Class A fire-retardant standards.

Acoustics First Corp. L16148

Intro: Bermuda Triangle Trap to eliminate bass buildup, featuring a broadband sound absorber to fit room corners; Sound Cylinder stand mounting traps to create "instant" voice-over booth or audio mixing area.

Also: Pyramid and anechoic wedge acoustical foams; mass loaded noise barriers.

ADC TeleCommunications L21149

AEQ SA L12559

Intro: TLE-02D combination ISDN audio codec with built-in terminal adapter, digital hybrid with echo suppression and frequency extender for use on analog and/or mobile telephone systems, and portable mixer with returns and headphone amplifiers, MPAC-02 multiformat, dual-channel portable ISDN audio/data codec; ACD-5001 dual multiformat ISDN codec with built-in terminal adapters.

Also: BC-300, BC-500, BC-2000 and BC-2500 mixing consoles; TH-02EX MLII, TH-12 and TH-10 telephone hybrids; Euro-Rack modular rack system; ACD-3001 audio codecs; AM-03 audio monitor; DCS-10 digital commentary system; Mar4Win broadcast automation system; MP-10, PME-02T and TLE-02 portable mixers; and turnkey systems.

AEV Srl L11291

Intro: Millenium ISDN codec with built-in terminal adapter support for up to three ISDN lines and ISO/MPEG Layer II and Layer III, G.722, ADPCM and J52 encoding; Telereport 30 portable digital hybrid compatible with both four-wire and GSM cellular telephone systems.

Also: Virtual Radio broadcast automation system; Excalibur, MMS 412 and BSM 622 consoles; Exclusive, Mirage, Luxor, Starlight and Thunder on-air processors; RDS 3500 Radio Data System encoder; TLR 10, TLR 20, UMR 6200 and ITB 301/302 telephone hybrids.

Aircraft Production Libraries L23641

Intro: "Getting In Stride," 90 solo piano edits; "The Boys Against The Girls," 79 dramatic and youthful rock edits; and "Guitar Ensemble," 84 classical guitar edits.

Airstar Lighting Balloons L17963

Akai Musical Instrum. Corp. L13966

Intro: DR16 Plus digital hard disk recorder with sophisticated 24-bit, 96 kHz sampling rate, random-access editing capabilities and a 16-channel mixer in 4RU; DLX16 tabletop workstation remote control unit offering multimachine control with 16 faders, 16 pan pots and EQ for broadcast and/or post production use; RE32 for real-time control of transport and record functions of up to 128 tracks of audio.

Also: S5000 and S6000 samplers; DD8 Plus hard disk recorder; DD1500 digital audio workstation; and DPS12 V2.0 digital personal studio.

Alesis Corp. L12562

Intro: M20 Professional 20-Bit Digital Audio Multitrack Recorder with 24-bit digital converters, 9-pin control support, industrial tape transport, advanced synchronization features; S1 Active Subwoofer and M1 Active Bi-amplified Reference Monitors, a standardized playback source for stereo or 5.1 surround production; Q20 20-Bit Master Effects box with balanced XLR inputs/outputs, 20-bit digital converters, internal power transformer, and S/PDIF digital I/O.

Allen Avionics Inc. L23740

Allen Osborne Associates Inc. L20968

Intro: Hilomast, a telescopic pneumatic mast for remote ENG, cameras and lighting.

for MW; Model 6725 25 kW air-cooled dummy load for AM and FM.



Race for Atlantis

Allied Tower Co. Inc. L13154

On Display: Broadcast towers.

Amco Engineering Co. S6544

Intro: Monitoring enclosures in a variety of sizes, heights, widths, depths, extensive colors.

Altronic Research Inc. L13694

Intro: Model 3500 calorimeter with improved design for faster computation and better performance; RF Monitor PC-based RF monitor.

Also: Model 77150 150 kW air-cooled dummy load

Amek USA L12589

Intro: DMS digital mixing system for broadcast and production.

See LISTINGS, page 42 ▶

The Replicator.

Digital Audio Delay Systems

Traffic Master II, System 6

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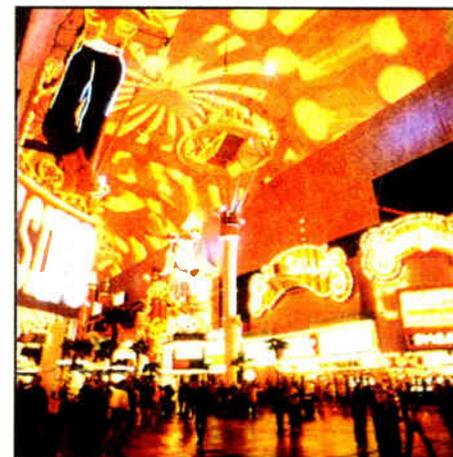
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► LISTINGS, continued from page 41

- American Eagle Financial Grp** L121574
- Ampex Corp.** L10634
- AMS Neve** L22337
Intro: ESP, a digital processing platform for AMS Neve audio consoles that uses processor cards that are 0.6 micron chips.
- AMX Corp.** S8422
- Anchor Audio/Anchor Communications** L24753
Intro: Xtreme, 130 watts and reaches crowds up to 5,000 and has a CD/mic holder module.
- Andrew Corp.** L22937
Intro: New earth station antenna products, including a 6.5-meter C-band receive/transmit antenna, 3.7-meter pipe-mountable antenna, ValuStar line of 1.2- to 3.6-meter receive-only antennas, and two- or four-port extended C-band feed systems.
Also: HRLine rigid coaxial line for medium- to high-power broadcast applications; Helix air dielectric cables; Inners Only inner connectors; GuideLine circular waveguide.
- Antenna Concepts Inc.** L11841
- Antex Electronics** L10952
Intro: BX-44 and LX-24M 20-bit, half-size PCI cards for multichannel MPEG record and playback with digital I/O; BX-8 eight-channel PCI playback card for both MPEG and linear PCM audio.
- Anthro Corp.** S5859
Intro: AnthroBench supports up to 600 pounds and is available with adjustable shelves.
Also: AnthroCarts and RackCarts.
- Aphex Systems Ltd.** L11259
Intro: 1788 Remote Controlled Mic Preamp features remote control, networking capabilities, eight channels; 2020 FM Pro offers clarity of analog audio signal path with the consistency and flexibility of digital control.
- Apogee Electronics Corp.** L10990
Intro: PSX-100 two-channel, 24-bit, 96 kHz A/D-D/A converter with AES, ADAT, TDIF and S/PDIF (coax and optical) interfaces, soft limit to record at a higher level without overs, UV22HR to translate 24-bit signals to 20- or 16-bit and two proprietary Apogee low-jitter master clocks; Rosetta two-channel, 24-bit A/D converter available in 44.1 and 48 kHz or 44.1, 48, 88.2 and 96 kHz versions for project studio recording and mastering to DAT, MO, video editors or modular digital multitracks.
Also: AD8000 eight-channel, 24-bit conversion system; Apogee Master DAT; Apogee Master ADAT; Apogee Master DTRS; Apogee Gold/Silver CD-R; Apogee Wyde Eye AD analog/digital cable.
- Apoio Tecnico** L11194
- APW Enclosure /Stantron** TBD
Intro: Stantron Multimedia editing desk can accommodate an array of equipment in an elegant work area, using solid oak beveled edges; ExpressRack, a 19-inch and 23-inch rack that can be shipped quickly, has easy cable access, heavy gauge steel welded construction, can be used in a modular situation, vented
- side panels with locking feature and mounting angles that adjust to any depth within the frame; Wall Mount Cabinets.**
- Armstrong Transmitter Corp.** L13759
On Display: Transmitters, amplifiers, exciters, STLs, antennas.
- Arrakis Systems Inc.** L13662
Intro: DigiLink IV (DL4) hard disk-based automation system supports satellite automation, live assist, "net catching" and remote control; W.R.A.N. network headend control software for DL4.
Also: DL3; TS3; 1200; 12,000; 22,000; furniture systems.
- AT&T** L13341
- ATC/Antenna Technology** S5948
- ATDI** L10562
- Audi-Cord Corp.** L12467
- Audio Accessories Inc.** L16733
- Audio Developments Ltd.** L12864
- Audio Follow** L10866
Intro: DDO-NT, a range of applications for live or automated broadcasting, editing, recording and scheduling; Air Lite standalone audio automation and/or workstation system.
Antonio Mendes Nazare, Int'l Sales Mgr.
73 rue de l'Evangile
Paris, F-75018
FRANCE
+33-1-46-07-26-26
FAX: +33-1-46-07-00-26
E-mail: contact@audiofollow.fr
www.audiofollow.fr
- Audio Ltd.** L12367
On Display: Wireless microphones.
- Audio Precision** L11831
Intro: System Two Cascade Dual Domain new DSP-based test set with support for 96 kHz digital audio sampling rates and longer signal acquisition lengths to ensure high performance and correct interface with digital audio.
Tom Mintner, Dir. Sales/Mktg.
PO Box 2209
Beaverton, OR 97075-2209
503-627-0832
FAX: 503-641-8906
E-mail: sales@audioprecision.com
www.audioprecision.com
- Audio Processing Technology Ltd. (APT)** L12470
Intro: NXL384 broadcast network transceiver designed to deliver audio over fixed digital links such as STLs and permanent studio networks, available with analog or digital options and integrated backup circuitry, auxiliary data facility, and alarm and test functions for total transmission security; BCF-256 broadcast communications frame full-duplex digital audio codec for both direct-dial ISDN circuits and fixed digital links for inter-studio and STL applications, features integrated ISDN terminal adapter, auxiliary data, backup circuitry and both digital and analog I/Os.
Also: DSM100 Pro-Link WorldNet system and DRT 128 digital reporter terminal.
- Audio-Technica U.S. Inc.** L16713
Intro: ATW-100 Camera-mount wireless, with 100 selectable channels and a rugged all-metal construction; AT849 stereo boundary microphone, all-metal construction with interchangeable elements (cardioid supplied), internal electronics and low end roll-off switch.
Also: AT4071a, AT4073a, AT815b and AT835b shotgun microphones; AT822 and AT825 stereo microphones; AT804 omnidirectional dynamic field microphone; 40 Series studio capacitor microphones.
- Audio Technologies Inc. (ATI)** L16126
Intro: AES/EBU digital audio distribution amplifier available in single- and dual-input configurations, featuring data reclocking and regeneration, up to 12 XLR or 24 BNC isolated outputs per channel, transformer-balanced inputs, loop-through inputs with switchable terminations, input cable equalization, display of input signal status and errors, accepts sample rates from 27 to 96 kHz, standard sample rates of 32, 44.1, 48, 88.2 and 96 kHz.
Also: Studio and field mixers; mic, line, turntable, power and analog and digital distribution amps; Match-Maker and Disc-Patcher interface amps; headphone amps; Press Box mic distribution amp; Vanguard Series



of on-air broadcast consoles; System 10,000 modular plug-in mic, line and audio distribution amps; Nanoamp two- and four-channel LED VU and PPM display meters.

Audio Toys Inc. L14183

Intro: Paragon II, a live music production console, is able to generate up to 20 stereo output mixes and has a unique mic preamp design, patented compressor, noise gate, four band parametric EQ, multiple routing paths and dual solo busses.

Also: Uptown Automation, moving fader automation for mixing consoles.

Audioarts Engineering L12171

Intro: R-17 radio console; Sparky digital on-air console that accepts and outputs both analog and digital signals, open architecture design with 12 inputs, three stereo buses, multiple format A/D input converters, machine control, digital mix-minus and phone module support for two callers.

Auditem S.A. L10562

Intro: Audemat AM-MC3 fieldstrength meter and modulation analyzer with built-in GPS receiver, cartography carryout module and AM/MW scanner; Audemat DARC 3 encoder for meeting to ETSI ETS 300751 standards with large range of I/O to support any network connection; Audemat FM-MC3.2 FM fieldstrength meter and baseband-signal analyzer with GPS receiver features MPX power measurement adhering to new IUT-R SM 1268 and CEPT Rec 5401 recommendations, peak modulation recorder, RDS and DARC data analyzer and recorder and an FM band scanner.

Also: DT100 digital FM transmitter; RDS3 RDS/RBDS encoder; UECP-SERV software; and RXR1 FM/RDS receiver.

Autogram Corp. L13183

Intro: Pacemaker II bi-modular, expandable console with all-LED illumination and a standard Autogram autoclock.

Also: AC/IC Series; Mini Mix 8A and 12A; RTV-20; Pacemaker Series consoles.

AutoPatch S6828

On Display: Half-Y; 1YDM; 1Y-16; 4YDM; 18Y-XL.

Avcom of Virginia Inc. L22870

Intro: MSA-90A direct frequency synthesis spectrum analyzer for the 50 kHz to greater than 1 GHz frequency range; DFAS-450A alignment system for tuning duplexers and filters, comprised of MSA-90A 1GHz spectrum analyzer, MTG-1000A microwave tracking generator and LPF-500A low-pass filter.

Also: Portable spectrum analyzers; network analyzers; microwave signal generators; filters; amplifiers; power dividers; broadband noise generators; spectrum

See LISTINGS, page 44 ►

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World Radio History

► LISTINGS, continued from page 42
display monitors; portable test receivers; terrestrial interference survey horns; waveguide-to-coax adapters; DC power blocks; 50-ohm terminators.

Avitel Electronics Corp. L25125

Avocet Instruments Inc. L11587
On Display: Delay Canceller.

AVP Mfg and Supply Inc. L24565

Intro: Programmable audio jackfields; programmable normals; grounding.
Also: Rapid Punch; EDAC; RS422 jackfields.

Phil Baker, Mktg. Mgr.
11 Brown Ave.
RR2
Cambridge, ON N1R 5S3
CANADA
519-740-7966, Ext. 28
800-481-2493
FAX: 519-740-0131
E-mail: sales@avpmfg.com
www.avpmfg.com

AWS Inc. (Automated Weather Source) L20266
On Display: AWS WeatherNet; AWS Online; JavaWx; Slide Show.

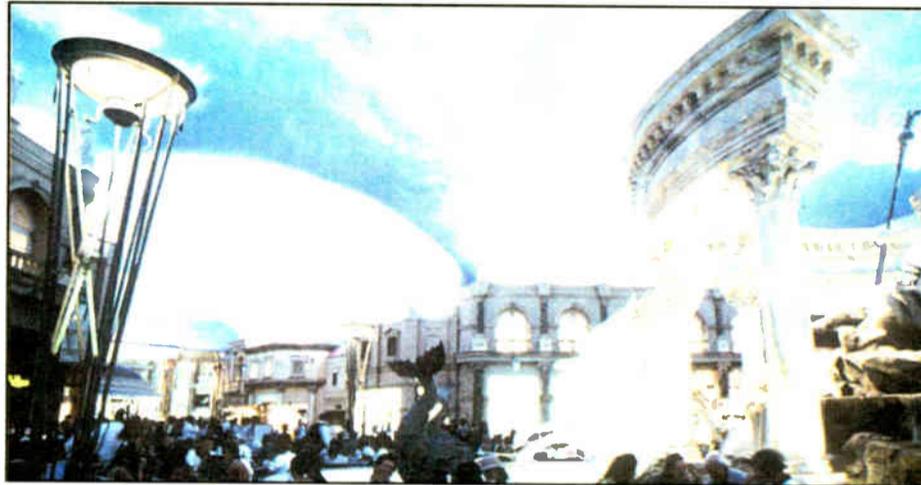
Axel Technology Srl L10852

Intro: Falcon Series five-band digital audio processor; Nexus Series of broadcast audio consoles, from small portable versions to tailor-made units with up to 40 channels.
Also: Macrotel 3/7 studio and portable telephone hybrid; RDS Pro 1010; ISDN PC solution; Forget communications logging recorder; Radio Light digital radio automation system.

Axon Digital Design B.V. L11522
On Display: 20-bit audio A/D and D/A converters.

Azden Corp. L13157, L20671
Intro: 400UDR, UHF ENG portable wireless receiver, true diversity, 63 frequencies available with matching 63-frequency body-pack and handheld transmitters.

Also: Pro Series two-frequency VHF portable wireless systems; Producer Series VHF ENG portable wireless systems.



Forum Shops

B&H Photo Video Pro-Audio L20673

BAF Satellite and Technology S5960

Intro: Digital Satellite Space Segment, lets users maximize satellite transponder capacity and is available for long-term, short-term and occasional users; Video/audio streaming to put broadcast programming on the Internet.

Balboa Capital Corp. L20818
Intro: Financing for non-equipment expenses such as rent and payroll in conjunction with a new lease;

Also: New and used equipment leases; sale lease back; master lease; software only leasing; seasonal leases; step leases.

Baron Services L20382

BASF/Emtec Pro Media S7555

On Display: Variety of recording media, including

ADAT; formatted ADAT; DAT; CD-R; SM 900; SM 468; SM 911; DM 931; reference master cassette; chrome extra type II cassette; ferro extra type I cassettes.

Belar Electronics Laboratory L12881

On Display: AM, FM, FM stereo, and RDS/RBDS monitors; spectrum analyzer.

Belden Wire & Cable Co. L22974

Intro: Riser Rated and Flex CM Brilliance audio

snakes for pulling into NEC RM raceways.

Also: Wide range of audio cables, including 1172A; 1192A; 1800B; 1800F; 1803F; 1883A; 1904A; 9451; AudioFlat; MediaTwist.

Benchmark Media Systems L21270

Intro: AD2404-96 four-channel 24-bit audio digital-to-analog converter system with selectable sample rates of 44.1, 48, 88.2 and 96 kHz; DAW1 digital audio workstation interface provides a single-channel mic preamp, three stereo line-level analog source selections, two digital input source selections, 20-bit stereo A/D and D/A conversion; VCA-2 remote stereo voltage-controlled amplifier with balanced instrumentation inputs, gain control from -100 to +20 dB and low THD+N of 0.002 percent and balanced control inputs for long distance control.

Also: Interface amp series; MPS microphone pre-amp systems; System 1000 audio distribution amp; ADA 2008 four-channel 20-bit bi-directional A/D and D/A converter; SPM Series analog meter systems.

Best Power/North Star Technical Services S3622

Intro: Best 610, on-line high-frequency double-conversion power protection for critical broadcast applications.

Bexel Corp. L20587

On Display: Distributors for Sennheiser, Clearcom, RTS/Telex, Shure, Motorola, Audio Technica, Mackie, DBX, Anchor, AKG, Aphex, Fostex, Tascam, Whirlwind, 360 Systems, Rapco, Atlas and Setcom.

Bext Inc. L12167

Intro: LEX 25 SPC 25 W FM exciter with built-in stereo generator and programmable limiter; LEX 25 EMR 25 W exciter with a built-in programmable receiver/translator.

beyerdynamic Inc. L16121

Intro: M99 announcer's mic with large diaphragm; See LISTINGS, page 45 ►

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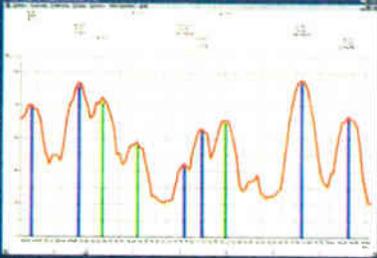



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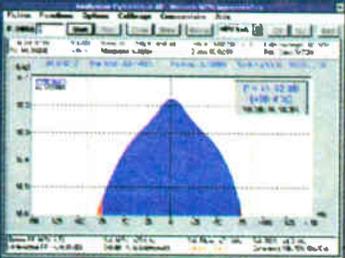
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► LISTINGS, continued from page 44

TE600 UHF multifrequency diversity pocket pack or camera-mount receiver for ENG/IFB.

Bi-Tronics L21462

On Display: CA-Combost connector features Neutrik XLR/quarter-inch connector terminated via Bi-Tronics quick termination block for use with #18 to #30 gauge audio cable.

Bird Electronic Corp. L11549

Bomar Interconnect Products S5928

Intro: BNC installer kits, packaged in lots of 50 for installer remote or bench assembly.

Boonton Electronics L11196, L13055

Intro: Model 4530 RF peak power analyzer for HDTV and DAB transmitter sites; Model 4500A RF peak power analyzer for laboratory R&D of HDTV/DAB digital audio; Model 4530 peak power analyzer; ATE/transmitter test instrument for HDTV and DAB.

Bradley Broadcast and Pro Audio L11853

Intro: Cedar CDR Desktop Publisher, an automated CD duplicator and printer, available in one, two or four drive options, will hold 50 CDs per bin.

British Information Services S4641

Intro: Daily newsfeeds in Spanish, free to radio stations in Latin America and the United States; daily audio and text newsfeeds via the Internet at www.britain-info.org

Also: "Newsbreaks from Britain."

Broadcast Electronics Inc. L13677

Intro: 10 kW frequency agile, solid-state transmitter can maintain 95 percent of power into a normal load if one module is removed, modules can be removed

and replaced without perceptible carrier interruption. N+1 compatible to ensure automatic backup for any signal in the band.

Also: AudioVAULT digital storage system; AM and FM transmitters.

BSP

Intro: Customized keyboards that place software commands directly on hot-keys with customized text, icons, colors, etc., according to the needs of the software package.

L13544



Harley Davidson Café

Broadcast Richmond L12467

Broadcast Software International (BSI) L10588, L14187

Broadcast Supply Worldwide (BSW) L13266

On Display: Audio and broadcast equipment distributor representing hundreds of manufacturers; free catalog and 4-Day Sale featured.

Broadcast Technology Ltd. L12802

Broadcast Tools L13266, L13072

Broadcasters General Store L13072, L20814

Bulldog Group Inc. S6652

On Display: Bulldog audio media plug-in.

Burk Technology L13962

Intro: AutoPilot for Windows helps monitor and control many sites from a single PC.

Also: ARC-16 transmitter remote control and accessories.

Burle Industries Inc. L18508

Intro: Broadcast cavity rebuild program, rebuilding FM, VHF and VHF broadcast cavities.

Also: Power tubes; cavities.

Burst Electronics Inc. L21463

C-Cube Microsystems S9537

Intro: dvxpress-mx. Pinnacle Systems, FAST Multimedia and Accom will introduce new dvxpress-mx-based video production products for MPEG editing, DV editing and DV/MPEG mixed format editing.

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CAD Professional Microphone L10598

Intro: VSM-1, cardioid valve true condenser microphone merging VX2 tube topology with Equitek servo technology; CAD VX2 dual-valve condenser mic featuring custom handwound transformer; AraSys, digital direct sequence spread-spectrum wireless mic system 20-channel simultaneous same-site capability.

Cakewalk L10394

Intro: Pro Audio 8 digital audio and MIDI workstation for Windows 95/98/NT includes support for digital video, DirectX plug-ins, 24-bit, 96 kHz, high-end audio hardware and more.

Also: Audio FX 1, 2 and 3.

Calculated Industries Inc. L21465

Calrec Audio Ltd. L11485

Intro: Digital T Series audio console, can boot up to full operation in less than 14 seconds.

Also: S2 analog console; C2 analog console; and X Series digital radio on-air console.

See LISTINGS, page 46 ►

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▶ LISTINGS, continued from page 45

- Calzone Case Co.** L24019
- Canare** L24780
On Display: SDI patchbays; Star Quad mic cable; cable strippers; BNC, F, RCA, snakes; reels; tooling; bulkheads; precision terminators.
- Canopus Corp.** L13913
- CartWorks/dbm Systems Inc.** L11591
Intro: CartWorks digital audio systems are designed for user-friendliness and power to perform a variety of demanding CD-quality audio tasks.
- Cases Plus** S5129
Intro: Warrior RackMount Cases, designed and engineered to provide complete protection for the EIA 19-inch rackmount equipment and instrumentation; Kinetics wheeled cases injection molded from ABS plastic alloy to shield contents from shock and impact.
Also: Kinetics Cases; Zero Transistainer Cases.
- Castle Transmission Int'l.** L11546
- CBSI/Custom Business Systems Inc.** L12553
Intro: Release 3.0 of Windows-based business software for traffic, billing and sales management includes new reporting tools, multistage productivity and A/R updates; Digital Universe automation system with updated features, including network capture from satellite sources, audio routing and improved channel capacity.
Also: InterAcct interactive accounting software.
- CellXion Mobile Int'l** S5057
Intro: SNG, ENG, EFP, custom lightweight non-CDL shelter; guyed towers with all weld construction, pivot base foundation, climbing ladder and transmission line support, individual design.

- Central Tower Inc.** L24241
- Circuit Research Labs Inc. (CRL)** L12859
Intro: Expanded controls and full remote package for DP-100 V2.0, including AGC speed and gain freeze circuitry.
Also: Line of audio processing products for AM/FM, stereo and SCA generators.
- Co.El. Complementi Elettronici Srl** L12336
- Coaxial Dynamics Inc.** L12377



Las Vegas Showgirls

- Clark Wire & Cable** L17658
Intro: AES/EBU digital audio cable in two-pair zip-type, ideal for bidirectional dubbing in four-, eight- and 12-pair bundles; power filter/conditioner that re-establishes ground for sensitive, microprocessor-based system, protects systems from power line anomalies such as harmonious surges and transients, including lightning strikes.
- Clear-Com Intercom Systems** L25062
On Display: 12 channel party-line intercom systems; belt packs; headsets; speaker stations; wireless intercom; IFB systems; interfaces to other communication systems.
- Columbine JDS Systems Inc.** L21257
Intro: Spotdata Electronic Invoicing gives agencies a secure way to download station invoices via the Web to its accounting system, speeding reconciliation and payment; Technology Integration Group suite of consulting services to specialized software for increasing productivity.
- Comark, Div. of Thomcast Communications Inc.** L18818

- Commercial Satellite Systems** S5150
On Display: Inmarsat Mini-M; B terminals; C-Band and Ku-band systems with system data rates ranging from 2400 bps through 1544 kpbs.

- Communications & Power Industries (CPI)** L18834, S5868
On Display: Eimac power grid triodes and tetrodes for broadcast applications.

- Comprompter News and Automation Systems** L24365
Intro: ENR for Windows NT, a Windows NT and SQL7-based news and automation system with full newsroom features including producing, prompting and archiving.
Also: ENR DOS-based news and automation systems and Election software.

- Computer Concepts Corp.** L13666
Intro: Visual Traffic V.T. 32-bit Windows NT-based traffic and billing system with import/export flexibility, pre- and user-definable management reports and the ability to calculate commission rates, splits and sales goals; NewsRoom for management of newswires and network-fed text and audio, as well as the new WebNews feature to facilitate Web site updates.
Also: Maestro Windows NT-based digital audio hard disk storage system.

- COMSAT Corp.** S5955

- Comrex Corp.** L13180
Intro: Vector POTS codec delivers 15 kHz two-way, high-quality audio on standard telephone lines with four modes of operation (music, voice, HotLine or plain telephone), includes a three-channel mixer with an extra input for the main program or producer cues and an additional

See LISTINGS, page 48 ▶

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▶ LISTINGS, continued from page 46

output for PA feeds.

Also: HotLine analog-phone line (POTS) codec; Nexus and other ISDN codecs for digital lines; LXT/R frequency extender; mix-minus bridge; Codec Buddy remote studio; and telephone couplers.

Kris Bobo, V.P. Development
65 Nonset Path
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FAX: 978-635-0401
E-mail: info@comrex.com
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COMTEK Inc. L24553

On Display: BST-25/PR-25 synthesized transmitter and receiver; M-72 transmitter; MCR-82 receiver; PR-72 B receiver; DX 3-4 digital IFB controller.

Continental Electronics Corp. L18830

Intro: 317D 50 kW all-solid-state digital AM transmitter with a compact footprint; solid-state, high-power digital FM transmitter with distributed control and power supply systems and constant impedance output combiner.

Also: AM transmitters from 1 kW to 1 MW; DAB transmitters; digital exciters; FM transmitters from 500 W to 70 kW; and IBOC digital transmitters.

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Control Concepts Corp. L22547, \$5148**Creative Support Services \$4526**

Intro: Dawn digital audio worldwide network allows producers to search a keyword database, listen to full-length streamed samples and then download the music they want from CSS libraries via Dolby AC-3 compression and Liquid Audio; 27 new CD titles for 1999, including "Max Trax," "Target Trax," "Back Trax" and "Project Platinum."

Also: Range of established CDs including "Hot Spots," "Soundscapes," "America's Tracks" and "Momentum."

Crouse-Kimzey Co. L12479**Crown Broadcast/Crown International L11572**

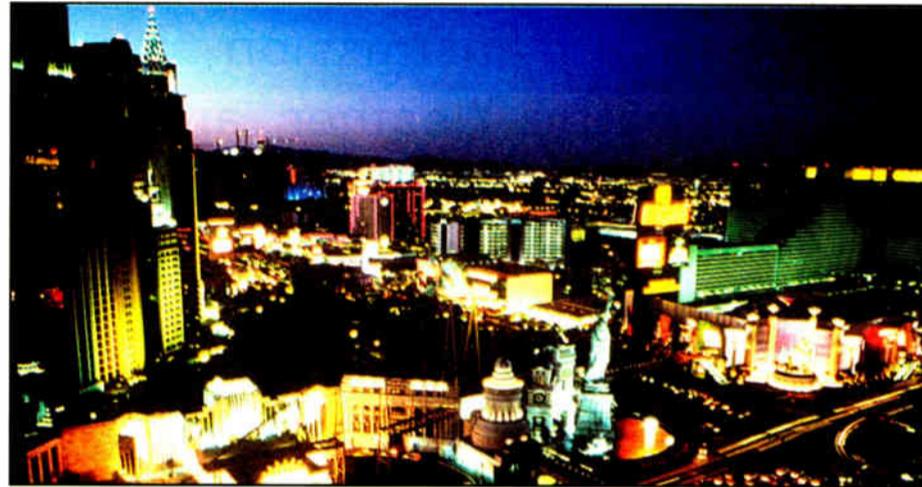
On Display: FM transmitters; translators; amplifiers; CM-310A handheld differential cardioid microphone for singers, sports announcers, with high gain-before-feedback and isolation; CM-311A headworn differential cardioid mic for sports

announcers, mobile DJs; CM-312A, lighter and to the side of the mouth for announcing, talk shows, Sony headphone mounting available for headset models; CM-700, stand-mount cardioid condenser; CM-150, omnidirectional, stand-mounted cardioid condenser mic; MB Series, miniature supercardioid boundary mics for conference table, group discussions, ENG, natural sound; PCC-130 small cardioid boundary mic for conference table, group discussions; PCC-170, larger and supercardioid, switchable models available; PZM-6D, small pressure zone microphone, hemispherical pattern, eliminates acoustic comb filtering.

Crown Castle International L11546

Intro: Tower facilities management package for radio, analog and digital TV.

Also: Broadcast transmission network provision.



Las Vegas Strip

CTE International Srl L10667

Intro: VL1000 1 kW lightweight, microprocessor-controlled, CE-certified amplifier compliant with ETSI 300-384, offering a built-in clock for maintenance record and ambient temperature alarm; DEX30 digital exciter with oscillator and modulator, built-in RDS and co-frequency functions.

Cutting Edge Technologies L12594

Intro: Omnia.am dedicated all-digital dynamics processor for AM, NRSC low-pass filtering plus selectable narrowband filters for news/talk formats and international requirements, EQ adjustment for plate-modulated transmitters, processing presets, daypart scheduling and remote control, analog and AES/EBU digital I/O and mono or stereo processing; Omnia Plug-Ins enhance the Omnia family of all-digital audio processors for broadcast including Omnia.hot plug-in for loudness and additional plug-ins for stereo enhancement and reverb; Voice Processor studio and on-air all-digital processor for voice talent including AGC, EQ, dynamic compression, de-essing and effects, 24-bit resolution, high-quality mic input with phantom power, analog and digital I/O, remote control via RS-232 and TCP/IP and front panel headphone monitoring with level control.

Also: Omnia.fm and Omnia.fm.jr for FM broadcasting; Omnia.dab for DAB broadcasting; and Omnia.net for webcasting.

D - E**D&C Electronics L12369****Dalet Digital Media Systems USA Inc. L13394**

Intro: InterWeb gives sister stations, affiliates, clients or reporters access to audio databases via the Internet, can be navigated using HTML formatting and standard browsers; Dalet Web Publisher, a companion application to the Dalet5 digital audio system, converts data from the audio database into Web sites, allowing users without HTML experience to drag and drop audio, stories or logs from the broadcast database to a Web page; Team News integrates text and audio editing and

Dataworld L12143

Intro: DataXpert, for information and mapping.

Davicom Technologies Ltd. L13057

Intro: FMPM-01 monitors RF power level at the output of an FM transmitter with a demodulator to provide a sample of the audio signal; enhancements and updates to the MACcomm operational software for Davicom M-A-C Systems.

Also: M-A-C and mini remote controls; DAPO-01 audio detector.

David Group L13590

Intro: TF(S)-20D exciter with SMT Technology, no tuning or adjustment required when changing frequency, front-panel LED display of frequency, front-panel meters continuously display output power, reflective power, power-supply voltage and current, frequency deviation and pilot; TF(S)-1000 all-solid-state FM transmitters with five 300 W MOSFET amplifier modules, no tuning or adjustment required when changing frequency; TXVP-FMX stainless vertically polarized FM transmitting antenna with low VSWR and high gain.

Also: FM transmitters with output powers from 20 W to 3 kW; circularly and vertically polarized FM transmitting antennas; feeder cable and connectors; multiplexers; SCA encoders.

Dawn Satellite Inc. S5048

Intro: Digital-ready LNBS with +/-500 kHz low-orbit stability or better, 25-degree noise temperature or better, and good phase noise performance; Coversat snow and ice protection for satellite dishes, provides a vertical surface of a slick vinyl material to help keep snow off dishes.

Also: Comtech 3.8-meter satellite antenna, C-band LNBS, downconverters, power dividers, cable, satellite receivers.

DB Elettronica L10962**DCM Inc. L25068****Delco Wire & Cable Ltd. S2838**

Intro: Clarity broadcast cables; 110 ohm AES/EBU, ENG cable; custom broadcast cable.

Delta Electronics Inc. L12473

Intro: TCA wide-band RF ammeter designed to operate over a broad current range from 20 kHz to 5 MHz for all modes of operation with 3-1/2 digit display and autoranging circuitry for high-resolution measurement of RF current.

Also: RF ammeters, operating impedance bridges; coaxial transfer switches; AM stereo exciters; AM stereo monitors, toroidal current transformers; receiver/generators; stereo noise generators; splatter monitors; high power pulse reflectometers; buffer amplifiers.

Delta Meccanica Srl L11195

Intro: 500 W DAB filter and motorized 1-5/8 inch coaxial switch.

See LISTINGS, page 49 ▶

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► LISTINGS, continued from page 48

Denon Electronics L17607

Intro: DN-991R MiniDisc cart player/recorder with program play, rear-panel keyboard port, sleep function and large, three-row fluorescent display; DCM-5000 100-disc CD autochanger with two independent drives, analog and digital outputs, PC control, 24-bit alpha processing, HDCD decoding, composite video output and the DCM-5001 slave unit; DN-H800 five-disc CD carousel; AM/FM tuner with RDS, adjustable CD-playback speed, numerous playback modes and RadioText features.

Also: DN-M1050R MiniDisc recorder/player; DN-C680 and DN-C630 CD player; DRD-1400 200-disc CD autochanger.

Deutsche Telekom AG S6244

Intro: ATM Broadcast Services, information about the recently launched first commercial ATM Broadcast Service in Germany.

Also: A range of European based broadcast transmission services via transmitters, cable and satellite.

DG Systems L11016

On Display: Receive/Playback Terminal RPT with analog and AES/EBU digital audio outputs; Record/Send Terminal (RST) with AES/EBU digital I/O.

Di-Tech Inc. L18242

Dialog L11253

Intro: CTAXI flashcard recorder with ISDN interface that supports ISO/MPEG Layer II and Layer III compression, waveform editing, real-time audio transmission to codecs like CDQ Prima, Zephyr and MusicTAXI, as well as file transfer to PCs and databases; TAXI SL-PRO for remote Windows-based or external panel control of a codec.

Dielectric Communications L13986, L24742

On Display: Antennas; filters; transmission line; dehydrators.

Digidesign Inc. L10683

Intro: Pro Tools24 MIX for Mac/NT; ProControl; Dolby 5.1 TDM Surround Panner; FibreChannel Shared Storage Storage System; DigiDrive 9Gb Hard Drive, features quiet drive enclosure.

Also: Digital audio workstations; ProTools; peripherals.

Digigram Inc. L10653, S9524

Intro: VX Pocket professional laptop soundcard with 24-bit converters, two balanced analog mono inputs at mic or line level, two balanced analog outputs, S/PDIF I/O for direct digital transfers and a new version with LTC input for video sync; NCX200 network audio terminal connects to a server via 10/100baseT Ethernet to decode and playback a stereo audio stream for audio-on-demand, permanent playback and/or public address, bi-directional serial connection permits source selection; PCX2122np and PCX221np full power stereo soundcards with 24-bit A-to-D/D-to-A converters, Word Clock and LTC SMPTE time code inputs along with a programmable sampling frequency of up to 96 kHz.

Also: Xtrack multitrack digital audio editor.

Digital Audio Labs S6224

Digital Radio Mondiale L10882

Diversified Marketing L14190
On Display: F.A.R., FM transmitters.

Dolby Laboratories Inc. L21328, S7438

Dorough Electronics L22225

Intro: Dorough Loudness Meter, peak and average reading meter for accurate monitoring of audio channels.

Also: Model 40-A2 loudness meter.

Doty-Moore Tower Services L16040

Drake Automation Inc. L18118

Draper Inc. S6874

On Display: Audio/Visual communications equipment and internal light control shading systems.

DSP North America Ltd. L13297

Intro: Postation PMAX for mixing and monitoring multiple SurroundSound mixers in a fully integrated digital audio production environment.

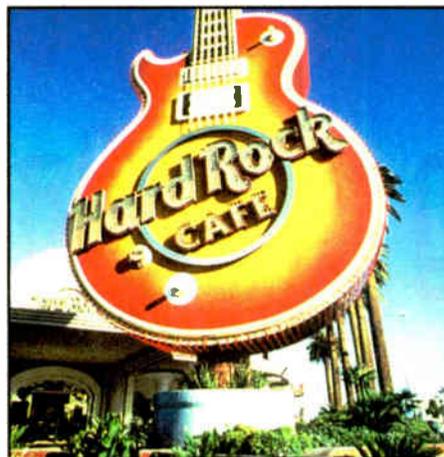
Also: Postation desktop series of audio production workstations.

DTA Carlson L20816

Intro: Consultants in architecture, engineering, construction and systems integration.

DTN Kavouras Weather Services L22778

Intro: MetWork FileServer, network solutions for real-time dissemination of meteorological information based on the Windows NT format, supporting standard TCP/IP communications, TCP/IP utilities-FTP (push or pull), NFS and various LAN configurations.



Hard Rock Café

Dwight Cavendish Ltd. L22568

Intro: Audio anti-copy protection systems.
Also: Distribution amplifiers.

DYPLEX Communications Ltd. L11527

E-Z UP International Inc. L13691

Intro: E-Z UP Hut features an easy-to-use white-powder-coated frame that sets up in 60 seconds and has a gable pitched top with a large area for custom graphics.

Also: E-Z UP Eclipse and Encore instant shelters.

Econco L13083

Intro: TH558 500 kW shortwave; TH347 9017 1 kW UHF; VTU639B1 Ku-Band 300 W TWT.

Also: High-quality medium-to-high power rebuilt power tubes for radio transmitters.

Edac Inc. L10981, S4214

Intro: Multimedia connector carries audio and video signals; RF audio and video connectors and jacks.

