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New Territory
HD Radio raises brings new awareness to the issues of cascading algorithms.

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Dynamic Mics, Vintage Twist
Al Peterson reviews two models from Heil Sound.

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Radio World



\$2.50

The Newspaper for Radio Managers and Engineers

March 28, 2004

NEWS MAKER

Shapiro: Don't Restrict HD Radio Recording

ARLINGTON, Va. Speaking about radio over the years, Consumer Electronics Association President Gary Shapiro has been blunt. For example, he said that early versions of in-band, on-channel digital audio broadcasting needed to be fixed. At one time a naysayer about IBOC, he now believes it will work and that stations should embrace their digital future or be left behind as other media overtake those on AM and FM in their capabilities to entertain and deliver information.



Gary Shapiro at CES 2004

Shapiro will keynote the Broadcast Engineering Conference at NAB2004. Most of his remarks will be about television, so Radio World News Editor/Washington Bureau Chief Leslie Stimson recently spoke with Shapiro about radio's digital transition and other forms of consumer electronics technologies competing with radio or that could in the future.

RW: We've got product for satellite radio and finally HD Radio. What is going to drive consumers to buy those receivers?

Shapiro: Consumers love digital. We've seen that, not only in the video See SHAPIRO, page 5 ▶

NAB Hits the Hot Buttons

The Spring Convention Explores Radio's State of the Art

Extended Coverage Inside

Photo by Bob Kovacs

It's Here!

Are You Ready?

Ibiquity to Highlight Data Capabilities

LAS VEGAS Ibiquity Digital Corp. wants broadcasters to see the data possibilities enabled by its HD Radio system. It plans a number of data demonstrations in its booth at the NAB convention in April.

"We'll be showing advanced data applications, such as real-time traffic reports and overlaying those onto a navigation system," said Dave Salemi, Ibiquity vice president of marketing.

The over-the-air live demonstration will include a feed of audio and traffic data from Beasley-owned KSTJ(FM). The station converted to HD Radio in January using Broadcast Electronics

transmission equipment.

The idea is to show stations how to implement an advanced data application at their station, said Tim Bealor, vice president of RF systems for BE, which is setting up the demo.

Separate antennas

Beasley Broadcast Group is using a BE FMi 201 HD Radio transmitter, FXi 250 exciter and new XPi 10 HD Radio signal generator feeding a three-bay Shively 6813-3 antenna, separate from the main analog broadcast. The station is broadcasting HD Radio under an experimental permit, pending the FCC's rulemaking on the use of separate antennas for digital service.

At the studio, KSTJ(FM) has a BE AudioVault digital audio system upgraded with the HD Radio Broadcast Multimedia Language protocol and the new importer

software and hardware for advanced data applications, called Radio Data Dimensions. RDD is an accessory to AudioVault that runs on a second computer.

RDD manages data from the AudioVault as well as data from external sources, translating the material into a format that can be fed into a signal generator. In a typical BE air chain, the RDD is situated between the AudioVault and the XPi signal generator.

The demonstration has been updated with newer software since BE and Ibiquity collaborated on a demo in January for the Consumer Electronics Show.

A Visteon receiver and mapping program will be used for this demonstration.

To bring the concept to station implementation, "There are going to be data guidelines so (station personnel) can encode a traffic report or provide emergency information ...that is fed through the IBOC channel and

overlaid on a map that's part of a vehicle navigational system," said Bealor. Problems areas the driver might want to avoid could be highlighted on the map display, he said.

Related demos

The data guidelines Bealor referred to are being developed by Ibiquity and transmission equipment manufacturers. They are tweaking the HD Radio technology so that managers may be built to take all a station's programming, including programming pulled off a satellite, plus the program-associated data and possibly a secondary audio channel, and enable station staff to decide what programming and data they want to insert into the transmission chain.

In its own booth, BE will demo an automation system that generates the main program channel, the secondary audio channel, program-associated data and non-program associated data for the primary and secondary channels. The system would have a data manager feeding the material a station chooses into transmission equipment and into a radio that can receive both a main and secondary HD Radio channels.

Ibiquity will have several home and car radios on display, to show models available from its receiver partners or those coming to market, along with radios in development that are slated for 2005 availability.

At least two Ibiquity partners plan to offer surround sound demos in their booths. SRS Labs will demo its 5.1 Circle surround-sound technology enabled by the HD Radio system.

Neural Audio will demo 5.1 surround technology enabled by the HD Radio system in the Harris booth. Harris plans a live demo with a Seattle FM station's HD Radio signal including Neural's surround technology at a low bit rate delivered to an in-dash receiver in an SUV.

Harris also plans a demo of the supplemental audio concept, the Tomorrow Radio approach, for FM.

— Leslie Stimson



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More LPFMs May Be Allowed

Advocates Say Hundreds More Are Possible; NAB Anticipates Interference Problems

by Leslie Stimson

WASHINGTON There's a chance low-power FM radio stations may be allowed on third-adjacent channels after all. The FCC has said keeping the third-adjacent channel separation requirement is apparently no longer in the public interest; in a report to Congress it has recommended dropping the requirement.

A powerful lawmaker has signaled his intention to develop legislation to back up the report with action. LPFM groups believe "hundreds" more such frequencies may be allocated.

More than 3,000 organizations applied for LPFM licenses in 2000-02. An estimated 1,000 applications were granted, according to Deputy Chief of the FCC's Audio Division Nina Shafran. Of those, about 300 are on the air.

Whether hundreds more LPFM frequencies would be allocated and how long this process might take is unknown. At least one radio observer believes that in this election year, the process from passage of legislation to FCC enactment could take a long time.

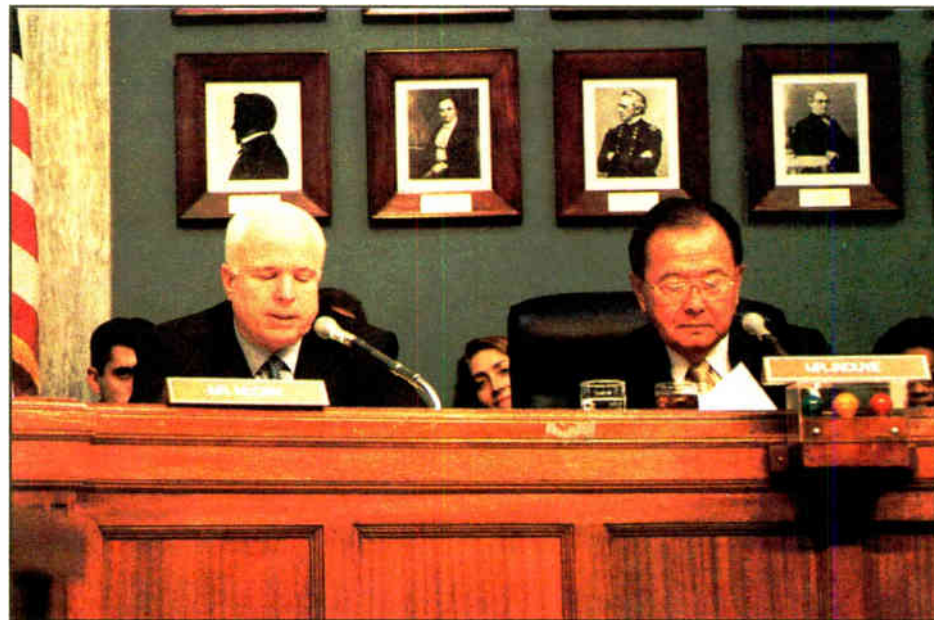
After reviewing a report of third-adjacent-channel testing conducted by Mitre Corp., the commission stated that "reduction or elimination of existing third-adjacent channel LPFM minimum distance separation requirements is possible without increasing the potential for third-adjacent channel LPFM interference to existing stations."

'Deeply flawed'

Reacting to this unexpected setback, which came two months before its spring show, the NAB, long a vocal critic of LPFM, came out swinging against the FCC recommendation.

NAB spokesman Dennis Wharton said, "It is unfortunate the FCC is relying on the deeply flawed Mitre study in mak-

ing its recommendation to Congress. Local radio listeners should not be subjected to the inevitable interference that would result from shoehorning more stations onto an already overcrowded radio dial."



Senate Commerce Committee chairman Sen. John McCain, R-Ariz., left, and Sen. Daniel Inouye, D-Hawaii.

cent channel interference is a technical issue that has become a political issue, a thought echoed by more than one commenter to the commission.

ing its recommendation to Congress. Local radio listeners should not be subjected to the inevitable interference that would result from shoehorning more stations onto an already overcrowded radio dial."

"Despite near universal praise for low-power radio, incumbent broadcasters 'cried wolf' and successfully asked Congress to severely curtail the service in the most populated areas," stated Cheryl Leanza, deputy director for Media Access Project.

LPFMs should be fully deployed, she said, calling NAB's technical complaints about the Mitre report "a façade. ... The broadcasters were never interested in the scientific truth in the first place."

NAB, National Public Radio, the International Association of Audio Information Services and the Consumer Electronics Association raised questions

time digital operation for stations and their listeners "will prove to far outweigh the limited additional interference predicted by Ibiquity's studies."

Based on the results of Ibiquity's field trials, NAB's radio board believes any additional interference introduced into the AM band at night by the introduction of IBOC would primarily affect distant analog sky-wave signals. The board believes the improvements promised by IBOC for AM is "well worth" the tradeoff.

NAB recommends the FCC adopt nighttime AM IBOC with the provision that the agency "address instances of unanticipated interference on a case-by-case basis."

The technical group reviewed three studies submitted by Ibiquity: an analytical study of the impact of AM IBOC on nighttime analog broadcasts; field trials of nighttime AM IBOC on two Class A stations and subjective evaluations of the impact of IBOC on nighttime analog broadcasts; and field performance tests providing nighttime digital coverage information.

NAB urged the commission to issue a "blanket" license for AM stations now authorized for nighttime operations, so that individual stations need not seek separate permission to go digital at night.

Congress told the FCC to conduct the tests when it decided the commission should retain third-adjacent channel protections as LPFM was authorized in 2000.

Now, at least one lawmaker who voted against the Telecom Act is seeking to allow more low-powered stations on the air as a solution to media consolidation.

Senate Commerce Committee Chairman John McCain, R-Ariz., stated, "Four years ago, broadcasters masqueraded their concern about competition from new low-power FM stations in grossly exaggerated claims of interference. The FCC has (now) stripped the broadcasters of this disguise by concluding that these stations would cause virtually no interference, and recommending the removal of certain limits on such stations."

The Mitre report states that no third-adjacent channel interference between an LPFM and a full-service FM would exist beyond a 1.1 kilometer radius — about 3,600 feet — around the LPFM transmitter site. The existing complaint and license modification procedures should be enough to resolve any "anomalous" interference cases, believes the commission.

The FCC's report also concludes that LPFMs on third-adjacent channels would have "little or no" effect on a terrestrial station's transition to digital because third-adjacent channel LPFM interference to

See LPFM, page 7

NEWS WATCH

NAB Pushes FCC To Let AMs Go Digital At Night

WASHINGTON The NAB has recommended to the FCC that the agency authorize AM nighttime IBOC operations. In a five-page letter from Senior Vice President and General Counsel Jack Goodman, NAB explained why its radio board endorsed the idea.

"Our radio board is very optimistic that AM IBOC will offer AM broadcasters and their listeners near-FM quality within broadcasters' core service areas," Goodman wrote. NAB also hopes nighttime digital authorization will spur receiver companies to market digital radios.

The board reached its conclusions after an NAB ad hoc committee working on AM nighttime for IBOC reviewed test reports submitted by Ibiquity (Radio World, Feb. 11, page 2). Those reports were to be submitted to the commission soon, NAB said. The board and the trade association believe the benefits of night-

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Vote Now, Then Pack for NAB

Friday April 2 is the final day of voting in Radio World's "Excellence in Engineering" Award.

If you have not voted, please do so now by clicking on the award logo at www.rwonline.com.

A dozen outstanding engineers are nominated, all of them winners in my book. Their photos appear here. We'll honor the top vote-getter at the NAB convention.

★ ★ ★

Radio World is well represented on the panels at NAB.

Tom McGinley, Radio World technical adviser and director of engineering for Infinity Seattle, joins his Infinity colleague Dave Casey in the Tuesday session about "Song Title and Artist Over RDS: The Nuts & Bolts."

RW Contributing Editor Skip Pizzi of Microsoft moderates "Year of the PVR," a Wednesday session on changes brought by the personal video recorder. It's a video session, but anyone who pays attention to technical trends might learn something about the future of radio listening in the PVR experience.

Al Peterson, RW technical adviser, columnist and house wit, is production/imaging director of Washington-area station WMET(AM). His Thursday presentation is about exploring new directions in radio production as part of "Radio Broadcast Content Collection and Distribution."