Also: Rack and panel connectors and D-Sub connectors.

See LISTINGS, page 51 ►

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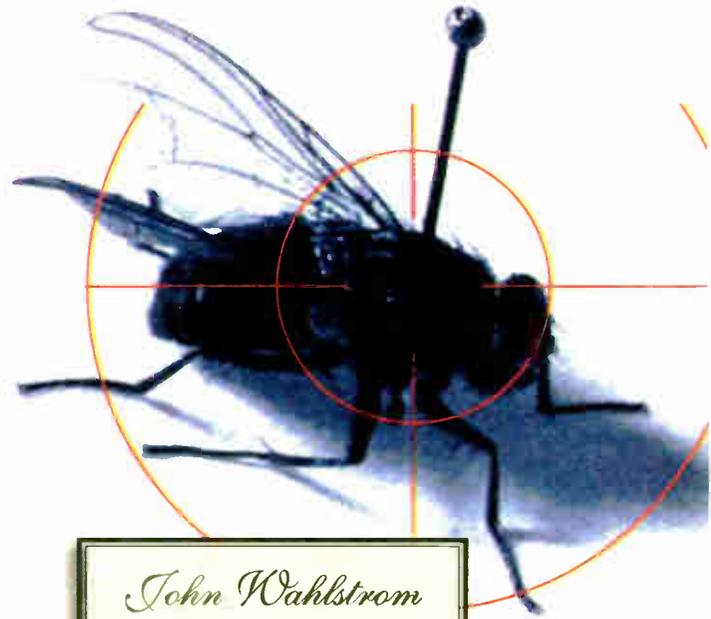
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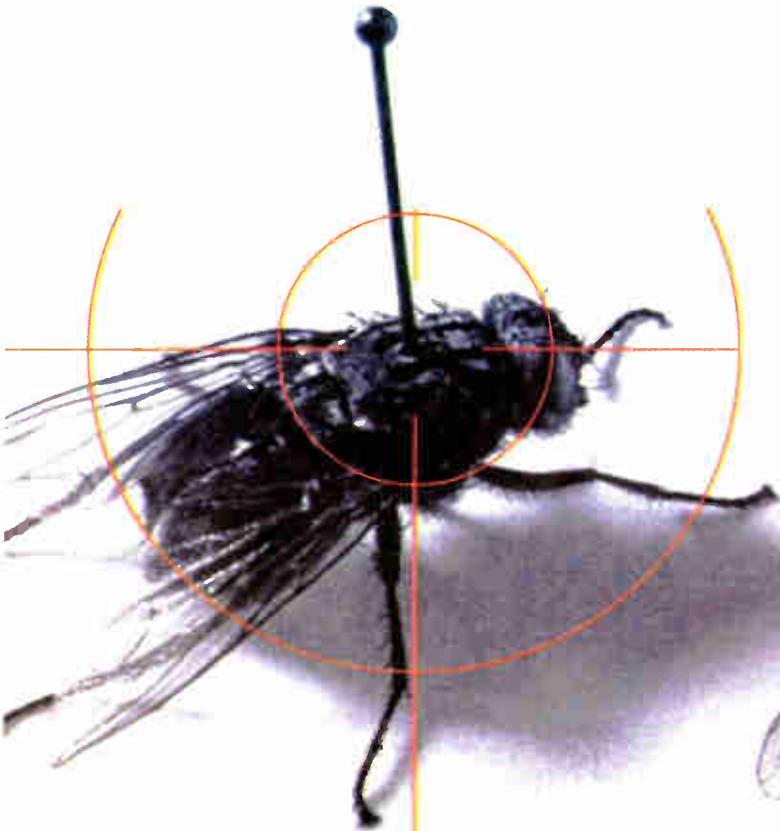
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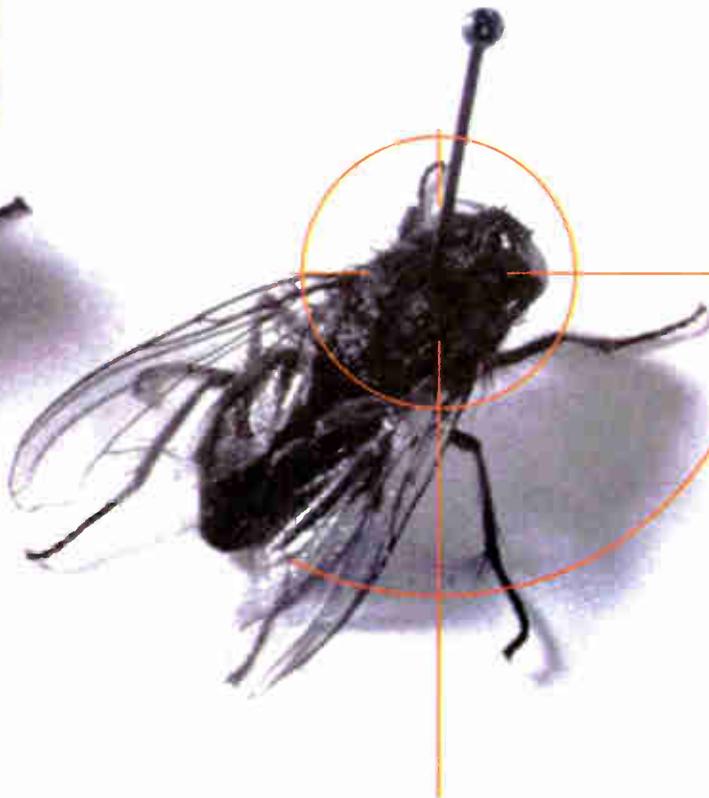
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► LISTINGS, continued from page 49

EDX Engineering Inc. L11562
Intro: AMW 3.0 for Windows 95/98/NT offers advanced mapping capabilities including color gradient displays and support for a worldwide GIS database with a query function that provides and calculates detailed information for all map layers and drawing tools that can be used to create a ground conductivity database.

Also: FMSR 5.0; Signal 5.0; EDX SignalPro 2.0; MCS 3.0; MSITE 5.0/5.5; TPATH 5.5.

EEV Inc. L24024, OD265

Electronic Associates Inc. L20717
Intro: DataLine expandable transmitter remote control system offers integrated data access, pager and voice interfaces and operation as a standalone unit or with single or multiple site control point host programs; RF-Manager Version 8.0 features remote access to the control point host system in addition to the access to the transmitter site system; RF-Host Version 2.0 features remote access to the RF-Host Multisite Controller, access to any connected transmitter site and pager notification from the RF-Host.

Also: RF-Manager; Pocket Monitor; RF-Host.

Electronics Research Inc. L13162

Electrorack Products Co. S4614
Intro: Relay Racks inexpensive open racking system that bolts to floor for stability; Electrosafe seismic protection for electronic equipment, NEBS-tested for up to 8.5 on Richter scale; Kosk custom-design Nema environmental protection and security system for in/outdoors.

Also: 19-inch rack mount cabinets, studio consoles, desks, EMI shielding and custom cabinets.

Elenos Srl L13389

Intro: FTG stereo exciter with a digital control panel, easily customized with plug-in boards to add audio processing, stereo encoding and RDS encoder; E4TX5000/E4TX10000, 5/10 kW tetrode transmitters with a supercompact design, broadband input and high anode efficiency; DAVL4 audio processor that uses 32-bit floating point algorithms and with an optional built-in DSP stereo encoder; Equgraph 27-band, one-third octave, 32-bit floating point algorithms audio processor with ambience presets.

Also: FM tube amplifiers and transmitters up to 25 kW; FM solid-state amplifiers and transmitters up to 2 kW.

Elettronica Industriale SpA L12135

Elettronika Srl L20387

Intro: EKA 3000S FM Solid-State Transmitter features MOSFET technology, microprocessor controlled with low energy consumption and 3 kW of power; EKA 6000S FM solid-state transmitters, MOSFET technology and microprocessor controlled with low-energy consumption and 5.5 kW of power.

Emulive Imaging Corp. S432

On Display: Emulive server (standard or commerce edition); Audio Producer; MultiMedia Producer; Active Theatre; Theatre Xpresso.

ENCO Systems Inc. L11894

Intro: DADPRO32 digital audio delivery system for live-assist and/or automated on-air operation, production and inventory management, with options for integrated newswire capture and editing and multitrack production, supports both LAN and WAN capabilities as well as satellite-based store forward and remote management of unattended downlinks.

Energetic Music L16048

Energy-Onix L13084

Intro: Roadcaster frequency-agile RPU with facilities for duplex operation; Pulsar solid-state AM transmitter with efficient PDM available in 250 W, 500 W, 1 kW, 3 kW, 4 kW, 5 kW and 10 kW powers; Legend "C" solid-state FM transmitter available in portable

versions at 300 W, 500 W and 1 kW, cabinet versions at 1 kW, 1.5 kW, 2 kW, 3 kW, 4 kW, 5 kW and 10 kW broadband, full accessibility with drawers mounted on slide rails.

Engineering and Technical Services S5051

Equi-Tech Corp. L11597
Intro: Model ET1.5R and ET2R balanced power rack systems are smaller, lighter and less expensive than their predecessors.

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Ergo 2000 S4538

Intro: Switchman (rackmount), allows for monitoring of up to 64 CPUs using one keyboard, one monitor and one trackball; E2 CKS-3 (rackmount), a keyboard, trackball and LCD monitor in a 5.25-inch rack space; E2 SVGA 17 1B, fully encased in metal with an XGA 17-inch monitor/rackmount.

Also: E2 CKS1 rackmount keyboard tray.

ERI-Electronic Research L13162

On Display: Manufactures and installs omni and directional FM antennas, filters and combiners for commercial broadcasting.

ERM S7879

Intro: Heatsinks Bonded, available in copper and aluminum.

ESE L18528

Intro: "U" Series time and date slave displays featuring several enhancements, including the ability to

automatically decode and display from four different time code standards and continues to count in the event time code is lost; ES-103 GPS master clock/time code generator features a rackmount enclosure, front-panel display, three time code outputs.

Also: Master clock systems; GPS products; stand-alone clocks and timers; SMPTE time code products; programmable event clocks; PC time code interfaces; audio and video distribution amplifiers; audio level indicators and interfaces.

ETM-Electromatic Inc. L24439, S5974, OD140

Intro: 125-Ku antenna mount version offers maximum output power by limiting the waveguide run and minimizing the associated RF losses, 120 W flange power, 422/485 interface and 1:1 redundant operation for mobile SNG or fixed SATCOM applications; 120-Ka millimeter amplifier offers 100 W flange power at 27.5-29.5 GHz with a 27-30 GHz option and a 19-inch rack or split hub mount version.

See LISTINGS, page 52 ►

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



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



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Circle (213) On Reader Service Card

▶ LISTINGS, continued from page 51

- Euphonix Inc.** L12483
Intro: CS3100B high-performance mixing system for broadcast production. 5.1 surround sound capable, compact size, status/mute lock, instant recall; R-1 24-bit disk-based multitrack recorder to replace analog and digital reel-to-reel multitracks, MADI, digital I/O, variable speed, reverse, play, jog, and time code synchronizer.
- Eutelsat** S4851
- Eventide Inc.** L11279
Intro: Orville Harmonizer multichannel effects processor.
Also: DSP4000B broadcast/production Ultra-Harmonizer; H3000B+ broadcast Ultra-Harmonizer; BD500 broadcast/obscenity delay; BD941/942 broadcast audio delay.
- Exabyte Corp.** S4938
Intro: Mammoth LT tape drive provides AME

media, 14 GB capacity, 120 MB per minute throughput, automation-ready and backward compatibility with Exabyte 8mm products and LVD and single-narrow SCSI configurations.

Also: Mammoth; EZ17 Mammoth Autoloader; 230D DLT library.

Exeltech S633
Intro: M8 series of DC to AC power inverters.

Express Video Supply Inc. L11433
On Display: Audio tape stock.

Factum Electronics AB S832
Intro: DRC 100 high-fidelity audio compression with a non-intrusive algorithm that preserves the qualities of music; NICAM end-to-end data broadcasting system solution offering a high-capacity NICAM/VBI channel.
Also: MAP100E/MAP1100 MPEG audio encoder/decoder; DBS100 DAB data broadcast server; DTA10B STI/ETI transport adapter.

Fairlight USA L12158

Intro: MediaLink, a high-speed networking solution for MFX3plus and FAM digital audio workstations; MediaLink Server, a high-speed Microsoft NT-based server solution offering a range of RAID storage options and supporting up to four MediaLink networks, each with multiple workstations; Fairlight Digital Video Disk Recorder, a standalone non-linear digital video disk recorder, is also a replay system.

Also: MFX3plus digital audio workstation; FAME integrated digital audio production system; DaDplus digital audio dubber.

Fender ProAV Systems L11152

Intro: Passport P150, a self-contained portable sound reinforcement system with speakers, mic, cables, stereo, 75 W per channel, three mic inputs and one stereo line in, digital reverb, VIP (Vocal Input Priority) "ducking" feature on channel one mic, 12V battery with accessory adaptor; Powered Expander for Passport, self-contained speakers and 125 W per chan-



Hoover Dam

nel stereo amplifier for increased power and coverage with Passport 250 or other portable mixer, processor selection for use as sub-woofer; Extension Speakers, speakers and storage compartment for use with Passport 250 to increase audio coverage.

Also: Passport 250; Powered Mixers; Sound Reinforcement Speaker Systems.

Fidelipac Corp. L13177

Intro: MXA, an analog broadcast console, features 12 stereo inputs, two stereo output buses, two mono output buses, a 13-inch wide frame, full independent remote features and modular construction.

Also: DCR 10 digital cart machine; MX series analog consoles; MX/D digital console; BA 1230 digital console; CTR analog cart machine/ Models 300, 380 and 1000 NAB audio cartridges; handheld and tabletop erasers; standard and custom studio warning lights; DynaTool digital interface devices.

FirstCom Music L13153, L23238

Flash Technology Corp. L11882

On Display: Tower lights, obstruction beacons, monitoring, service.

FM Systems Inc. L16539

Forecast Consoles Inc. S4335

Intro: Modular and custom furniture, TV and radio consoles and furniture.

FrameRate Corp. L15955

France Télécom S4768

Fresh Music Library L16442

Intro: "Fresh Produce Library," a seven CD set of sound effects and productions.

Also: "Fresh Music Library."

Frontline Communications Corp. L25177, OD330

FSR Inc. S5230

Intro: FL-600P, a floor box for carpeted floors that handles power, video, audio, telecommunications; AVS-8S, a rack-mounted 8 x 1 and 8 x 2 audio and video switcher; SPC-15, a rack-mounted power sequencer and power conditioner featuring solid-state switching, UL listed.

Also: Wall boxes; audio and video switching modules; power sequencers; floor boxes; table boxes.

Full Compass Systems S7840

G-I

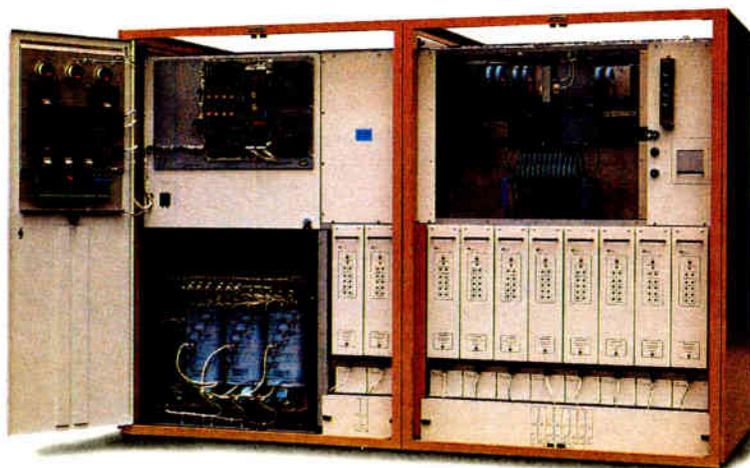
GAMPRODUCTS Inc. L18510

Intro: GAMFLOOR instant vinyl flooring, durable, flexible, available in many colors including chromakey blue and green, covers wood, vinyl, concrete, plaster, glass with matte and glossy colors as well as clear, wood grain and more, easy to install, easy to remove and leaves no residue, 48 inches x 100 foot rolls.

Garner Industries L18531

Intro: Model 4000FS with EMF shielding and unique design enhancement, reduces electro-magnetic See LISTINGS, page 53 ▶

Knowledge



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The Nautel XL series of AM transmitters are built to provide the reliability you've always wanted, and the capabilities you'll need in years to come. Every XL model is 20% more powerful than competing transmitters. That's enough reserve power to accommodate simultaneous IBOC digital transmission while maintaining full AM performance.

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benefit from unsurpassed system reliability and can maintain full operation even in the unlikely event that a power module requires service. Full duplication of critical low-level circuits further contributes to system reliability.

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▶ LISTINGS, continued from page 52

field emissions by 50 percent without affecting erasure quality and is available in both 60 Hz and 50 Hz.

Also: Model 105; Model MGD 3; Model 682A; Model 4000 (FS).

GE Americom L18824, S5655
On Display: Global satellite system.

GEC Marconi Communications L13973

Gefen Systems L17860

Intro: SFXNet system for audition and transfer of any sound effect in high resolution audio to multiple workstations; SFX Sampler to audition sound effect samples from hard disk and then transfers audio from CDs; PC/Mac 2000 cross-platform CPU switcher for working among a combination of up to six different Mac and PC computers using the same monitor, keyboard and mouse.

Also: Extend-it TSE 150, PCX 150, TSE 241 and PCX 241 CPU switchers; ADB100, ADB500 and M&E Pro Software.

Gene Michael Productions L11526

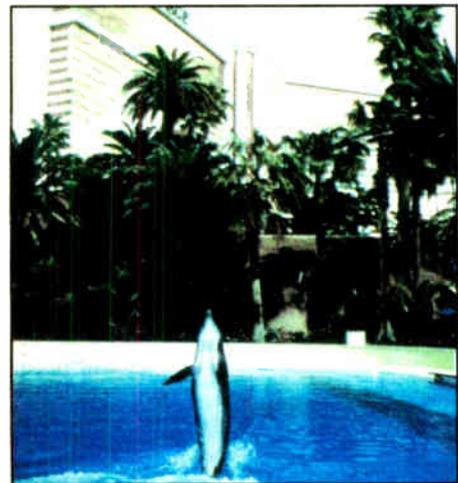
Intro: 12 new volumes of production music offered on buy-out or lease basis.

Also: More than 85 CDs of quality production music in a variety of styles.

Genelec Inc. S1745

Intro: 2029A, a digital stereo monitor system with digital input, works with optional 1091A subwoofer.

General Instrument Corp. L24068



Mirage Dolphin

Gentner Communications Corp. L13170

Intro: DH30 24-bit digital hybrid with remotable presets and password protection.

Also: SPH10, DH20 and DH22 hybrids, TS612 telephone interface/hybrid and GSC3000 site control system.

Gepco International Inc. L16461

Intro: D5524EZ two pair, 110-ohm digital audio cable in a zip construction for simplified termination; 552404GFC 26-gauge, four-pair, 110-ohm digital audio cable with color-coded pair jackets and gep-flex overall jacket.

Also: Digital audio, multipair, single pair, microphone and speaker cables.

GFRC Shelters L13690

Intro: GFRC shelters, transmission equipment shelters, concrete.

Giant Advertising S4820, L10260

Gorman-Redlich Mfg.Co. L13877

Intro: Model EAS-1 encoder-decoder can now be supplied with a DTMF interface so messages can originate from a remote location using a telephone keypad.

Also: Digital antenna monitors for AM directional arrays; EAS encoder-decoders; weather radios.

Graham-Patten Systems Inc. L12805

On Display: SoundPals family of digital audio building blocks.

Groove Addicts L11589

Intro: "Kool Moves" urban jingles music library and production work parts package for Urban AC or Urban RB/Oldies formats; "Extreme Noise," in-your-face image sweepers, news and work parts package including the hit "Gravity Music Library"; five new radio demo jingles featuring hot session musicians and vocalists from Los Angeles, New York and London.

Also: "Groove News," "Mindbenders" and four production libraries.

H.L. Dalis Inc. L22972

Intro: Custom wall plates and panels, anodized aluminum, loaded with the connectors of your choice, engraved.

Also: Cable and panel distributor.

Hafler Professional S8729

Intro: P1000 Transana compact broadcast studio monitor is for recording or critical listening, headphone system amplification, SurroundSound applications,

paging systems, balanced or unbalanced use; TRM8 custom-designed powered monitor speaker system by Hafler and the Rockford Acoustic Design Division; TRM6 two-way bi-amplified active speaker system.

Hannay Reels Inc. L23168

Intro: AV-1 reels, rugged, stackable, adjustable brake and removable side panels; AV-2 reels are similar and designed for ease of transport.

Hardigg Cases L24450

Intro: Rotomolded cases for audio and broadcast equipment; fly packs; shock-mounted EIA rackmount cases; custom cases.

Harris Broadcast Systems Division L16710

Intro: ITIS D-SMUX studio and D-EMUX ensemble multiplexers for DAB applications; ENCO DAD-PRO³² digital audio delivery system, intuitive on-screen displays, on-air flexibility and enhanced user-friendly Sound Cubes with interfaces that provide

a low learning curve.

Also: Harris Z10CD 10 kW digital solid-state FM transmitter; DIGIT CD digital FM exciter; HT 25CD 20 kW digital FM transmitter; CD LINK 950 MHz uncompressed digital aural STL; DX 10 10 kW digital solid-state medium-wave transmitter; DRC2000 digital audio console; Orban Audicity audio editor; Wheatstone A6000 on-air radio console; CD2001 CD player; ENCO DAD_{NT}; 360 Systems Short/cut personal audio high-speed editor; 360 Systems Digi/Cart; 360 Systems Instant Replay; Mackie d8b console; Audion VoxPro digital sound editing system.

Harris-Intraplex Transmission Solutions L12853

Intro: Intraplex IntraLink ISDN multiplexer, centrally controls up to six remote broadcasts and from a 3 RU rack shelf can control multiple basic rate ISDN lines used in on-location sports broadcasts, off-premise news, weather and traffic, program delivery

See LISTINGS, page 54 ▶

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▶ LISTINGS, continued from page 53

to other stations, supports talent broadcasting from home, can back-up a studio-to-transmitter link and is compatible with most industry codecs, delivery of MPEG program audio up to 128 kbps and LAN data at 128 kbps and is field configurable via new Windows-based user interface; STL PLUS digital STL system supports bi-directional transmission of program audio STL/TSL, remote control, LAN data and telephone service on a single T1 digital line, microwave or fiber-optic links and features internal CSU, new Windows-based user interface and enhanced front panel display.

Also: Intraplex SynchroCast; Intraplex DCS-9500/9560 Digital Cross-Connect Systems; Intraplex OutBack MPEG Layer II ISDN audio codec.

Harrison By GLW L11577

Henry Engineering L12368

Intro: Digistor-CD CD-quality digital audio recorder for utility use, telephone information, message-on-hold, broadcast IDs, jingles, spots, translator IDs, or network news delay; Audio Online version 4.0 multiline, menu-driven, multmessage caller-interactive telephone information system with screen call-counters, text message descriptions and several hours of storage using standard PC.

Also: Matchbox II; Portamatch; Twinmatch; Micromixer; Stereomixer; Stereoswitch; Superelay; and Logicconverter.

Herman Electronics S4517

HHB Communications USA LLC L13994

Intro: Genex GX8500 multiformat digital audio linear/non-linear recorder; Circle 3 monitor combines a custom-designed, linear-response 5.5-inch bass/mid driver with a ferrofluid-cooled soft-domed tweeter.

Also: Circle 1 monitor; 5.2 GB MO disk; Radius and Classic Series tube processors, preamps and EQs; CDR74 Silver.

Hi-Tech Enterprises Inc. L22458

Holiday Industries Inc. L13980

Intro: HI-4460 graphical display, interchangeable electric and magnetic field probes, 5 Hz to 40 GHz operation, percent of standard readings, data logging, PC interface and Windows software, on-board graphical data review; ProbeView interchangeable electric and magnetic field probes, Windows-based measurement and analysis software; HI-3804 combination electric and magnetic field meter, ISM frequency bands 10-42 MHz, data logging, on-board data review.

Also: HI-4000 broadband measurement system; personal protection equipment; personal monitors; induced current meters.

Hollywood Edge L12809

Hosa Technology Inc. L16155

Intro: PHB-265 audio patch bay, front panel switchable from full-normal to half-normal to de-normalled, 40 patch points; CDL-313 S/PDIF to AES/EBU converter, RCA and XLR connections.

IBM L12826

IDT - Impact Développement L10662

Intro: Digital broadcast sound processors featuring 24-bit, 96 kHz audio.

Also: Sound Design, five- and seven-band broadcast audio processors for FM and AM with full software control and digital I/O; Sound Style four-band broadcast audio processor.

Illbruck Acoustics Inc. L13059

On Display: SONEXclassic; Panels; Contour Ceiling Tiles.

Image Video L21635

IMAS Publishing L14181, L16118

On Display: See listing under Radio World.

Independent Audio L10587

Intro: Sonifex Courier, a hard-disk location recorder with editing and interconnection boxes; Redbox interconnection boxes.

Industrial Acoustics Co. Inc. L11585

Inovonics Inc. L13878

Intro: Model 520 AM modulation monitor for tunable, off-air or direct-in operation, reads total modulation in percent with adjustable and preset peak flashers, alarms for carrier loss and loss-of-audio.

Also: Audio processors for AM, FM and TV; FM stereo generators and processor/generators; AM, FM and subcarrier modulation monitors; FM translator receiver; RDS encoders and decoders.

Integrated Systems Design Center S2450

Intel Corp. S8471

Intelsat S5659

Intro: Intelsat satellite system for global satellite communications for broadcasting and Internet services.

Also: Satellite capacity and services.

International Cellulose S1967

On Display: K-13; SonaSpray "FC" acoustical finish; Celbar wallspray.

International Datacasting L13970

Intro: SuperFlex satellite digital broadcast system, providing flexibility in data distribution, bitrate agile with data rate capacity from 256 kbps to 31 Mbps, synchronous, asynchronous or Internet protocol datastreams, allows for distribution of multiple datastreams.

Irte SpA L12838

ISIS Group L24857

Intro: RTS-201, an analog or digital 2x1 multi-level protection switcher that can be operated manually or automatically.

Also: Compact additive mixer for remote.

Italiana Ponti Radio SRL L25128

Itelco L13346

Intro: 800 W L-band DAB transmitter utilizing LD MOS technology; DAB VHF band III transmitter with air-cooling amplifiers for international customers.

ITI International Towers Inc. L15146

Intro: Broadcast towers, including trimount guyed towers to 2,000 feet, self-supporting broadcast towers to 1,000 feet; tower services including erection, foundations, transmitter buildings, tower structural analysis and modifications, antenna repair and replacements, general tower service and repair services.

See LISTINGS, page 55 ▶

**You'll have a hard time figuring
last time a DX transmitter we**



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▶ LISTINGS, continued from page 54

J-L

- J.L. Fisher** L24777
Intro: Carbon Fiber Microphone Booms.
- Jampro Antennas/RF Systems** L16320
On Display: Penetrator sidemounts, internal fed "rototiller" sidemount.
- JBL Professional** S7529
Intro: LSR2BP bi-amplified monitor, linear spatial reference design with 8-inch, two-way configuration and optional subwoofer; LSR25P bi-amplified monitor, compact but powerful 5-inch two-way design with linear spatial reference components; LSR12P active 12-inch subwoofer, built-in bass management system for use in stereo and multichannel applications.

- JK Audio Inc.** L11256
Intro: Innkeeper 1 Digital Hybrid, using a proprietary algorithm to connect callers to consoles for on-air interviews, allowing balanced in and out and head-phone monitoring.
Also: QuickTap; THAT-1 and 2; Inline Patch; Remotemix C+; Remotemix 3; Remotemix 3x4; and Pureformer.
- John F. Anderson** L13522
Intro: Real Estate services.
- JVC Professional Products** L21501
- K & H Products/Porta Brace** L21467
- Kart-A-Bag** S4322
Intro: Kartmaster HD500S telescoping hand cart carries 600 pounds, converts into worksite table top and attaches firmly.
Also: Tri-Kart 800, Super 600.
- Kathrein-Werke KG** L11535
On Display: FM and DAB broadcast antennas, combiners and turnkey systems.
- JLCooper Electronics** S7581
Intro: MCS3, a media control station tactile remote with five available versions including USB, RS-422/9PIN, RS-232, MIDI/MMC and ADB; MCS-Bridge, a graphics display track arming and control option for MCS 3000 Series media command stations; MCS-Tracker, a 64-channel tracking arming module.
- JMR Electronics** S9344
Intro: Fortra Rackmount 10R features high storage capacity for RAID and JBOD enclosures, 10-bay that supports 10,000 rpm drives, two hot swap RAID con-
- troller bays in 3RU or 5.25 inches; Modular Tower features hot-swap canisters that support Fibre Channel, SE and LVD drives in a small footprint; Electronic 19-inch cabinets support standard 19-inch rackmounts equipment.

- Kay Industries Inc** L17212
- KD Kanopy Inc.** L12896
- Killer Tracks Production Music** L15852
Intro: Global Track Search Mac- and PC-based search software for managing all aspects of music catalogs; "Match Music" & "Killer" broadcast libraries now available for licensing; Digital Music Delivery offers music for streaming, licensing or downloading over the Internet, as well as hard-drive delivery.
Also: Variety of music libraries, including "Killer Tracks," "Chronic Trax," "Killer Latino Atmosphere," "Koka Media" and "Killer Classics."



Planet Hollywood

- Kings Electronics Co. Inc.** L21837
- Kintronic Labs Inc.** L12182
Intro: Dual AM 0 to 50 W frequency-agile exciter combines parallel operations of two AM transmitters and can be used as an RF bridge driver; Militarized 5 kW AM all-band mobile antenna system features quick setup, efficiency and low profile; Digital Optilink digital fiber-optic control of AM directional antenna systems.
Also: AM broadcast antenna systems and accessories.
- Kline Towers** L24847
On Display: Guyed and self-supporting towers to 2,000 feet for broadcasting operations.

- Klotz Digital Audio Communications Inc.** L10994
Intro: Spherion digital audio on-air radio or TV production console based on Vadis 3d audio router technology featuring 12 or 20 faders with unlimited source and mix-minus capability, the ability to connect sources appearing on any fader, machine control logic following every source, source-to-fader formats saved with routing assignments and recalled on console-wide basis, EQ, limiters, gates, compressors, programmable button bank section configurable for additional monitor source selects, intercom, specialized task signal routing and full-function machine control; Paradigm digital audio console featuring voice processing and HPF on all mic inputs, SRCs on all digital line inputs, mode, pan and phase reverse on all inputs, two faders of six source selectors, large time-of-day and event timer displays, digital and analog outputs, a console layout that can be configured, saved and retrieved for each operator, PGM, REC, TEL1, TEL2 and PFL (cue) with cue speaker busses, headphone, CR and studio monitor outputs.

- Kramer Electronics** S7544
- L.&S Radio Communication** L10697
Intro: CHIRplus_BC, a broadcast planning and coordination tool (FM/TV) that includes a network processor, frequency scan, ITU conform, coordination macro and population analysis; CHIRplus_DAB, a DAB planning and coordination tool that includes a T-DAB specific database, coordination macro, contour calculations and network process; CHIRplus_DVB, is a planning and coordination tool for network processor, coordination macro and DVB specific database.

See LISTINGS, page 56 ▶

ng out the nt down.



The technology is so reliable you can set your clock by the Harris DX transmitter line with power ranges from 10kW to 2MW that have 110% sine wave modulation, hour after hour.

DX has the highest reliability record in the world with high power units reaching an MTBF of greater than 100,000 hours. Its patented Digital Amplitude Modulation practically eliminates unscheduled off-air time.

Harris DX transmitters tick so solidly that they virtually pay for themselves with efficiencies gained of up to 86%.

With specifications like this, it's hard to believe one would ever go down, but statistics show that a Harris DX transmitter might go off the air once every millenium or so. But, we doubt it.



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▶ LISTINGS, continued from page 55

Larcen-TTC L18844
On Display: Digital radio transmitter for VHF band III and L band.

Leader Instruments Corp. L16932

LeBLANC Broadcast Inc. L18844
On Display: DAB digital radio transmitters for L-band and VHF band III.

Lectrosonics Inc. L23438
Intro: Frequency-agile wireless UHF microphone equipment for studio and ENG applications; AM16 16-channel automatic mic mixer with built-in 16x12 routing matrix; high-performance antennas and accessories for wireless mics.
Also: Wireless IFB, VHF and UHF wireless microphones.

Leitch Inc. L22257

On Display: Integrator router combines multiple signal formats in single 4, 6 or 8 RU frames for deterministic, field accurate switching; also available are mono or stereo analog audio, coaxial or fibre serial digital video.

Lighthouse Digital Systems L11426

Lightning Control Systems L13649

Lightning Eliminator and Consultants L18109

Intro: Sandwich Block surge suppressor features fast reaction times and ability to withstand up to 1,280,000 amps per phase low clamp ratio; Chem-Rod grounding electrode low surge impedance grounding systems featuring the equivalent of 10 conventional rods and designed for lightning protection and surge protection systems.

Linear S.A. L12835

Link Comunicaciones S.A. L10954

Link Electronics Inc. L21267

Liquid Audio S5227, S8129

Intro: Liquid Express music and sound effects library provide multiuser intranet access to many of today's production music libraries for searching and downloading as .WAV, .AIFF or .SDII files for use with digital editing systems.

Also: Liquid Music Player; Liquifier Pro; Liquid Music Server.

LM Engineering Inc. S-8142

Intro: Composite Series ATA shipping cases offer the same protection as traditional laminated plywood but weighing 30 percent less, as puncture-resistant as 3/4-inch plywood.

LNR TrexCom S5951

Intro: M2-Series converters with extended bandwidth, reduced size and advanced performance.



The Fountains of the New Bellagio

Location Sound Corp. L11867

Intro: RRB-2 Remote Roll for the Fostex PD-4.

Also: Professional audio and communications equipment; sales, rental, repair, education.

Bobbie Jean Frank, Mktg. Dir.

10639 Riverside Dr.

N. Hollywood, CA 91602

818-980-9891, Ext. 304

800-228-4429

FAX: 818-980-9911

E-mail: info@locationsound.com

www.locationsound.com

Lodestar Towers L18844

On Display: Tower management for TV FM tower installations.

Logitek L13458

Intro: Surround Sound meters, 5.1 and 7.1 format vertical bargraphs in a compact desktop case; Trumix, an additional control surface in modular form for the Logitek Audio Engine; Numix on-air digital audio mixing console with up to 36 faders, four program busses, built-in router, pan, mix-minus and more; Ymix for Windows/PC-based control of the Logitek Audio Engine.

Also: AE32 Audio Engine, ROC-10 and ROL-5 digital audio mixing consoles, Bright-VU, Super-VU and Ultra-VU LED audio meters.

Loral Skynet S5671

Intro: Telstar 6 satellite for broadcast and syndication in all U.S. states, southern Canada, Mexico and the Caribbean.

LPB Inc. L13977

Intro: FM Advantage self-contained, Part 15 low-power FM transmitter; Salsa NT digital audio system, a Windows NT version that allows the networking of multiple radio stations.

Lucent Digital Radio/Lucent Technologies L12146

On Display: Patented Multi-Streaming In-Band On-Channel (IBOC) Digital Audio Broadcast (DAB) technology; demonstration of Lucent Perceptual Audio Coder with Unequal Error Protection.

M-O

M & C Systems Inc. S4863

Intro: Presence virtual spectrum analyzer, a Windows NT-based monitor and control system that is integrated in a single chassis, detects carrier loss and unauthorized frequencies, provides worldwide remote monitoring and more; Uplink power control software, monitors and controls the output of power amplifiers using a stable signal source.

Mark Sivertsen, VP Mktg.

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► LISTINGS, continued from page 56

Mackie Designs Inc. L10691

Mager Systems L12891

MAGMA S8060
Intro: Four-slot PCI expansion system, allows users to add four PCI slots to a PCI-based Mac, Powerbook or PC.
Also: Two-, seven- and 13-slot PCI expansion systems.

Magnum Towers Inc. L12373

Manhattan Production Music L16254
On Display: MPM library (50 CDs, traditional); Apple Trax library (50 CDs); Chesky Records Classical Series (50 CDs); Audiophile Sound Effects Series (six CDs, 594 effects).

Marshall Electronics Inc. L20965

Martech L10859
On Display: MSS-10, microphone preamplifier.

Marti Electronics L13677
On Display: RPU; STL; TalkPort; Smarti.

Martinsound Inc. L10859
On Display: ACX-automated console expander (portable).

Maxell Corp. of America L24512
On Display: PRO DATADAT, DTRS audiocassettes and MD-Pro MiniDisc.

Maycom Automation Systems L10857
Intro: EasyCorder digital portable recorder with editing and transfer capabilities; lsys PC-based audio codec that is compatible with variety of hardware- and software-based codecs; CoSTAR radio automation system.
Also: L108SF automation system.

Media Concepts Inc. L17033

Media Tapes and More Inc. L13817

MEDIACRAFT - Quicktime MUSIC LIBRARY S8036

MediaFORM Inc. S8664
Intro: 3706P unattended duplication and printing system capable of handling 175 CDs in six drives and thermal printing capabilities; API000 standalone auto-



Treasure Island Pirate Battle

mated thermal printing system with 175-disc capacity; 3704 automated 100-disc, four-drive capacity for job streaming.
Also: Standalone CD5900, CD5100 and CD4300 CD recorders; CD2701 automated CD recorder.

Mediagenix S625
Intro: What's On software for program scheduling, asset management, program acquisition and management and trailer management.

MediaTOUCH L11558
Intro: QuicPix cart replacement live-assist software for Windows with a seven-event "virtual cart" log area, 27 hot keys in broadcast mode, and the ability to run as a standalone PC or be connected to other air studios and production rooms with the company's Card Independence technology; CD Ripper CD-to-MPEG II conversion production tool, designed for use with MediaTouch OpLOG and QuicPix digital audio systems; Card Independence software codec allows radio stations to play CD-quality MPEG II audio on any

Windows-compatible soundcard.
Also: OpLOG 2000 touchscreen air controller for Windows.

Mediatron L10283
Intro: AirControl NT99 live assist and automation system in Standard version for small to medium radio stations and a Professional version for larger broadcasters; new VoiceTrack and TimeAnnounce plug-ins let the system expand as needs change.

Megatrx Production Music L13158, S4632

MEMEX L13416
Intro: Prism fully integrated Windows-based software modules for contracts, financial and program management, sales, traffic, multichannel scheduling, media libraries and operations.

MGE UPS Systems S4929
Intro: Broadcasting Comet provides a battery backup for post production, newsrooms and transmitters; EX/ESV+ rackmountable UPS from 700 VA to 3 kVA.
Also: UPS power conductors and inverters.

Micro Communications L17810
On Display: Coax switches; bandpass filters; notch filters; low-pass filters; FM multichannel combining modules; directional couplers.

Microboards Technology L11466
Intro: Audio Station 14-drive duplication station with hard drive and DVD upgrade; Copywriter D2D rackmountable, quad-speed duplication system; DSR 8880 eight-times speed duplication tower with four Plexton drives and 32-times speed reader.

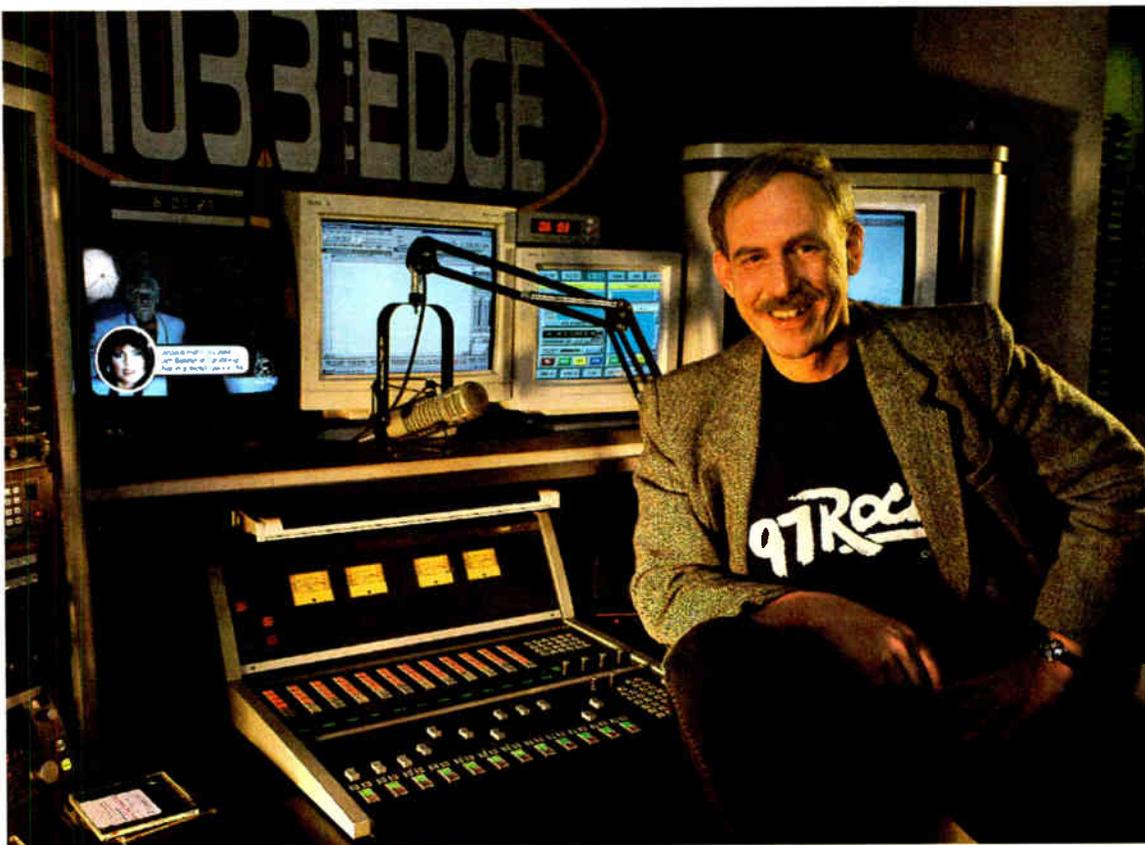
Micron Audio Products Ltd. L17433
Intro: TRAM TR-50 series II microphones and accessories.

Microsoft Corp. S4026

Microspace Communications S4848

MicroVideo Ltd. L24435
Intro: Audio A-to-D and D-to-A converters, part of the Microvideo Series 200 range, a series of low-cost 2X AES/EBU-to-analog converters.
 See LISTINGS, page 58 ►

mercury's rising - in buffalo



Mercury Radio in Buffalo, NY stations include: WEDG fm, WGRF fm, WHTT fm, WHTT am, and network head-end for Buffalo Bills football.

"This is the only product available in the world that allows the digital networking of consoles with each other and the master router," says Dave Halik, CE, Mercury Radio Communications. "I've looked at other digital consoles and routers, but none of them talk to each other."

"One source connected anywhere on the system is available to all locations without any rewiring necessary, thanks to the Vadis' fiber networking. It really changes the concept of routing. Installation is vastly different than with previous consoles. I just plug in one fiber line, and it makes 64 pairs of trunking."

"Thanks to our three fiber optic-linked Vadis DC consoles from Klotz Digital Audio, we can produce all of the mix/minus configurations needed to broadcast the Buffalo Bills ISDN feeds and perform our regular station broadcasts requirements simultaneously. It's truly been a godsend to me."

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Circle 111 On Reader Service Card

▶ LISTINGS, continued from page 57

Also: AES 200 analog audio to AES/EBU converter; Mux 200 audio multiplexer; DMX 200 audio demultiplexer.

Microwave Filter Co. Inc. L18239

Intro: Millimeter Wave Filter handles up to 50 GHz for signal processing and interference suppression.

Microwave Radio Comm. L21142

Middle Atlantic Products S8941

Milestek Inc. L20861

Intro: Rackmount media holders store CDs, VHS, audio cassettes, laser disks, LPs and other media; Category 5 front access 12- and 24-port RJ45 panels that mount on surface.

Modulation Sciences Inc. L24436



Star Trek Experience

MOHAWK/CDT L24536

Intro: Digital two- to 16-fiber count single- and multi-

mode tactical fiber wrapped with Aramid yarn for tensile strength in a choice of jacketing materials.

Also: AES/EBU audio cables.

Moseley Associates Inc. L12871

Intro: Starlink SL9003Q all-digital, 950 MHz studio-transmitter link.

Also: PCL-6000 analog studio-transmitter links; DSP-6000 digital audio codecs.

mSoft Inc. S8926

Intro: ServerSound cross-platform Windows NT-based audio/video retrieval system that uses a hard disk array accessible via an Ethernet network, the Internet or a variety of phone options; Pro/Spotter module for ServerSound eases supervision of spotting unlimited projects at the show, reel, scene and spot levels, also allows simultaneous supervisor and editor instruction details, spot management and sound auditioning/editing from multiple windows; Pro/Master software for ServerSound simultaneously automates mastering and linking to groups of libraries and CDs with numerous indexes.

MUSICAM USA L12856

Intro: TEAM T-1/E-1 audio multiplexing transmission system featuring digital-master-quality audio with no compression and the ability to transmit 12 audio programs simultaneously; RoadRunner portable ISDN codec/mixer, a one-box remote broadcast solution that supports ISO/MPEG Layer II, Layer III and G.722 coding.

Also: CDQ Prima stereo ISDN codecs; FieldFone/StudioFone analog (POTS) codecs.

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MYAT Inc. L16310

Nada-Chair S1748

On Display: NadaChair Back-Up; Sport-Backer; Sit-Pack.

Nady Systems Inc. L16732

NagraAudio L13312

On Display: ARES-C mono or stereo digital compressed PCMCIA Flashcard recorder using analog inputs and analog or digital outputs, sampling rates from 8 kHz to 48 kHz using bit-rates from 64 kbps up to 192 kbps, with G.711, G.722, MPEG 1 Layer II algorithms, on-board file directory management, non-destructive virtual editing, can be equipped with internal ISDN codec; C-PP rack-mount version; NAGRA-D four-channel 24-bit digital tape recorder using both analog and digital I/O, can be set for sampling rates from 32 to 96 kHz, 20-bit internal A/D converters, on-board tape directory management.

Nautel Maine Inc. L12884

Intro: XL60 AM IBOC/DAB-ready transmitter, 50 kW solid-state, with 155 percent positive peak modulation at 50 kW, 20 percent reserve power, modular, on-air serviceable, dual exciters with auto changeover and 84 percent overall efficiency; XL12 IBOC/DAB-ready AM transmitter, 10 kW solid-state, 155 percent positive peak modulation at 10 kW, 20 percent reserve power, modular, on-air serviceable, dual exciters with auto changeover, 84 percent overall efficiency; FM20, 20 kW solid-state FM transmitter with digital FM exciter, digital AES/EBU or composite interface, modularity (PA and PS), on-air serviceable, cool operation and 65 percent overall efficiency.

Also: Solid-state FM transmitters: 3.5, 5, 8, 10 and 16 kW; solid-state AM transmitters: 1, 2.5, 5 and 30 kW.

Nemal Electronics Int'l. L24829

Intro: 37-Pin (DT12) connector, extremely rugged machined body with weatherproof insert, setscrew design prevents insert rotation, wire retention on dust caps, heavy duty strain relief and completely compatible with existing designs.

Also: Flexible, UL-approved audio snake cable.

See LISTINGS, page 62 ▶

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EDUCATIONAL CIRCULAR SERIES

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

LOW POWER CIRCULAR SERIES

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

MEDIUM POWER CIRCULAR SERIES

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

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

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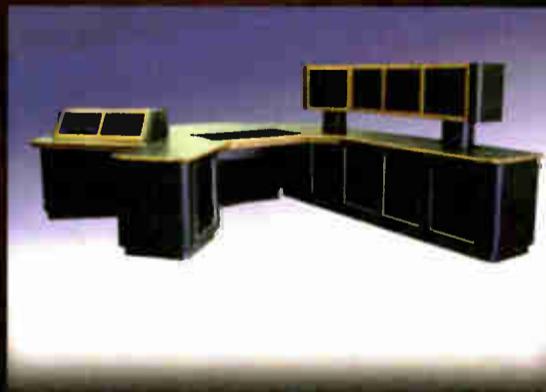
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Circle (188) On Reader Service Card
World Radio History

► LISTINGS, continued from page 58

Netia Digital Audio L10671

Intro: Radio Assist, a modular, Windows NT-based software system running on Antex or Digigram soundcards for audio broadcasting applications, including automated feed acquisition/recording, one- to 16-track audio editing, remote control over multiple station playlists from a centralized site, on-air broadcast playlists, full control over studio GPIs, PC-based virtual cart players, SQL indexed databases and drag-and-drop functionality.

Also: Media Network software package.

Laurence H. Gross, Acting Pres. (U.S.)

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Columbia, MD 21044-3768

410-730-2616

877-730-2616

FAX: 410-730-6718

E-mail: netia-us@netia.fr

www.netia-broadcast.com

Neotek L10859

On Display: Elite, Elan, Encore and Essence consoles.

Network Electronics AS L10812

Intro: UNI-PRO XY master control panel for control of up to 16 routers with a two times 3x12 character illuminated LCD display for sources and destinations; DA-ACON 24-bit 2x AES/EBU-to-stereo analog audio converter.

Also: Digital and analog audio routers; audio distribution amplifiers; audio converters.

Network Music LLC L17037, S4222

Intro: Aftershock Library, 389 cuts on four CDs, including glides, sweeps, drones, winds, jets, fly-bys, lasers, zaps, bursts, sprays, snarls, missiles, guitars, explosions, hits, kickers, ambient sounds and stingers.

Also: Production Music Library; Classical Library; Sound Effects Library; Spike and Glide, Brainstorm and Shockwave Production Elements libraries.



Mirage Secret Garden

Neutrik USA Inc. L16552

Intro: Minirator MR1 battery-powered analog audio generator provides Sinusoidal signals over the audio band

from 20 Hz to 20 kHz at levels as low as -76 dBu and up to +6 dBu, including sweep capabilities at various speeds; NP3TT-P Bantam Plugs, comes in two pieces with interchangeable sleeves in 10-resistor colors, requires a standard RG58 crimp tool, designed to be compatible with industry-standard TT audio patch panels.

Newpoint Technologies Inc. S5929

Intro: Newpoint COMPASS, offering control, monitoring and management of station networked devices, user configurable, expandable and maintainable and features alarm and event manager, fault isolation and resolution, scheduling and routing services, "point and click" graphical interface, NT operating system and a library of manufacturer device interfaces; SATNET Manager offers control, monitoring and management of earth satellite stations with a UNIX (SCO) operating system.

Nicom LLC L10271

Intro: BKG1/P Portable Broadband FM Dipole, stainless-steel FM broadband antenna with sturdy construction and compact for shipping, removable bays, highly portable; NPT20 20 W FM Exciter, high-performance, low-cost 20 W FM exciter; NTR 25, 25 W low-cost FM translator.

Also: Low- and medium-power broadband FM dipoles; medium-power broadband FM directional antennas; broadband FM directional panels; narrow-band FM circularly polarized antennas; medium- and high-power broadband FM circularly polarized antennas; STL antennas; FM bandpass cavities.

Non-Stop Music S4310

Intro: Extreme Music Library, more than 60 CDs in more than 20 categories and an additional 20 CDs in 1999.

Also: Non-Stop Music library.

Norsat S5159

Intro: VSAT, small 1 W and 2 W transmitter units with C- and Ku-band capabilities;

Also: C- and Ku-band LNBS; block downconverters.

Northern Technologies Inc. L15854

Intro: hs900 individual user equipment protection using silicon avalanche diode dual-stage protection for AC line applications, seven-outlet surge protection for audio, video or computer equipment, integrated circuit breaker with audible alarm, stops unwanted interference with built-in noise filtering, features seven outlets to support multiple devices, provides EMI/RFI noise reduction and supports a broad range of equipment up to 15A; a two-stage protection system ensures continuous protection; engineering assistance to configure appropriate equipment.

NPR Satellite Services L13172

On Display: Digital satellite equipment sales from manufacturers such as Crown, Comstream and Wegener.

NSN Network Services S5156

On Display: Radyne/Comstream satellite audio, Wegener Satellite, SierraCom, Skydata.

NVISION L12126

Looking for the best digital audio system?

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Just try running a station on 2, 3, even 6 channels. Most systems can't get much further than that, uncompressed, without adding lots of extra hardware. Digital Universe gives you 50 stereo channels,* all from a single server. No other system comes close.

*Tested capacity as of January 1999. Advances in PC hardware yield ongoing improvements in channel capacity.

No Proprietary Hardware

These days, any system built around proprietary hardware is a dead end. But Digital Universe is software based, so your hardware choices are wide open. Run your system on standard, affordable PCs and mix and match audio cards among workstations: it's up to you.

Windows NT + Client/Server

Digital Universe's leading-edge Windows NT platform and client/server architecture give your system room to grow, without clumsy workarounds or multiple PCs in every studio. And Digital Universe was written for NT, not just "optimized" for it - it's the right infrastructure for the future as well as the present.

Sound impossible? Take the Digital Universe challenge. Contact us today to request your checklist for selecting a future-proof digital audio system. Then, compare apples to apples. Once you've heard what Digital Universe can do for your station, you won't settle for anything less than gold.

DIGITAL
DU
UNIVERSE

► LISTINGS, continued from page 62

OMB America L10986
Intro: EM-250 compact exciter with switching power supply and digital display.

OmniMount Systems Inc. L11316
Intro: ARC Component Shelving System, an adjustable wall-mounted shelving system with integral lighting and an effective wire management system.

OMNIMUSIC L16545
Intro: OMNISPOTS, collection of 30-second music beds for post-production and ad agencies. Four CDs, 99 cuts per disc.

On Display: OMNIMUSIC, a 160-plus CD library of contemporary broadcast and corporate music, blanket and laserdrop rates. New Internet delivery service available.

Omnitronix Inc. L13979
Intro: Shortwave broadcast transmitter, 100 percent solid-state covering 3 to 6 MHz; frequency-agile MW transmitter, one-second frequency change and lightweight compact design, synchronous broadcast option allows several transmitters to be locked to the GPS satellite time base for synchronizing signals.

On Air Digital USA L12477
Intro: Callout! Ask Your Listeners, a Windows 95/98 music research software package with 32-bit application, single-user or client/server applications that includes telephony card and headset.

Also: Ultimate Digital Studio II audio management and control system that offers machine control with interfaces to music and traffic scheduling systems and professional CD changers and hard drive systems.

Opamp Labs Inc. L21573
On Display: Manufacturer of amplifiers, press boxes, audio transformers, oscillators, power supplies and custom sub-systems.

Opus 1 Production Music S1730
Intro: Opus 1 Music Library, production music for film, television, radio and multimedia.

Also: Kosinus Library, Sound Stage (AVJ) Library, JW Media Music Library and No Boyfriend Music Library.

Orban L13684
Intro: Optimod-AM 9200, upgraded with version 2.0 software including presets for high-frequency (shortwave) radio applications; Optimod-DAB 6200, engineered for digital audio broadcasting, Webcasting and two-channel digital television; Audicy multitrack audio editor that offers networking among workstations.

Otari Corp. L21653
Intro: Advanta, a large-format digital audio production system, modular and configurable, featuring application-specific configurations to address current and future needs of music/broadcast and post-production audio industries, incorporates 40-bit DSP technology and a fast communications network, capable of handling all formats up to 24-bit at up to 96 kHz sampling rates; Radar II HDR Series recorder with record time of more than 40 minutes of 24-bit 24-track audio, locks to all standard SMPTE/EBU timecode rates and formats; Lightwinder LW10 dedicated fiber-optic system for transmission of mic or line-level signals; LW-50 system to send and receive 64 channels of full bandwidth, low-distortion audio using fiber-optic cable.

P-R

Pacific Radio L16549

Pacific Research & Engineering Corp. L13670
Intro: Integrity digital broadcast console, providing a digital signal path with the security of analog redundancy; Airwave Digital, offering two frame sizes, three stereo program busses and room for two telco inputs; QuikBilt II ready-to-assemble

modular studio furniture.
Also: BMXIII on-air console; Radiomixer on-air console; Primeline studio furniture; AMX and ABX production consoles.

Panasonic Broadcast & Digital Systems L22901, L12120

Passive Power Products L16112
Intro: CY200 series FM switchless combiners offer on-air amplifier switching at powers up to 100 kW, remote control and a compact size.

Also: Notch filters, bandpass filters, low-pass filters, channel combiners, power combiners, switchless combiners, switching systems, couplers, line switch isolators and DAB filters and systems.

Penny and Giles Controls L11566
Intro: PGFM3200-DC motorized fader with smooth operation using a new drive cord design.
Also: Audio volume controllers, faders and potentiometers.

Penta Laboratories L12370
On Display: Electron tubes.

Phasetek Inc. L14059
On Display: AM antenna phasing systems, antenna tuning units, diplexers, RF components.

PHI Enterprises Inc. S7481
On Display: The Professional Touch and Rejuvenator Plus.

Phillystran Inc. L10966
On Display: HPTG-I High Performance Tower Guys for AM towers, made from Kevlar aramid fiber, used as replacement for steel guys to create an aperture for an FM signal, supplied with Corona sockets designed for HPTG-I.

PMI Audio Group L10883
Intro: MD Report, transforms a consumer DAT/MiniDisc into a pro portable unit with phantom power, AES/EBU in/outs and balanced XLR in/outs; CLM Dynamics two-channel analog mastering equalizer; JoeMeek VC7 stereo mic preamp.

Potomac Instruments Inc. L13174
On Display: 1900 series medium-wave antenna monitoring system; FIM-41 AM field intensity meter; FIM-71 VHF field intensity meter; AA-51A audio analyzer; AG-51 audio generator; SD-31 RF Synthesizer; 1700 series remote control accessories.

PricewaterhouseCoopers S5173

Prime Image Inc. L23485
Intro: CASH unit creates commercial time to generate additional revenue without affecting program time. Successful in-station tests with mono audio signals have created 30 seconds in as little as two minutes.

Prism Media Products Inc. L13155
Intro: Quartz CP 1000, intelligent router panel with buttons that incorporate an eight-character LCD that can display sources, destinations and other functions with multicolor backlighting.

Pristine Systems L10983
Intro: Pristine RF-EDIT on-air waveform recorder and cut-and-paste editor can record and edit audio files in PCM, MPEG and Dolby AC-2 audio formats in stereo or mono.
Also: RapidFire Digital Studio System.

Production Garden Music L16839
Intro: Air Assault II, a new generation of "audio sweetening" production elements; Music Street Production Library, high-end broadcast production
See LISTINGS, page 64 ►

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**TOMORROW'S TECHNOLOGY
FOR TODAY'S RADIO BROADCASTING**

► LISTINGS, continued from page 63
music beds in 12 categories; Manchester Special Edition, New York-produced broadcast production music for retail productions.

Professional Label Inc. L15060

Intro: Glossy CD Face Label Sheets, photo-quality glossy white labels that work with laser or inkjet printers; Widget, free plastic applicator device to center CD labels.

Professional Sound Corp. L13588

Intro: M4mkII portable four-input, two-output mixer designed for use in the field, can operate off an NP-1 rechargeable battery, provides power for wireless receivers and remotely controls the gain of channel one from a convenient remote control.

Also: UHF log periodic antenna, covers wireless mic range (450 to 900 MHz).

Prolease S5920

On Display: Equipment financing.

AES/EBU?



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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.

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Promusic Inc. S4330, L17939

On Display: Music and sound effects library, 1,500 CDs in every musical style.

Propagation Systems Inc. (PSI) L10343

Intro: FHR and FMR broadcast antenna, a series-fed antenna with internal feed point for applications requiring relative insensitivity to icing, excellent VSWR bandwidth; STL high-gain 6-foot grid parabolic antenna for 800 to 1000 MHz, stainless steel construction and type "N" input.

Prophet Systems Innovations L12162

On Display: Audio Wizard for Windows, a central file server for live, automated and satellite usage that features WANcasting, voice tracking and real-time editing.

Pulizzi Engineering Inc. S4314

Intro: Intelligent Power Controller, IPC 33xx series member provides control of power remotely via the network, with control of up to 280 AC ports serially connected, help menu and name assignment to each AC outlet.

QEI Corp. L12889

Intro: The QUANTUM M series solid-state FM, offers a broadband combiner, splitter and can accommodate any 20 W digital or analog exciter input with increased safety margins on all power supplies and air flow for a range of site conditions; Combiner monitoring and protection system, custom high-speed analysis and fault detection for combiner and master antenna systems.

Also: QUANTUM E-series low power solid-state FM transmitters, FMQ-B series single-tube FM transmitters, CAT-LINK digital STL/TSL systems, 691 modulation monitors 675B, 695, 695-50, 695B, 695B-50 FM exciters, 710A digital stereo generator, QUICK-LINK II digital audio link.

Quantum Corp. S9359

Radio Computing Services (RCS) L12867

Intro: Selector/Win, new Windows version of the music scheduling software; RadioShow, with continuously changing visual content including text and pictures to promote station and sponsors during songs; RCS Player, a simple digital audio system that plays music or traffic log or both. Rearrange the log up to last second.

Also: Internet Voice Tracking technology for talent daily shows that installs in minutes on any laptop or home computer.

Radio Express Inc. L12762

Intro: Radioplay Weekly Music Services, choice of four CDs per week, newly revamped, delivering all charting new releases dedicated to speed and accuracy in delivering the following popular music formats to radio broadcasters; Radioplay USA Pop Express (CHR, AC, urban); Radioplay USA Rock Express (rock, alternative, adult alternative); Euro Express (European hit radio); Exitos Express (pop, rock and baladas from Latin America and Iberia); World Chart Show, French Version, newly available French-language version of popular hit music program; Red Hot Jingles Production Library, thousands of tracks of hot production music from the BRG Music Works libraries; Station ID jingles from Thompson Creative, newly available from Radio Express, station ID jingle packages from top U.S. stations, can be sung in any language; Bumpers monthly CD service, one CD per month with intros from current hit songs, classic hits and seasonal selections, for use as bumpers; Powergold 98 Advanced Music Scheduling for Windows, 32-bit Windows 95/98/NT application for radio station music scheduling.

Also: Masterdisc Custom Music Libraries, Production Libraries, Supercharger Production Tool Kit, IMAGIO, Red Hot Jingles, Station ID Jingles from TM Century and Thompson Creative.

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Radio Systems L11581

Intro: Millennium Consoles with rubber keypad switching, clock/timer standard, expanded channel logic, selectable cue logic, eight position switches; DA 4x4A distribution amplifier with removable barrier strips, front-panel audio and peak level indicators, configurable to 1x16, 2x8 or 4x4.

Also: Telephone hybrids, clocks/timers, GPS products.

RealNetworks Inc. S5244

Register Data Systems L11569

Intro: Traffic 32, a multiuser, multistation traffic, management and billing system with direct posting to Windows-based accounting packages.

Also: System Six/System Seven, traffic/billing software, Phantom digital automation system.



Big Shot Atop the Stratosphere

Radio World/IMAS Publishing L14181

On Display: The newspaper for radio managers and engineers. Radio World is published in editions for the United States, Europe, Middle East, Africa, Asia and Latin America by the IMAS Publishing Group. Also from IMAS are regional editions for China, Japan, Germany, France and Brazil. IMAS is publisher of Pro Audio Review and produces the NAB Daily News.

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Radiomation L10959

Radyne ComStream S5665

Intro: IntelliCast 2000 digital broadcast receiver featuring flexible transmission of digital video, audio or data, a low-cost broadcast network, variable rates, network control, BPSK or QPSK modulation; ABR202 Digital Audio Receiver, flexible, high-quality digital audio transmission for the commercial radio broadcast market, radio program distribution, point-of-purchase audio with advertising insertion and data broadcasting.

Also: PromoCast, IntelliCast 401 and 801 VR, ABR200, DAC 700, DMD2401 LBRO, AX801.

RAM Broadcast Systems L12891

On display: Consulting and system design. Manufacturer of custom cabinetry, master clocks, timers and phasescopes.

RCI Custom Products S8042

Intro: E.L. Series plates and panels, wafer-thin cool-burning lamps sandwiched between a backing plate and reverse engraved plastic front plate; BMAV 2, a portable passive broadcast media press feed box that features 12 audio outputs and six video outputs and combines audio and video mults into one unit; BM24 II, portable passive 1-in 24+8 out press feed box with input VU/level meter, isolated outputs and 24 XLR, eight phone and mini phone.

Also: Custom plates and panels, BM 30T and BM 30M press box, CT2 cable tester.

RDL Radio Design Labs L12155, L16933

Intro: RC2-ST two-channel remote control system; RC4-RU four-channel remote control system; RC4-ST four-channel remote control system; RLC3 remote level control system; RT2 remote control selector.

Also: Rack-Up Series, Stick-On Series, TX Series.

RF Parts L10958

RFS Broadcast L124248

On Display: FM broadband and sidemount antennas, combiners, patch panels, RF feeder, rigid line, filters.

Richardson Electronics Ltd. L118110

Rip-Tie Inc. L122970

Intro: Cinchstrap EG, hook-and-loop Cinch Strap with grommet mount for use with component racks, Rip-Tie Lite, double-sided hook-and-loop straps for light duty applications.

Also: Cable wrap, Cable Catch, Cinch Strap, Cable Hanger.

River City Sound Productions L15855

Intro: Buy-Out Production Music Library with Broadcast Series CD featuring a variety of music in full song lengths followed by 60-, 30-, 15- and 10-second edits, categories are Sports, Mellow, Corporate/Industrial, Country, Hi-tech, Rock, Atmospheric, Urban and Miscellaneous; Specialty Series CD featuring a specific style, including Weddings, Nature, Country, Corporate/Industrial, Mellow Moods, Sports, Classical I and II and Useful Stuff I and 2.

Rohde & Schwarz GmbH & Co KG L15843

Intro: DAB Transmitter Series 6000 solid-state transmitter with MOSFET amplifier, COFDM modulator and GPS receiver integrated in the exciter with high transmission quality and power efficiency, compact 19-inch standard rack, for VHF band III and L-band.

Also: Audio analyzer, modulation analyzer and solid-state VHF-FM transmitter family.

Rohn Industries Inc. L124325

Roland Corp. U.S. L12185

Intro: DS-90 Powered Monitors employing 24-bit digital inputs, analog inputs and high-quality built-in amplifiers for flat frequency response, for digital studio applications; VM-3100Pro and VM-3100 V-Mixing Stations, compact digital mixers for MIDI musicians, modular digital multitrack owners and V-studio owners; V-Mixing System affordable separate component digital mixer with many configuration options between console and processor, yielding up to 94 channels of digital mixing and eight stereo effects processors; VS-880EX, a software upgrade (v. 2.0) for use with DS-90 powered monitors, allows VS-880EX users to access a variety of sonic models from high-end active to radio/TV speakers; VS-1680 "V-Xpanded" software upgrade for 18-track playback, allows users to mix down up to 16 tracks to two additional tracks for mastering, includes algorithm with split-frequency compression.

See LISTINGS, page 66 ►

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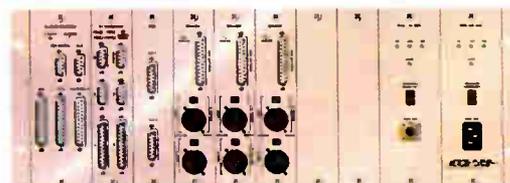
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▶ LISTINGS, continued from page 64

- Rorke Data Inc.** L16554
Intro: MaxArraLVD/FC, desktop and rackmount storage arrays that integrate removable, single-connect Cheetah and Barracuda drives, two-, four- and eight-bay configurations available with capacity ranging from 18 to 4,000 GB; Galaxy RAID FC/RAID, scaleable, fault-tolerant RAID's that can be custom-configured by number of channels/servers or controllers, with storage from 100 GB to 3 Terabytes.
- Rules Service Co.** L16445
Intro: FCC rules published in loose-leaf and on CD-ROM.
Also: FCC rules on loose-leaf and disk; patent and trademark rules and copyright rules.
- Russ Bassett** S2538
On Display: Audio/video media storage systems include steel shelving products that store up to 984

- CDs; steel standard-depth lateral files that store up to 1,728 cassettes or 2,496 CDs; steel extra-deep lateral files that store up to 3,136 CDs or 3,654 audio cassettes.
- RYMSA** L20677
Intro: DAB filter.
Also: Antennas for radio broadcast, radio combiners, coaxial switchers, switching frames.

S-U

- S.W.R. Inc. (Systems with Reliability)** L21449
On display: RF equipment, antennas, towers.
- Satellite Engineering Group** S4861
- SBS Bit 3 Operations** S8925
Intro: PCI Expansion Unit adds seven to 13 PCI slots for expanding PCI systems and approved for use with Digidesign, Media 100, Accom (formerly Scitex) and many more.

- SCA Data Systems Inc.** L12371
Intro: Micro-Miniature receivers, portable, heavy-duty, exceptional reliability; Coded Modulation Series, fade-resistant subcarriers; SCPC Satellite Receivers.
Also: NT Series high-speed performance data systems, PG-57-4 phase-locked paging generators, 9600 bps subcarrier data system, RD-57 RDS generator.

- Scala Electronic Corp.** L11535
On Display: CL-FM log-periodic FM antenna, CL-FMRX receive log-periodic FM antenna, GP-FM groundplane FM antenna, CA5-FM Yagi FM antenna, HDCA-series Yagi FM antennas, FMO crossed-dipole omnidirectional FM antenna, FMV dipole antenna, MF-950B STL antenna, PR-950 STL antenna.

- ScheduAll by VisuAll Inc.** S4522
Intro: ScheduALL facility and personnel management system; ScheduALL Library and Labelling System, information system for quick storage and retrieval of material, with bar codes capability;

ScheduALL for Satellites, a satellite resources scheduling system.

Schoeps/Posthorn Recordings L12794

Scientific-Atlanta Inc. L16304

Scott Studios Corp. L11890

Intro: Scott NT Digital Air Studio System uses Digigram, Audio Science, Antex or APT audio cards; Voice Trax Via Internet (VTVI) allows recording of voice-tracks for distant stations from an ordinary computer with sound-card and Internet connection, basic version available free to Scott Systems users.

Also: Spot Box cart-replacement system; AXS 2000+ affordable satellite/CD digital audio controller; Invincible self-healing redundant Scott NT; Voice Trax prerecord announcer shows in context; News Booth news actualities and text; Digital Long-Form Recorder (DLR) net catcher; and Remote Recording Router (RRR) wide area network manager.

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Seamount Technology S1545

On Display: Audio patch bays, AES/EBU, analog, data patch bays, cable assemblies, distribution panels.

Selco Products Co. L14189

Intro: Potentiometers, quad-ring shaft and full housing seals designed to withstand waterspray and outdoor weather conditions, integral amp and panduit mating connectors that provide true plug-and-play features both external and front panel applications; small and compact models offer rotational life of 10 million full cycles and 50 million dither cycles.

Also: Control knobs and analog/digital panel meters.

Sencore Inc. L12609

Sennheiser Electronic Corp. L24825

Intro: MKE2 Gold Mic, redesigned to be more immune to sweatout. EK3041 microphone.

Shively Lahs L12877

On Display: FM and UHF broadcast antenna, combiners, B-line transmission line and related equipment.

Shure Brothers Inc. L16314

Intro: PSM 700 in-ear wireless monitoring system with 32 selectable channels and universal fit dual-driver earphones.

Siel Sistemi Elettronici SRL L11255

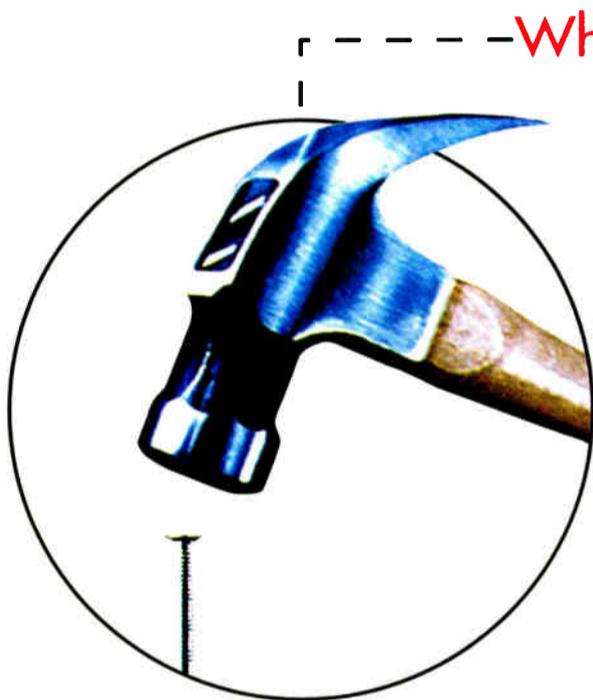
Intro: RFB 1500 W solid-state FM amplifier with low maintenance requirements, low consumption and high acceptance of power line variations, compact size; RFB 3000 3 kW solid-state FM amplifier, broadband FM amplifier with easy check of the functioning and sturdy modular mechanical/electrical construction.

Also: Exciters, tube and solid-state transmitters, radio links.

Sierra Automated Systems L13982

Intro: SAS 16000D digital audio routing switcher with 32-by-32 AES/EBU signal path in compact 2 RU package, multipoint RD-422 and RS-232 interfaces, multiple interconnect options, nonvolatile system memory, alphanumeric front-panel controls, built-in audio confidence and analog outputs, and large selection of control panels; AS 64000 digital audio routing switcher with 256-by-256 ultra-high-density packaging analog router, stereo/mono integrated within same system, SAS-EMPA multiprocessor architecture, 118 dB enhanced dynamic range, +28 dBu max I/O levels, multipoint RS-422 and RS-232 interfaces, nonvolatile system memory, alphanumeric front-panel controls and large selection of control panels.

See LISTINGS, page 68 ▶



When you need to nail the sound

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

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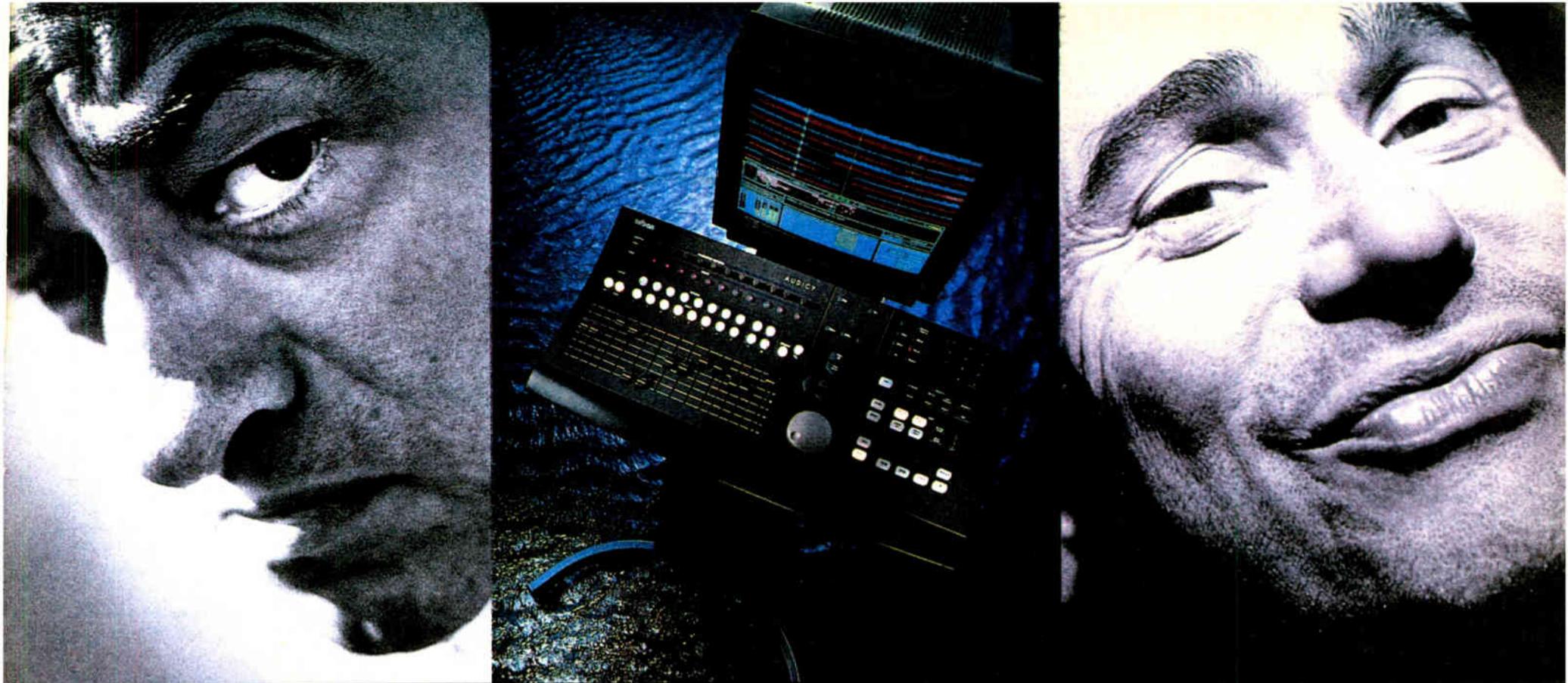
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In fact, in the time it takes a GM to recite the "we can't afford this" speech, you can demonstrate why so many fiscally-minded stations have concluded

just the opposite. There is no better way to speed up audio production; no quicker return on investment. The new Audicy offers features that keep the entire station working smarter today and tomorrow. Fully networkable and file compatible with major on-air delivery systems, it's fast, flexible, intuitive, and easily the most creative tool you can use.

STILL A SKEPTIC?

Let your GM set an unrealistic deadline. Then stand back and watch Audicy go to work with RAM-based speed, editing and mixing up to three times faster than other digital workstations. With Audicy you edit in real time, by ear, working on up to 24 tracks. Access to audio is instantaneous even when using its complete suite of built-in effects including OPTIMOD compres-

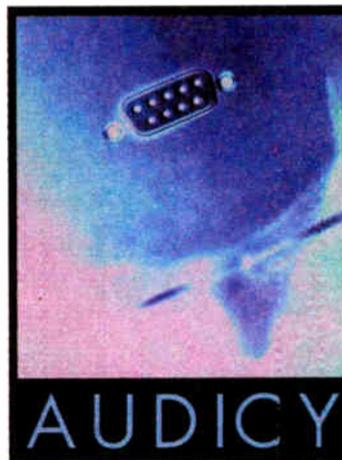
sion, EQ, and Lexicon reverb. Not to mention Time Fit, the industry's best-sounding time compression.

WORK FASTER, WORK SMARTER.