★ ★ ★

In addition to our regular contributors, a number of industry professionals whose bylines have appeared in Radio World are on the NAB agenda.

Among them: Fred Baumgartner of Broadcast Technical Services co-moderates the SBE Ennes Workshop on Saturday. Ron Rackley of du Treil, Lundin and Rackley reports on "Evaluation and Improvement of AM Antenna Characteristics for Optimal Digital" on Tuesday. Jeff Detweiler of Ibiqity Digital speaks Tuesday as part of the IBOC sessions.

Also, Tom Ray, corporate director of engineering for Buckley Broadcasting/WOR Radio in New York, talks about "Real-World AM IBOC Coverage Using a Consumer IBOC Radio" on Monday. Ray also moderates "Technical Regulatory Issues for Radio and Television" on Wednesday.

Troy Pennington, chief engineer of Cumulus Broadcasting, moderates the "Radio Facilities Management" sessions on

★ ★ ★

Radio World has a small army of staff and contributors covering sessions and booths.

Our News Editor/Washington Bureau Chief Leslie Stimson, the hardest-working journalist at this convention every year, will attend the Public Radio Engineering Conference, be poised by the door outside



Voting ends April 2 for our 'Excellence in Engineering' Award. The nominees are Cris Alexander, Andy Andresen, James Davis, Bob Hess, Ralph Hornberger, Stephen Poole, Tom Ray, Greg Savoldi, Steve Schott, Mike Sirkis, Milford Smith and Glynn Walden.

Wednesday; and David Baden, chief technology officer of Radio Free Asia, talks about quality assurance in technical management as part of that session.

It gives me no end of pleasure to see topics and people who have appeared in Radio World on the agenda of the NAB show. Convention topics often are the seed for stories you see here; and, working the other way, Radio World articles frequently spawn NAB sessions. It's a mutually beneficial, if unofficial, relationship that I value.

the NRSC meetings, hunt down IBOC experts, prowl the sessions, sit in on the FCC Chairman's Breakfast and the keynotes, cover Eddie Fritts' wrap-up press conference and much more. If you see Leslie, be sure to say hi quickly; she moves fast.

Studio Sessions Editor Michele Kramer Peterson and Buyer's Guide Editor Kelly Brooks will be visiting booths and covering sessions and press conferences. A platoon of engineering contributors, too many to list, will fan out to dig in every nook and corner of the show floor.

From the Editor



Paul J. McLane

I, too, will be roaming the floor and sessions, and will officiate in the annual "Cool Stuff" Award process as well as announce the winner of our "Excellence in Engineering" Award.

I've also been invited by the folks at D.A.V.I.D. to pick the random name of the winner of a Latitude automation system. You can enter to win at their booth. To register you must be employed by a U.S. call-letter radio station.

A tip for getting the most out of the NAB show: Stimson and I work hard to make sure the headlines of the day are posted at our Web site at www.rwonline.com. Log in daily to see what's going on.

You can be an honorary member of our information collection team, too. I welcome your thoughts via e-mail during the show. Drop me a line with any hot tips, about products or otherwise, via e-mail to radioworld@imaspub.com. What are you hearing as the hot topics of the show? Indecency fines and profanity delays, RF enforcement, the revival of RDS, the threat of satellite localism, HD Radio ... let me know what people are talking about.

★ ★ ★

Our NAB convention preview appears in this issue, featuring a day-by-day breakdown of the Broadcast Engineering Conference sessions plus a look at Radio Management and other events we think you'll find of interest, and detailed listings of the companies with products and services for radio attendees.

I'll see you there. ●

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World Radio History

Shapiro

► Continued from page 1
world, we're seeing it in the radio world. Satellite radio services are successful. We expect that HD Radio will be successful, provided that broadcasters promote it. And that traditional consumer rights are preserved.

The recording industry association is making a big push to restrict con-

and they're working with us, so I think that's very helpful.

RW: *Aside from that issue, what are you doing as an association to help HD Radios sell?*

Shapiro: We're an association that includes retailers as well as manufacturers. It's mostly manufacturers right now. We have 1,500 companies.

One thing that unites our companies is the belief in digital and that digital is good, whether it's video or audio. We've

tioned correctly, by HD Radio itself, by radio broadcasters and by us, as a natural evolution so that radio, local radio, can compete with all the other forms of media, not just digital radio, but compact disc, MP3, the Internet, DBS, everything that radio is essentially competing with today.

RW: *At the WHUR(FM) digital launch event in Washington in January, they had a van with a Kenwood radio. They'll use it to demo the technology to clients and also at retailer events, to allow people to hear HD Radio.*

Shapiro: I think you'll see more of that as retailers, manufacturers and broadcasters work together along with HD Radio.

RW: *You mentioned MP3, the Internet, competing with radio in the car, and also CDs. There are all these technologies that radio is competing in the car with now. Are there others you see bubbling on the surface?*

Shapiro: Absolutely. First of all, radio's competing in the home with virtually everything. Now realize that I don't listen to radio in the home, I listen to DBS in the home.

That's what I do, for the music. I used to listen to my favorite radio station. Now, I don't, for the most part, unless it's talk radio. ...

In the car, there is competition today obviously, with satellite digital radio, which is growing (like) gangbusters. It's really doing phenomenally well. It's really taking off. But, there's also MP3. ...

One of our hottest categories of prod-

uct now is mobile video. It's a back-seat-of-the-car item, and it's for the kids. ... It's being sold as original equipment by Detroit. Is it competing with radio? Well, kids are sitting in the back, watching it. They're not listening to radio, nor are other passengers.

Also, what we'll see in the car, it's just matter of time, are these new forms of audio, which are beyond CD-quality. We'll have SACD (Super Audio Compact Disc) and DVD audio. Also, the Internet will be more of a delivery mechanism for audio in cars. That's just natural.

We'll see telephone-based services being more of a delivery mechanism for music. We're seeing it now in other countries where they have not only video games, but in a sense music delivered via your telephone. ... You will see the evolution of other forms of music entertainment information delivery in the car through all sorts of mechanisms, prerecorded and live.

Radio's risk today, if it just continues to do what it's doing — it will be the poor stepchild of all these other media. It will have its niche but it will be a smaller niche. ...

RW: *Yes, that's what some people were saying satellite radio was going to be.*

Shapiro: I spoke to the broadcasters about 10 years ago, and I talked about the growth of the CD in the car and things like that and how they have to go to digital radio. I remember being met very skeptically.

Several times I spoke to the broadcasters

See SHAPIRO, page 6 ►



CEA President/CEO Gary Shapiro

Photo by Leslie Stinson

sumer recording rights in the area of HD Radio. I think that, if they are successful, that would harm radio broadcasters severely.

RW: *Restrict recording rights. Meaning if you're in your car, they don't want you to have those TiVo capabilities of going back and forth and possibly recording...*

Shapiro: Or at home. They want to restrict all sorts of things. They've been lobbying at the FCC. They're starting to make waves in Congress. It's something that would greatly hurt the launch of and the consumer acceptance of a product if they knew they were buying a product that was essentially maimed.

RW: *What can broadcasters do?*

Shapiro: The NAB is coming on very strong against this, as they should,

been promoting the concept of digital for a long time, as we've done with HDTV successfully and we have done with digital radio as a concept, whether it's satellite or terrestrial. We'll continue to do that.

We appeared at the HD Radio press conference (at CES 2004), as we have before. (Ibiquity President/CEO) Bob Struble sits on our board of directors. (Ibiquity) has good relationships with many of the manufacturers. Certainly, this is something we will be talking about increasingly as the product is launched with retailers. ...

We have several programs with which we reach out to consumers directly. ... Consumers have a high degree of knowledge about digital. They understand, beginning with the compact disc, that digital is better. Right now, radio is the inferior medium.

I think consumers see that, especially AM. I think this HD Radio will be posi-

Shapiro Up Close

Gary Shapiro is president and CEO of the Consumer Electronics Association, the U. S. trade association representing roughly 1,500 companies in the consumer electronics industry. It also owns and produces what it touts as the continent's largest annual trade show, the International CES. The 2004 event attracted 4,500 exhibitors and 129,000 attendees.

Shapiro has been active in the development and launch of HDTV. He co-founded and chaired the HDTV Model Station and has served on the board and executive committee of the Advanced Television Test Center.

Shapiro is vocal on behalf of manufacturers' efforts to preserve the legality of recording equipment and in the debate over video rental rights and the right to record. Shapiro is chairman of the Home Recording Rights Coalition and has testified before Congress to help ensure the growth of the video rental market, VCRs, home computers and audio recording equipment, including MP3 technology.

At CEA, Shapiro heads a staff of 130. Prior to joining the association in 1991, he was an associate at the law firm of Squire, Sanders and Dempsey. He also worked on Capitol Hill as a congressional staffer.

Shapiro received a juris doctor degree from Georgetown University Law Center and is a Phi Beta Kappa graduate with a double major in economics and psychology from the State University of New York, Binghamton.

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Shapiro

► Continued from page 5

five to 10 years ago. That's why I'm glad to see they're embracing HD Radio. Just like when we fought so hard to the feature on radio where they could identify the genre of station and things like that, and, it was such a long...

RW: RDS?

Shapiro: RDS was a battle with broadcasters for years. And it was something with which a lot of them have somewhat of a competitive advantage and enhance their sales, but it was something that still is only slowly being deployed. But yet manufacturers have embraced it more. It's being equipped in a lot of cars.

RW: RDS is experiencing a revival. Do you think it's going to gain in popularity? Is that sort of an interim step until a station goes digital?

Shapiro: RDS is certainly very hot right now. It is growing in popularity. It's a relatively easy thing for broadcasters and for manufacturers to put inside of a radio. ... But it's a feature, it's not the answer.

There's other areas of competition for radio broadcasters, even things like OnStar navigation. These systems are in vehicle navigation systems. They're providing different ways of getting information and even potentially entertainment to consumers.

So radio broadcasters relying exclusively on their business plan, on rush hours in automobiles is a challenge, especially since there are other channels ... into and with the automobile. Obviously rising gasoline prices, the pressure of telecommuting, the economy itself.

Assuming that people are going to spend more and more time in their cars, and that's the wave of the future is a dangerous thing. The radio broadcasters have some spectrum. It's an opportunity to build on that spectrum.

They've kind of ceded much of the home at this point because of alternative services and lower quality. The car is something which is tough to have a whole industry rely upon. The thing is the home is — where it used to be you had a TV set in one room and a radio in the other room — now what you're starting to see is people are plastering their rooms with TV sets. They're keeping their TV set on more. It's a mechanism

not only for music but for information.

So, you could get it from either cable channels or DBS. You're getting it for music. And you're getting information as you have screens all over your house as the TV set prices have come down.

RW: You mentioned people are spending less time listening to radio in their cars. Kids are in the back seat watching Disney videos and other things. Arbitron is seeing that trend too. The way they put it is younger people are not learning the habit of radio like we did because they're spending more time with other media. Is radio going digital enough to keep consumers interested in the medium of radio?

The recording industry association is making a big push to restrict consumer recording rights in the area of HD Radio. I think that, if they are successful, that would harm radio broadcasters severely.'

Shapiro: Of all these new technologies, radio does not have the monopoly on real-time information. Microsoft has a watch that allows you to get information about weather.

RW: The Spot Watch...

Shapiro: Right. You can get real-time traffic information all sorts of different ways now before you leave your home, whether it's from your television or the Internet or some other services that are starting to be marketed and developed.

You can choose what type of music you want, and get it pre-recorded or you can download it from the Internet. You have choice. So, what is it that radio uniquely brings to the listener? That's a tough question.

RW: Localism.

Shapiro: But localism has been redefined by all sorts of other services, whether it's television, it's newspapers going online, it's the ability to call a phone number and get the weather or traffic or have it customized for where you are. ...

I think radio is challenged and will be challenged for several years. You can't just take a photograph of where it is

today and say, 'We'll stay that way.' Whether or not the facts show it, the perception is radio has lost market share over the last several years. Unless radio embraces new technologies like HD Radio, it will continue to lose.

The fact is, satellite radio services came along, they didn't exist a few years ago and now they're in seven figures. Those people, who own satellite radio (are) paying the several dollars a month, are listening. When they're listening they're obviously not listening to local radio. ...

RW: Are broadcasters going to need to create better content to go with the digital?

you have devices that hook up to a certain Web site where you get the music that you want. ...

If you just keep your phone on, you essentially have Internet connectivity. There's Bluetooth. And now there's other forms of WiFi coming now which go a few miles. ...

We're still at the toddler phases of this digital age. The digital age, combined with the connectivity allowed by the Internet, and growth in technology, and capacity and speed, we're going to be connected so many different ways to each other and to entertainment.

No one medium will have any form of monopoly or certainty, either locally or nationally, or even Internationally. So to the extent that the globalism is occurring in every other part of our economy and manufacturing and things like that is also going to occur in audio and video and elsewhere. Whether you're a television broadcaster or a radio broadcaster technology is going to force you to have new forms of competition.

RW: Like the phones that have the FM radios in them ... because Ibiqity is saying that its system will work on those kinds of delivery systems.

Shapiro: Of course it will. Ibiqity has some very creative people. Bob Struble is extraordinarily bright and very diplomatic and I think the company's changed radically.

I used to think that in-band, on-channel didn't have a chance. Now I think he's turned it around 180 degrees. The technology seems good and the leadership seems good. I think the time is right for the launch of in-band, on-channel. The biggest risk I see is if broadcasters are just going to be asleep at the switch. ...

The advantage in HD TV that we didn't anticipate was that DVD came along and (generated) this phenomenal interest in watching digital television which helped fuel the transition to HD TV, more than broadcasters broadcasting HD TV.

I don't see an analogy there for radio. The challenge is the chicken and egg. And that's why I think in the case of digital radio, if broadcasters are going to be able to compete with satellite radio and other services they're going to have to make a concerted, informed, business decision, to be as aggressive as humanly possible to embrace Ibiqity. If they're not, then I think they have a very bleak future. 🌐

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World Radio History

LPFM

► Continued from page 3

digital receivers is "unlikely" to occur beyond 130 meters — about 425 feet — from the LPFM transmitter.

In public comments filed by 24 parties, none addressed this issue, the commission stated. Eighteen commenters support eliminating or changing the third-adjacent channel minimum separation requirements.

Three filers, including Cox Radio, NAB and Livingston Radio, support retaining third-adjacent channel protections.

One set of ears?

"Mitre produced and compiled a voluminous report, but it did not have audiences judge whether objectionable and harmful interference occurred, and neither were its interference determinations based upon any manner of averaging," stated Cox in its comments to the FCC.

"Instead, a single individual — indeed, a professional technician — offers the sole opinion for all of Mitre's extensive interference determinations."

Cox agreed with NAB and Livingston that the commission cannot reasonably rely on the report to recommend modifications to the separations requirements.

"Mitre has elevated the opinion of a sole professional above that of the average radio listener, and, more to the point, it unabashedly has elevated cost concerns above congressional mandate."

Livingston Radio Co., licensee of Station WHMI, a Class A FM station in Howell, Mich., stated: "The (Mitre) report indicates that at the protected contour of a full-power FM station, a third-adjacent channel LPFM station would be expected to cause interference over a radius of 1.1 km around the LPFM transmitter, which equates to an area of about 3.8 square kilometers. ... A third-adjacent LPFM station would in effect punch a 'bullet hole' of 3.8 sq. km. or less in the service area of a full-power station."

Several new LPFM allocations would, in effect, create multiple "bullet holes" in a full-power FM's service area, "leaving the full-power station with a service area looking like a slice of Swiss cheese," states Livingston.

"The present rules do not take into account the cumulative impact of multiple LPFM stations. ... The laws of physics apply at all power levels, not just high power; and they cannot be ignored just because LPFM stations operate at lower power than their full-power counterparts. Livingston fears that the commission is trying too hard to brush the laws of physics aside because of its public policy objective of increasing the number of media voices."

Another three filers, including NPR and IAAIS, support keeping existing channel protections with respect to FMs providing reading services on their subcarriers.

Although NPR believes LPFMs could be placed on third-adjacent with certain restrictions, it took issue with the methodology of the FM subcarrier and radio reading service tests conducted by Comsearch, a Mitre subcontractor for the LPFM tests.

Comsearch tested only a single SCA receiver and only one radio reading service — on KNOW(FM) in Saint Paul, Minn. — "even though radio reading ser-

vices operate on one of two subcarriers, and the full-power station at issue operates monaurally, making the reading service it carries less vulnerable to interference," NPR stated.

"As a general matter, given obvious variances in terrain, station technical parameters and other variables among stations that carry radio reading services, it is impossible to draw conclusions about all radio reading services based on the results of a field test of a single one," states NPR.

NPR said the Mitre study had "limited value" in determining "the likelihood and severity" of third-adjacent channel LPFM interference.

Further, NPR said if it does allow LPFMs on third-adjacent, the interference complaint resolution process should be expanded. The FCC "should

consider complaints from listeners beyond 1 kilometer from the LPFM site, listeners whose reception via mobile receivers is impaired, listeners who complain more than 1 year after initiation of the LPFM service, and listeners whose reception of translator service is impaired."

Complaint resolution

NPR said the FCC should not ignore complaints because the interference was not "predicted."

Ten individual LPFM filers who favor dropping the third-channel protection requirements reported that their LPFMs are suffering co-channel interference that could be eliminated if the stations could change frequency to third-adjacent channels.

The commission is also asking

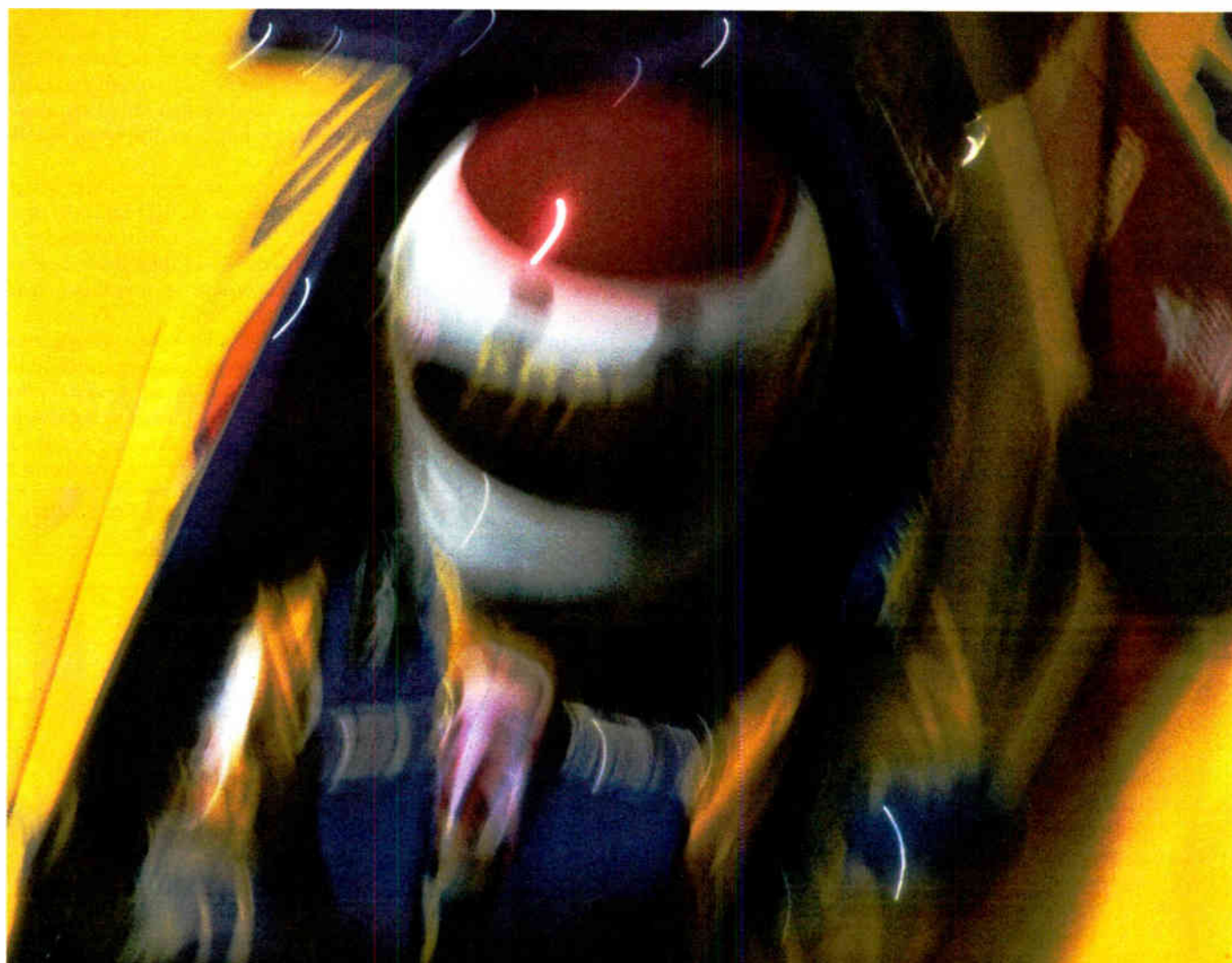
Congress if it can skip what were supposed to be the last portions of the testing: listener tests and an economic analysis of the effects of LPFMs on existing FMs in a market due to the agency's lack of funds. The commission estimates the additional testing would cost around \$800,000.

LPFM supporters were pleased.

The Prometheus Radio Project says such a change could result in "hundreds" of new LPFMs on the air.

"Convinced by the corporations' cries of 'interference,' Congress passed a law keeping low-power radio off of most of its intended frequencies, and over 60 percent of the potential stations were lost," stated Prometheus Radio Project technical director Pete Tridish.

The group intends to help groups apply for LPFM stations. ●



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DIGITAL NEWS

IBOC Standards Are On, Again

NRSC, Ibiquity Agree on Elements to Include In Digital Radio Transmission Standard

by Leslie Stimson

After months of wrangling, the National Radio Systems Committee and Ibiquity have reached agreement about what to include in the transmission standard for digital radio.

The agreement is important for two reasons, parties believe: to give certainty to the marketplace about the technology, so that more broadcasters and manufacturers participate in the digital transition; and to give the FCC what it needs to craft final service rules for in-band, on-channel digital audio broadcasting.

In addition to reviewing data that Ibiquity has passed on to the group, members of the NRSC will review addi-

tional data as it comes in over the next few weeks and begin to craft a standard.

The agreement is a compromise. Originally, NRSC members wanted what they considered to be a complete transmission standard, including specifications for Ibiquity's new HDC codec. In the fall, the NRSC told Ibiquity it needed information on all Ibiquity transmission-related patents and data-transport details in addition to the codec specs.

Ibiquity turned over information on approximately 70 patents related to its IBOC transmission system, but said it could not do the same for the new codec.

"Business relationships preclude Ibiquity from releasing codec information," Al Shuldiner, Ibiquity senior vice

president and general counsel, told Radio World in February.

"We've worked out an agreement to give them complete details on how the data system works," he said. That includes details on what Ibiquity calls AAS, data that is not program-associated.

This is the data that could be used to deliver such items as traffic or weather reports.

Ibiquity also has agreed to disclose the codec interface to the HD Radio system.

NRSC members say that under the agreement, they feel they'll have enough information to develop a usable and reputable standard.

"The NAB Radio Board passed a resolution supporting ongoing standards development, and saying it was comfortable with a standard that did not disclose the particulars of the codec. We were not

comfortable with a standard that left out virtually anything else," said Milford Smith, chairman of the DAB subcommittee of the NRSC.

He said Ibiquity also is willing to disclose the starting sequence for the "scrambler," which initializes various parts of the HD Radio system. Without this code, Smith said, it would be harder for someone to make compatible equipment for HD Radio.

"We have the elements we think we need to craft a transmission standard so someone skilled in the art can make a compatible device. So, there's no trade secrets in there. All the elements are in there to build a product," said John Marino, NRSC spokesman and vice president, NAB Science and Technology.

"We'd like to have had the codec in there," said a separate NRSC source. "But it became evident Ibiquity had compelling reasons" for not disclosing the codec specifications. The NRSC could have taken a hard line, but then it would have no standard, he said.

But all parties wanted a standard in order to give the technology legitimacy in the marketplace and satisfy the commission's expectations.

"Until there's formal rules, this (IBOC authorization) is all interim and temporary. There's no solid foothold on the part of broadcasters, particularly those who are not involved in the process," said this source. He said some observers watched the codec problem and chose to hold off implementation and receiver development until the technology "seemed more solid."

Marino and Smith agreed equipment manufacturers don't need the codec details to build HD Radio compatible transmission equipment.

"The idea is to have a transmission standard that anybody can plug their codec into," said Marino. Ibiquity has agreed to license its HD Radio system to broadcasters and manufacturing

See STANDARD, page 10 ▶

Study: Digital Radio Can Only Grow

SCOTTSDALE, Ariz. The digital radio product category — both satellite and terrestrial — will grow to more than 19 million units total shipped by 2007. That's according to research firm In-Stat/MDR.