The sleek controller gives you positive, tactile command over all functions, with dedicated controls for every key operation and parameter setting. The transport controls and scrub wheel let you "feel" the audio, scrubbing with sample-accurate precision—and sounds to match at any scrub or fast wind speed. And since most

of your work is done from one screen, you never get lost navigating through endless drop-down menus.

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



orban

A Harman International Company

► LISTINGS, continued from page 66

panels; DXE256 digital audio port expander option for SAS64000 Series audio routing switcher, and network router control software option for the SAS64000.

Also: SAS 16000 audio routing system, SAS 32000 stereo audio routing and mixing system, SAS 32000 matrix intercom/IFB system.

Sierra Video Systems Inc. L15960

On display: Digital audio routers with up to 1,024-by-1,024 capabilities.

Sigma Electronics Inc. L25172

Silicon Valley Power Amplifiers L11564

On Display: Solid-state FM power amplifiers, B-2000, B-1000, B-600.

Sira Sistemi Radio L11535

Intro: UC/FM/LB-XX/3, an FM directional combiner, featuring compact size and high selectivity.

Sistemas Radiantes F. Moyano, SA L11154

On display: Company designs, manufactures and installs antennas and multiplexers for AM, FM and DAB, linear/circular polarization antennas, power splitters and combiners.

SkyStream Corp. S5122

SMARTS Broadcast Systems L12378

Intro: Windows NT Server for Smartmaster, a full backup of digital audio for no-fail operation; Windows NT Operator Interface, Windows ease of use for operators with continued reliability.

Solid Electronics Laboratories L10689

On Display: SEL Model DCP-1A FM Composite Processor/Low Pass Filter for increased loudness and SCA protection.

Solid State Logic L12177

Intro: Aysis Air Digital Broadcast Console, providing up to 96 channels and offers a number of new facilities including improved Surround Sound operating modes for 5.1 for AC3 or Dolby Surround with a simultaneous stereo mix; Axiom-MT Digital Multi-Track Console with 48 multitrack buses, 12 main mix buses, 12 aux buses and more than 200 mix returns and up to 96 fully-featured channels.

Solutions Custom Furnishings S8932

Sonic Desktop Software S9132

Intro: Smartsound Version 1.6.5 for Mac, audio creation software with sound effects. Also available, Smartsound Version 1.5.5 for Windows.

Also: Smartsound Audio Palette CD series, v1.6.5 for Mac, v1.5.5 for Windows.

Sonic Foundry Inc. S4022

Intro: Select Stream Producer Internet streaming media content producer, currently in beta form; ACID Content Loop Libraries, thousands of new loops in

multiple genres to create a wide variety of musical styles; Express FX 1 and 2, downloadable DirectX audio plug-ins; Audio Anywhere, to add digital quality audio to a Web site or business presentation.

Sonic Solutions S7232

Sonifex Ltd. L11296

Intro: Version 1.5 software for the Courier portable digital audio recorder, supports PCMCIA hard disk or flashcard, records, plays back, edits and transfers audio via telephone or optional ISDN line and features cut-and-paste editing, modem data transfer, and built-in phone book for quick dialing; Redbox Series connection boxes, including digital distribution amplifier with S/PDIF or AES/EBU outputs, A-to-D converter, sample rate converter, can handle 96 kHz audio, based on the styling of the analog product range with red anodized cases that can be screw- or rack-mounted.

Also: HY02 analog and DHY02 digital telephone hybrids, Sentinel+ range of audio logging machines.

Sony Electronics Broadcast Professional Co.

L16730, OD410, S2771

On Display: Audio equipment for broadcast, production, business, industrial, government, medical and production and display sectors.

Sound Ideas L16441, L12895, S4215

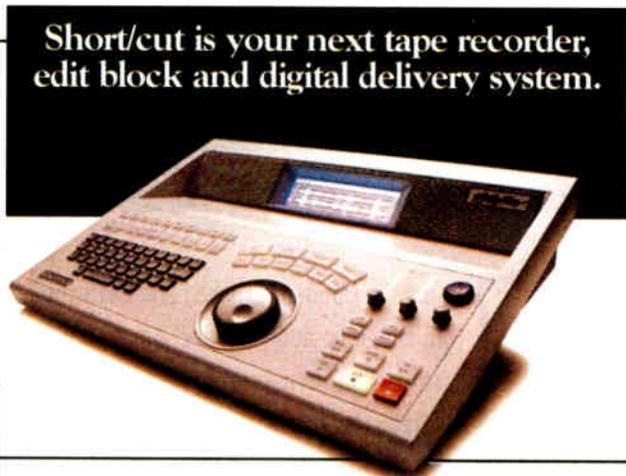
Intro: Series 6000 Extension II, 10 CDs featuring more than 1,000 effects including communications and electronics effects; Audience Reactions CDs containing more than 500 reactions featuring studio audience material, complemented by larger arenas, sports stadium crowds and children's reactions; Mix V1 with 150 full-length, royalty-free music tracks on five CDs from 20 professional composers spanning 13 high-demand music categories, packaged in a compact storage binder with track and index listing.

Also: Series 9000 "Open & Close," Series 7000 "Ambience II," Series 8000 "Sci-Fi," Series 6000 "The General" and Series 6000 extension, Series 5000 "Wheels" and "Wheels II," Series 4000 "Hollywood," Series 3000 "Ambience," Series 2000 general sound effects, Series 1000 general sound effects, digitally remastered International SFX library, Lucasfilm, Universal, Twentieth Century Fox, Warner Bros. and Hanna-Barbera sound effects libraries, Hanna-Barbera "Lost Treasures," Disney "Ideas," Rocky and Bullwinkle and Friends," "Larger than Life," Sound Ideas, Turner and Beatbox music libraries.

If you haven't already taken these out for a test drive, here's your chance.

Short/cut™ Editor

The perfect replacement for generations of reel-to-reel tape recorders. Short/cut delivers hard-disk storage, plus fast cut and paste waveform editing. Add an optional Zip™ drive and get low-cost copies. This editor is fast enough for on-air use, and tough enough for the road. So take Short/cut out for a test drive and watch it perform.



Short/cut is your next tape recorder, edit block and digital delivery system.

Test drive theirs then test drive our DigiCart/II Plus. We've got more under the hood.



DigiCart®/II Plus

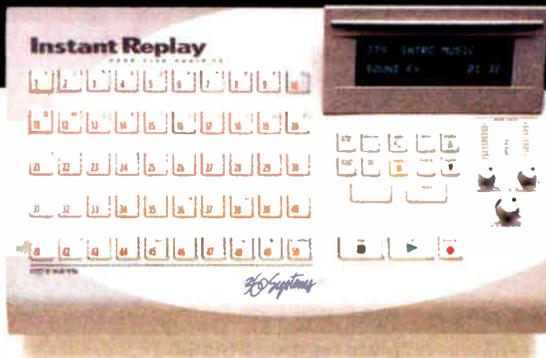
The new DigiCart/II Plus puts up to 50 hours of audio on hard disk, and now includes the popular Zip™ drive for low-cost storage. As always, it's your choice of linear or Dolby® AC-2 recording, plus precise editing and powerful playlisting capabilities. The new "Plus" model delivers all the reliability that has made DigiCart a broadcast standard, and it's now available at a great new price. Ask for a test drive, and put it through the paces at your station.

Instant Replay® 2.0

NEW • SCSI port supports external disk drives for expanded storage capacity. • Choose linear or Dolby® AC-2 recording format.

Instant Replay puts a thousand audio clips right at your fingertips. Sound effects, music, station ID's - up to 24 hours of your greatest material. And with 50 Hot-Keys, you can make your shows as spontaneous as you'd like. With everything titled, timed and ready to play, you'll find Instant Replay fast, fun and easy to use. So take us up on our offer to go for a test drive. We're sure that once you try these products, you'll want to park them at your place.

Instant Replay. Instant sound effects. Instant music. Instant fun. Take it out for a joy ride.



Gaming

Soundcraft USA L12589

On Display: Series FIVE live-sound production console with up to 60 inputs, 12 Aux sends, 10 output matrix; Broadway live-sound production digitally controlled analog console, up to 120 inputs with automated recall/reset automation.

Soundscape Digital Technology L13071, S6844

Intro: Mixtreme 16-channel PCI card with mixing software, two TDIF ports, 24-bit support, third party plug-ins; System 12 Editor, hardware/plug-in, bundle 12 tracks per unit, digital mixing software; System 24 Editor, hardware/plug-in, bundle 24 tracks per unit, digital mixing software.



PROFESSIONAL DIGITAL AUDIO

► LISTINGS, continued from page 68

Soundtracs USA L13997
Intro: DPC-II. 160-channel digital production console with full processing on all channels, work surface sizes from 16 to 96 motorized faders, 24-bit conversion, 96 kHz operation, plus stereo, LCRS, 5.1, 7.1 mixing and monitoring.

Spacecraft Components L11432
Intro: Electrical connectors offer quick delivery at competitive prices.

Staco Energy Products Co. L24855
Intro: Unistar II Series 6 to 10 KVA single-phase UPS, advanced true on-line UPS with bypass switch, wide volt input range 208, 220, 230, 240, 120/240 V output power, 50 or 60 Hz selection switch; Unistar II Series I to 3 KVA single-phase UPS, microprocessor advanced on-line UPS, 120 V input or 230 V input units, conditioned output power 50/60 Hz; SE Series 100 to 250 KVA three-phase UPS, advanced true on-line UPS with bypass switches, ±20 percent input voltage range, 208, 480, and 220 V input/output, continuously conditioned output power, 50 and 60 Hz available units, smart battery management, small footprint.
Also: SVR Series 19-inch rack mount single-phase 2.5 to 15 KVA regulator; MVR Series three-phase 2.5 to 1,000 KVA voltage regulator.

Stainless Inc. L16712
 Tower manufacturer.

Stanford Telecom Products Group S4761
Intro: STEL-9260, a modem for VSAT (very small aperture terminal) applications; STEL-9258, a demodulator assembly for VSAT applications.
Also: Modulators, demodulators, complete modems for VSAT applications.

Storeel Corp. L22925
Intro: Room Stretcher high-density compact storage system for CD, DAT and other small formats.
Also: CD and DAT compact storage units.

Studer North America L18107
Intro: On Air 2000 digital broadcast console, 6, 12, 18 or 24 input channels each with A/B input selector, user-friendly interface, microphone and console snapshots, password protection, easily integrated into existing digital or analog systems; D19m modular digital I/O rack, 4-channel 24-bit analog, 8-channel AES, 8-channel AES w/SRC, 16-channel ADAT optical, 4-channel remote control mic/line amps, 56-channel MAD1 and can convert between various formats; OMR8, an 8-channel 24-bit disk recorder/dubber, with eight channels, hard disk or MO, 24-bit A/D-D/A converters, digital I/O, full timecode sync and editing interface included.
Also: D950 digital mixing system, A827 analog tape recorder, V-Eight digital modular 20-bit multitrack recorder.

Studio Technologies Inc. L12862
On Display: StudioComm for Surround Series Model 58 Central Controller/Model 59 Central Console, multichannel surround sound monitoring; StudioComm for Surround Series Model 68 Central Controller/Model 69 Control Console, six channel (5.1) applications for music recording and broadcast facilities.

Superior Broadcast Products L12141
On Display: FM transmitters, including 120 and 300 W solid-state models and higher-powered models of 1 to 30 kW; translators; broadband antennas; solid-state FM STL transmitter and receiver.

Svetlana Electron Devices Inc. L12053
Intro: 3CX2500F3 Power Triode for AM broadcast transmitter replacement, with flying leads for mounting convenience.
Also: Plug-compatible replacement tubes.

Switchcraft Inc. L10977
Intro: PPT Punchdown Terminal, IDC terminal,

heavy-duty housing, serrated teeth, incorporated into MTP, TTP and Front Access Series of audio patchbays and backpanels; Qwik Twist Series microphone/XLR connector, with 3 through 7 pins/contacts and black and gold finishes, coming in June 1999.

Also: A line of broadcast interconnects.
Symetrix Inc. L13070
On Display: Voice processors, equalizers, broadcast delays.



Roller Coaster at New York, New York

Syntrillium Software Corp. L14187
On Display: Cool Edit Pro 1.1, a 64-track digital audio recorder, editor and mixer with more than 30 effects including EQ, time shift, reverbs and noise reduction.

Systembase Ltd. L18160
Intro: C400xr ISDN Audio Codec, a 15.6 kHz mono audio, AES/EBU digital interface, has bi-directional links and operates on 11 international ISDN standards with studio-to-transmitter links; C310xr ISDN Audio Codec, a 15.6 kHz mono audio AES/EBU digital interface, has bi-directional links and operates on 11 international ISDN standards outside broadcast communications circuits.
Also: C100xr Digital Codec, MUX256 Multiplexer, RG70 Two Wire Converter.

Systems Wireless Ltd. L24859
Intro: Lectrosionics UCR205D ENG/EFP wireless receiver, improves operation in tough RF environments, lower current draw provides extended operation when powered by an external DC source; Matrix Plus ICS-2110 digital intercom display station with 24 key assignment station, five character LED displays, and DTMF access.
Also: Sanken line of microphones, IFB and telephony equipment from JK Audio.

TAI Audio Inc. S4527
Intro: Lectrosionics UCR205/UM200B frequency-agile UHF wireless receiver/transmitter with smart squelch and external power only; PSC M4MK11 small, four-channel portable audio mixer with internal power distribution for wireless mics and boom-pole-mounted remote control; Lectrosionics R1/T1/T2 IFB frequency-agile UHF system, including R1 belt-pack receiver, T1 hand-sized transmitter and T2 belt-pack transmitter.

Talk America Radio Network L12863
On Display: Talk America radio networks.

Tally Display Corp. (TDC) L24812
Intro: Gel Block Displays, inexpensive, low-power consumption tri-color displays that include three levels of tally, interchangeable transparencies, various sizes and configurations; Digi-text state-of-the-art digital display system that provides simultaneous English translations of foreign languages on LED signs, a fully-electronic system that replaces slides and mechanical projectors; indoor/outdoor "zipper" displays, high-resolution LED displays that stream news and information with the ability to insert logos, graphics, roll, scroll and otherwise manipulate type.

Tannoy-TGI North America L11494
Tascam L22383
Intro: TM-D4000 digital recording and mixing console for post production, project studio and home recording environments; DA-40 digital audio tape recorder for DAT mastering and a successor to the company's DA-30mkII.
Also: CD-450 compact disc player; CD-RW5000 compact disc recorder; MD-801 RmkII MD recorder, reproducer and editor.

TC Electronic Inc. L10694
Intro: Finalizer 96, 24-bit/96 kHz version with new dithering types and high-resolution multiband dynamics processing; DB MAX Mark II version 2.02, a hardware and software enhancement to the digital broadcast maximizer multiband signal processor; Unit.Y hardware or software plug-in card for the Yamaha 02R digital console providing extended routing and mixing capabilities, 24-bit ADAT/TDIF I/O and new Finalizer software option.

Tech-Tran Corp. L12102
Intro: DC Power Supplies, modular design, dry-type, easy to service.

Techflex Inc. L24453
On Display: FLEXO expandable sleeving for hose and wire covering, bundling and protection.

Techni-Tool Inc. L21562
Intro: Techni-Tool Catalog #66.

Technology for Communications, International L24235
Intro: Model 657 Omni-Gain wideband FM broadcast antennas; turnkey system capabilities for radio and TV broadcasting; spectrum management.
Also: Products, partnerships and services for DTV conversion and transmission.

Technosystem SpA L12446
Intro: MWS-40, a two-way 40 GHz multimedia wireless system offering modular telecommunication traffic capacity.

TecNec L22461
On Display: Cables; connectors; adapters; patchpanels; patchbays; wall plates; distribution amps; switch-

See LISTINGS, page 70 ►

On-air QuickPick is just part of our picture.

- Access your entire audio library on-line.

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► LISTINGS, continued from page 69
ers; sound absorbing materials; other problem solving technology.

Tektronix Inc. L.22914, S424, S7172

Intro: Audio Converters 8920ADC/8920DAC feature 20-bit conversion and signal path, 75 ohm BNC I/O, special connector to allow terminal block input/output, remote control and monitoring via Ethernet; 8920ADC Audio A-D Converter has 48 kHz sampling, four-channel digital output (two stereo pair copies); 8920DAC D-A Converter accepts 32, 44.1, or 48 kHz input, has 15-24 dBu output range.

Telecast Fiber Systems Inc. L.25131

TeleCast Group AS L.25147

Telex Communications Inc. L.24228

Intro: ProStar UHF UT-12 universal plug-on transmitter for usage of any XLR-compatible dynamic



Dive!

and electret microphone with the company's ProStar UHF wireless microphone system: ENG-100

receiver, a 100-channel portable UHF ENG receiver that works with the LT-100 beltpack transmitter and

SH-100 handheld transmitter, operates on two AA batteries and features a headphone monitor and adjustable audio output; PST-16 portable Sound Mate transmitter, a 16-channel portable transmitter that works with a variety of lapel and headworn microphones, operates in the 72-76 MHz band, uses two AA batteries and can be recharged in the companion BC-100 drop-in charger.

Telos Systems L.12594

Intro: Telos ISDN Hybrid for talk-show systems offers all-digital connection from studio to telco central office via ISDN, two complete hybrids in one unit with mix minus matrix, AES/EBU digital I/O, digital EQ with caller AGC and two mic/line inputs with 48V phantom power; Telos Digital Phone System, an ISDN primary rate interface for talk shows that offers the sharing of multiple lines with many studios, flexible system control of any talk show from any studio, an expandable system of up to 96 lines and supports Assistant Producer talk show management software for Windows; Audioactive Production Studio Pro offers a CD-ROM professional version software encoder, supports Shockwave and ASF, enables direct automation of the encoding process via command line or scripts and provides MP3 compression.

Also: Zephyr and ZephyrExpress digital network codecs; digital telephone hybrids and talkshow systems; audioactive Internet encoder hardware.

TERACOM Components L.11462

Teratek Software L.11496

Intro: Teratek media streaming solution for automation and live assist, remote devices over network.

TFT Inc. L.11554

Intro: Digital Insertion Unit with digital interrupt, signal detect, support of 32, 44.056, 44.1 or 48 kHz, no delay and seamless interrupt.

Also: AM/FM modulation monitors; digital/analog STLs (composite/mono); Booster/Reciter and EAS.

Thermodyne International Ltd. L.21925

Intro: Slimline cases with pull out handles and corner mounted wheels.

Thomson Components/Tubes L.16333

Tieseci by GE Inc. L.13389

Tiffen Co. L.24253

TiltRac Corp. L.11532

Intro: JazMan, a robotic autoloader for Jaz Drives.

TM Century Inc. S640

Intro: Imagio compact library of high-energy contemporary sounds and eight folios with 180 titles, 400 stagers and 400 effects; Audio Architecture music library using technology that provides layer mixes for building the perfect bed in a workstation environment; Bumpers, short clips of current and classic songs to use in live programs for "ins and outs."

Also: Station IDs, HitDisc/GoldDisc music service, commercials, production music libraries.

Torpey Time L.24438

Intro: CLK-17, CLK-18, a wide range of digital time displays for use by broadcasters in control rooms, studios, and viewing areas, operate from any of the common time codes used today including ESE, SMPTE, DQS and NPR, new styles and more compact cases allow for more flexibility in the layout of the facility, LED digit sizes up to four-inches.

Tower Engineering Consultants Inc. L.18557

On Display: Tower Evaluation, Inspection and Analysis.

TRF Production Music Libraries L.16548

Intro: Powersound Production Music Library, focused on contemporary styles, contains jingle-length and sting-length versions of a variety of music with acoustic background and theme music; Pan Production Music Library, more than 120 CDs containing full-

See LISTINGS, page 71 ►

No Tradeoffs No Risks

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...at a cost savings means real value in any broadcast market. But don't take our word for it or let our 25-plus years in the business cloud the issue. Try these or any of our first-quality products at your station at no risk with our no-fault, 30-day return policy,



"David-II" FM PROCESSOR/STEREO-GEN

Famous the world over for surprisingly competitive and clean audio at a budget price. Digital synthesis design gives great specs and terrific sound.

FM MOD-MONITOR WITH PRESCALER

Off-air modulation measurement with easy-to-read display, 8 station presets, alarms and multipath indicator. A companion tunable subcarrier monitor/demod is also available.

PRECISION FM REBROADCAST RECEIVER

A feature-packed receiver for translators and other demanding off-air program pick-ups. Synthesized tuning, MPX/demod outputs, alarms and more!

RDS/RBDS "MINI-ENCODER"

Quickly program it with any PC to transmit station call letters, format and other identifiers, translator frequencies, promos/slogans, phone number, etc.

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► LISTINGS, continued from page 70
length, jingle-length and sting versions of a variety of music; CDs of Production Music. 26 new CDs with wide variety of music and available in full-length, jingle-length and sting versions.
Also: Production music library with over 4,000 discs; comprehensive sound effects library.

Triple Crown Products Inc. S3673

Intro: Brand-name merchandise to create an attractive and professional image for your company.
Also: Caps, uniforms and ad specialists.

Turner Audio Sales, LLC L12154

On Display: Products from Rycote, Lectrosonics, Peter Engh, K-Tek and others.

TV Technology L16118

On Display: TV Technology is published in editions for the United States, Europe, Middle East, Africa, Latin America and Asia by the IMAS Publishing Group. Also from IMAS are regional editions for China, Japan, Germany, France and Brazil. IMAS is publisher of Radio World, Pro Audio Review and Pro Video Review, and produces the NAB Daily News.

Tyros Trade Srl L10870

Ultralife Batteries L11197

Intro: UV9L-FP, long-lasting 9V lithium battery.
Also: Line of batteries.

Unique Devices L15662

United Ad Label Co. Inc. S3555

Intro: MiniDisc and U-Matic spine labels that can be printed in a laser printer; DCVPRO, Jaz and Zip disk labels that can be printed in an inkjet printer.
Also: Labels and packaging for audio, TV and video media.

United States Broadcast L25104

Intro: NP-2 lightweight 4.5 amp nickel-metal hydride battery, no memory and more powerful than NiCad batteries; Lightning 4 four-position rapid battery charger for NP-style batteries, charges all positions simultaneously, can supply all stations up to 2.5 amp charge at once, elective discharge for eliminating memory in NiCad batteries, as well as LED power-indicators on each station; Mobile trucks for audio and video applications from 10 feet to 53 feet with expanding or straight sides.
Also: NP-1C battery; general and Wiseguy battery chargers.

US Army Reserve Command L13543

USA Digital Radio L10656

Intro: Developing in-band, on-channel (IBOC) digital audio broadcasting (DAB).

Utility Tower Co. L13688

On Display: Designs, manufactures and installs custom and standard guyed towers, self-supporting towers and monopoles.

discs, and the Valentino Production Sound Effects library with 60 compact discs.

Videquip Research Ltd. L12433

Intro: FC-2 digital audio format converter for all formats; FC-1 S/PDIF (coaxial or optical) to AES digital audio converter.

Also: Phase 3 product line; DAVE-2000 digital audio editor/playlist.

W. Clark and Associates, Ltd. L10913

Intro: TCD-26R time code display reader with 100-foot visibility, up/down counter modes, reads SMPTE, EBU, ESE, IRIG-B, 24-fps film and drop frame and red, amber, and green displays; TC1 500 time code interface reads, converts, and generates time codes for TV and radio, as well as conversion among time code formats; GPS200 master clock generator generates SMPTE and IRIG-B time codes, synchronized to atomic clock in GPS satellites, comes with marine-type pre-amplified antenna, rackmount kit available.

Also: Master clock and time code generators, time code readers, network time code synchronization, time code interfaces and LED digital displays.

Walters-Storyk Design Group S2606

Intro: Nova Wall design and installation of custom acoustical fabric-wrapped wall and ceiling panel systems.

Ward-Beck Systems Ltd. L14168

Intro: R2K Series compact radio consoles with 24-, 36- and 48-inch wide frames, all connections via pluggable screw terminals; SMS-4 four-channel stereo metering system, analog or digital units, 110/75 ohm; POD16 stereo audio fader with three selectable cross-fade patterns.

Warner Electric L18260, L11594

Intro: SW rackmountable UPSs feature wide input correction range, hot-swappable batteries, cold start and power management communication.

Also: Stabiline WHR Series voltage regulators, Stabiline power conditioners, Stabiline transient voltage suppressers, Luxtrol lighting controls, five-way binding posts and Supercon electrical connectors.

WaveCom Electronics Inc. S4326

Intro: Custom design of communications products for cable and telecom markets. 256 QAM modulators, QAM upconverters, frequency stackers/destackers, frequency translators for data-over-cable, FM stereo modulators, frequency agile modulators.

WaveFrame Inc. L11262

Intro: WaveFrame version 6.5, new features include reversed effects, integration with mSoft sound effects server and .BWF support; WaveFrame APS Sampler integrates RAM-based sampling with Windows-based digital audio workstations, features cue-sheet-based sequencer.

See LISTINGS, page 72 ►

V-X

V-Soft Communications L12481

Intro: PROBE for Windows, an expert-level propagation prediction program incorporating Longley-Rice TIREM, PTP and FCC models, including census database with demographics; FMCONT for Windows FM frequency search program combines contour to contour with minimum spacings and graphical interface; Terrain3D for Windows for model radio signals and STL over 3D terrain that uses OpenGL that animates 3D terrain with Longley-Rice analysis.

Also: Contour, ID Series, InterLDG, Pattern, Plotpath, RFHazz and SearchFM.

Valcom Ltd. L14165

Valentino Production Music Library L17213

Intro: Reliable Music Library, licensed music library consisting of 20 compact discs.
Also: Music library consisting of over 200 compact

Get the full picture.

- Live assist, walkaway and satellite
- Four on-air digital players with volume, fade and seque control
- Easy playlist editing capability
- Access your entire audio library
- RF edit on-air waveform editor
- Instant jock "audio drop box"
 - Bulletproof reliability
 - Satisfaction guaranteed

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▶ LISTINGS, continued from page 71

- Wave:Space Inc.** L11520
On Display: Facility design and acoustic consultancy services.
- Weather Central Inc.** L11240
- Weather Metrics Inc.** L20669
Intro: Internet Weather live real-time weather data from local weather network.
- Wegener Communications Inc.** L24235, L22778
- Wenger Corp.** S7829
- West Penn Wire/CDT** S7842
On Display: Audio cables, miniature type, coax broadcast cable.
- Wheatstone Corp.** L12171
Intro: A-5000 Audio Console, analog radio console using the same mainframe as the Wheatstone D-



Rain Forest Café

500 Series digital console, allowing for conversion to full digital operation, four stereo buses, two internal mix minus assigns, full machine logic, electronic switching, LED illuminated switches and fully hot-swappable plug in modules; D-600 Audio Console, a

digital on-air and production console available in mainframe sizes up to 40 positions, inputs feature four-band EQ, dynamics processing, ducking, eight-character source displays, four stereo buses with digital and analog outputs, all switches, faders and displays are

addressable via serial interface.

Also: A-6000 radio console; Wheatstone studio furniture.

Whirlwind L18054

Intro: PressPower2, two mic inputs to 16 outputs, each mic/line switchable, operates on internal batteries or external DC source as well as AC, automatically switches to DC backup in the event of AC power failure; MPM-1, priority zone paging/music mixer, with three sets of stereo audio inputs selectable by front panel push buttons, has a fourth stereo input with priority that automatically mutes the others when signal is present, a fifth mic input has top priority and mutes or ducks all other inputs when signal is present; W5 and W6 MASS Connectors, new series of smaller MASS connectors with 48 and 84 pin/socket combinations, respectively.

Also: MD-1 mic to line driver, Qbox audio test device, US Audio line of rack mount mixers, splitters and distribution amps.

WhisperRoom Inc. S4514

On Display: Portable sound isolation enclosures.

Who Did That Music? Library L11589

Intro: 10 new WDTML CDs in a variety of categories; "Gravity" library of contemporary tracks; and "Revolucion" Latin music library.

Also: "Mind Benders" and "Work Parts" series.

Will-Burt Co. L24528

Intro: D-TEC Safety System will detect overhead power lines and other objects and stops a mast from extending into hazardous areas.

Also: V029.

Winsted Corp. L18120, S7440

Intro: High-capacity tape storage, tape/media storage in three styles of cabinets.

Wireworks L16101

Intro: TEC256 computer-based multipin-cable tester designed to make multicable testing easy, fast and effortless, can test up to 256 points for opens, shorts, crosswiring and resistance in less than 1 second.

Also: Multicable components group, microphone splitters and custom panels.

Wohler Technologies Inc. L25184

Wolf Coach Inc. L25135

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Intro: CommScope AES/EBU audio and digital video cable.

Also: Edac, Neutrik and Switcraft audio connectors; Mogami audio cable.

Yamaha Corp. L13989

Intro: D24 24-bit, 96-kHz 8-track digital recorder.

Z Technology Inc. L13819

Zack Electronics L22768, OD155

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FIRST PERSON

XXXIII: A Super Bowl Odyssey

How One Network Radio Reporter Survived Super Bowl Weekend in Miami

Peter King

Many who watch the biggest single sporting event in the world on TV have the mistaken impression that those of us who cover the game just show up in the host city, go to dozens of parties, eat free food, drink free booze ... and watch the game.

Nothing could be further from the truth, especially when editors are breathing down your neck for new material every few hours for news and sportscasts — or to fill three- or four-hour talk shows! My assignment was to cover Super Bowl XXXIII for CBS News Radio from as many different angles as possible during the weekend.

Welcome to Miami

Friday, Jan. 29, mid-afternoon: I check into my hotel and walk across the street to the Hyatt Regency to pick up my credentials, seat locations and invitations to pre- and post-game meals. Then I call the Super Bowl Sprint representative with the seat location info, so our ordered lines can be installed at Pro Player Stadium.

My assignment was to cover the Super Bowl for CBS Radio from as many different angles as possible.

By 5 p.m., everything is going like clockwork, the calm before the storm.

Back to the hotel to set up my mini studio: Comrex HotLine codec, headset, computer — and the first of many wrinkles. I plug in my headset, turn on the HotLine and in my ear I hear a local Hispanic FM station — loud!

For the next half-hour I walk around the room, plugging the red box into every available power socket, moving it up, down and sideways to see if there's any way to get rid of the music. It only gets louder. I then pick up a different station playing AC music.

The HotLine goes back in the box, out comes my Reporterphone, to my great disappointment.

Then the beeper goes off. Sprint cannot install our ordered POTS lines at our assigned seat location; it's in an area allocated for non-broadcasters. Time to call the NFL to request a seat change, no mean feat considering 3,000 of my fellow journalists are in town and most already have their assignments.

The league's Vince Casey is sympathetic, partly because CBS/Westwood One holds the radio rights for the game, and CBS News will open its hourly newscasts from the game. He calls back to say I can exchange my game credential Saturday morning.

6 p.m.: Out to party! Traffic to South Beach is a nightmare, but I know I'll be able to talk with the fans and maybe

some players at the NFL Player's Party. KC and the Sunshine Band are wrapping up "Get Down Tonight," and I get my MOS, record some roses, and head back to the hotel at 7:30, complete with a rare roast beef sandwich from the legendary Wolfie's Delicatessen.

After another round of heavy traffic to the mainland, eat and file cuts, roses and nat sound, and get some sleep.

Saturday, Jan. 30, morning: Time for the first of two news conferences, with

the mayor of Atlanta and the governor of Georgia. I run into reporter Richard Sangster of WSB(AM), Atlanta, and learn one important piece of information from him: his codec also is picking up the salsa station. I feel better about my own problems.

Do the Dirty Bird

Atlanta Mayor Bill Campbell announces plans for a Monday victory party. The governor speaks, and someone

dances the Falcons' "Dirty Bird" touchdown dance. Then it's time for the most anticipated announcement of the day, the NFL Hall of Fame inductees, next door.

11:25 a.m. The room is packed. I plug into the mult box and realize at 11:25 that it's going to be tough to get out for a noon



live shot, so I begin mapping strategy to crawl around camera people and writers without blocking someone's picture.

The announcement comes at about See SUPER BOWL, page 86

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WorldRadioHistory

Workbench

Radio World, March 31, 1999

Keep Your Transmitter Room Cool

John Bisset

With the mild weather many of us have had this winter, maintenance of summer-time equipment, specifically air conditioning systems, may have become a year-round requirement.

If you are looking to replace your air conditioning system or simply upgrade an existing cooling system, here are some ideas in pictures you'll want to consider.

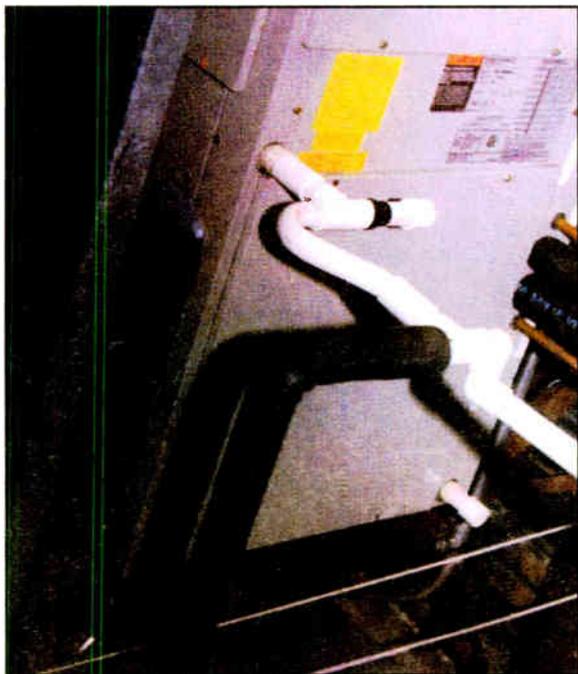


Figure 1: The clean-out cap on top of the condensate drain makes for simpler cleaning.

Figure 1 shows an inexpensive add-on that will save money as the years pass. The addition of a removable cap to the top of the condensate drain assembly will speed cleaning whether a wire snake or pressurized air from a mechanic's purred

lips are used.

For either new or existing systems, fashioning a drip pan (Figure 2) in case the condensate drain clogs up is another inexpensive feature, especially if the equipment had to be placed over transmitting equipment or high voltage transformers and power supplies.

I like to add a water sensor to the condensate drain pan. You can buy these at some hardware stores or build one from

schematics found in cook books or electronic hobby magazines. Tie it into your remote control to page you for maximum effectiveness.

Make sure if you're specifying a new system that you have included a low ambient control. This allows the air conditioner to operate in cold weather — without it, you're liable to find your transmitter room unbearably hot next time the outside temperature drops to 30 degrees.

Most transmitter manufacturers recommend an exhaust hood instead of physically attaching the exhaust ductwork directly to the transmitter exhaust port. Worried about positive outside air pressure blocking the flow of exhaust air from the transmitter? Affixing a few pieces of yarn at the edge of the hood (Figure 3 and inset), provides a visual indication that the air is flowing in the right direction.

Thanks to Jon Banks for these air conditioning ideas.

★ ★ ★

Marvin from Veni Vidi Video Productions in Austell, Ga., e-mailed a comment about our Sept. 30, 1998, column about clearing PC board holes using a straw (when nothing else is available).

Marvin writes that he's used a toothpick, which he keeps moist by holding it in the corner of his mouth. The soldering iron is used to melt the solder and the damp end is used to spear the hole before the solder solidifies. As opposed to a solder sucker or straw, the "spear" method usually leaves some solder on the pad so the replacement part can be fixed in place.

Marvin said the round picks work better and adds that when blowing out solder, tiny bits may wind up shorting some-

thing else. The suggestion, of course, was an emergency fix; both ideas demonstrate the ingenuity of engineers!

★ ★ ★

Also from my e-mail files is a note from Randy Selvidge, chief engineer for Fox 27, KDEB-TV. Randy writes that he's been using Bob Clinton's trick of re-soldering the solder blobs on #387 type lamps for a number of years. It seems that the lamps used in the Grass Valley 1600 video switcher suffer from the same "flattening" problem and the rounded solder blob on the base of the lamp quickly solves the problem of intermittent lighting.

John Bisset has worked as a chief engineer and contract engineer for more than 20

years. He is a district sales manager for Harris Corp. Reach him at (703) 323-8011.

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



Figure 3: Here's a simple, effective way to ensure that positive outside air pressure is not defeating your cooling system.



Figure 2: The extra expense of a condensate drip pan can save thousands of dollars should the drain clog.

GET YOUR SOUND TOGETHER

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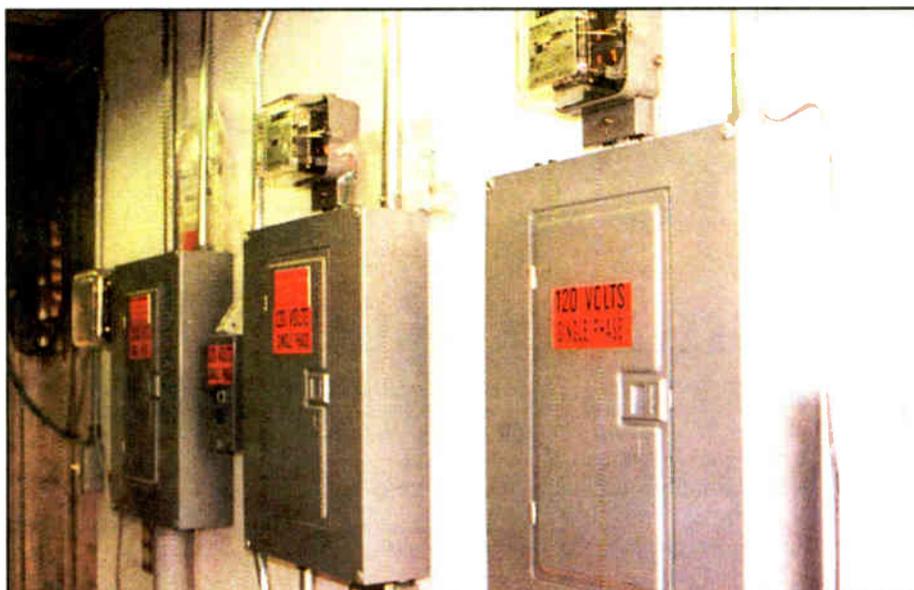
Charles S. Fitch

This is one in a series of articles about the National Electrical Code. The articles in the series are available online at www.rwonline.com in the reference section.

In previous articles dealing with the National Electrical Code and its impact on radio stations, we have brought the power from the utility up to the wall of the station just after the meter.

At this point, we are still in the area of what is referred to as "service conductors." A subsection of Article 230, paragraph 70, subsection (a) has essentially remained unchanged from the first NEC published in 1897.

One of the many threads of logic and a notable goal in the NEC is that no conductor will be unprotected from destruction or damage due to current overload. Also, no conductor will be protected by a circuit-opening device that is higher in ampere rating than the wire's rated ampacity. The rare exceptions are related mainly to personnel



Breaker panels with individual metering serve multiple transmitters at a community tower site.

There may or may not be a fuse on the input to the transformer that feeds your building. More than likely, the closest fuse or circuit breaker (CB) is where the high-voltage line branches to your sec-

transformer(s) impedance supplying your location may limit the maximum current flow into your site to substantially less than what will open that protection device. Sometimes even thousands of amps can still be supplied.

The first opportunity to protect your site and system from becoming a soldering iron is the "main breaker" in your electrical distribution system. The NEC in Section 230-70 wants to make sure that those service conductors with nearly unlimited amps do not proceed far into your building or plant before they get to that main breaker.

Electric appearance

Often the main breaker is part of the meter socket assembly outside, appearing electrically just after the meter. This is true especially when your supply conductors have to travel up several floors to get to your space.

It's 1999. Do you know where your main breakers are?

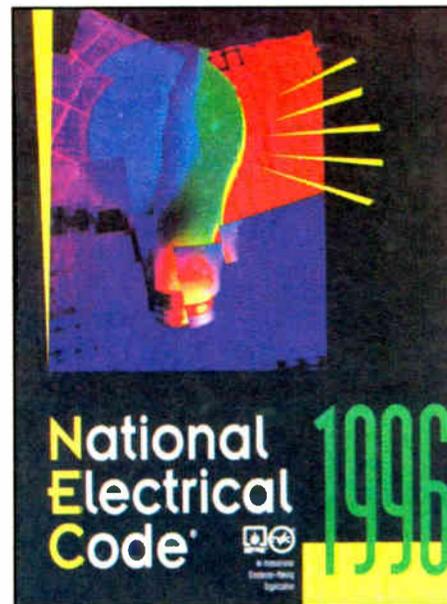
safety.

Section 230-70 is a near-perfect, and probably the first, example of this philosophy in the NEC.

By contrast, most utilities have circuit interrupters only on the high side of their transformers. Very seldom are they found on the low-side distribution.

tion of the neighborhood.

The nearest fuse may need 10, 50 or 100 times or more of an overload than your total service rating to open that nearest utility protection device, especially when the utility has elected to have common secondaries. In fact, the resistance of the conductors and the



Breakers and/or fuses essentially have four important ratings: maximum voltage for the current at which they are "rated," which is to say suitable and tested for use; rated trip current, the current point in amps at which we expect them to open (interrupt the circuit); interrupting amps, the maximum amperage flow through the device that the CB or fuse can safely interrupt without self-destructing or fusing together from arcing or melting, etc.; and fuse curve, the time it takes to open at the rated current point and for increasing currents thereafter.

CBs and fuses do not open magically at the rated current point. Industry-wide, the spread can be as much as +/- 10 percent. For example, a hundred different 20 A CBs could open at some point between 18 and 22 amps. They will open after some finite amount of time, set by the fuse curve, that this current level is impressed continuously.

In this case, we're talking about a typical electrical panel breaker, which is not to be confused with a "laboratory grade" CB that will open very nearly at rated current according to its fuse curve.

The quality you pay the most for in a fuse or CB is its rated maximum current interrupting capability. This is the maximum instantaneous current flow, such as 5,000 or 10,000 A, that it can interrupt without self-destruction. Most commercial-grade devices are rated 10,000 A, normally adequate, but a requirement for a higher rating can be indicated.

If you don't know, or your circumstances are complicated, seek the help of a competent professional. Your electrical system likely will outlast the transmitters, heaters, most of the water system components and everything else in your station. You should try to get it right the first time.

Take it seriously

None of this discussion should be taken to mean that a CB or fuse will protect you and your life. These breakers are there to protect the loads and lines and to prevent fires. The amount of current that it will take to paralyze, burn or throw you violently into a life-threatening collision won't even be noticed to a 20 amp CB. You will be dead 11 times before that breaker will open, but there is one device that can help.

A Ground Fault Interrupter (GFI) device is a special kind of CB that opens when it detects leakage current, such as from a 120 V equipment circuit, passing

See BREAKERS, page 81 ▶



EXTRA! EXTRA!

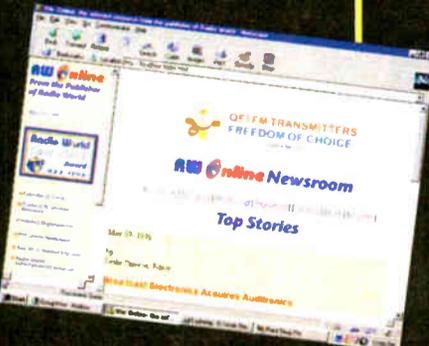
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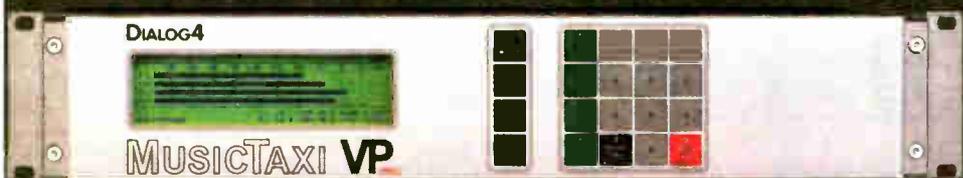
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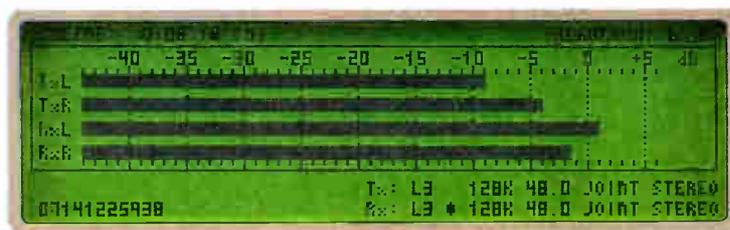
The Dialog4 MusicTAXI range is one of the most comprehensive codec packages on the market today. It contains all the standard ISO/MPEG audio coding algorithms in common use today such as Layer 2 and Layer 3, as well as CCITT G.722 for high grade voice bandwidth connections, and G.711 so it can talk to a plain old analogue telephone line, too. Connectivity features include up to three ISDN terminal adapters and X.21 port, for operation up to 384kbps. Dialing is quick and easy using the 96 entry directory.



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others without complicated manual programming. Operationally the buttons are large and straightforward to use, while the illuminated LCD display gives a clear indication of what is going on at all times. No noisy internal cooling fan to worry about in quiet studio conditions. The Remote Panel can control a MusicTAXI from over 1500 feet away via the RS422 interface. The online menu indicates online time, send-level, receive-level, adjusted headroom, Rx and Tx audio configuration, SYNC flag of MusicTAXI at the other end.



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WIRED FOR SOUND

May I Coax You Into Something?

Steve Lampen

We have dealt with microphone cable, line-level cable and digital versions of both in this column. But one kind of cable you probably play with carries audio only occasionally: coaxial cable.

It is labeled *coaxial* because all elements are on the same axis, or are coaxial, as in Fig. 1.

We have written in this space about how we can vary the impedance of paired cable simply by bending the cable and causing the wires in a twisted pair to separate. No such separation is possible in coax cable — the design automatically “locks” all components together.

Thus, when computers first came on the scene with lightning-fast speeds of a megabit per second, coax was the obvious choice, and remained that way for almost 40 years.

As we go higher in frequency, impedance variations become more critical. They show up as structural return loss, or SRL, in which part of the signal is reflected back to the source. This symptom easily can be

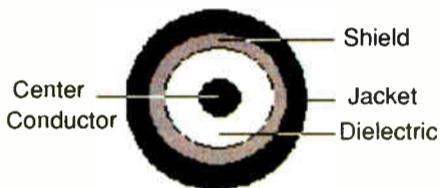


Figure 1

confused with attenuation, when actually the problem is an impedance mismatch.

If the loss in your system is significantly more than the manufacturer's advertised attenuation spec, you likely are experiencing impedance mismatching and SRL.

I probably don't have to explain this concept; you already know about return loss. But you call it by a different name: SWR or VSWR, for voltage standing wave ratio.

Every grizzled engineer has a piece of blown-up transmission line caused by excessive standing waves. When you are sending kilowatts down the line, a little reflection will show up as more than just less signal!

Unsuitable loads

A lot of transmission-line failures are resistance failures. For instance, a bullet corrodes, heats up because of the poor connection, expands in the heat, makes worse contact, heats up even more and, eventually, ka-pow!

In another common scenario, a line sees an inappropriate load, perhaps an antenna that is not 50 ohms at a specific frequency. We end up with a large hole somewhere down the transmission line. That hole is where that standing wave decided to stand.

So how high is high frequency, and when do you have to worry? And, for that matter, how do you determine the SRL of a particular cable, especially small stuff like RG-58, RG-59 or RG-8?

All you have to do is back up a col-

umn or two, and find the formula for

$$W_m = \frac{300,000,000}{F} \times V_p$$

wavelength:

In the formula, W is the wavelength in meters, F is the frequency in Hertz and Vp is the velocity of propagation of the material around the center conductor.

Any flaw or mismatch that is one-quarter wavelength or more will have an effect. The higher the frequency, the worse the effect.

So let us say you're broadcasting at 100 MHz in the FM band. Even with a “perfect” dielectric (Vp = 100 percent) — which is, of course, impossible — that means a wavelength of 3 meters (9.84 feet) and a quarter-wave of 0.75 meters (2.46 feet).

If you have an antenna attached to a receiver, it is most likely a 75-ohm impedance antenna output and receiver input. If you then put in 50-ohm cable that is longer than 2.46 feet, you will probably wonder where the signal strength went.

So you put on some bigger 50-ohm

coax, but the problem is still there. It is a mismatch! Put in the world's worst 75-ohm coax and you will have tons of signal strength.

In the same vein, a 50-ohm BNC or other connector on a 75-ohm cable would have no effect at 100 MHz. It is only an inch long — insignificant compared to 2.46 feet. You would need 30 or so connectors in a row to get to the 2.46 foot critical distance.

That is unlikely for an antenna lead-in, but quite possible in a video production studio with switchers, routers, patch panels and processing all in a row.

Built-in tolerance

The average coax usually has an inherent impedance tolerance

See COAX, page 85 ▶

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PRODUCT EVALUATION

Vector Makes the Most of POTS

Paul Kaminski

The desire to send near-studio quality audio back to a station during remote broadcasts often is difficult to appease.

Even if you can't put in an ISDN line or put up an RPU link, the Comrex Vector POTS codec can satisfy that desire.

To fulfill the wish of sending improved audio back over the telephone is nothing new to Comrex; its single-line frequency extender opened those horizons in the mid-1970s. The Vector seems to be the next digital step in that progression.

POTS codecs, for use on "plain ol' telephone service," use special algorithms to encode and decode audio so it can be transmitted and received simultaneously (give or take a few milliseconds). The Vector does this with a higher-speed 33.6 Kbps modem.

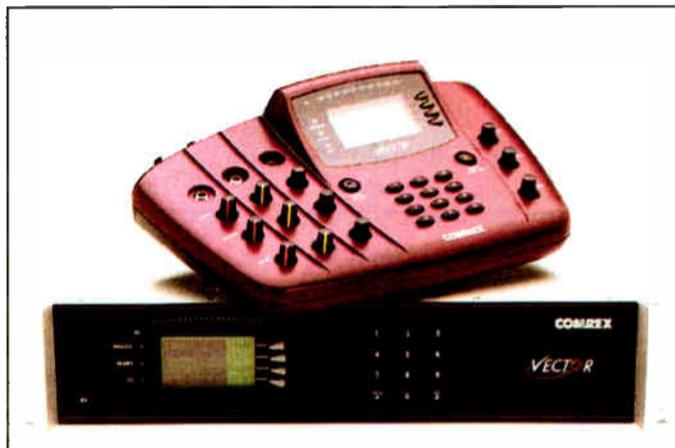
This process seems simple, but actually it's like trying to put 10 pounds of sugar in a 9-1/2 pound sack while going 70 miles an hour over a bumpy road. You have to have a connect rate sufficient to produce quality audio.

Comrex Vice President of Engineering Tom Hartnett worked on both of those problems.

"The connect rate was fairly straightforward, since we used standard modem technology," he said. "We did integrate a

couple of things like the rate drop feature into the modem code to help with reliability, but the modem is still pretty standard.

"The real R&D in the Vector is in audio coding, and integrating the algorithm on a platform that would also support the HotLine algorithm," he said, referring to another Comrex POTS codec.



Comrex offers portable and studio versions of the Vector.

The Vector will yield audio from 20 Hz up to 14 kHz in its music mode, and 20 Hz to 7 kHz in its voice mode if the connect rate is 33.6 kbps. In the HotLine mode, the audio frequency response is from 20 Hz to 10 kHz at that same connect rate.

Given the state of POTS lines, that's an

almost ideal laboratory style connection. It will connect at the highest possible rate if set to its "Max Rate 33600" setting.

If the signal starts to lose its initial quality, and you hear skips like a stuck CD, that means the line is degrading. To fix that, drop the connect rate and clean up the line without disconnecting. The Vector will mute the audio until the newer, lower rate is re-negotiated.

Comrex specifically designed the Vector to be compatible with its HotLine. It is backward compatible, which simply means that the Vector connection will default to the lowest setting of the two units, whether with rate, voice mode or, if called by a HotLine, HotLine mode.

If the line is so bad that it won't support a modem call, or the place you are calling has neither a Vector nor HotLine, use the Vector as a regular telephone by selecting the appropriate mode.

Flexible operation

If you really want to maximize the line and connection, the voice mode will transmit low-speed data (300 bps) simultaneously with the 7 kHz audio and its increased error correction capability if the connect rate is over 16.8 kbps. A simple terminal program would allow notes to be passed over the same line used for talkback and program feed (at 300 bps, text is probably the only application that will work well).

There are two models of the Vector: a field model, with a built-in four-input mixer, and a studio model, with a built-in interruptible foldback (IFB) system. Both models can be set to auto answer. Each has a loopback test mode so audio levels can be checked at different data rates.

The instruction and installation tips are contained in a manual which is informative and folksy — especially the part on how to schmooze the telephone person who may come to your premises to fix things. The Comrex Web site has much of the same information, in the same style. (Where else can you solve your knotty problems and also see a picture of a pet blue lobster and Max, the chocolate beagle? When you go to the Comrex Web site, click on Pets to see what I mean.)

In the field

We tested both ends of the Vector system in a real-world situation, backhauling our Motor Sports Radio program feed to affiliates WCDW(FM) and WPHD(FM) in Binghamton and Elmira, N.Y., respectively. The test also included calls to Vectors on dial-up at WBZ(AM) in Boston, and the BBC Broadcast Center at Bush House in London.

The quality we were able to get, over a dialed-up phone line in both music and voice modes, amazes me. We used it to feed a telephone recording/backup feed of our programs in POTS mode and discerned no problems in that mode.

Product Capsule: Comrex Vector POTS Codec

Thumbs Up

- ✓ Makes remotes very simple
- ✓ All-in-one box
- ✓ Solid audio at lower baud rate
- ✓ Straightforward prompts
- ✓ Backward compatible with HotLine
- ✓ Cool Web site

Thumbs Down

- ✓ Small option buttons sometimes stick
- ✓ Some high-end smear with highly processed audio

For more information contact
Comrex Corp. at
(973) 263-1800; or visit its Web site at
www.comrex.com

Setting up the Vector was a snap. The programming instructions were straightforward. After two attempts, we found we could go off the menu screens and do what we needed.

The tiny buttons hung up in their slots sometimes when we pushed them; Comrex noted that and is working on an improvement.

The Vector's audio quality seems close to that of an ISDN line, but according to Hartnett, it will never rival the quality and reliability available through ISDN.

"We ... recommend POTS codecs to folks who can't be tethered or can't get ISDN, or have short-notice stuff," he said.

The basic reason is the changing characteristics of an analog phone line, even in the middle of a call.

See VECTOR, page 90

Vector Specs

Connections:

- Audio In: 3-pin XLR female (4)
- Audio Out: 3-pin XLR male (1)
- Headphone Out: Quarter-inch stereo phone jacks (3)
- Tel Line and Tel Set: 6-pin RJ11C modular jacks (2)
- Contact Closures (Ready and CC): Eighth-inch 2-conductor mini-jacks (2)
- Accessory Port: 9-pin "D" type connector (1)

Levels:

- Audio input impedance: 10 kohms
- Mic input levels: -85 to -45 dBu
- Line input levels: -10 to +10 dBu
- Audio output impedance: 100 ohms
- Line level out: +12 dBu max
- Headphone out: 0.5 W
- Telephone Line out: -9 dBm @ 600 ohms
- Power: External supply; 5V, 4 A, 110 to 240 VAC 50/60 Hz
- Power connection: 2.1 mm inner diameter; coaxial
- Size: 13 x 9 x 3.5 inches (portable version)
- Weight: 3 pounds

Contact closures:

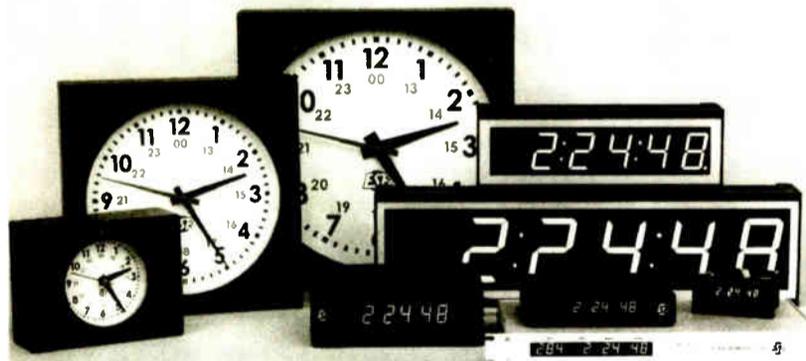
- "Ready" provides dry closure when decoder is in sync with encoder.
- "CC" provides momentary dry closure when the CC key is pressed during connection.

Nominal Coding Delay (Portable and Rackmount): 100 milliseconds

"Remember that time is money."

— Benjamin Franklin

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Devices to Protect Your Station

► BREAKERS, continued from page 76 through you to ground.

Normally, a GFI is incorporated into a convenience outlet device that will trip with leakage current as low as 5 milliamperes. You've probably seen one in your bathroom. This downstream device should be everywhere you might

sultant engineer.

We will come back to GFIs when we get further downstream from the main breaker.

Stopping the surge

This is a good point in our flow to mention another sort of a reverse break-

right in to a CB position in your breaker panel, and with a simple ground connection, provide immediate and low-hassle surge-suppression for that panel and downstream loads.

In a single-phase panel, these normally take two breaker positions; in a three-phase panel, they take four. When you plan your breaker panel layout, make room for these. (See the Mt. Alexander electrical layout drawing in the previous article, RW, March 3, page 21.)

To return to our original point: for all the good (and NEC) reasons discussed above, the main breaker needs to be as close to the point of entry into the build-

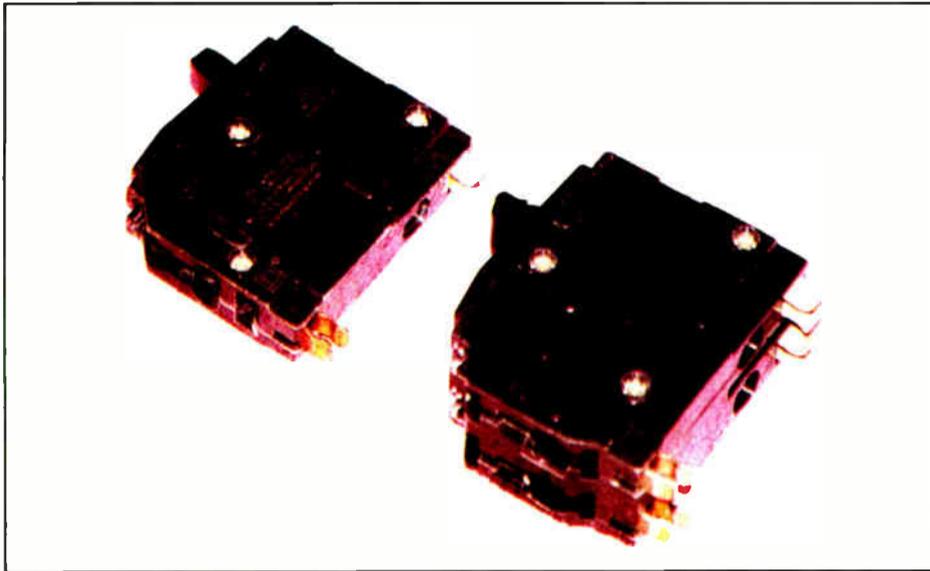
ing as reasonably can be achieved.

As a side note, although you can have breaker/fuse panels in a bathroom — not a good idea but allowable — you cannot have your main breaker in a bathroom.

The main breaker can be separated from the downstream fuses and CBs, but in a typical radio station, the main breaker and the branch CBs usually are together in one panel. We'll assume that this is the case and that's where we'll begin next time.

■■■

Charles S. Fitch, W2IPI, is a registered professional consultant engineer, a member of the AFCCE, a senior member of the SBE, lifetime CPBE, licensed electrical contractor, station owner and former director of engineering of WTIC-TV in Hartford, Conn., and WSHH-TV in Marlborough, Mass.



Typical One- and Two-Pole Snap-In Breakers

have the possibility to come in contact with line voltage, such as your workbench. There are combination GFI and current trip main breakers that are mandated in some large services. If you're operating at this level, you had better have the services of a professional con-

er-type device which, although not a life-saver, is a real station-saver.

Recent surge suppressors from major panel manufacturers have the same physical dimensions and connection characteristics as panel breakers. These cost-effective, convenient devices snap

Safety First

There is no humor in injury or death from electrocution.

Electricity can kill and maim. Learn the highest respect for this most powerful tool.

Not only can electric shock harm you directly but it can precipitate lethal secondary injuries.

For example, a single strand sticking out from behind a wire nut on a phase wire grazed the back of the hand of a young electrician on a job site I was inspecting a few years ago. His young nervous system reacted very well to the shock, throwing his arm and shoulder back. However, this threw him off a 10-foot ladder and *the fall* nearly killed him.

An engineer close to the author took a small shock from a static discharge capacitor. That person's highly tuned nervous system caused him to bolt up straight, thrusting back his head into a beam. He still has not recovered properly.

We must work not only as safely as we can (sometimes even that is not enough) but we must also work *on* safety as much as we can.

Safety is the result of an explicit act of prevention, *not* as a result of assumed coincidence. Please quote me to your management.

Build these rules into your everyday operating procedure:

1. Never work alone on electrical equipment.
2. Never work alone on electrical

equipment.

3. Never work alone on electrical equipment.

4. Disconnect all power to all sections of what you are working on and the area where you are working.

5. Assume nothing. The only exceptions: assume that everything is energized until proven otherwise, even if you were the one who shut it off; assume that the guy before you did nothing per NEC (which means that nothing was wired standard) until you determine otherwise, and even if *you* were the guy.

6. Use insulated tools, work primarily with one hand, and with both hands in insulated gloves whenever possible.

7. Never work when you are tired, after consuming alcohol or drugs, including prescription drugs that can cloud your judgment.

8. In case I haven't mentioned it, never work alone on electrical equipment.

People sometimes ask me why I am so hyper about working alone. The answer is that accidents happen in all industries and circumstances. When there is someone there to help you or summon aid quickly, disaster can be averted.

To be a successful professional, you must either be very, very smart, or very, very careful. I don't consider myself very smart, so I have elected to be very, very careful. When it comes to your life, you should be, too.

— Buc Fitch

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Orban Exits Delivery Business

Enco Will Offer Certain AirTime Features; Harris Becomes Exclusive Enco Source

Brian Galante

It's DAD time for AirTime.

Equipment supplier Orban is getting out of the business of making on-air audio delivery systems. It has discontinued its AirTime product line, and notified users that service support will expire next year.

Orban's processing and digital workstation products are not affected.

Former competitor Enco Systems reached agreement with Orban to offer certain parts of AirTime as features in its own DAD_{PRO32} digital audio delivery system. In particular, Enco customers can now purchase the popular Sound Cube cart machine-style interfaces used in AirTime.

Enco also encouraged AirTime users to "upgrade" their systems to DAD_{PRO32}.

At the same time, Enco announced that it has replaced its dealer network of 18 companies with Harris Corp. as its worldwide representative.

No more QNX

Orban purchased a delivery system called DDS from Radio Systems in 1996. The system was built around the QNX computer operating system. Orban redesigned and renamed the system as AirTime in 1997. But the market didn't respond.

"With the growing acceptance of Windows NT as 'reliable enough,' the appeal of AirTime and its real-time operating system was not persuasive for most customers to work outside the dominant computing environment," said Amy Huson, Orban vice president of marketing and customer service.

Huson said Orban had made a "tough assessment" of the product.

"The primary shortcoming of AirTime is QNX," Huson said. "What we believed was a market advantage has changed significantly with the growing acceptance of

Windows NT.

"I think the market has spoken and they want to be on a Windows-based product to fully integrate with all the



The QNX operating system was an important selling point of AirTime, but it proved out of step with the market.

business functions of a radio station. Since there are a number of systems that offer that today, Orban is merely listening to the broadcast community," Huson said.

Enco will not adopt QNX technology in its DAD_{PRO32}.

"We are Windows NT for each of the workstations; the file servers are Novell Netware," said Larry Lamoray, vice president, sales and marketing for Enco.

No money changed hands in the transaction, Huson and Lamoray said. The deal was not a sale of AirTime; only information and technology changed hands.

"We are literally collaborating on a hybrid solution," Huson said.

The wishes of Harris Corp., Orban's largest dealer, were part of the equation.

Huson said Harris was pursuing the Enco rep deal, even as Orban was deciding to discontinue the AirTime product.

"We said 'Great, no problem, we'd like to make that an easy transition.' We have no problem working with Enco."

Huson said Enco was the first compa-

allows users to plan a full year's budget cycle.

"Without a current product in the field, the pace of change in computer hardware and operating systems will make it near-impossible to continue quality service," she said. By establishing a clear date to end support, she said, Orban is being honest.

"We're encouraging people to look at their options now. ... It may sound harsh, but in the long run we're doing our customers a service."

Support for older DDS systems will end on July 1 of this year.

"The DDS customers got a lot more run for their money than they probably expected when DDS was sold to Orban," Huson said.

More for DAD

For Enco, the deal means one less competitor, a pool of potential new clients, new features for its own product and the sales effort of Harris.

"We've created a method to import the existing AirTime audio inventory — the audio cuts, library, schedules and all that — into a DAD system," Lamoray said. "We will support the existing Orban Sound Cubes, and we are creating an Enco version and will show it at NAB99."

AirTime users who wish to convert to an Enco system can retain their Sound Cubes, he said. In fact, he said, much of the AirTime system can be reused.

"How the upgrade is accomplished varies by the user," he said. "In most instances we can reuse the majority of the hardware installed."

Other enhancements to DAD_{PRO32} include the ability to integrate with the Orban Audicy workstation, and LAN and WAN capabilities for group audio inventory sharing and program management.

According to both companies, AirTime is no longer available as a separate package.

Harris Broadcast Systems will assume the position of sole Enco representative, marketing the system worldwide. The company will also provide systems engineering.

"Harris has a strong relationship with Orban and Enco," said Jim Woods, vice

See ORBAN, page 85 ▶

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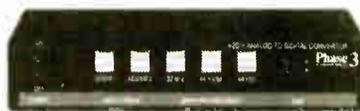
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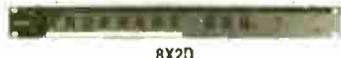
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READER SERVICE NO. 17

Many Uses for Coax

► COAX, continued from page 79
(variation) of ± 3 ohms. Better cables are ± 2 ohms. The best stuff I have ever seen in small coax cables are some precision video cables, which have impedance tolerances of ± 1.5 ohms. But do not rush out to buy some for antenna lead-in. It is the wrong stuff, but for other reasons.

Many engineers are surprised there are coaxes, even of the same impedance, designed for vastly different applications.

For instance, there are RG-59 cables intended for baseband video (bandwidth DC to 4.2 MHz), which radio guys should never see unless they have surveillance cameras somewhere.

Then there is RG-11 for serial digital precision video, which can go from DC to 2.5 GHz. There is also CATV/broadband cable which does not even start until 50 MHz. Why? Because 54 MHz is where TV Channel 2 is.

CATV cable is fine up to 1 GHz, even beyond 2 GHz in some versions, but not down to DC. Those CATV/broadband cables use a center conductor which is copper-clad steel. At frequencies of 50 MHz and above,

"skin effect" is a major factor: the signal rides on the skin of the cable.

Therefore, only the skin needs to be copper, but the inside does not. In fact, the DC resistance is more than *double* what an all-copper cable would be.

Copper-clad designs are fine for FM or TV and above, but would be a bad choice for a surveillance camera at 4.2 MHz, not to mention S/PDIF or coax AES3 at 3 MHz. For those applications, you want all copper, inside and out!

Skin effect

The skin effect requirement works in reverse. For instance, if you see a cable with a tinned-copper center conductor, you can guess that it is intended for use below 50 MHz.

Tin resists oxidation and corrosion, so such a cable might last longer outdoors. You just cannot use it as effectively at higher frequencies. Above 50 MHz, the signal would be riding on the tin, and tin is not as good a conductor as copper!

Another giveaway that a particular cable is for low or high frequencies is the *dielectric*, the insulating layer between the center conductor and shield.

If it is milky-clear, it is either solid polyethylene or solid Teflon.

While these are good-to-excellent choices for low frequencies or higher power, their attenuation performance at higher frequencies can be easily surpassed by foaming the dielectric. Foaming plastic, such as "nitrogen gas-injection," can reach velocities of 83 percent or better.

Foam

Foaming lowers the dielectric constant, capacitance and attenuation of the cable, while increasing the velocity of propagation. Foaming also reduces the volts-per-mil dielectric strength and power handling capacity of a cable.

In conclusion, coaxes come in many forms, first separated by impedance. Then you can choose all-copper center conductors for both low- and high-frequency applications, or copper-clad steel conductors for high-frequency-only applications.

Finally, you can choose foamed or solid-core dielectrics. The foam offers lower signal loss; the solid is better able to handle higher power.

Steve Lampen is a senior audio video specialist for Belden Wire & Cable Co. in San Francisco. His book, "Wire, Cable, and Fiber Optics for Video and Audio Engineers," is published by McGraw-Hill.

DAD Time For AirTime

► ORBAN, continued from page 83
president of radio systems for Harris. "The cooperation between the three companies to reach this agreement has been extraordinary."

According to Lamoray, the decision to use Harris was a result of the shifting nature of the radio broadcast market. "The amount of growth and acceptance that Enco is experiencing worldwide dictated that we need entities such as Harris to assure that we address it efficiently," he said.

"None of the dealers really had the adequate infrastructure to address projects of the scope we're experiencing: large-group standardization deals, large radio networks internationally," he said.

Graceful exit

Asked if Orban had lost money in the purchase of AirTime, Huson said yes.

"You bet. It's a significant amount, but not enough to harm the company in a significant way," she said.

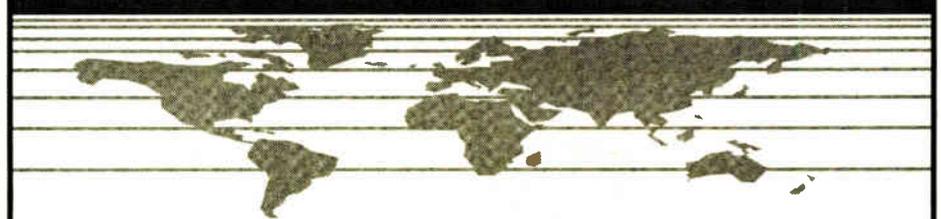
"There were three considerations to this decision: financial realities, technical and long-term brand considerations."

She noted that Orban's parent company, Harman, also makes audio delivery systems, sold mostly through other divisions in Europe.

Huson said Orban tried to protect the interests of its users in the process of exiting the market. "We wanted to do it gracefully, working with both our dealers and end users so we don't leave people hanging."

■ ■ ■
RW Editor Paul J. McLane contributed to this story.

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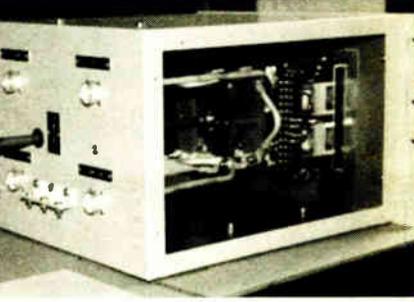
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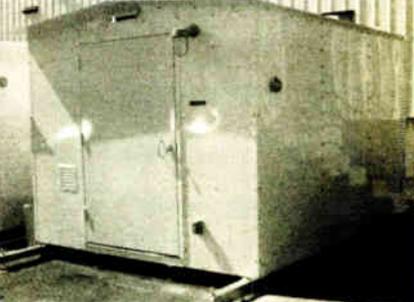
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At Super Bowl XXXIII

► SUPER BOWL, continued from page 73
11:35. My MiniDisc is recording the statement by the Hall of Fame director and that of Eric Dickerson, the only inductee in attendance.

I crawl out, do my live shot, crawl back in, retrieve my equipment and get back to the hotel to file wraps and cuts before heading out to Pro Player Stadium for another story. Lunch is a handful of Chex Mix.

Saturday afternoon. Next stop: Pro Player Stadium to interview an FAA representative about the special control tower set up for the game and get MOS for that night and the next morning.

I also meet fellow CBS freelancer Steve Futterman, working for Canada's CBC and filing pieces for us as well. I'll be grateful for his presence later that night, when Eugene Robinson of the Falcons is busted for soliciting on Miami's Biscayne Blvd., because the story happens while I'm enjoying my first real meal out. Steve is right on top of it.

I file my pieces late Saturday night, and get to sleep.

Sunday, Jan. 31, 9 a.m. Game day.

I don't have a media parking pass.

My strategy is to arrive early to get a parking place; I find one, for thirty bucks, about a mile away from the venue, and start gathering MOS on the Robinson affair, tailgating and whatever else folks want to talk about.

I file several wraps with my Marti

Cellcaster, and get lucky; a man in a golf cart agrees to drive me over to the stadium with my equipment for \$10.

Mid-day The media are not being admitted until 3 p.m., but another sympathetic NFL official gets me in at 12:30.

Glamour meals

I pull my cart of equipment up a circular three-story ramp to the auxiliary press box — a row of hard stadium seats set

aside for media use. A game sponsor has thoughtfully provided seat cushions, but mine flattens out in moments. It's going to be a long sitting spell.

3 p.m. The first in a series of live shots goes well. My HotLine works like a charm, but the stadium music is already so loud, it's difficult to hear the return feed.

I've abandoned my regular phone, and have dialed my computer into our AP-

ENPS system to communicate with New York via e-mail. As the other media begin to file in, I munch on a box lunch (turkey on a roll) left for us by another game sponsor. Later, I'll indulge in a foot-long frank and several Diet Cokes. Game day glamour meals.

The sound and energy reach a fevered pitch by the time my next live shot comes up at 5.

6 p.m. In my headset comes the CBS sounder, and then I hear myself say, "CBS News, I'm Peter King live at Pro Player Stadium in Miami, where we're

The producers and techs in New York have my roll cues and everything goes smoothly.

less than a half-hour away from Super Bowl Thirty-Three."

It's the first of five "opens" I'll do from the game venue. The band Kiss has just finished playing; I can actually hear myself and my actualities above the crowd noise.

For the next four hours, I listen to the game broadcast with CBS' Howard David and Matt Millen, while copy editor Frank Teltsch in New York is pulling play-by-play cuts for the hourly newscast.

We e-mail back and forth to decide what cuts to use. Frank is busy coordinating reporters Lee Frank and Jim Krasula, who are following the action with sports fans in Denver and Atlanta, respectively.

The result is a Super Bowl roundup every hour, which keeps the news audience up to date.

Broncos on top

10 p.m. "CBS News, I'm Peter King at Pro Player Stadium in Miami, where the cheers are loud enough to reach the Colorado Rockies!"

Denver has won its second straight Super Bowl. KC and the Sunshine Band are playing a post-game set on the field. John Elway is thanking the fans and his teammates and *not* talking of retirement.

11 p.m. the story is in Denver, where police in riot gear have used tear gas to break up rowdy demonstrations.

Lee Frank's report leads the 11 p.m. newscast. That's my last 'cast of the night, and after feeding some rosers, with the stadium almost empty, the heavens open up. I scramble to get the equipment under cover, then pack and get to the hotel. Asleep by 1 a.m.

Monday, Feb. 1, 4:20 a.m. Wakeup time comes too early. Because I can't use my codec at the hotel, I go to the CBS News Miami bureau to file from there.

I find a phone jack in TV correspondent Bernard Goldberg's office, which I've used before (he'll never know how much I owe him unless he reads this), and do live shots at 6 a.m. and on the "World News Roundup" at 8, using John Elway and Mike Shannahan cuts rolled in from New York.

The producers and techs in New York have my roll cues and everything goes smoothly. Thankfully, the main story is now in Denver.



I record one more piece, and I can go back to the hotel and catch a three-hour nap before driving home to Orlando.

Footnote: You know the Super Bowl is over when all of the overpriced merchandise is already selling at a 50-percent discount. They lined up in my hotel lobby for bargains as I checked out Monday afternoon.

I leave with a Super Bowl tote bag, sport shirt, a tiny headset radio given out at the game, and, still in my equipment bag, unused tickets for Sunday's pre- and post-game meals and a Saturday night pre-game party.

Oh, well. Maybe next year in Atlanta. I've already put in my request to cover Super Bowl XXXIV.

■ ■ ■

Peter King is a reporter for CBS News Radio, based in Orlando.

The Rest of The Pack

Dozens of stations and networks came to Miami to convey Super Bowl fever to their listeners, and it didn't matter that their home teams might not have been involved.

Walking around Radio Row at the Hyatt Regency, I found more stations that were *not* from Atlanta or Denver.

Radio Row was inundated with celebrities, NFL players and officials, and journalists all week long; broadcasters had no shortage of material.

For example, Chief Engineer Rob Chickering led a crew from KCTK(AM) and KLIF(AM) in Dallas, undaunted by the lack of Cowboys in the game.

Along with the usual assortment of mixers, headphone amps and other gear, he brought wireless headphones and mics so the hosts could roam.

Roaming talent

Chickering brought Lectrosonics wireless mics and a Comtech wireless headset system, which had great range. The talent was able to roam several hundred yards to the valet parking station outside the hotel to greet incoming celebrities. They used a single, split ISDN line for both stations, and had a second ISDN unit and a POTS codec for backup.

With the Dallas Cowboys watching from home, why bother showing up?

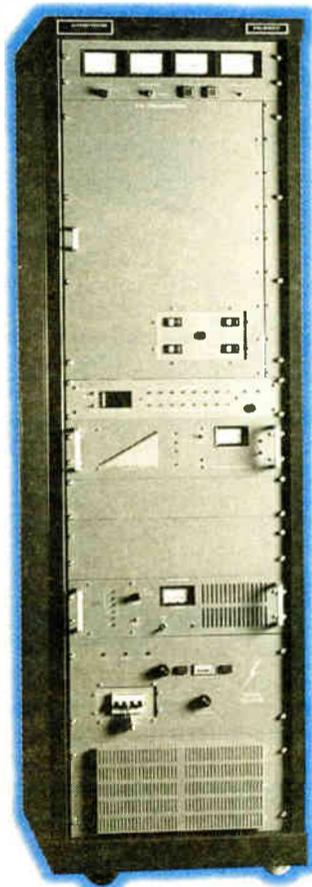
"Programming-wise, it's worth it. You can create what you want to generate excitement in any situation," Chickering said.

Doug Lane, sports technical director of WEEI(AM) in Boston, agreed.

"We've covered just about every Super Bowl since '86," he said, "and it adds flavor to a big event."

See RADIO ROW, page 87

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► **RADIO ROW**, continued from page 86
 WEEL brought a midday show and an afternoon drive show, which translated to about eight hours of daily air time and time to record material for the next day's shows. Lane used a Ramsa 133 console, modified for talkback for the announcers. Shure SM-58 mics and Shure FP-12 headphone amps.

WEEL used Comrex Nexus codecs for ISDN transmission, with a Comrex HotLine backup.