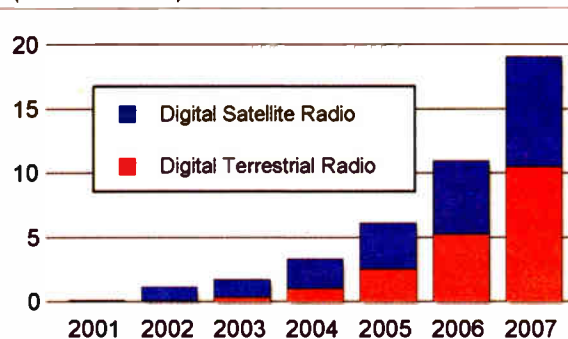
The firm states that data services and new digital-only content will drive demand, a trend seen in the United Kingdom with Eureka-147 digital radio sales.

"When the first digital broadcasts became available in Europe, receivers were too expensive for the mass market," stated analyst Michelle Abraham. "Over five years later, receiver prices have come down, but many countries are still trialing digital broadcasts, waiting for the regulatory framework to be in place and digital coverage to expand."

Other trends In-Stat/MDR anticipates: Newer, less expensive radios will drive consumer demand for Eureka products; other countries will see satellite radio becoming a success in the United States and want to achieve that success; and digital tuner cost reductions will convert the most expensive of the analog radios to digital by 2007.

More information is at www.instat.com.

Worldwide Digital Radio Market Forecast (Units in Millions)



Source: In-Stat/MDR, 12/03

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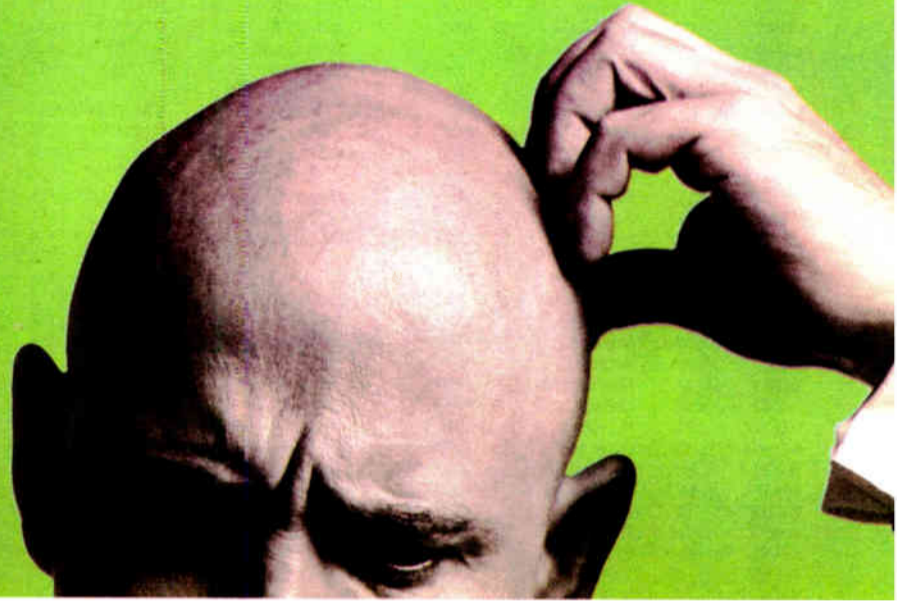
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The new Omnia-6EX has enhanced processing for analog FM, and is ready for HD Radio with a second limiter section and digital output. Both FM and HD limiters and outputs are included as standard.

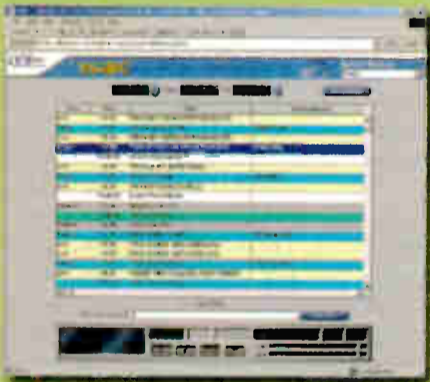
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SHOW PREVIEW



**THE WORLD'S LARGEST
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April 17-22, 2004 • Las Vegas, NV

Sunday: Science and Security

• Sunday morning, April 18: "State of the Art in Radio 2004"

• Sunday afternoon, April 18: "Preparedness, Security and Recovery for Radio and Television"

by Michael LeClair

The newest technologies in radio broadcasting are the focus of a series of sessions at NAB on Sunday morning April 18 called "State of the Art in Radio 2004."

Moderated by long-time radio engineering executive Al Kenyon, this group of papers will investigate leading-edge products and design.

"We're trying to cover all the bases," said Kenyon, "from studio facilities to encoding technologies."

The opening paper will be presented by David Frerichs, vice president and general manager of Coding Technologies.

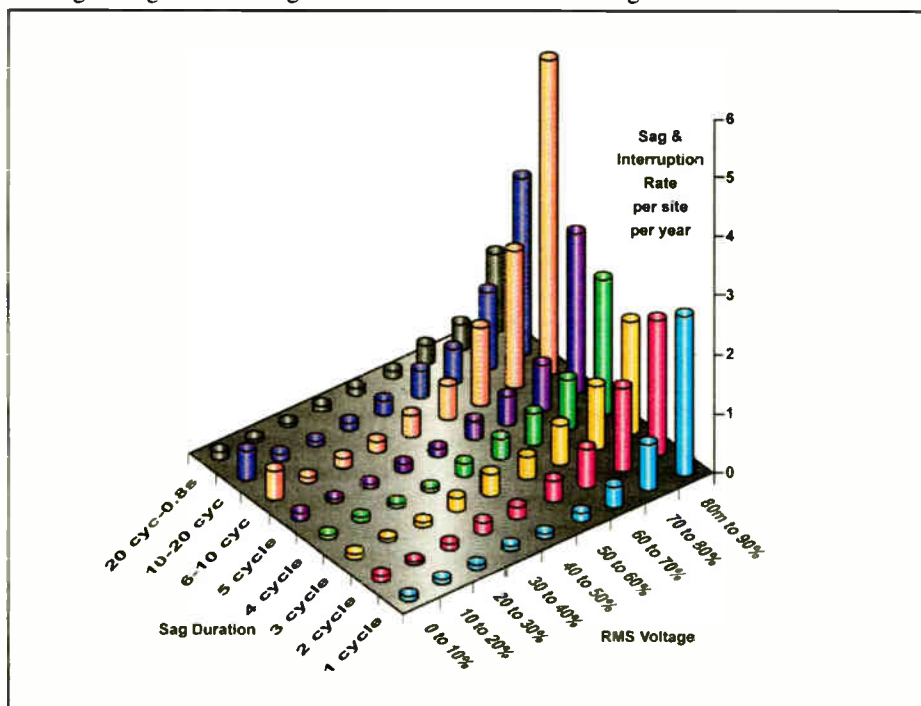
"Expanding Digital Broadcast Services Using MPEG-4 HE AAC and Other SBR-Enabled Codecs" will offer an overview of the latest Spectral Band Replication codecs. SBR is central to the new HDC codec used by Ibiqity Digital for HD Radio and "can enhance the efficiency of audio codecs up to two times," according to Frerichs. The paper will focus on new service capabilities such as 5.1 surround sound and very low-bandwidth streams.

Details of a new system allowing FM broadcasters a significant service increase will be the topic of "Tomorrow Radio," presented by Mike Starling, vice president of engineering for National Public Radio.

NPR, in collaboration with Harris Corp. and Ibiqity, has developed and tested a system allowing a supplemental audio channel for stations broadcasting in digital. Starling will describe

building an all-digital radio station," said Born. "Here are our ideas — and it's OK to steal them if you like them."

WSPN constructed the studio facility with Klotz digital routers and control sur-



A graphic from MGE UPS charts the number and severity of power 'events.'

the system design and show results of recently completed field tests of Tomorrow Radio.

"We found that the coverage and audio quality on the secondary channel was amazingly good, even at these low bit rates and power levels," said Starling.

Construction of a studio facility employing the latest technologies is featured in "A Modern Radio Station," from Marvin Born, vice president of engineering for Dispatch Broadcast Group. "This presentation describes our experience in

faces at the heart of the audio plant. Inter-studio wiring used fiber optic cable and Ethernet connections for all communications. The buildout was completed in four months and under budget.

"State of the Art in Receiver Design for HD Radio" will discuss the basic technology that underlies HD Radio. Presented by Trudy Stetzler, digital radio manager of Texas Instruments, and John Gardner, marketing manager, this paper will offer a brief history of HD Radio and a look at the latest technological develop-

What: NAB2004

Where: Las Vegas Convention Center

When:
Conferences: April 17-22
Exhibits: April 19-22

Cost: Various package prices apply. Price for an NAB member registering by April 14 is \$425, for others \$825. Discounts are available for spouses, government, students, groups, selected events.

Info: www.nabshow.com

ments in receiver design.

"New developments in the state-of-art for HD Radio now integrate both conventional and digital receivers in one unit," Gardner stated. "This reduces both the cost and physical size, allowing HD Radio receivers to be fit in a single chassis." New HD Radio receivers also can incorporate the latest ideas in transmission, such as the Tomorrow Radio.

The final paper of the morning will address recent developments in AM that have been prompted by the demands of digital modulation schemes such as HD Radio.

"Advances in AM Modulation Techniques That Improve Digital Transmission for HD Radio and DRM," presented by Ky Luu, senior principal engineer for Harris, will discuss the need for a highly linear signal path when using digital modulation. Advances in modulation technology offer enhancement to familiar modulation schemes, such as Pulse Duration Modulation, for both digital and analog signals.

See SUNDAY, page 15 ▶

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World Radio History



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Monday: Digital Radio, Here and Abroad

• Monday morning, April 19:
"Digital Radio Transition Worldwide"

• Monday afternoon, April 19:
"IBOC and Digital Facilities
Implementation"

by Susan Ashworth

One of the most important new technologies to hit the radio industry is up for debate on Monday, April 19, when radio executives square off to discuss the merits of digital radio, both here and worldwide.

Worldwide digital

After the opening festivities kick off for the Broadcast Engineering Conference, attendees will get an international glimpse at digital radio during the session "Digital Radio Transition Worldwide."

"The BEC is an event devoted to an international audience, and so we want to look at how digital radio is impacting other countries," said session moderator Milford Smith, vice president of engineering for Greater Media.

In his paper "DRM in the AM Band," Donald Messer, director of the spectrum management division at the International Broadcasting Bureau/VOA, will look at the digital radio broadcasting system Digital Radio Mondiale.

Messer, a developer of the technology, will talk about how the technology is used for international shortwave and medium-wave broadcasts in some 50 operations. DRM is for use in the broadcasting bands below 30 MHz (long-wave, medium-wave and shortwave).

Attendees can compare the progress of broadcasting in Europe from Philip Laven, technical director with the European Broadcasting Union, in his paper "Digital Radio Broadcasting in

Europe — The Show Is on the Road."

Laven will update attendees on the Eureka-147 digital broadcasting standard developed in Europe. That technology, which critics say got to a slow start, is seeing improvements, and consumer receivers are becoming available. Laven will update attendees on progress being made with digital radio transmissions and technologies in several European countries.

For U.S. radio broadcasters contemplating the merits of metadata in digital radio, Shigeru Aoki from TokyoFM Broadcast will share his experience. The delivery of metadata along with audio

programs is the focus of "Metadata for Radio Broadcasting" in which Aoki will discuss how TokyoFM Broadcasting uses the XML profile to deliver metadata.

IBOC implementation

One of the more heavily attended tracks at NAB is likely to be "IBOC and Digital Facilities Implementation," led by moderator Norm Philips of Susquehanna Corp.



An Ibiqumy map predicts WOR(AM)'s digital coverage in green and yellow, blend-to-analog in red.

You can hear the squeaking of a door in the background at the station or the weatherman whispering to another staffer.

— Tom Ray

"We'll give attendees an overview of real-world installations from those who have already seen what's in store," said Philips, who is director of technical operations for the company and has some of

that first-hand knowledge: Susquehanna is in the process of installing IBOC at nine of its FM stations.

"The paper presenters will share ideas — things people may not have thought of — as well as some of the challenges the industry may face as it rolls out IBOC," he said.

While excitement certainly surrounds the technology's capabilities, concerns and queries also swirl around IBOC's real-world implementation.

"Real-world experience is what a lot of radio engineers want to hear about, primarily because there are things (surrounding this technology) that you probably haven't even thought of yet," said Paul Shulins, director of technical operations for Greater Media, which has installed IBOC technology into five of its FM stations in Boston.

For Shulins, who will share his thoughts during "Real World IBOC Installations," those issues included unforeseen changes that had to be made in the studio as well as dealing with the STL link and planning issues at the transmitter site. Shulins will discuss the company's plan to use a separate antenna system, which will radiate the signal on a master antenna system for multiple stations.