"ISDN is a breeze to use, but most people are still afraid of it," Lane said. "I've been using it for seven or eight years now with the NBA," in coverage of the Boston Celtics.

A number of international broadcasters were in Miami, including the BBC's Simon Crosse, who had the responsibility of sending back reports and programs to six radio networks in the United Kingdom. Destinations included the BBC

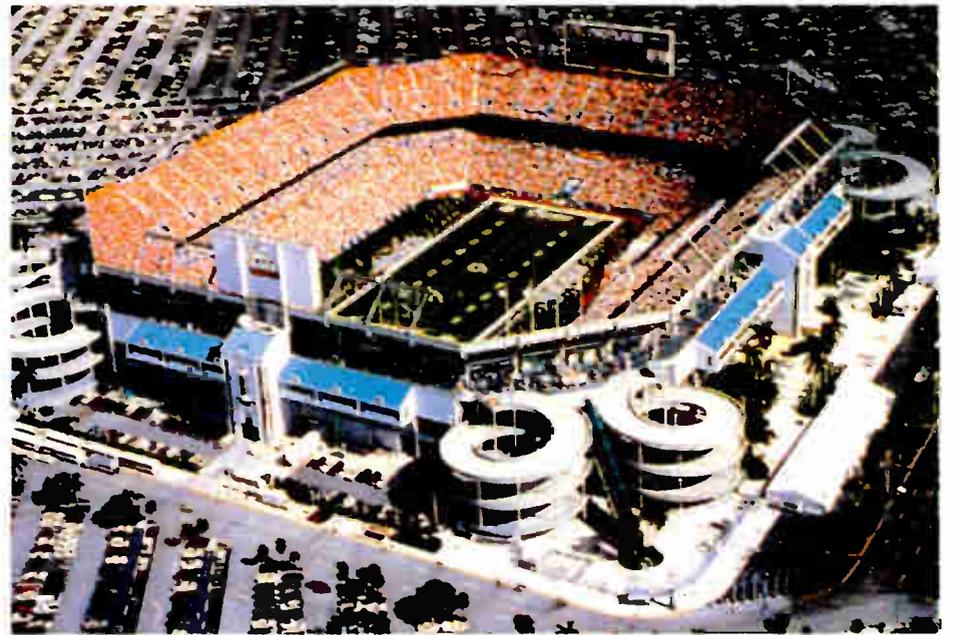
World Service, heard around the globe via satellite and shortwave. Crosse reported great interest in the football game in places like New Zealand and South Africa.

He used a Musicam USA RoadRunner to send ISDN reports back to London, including a one-hour special.

"We hired an engineer out of New York to run the program because we had a large number of guests, players and journalists," he said. Crosse used Sony MiniDiscs and a Professional Walkman to gather sound.

Any pitfalls? "Radio Row is a noisy place to broadcast, we have nothing like this at any of our events," Crosse said, but called it a great place to work because of the atmosphere and electricity.

"I was also worried about the compatibility of ISDN circuits, especially for programs on our Radio Four network, which is on FM and broadcast



Pro Player Stadium is home of the Miami Dolphins and the Florida Marlins, and was host of Super Bowl XXXIII, Jan. 31, 1999.

In the Booth at CBS Radio

Super Bowl XXXIII wasn't the most exciting of games, but Howard Deneroff, the coordinating producer for CBS Radio Sports, said it was certainly the most intense Super Bowl broadcast he's been involved with during his 10 years with the network.

CBS aired a 90-minute pre-game show, its longest ever. More announcers were used than ever before, including sideline and grandstand reporters, and the network stayed on the air for a post-game show of another half hour.

The CBS booth setup made provisions for an array of audio feeds: mics for booth talent Howard David, Matt Millen, and Tommy Tighe; wireless mics for grandstand reporter Steve Goldstein and sideline reporter John Dockery; and the stadium PA system feed.

Also in the mix: a raw feed of nat sound from the playing field (grunts, groans and hits); the referee's wireless mic; a 360 Systems Short/cut digital workstation for playback of recorded interviews and segments; and several sets of dry pairs from the team locker rooms for post-game interviews.

ISDN to Virginia

Air talent and most of the production crew were hooked up with IFB in their headsets, and Deneroff played traffic cop between talent, technicians, game-site production assistants and producers putting together the feed to the Westwood One facility in Arlington, Va., where the final mix was created.

The mix to Arlington was sent via ISDN, with a backup feed transmitted via Comrex HotLine. CBS also provided feeds inside Pro Player Stadium for the commissioner's box and a luxury box for clients.

"Was it hectic?" Deneroff said of the work environment. "Yes. Intrusive? No, because I'm used to hearing lots of voices in my head during a production like this. There's room for confusion."

He said his production crew has its rhythm and is at the top of its game by the time the Super Bowl comes around. By Sunday, Deneroff was running on adrenaline and very little sleep, but it didn't matter.

"The Super Bowl is what you live for if you're doing this, and if you're not pumped up, something's wrong," he said.

Wireless mics and headsets present a special challenge at the Super Bowl, where literally hundreds of frequencies are used for radio, TV, security and other users. Deneroff said the frequency coordination was good in Miami.

One of the best interviews never got on the air. A preproduced segment with the Falcons' Eugene Robinson was scrapped after he was busted for solicitation on the eve of the game. That left a four-and-a-half minute hole.

Deneroff was able to get former Cincinnati Bengals quarterback Boomer Esiason, whose teammate Stanley Wilson went on a drug binge and disappeared the night before their Super Bowl 10 years ago, to pinch hit in the booth and compare the incidents. Sideline reporter and former NFL player John Dockery was able to get "off-the-record" reaction from the field and tell listeners about how Robinson's teammates and coaches felt about it.

"That alone," Deneroff said, "was worth the addition of a sideline guy."

Mom's TV set

There were glitches. CBS, like Fox TV, came back from one break to find a play in progress, an 80-yard John Elway touchdown pass. The play still made it on the air.

Television monitors in the broadcast booth were installed at an awkward angle for the announcing team, so Deneroff borrowed a TV set from his mother's home about three miles away. (He told his mother she should be listening, not watching, anyway.)

"Based on what we could control, I can't think of anything that could have gone better. Everything went well," he said. "Everybody was pumped, the engineers busted their humps, and for most of us, it was the culmination of a week's worth of 19-hour-long days. But remember, it's easy to produce when you love the job, and I do."

— Peter King

in stereo," he said. "They expect things done properly and weren't going to settle for anything in mono. The engineer managed to pan the guests and hosts left to right, and it was a technical success."

Crosse worked without a backup for his ISDN circuits, but fortunately, the only ISDN dropouts came as they were airing taped segments from London.

"I also keep a telephone line open to the editor back home," he said.

ESPN Radio

The main lobby of the Hyatt Regency was dominated by ESPN Network broadcasts and flagship station WMVP(AM). "ESPN Radio 1000" in

Chicago. The station brought seven people to town for a week, according to Mitch Rosen, director of operations.

His setup included Comrex Nexus ISDN units, Comrex HotLine backup, a Telos Zephyr codec at the studio in Chicago for minimum delay, with a G.722 setting both ways, and MiniDisc recorders for interviews.

Talk show host Bill Simonson said the name recognition of his employer helps in the job.

"Being a part of the ESPN family, we've had access to a lot of big-name guests, from players to ESPN anchors. Our location has been a big advantage," he said.

— Peter King

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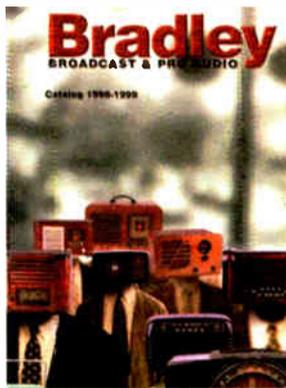
MARKET PLACE

Bradley Catalog Online

Bradley Broadcast recently gave its Web site, www.bradleybroadcast.com, an overhaul.

A major feature is an online version of the company's 1998-99 catalog. According to General Manager Arthur Reed, the company has seen a "dramatic upswing" of visitors to its site, many whom have inquired about the Bradley catalog.

"We decided to provide instant gratification to those visitors, as well as a resource that is always available at the customer's computer," Reed said.



Part of the allure of the online catalog, according to Reed, is that the company is not using Adobe Acrobat to display the catalog, instead devising a more user-friendly route for viewing its pages.

"With careful reworking of the original printed catalog, we were able to produce an acceptable compromise that displays the images from the catalog without using so much bandwidth that the pages would not load quickly," said Reed.

For more information, contact Bradley Broadcast in Maryland at (301) 682-8700; fax (301) 682-8377 or circle Reader Service 219.

AETA Portable Codec

AETA Audio manufactures the newly updated Scoop Reporter II portable audio codec for field reporting applications. Compatible with both POTS and ISDN lines, the unit supports G.711, G.722, ISO/MPEG Layer II and J.52.



According to Mark Kaltman, president of AETA Audio, the unit is substantially improved over the earlier Scoop Reporter II. Also, with its internal D-cell battery backup and numerous AC voltages, it can be used virtually anywhere, he said.

"A field reporter can literally get 'the scoop' under any conditions," said Kaltman.

"From a network standpoint, probably the best thing is its intuitive interface, which is so simple to use that talent can hit the road without technical assistance."

Developed for ENG applications where studio access is unattainable, the Scoop Reporter II combines POTS and ISDN capabilities with a three-channel mixer. With ISDN, the unit sends and receives 20 kHz audio at 128 kbps; with POTS, it delivers 7.5 kHz audio. A balanced XLR output can be used for studio producer IFB and mix-minus feeds from the studio or to feed a local PA system. (See related story, page 3.)

For more information, contact AETA Audio in New Jersey at (973) 659-0555; fax (973) 659-9555 or circle Reader Service 116.

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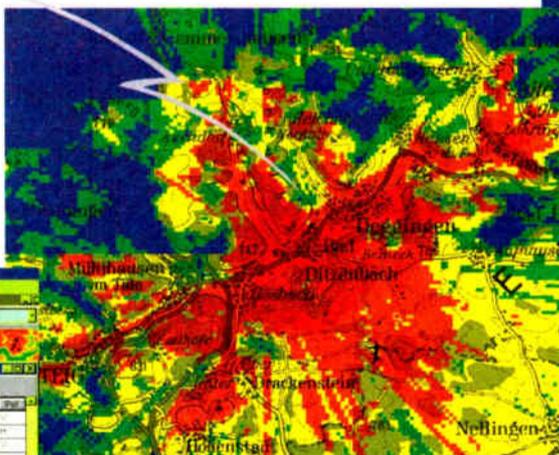
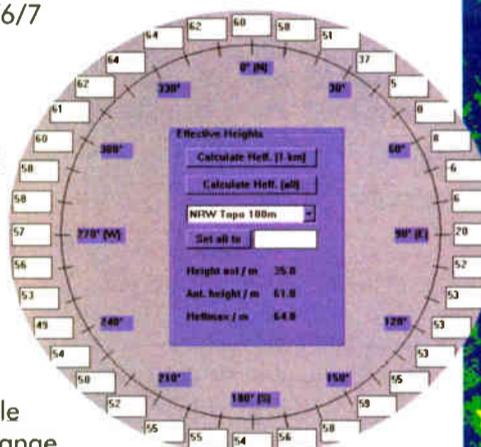
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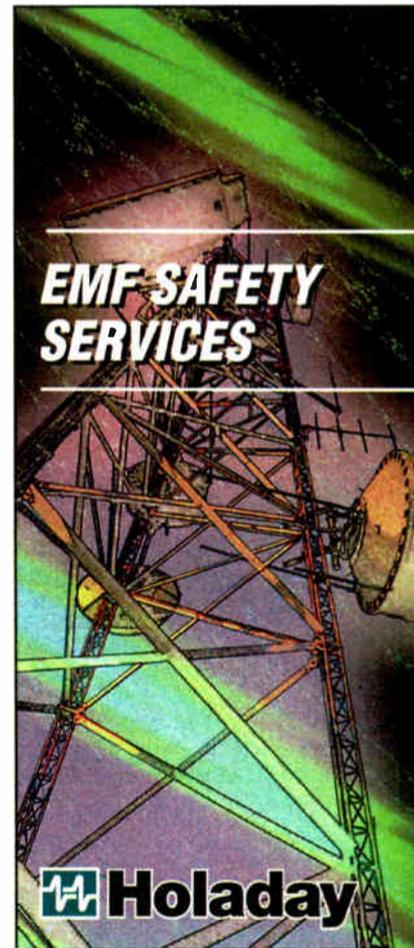
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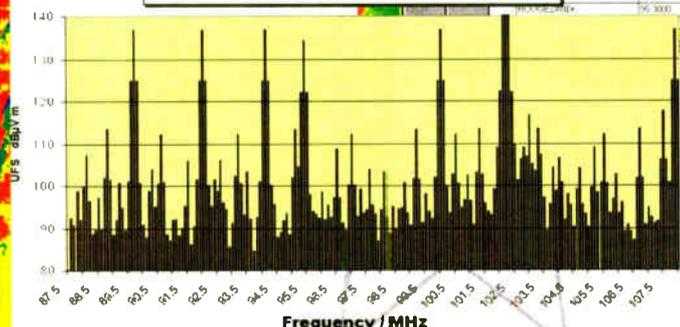
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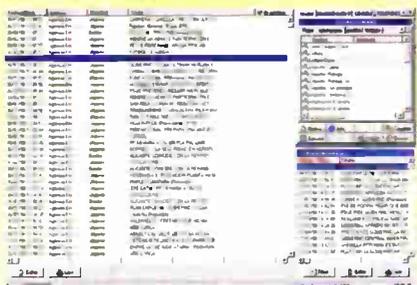
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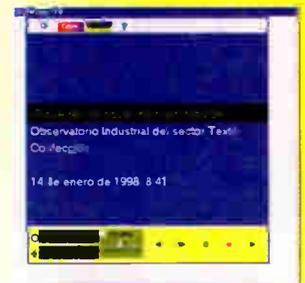
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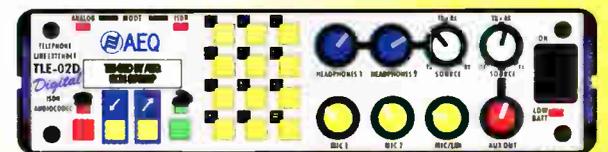
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Big City Plans L.A. Facility

Big City Radio has a studio build in the works in Los Angeles.

Harris Broadcast Systems won the contract to design and install the facility and provide the gear. The project includes four studios and a terminal room.

Harris said the new facility will be "digital ready," using the new Wheatstone A-5000 analog audio console. The design of that board lets the user upgrade it to a D-500 digital later. Other gear selected by Big City: Orban AirTime Digital Delivery System for on-air playback, Orban Audicy workstation, SAS routers and Arrakis furniture.

For more information, contact Harris in Indiana at (800) 622-0022 or circle Reader Service 90.

TCl Completes Antenna Installation

TCl recently installed two Model 657 OmniGain wide-band FM broadcast antennas at California radio stations KQBR(FM) in Woodland and KSAC(FM) in Sutter Creek.

According to TCl, the antennas have widened the listening area of the stations without an increase in transmitted power. The improvements in signal strength and coverage area result from an antenna design that concentrates much of the transmitter's energy into the main beam serving the listener.

For more information, contact TCl in California at (408) 747-6147 or circle Reader Service 141.

Mercury Radio Chooses Klotz Again

Mercury Radio Communications, consisting of three Buffalo, N.Y., area FM stations, recently purchased its third Vadis DC digital console from Klotz Digital.

Mercury installed its first Klotz board in its digital production studio in 1997. The second, installed in July 1998, serves as the network head-end for Buffalo Bills' NFL football broadcasts in Mercury Radio's aux/production studio.

The new console is for the on-air control room at WEDG(FM).

Dave Halik, chief engineer of Mercury Radio, likes the flexibility of the Vadis DC. He said the station did not have the physical space to produce all of the mix/minus configurations to broadcast each ISDN feed. "Now, with the press of a button, we can reconfigure the systems for any number of remotes," he said.

For more information, contact Klotz Digital America in Georgia at (678) 966-9900; fax (678) 966-9903 or circle Reader Service 167.



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Dave Halik at the Vadis DC Digital Console

Simplify Your Radio Remotes

► VECTOR, continued from page 80

The only noticeable glitch in our program feed was a small smear on the high end of the audio when it was recorded to the station's digital audio system.

Only the most critical of listeners at the station could pick it out. Given the inherent limitations and risks of POTS audio coding, that was more than acceptable for a voice feed. That experience echoed Tom's comments.

Though the Vector will work miracles with a single dial-up phone line, there are limitations that users need to consider.

Do's and don'ts

The operations manual discusses at great length the do's and don'ts of connecting to an analog line. Best results are achieved by connecting to a dedicated analog outside line, not through a multi-line phone system. The manual cautions against connecting the Vector to a digital line, so much that it urges users to carry an inexpensive phone or the IBM "Modemsaver" to check the line before connection. At \$4,500 a copy, that's a prudent precaution.

Cell phone connections won't work

with the Vector.

"We've taken the tack that our users want minimal delay in POTS codecs," said Hartnett. "This means the audio data needs to be sent in very close to real time, with no room for resending lost information."

"Any cellular user knows about the clicks, pops and dropouts common during a call," he said. "Each of these problems will corrupt audio codec data to the point where the corruption will be intolerable."

Newer iterations of PCS and GSM cell phones support 9600 baud, which may increase to 14.4. The Vector will allow 7 kHz audio at 14.4.

Satphones, like the ones you see in the Everything Wireless catalog, may use lots of audio compression in the voice path, which will make the modem intolerable.

The data rate of 2400 won't allow POTS codec audio to be transmitted with either the Vector or the HotLine using such a system. Inmarsat standard A&B satphones have 64 kb data channel capability, which lends itself to the use of ISDN units like the Nexus.

No battery option for the field Vector exists as of press time. One could use a 12 V inverter or a UPS to

power the AC power supply. The external power supply outputs 5V@4A when connected to a 120/240 VAC 50/60 Hz source.

John Andrews, Comrex tech support, suggests checking if the inverter emits sine-wave rather than square-wave power. I'd use a surge protector on the inverter.

Given its limitations, the Vector improves a dialed-up phone line to such a degree that major broadcast organizations are using them for short-notice remotes.

MRN Radio of Daytona Beach, Fla., used one from Suzuka, Japan, to send its daily "NASCAR Today" news show back to the United States; the WOR Radio Networks have a pair that they broke in with a remote from Alaska.

It's a quality backup for an ISDN or other backhaul link, and, if those links aren't available, an alternative for better quality audio from a remote location. The product won a Cool Stuff Award from RW in 1998.

■■■

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

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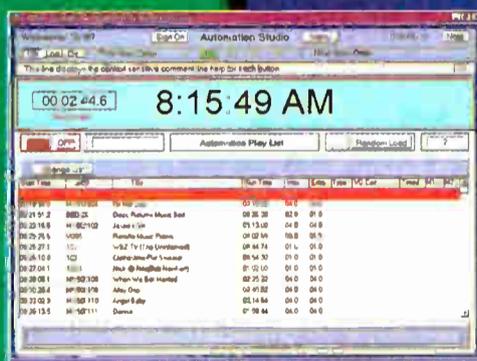
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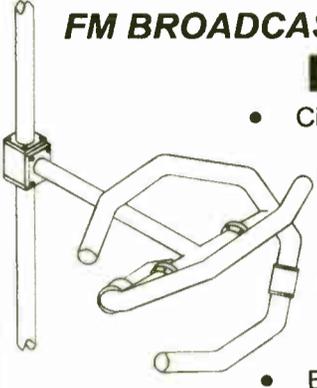


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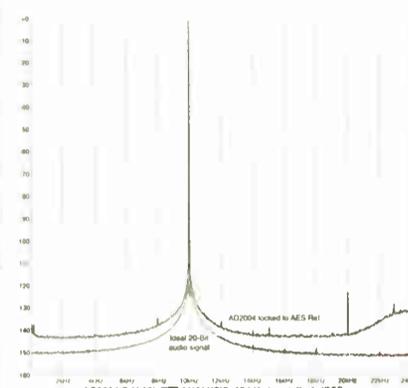


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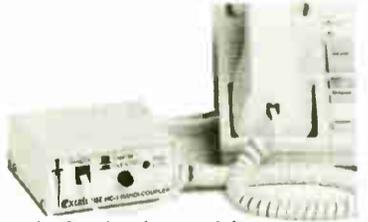
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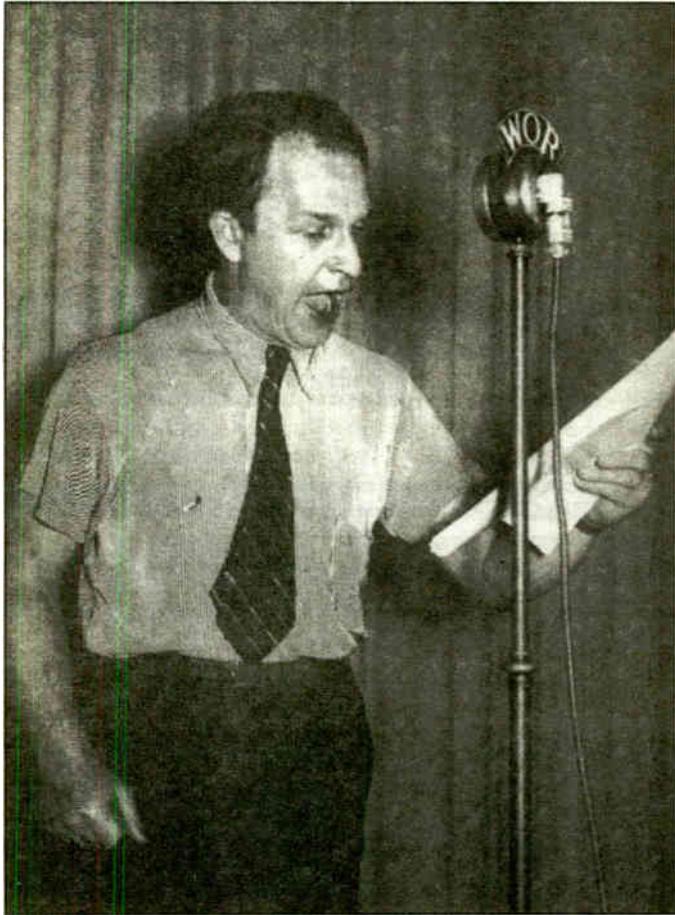
READER SERVICE NO. 126

ROOTS OF RADIO

Déjà vu: 'The Witch's Tale'

Read Burgan

Radio listeners on the West Coast recently had a taste of old-time radio when "The Witch's Tale," a radio program from the 1930s, was recreated for broadcast on several stations. This is a



Alonzo Deen Cole

story of how that show came to be, and why we remember it at all today.

KLOS(FM) in Los Angeles and 15 other stations aired the recreation of two scripts from the classic horror series in October. The episodes, "Devil Hands" and "The Tenant," aired on the "Mark and Brian Show" from the Museum of Television and Radio in Los Angeles. Featured performers included Barry Williams ("The Brady Bunch"), Bill Mumy ("Lost in Space"), Ted Levine ("Silence of the Lambs") and Judd Nelson ("Suddenly Susan").

"The Witch's Tale" is also the name of a new book containing radio scripts of 13 stories from the series, and it plays into the story too.

Historical value

Written by Alonzo Deen Cole, the first "Witch's Tale" program originated in the studios of WOR(AM) in New York and was broadcast over the Mutual Broadcasting System. The program was introduced on May 28, 1931, and continued for 332 episodes, ending in 1938. For most of its run, the show was a half-hour weekly program, with each story complete in one episode.

"The Witch's Tale" is an important footnote in radio history, not only because it was one of the first of its genre, but because nearly all radio, television and even comic book horror series that followed borrowed liberally, and often shamelessly, from the conventions developed by Cole. From its inception, Cole used the character of a witch named Nancy to introduce his

program.

Initially, Cole used actress Adelaide Fitz-Allen in the role of Nancy. She was 75 years old when she began the role, and in the publicity pictures, she looked every bit the part of a fearsome witch. When Fitz-Allen died four years later, Cole went from the sublime to the ridiculous when he replaced her with Miriam Wolff, age 13. Actually, casting the young Wolff as Nancy wasn't that farfetched — she had previously portrayed witches on the CBS children's series "Let's Pretend."

Witch Nancy introduced each episode, with lots of cackles along with accompanying "meows" from her black cat Satan, played by Alonzo Deen Cole himself. Here is an abridged sample of Nancy's dialogue from the opening of the Feb. 8, 1932, episode:

"He he ... douse that candle! It's more cheerful in the dark. Now draw up t' th' fire an gaze into th' embers — t' a cheerful leetle town, t' Noo York City we're a goin' — where cheerful lookin' houses stan' in cheerful lookin' groun's. An in one o' these houses we're goin' t' call on sum cheerful lookin' pepul. He he ... ever'thin' 'bout this stury's nice an' cheerful at th' start — an mebbe — mebbe — it'll stay that way. Mebbe! He he he he ..."

Future radio horror programs would use similarly mysterious characters for introductions, including "Suspense," "The Whistler," "The Mysterious Traveler" and "Lights Out."

Spooky atmosphere

The stories ran the gamut of horror lore: hands with a will of their own; an artist's dummy that could kill; haunted houses; a mirror leading to the fourth dimension. Cole was a gifted writer who managed to turn out a new, grisly tale each week. Many of his tales were original, while others borrowed from classical legends and authors. He added his own twist to each story.

In later years, he became the sole writer for the radio series "Casey, Crime Photographer," turning out 384 scripts. He also provided scripts for "Seth Parker," "Hour of Charm," "Gangbusters," "The Kate Smith Hour" and "The Shadow," producing nearly 900 radio plays in all.

Cole directed the "Witch's Tale," and he and wife Marie O'Flynn always played the key roles. Actors Mark Smith and Alan Devitt provided the other voices on the series. Music and sound effects, combined with artful scripts and skillful

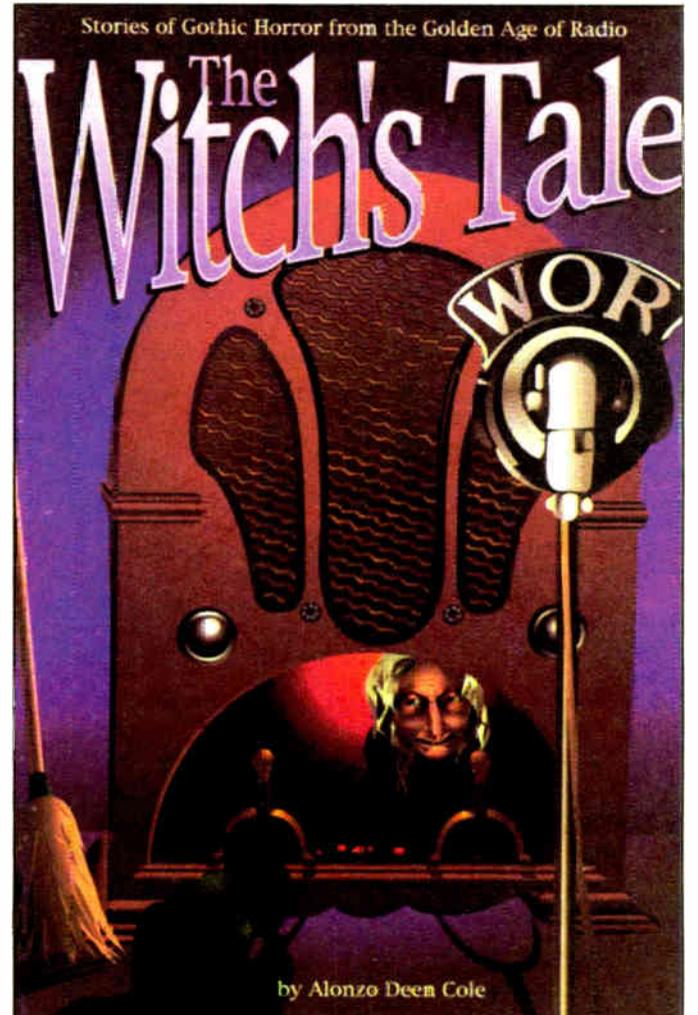
acting, produced a program that was consistently popular during its seven-year run.

Syndication

After the series ended its run on the Mutual Broadcasting System in 1938, Cole sold a syndicated version to regional radio stations using recordings of the original broadcasts. This sustained the program for another six years.

In a twist of fate almost as ironic as some of his scripts, Cole is responsible for the dearth of recordings of his program available today. In 1961, while preparing to move to California, Cole destroyed all of his recordings of "The Witch's Tale," convinced they had no further commercial value. Only about 30 recordings of the original 332 episodes are known to exist, and most are in extremely poor condition.

reworks of other authors. Originally, Siegel planned to scan the scripts for inclusion in the book into his computer, but the many marginal notes and



Retired public school superintendent David Siegel helped revive the legacy of 'The Witch's Tale' by compiling 13 stories for a book.

If it hadn't been for the efforts of a retired public school superintendent named David Siegel, of Yorktown Heights, N.Y., Cole's "Witch's Tale" legacy might have died with the destruction of the original radio recordings. By editing and publishing the "Witch's Tale" book, Siegel has ensured that the program's legacy will continue.

Siegel began collecting classic radio programs in the 1960s and now owns more than 65,000. He has established a reputation as an old-time radio authority. When the television series "Biography" needed radio excerpts for its documentaries on Walter Winchell and Danny Thomas, they asked Siegel to supply them. One of his audio clips appears in the recent HBO film on Walter Winchell.

All 332 scripts were shipped in four large cartons to Siegel, who photocopied the entire set. Each script ran an average of 25 to 28 pages. All were in fragile condition. It took 10 working days to photocopy the entire collection.

To the rescue

In selecting which scripts to publish, he first eliminated those represented in the existing 30 recorded programs. He further eliminated those that were

changes made that impossible. His wife Susan diligently typed each script.

The resulting 13 stories provide a nice balance of the kinds of stories that constituted "The Witch's Tale" radio program and made it such a hit with its original listeners. Siegel has provided an introduction that details Cole's career and a background on the program and its participants. Several rare publicity photos are included as well.

The book is sure to please anyone with an interest in old-time radio programs — horror stories in particular.

■ ■ ■

Read Burgan is a free-lance writer and former public radio station manager. Reach him at (906) 296-0652 or through e-mail at rgb@up.net

Order Info

"The Witch's Tale," by Alonzo Deen Cole (ISBN: 1-891379-01-1), is available for \$22.95 including shipping and handling from Dunwich Press, P. O. Box 193, Yorktown Heights, NY 10598. Or call (914) 245-6608, fax (914) 245-2630, or e-mail bookhuntpr@aol.com

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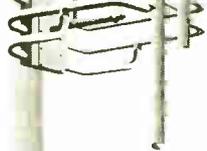
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Net Firm Pursues 'Public' Strategy

John Montone

It sounds like the set-up for a joke: "So these two media guys meet for lunch and start an Internet company ..."

In this case the story is true, and the casual lunch led to the creation of a network that provides content for seven radio programs and reaches two audiences thanks to the blending of radio and the Net.

Two school chums — a popular public radio personality and an accomplished marketing agent looking for a break into the Internet industry — were having lunch a few years ago. The radio guy mentioned that his show had 2 million listeners each week. Maybe, he said, the two should work together.

The concept for NewMarket Network was born.

Today several popular public radio shows have something else in common besides their on-air networks. They all have Web sites designed and operated by NewMarket.

Among those on the network are "Car Talk," "The Savvy Traveler" and "Whad'Ya Know."

The radio programs are delivered through NewMarket's Internet content or Web programming delivery service.

The concept is that the two media, radio and the Net, benefit each other, maximizing the number of radio listeners and the time spent listening.

Tom Lix, the founder, president and CEO of the Boston-based Internet firm, targeted public radio listeners specifically.

"They pay attention and they're interested."

He said there exists among public radio listeners a strong link between the show and the audience. Lix believes this allows



The 'Earth & Sky' Web Site

him to accomplish his goal of using the Internet to add value to a radio show.

The Lix strategy is to set up partnerships with established media brands.

NewMarket Web sites have been designed to be "complementary but different" from the shows themselves. They are not simply audio on the Internet, according to company executives. Lix said he seeks to "create some dialogue" between hosts and listeners, among his branded media partners.

Lix pursued a marketing career in the 1980s as an independent consultant. He said his expertise lies in brand extensions.

Five years ago he became interested in the Internet and a chance to start his own company. Lix saw the Internet as an "amazing opportunity, much like the beginning of radio and television."

He was so excited about the possibilities that he admits starting the firm in 1995 without a clear mission or intent. The only exception was that the compa-

ny would use a marketing strategy he calls, "marketing leverage."

Leverage

This was the term Lix used to explain the concept of reaching many people at once, one of the Net's selling points.

How to segment an audience, apply the appropriate advertising messages to the right segmented group and deliver an effective ad that appeals to a varied audience are key issues in developing ad campaigns for the Web.

Early on, NewMarket formed online databases for associations. Radio fell into the lap of the new media network when owner Lix lunched with grad-school mate Tom Magliozzi of the "Car Talk" brothers.

He said, "Tom sort of leaned over the table and dope-slapped me and said, 'I've got 2 million people a week listening to my radio show, maybe we should be doing something together.'"



The first radio show on NewMarket Network was 'Car Talk.'

Marketing leverage eventually became "media leverage," Lix said.

According to Lix, the relationship with "Car Talk" demonstrates the synergy between radio and the Net.

"Car Talk" listeners, he said, frequently asked how to find a good mechanic.

"So what we did on the Web was create a database structure, and what we did on radio was say, 'Let's all get together here. We're all friends and

See NEWMARKET, page 98 ▶

1998 Top Ten Billing Stations

Est. Station Revenue Rank	Arbitron Market Rank	Arbitron Market Name	Call Letters	Format	Owner	BIA 1998 Est. Station Revenue (in \$000s)
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2	1	New York	WXRK(FM)	Rock	Infinity	45,600
3	1	New York	WLTW(FM)	Lite AC	Chancellor	45,400
4	2	L.A.	KHIS-FM	Top 40	Jacor	39,200
5	1	New York	WINS(AM)	News	Infinity	38,300
6	2	L.A.	KRTH(FM)	Oldies	Infinity	37,100
7	1	New York	WKTU(FM)	CHR/rhythmic	Chancellor	36,900
8	1	New York	WCBS-FM	Oldies	Infinity	36,400
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Copyright Laws Control Webcasts

James Careless

Is there something to fear from new legislation governing the streaming of music on the Web?

New licensing laws may restrict what radio stations and other Webcasters can program on the Internet.

The fear is real, according to Peggy Miles, president of Intervox Communications, who keeps a close eye on the developing Webcasting industry.

"There have been some laws that have been passed that may limit the ability for a radio broadcaster to do personalized radio," she said.

"Personalized radio" describes Web audio channels programmed by users to their own musical tastes.

In particular, Miles is most troubled about the Digital Millennium Copyright Act of 1998.

While the act was designed to protect the rights of copyright holders or artists, it poses many restrictions.

According to Miles, some of these restrictions, like on-air rules, are usual and customary. But, she said, others are threatening and questionable to radio broadcasters, program directors and disc jockeys.

DMCA was enacted to bring U.S. copyright laws in line with two World Intellectual Property Organization treaties. In turn, the WIPO treaties are

designed to help copyright holders cope with the Internet.

In some ways, the act isn't revolutionary. For instance, it stipulates that copyright holders must be paid for the use of their material, just as they are for over-the-air broadcasts.

For radio stations that are simulcasting their over-the-air feeds on the Web, payment is relatively simple.

For example, to use ASCAP material, station managers simply download the ASCAP License Agreement for Internet

fees. Two types of licenses are available from BMI. A formula used in calculating which license is right for your Web site is posted on the BMI Web site at www.bmi.com

If the fees, based on the calculations BMI mandates for use, exceed the minimum amount already paid, then payments must be sent in with the quarterly reports. No provision is stated by BMI if you calculate that you have over-paid the fees, however.

Honoring the ASCAP pledge, these

Those laws are too restrictive, too early, for the Internet.

— Peggy Miles

sites on the World Wide Web (available at www.ascap.com), fill it in and mail it back to ASCAP.

Fees start at \$250 a year, according to the licensing company.

The fees are based on a number of factors including "Web site revenue," a term ASCAP uses to assess more fees based on the revenue earned from the broadcaster's Web site.

BMI requires a minimum fee of \$500 per year, which is applied toward any additional fees. BMI requires stations to file quarterly revenue reports, which are used by the organization to calculate

stations have to keep ASCAP informed as to their actual music usage.

However, for simulcasters this is relatively easy. According to Marc Morgenstern, ASCAP senior vice president of new media, simulcasters can just send duplicates of their over-the-air filings.

"If you have that, and there are cue sheets, it's just a matter of sending that along," he said.

Net only

However, for Internet-only music stations, maintaining ASCAP and BMI lists could prove to be a major hassle.

The act allows the stations to avoid the hassle by providing them with the option to obtain a "statutory license."

It's a blanket performance license that eliminates the need to negotiate with each copyright owner.

But the statutory license comes with restrictions, according to the Recording Industry Association of America information page on DMCA at www.riaa.com

For instance, statutory license holders can't play more than three songs from a particular album within any three-hour period. An additional restriction states these license-holders can't play any two songs consecutively.

As well, Webcasters can't play four songs by a specific artist or from a boxed set within any three-hour period, including "no more than three consecutively," according to the RIAA rules posted.

Retransmitters

This is called the "sound recording performance complement" in the act. The rules contain more commandments to be adhered to in the process of Webcasting.

For instance, the copyright act states, "Retransmitters of over-the-air radio broadcasts are required, upon notice, to cease retransmissions of digital broadcasts that regularly exceed the sound recording performance complement."

The DMCA rules state, "For analog broadcasts, retransmissions must cease, upon notice, if a substantial portion of the broadcast transmissions exceed the complement."

In addition, Webcasters (and thus radio stations) can't announce that they are playing a run of such songs beforehand or publish related advance "song or artist playlists."

DJs also are forbidden from announcing the exact time a run of related songs will be played. At best, they can say it will happen — just not when.

The DMCA also stipulates that archived programs — stored on a station server for playback on demand — cannot be less than five hours long and must be changed after two weeks.

"Merely changing one or two songs does not meet this condition," the RIAA rules warn.

Meanwhile, looped programs (programs that repeat continuously) may not be less than three hours long and, mercifully, are governed by the two-week mandatory change rule.

These restrictions have a purpose — namely, making it difficult to pirate any single artist from a Webcast site.

However, these restrictions also make it impossible for a user to program their own Web station to their tastes.

If the person wants to hear nothing but Alanis Morissette, for instance, the most they can hope for is three songs every three hours, at best.

Private negotiation

Everything has its price, of course, and it is possible for Webcasters to negotiate better deals with the copyright owners themselves.

However, small start-up companies and entrepreneurs who are trying to open new frontiers, such as personalized radio broadcasts, rarely have the staff or financial resources for such details.

Usually, they're too busy just trying to survive and build a successful operating plan, according to Miles.

For these companies, and others who obtain statutory licenses, "those laws are too restrictive, too early, for the Internet," said Miles.

From Miles' point of view, the well-intended goal of protecting the interests of artists may cause Webcasting on the whole to suffer.

In looking ahead, radio observers recall the fight over the rollout of digital audio tape, which delayed — and perhaps impeded — the acceptance of a new recording medium in order to assuage copyright owners' fears of mass piracy.

Webcasting advocates hope to avoid a similar outcome in the licensing of Web audio content.