"It's also important to emphasize protecting your precious, existing analog service," Shulins said. "And how do you do that when you're running it all through IBOC equipment?"

Audio integrity will also be a focus for Herb Squire, vice president of engineering and operations for DSI RF Systems, who will replicate some typical broadcast audio scenarios during "Dueling Algorithms Meet IBOC (Can Audio Survive?)" and offer some background on improving audio in a digital environment.

That's likewise the goal of R. Scott Martin, principle research engineer with Nautel, who will talk about how an audio processor and digital FM exciter can be interconnected for clearer audio signals in his paper "Enhancing the Digital Path: Digital Multiplex (D-MPX) Connectivity."

Immediately following, Eric Wandel, director of product development for ERI, will present "Test Results of Dual-Input Sidemount FM Antenna" and will touch on how the sidemount antenna will be an enabling technology for many FM stations attempting to begin their digital transition.

The most anticipated discussions this year will probably revolve around the release of consumer receivers for IBOC terrestrial digital radio. Tom Ray, director of engineering for Buckley Broadcasting, purchased an HD Radio in December and decided to complete his own tests by taking the technology on the road.

"Ibiqumy told us it would sound good out to a certain contour in our area, to a certain level it would perform, and so I wanted to see if that was really true. So I took the radio for a ride," he said, with a contour map at his side. "Turns out they were right on the money."

Ray, who has written about HD Radio in Radio World, will share his impressions of how the technology worked in different locales — in downtown Manhattan, in the more suburban areas — and what engineers can expect as they begin to roll out the technology during "Real-World AM IBOC Coverage Using a Consumer IBOC Radio."

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See MONDAY, page 15 ▶

Sunday

► Continued from page 12

Always a concern for radio stations, it seems that recent events have brought even more attention to the need for reliability and security in radio system design.

"Preparedness, Security and Recovery for Radio and Television" will address these issues as part of the Broadcast Engineering Conference on Sunday afternoon at the NAB show. Thomas Weber, engineering maintenance supervisor for WISH-TV8, will chair this session.

"National security concerns have become more important in the last three years," said Weber. "The widespread failure of the power grid last summer also points out the fallibility of commercial electrical power. With more media choices out there than ever before, broadcasters have to ensure their operations are reliable in an emergency."

Starting off the session, David Wilson, director of engineering for the Consumer Electronics Association, will present "New Industry Standard for Public Alert Receivers."

The CEA has developed a new standard that defines the minimum performance criteria for hazard-alerting receivers. These receivers can be incorporated into AM or FM radios and receive digital transmissions from the National Oceanic and Atmospheric Administration and can provide alerts to the public about potential hazards.

"With improved federal funding, NOAA has added over 400 stations in the United States over the last six years, greatly expanding the coverage area that can be reached with weather alerts," Wilson said.

Backup power is the topic of "Design Considerations for Emergency Power

Monday

► Continued from page 12

"I've been listening to a commercially available radio since December on my way to work each day, and what a difference. It sounds like I'm listening to a entirely different station," he said.

"The audio sounds so much better — you can hear the squeaking of a door in the background at the station or the weatherman whispering to another staffer. It's an overall different impression than what you would get with a standard AM station, where the talent often sounds muffled and thick. I was surprised it worked exactly as they said it would. It's a truly different experience."

Other sessions on tap during the IBOC track include "HD Radio: A Cost-effective Approach to Producing Enhanced Radio Programming for a Digital Audience," presented by Nicolas Hans, product director for Dalet Digital Media Systems; "IBOC: The Real World," presented by John Kennedy, director of engineering for Entercom Boston; and "HD Receiver Updates," presented by Bill Whikehart, senior technical specialist from Visteon.

Susan Ashworth is the former editor of TV Technology, sister publication to Radio World, and is a contributor based in San Francisco.

Systems at Broadcast Facilities," from Gregory Forbes, system engineer for PBS. "The emphasis is on designing power systems for seamless backup with appropriate capacity and preparedness for extended outages," Forbes he said. The paper also will address how to implement power system upgrades without downtime in a live broadcast environment.

"Broadcast Business Continuity," by Sidney Skjei of Skjei Telecom will give real examples of disaster preparation and recovery from disaster situations. This paper develops the requirements for disaster recovery as it applies to broadcasting organizations. Also, new aspects of disaster preparedness posed by the threat of international terrorism will be discussed.

Alan Katz, segment manager of MGE

UPS Systems, will address the problems of poor electrical power quality in "Keeping Broadcast Facilities Online in the Digital Age."

"At least 14 times a year, the average broadcast facility experiences a power event that has results ranging from locking up electronic equipment all the way to taking the transmitter off the air," Katz stated. Specific types of power quality problems and their appropriate solutions will be investigated.

"EAS and Disaster Preparedness ... Can They Work Together?" will be presented by Roswell Clark, director of technical operations at Cox Radio. Investigating the benefits of partnership between broadcasters and public emergency management officials, Clark describes how disaster planning and EAS work together.

Also, the new requirements for reliability posed by the conversion to digital by broadcasters will be probed in "Mission Critical Broadcast Design: The Show Must Go On," from Leo Soucy, founder and owner of Facilities Engineering Associates. As broadcasters transition to digital, new computer-based systems are more susceptible to problems with power and cooling.

"In the digital world, a loss of power in excess of 50 milliseconds requires a reboot and a return to the proper point in the program before continuing," Soucy said. "The actual broadcast outage can be much longer than the power outage."

Soucy draws on lessons from the history of mission critical data-center design and applies them to the broadcast facility.

Several other sessions related to television are also part of the day's papers.

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Tuesday: RDS and RF, in Depth

• Tuesday morning, April 20:
"Radio RF and Transmission Developments"

• Tuesday afternoon, April 20:
"RDS and Data Broadcasting"

by Mario Hieb

The Tuesday morning session of the NAB Broadcast Engineering Conference is "Radio RF and Transmission Developments," focusing on developments in HD Radio systems.

Moderator Martin Hadfield, vice president of engineering for Entercom, said, "Aside from the high-spirited Q&As which are likely to

follow each of the presentations, I believe the IBOC occupied-bandwidth measurements and the HD Radio coverage papers will generate the most buzz among the attending engineers."

On a much-anticipated subject, AM system expert Ronald Rackley, P.E., partner in the consulting firm du Treil, Lundin and Rackley, will present "Evaluation and Improvement of AM Antenna Characteristics for Optimal Digital," a look at the esoteric world of AM digital transmission and AM transmission systems.

"AM-IBOC digital transmission places a high demand on antenna system bandwidth, both from the standpoint of the input impedance at the transmitter load and that of the far-field radiation

characteristics," Rackley said.

"Directional antenna systems present the additional complication of sideband phase and amplitude errors resulting from changes in pattern shape with frequency, which can render digital modulation un-decodable in areas with satisfactory analog reception."

He will discuss steps that can be taken to evaluate antenna performance and improve coverage. Also, the results of tests at a number of AM-IBOC stations will be compared with their observed on-the-air signal quality.

Another presentation related to AM-IBOC is "AM Linearity Performance Measurements in Modern AM Transmitters and the Relationship to HD Radio and DRM Performance," presented

by Geoff Mendenhall of Harris Corp.'s Broadcast Communications Division.

Digital transmission waveforms require linear and consistent transmission paths. Performance measurements for AM transmitters may not provide enough information when used in conjunction with HD Radio or Digital Radio Mondiale.

Mendenhall plans to discuss an independent measuring technique to give broadcasters a tool to use when choosing HD-Radio and DRM equipment.

What questions are raised about the measurement of complex waveforms as stations deploy IBOC?

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How much difference a year makes. Among the presentations is a high-profile panel discussion about RDS implementation in the United States.

David Maxson, managing partner of RFsigns.com, will talk about "IBOC RF Measurements." Among the questions listed in show planning materials: How will engineers know that the analog-to-digital power ratio is correct? How does one characterize the distortions that filters, combiners and tuning units may cause to the digital waveform? What are the consequences of digital sideband splatter on adjacent channels?

The use of circulators to improve isolation and the load impedance for transmitter systems is the focus of "Design and Field Results for the Utilization of Circulators in High-Power Broadcast Transmission Systems" by Jim Stenberg, director of advanced RF development for Dielectric Communications.

He will describe such use in the combining of analog and digital FM signals and will include measured data for high-power combining systems and interleaved antennas.

"The use of high-power circulators to provide non-varying load impedances to the output tube regardless of the transmission line and antenna load match has several significant benefits for both TV and FM transmitters," Stenberg said.

"For digital signals, a high signal-to-noise ratio can be maintained, since the tube/final sees a constant impedance — large impedance variations cause S/N degradation. Second, the overall RF system complexity can be reduced, since reflective type 'mask' filters can be used rather than constant impedance type."

See TUESDAY, page 18 ►

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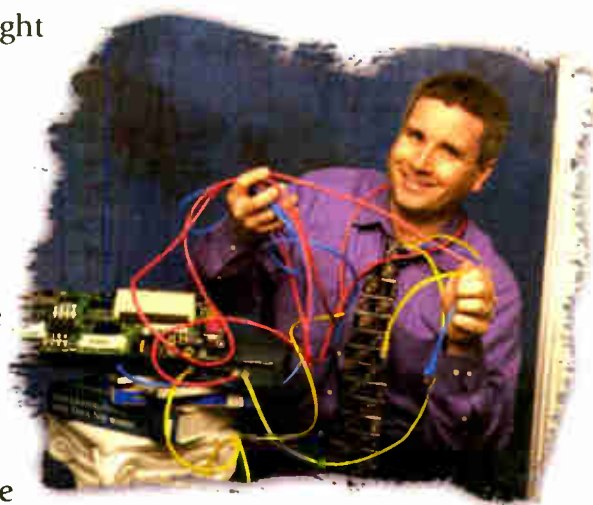


Chris Lawton
Sr. Systems Engineer
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Tuesday

► Continued from page 16

Also, he said, in multichannel and IBOC combiner installations, the isolation between transmitters can be significantly improved, reducing the risk of intermodulation production.

He said circulators have been used for these reasons in low-power transmitters for many years, but that developments in low-loss, temperature-stable ferrite materials and circulator construction have allowed their introduction at very high power levels.

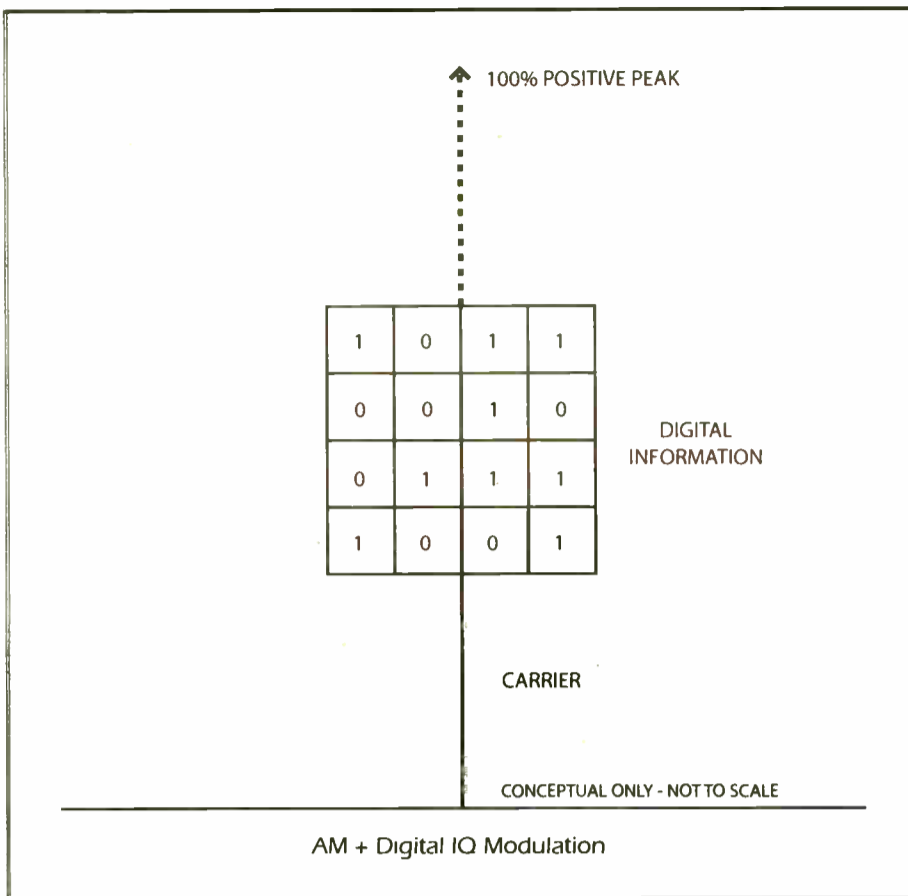
Mike Bergman, senior manager of digital broadcast products for Kenwood USA, will explore results from extensive field testing of FM HD Radio and Tomorrow Radio during 2003 in "HD Radio FM Broadcast Coverage — What To Expect."

He will present results that show how the digital audio coverage area is affected by several kinds of adjacent interferers, and how "coverage" may be viewed in different ways for various applications.

"EH Antenna" is a presentation of the concept and practical implementation of the EH Antenna by Ted Hart, CEO of EH Antenna Systems. The EH Antenna, as developed for AM broadcast, is in the form of a vertical dipole, which means no ground radials would be required.

It is shorter than a 1/4-wave tower and has antenna pattern gain and overall

efficiency greater than a 1/4-wave tower with buried radials. Because ground radials are not required, the antenna can even be placed on a freestanding tower or building, reducing land requirements to virtually zero.



A graphic from Ronald Rackley's planned presentation on AM antenna characteristics for optimal digital.

McGinley said, "the continued growth and perceived competitive pressure of satellite services that provide this feature; and the recent realization that up to one-third of all cars on the road have RDS-capable radios, and most all new models have them.

"Receiver manufacturers made this happen on their own, with no help or urging from broadcasters, mostly because standardizing RDS-enabled designs used worldwide became cost-efficient and preferable to build," McGinley said.

"Since we already had RDS encoders online since 1996 displaying station logo info for all four of our FM stations in Seattle, and an automatic real-time source of song title and artist data info from our digital storage system, it seemed only logical to connect the two together via a home-grown visual basic PC program. We will describe the nuts and bolts of how we did that."

In an "IBOC Data Services Overview," Jeff Detweiler of Ibiqity Digital Corp., will discuss one of the biggest advantages that the company's in-band/on-channel digital radio technology brings to AM and FM radio broadcasting: a built-in data broadcasting capability.

He will explain the capabilities and differences of the three data services supported by HD Radio — MPS, SIS, and AAS.

Paul Signorelli of Impulse Radio will expound on various methodologies for multiplexing data services over the transmission layer in "Methodology for Data Service Multiplexing."

This involves combining data from more than one service on a single IBOC channel or logical channel. The paper will discuss how multiplexing can make use of the logical channels of the IBOC transmission system to provide different degrees of service for data services and how multiplexing can be used to optimize bandwidth for data service transmission.

With the advent of HD Radio, broadcast engineers are faced with a host of technical issues as they move existing facilities into the age of digital broadcasting.

In "IBOC Data Broadcasting at Your Station," Ray Miklius, vice president of studio systems for Broadcast Electronics, discusses how the entire broadcast chain, from audio input through the antenna, needs to be analyzed and upgraded to support this new service. In this presentation Miklius will provide an end-to-end description of how the introduction of data broadcasting over IBOC will impact your facility.

"Traffic Data — The Killer App?" Technology developers from all segments of the broadcasting industry have been working with Ibiqity to facilitate the introduction of HD Radio.

Joseph Reed, the chief information officer of Mobility Technologies, is exploring opportunities with the company to bring advanced traffic monitoring capabilities to radio listeners. Mobility provides advanced traffic services to radio and TV broadcasters and is positioned to redeploy their content for an HD Radio advanced data service.

RDS and data

David Layer, director of advanced engineering for NAB, will moderate the afternoon session, "RDS and Data Broadcasting."

"Kicking off the session is a special one-hour panel discussion on RDS," he said. Among the panel to discuss "RDS Implementation in the U.S." are Jeff Littlejohn of Clear Channel, Marshall Bandy of DataFM, Jeff Marrah of Delphi Electronics, Kelly Christensen of StratosAudio, Allen Hartle of The Radio Experience, and Chad Steelberg of dMarc Networks.

"This should be an exciting discussion about how broadcasters are using RDS today and what kind of opportunities exist for broadcasters to attract listeners and increase revenue," Layer said.

Jackson Wang, president and CEO of e-Radio Inc., will discuss "Enabling the Application Layer in Broadcast Based Datacasting."

By enabling the datacasting application layer using technical standards that are easy to implement, a multitude of public service and commercial digital applications are facilitated and production costs are lowered. Wang will talk about Canadian experiences in development and field deployment of applications that broadcast audio and digital weather, news, sports, traffic bulletins and emergency notification services facilitated with human language independent XML.

In "Song Title and Artist Over RDS — The Nuts & Bolts," Tom McGinley and Dave Casey, director of engineering and assistant chief engineer for Infinity Seattle, respectively, share the experience of a broadcaster that has implemented song title and artist using RDS and what it took to get this service up and running. McGinley also is technical adviser to Radio World.

"The rush to displaying song title and artist info on FM RDS displays has become a hot topic for two reasons,"

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Wednesday: Regulation, Facilities

• *Wednesday morning, April 21:*
 "Technical Regulatory Issues for Radio and Television"

• *Wednesday afternoon, April 21:*
 "Radio Facilities Management"

by Tom Osenkowsky

"Technical Regulatory Issues for Radio and Television" at the NAB Broadcast Engineering Conference will be chaired by Tom Ray, corporate director of engineering for Buckley Radio/WOR Networks.

"This session runs the gamut from closed captioning, environmental issues and recent changes to the Broadcast Auxiliary Frequency regulations," Ray said.

Here's a review of scheduled topics of interest to radio readers.

Regulation

Addressing the issue of "RF Exposure Management" will be David P. Maxson, managing partner of RFsigns.com.

"Current practices in controlling and marking RF sites range from the very simple to complex," he said.

"Most broadcast facilities have signs that do not meet current ANSI standards for informing people of the key facts: the level of risk, the nature of risk and the action to take to avoid the risk."

Most broadcast facilities have signs that do not meet current ANSI standards for informing people of the key facts.

— David Maxson

"With the recent FCC files against the Mt. Wilson stations, RF exposure management is on everyone's mind," moderator Ray said.

"What Is NEPA?" will be discussed by Robert Repasky, project manager for NEPA and ecological services at The Payne Firm in Cincinnati.

Stations considering erection of new towers or modifications to existing towers must be familiar with the National Environmental Policy Act of 1969. The FCC has incorporated the principles of NEPA in the Form 301 process.

"This presentation will inform participants about the importance of their responsibility in environmental issues as it relates to new tower construction," Repasky said. "Other topics include the impact of towers on migratory birds, construction near officially designated wildlife areas and nature preserves, locales eligible or eligible for listing in

the National Register of Historic Places or Native American religious sites."

This session is of interest in light of the FCC's Notice of Inquiry "Effects of Communications Towers on Migratory Birds" last August. Also, the Michigan Department of State Police and Michigan Department of Information Technology and the U.S. Fish and Wildlife Service recently began a four-year study of potential dangers of the interaction of migrating birds and communications towers. The Michigan State Police operates 180 towers.

"Broadcast Auxiliary Service Frequency Coordination and Database

Issues" will be addressed by Timothy Hardy, vice president of engineering at Comsearch.

The FCC mandated formal frequency coordination in the Broadcast Auxiliary Service microwave bands as of Oct. 16, 2003.

"In an effort to ensure accurate interference analysis in the BAS microwave bands, we have been diligently updating the Comsearch database utilizing a number of different sources of information and datasets and comparing this to the FCC's database," Hardy said.

"There are many well-known deficiencies in the ULS database that we are addressing in our database. However,

applicants are still making significant errors in their applications that are not always discovered by the commission staff."

Database accuracy is important to ensure interference-free operation, especially in congested markets. This presentation will address the database issues, common errors in the application preparation process as well as the steps involved in the FCC-required coordination process.

"A Summary of FCC BAS Issues" is likely to be of interest to those who operate or intend to operate RPU, STL and TSL systems. It will be presented by Dane Ericksen, senior engineer with Hammett & Edison Inc.

When asked about the most significant
 See WEDNESDAY, page 25 ▶

Logitek Brings Large Console Flexibility to small workspaces



Remora-10 console at Cache Valley Broadcasting, Logan, UT



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Remora-4: four faders with controls for input assignment, monitors, and console functions

Remora-10 (shown): addition of six-fader module brings additional mixing capability with another stereo LED meter

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Remora-22: incorporates Remora-4 base unit with three 6-fader modules

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Thursday: Collection and Distribution

• Thursday morning, April 22:
"Radio Broadcast Content Collection
and Distribution"

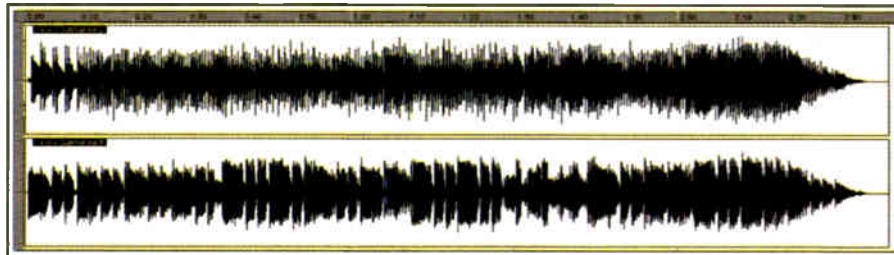
by Michael LeClair

The final day of the Broadcast Engineering Conference offers the session "Radio Broadcast Content Collection and Distribution." Chaired by David Layer, director of advanced engineering for NAB, it will explore radio production, sharing of content among station groups and audio processing.

"This is a perennial topic due to the need for radio stations to provide content on a 24/7 basis," said Layer. "In particular, distribution of radio content is undergoing a transformation due to the effects of consolidation and the Internet."

The opening paper will be presented by Alan Peterson, Radio World columnist and production/imaging director of WMET(AM) in Washington. "Exploring New Directions in Radio Production" discusses the newest audio and music production software and techniques available to production engineers looking for that extra creative edge.

"Musicians and recording engineers are using a range of powerful processing tools, but few radio producers are using these yet in the field," said Peterson. This year's presentation will



Mastering Techniques Compared:
The Beatles "Yellow Submarine" 1966 (above) and 1999 (below)



Ariane "Sound Processing: A Time and a Place"

David Reaves will offer a paper on audio processing.

be a continuation and update of last year's "Beyond the Digital Editor" from Peterson.

"WANcasting: What Are You WANning for?" will open with a brief history of the evolution of wide-area network distribution systems and their purpose. Presented by Jeff Zigler, senior manager of sales engineering for Prophet Systems Innovations, this ses-

sion offers a perspective on methods and systems used for WANcasting and how new levels of connectivity have

technique of relaying broadcasts by recording programs off-air for later use.

Finally, David Reaves, co-owner of Translantech Sound, which makes audio processors, will look at the limitations of philosophies in broadcast audio processing. In his paper "Sound Processing: A Time and a Place," Reaves will call for a new type of audio processing to meet the challenges of the current radio environment, especially in light of the beginning deployment of HD Radio.

The HD Radio system will require new processing techniques to allow seamless matching of digital broadcasts to the conventional analog signal during times when the radio may switch between these two signals. Reaves suggests, "Radio management and programmers should consider giving up some loudness to improve fidelity."

In addition, Reaves observes that Arbitron measurements show a decline in radio listening over the last five years and believes that an improvement in sound quality may help to reverse these numbers. He observes a music industry trend to release music for distribution that has already been significantly processed to achieve loudness.

Distribution of radio content is undergoing a transformation due to the effects of consolidation and the Internet.

— David Layer

brought about new applications. Future potential applications, and the up-and-coming technologies which will support them, round out the session.

Digital distribution of audio programming is also the topic of the next paper, by Naruhiko Nahira, chief technology officer of Tokyo FM Broadcasting.

"Digital Audio File Distribution for Radio" relates how the Japan FM Network, a group of 38 affiliated FM radio stations all over that country, moved from conventional analog to digital distribution. Naruhiko Nihira and Motoko Sasaki of Tokyo FM will demonstrate the reduced costs and time required compared with the traditional

Additional compression at radio stations of this highly processed content has caused a decline in sound quality for FM radio.

"I feel that processing manufacturers need to recognize that we are presented with a wide range of audio signals in terms of processing and build a processor that can recognize the amount of processing needed for adequate loudness," Reaves said.

In a possible blueprint for the future, Reaves proposes to harness the power of digital signal processing to perform analysis of audio program dynamic range and clipping. This information can then be used to control the amount of additional processing added by the radio station.

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Name: John Bisset
Occupation: Northeast regional sales manager for Dielectric Communications
Experience: 34 years in the industry. SBE Certification; presenter of NAB Transmitter Workshop; speaker at numerous conventions; contributor to NAB Radio Handbook
Mentors: Lamar Newcomb, Ray Gill, Steve Dana, John Cunningham, Charlie Wright, John Mullaney Sr. and Jr., Mitch Montgomery, Morgan Burrow, Jim Weitzman, Alan Pendleton, Morris Blum, Milford Smith, Tom Giglio, Scott Beeler.
Favorite memories: Early days of AM improvement; demonstrating the Splatter Monitor to the FCC with fellow Delta employee Tom Wright; development of *Workbench* into RW's most popular feature.
Quote to live by: "Few things are more persistent and intimidating than our fears and our worries ... especially when we face them in our own strength." — Swindoll

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The Science of Effective Radio

NAB Management Sessions Look at Digital Implementation Questions

by Ken R.