■ ■ ■

James Careless is a regular contributor to RW.

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Dan O'Day's Formula for Success

Sallie Schneider Sauber

Is there a formula for writing a good radio commercial?

According to radio personality Dan O'Day, the concept for writing good advertising copy is simple. Begin the process with the standard principle that a good radio commercial must motivate the listener to act.

A spot may be the funniest thing since Seinfeld. It might have won a Mercury Award for creativity. But if it fails to sell, your client doesn't care how much work went into it.

Dan O'Day hosts the seminar "How To Create Radio Commercials That Sell," and has appeared at various broadcast organizations' events. For example, he



Dan O'Day

recently hosted a seminar sponsored by the Ohio Association of Broadcasters. RW sat in, to hear what he had to say.

O'Day's seminar reminds advertising executives and radio salespeople to tune in to their listener's point of view, avoid boring facts in a commercial and to do whatever it takes to keep the listener attentive when developing and writing radio commercials.

Commercial babble

O'Day began with a clear picture of how easy it is for unhappy radio listeners to tune out when they feel assaulted by a commercial.

For example, bad newspaper ads and television commercials may fail to sell, but an annoying radio commercial can drive listeners away.

Newspaper ads can be ignored. If you're in the middle of watching your favorite TV show, you're not likely to

Commercials should present information from the listener's point of view.

change the channel and stay away for a significant length of time. In radio, though, not many are loyal to your station. People will surf the dial in a heartbeat if you give them a reason.

One trap that commercial copywriters can fall victim to, O'Day said, is the approach based on the belief "My client knows her business better than anyone." This statement may be true. But the listener doesn't care that Margie's Bank has been in business since the beginning of time or that the

bank's assets are at an all-time high of \$67 trillion. This information is not going to motivate anyone to switch from Fred's Bank to Margie's.

O'Day urges writers to convince their client that bragging about her business doesn't make for a good commercial. A good commercial must get the listener's attention. Cliché phrases or what O'Day calls "commercial babble" are sure ways to lose an audience.

For example, how many times have you heard about the "friendly knowledgeable sales staff" at the store where there's a sale "going on now," offering "store-wide savings" because it's "clearance time?" Give the audience a

reason to "hurry on down" other than the fact that the store is "conveniently located."

Saving 20 percent on recliners isn't a big deal, but consider this angle when you announce the sale. A special day or the holidays are coming up and it's apparent that the old recliner isn't holding up so well. Set up the scenario like this: "Gee ... wouldn't Grandma be impressed when she sits down to open her gifts in a brand new one?"

Focus on listener

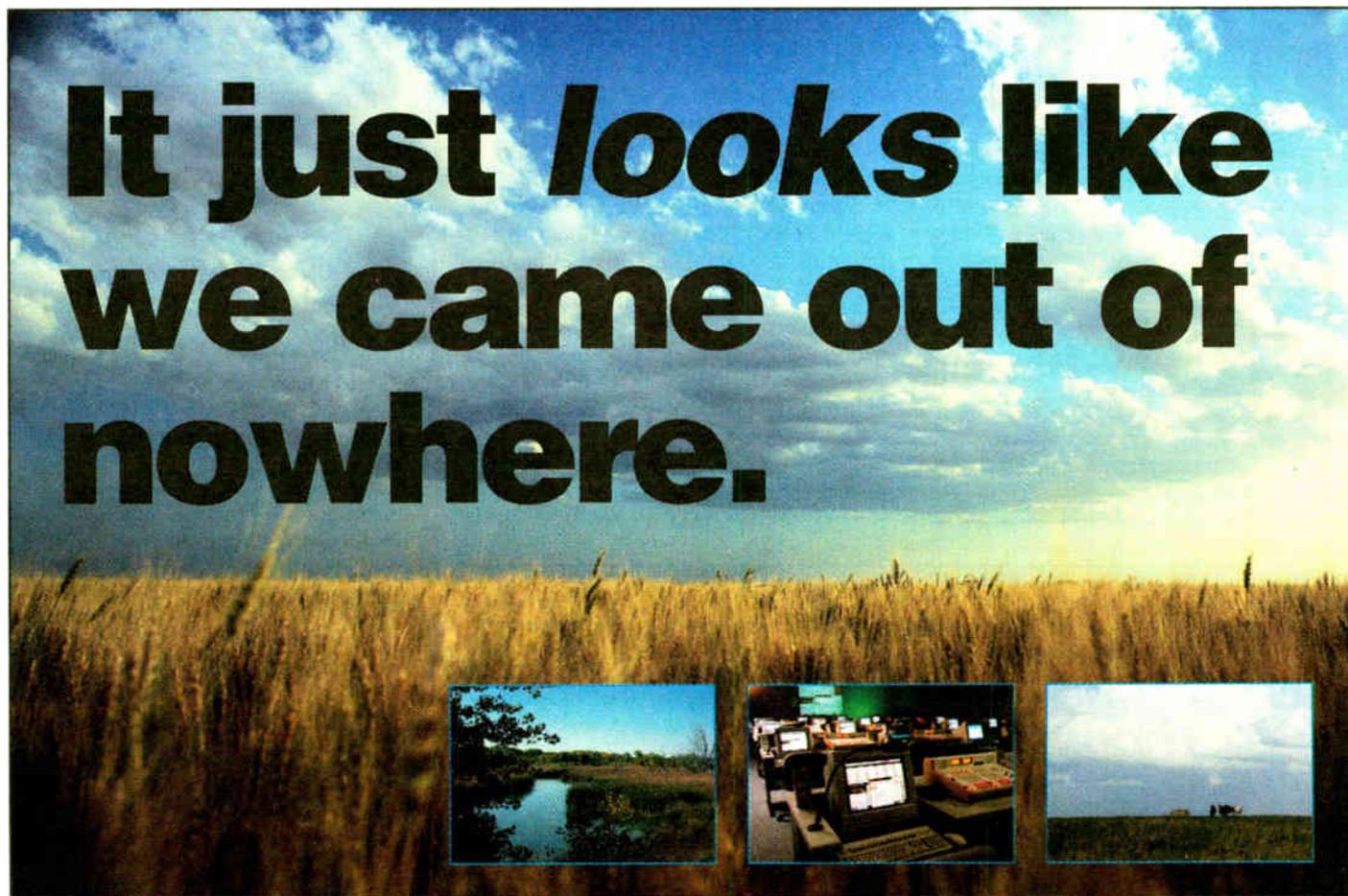
O'Day also recommends that radio commercials present the information from the listener's point of view.

Don't say, "Q105 is pleased to announce that we have the chance to give away a large sum of money." Rather, a commercial or teaser can be far more motivating when it's rephrased like this: "Hey — How would you like to win five thousand bucks?"

Instead of sending the message that the station is successful enough to give away \$5,000, and banking that the listener is impressed with that, the message makes the listener a star by becoming the potential winner of a contest.

Production directors should be aware that sound effects in commercials should be sprinkled like seasonings in cooking: use sparingly. According to O'Day, the lasers and explosions behind the chopped-up voice-over with excessive

See DAN O'DAY, page 102 ▶



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The latest to join NewMarket Network Radio Shows online is 'talking plants.'

There are now more than 15,000 entries in this file.

"It's an amazing resource that you never could have done on the radio alone or on the Internet alone," Lix said.

In choosing his branded media partners, Lix looks for shows with a substantial audience and a strong bond between the show and the audience.

"It's not just passive listening, it's active listening," he said.

While some broadcasters have viewed the Internet with suspicion, believing it to be a rival for the public's attention and another new-media slot to feed from advertisers' budgets, Lix does not share that philosophy.

"We're not here to compete with

radio," he said. "The last thing we want is to draw audience away from radio. We like to pull audience in."

In the three years since the creation of the "Car Talk site," Lix said, the number of listeners has grown from 2.2 million to 2.8 million. The Web site, meanwhile, attracts about 30,000 hits a day.

NewMarket generates revenue by selling branded merchandise to fans of its shows and from its sponsors. That list includes Consumer Reports, Sears, Ford, Nissan, Microsoft, Valvoline and L.L. Bean. Lix said advertisers know in

advance they will reach what he claims is a specific and well-defined target market. This is an audience the advertiser knows is already interested in their products.

Listeners to public radio are accustomed to no-frills, non-commercial programs, not to lots of ad spots.

According to Lix, the commercial-free nature of public radio represents an untapped market of millions of listeners.

"We can commercialize that opportunity," said Lix, "but do it in a way that's acceptable to a rather discriminating public radio audience."



John Montone is a radio reporter for 1010 WINS(AM) in New York. Reach him via e-mail at jfmontone@worldnet.att.net

Ed McLaughlin Wins Radio Excellence Award

Ed McLaughlin, former president of ABC Radio Networks and the man responsible for launching the Rush Limbaugh show, is this year's recipient of the Radio Advertising Bureau Kevin B. Sweeney Award.

Sweeney was the first president to serve RAB. The award is presented annually to an individual who exemplifies excellence in radio. RAB President Gary Fries said, "Ed has always been a visionary," Fries called McLaughlin an "inspiration" to the industry for breaking tradition and forging new trails of success for radio.

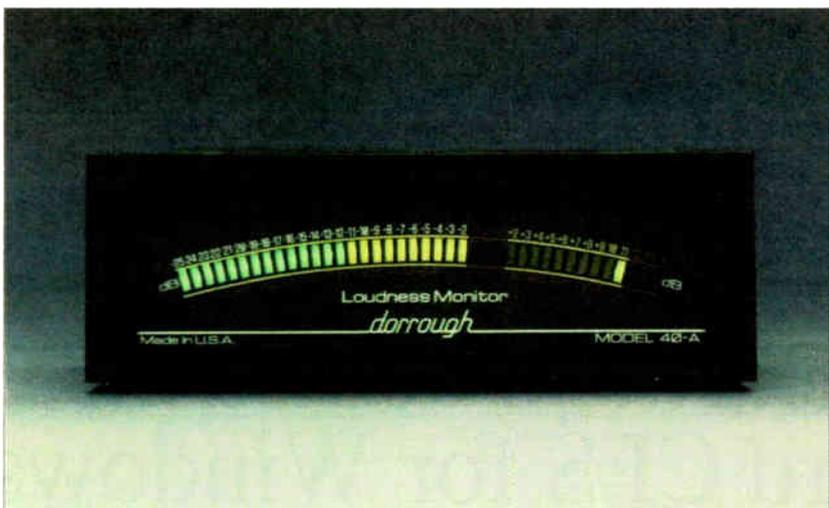
McLaughlin is the founder of EFM Media Management, the company that produced and distributed the Rush Limbaugh and Dr. Dean Edell shows. He served as CEO and chairman of the company.

In 1997, EFM sold the assets of the radio shows to Jacor Communications.

Among his accomplishments in the industry: McLaughlin was the first to obtain exclusive live radio network rights to the Olympic Games and the first to produce long-form programming with ABC Radio. He also engineered the acquisition of program legends "American Top 45" with Casey Kasem and "American Country Countdown" with Bob Kingsley.

A San Francisco native, McLaughlin graduated from San Francisco State University. He lives in Connecticut with his wife and daughter and remains active in broadcasting.

— Laurie Cebula



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Weiner's 15-Year Battle Ends

Anita Louise McCormick

Former pirate radio operator Alan H. Weiner fought for 15 years in an effort to convince the FCC to grant him a license to operate his low-power radio station, WBCQ, from his farm in northern Maine.

Now Weiner is on the air on the short-wave band. On Sept. 8, 1998, Weiner switched on his mic. "WBCQ-The Planet, 7.415 MHz out of Monticello, Maine ... it has been such a long journey for this radio station to get on the air."

When Weiner attempted to get a short-wave license from the FCC more than 15 years ago, his past activities in pirate radio prevented him from getting FCC approval. In the early 1970s, Weiner operated pirate radio stations from his father's garage in Yonkers, N.Y. He also operated Radio New York International, an offshore radio station that Weiner built in 1987 to broadcast from international waters four and a half miles off Long Island. This history of clashes with the FCC led to the commission's denial of his application, until recently.

Adventures

Weiner's pirate radio adventures, as well as his work with AM and FM stations and offshore radio, are chronicled in his recent book, "Access to the Airwaves: My Fight For Free Radio," published by Loompanics Unlimited.

In December 1997, the FCC finally approved of his plans to build a 50 kW shortwave radio station on his farm in Monticello, Maine. "They gave me another

ter, which he commended for its audio performance. The log-periodic beam antenna sits atop a 60-foot tower and faces southwest. "We use it to beam toward Mexico and it works beautifully," Weiner said.

"This is a free-speech station," Weiner said. "The purpose of WBCQ is to give more people an opportunity to access a worldwide listening audience. We want



Shortwave radio operator Alan Weiner sits in the WBCQ studio.

to provide news, information and entertainment of a different sort to the short-wave listener. Shortwave radio has become stuffy and predictable, we want to shake things up."

WBCQ Operations Manager Randi Steele said, "The station's logo of a globe encircled by a rainbow represents our desire to program a wide social and political spectrum of viewpoints."

On weekends, the lineup includes host Hank Hayes and friends for Radio Free New York. Johnny Lightning's Radio New York International show can be heard every Sunday evening.

Other WBCQ programs include Steve Cole's "A Different Kind of Oldies Show," a heavy-metal music show presented by Khaos A.D., a program for satellite TV enthusiasts, and talk shows that focus on constitutional

issues and religious programming.

Weiner said listener response has been overwhelming. Since the station signed on, he said, WBCQ has received thousands of letters, cards and e-mails. While many listeners are in North America, Weiner said people have reported hearing the station as far away as New Zealand.

"It's beyond our wildest dreams," Weiner said. WBCQ has already leased all of its prime evening time slots. However,

some daytime and late night slots remain available, according to Weiner.

The future

What does Weiner plan to do with WBCQ? "We will probably go on the air 24 hours a day in the spring and start using frequencies that can be heard well during the daytime," Weiner said.



Weiner said. "It's inexpensive and very accessible. You can buy a shortwave radio for as little as \$29.95. And once you own one, the world is at your fingertips."

Meanwhile, Weiner is watching developments at the FCC with interest. On Jan. 28, the commission proposed three types of service for the FM band — ranging from 1 to 1,000 watts, with coverage areas ranging from about one to nine miles — and it has asked the public for comment.

"I'm glad the FCC is finally looking into enabling ordinary citizens to get into broadcasting," Weiner said. "I hope they go far enough and make it a reasonable and easy process that will allow individuals to have fast, easy and inexpensive access to the airwaves. If they do that, the FCC will have fulfilled their mandate to serve the public interest."

■ ■ ■

Anita Louise McCormick's book "Shortwave Radio Listening for Beginners" is published by McGraw-Hill.



The WBCQ Radio Tower

chance because I have not violated any FCC rules since my early pirate days," Weiner said. "There is some new blood at the commission and they decided to be nice to me."

Weiner is not only a former pirate radio operator, but a radio engineer as well. He started the construction of WBCQ in April of 1998, soon after the long-awaited approval arrived. By mid-August, the station was ready to test on the air.

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critics Nat Hentoff and Stanley Crouch. The Duke Ellington project is produced by Newark, N.J., station,

WBGO(FM) and The Luce Group. The radio program is created in a series that includes 60 five-minute modules and 13 one-hour documentaries and is available to stations nationwide.

Rare historical transcripts from the Duke himself, commentary from jazz critics and from Ellington's colleagues like Dizzy Gillespie, Roy Eldridge and Clarence Brown are featured in the program. This project, scheduled for completion by the end of April, is made in honor of Duke Ellington's 100th birthday on April 29.

"The Duke Ellington Centennial Radio Project" can be heard on the World Wide Web at WBGO.org

For additional information contact Jim Luce at (718) 786-1379 or circle Reader Service 91.

More Power to the Duke From CBS Radio

A multi-part series called "Duke Ellington: Beyond Category," also celebrates the 100th anniversary of the great jazz artist's life and is offered from CBS Radio News to all its network station affiliates.

News anchor Sam Litzinger hosts the series, which includes six one-minute, self-contained segments plus a 10-minute program featuring interviews with

jazz stars that include Tony Bennett, Wynton Marsalis, jazz radio host Dick Goldin and students of the Duke Ellington School of the Arts in Washington, D.C. The radio program also features a classic interview from the early '70s with Ellington and CBS newsman Mike Wallace.

Other featured guests speakers in the series are poet Maya Angelou and choreographer Judith Jamison.

For additional information contact CBS Radio News at (212) 975-6952 or circle Reader Service 67.

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Contest Control Screens Calls

At last, only the winners can get through to the jock on the air, no middle man to say, "Sorry — you're the loser," repeatedly. The Contest Control is a telephone answering and messaging service that selects only the winners to "ring" inside the studio, while losers are quickly and efficiently dealt with by an electronic messenger.

According to Hi-Tech Solutions, a software developing company, the automated system conducts contests or surveys by answering incoming contest calls, sending an answer to the caller and delivering a targeted advertising campaign or message based on the geographical location of the caller.

The company said the messages are professionally recorded to introduce the promoter, deliver advertising and notify the caller that, indeed, he is a contest loser.

This system is run and controlled by the promoter via telephone or on the Net. The system further tracks contestants on the Net with real-time feedback on contest activity.

For additional information contact Hi Tech Solutions at (703) 449-9300, visit their Web site at www.contestcontrol.com or circle Reader Service 92.

Marketing Radio Ad Sales On the Telephone

Radio Profits Corporation claims telemarketing is a powerful sales tool for radio. The company reported that a salesperson from Morristown, N.J., radio station, WMTR(AM), closed five sales in two days, operating in a sound-proof booth from the floor of a recent radio conference. RPC offers a system for telephone sales for commercial radio broadcasters.

The marketing scheme comes with a complete database of prospective clients, according to the company. In addition, the package includes hardware, software, aid in hiring and training a telemarketing staff, scripts for



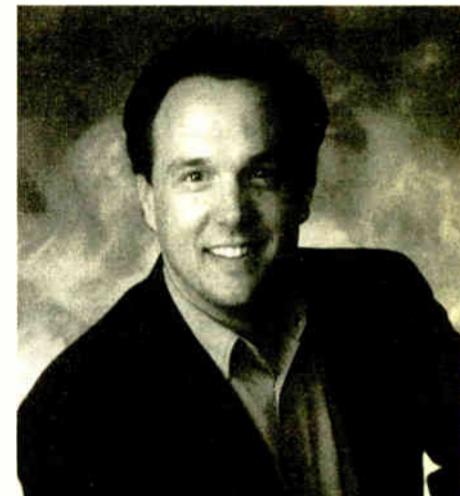
promotional broadcast campaigns, incentive programs for phone sales reps and provides a daily report for management analysis.

The company said the Radio Profits system is currently in use in 84 stations in the U.S. and nine stations in the U.K.

For additional information contact Scott Wolfe (757) 596-4550, send e-mail to scott@radioprofits.com or circle Reader Service 94.

New Talk Radio Show On Investment Funding

Doug Fabian — technical analyst, mutual fund advisor and columnist fea-



Doug Fabian

tured in the Wall Street Journal and Fortune magazine— will take his advice on the airwaves in southern California.

The new talk show "Fabian on Funds," started March 6 and continues each Saturday from 9-10 a.m. on CBS station KLSX(FM). Fabian Investment

See STATION SERVICES, page 101 ▶

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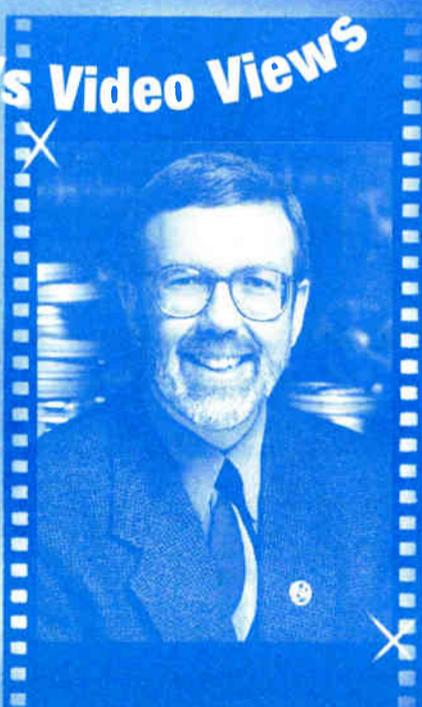
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Ad Council and 'America's Promise' Deliver PSAs

In support of a national effort to provide healthcare coverage to uninsured American children, the Ad Council will distribute public service announcements to its network of 7,100 radio stations in the nation.

The three-year, \$7 million campaign is sponsored by Bonneville Corp. and is in keeping with the company's commitment to support "America's Promise," an association chaired by Gen. Colin Powell.

Radio stations will be provided with a CD with pre-recorded spots in English and Spanish, a live-read script and special PSAs for use with local advertisers. Each PSA directs the listener to a toll-free phone number (1 (877) KIDS-NOW) that will give information about where and how listeners can obtain free or low-cost health insurance in their state.

The ad campaign includes six PSAs that feature Powell. The campaign is tar-



geted to reach parents of uninsured children. Its mission is to increase awareness of the Children's Health Insurance Program, a federal and state partnership to provide affordable or free health insurance for uninsured children.

For additional information from the Ad Council visit their Web site at www.adcouncil.org or circle Reader Service 68.

Jerry Lee Puts Radio in Community Service

Jerry Lee, co-founder of WBEB(FM) in Philadelphia, radio pioneer and founder of The Jerry Lee Foundation, recently shared in the foundation's recognition by the National Broadcast Association for Community Affairs.

The association recognized the foundation's significant contributions to the community. NBACA includes community

ment the effectiveness of different crime prevention programs so that eventually we can concentrate resources on programs that are proven to work." Lee said.

Throughout his long career in radio, Lee has been a catalyst for change and improvement. He is founder of the Arbitron Advisory Board and the longest-serving board member of the NAB.



Jerry Lee sponsors the foundation that bears his name.

Lee has raised \$2.1 million for seven doctoral fellowship programs to study areas shown to affect inner-city crime.

affairs professionals from radio, television and cable stations. It announced an annual award on the foundation's behalf.

NBACA recognition

The Lee Foundation will give the award, including a \$2,500 cash grant, in recognition of outstanding community service programs, news series or public service campaigns examining local crime-prevention programs.

"Our goal is to encourage the broadcasting community to examine and docu-

Established in 1997, The Jerry Lee Foundation is a non-profit organization that uses radio to solve two fundamental issues facing inner-city populations: crime and problems of education.

"The biggest problem with crime prevention is that we simply don't know which programs work," Lee said.

In an effort to improve education in inner cities, the Lee Foundation co-funded a \$100,000 program to study a program in the Union City, N.J., school district, which succeeded in turning low grades into top scores in national

standardized testing.

Lee's interest in education is not new. In 1995, before the foundation was formed, he developed a pilot learning program that helped the Philadelphia school system reduce the number of seventh graders held back each year.

Through the foundation's efforts, Lee has raised \$2.1 million for seven doctoral fellowship programs to study inner-city crime, and he personally funded the first two programs at \$60,000 per year.

— Linda Sultan

New NAB Radio Board Members

The National Association of Broadcasters has announced the results of the run-off elections for the 1999 NAB Radio Board. The two-year terms will begin in June. The newly elected board members are Steve Samet, president/general manager, WZOE-FM Broadcasting in Princeton, Ill., and John Borders, president/CEO of Sunburst Media in Dallas. Samet won the seat in District 17 while Borders was elected in District 19.

Meantime, Jimmy de Castro, president, Chancellor Radio Group, Chancellor Media Corp. was appointed to the board. He will serve as a major market group representative in a vacancy created by the death of Tom Milewski of Greater Media.

— Sharon Rae

STATION SERVICES

► STATION SERVICES, continued from page 100 Resources, parent company of the radio show and mutual fund advisory service, said the show is designed to appeal to experienced investors, as well as to beginning investors.

Doug Fabian has appeared on radio talk shows in San Diego at KSD(AM), KFNN(AM) in Phoenix and WOR(AM) in New York. Fabian publishes the Fabian Investment Resources newsletter.

For more information contact Fabian Investment Resources at (800) 950-8765 or circle Reader Service 172.

Public Radio's First Film Weekly In Syndication

The first weekly program on movies and video from National Public Radio began its rounds as a nationally syndicated program earlier this month.

"Film Week," formerly a Los

program discusses issues regarding film and society, reviews theater and video releases and provides commentary about the film and video industries.

Host Larry Mantle is also producer of the radio program. He serves as program director and news director at KPCC(FM), Los Angeles, the flagship station of "Film Week."

Movie critics that contribute to the program as featured guests include



Larry Mantle hosts 'Film Week.'

Jean Oppenheimer, film critic for New York Times/Los Angeles Times; Peter Rainer, critic for New York Magazine and Chairman of the National Society of Film Critics; and Ella Taylor, film critic for Atlantic Monthly/LA Weekly.

For more information call Ken Mills at (615) 513-9988 or circle Reader Service 42.



with Larry Mantle

Angeles-based radio show, will be delivered via satellite each week to NPR stations across the country. The one-hour

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All shows are barter, no cash payment. For free CD demo, contact David West Dick Brescia Associates (201) 385-6566

HEARD ON 500 RADIO STATIONS!



Tash Joins InXsys

Robert "Skip" Tash has joined InXsys Broadcast Networks Inc. Tash, formerly Radio World associate publisher, will head InXsys' radio division as executive vice president.



Skip Tash

Tash's new responsibilities include directing all nontraditional revenue efforts for radio stations and networks that want to join the InXsys online affiliate program.

InXsys, based in Longview, Wash.,

produces multimedia classified, auction and personals services to consumers and business to business.

BE Expands Digital Service Staff

Broadcast Electronics has five new faces on staff in the digital service division. The company has added Larry Price, Steven Miller, Jeffrey Walker, Hector Brown and Ray Miller to the division.

Price will serve in the position of customer service engineer, digital products. Steven Miller joins BE as studio systems integrator. Walker, Brown and Ray Miller rejoin the digital service division from other departments at BE.

BSW Announces Promotions

Equipment dealer Broadcast Supply Worldwide is announcing three new promotions.

Thomas Roalkvam was named sales manager. Roalkvam has served as a BSW sales representative for three years.

John (Jay) Ubben was promoted to director of marketing. Ubben, an 11-year BSW veteran, is responsible for product selection, pricing and promotion. He also will serve as a contact for manufacturers, and will oversee company advertising and marketing efforts.

Tor Hagen has a new title at BSW. He will serve as director of advertising, responsible for all corporate and co-op direct mail, Web and trade advertising.

WTOP PD Promoted

WTOP-AM-FM in Washington, D.C., promoted station Program Director Jim Farley to the post of vice president of news and programming.

Farley previously served as managing editor of ABC News Radio and

vice president of NBC Radio News. He has been a part of the WTOP team since 1996.

WTOP is one of five Washington-area radio stations owned by Bonneville International Corp., based in Salt Lake City.

New Hires, Promotions at Harris

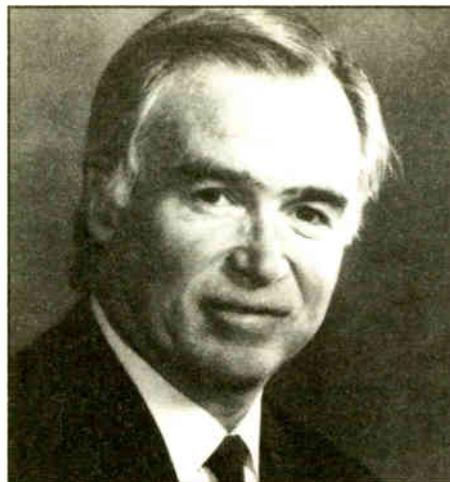
Cam Eicher has a new title at Harris Corp. Eicher has been promoted to manager of the broadcast center, the U.S. sales and telemarketing hub for the broadcast systems division's line of distributed audio and studio products.

Wes Kimes has been appointed vice president of worldwide sales for the broadcast systems division. Kimes previously served as vice president of sales for the Midwest and Canada for Siemens Telecom Networks.

Don Spragg has been named to serve as AM radio product manager for the Harris Broadcast Systems Division. Spragg is a broadcast engineer, manager and product designer and will be based in Quincy, Ill.

Lindenmuth Appointed President/CEO of Quantegy

Richard A. Lindenmuth has been named as the new president and CEO of



Richard A. Lindenmuth

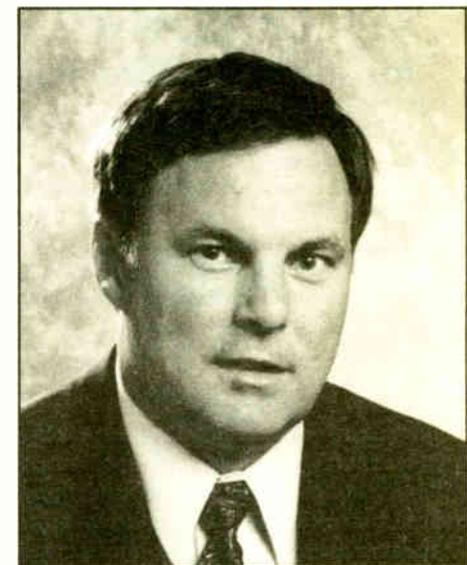
Quantegy Inc. He brings experience in the global technology markets. Lindenmuth is

the former president of ITT Business and Consumer Communications and president and CEO of Robinson Nugent Inc.

Quantegy, headquartered in Peachtree City, Ga., manufactures professional recording media.

Andrew Announces Management Changes

A series of management changes is in the works at Andrew Corp. John DeSana has been promoted to group president, Heliac Products. DeSana is responsible worldwide for the corporation's Heliac



John DeSana

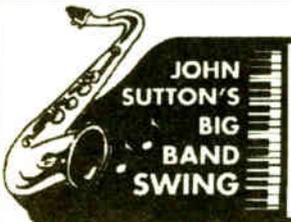
cable, connectors, assemblies and accessories product lines.

Thomas Charlton, group president, communication products, assumes responsibility for the company's terrestrial microwave, base station, ValuLine, satellite and broadcast antenna product lines as well as distributed communication systems and government systems.

Debra Buck Huttenburg continues to serve as group president of antenna systems and wireless products.



Tell us about personnel changes at your station or company. Send announcements to SoundWaves, c/o Radio World, P.O. Box 1214, Falls Church, VA 22041.



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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.



O'Day Exercises the 'Creative Muscle'

► O'DAY, continued from page 97

"How To Create Radio Commercials That Sell," the seminar written and delivered by Dan O'Day, is designed to address sales reps, production directors and copywriters.

Dan O'Day consults a limited number of radio stations and conducts air talent and copywriting seminars for individual stations, radio group owners and associations. Contact him at (310) 476-8111 or hear a free sample of this seminar online at www.danoday.com

Sallie Schneider Sauber is production director and copywriter for WATH(AM) and WXTQ(FM) radio in Athens, Ohio, and a regular contributor to RW.

ONLINE RADIO

What Online Listeners Really Want

Kim Komando

One thing is clear from Arbitron's first Internet Listening Study. The Internet offers as many opportunities for radio stations as it does threats.

For example, 13 percent of those surveyed said they listen to the radio less as a result of their online usage. Furthermore, 17 percent said their local radio stations don't play the types of music they want to hear.

If those dissatisfied listeners turn to one of the hundreds, if not, thousands, of online music playback alternatives, local stations could lose these people for good.

That's an example of the threat of the Internet. But cyberspace also presents an opportunity for radio stations.

For example, consider the prospects of simply expanding your listener base through Webcasting. According to the Arbitron study, about one-third of the population claims radio signals do not come in clearly at work. What's more, nearly two-thirds of those surveyed said that, in terms of what they would like to be able to listen to online, their PI station is the top priority.

Jacor in cyberspace

Balance those two thoughts with the fact that more and more desktops in the American workplace are being equipped with high-speed, always-on Internet connections. It's clear that the Internet gives you the opportunity to reach listeners new and old who have been excluded from tuning in during the day because they simply couldn't receive your signal.

This is one reason why Jacor station KSDO(AM) in San Diego is pushing the envelope by marrying traditional radio broadcasting with Internet Webcasting.

KSDO is no longer KSDO found on your AM dial; it's "KSDO.com" within all the station's on-air, online and off-line marketing and promotion.

As Cliff Albert, KSDO operations manager explains, "This is the first time as far as we know it that a radio station has completely tied in a station to the Web site. We're not just broadcasting radio programming on the Internet. We've dropped the old station's entire identity. We're now KSDO.com."

As you might expect, the Internet also gives you the opportunity to reach listeners outside the geographical confines of your broadcast tower. There's a waiting audience, too. About 30 percent of the survey respondents indicated that they would like to listen to out-of-area programming if given the opportunity.

What's most noteworthy, in my opinion, is that the Arbitron survey also indicates a legitimate opportunity to turn a

radio at least some of the time. On the flip side, over three-quarters of those surveyed said they would be at least somewhat interested in Web sites that provide information on local shopping.

In other words, your radio station may be positioned perfectly to serve as an online showcase for your advertisers.

This all makes for some interesting fodder, but it leaves some important questions.

There is no way to know how many people responded positively to more than one question. For example, how many people are interested in listening to your broadcasts via the Internet and are also interested in purchasing goods or services from your Web site? In other words, it's one matter to analyze individual survey questions, but quite another to form a realistic composite of the average Internet listener.

What's clear, though, is that the Internet could be the road to riches for radio station owners who react quickly and appropriately, while it could equally be the highway to hell for those who



KSDO dropped their on air name for the 'dot.com' slogan.

buck — to make a hard-dollar profit for your online investment. Cha-ching!

The survey drew several conclusions about how listeners relate to radio station Web sites.

To begin with, 71 percent of respondents who said they have visited a radio

The truth of the matter is that of all the sites on the Internet, I'd estimate that at least 90 percent of them are pure trash.

station Web site said they've also returned to that site at least once.

What's more, almost half of the survey participants said they'd be interested in buying merchandise or services advertised during a broadcast directly from the radio station's Web site. This idea alone — becoming an actual retailer of your advertisers' goods — gives rise to a number of possible e-commerce models.

A radio station could make its money on the front end by taking a cut of the online sales, on the back end by charging the advertiser extra for this service, or both. Even if the idea of full-fledged e-commerce seems daunting, you can still create additional online opportunities for your advertisers.

Two survey points bear this out. First, more than half indicated they have trouble recalling advertising information from the

make the wrong decisions or, worse yet, no decisions at all. The trick is to take what you know about your listeners, combine it with what's known about online users, and see exactly where the two converge.

Expert advisory

You know your listeners. As a computer expert with years of experience in cyberspace and as a national talk-host, I'm qualified to tell you a little about what to expect from most online enthusiasts.

Foremost, the Internet is about utility. Granted, recent surveys show that Internet users spend a large portion of their online time pursuing activities that can generally be described as entertainment. However, most online users will find no entertainment value in some large multimedia file that takes several



minutes to download over their standard telephone modem — no matter how engaging the effects in the multimedia presentation.

Indeed, even when it comes to entertainment, online users are looking for tools and information that they can really use, and use right now. It's also been my experience that online users are not quite as fickle as some might have you believe. With literally thousands of Web sites to choose from, it's easy to envision a user that goes hopping indiscriminately from site to site. How do you compete with that?

Of all the sites on the Internet, I would estimate that at least 90 percent of them are pure trash. I'm sorry if that seems harsh, but it's true. And it's a very important point. What it means is that if you manage to do your Web site right — creating an online presence that strikes the perfect balance between usefulness, entertainment value and efficiency — you'll have on your hands a site that people come back to again and again.

Believe me. Most users would be thrilled to find that one gem of a site, rather than having to sift through page after page of cyber-garbage just to find a worthwhile tidbit.

Sure, the Internet is posed to radically change the way radio stations do business. Yet, in a way, success on the airwaves is likely to boil down to the same thing it always has: knowing your listeners and delivering what they want by whatever media are appropriate.

Kim Komando's column appears regularly in RW. She is a national talk radio host, TV host, syndicated newspaper columnist and computer editor at Popular Mechanics. Reach her at her home page at www.komando.com

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Studio Sessions

Automation:

A New Twist.
Page 109



Radio World

Resource for Radio Production and Recording

March 31, 1999

Betty Crocker Back on the Radio

Flip Michaels

Back in the '30s and '40s, families would gather around an odd piece of furniture filled with glass tubes and a speaker to receive a dose of home-based state-of-the-art entertainment. And each week, the General Mills company would broadcast nationally an episode of "Betty Crocker Cooking School of the Air."

The show faded and disappeared with the advent of television, but now is back and geared for men and women of the '90s.

ing studio, smaller than most kitchens that utilize the good advice dispensed on the programs.

Cooking up a studio

Imagine working on the fourth floor of the corporate headquarters of General Mills, a 1950s-era steel and concrete building.

Now imagine having to try and figure out a way to design and incorporate a standalone studio without making any significant changes in the infrastructure of the building.

made it easier for me to give recommendations on how to move forward."

The studio had to be constructed from a converted storage room. The acoustics alone resembled the Grand Canyon.

Sheehan said, "I had the good fortune during my 20 years of radio experience, both locally and at the AP Radio Network, to learn from top engineers and other broadcasters about what works best in studio design."

"Using that information and a few of my own thoughts, we built a high-quality

facility that is among the best I have ever used," said Sheehan.

"We chose Acoustic Systems because of their reputation, experience and ability to build an affordable studio quickly. It really only took about six weeks from design to delivery."

The studio is equipped with industry standard CD, DAT and ISDN gear, as well as a pair of digital multitrack recorders.

"My producers love the setup because they can edit in the studio or from their desktop PCs," said Sheehan.

Programs are recorded using Compaq See BETTY, page 108 ▶



A Look Inside the 10-by-10-Foot Betty Crocker Studio

"The thing that makes Betty stand out from other cooking shows is that she is Today's Everywoman," said Executive Producer Jack Sheehan. "No impossible projects or complicated dishes, just good common sense."

Sheehan may be on to something. The latest marketing innovations of General Mills have caught the attention of both the Wall Street Journal and Fortune magazine.

"Betty is still about cooking, eating and food," Sheehan said. "The programs cover nutrition news, menu ideas, tips, kitchen gadgets, and supermarket and restaurant trends."

And the programs are produced in-house in a unique self-contained record-

The nation's No. 2 cereal maker has offices divided by moveable steel partitions over a poured concrete floor.

Utilities are fed through trenches and the Corporate Communications department has only 100 square feet to spare.

In other words, a 10-by-10-foot cell.

"It is always a challenge to help our clients be sure to choose the right features and options to serve their needs," said Steve Dutton, sales manager for Acoustic Systems, the company that built the studio.

"With General Mills, it was easy because of all the work Jack Sheehan had done in advance," said Dutton. "By the time he had first contacted me, it was clear the direction he was heading. This

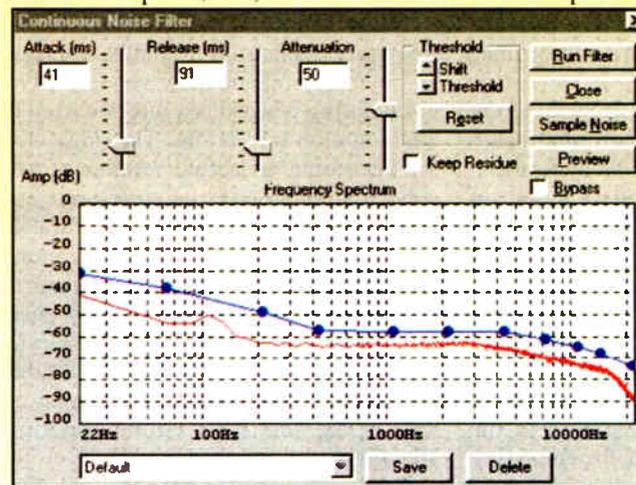
PRODUCT EVALUATION

DC-ART: Less Noise, And Even Less Cash

Read Burgan

Five years ago, a Mac-based digital audio restoration workstation would have cost up to \$100,000. Now DC-

ART 32 (Diamond Cut Audio Restoration Tools) has come of age, providing effective and useful digital audio restoration tools at a bargain-basement price.