Build or renovate a station cost effectively, take it digital, make your employees happy and create radio production that motivates your listeners.

That wide range of topics and more will be covered in the NAB2004 radio management sessions in Las Vegas.



Jeffrey Hedquist will speak about what makes for effective radio.

vices.”

Miklius said this data bandwidth might also be leased to third parties such as map providers who wish to download information into cars.

“I’m trying right now to build a revenue model so station management can figure the return on their investment,” he said.

Rethinking production

Radio commercials often are created in haste. Many are written by sales peo-

ple. Some spots are produced by employees who don’t understand the psychology of the listener.

This could all change.

On Tuesday morning, the topic is “Effective Radio Ad Production: A Research Update.” In a session moderated by Dirk Freeman, owner of Steeleboy Productions, two professors will unveil research that addresses what works best in commercials.

Rob Potter of Indiana University and Paul David Bolls, director of the study of communications, emotion and cognition from the Edward R. Murrow School of Communications at Washington State University, will speak.

“We’ve been testing attention, emotion and memory,” Bolls said. “We wanted to find the ‘orienting response,’ which is the element that will force the listener to increase his or her level of attention.”

Sometimes that element is silence. Sound effects, a change of voice from one speaker to another, or the onset of a music bed also can work.



Michelle McDonald examines the financial aspects of a new building or reconstruction.

See MANAGEMENT, page 24 ▶

Profitable digital

In two sessions on Monday April 19, “Going Digital: If You Build It...” and “Going Digital: ...When Will They Come?”, panelists will address questions about digital that weigh on the minds of general managers and sales managers, including aspects of RDS.

“We’re thinking about what kinds of promotions stations can run using the new Radio Broadcast Data System, and how much money they can make with it,” said Ray Miklius, vice president studio systems for Broadcast Electronics Inc.



Dirk Freeman moderates a session about research into what works in radio ads.

“We know that the investment must be justified, and I think there are many opportunities.”

He suggested several ideas including value-added commercials.

“If your advertiser signs up for an audio ad, the text can display a phone number, Internet address or even a coupon,” said Miklius. “Eventually, a multi-media display will be possible, and the station can charge a premium above the cost of the radio ad for these ser-



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NAB By the Numbers

Selected NAB convention attendance, approximate, as reported by the association.

1986:	39,000
1990:	50,400
1995:	83,400
2000:	115,300
2001:	113,400
2002:	92,400
2003:	88,000

See us at NAB2004 Booth #N1902

NAB Show Highlights

Aside from the Broadcast Engineering and Radio Management Conference sessions reported elsewhere in these pages, there are a number of keynotes, events and related activities at and around NAB that are of interest to radio. Here's a sampler. Some are not officially part of the convention. Information about these can be found at www.nabshow.com except where noted.

Public Radio Engineering Conference

Las Vegas Hilton
www.prss.org
Friday-Saturday, April 16-17



SBE Ennes Workshop

www.sbe.org
Saturday, April 17, 8:30 a.m.



NRSC DAB Subcommittee & NRSC (Full Committee)

Las Vegas Hilton
www.nrscstandards.org
Saturday, April 17, 2 p.m.

Broadcast Engineering Conference Keynote

Gary Shapiro, President/CEO, CEA
Sunday, April 18, 9 a.m.

NAB Career Fair

Sunday, April 18, Noon

RTNDA@NAB

Conference/expo for radio/TV news
www.rtna.org
Las Vegas Hilton
Mon.-Wed., April 19-21

Congressional Breakfast

Monday, April 19, 7:30 a.m.

All-Industry Opening Ceremony

Carly Fiorina, Chairman/CEO, Hewlett-Packard; Oprah Winfrey
Monday April 19, 9 a.m.



Carly Fiorina

Photo courtesy Hewlett-Packard

"Homeland Security: MSRC & the Role of Broadcasters in National Emergencies"

Session
Monday, April 19, 10:30 a.m.

Worship Technology Conference

Technologies used in production for churches and ministries
Mon.-Thurs. April 19-22



Sam Donaldson interviews FCC Chairman Michael Powell

FCC Chairman's Breakfast

Tuesday, April 20, 7:30 a.m.

Radio Luncheon

Mormon Tabernacle Choir's "Music and the Spoken Word" inducted into the NAB Broadcasting Hall of Fame; Crystal Radio Award winners announced.

Tuesday, April 20, 12:15 p.m. (ticket req'd)



Craig Jessop conducts the Mormon Tabernacle Choir.

"What's Fit to Air? Indecency, Advertising and Other Controversial Content"

Session
Tuesday, April 20, 2:15 p.m.

Management

Continued from page 23

"A lot of people are afraid to use a negative emotional tone, but they shouldn't be," Bolls said. "The data we have suggests that people pay more attention to negative information."

Also Tuesday morning is "Effective Radio: Turning the Research to Reality," with Jeffrey Hedquist, president of Hedquist Productions.

"Commercials need to speak to people with drama and stories," he said. "The radio audience doesn't care about sound design, which will only impress a production director. They need to hear something that will relate to them or someone they know."

Hedquist plans on creating commercials on the spot using suggestions and copy points provided by his audience.

"There are a thousand stories buried in our own lives and the lives of our clients," he said. "If you take the time to uncover them, you will avoid the 'I tried radio and it didn't work' syndrome later."

A morning Wednesday is "Building, Building Out, Building Over: Facilities

"New Technologies for Digital Media"

Super Session
Tuesday, April 20, 2:15 p.m.

"Regulatory Face-Off"

Session. FCC Commissioners Abernathy, Copps, Martin and Adelstein and Acting NTIA Administrator Michael Gallagher address media ownership, the transition to digital and other issues.

Tuesday, April 20, 4 p.m.



Commissioner Michael Copps

Broadcast Pioneer Awards

Broadcasters' Foundation salutes pioneers and gives its Chairman's Award to retired Commissioner Jim Quello, who turns 90. Happy Birthday, Boss. Bellagio Hotel
www.broadcastersfoundation.org
Wednesday, April 21, 7:30 a.m.

Independent Spanish Broadcasters Assn.

Constitutional Meeting
www.spanishbroadcasters.com
Wednesday, April 21, 9 a.m.

Technology Luncheon

Presentation of NAB Radio Engineering Achievement Award to Glynn Walden; keynote by Donald A. Norman
Wednesday, April 21, Noon



Glynn Walden

Amateur Radio Operators' Reception

Wednesday, April 21, 6 p.m.

"Still The BEST..."



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- Built-in Mixer
- External Processing Loop
- Switchable High Level/Mic Inputs
- Remote Frequency Change
- DTMF Control of Channel and Bandwidth
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TFT

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Wednesday

► Continued from page 21

recent FCC action in the Broadcast Auxiliary Service, Ericksen wrote, "The application of Part 101.103(d) prior coordination notice (PCN) frequency coordination protocols to 950 MHz Aural BAS stations. This requirement went into effect on Oct. 16, 2003, when the FCC declined to grant the SBE request for a second and final six-month stay of the PCN requirement.

"Besides the continuing sad shape of BAS records in the ULS, the standard that the FCC Rules suggest be used for PCN studies, TSB-10F, is 10 years old and does not address Aural BAS operations. Thus, there does not yet appear to be an 'industry consensus' of what D/U ratios should be used, and in that case Section 101.105(c)(2) of the FCC Rules says you must use a co-channel D/U ratio of 90 dB, and an adjacent-channel D/U of 56 dB," Ericksen continued.

"Few 950 MHz Aural BAS paths are likely to meet such stringent interference criteria. Concerns about the inapplicability of TSB-10F to Aural BAS, and the need for that June, 1994, standard to be updated, were pointed out to the FCC in the SBE petition for an extension of the PCN stay, but to no avail."

Facilities

"Radio Facilities Management" is the afternoon topic; it will be moderated by the immediate past president of the SBE, Troy Pennington, who is chief engineer for Cumulus Broadcasting in Mobile, Ala.

"Broadcasters in the Open Source Age" will focus on "free" software, the source code of which is available to the public and can be modified to meet specific needs.

Fred Gleason Jr., director of broadcast software development for Salem Radio Labs/Salem Communications, will discuss open source and applications such as office automation, audio editors/effects processors/plugin-ins, telephone call screeners, on-air play systems and hard drive automation systems.

"This very process has been going on in the film industry for several years now, with the result that open source OSes like Linux are now the dominant platforms there," he said.

"The reason, cited over and over again by the major players in that industry, is customizability, as opposed to the 'one size fits all' mentality of Microsoft and its ilk. It is my hope to help ignite a similar revolution in the radio sector."

"Quality Assurance in Technical Management" is an approach to running a technical facility that establishes baseline performance benchmarks for all aspects of the operation, including staff, systems, computers and equipment.

"In a time when all technologies are evolving at an ever-increasing pace, a QA program defines to the users of systems and corporate management exactly what level of performance can be expected," stated David Baden, chief technology officer of Radio Free Asia.

"In addition a QA program provides a set of analytical tools that help make

hard cost/benefit decisions about upgrading and/or changing systems and operational procedures."

"Effective Project Management — Implementing New Technologies and Controlling Risk" will be addressed by Kevin English, director of media and entertainment consulting for EDS.

"When you look at the media today, technology is becoming increasingly important. Technologies are becoming increasingly intertwined," he said. "As this happens, failure rates are increasing. We are paying more than expected and realizing increasing time requirements."

English will focus on 10 basic areas in this presentation. "Planning is essential in any project. Continuity must take place in the planning, construction and

operations phases."

The thrust will be how to quickly identify areas where the project is completed within budget and on schedule.

"Grounding Practices for Broadcast Facilities" are essential in studio and transmitter facilities.

Alan Rebeck, director of engineering for RO Associates, said, "I can honestly tell you that improper grounding accounts for up to 40 percent of improper operation, unnecessary lightning damage and downtime to telecommunications and broadcast equipment.

"Approximately six months ago," he recalled, "I performed consulting for a country radio station in Alabama that was off the air more than on, corrected the grounding at their transmitter site, and to my knowledge they have not been off the air since."

"Standby Power Generation's Role in Disaster Preparedness and Recovery" will be presented by Gary Olson, technical counsel of Cummins Power Generation.

This topic is timely in light of the blackout that affected the Northeast United States last year.

"To protect their facilities in the event of short or long-term power outages, broadcasters should plan to do an assessment of their facility, and the economic and safety impacts of going without power for any length of time," said Charlotte Hanley of Cummins.

"For reliable, cost-effective protection against outages, the most popular technologies in the marketplace today include uninterruptible power supply systems and diesel generators, as the costs of emerging technologies are significantly higher than reciprocating engine-based technologies."



XPi10: Hey, where's the signal generator?

The new BE XPi10 HD Radio signal generator is installed at the studio, rather than the transmitter. Why? To reduce STL bandwidth and repurpose more of your existing gear when you implement HD Radio. The XPi10 lets you take advantage of the revenue-producing opportunities of HD Radio, such as Advanced Application Services (AAS – the cool stuff on the receiver screens) and secondary audio service. Contact us for details on how the XPi10 gives you more HD Radio migration choices, protects your equipment investment from obsolescence, and saves you money.



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World Radio History

Honoring 'Music and the Spoken Word'

Luncheon at NAB Convention Will Include a Performance by the Choir

by Michael Hedrick

"From the crossroads of the West, we welcome you to a program of inspirational music and the spoken word."

For some 75 years those words have introduced the Mormon Tabernacle Choir's "Music and the Spoken Word," a radio and later television program that has brought music and inspiration to a worldwide audience.

First broadcast on July 15, 1929, it has garnered a weekly audience in the millions and a list of prestigious

awards. That list will increase by one on April 20, when the program is inducted into the NAB Broadcasting Hall of Fame at NAB 2004's Radio Luncheon in Las Vegas. The luncheon will include a performance by the choir.

"NAB's board of directors chooses Hall of Fame inductees based on a variety of factors," said Dennis Wharton, NAB's senior vice president of corporate communications, "including the impact on society, longevity of performer, group or program, and its

popularity. The Mormon Tabernacle Choir's "Music and the Spoken Word" is an ideal choice for the Hall of Fame given that it is currently the longest continuously running program in broadcasting."

Cueing by telegraph

"It's a singular honor," said Craig Jessop, the choir's music director. "It's a tribute to the choir as an American music icon and to the collective efforts of thousands of singers and a handful of music directors and organists."