Filtering Noise With DC-ART

ART from Diamond Cut Productions can do nearly as much for less on a PC than the cost of a night on the town.

Tracer Technologies of York, Pa. It has a retail price of \$199, but it can be pur-

See DC-ART, page 105 ▶

This is not my first experience with DC-ART. Two years ago I tested the program, and came away feeling it was not yet ready. So when I popped the new CD-ROM into my computer, I wondered what I would find.

Let me tell you the 720-day wait was worth it.

DC-ART was created by Diamond Cut Productions and is marketed by

MACKIE
Professional Audio Systems
www.mackie.com

► DC-ART, continued from page 104 chased for as little as \$99.50 in conjunction with other products including the Neato Labeler.

If you look into it, be sure that you are getting DC-ART 32, and at least version 3.0.

The 'like list'

First on my "like list," all DC-ART filters can be previewed in real time as you adjust the parameters. This is not only a plus, but should be the standard for all digital audio restoration software.

Being able to actually hear the effect of a filter as you adjust its onscreen controls saves a lot of time.

In addition, the entire DC-ART onscreen interface is easy to use and very intuitive. If you have done much digital audio work, it should not take long to figure out how to use its features, even if you do not bother with the manual. But you will want to use the manual. More on that later.

As is found on nearly all digital audio restoration software, the primary DC-ART tools are an Impulse Noise filter to remove pops and clicks and a Continuous-Noise filter to remove broadband noise like record surface noise.

The impulse noise filter is nicely designed, and provides threshold, size and tracking adjustments plus a special algorithm that optimizes the filter for vinyl or non-vinyl record sources (78s, Edison cylinders, foil recordings *et al*). I found the filter easy to adjust and as effective as any other impulse filter I have used.

As an added feature, the filter provides an onscreen readout of how many clicks per second and how many total clicks are being removed during the process.

This not only gives you a concrete feeling for how effective the filter is, but also shows if the filter is set too aggressively and could be removing program content. I give the DC-ART impulse filter an A-plus.

Sample and remove

Likewise, the continuous-noise filter is nicely designed and easy to use.

As with most continuous-noise filters, you highlight a portion of your WAV file that consists only of noise and click the "Sample Noise" button. This provides an on-screen graph of the noise along with a blue line above it that represents the filter that DC-ART will apply to remove the noise.

The attack, release times and the degree of attenuation of the filter can be adjusted up or down. If you desire to tailor the noise filter even more, you can manually adjust the shape of the filter line on the screen.

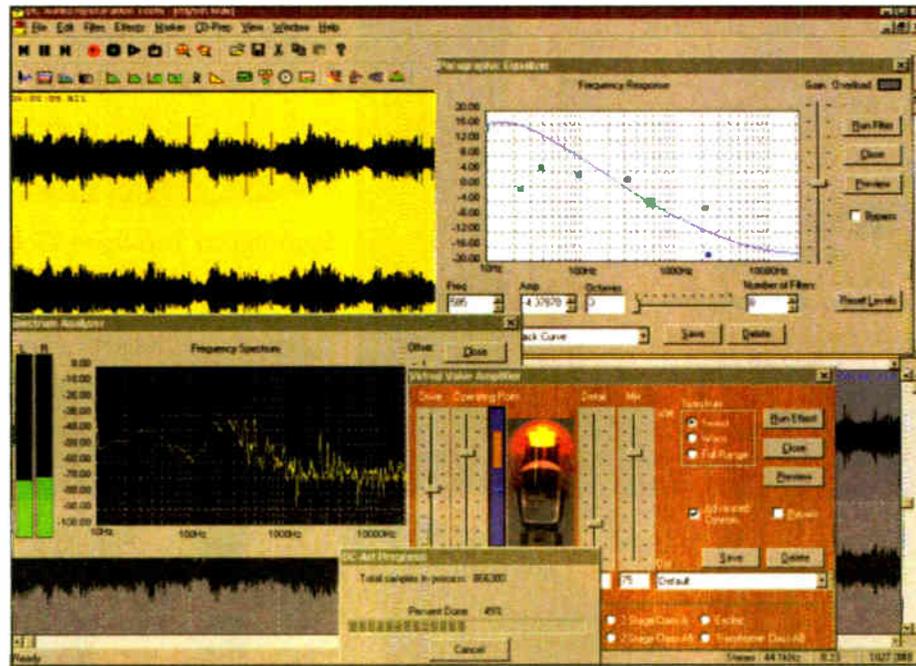
Does the continuous-noise filter effectively remove noise? Yes. I found it to be quite effective in removing record surface noise, hum, and similar kinds of "constant" noise.

You can adjust the attenuation as high as 100 percent, but in doing so, you will almost certainly introduce artifacts and begin to eat away at the program material. But this is a common problem with continuous noise-filtering software.

The DC-ART continuous noise filter is very easy to use and apply. I give it a B plus.

In addition to the impulse and continuous noise filters, DC-ART has a lot of other useful tools. Some — like notch, graphic and paragraphic filters — are fairly self-explanatory.

I found each of these filters extremely easy to use and very effective in their application. One of the really helpful features in the paragraphic equalizer presets



The DC-ART, With All Screens Running

is a whole set of equalization settings for both 78 rpm and vinyl recordings.

Proper EQ

Do you know what the proper equalization settings are for each of the many brand of 78 rpm recordings that were produced over the decades? Well, you don't need to.

Just pick the right preset and it will automatically be applied to your WAV file. And you say your new stereo amp doesn't have a phono preamp? No problem; just apply the RIAA equalization preset and all will be right.

Or, if your phono preamp has only RIAA equalization, you can still use it to record 78 rpm records. Then apply the Reverse RIAA preset to remove the effects of the RIAA preamp equalization and apply the appropriate 78 rpm equalization preset. Now that is really useful!

More useful stuff: the DC-ART "Change Speed" tool. It is likely you do not have a turntable that plays 78s. Almost no turntables made during the final 10 or more years before vinyl's demise have a 78 rpm setting.

However, if your turntable can play a 45-rpm record, you can still play a 78-rpm record.

Play back the recording at 45 rpm using DC-ART. Then pick the "Fractional Speed Mastering: 45 to 78 rpm" preset under the Change Speed tool, and your file will be automatically converted to 78 rpm.

Speed shift

You don't have 45 rpm? Still no problem. Record the record at 33 rpm and then choose "Fractional Speed Mastering: 33 to 45 rpm", followed by the 45 to 78 setting. Again, this is a good, practical, solid software tool that really works and serves a useful purpose.

Do you have a recording that varies in speed from beginning to end? The "change speed" tool provides you with the means for adjusting the speed over the entire recording. It can start at one speed and end at another. You can even vary the screen line to correct uneven speed changes.

There are more tools yet, but let me pick out just one more that I like: the

"Virtual Valve Amplifier." The debate rages on as to whether tubes are "warmer" and better sounding than their solid-state counterparts. Without taking a

In addition, it includes a Harmonic Exciter that allows you to actually add harmonics to the program material to brighten the sound. So whether you are looking for the warm, fuzzy sound of a tube amp, or the overdriven distortion of a guitar amp or just want to brighten an otherwise dull recording, the Virtual Valve Amplifier is a unique digital tool.

Keep reading

There are still more tools and features, but you can check out the Web site for information on those.

Aside from the software itself, the 292-page users' manual alone is almost worth the price of the software package. It contains oodles of information on digital restoration, the right kind of stylus to use, recording equalization curves, half-speed recording, working with vertical and lateral pressings and more.

This package was produced by engineers who needed tools for their own digital restoration work, so it is designed to work in the real world.

Tracer Technologies is at 1600 Pennsylvania Avenue, Unit 101, York, PA 17404, with a Web site at www.tracertek.com



For information contact Tracer Technologies at (888) 8TRACER or (717) 843-5833 or circle Reader Service 182.

Read Burgan is a free-lance writer and a former public radio station manager. He can be reached at (906) 296-0652 or via e-mail at rgb@up.net

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- Bob Hamilton, New Radio Star

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- Dave Oliwa, Radio And Production, May 1997

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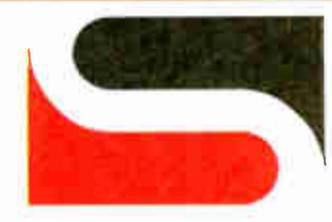
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CUTTINGEDGE

General Mills: A Cereal Serial

► BETTY, continued from page 104

PCs running SAWPlus software from Innovative Quality Software and the Digital Audio Labs Card-D Plus. Denon DN-650F CD players and Sony PCM-R500 DAT recorders further fill out the rackspace.

A Musicam USA Prima 110 ISDN system and Marantz CD recorder make up the remainder of the complement of toys that could well represent a traditional radio studio.

"Every time I hear Sheehan talk about his studio, he says he paid half of what he had budgeted for," jokes Dutton. "I like to kid him that we should have charged more. But seriously, General Mills realized up front the enormity of building a sound isolation room and therefore saw the value in our product.



"All too often people think, 'how can it be?' and they try it on their own, only to spend a lot more than ever anticipated with less-than-satisfactory results."

Change of diet

Sixty years of absence from the air brings with it a dichotomy of changes — from microwaves and health awareness to the unfolding of radio listening in cars, computers and portable receivers.

"That's very true," said Sheehan. "For example, we no longer do over-the-air recipes on the shows. People

cannot write them down fast enough. Besides, that is not what today's listeners want. Our research shows that over half of mealtime menu decisions are made on the way to and from work."

General Mills headed back to the kitchen in late 1997 by launching several new programs. "We started with 'Ask Betty, The Radio Show,' 'Team Cheerios Sports Report,' and a limited-run program called 'Wheaties Olympic Preview,'" said Sheehan.

"'Ask Betty' and 'Team Cheerios Sports Report' are 90-second programs that run five times weekly. They are commercial-free, have no promotional or commercial content, and are provided to stations free of charge."

Breaking ground

The Team Cheerios Sports report has broken new ground in sports reporting by profiling outstanding high school athletes across the nation.

According to Sheehan, "These are kids that not only excel on the field, but who are also academically outstanding, involved in their community, or have overcome some obstacle or challenge in their lives. The stories are designed to inspire and to counter the notion that high schoolers are disinterested slackers."

In 1998, General Mills introduced another two new programs: "Total Nutrition News" and the "Wheaties Sports Report."

"Wheaties profiles outstanding professional athletes, the top players in every sport," said Sheehan. "We don't talk about last week's game or batting averages. Instead, we try to find out a nugget of information that no one knows."

Sheehan said the show asks athletes about their best motivations, their role

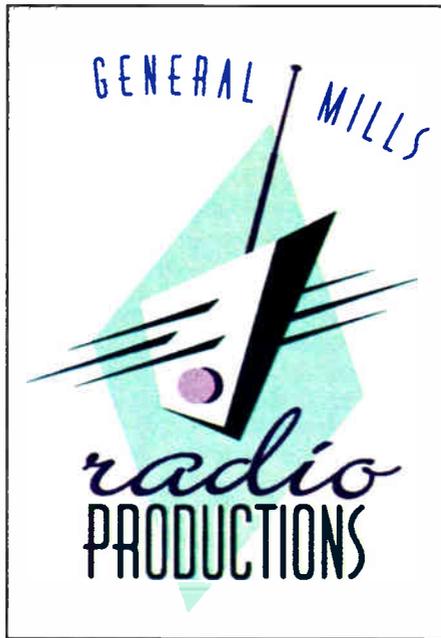
models, and what drives them to be the best.

"Wheaties is synonymous with excellence in sports and that's what this program is all about," said Sheehan.

What's cooking, doc?

So what does it really take to produce six daily programs?

The question usually has two possible outcomes: either you get a handful of transient amateurs or a small group of



pros committed to the cause.

"I have an outstanding staff of producers, all of them broadcast pros," said Sheehan. "The brain of 'Betty Crocker' and the writer/anchor of 'Total Nutrition News' is Stacey Farb."

Farb is a radio and television veteran that has worked in Minneapolis and throughout the Midwest. Sheehan said she loves foods of all kinds and loves to cook.

"But you could never tell it by looking at her," he said. "She is a marathon runner and an all-around competitor."

Farb is assisted by the entire staff of Betty Crocker Kitchens, which includes dozens of food scientists, nutritionists, dietitians and other experts who double-check the programs for accuracy and usefulness before they hit the air.

Another asset to the General Mills team is NFL broadcaster Mike Woodley.

"When he is not doing pre-game shows for Fox Sports or appearing locally on KFAN, Mike writes and anchors both the Wheaties and Team Cheerios features," said Sheehan. "He's a master at getting high schoolers and professional athletes to open up about themselves. His deep knowledge of sports makes him indispensable."

Farb and Woodley are assisted by producer Paul Mock. "Our ferret," Sheehan said, "digging out the experts, athletes and sources to provide us with fresh tape every week."

Mock also manages a list of stringers providing interviews and feature materials that are incorporated into the programs.

Not just brownies

"We're breaking new ground here," said Sheehan, on General Mills' recipe for success. "We are proving that a company whose primary business is not radio can deliver a radio product that is useful to listeners, and doing it without making a new brand of infomercials."

■ ■ ■

All General Mills programs are available on the World Wide Web as both RealAudio and WAV files. Find them at www.stations.com and Stations can also call (800) 334-5800.

Acoustic Systems can be reached at (800) 749-1460.

Flip Michaels is director of Multimedia Development for WITF-FM/TV, Harrisburg, Pa. He can be reached at Flip_Michaels@witf.pbs.org

A Sample Script from General Mills 'Betty Crocker's Kitchen'

Make it Greek for you! Next from Betty Crocker's Kitchen.

(Insert break here)

When you think of Greek, are you at a loss for words? Probably the only times you would use the language — aside from a trip to Greece — would be in school, studying mythology or in a restaurant, studying the menu. We can certainly help out the latter.

Greek food may have been a gift from Mount Olympus, with its heavenly combination of flavors — especially the desserts — but it is very much of this world, and something worth trying.

Apustolou voice: How do you eat Greek?

Cassandra Apustolou owns the Acropolis Restaurant in Saint Paul, Minn. A native of Greece, she's been serving up authentic dishes to Twin City-ans for the last 25 years.

Apustolou: We believe the lemon. It's good for the body. It's more the stomach works better with the lemon. The lemon dissolves the food better. Everything you can see you're going to find on the Greek plate.

Not all Greek food is easy to prepare, but with Cassandra's help, we'll point out shortcuts wherever possible. By the end of the week, you'll have no problem feasting in a language that's, well, Greek to all of us.

And that's today's treat — from Betty Crocker's Kitchen to yours.

Are You Really Sure You Want to Do This?

Travis

I am always a little distressed whenever someone asks me the question, "How do I get started in voice-over?"

There are a number of reasons for my uneasiness. In the first place, there is an insecure side of my personality that says, "Great, that's all I need, one more person in the business, as if there wasn't enough competition already."

Secondly, knowing how hard it has been to build my career, a more altruistic side of me says, "That poor kid doesn't know what he/she is in for."

On the other hand, I also know how satisfying my voice-over career has been for me. It has certainly been worth the struggle, the rejection, and the disappointments.

And the more confident side of my personality — the side that actually believes I have something to offer to this vocation — believes that if I actually am any good at my craft, I should welcome competition.

So, even with some reservations from my insecure side, I am always happy to share whatever insight I might have with those who are considering starting a career in voice-over.

Drumming up the biz

It is important to remember that the vast majority of voice-over performers work free-lance.

As a performer, you are responsible for both the quality and quantity of your work. You must be an artist and a businessperson.

The old showbiz dictum states, "The work is getting the work. The work you get is the reward." Most of the successful voice-over performers I know spend far more time and energy getting work than they do performing.

Some individuals have "fallen into" the profession and have made millions without so much as cutting a demo or taking a class. I am convinced these people were placed on the planet by

See TRAVIS, page 110 ►

APRIL FOOL

New Approach to Automation

Eugott Taykinn

The newest storage and automation system to hit the broadcast market comes from a small Texas firm that claims it "sounds more live than anything else available today, while eliminating the clutter of expensive computer equipment."

The DJ-ITB from Paso Frillo Software is a self-contained "radio station in a box," complete with music, liners, clever patter and the ability to execute turn-on-a-dime programming changes without the need for costly hardware or external support staff to reprogram the broadcast.

What is the secret? A real, live disk jockey, sealed inside the cabinetry.

"We like to think of them as tech support personnel," said Cal O. Rimiter, senior engineer for Paso Frillo and the designer of the DJ-ITB ("Deejay In The Box").

"Every four hours, we rotate a new technician into the DJ-ITB. It then becomes that person's job to maintain program integrity and execute the log in the order it was input."

The savings potential to the radio station are enormous, according to Rimiter.

caller is even thanked by the DJ-ITB before the connection is terminated."

Inside the DJ-ITB are three portable CD players, a telephone, a laptop PC for commercial playback and Internet access, and space for the support technician. A small access port built on the side of the DJ-ITB rack provides the technician inside with coffee, Twinkies and Subway sandwiches.

"We maintained the classic disk jockey diet," said Rimiter. "In fact, we are coming out with a twin-sized cabinet version for technicians that have spent more than two years inside a DJ-ITB system and require the extra horizontal space."

Auto-pilot

Complete unattended operation is possible with the DJ-ITB. The system is placed in Caffeine mode at 5 p.m. when office personnel lock the door and head for home. The support technician inside is fed a steady trickle of Starbucks, assuring uninterrupted operation until the 6 a.m. drive-time show.

"EAS compliance is also assured," claimed Rimiter. "Just as your high-priced live on-air talent would do, the DJ-ITB receives an EAS alert, calls

you at home and yells, 'What the @\$% do I do?'"

Howitt Hertz, the president of Paso Frillo, said the DJ-ITB is the perfect system for consolidated operations.

"We can provide you with as many support technicians as you require," he said. "At the end of the four hours, they all get out to stretch their legs, walk down the hall to the station next door, climb in and start a new show. And best of all, it sounds live!"

Enthusiastic

The support technicians are especially enthused about the potential success of the DJ-ITB.

"Let's face it, the computer market is changing," said Yagi N. Tenna, one of the Paso Frillo technicians. "The market for computer programmers is saturated and positions are being cut everywhere. Radio is where the real jobs are happening right now."

Tenna is inside a DJ-ITB system now in experimental use at an AM daytimer outside of Iamvery, Ill.

"Sure, it's a little snug in here, but I come in every day at 9 a.m., play some CDs, take some calls, then go home at 1 p.m. It's great," said Tenna.

Is it possible to air a talk show with a live guest using the DJ-ITB?

"Of course not," said Tenna. "Look at how little room I have in here!"

The big problem the company must

overcome is the comfort factor: how long a support technician can stay inside the DJ-ITB without a break.

According to Hertz, "The DJ-ITB runs well under windows, but runs better next to a restroom."

The company expects to ship fully functional DJ-ITB systems by next April Fool's Day.

■ ■ ■

Gotcha, friends: "Paso Frillo" is an anagram for "April Fool's," all names and places are fictional and the author's name should have tipped you off right away.



Inside the DJ-ITB, technician Yagi N. Tenna entertains listeners.



A Front View of the Paso Frillo DJ-ITB Prototype

"With the DJ-ITB, stations no longer need endure the high operating costs of programmers, MIS technicians, equipment upgrades and music rotation software. Computer maintenance is a thing of the past," he said.

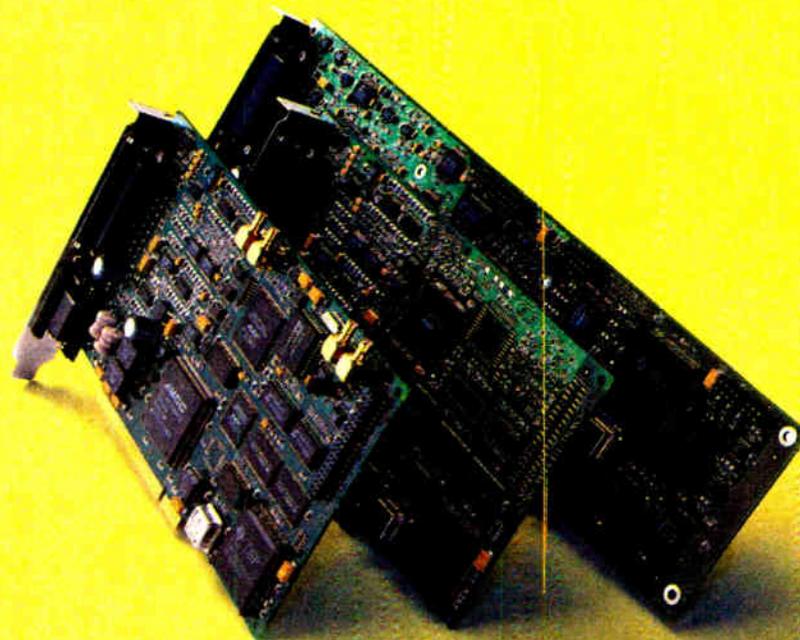
"The DJ-ITB does it all: picks the music, thinks of clever things to say, backtimes to the hour and makes sure all the commercials get played."

Rimiter noted the sophistication of the DJ-ITB allows it to answer the telephone and interact with callers.

"The DJ-ITB analyzes human speech in real time, ascertains what the caller wants, then executes the desired function," he said. "Song requests, weather updates, school closings — the DJ-ITB can do it all. The

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The Realities of 'Getting Started'

▶ TRAVIS, continued from page 108
the devil, simply to drive the rest of us crazy.

Everyone I know who works full-time in the voice-over profession has worked harder than they could possibly have imagined. They have struggled. They balanced the conflicts of their "day jobs" and their career while building up their clientele.

Most performers I know who have been doing this for any length of time can describe instances where they were ripped off for thousands. They had to ride out lean times and endure great disappointments.

Last year, I met one very successful performer who had grown very bitter over the years. He said if he could do it all over again, he would have sold real estate.

More good news

Once someone understands the above, what advice do I give them?

First thing, I ask whether or not this is truly something they want to pursue full-time or on-the-side. I know a few actors and disc jockeys who are quite happy to have voice-over as an extra creative outlet.

One of the first things a budding voice talent needs to do is to be available during the times they will be needed. If they can't leave work to get to a recording session, it will be a short career.

Budding voice-over performers need to understand that they will be running a small business. They will be responsible for both the product — the talent — and the sales — getting the work.

In most every case, developing "product" and "sales" requires considerable work, energy and time. If one or the other is lacking, success will be difficult.

So, "Where do I learn to do voice-over?" and "Where do I get the work?"

become the next questions.

In metropolitan areas, there may be voice-over classes available. I have seen them offered at colleges and by private individuals.

There are some excellent teachers out there and there are also a few individuals who may be less-than-qualified. There are also a few rip-off artists.

Teaching

While not always the case, a considerable number of less-talented voice-talent types who cannot make it in the business will teach classes in order to make a living. This is not necessarily a bad thing, however; some of the best teachers are not the best doers.

One can find the best teachers by asking for referrals. If you can locate some working voice-over performers in your area, it would not hurt to ask them.

Here in Southern California, the rip-off schools and teachers can often be identified by the promises they make. If they indicate they will "make you a star" or sign you with an agent, steer clear. There are exceptions to every rule of course, but remember the rule, "If it seems too good to be true, it probably is."

If there are no voice-over classes in your local area, try acting classes. Many of the skills needed for voice-over are very close to those required by actors. And, obviously, there is always radio.

No DJs need apply

Many voice-over professionals will recommend against working in radio, and there is a glimmer truth in that warning.

Printed on top of a lot of the audition copy I get in Hollywood are the words, "Don't want someone who sounds like a disc jockey." In voice-over sessions and auditions, I am sometimes reminded to keep the "radio sound" out of my voice.

However, I am sometimes hired for a job because I can do that "radio sound" when desired. Watch for more on that topic in an upcoming RW.

Quite a few people working in radio got their first voice-over jobs from station clients who, upon expanding their ad campaign, asked for the people who voiced their local station spots. Working in radio really can be a great starting place.

Another way to train: do it yourself. A reasonably good Radio Shack microphone and a cassette recorder can be used to practice reading copy.

One of the best exercises I know of is to read and record Time or Newsweek magazine cover-to-cover, including the ads, and then suffer through the playback.

Marketing

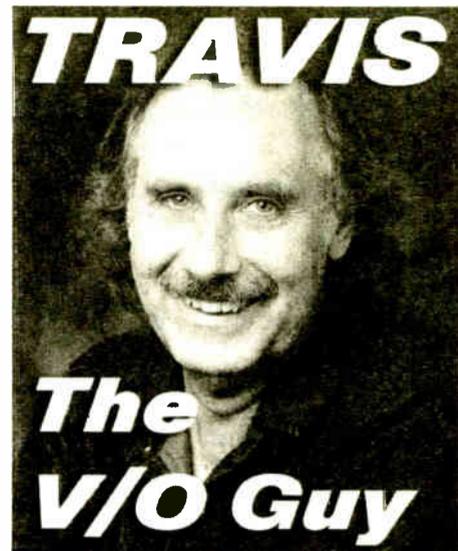
So, where does one get those first jobs? You already know you need a demo tape, normally a cassette with about 2 or 3 minutes of your best work.

If you have produced some radio spots, you already have something to present. Otherwise, locate a recording studio in your town equipped to produce a voice-over demo tape. Some of the schools and teachers are also set up to do this.

The shorter the tape, the better. Just be careful not to make the tape better than you are by spending too much time and energy on the demo. After I was in the field for three years, I recorded one of those bombs.

I was so proud of that tape, but what a disaster. During the following six months, I was dismissed right in the middle of two sessions. Years later, there are some producers who still will not call me because of what was on that tape.

I would have been much better off if I had not worked so hard on that tape. The general rule is: If you cannot do it in an



unfamiliar studio in three or four takes, leave it off your tape.

Where do you find those first clients? Try the phone book.

When I started out, I knew that I would have difficulty competing with the more established voicetalent in my area. I decided there were probably some businesses who were not using pro talent, but who should be.

I marked every type of business in the book that could possibly use voice talent. Naturally, I sent tapes to the more obvious choices — video and film production companies, a few advertising agencies — but I also found some less obvious possibilities, such as automated phone answering systems, multimedia producers and amusement parks.

One of those companies, then in the phone answering business, used me to branch out into interactive incentive marketing. Today this company is still one of my best clients.

The vast majority of people who attempt to get into the voice-over field soon give up. Most of them realize early on that the realities of that business are not for them. The few that remain, out of stubbornness, stupidity, or dedication are, to my way of thinking, the lucky ones.

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READER SERVICE NO. 129

Renaissance Console Does the Job

Alan R. Peterson

It almost seems traditional that a new console purchase for the main studio results in a "hand-me-down" of the old mixer.

The old air board ends up as the new production mixer. The former production console gets shuttled down the hall to the newsroom. The old five-pot special from the newsroom gets retired to the junk closet for who knows what?

Maybe it's time to break the hand-me-down sequence and consider a more serious board for the production room. And if you are looking at products from the "big board" companies, give consideration to the Renaissance consoles from Ward-Beck Systems.

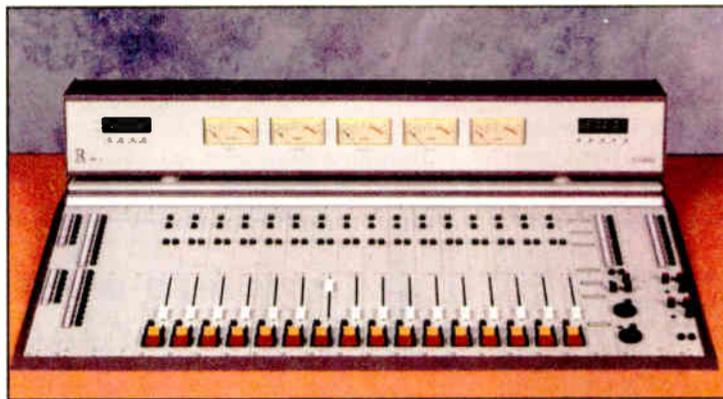
The Renaissance console line has a straightforward, easy-to-follow design. Anyone used to consoles with linear faders and large Channel On-Off buttons will take to this Ward-Beck board very quickly, although one may be momentarily confused by the on-off keys: The order is reversed from other consoles.

On the Ward-Beck Renaissance, the bottom red button is "On" and the top yellow one is "Off." If you have had experience with PR&E, Auditronics or most any other linear-fader console, you may be thrown by this, but not for very long.

One of the better features of the Renaissance consoles is the elimination of the weakest link on most consoles:

The rotary pots for headphones and monitor levels have been replaced by digital shaft encoders with large, heavy metal knobs.

Normally, the first components to wear on mixers are the monitoring potentiometers, due to heavy use. The Headphone Level and Control Room Level knobs on the Renaissance are large and have a heavy-duty feel. A cup-shaped



The Ward-Beck Renaissance Mark II Production Console

depression on the top of the knob surface allows you to adjust levels with a fingertip.

The Ward-Beck Renaissance consoles are available in three configurations: the Mark I, with up to eight input channels; the Mark II (shown), with up to 16 input channels; and the 24-input Mark III.

Each console has four telco sends with telephone conferencing; suitable for use

in a combined production/air room where talk and public affairs programming can be recorded and played later.

The Control Room Monitor module — the third module strip from the right — includes separate bass and treble EQ adjustments for headphones.

Ward-Beck has designed the Renaissance console line to provide multiple Program Sends, making the mixer

appropriate for four- or eight-track recording. Stereo Line Input modules and Mic Input Modules can be ordered for the Renaissance console, allowing program assignment down one of four stereo busses and one of two Aux sends for monitoring or

effects.

Five analog VU meters show Program Left and Program Right levels, Mono, and Aux levels on Left and Right channels. On the Mark I console, three meters track Left, Right and Mono signals.

Connections to the console are done on Molex or optional Edac connectors. Precabbling can be fabricated prior to receiving the mixer, with final connec-

tions made after delivery. All audio connectors have gold-plated pins.

Comprehensive monitoring facilities are provided for the Control Room and two studios. The Studio Monitor Module — shown extreme right — provides monitor and headphone level for the announcer and guests. Internal talkback capabilities are included in the Studio Monitor Module.

Technical specifications published for the Renaissance consoles place it in the company of other high-quality radio mixers.

Frequency response has been measured at ± 0.5 dB from 20 Hz to 20 kHz. Distortion (THD) on the line channels has been measured at less than 0.07 percent, 20 Hz to 20 kHz at an output test level of +14 dBu.

For the mic channels, THD has been shown to be less than 0.2 percent at an output level of +14 dBu. Mic input modules are capable of -60 to +30 dBm, continuously variable, with 23 dB of headroom.

The external power supply outputs a well-regulated +24 and -24 VDC to the Renaissance consoles, with a wide enough latitude to accept anywhere from 84 to 264 VAC, 47 to 63 Hz.

Ward-Beck Renaissance consoles can be purchased "off the shelf" in pre-determined configurations, or a customized arrangement can be made at the factory.

Ward-Beck Systems is at 841 Progress Ave., Scarborough, Ontario, Canada, M1H 2X4.

For information, contact Ward-Beck Systems at (416) 438-6550 or circle Reader Service 146.



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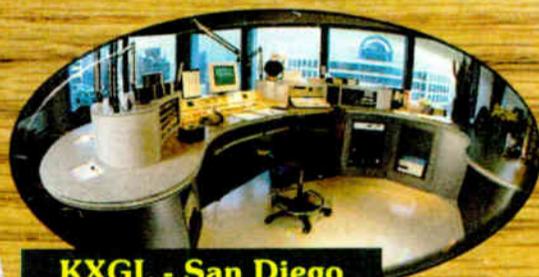
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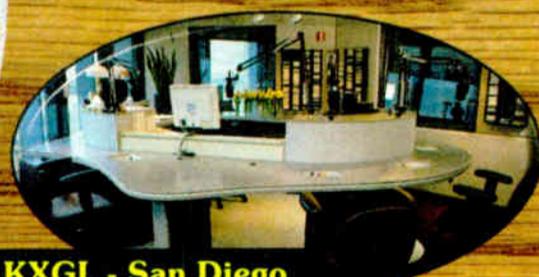
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PRODUCT EVALUATION

Excalibur Amplifier 'Functional, Not Fancy'

Tom Vernon

Digital revolution or not, analog audio distribution amplifiers are still a high-volume item for most equipment distributors.

At the high end of the price spectrum are DAs with output metering and monitoring, usually with a headphone jack and LED bar graph display. For many applications, these are frills that add to cost and that you do not really use. Most of the time, what you need is a reliable distribution amp with good specs.

Excalibur Electronics DA 2-6 and DA 2-10 are 1-by-6 and 1-by-10 stereo distribution amps that deliver maximum bang for the buck with no frills. Both the six- and 10-channel devices are packaged in 1RU boxes.

The once-over

The mechanical construction and paint finish on these DAs is superb. Front panel holes precisely line up with trimpots, and everything fits together well. Graphics are neatly silk-screened in black on front and back panels.

Mechanical construction and paint finish is superb. Graphics are neatly silk-screened in black on front and back panels.

In these days when broadcast equipment sometimes comes in tropical colors, the black-and-white paint scheme may seem a bit bland. Perhaps so, but it is also the easiest to read in dimly lit environments.

AC power for both of these DAs comes from a wall-mount 12 V transformer.

The circuit board layout is also simple and neat. There is one IC for the input stage, and one for each output channel. SIP resistor packs and zero-ohm jumpers simplify construction. Access to the bottom of the circuit board can be easily had by removing the bottom panel of the DA.

Input impedance is 20 kohm balanced. Output impedance is 20 ohms. Maximum input and output levels are both +22 dBm.

My bench test of the Excalibur DA was impressive. In all instances it exceeded published specifications. Frequency response is specified as 20 Hz to 20 kHz, ± 0.5 dB. Mine measured ruler flat from 20 Hz to beyond 200 kHz. Just for fun, I tracked it out to the -3 dB point, which turned out to be 750 kHz.

Phase response, although not specified, measured 0 from 20 Hz to 200 kHz. S/N ratio was 91 dB at unity gain. THD measured less than .001 percent at 1 kHz.

How does Excalibur deliver such high-quality audio in an inexpensive package? First, all circuitry is DC-coupled, elimi-

panel. It is tough and time-consuming to split up that two-pair cable neatly. Wiring errors are more likely as well.

Left? Right?

Another nice touch on the DA 2-6 is that all output channels are numbered from left to right on both the front and back panels. Many other DAs are labeled left to right on the front panel, and are reversed, right to left, on the back.

Finally, the front panel level controls are also grouped by channel, rather than 1 Left, 2 Left, etc.

Even in a sleep-deprived state after an all-night wiring session, it would be hard to

go wrong setting up these distribution amps.

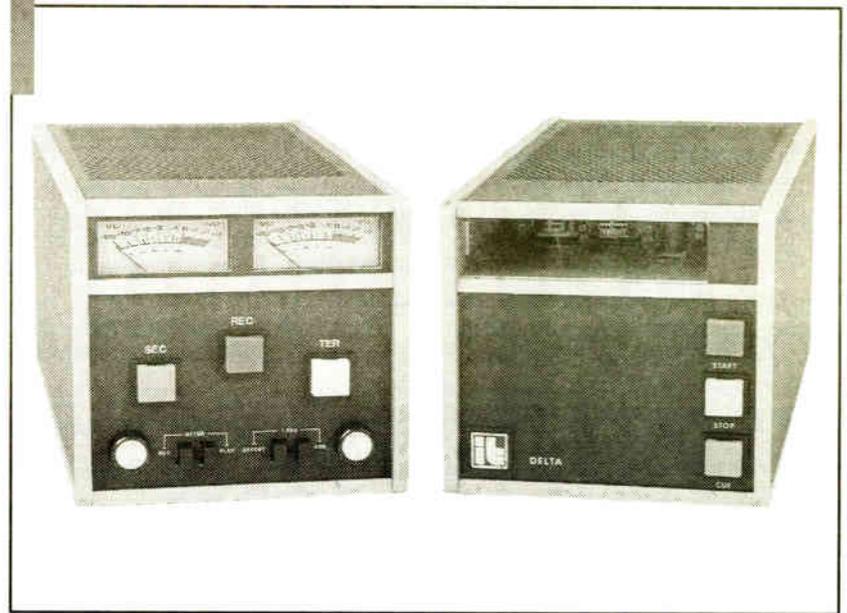
Excalibur is a low-profile company, but if they had a slogan, it would probably be "functional, not fancy."

List price for the DA 2-6 is \$395, and the DA 2-10 can be had for \$495. Both DAs come with a two-year warranty on parts and labor.

Excalibur products are made in Maryland and are available through many broadcast equipment suppliers.

Tom Vernon is a multimedia consultant working in Philadelphia. Reach him at tlvernon@blazenet.net or by calling (717) 367-5595.

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nating several capacitors and yielding a rock-solid low-frequency response. Second, state-of-the-art opamps are used throughout these DAs.

While many distribution amps use 5534 or 5532 opamp chips, Excalibur uses the newer LF 347 quad operational amplifier with a slew rate of 13 V/S. The quad LF 347 also simplifies circuit design, allowing one chip to be used for each stereo channel.

Third, by using trimpots for input common-mode rejection (CMR) adjustment, this DA achieves a 15 to 20 dB improvement over similar units that use fixed resistors.

Finally, the external wall-mounted AC transformer helps to reduce the residual hum and noise inside the chassis.

Quick and neat

Excalibur has obviously given some thought to the installation process. Doing a quick and neat installation is easy with these DAs. All audio connections are made via Euro-Block connectors supplied with the unit. There is one channel per connector.

If you are working with two-pair audio cable such as Belden 8723, just strip off about 3/8-inch of insulation from the wire, make your left, right and ground connections to the screw terminals, plug it in, and move on to the next channel adjacent to the one you just completed.

Compare this with distribution amps where left and right connections for each channel are on opposite sides of the rear

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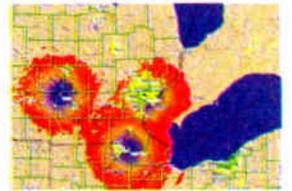
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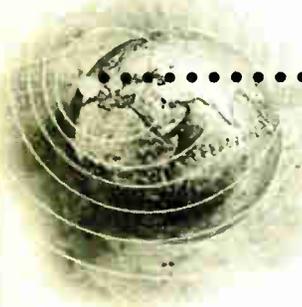
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ACTION-GRAM

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Please print and include all information:

Contact Name _____
 Title _____
 Company/Station _____
 Address _____
 City/State _____
 Zip Code _____
 Telephone _____

Are you currently a subscriber to Radio World?
 Yes No

Signature _____ Date _____

Please check only one entry for each category:

I. Type of Firm
 D. Combination AM/FM station F. Recording Studio
 A. Commercial AM station K. Syndicators/Station Providers
 B. Commercial FM station G. Audio for Video/TV Station
 C. Educational FM station H. Consultant/ind engineer
 E. Network/group owner I. Mfg. distributor or dealer
 L. Consultant J. Other
 N. Delivery Service (Internet/Cable Satellite)

II. Job Function
 A. Ownership G. Sales
 B. General management E. News operations
 C. Engineering F. Other (specify)
 J. Promotion K. Production Mgt or Staff
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