"This is absolutely wonderful. To have NAB recognize it is unparalleled," said Greg Garber, the GM of Bonneville Communications, the divi-

sion of Bonneville International that produces the show as a community service. "We would love to see as many radio and television stations carry it as possible."

The program comes from humble beginnings. For its first broadcast, the announcer perched on a ladder to reach the show's only microphone and took his cue from hand signals, while the audio engineer received the start signal by telegraph.

Today the show appears on about



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The Mormon Tabernacle Choir performs at the Opening Ceremonies of the 2002 Olympic Winter Games

2,000 radio and television stations and cable systems. The 30-minute program is broadcast every Sunday from the choir's home at Temple Square in Salt Lake City, and consists of four or five choral numbers accompanied by an organ and an orchestra. An inspirational message is read by the announcer about two-thirds of the way through the program.

In its long history, the program has had only three announcers: Richard Evans, Spencer Kinard and the announcer since 1990, Lloyd Newell.

The 375-member choir is a picture of devotion. An all-volunteer group, they pay their own expenses, and some choir members travel over 150 miles roundtrip several times a week to attend the public rehearsal on Thursday, the show on Sunday and other events.

Spiritual moments

"I love rehearsing," said Jessop. "Being there on a Thursday for the first 30 minutes before the rehearsal opens to the public, when we're alone in the vault (of the Tabernacle) is truly a spiritual moment. Quiet moments like that are the most special."

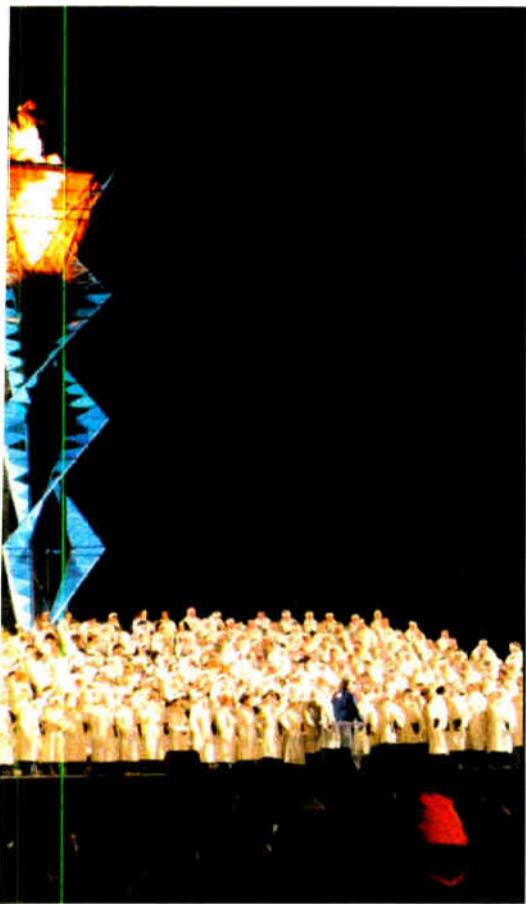
Its members' devotion has been rewarded with an international reputation and a bevy of music and broadcasting's highest awards, including gold and platinum records, a Grammy, an Emmy and a 2003 National Medal

See CHOIR, page 27 ►

Choir

► Continued from page 26
of Arts, the nation's highest award for artistic excellence.

"Wherever the choir goes, there are these magic moments that just happen," said Garber. "They went on an 11-concert tour last year and appeared in some of the premier choral music concerts in the country.



"They stayed one time at the Marriot Marquis," a hotel in New York city with a 400-foot-tall atrium, "and one morning they performed a few songs at the bottom of the atrium. People came out of their hotel rooms and lined the balconies to listen to this incredible free concert."

We would love to see as many radio and television stations carry it as possible.

— Greg Garber

The choir itself was formed in August 1847, not long after the first Mormon pioneers settled near the Great Salt Lake, and draws its roots from the tradition of singing hymns during the westward trek and around nightly campfires.

Billions served

Since then its storied history has grown to include performances with other famous music groups, such as the New York Philharmonic Orchestra and the Royal Orchestra of London. In 2002 it sung at the Opening

Ceremonies of the 2002 Olympic Winter Games in Salt Lake City, a performance seen by 2.5 billion people, according to Garber.

The choir has also produced some 150 recordings, was the first to record in stereophonic sound and had a record taken on an Apollo space mission.

"I'm very taken by the way the American public has sustained and valued the choir," said Jessop. "During a recent tour of the East Coast, I was overwhelmed by the affection of the public for the choir."

While the "Music" is provided by the choir, the "Spoken Word" is handled by the announcer. The inspirational message offers a simple piece of life wisdom. Recent messages have emphasized looking to trusted family

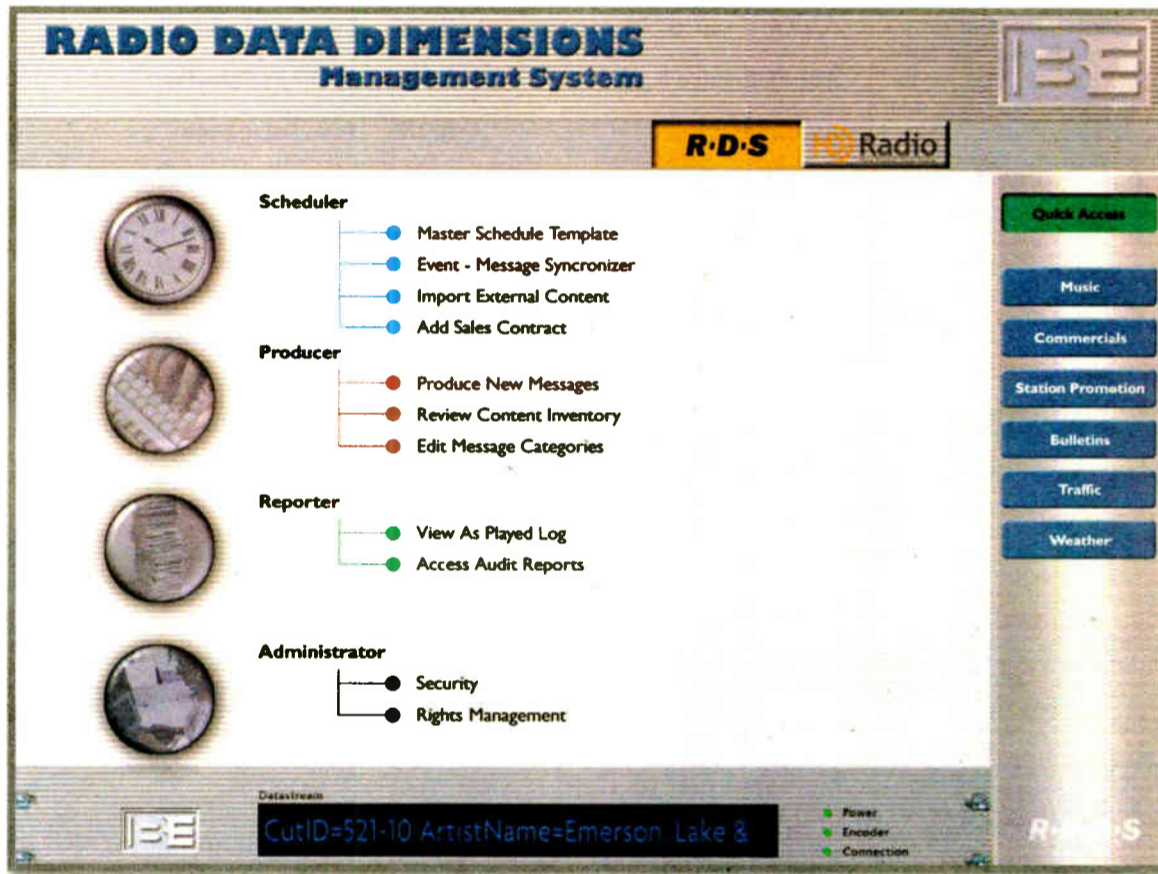
and friends for guidance, forgiving human foibles and understanding the power of words.

The tradition of the weekly message grew out of Evans' habit of relating the title of a song to a life lesson, which eventually became a short sermon and finally a formal message. During Evans' 41-year tenure, he wrote every message, though that duty is now handled by a group of writers, including the announcer.

"Music and the Spoken Word" is an American tradition that continues to draw and speak to a huge audience, and it's fitting that its story should end the same as each program, with the words: "Again we leave you from with the shadows of the everlasting hills. May peace be with you this day and always." 🌐



Lloyd Newell is only the third announcer in the program's 75-year history.



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World Radio History

EXHIBITORS



**THE WORLD'S LARGEST
ELECTRONIC MEDIA SHOW**

April 17-22, 2004 - Las Vegas, NV

NAB2004

Exhibit Hours

Mon. April 19	9 a.m.-6 p.m.
Tues. April 20	9 a.m.-6 p.m.
Wed. April 21	9 a.m.-6 p.m.
Thurs. April 22	9 a.m.-4 p.m.

The following is a selection of exhibitors of interest to radio attendees at NAB2004. Highlights are paid for by exhibitors, information is from the companies. Check the on-site program for changes, late-registering suppliers and the full list of convention booths.

Booths preceded by the letter N are in the North Hall of the Las Vegas Convention Center. C indicates Central Hall, SL is South Lower Hall, SU is South Upper Hall, MM is Mobile Media, MR is Meeting Room. Booths preceded by R are RTNDA booths at the Las Vegas Hilton.

360 Systems <i>On Display: Short/cut, Instant Replay, DigiCart II, DigiCart/E Audio Server</i>	C9606	Active Power Inc. <i>Intro: CleanSource UPS 1200, a battery-free, flywheel-based 1200 kVA UPS that handles crowbar events, eliminates need for lead-acid batteries; space-saving, environmentally friendly, efficient, tolerant of temperature extremes, extends company's systems into megawatt class.</i> <i>Also: CleanSource DC, CleanSource UPS, GenSTART</i>	C1217	Ametek Hunter Spring <i>Intro: Retractable reels for power cords, coaxial cable, Ethernet and other cables.</i>	C2329
5 Alarm Music <i>Intro: Poetic and vividly emotional production music. Your personal music concierge. Film music, American culture, ethnic, edgy, cyber-space offbeat, urban street.</i>	SU7052	A. F. Associates Inc.	C4722	Ampex Data Systems Corp.	SU12007
A.N.T. Antenna Nord Telecomunicazioni	N4208	ADC	C6413	AMS Neve <i>Libra Live Series II, DFC, AFSC, Logic MMC, Neve Outboard</i>	N1612
ABE Elettronica S.p.A.	C1432	Adder Technology	N2736	Anchor Audio	N3027
ABS Trade srl	N3326	Adobe Systems Inc.	SL4730	Andrew Corp.	C5706
AccuWeather <i>Intro: Weather content extended to the wireless arena.</i>	C6034	Advertising Edge	N2016	Anton/Bauer Inc.	C3806
Acoustic Systems <i>Broadcast and control room product lines.</i>	N4108	AEQ	N1312	Aphex Systems <i>Intro: Model 320D Compellor with digital I/O 24/96; Model 1100 MKII Two-Channel discrete Class A microphone pre-amp, 24/192 A/D, MicLim; Model 228 eight-channel -10dB to +4dB interface, metering selectable for each channel, independent output control.</i> <i>Also: 2020 MKIII, 720II, 320A, 622, 661, 207, 204, 120A, 124</i>	N1009
Acrodyne (Ai)	C3836	AEV	N4122	Apogee Electronics	SL3458
		AKG Acoustics	N4018	Appliedinfo Asia <i>Intro: Bicultural and bilingual media-related ventures between the United States and China.</i>	SU9980
		Allen Osborne Associates Inc. <i>Intro: A4-30 is a stand-alone, four-leg pneumatic mast, can go up to 30 feet and hold 50 pounds top load, can be placed anywhere in five minutes with one engineer. Comes with air pressure device and tools and instructions. Cost is under</i>	C7748		



BCM 104 High Resolution Broadcast Microphone

Think Of It As A Stealth Fighter For Your Voice

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Neumann has been doing a lot of listening lately. We've been listening to the radio, and what we've heard is that the world really does need a better broadcast mic. A much better one. Introducing the first Neumann mic built expressly for broadcast applications. Our new BCM 104 is a condenser mic that can handle any talent that's thrown at it, and make it shine. And best of all, it does it at a price that's "broadcaster friendly."

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The New Las Vegas Monorail

\$5,000; Drive-Up Mast is a stand and up to 30 ft. drive-up mast system, under \$3,500.

Also: Remote mobile mast

Allergy Alert **C10419**
Intro: More than 72 million Americans suffer from allergies. Attract them to your station by including daily pollen forecasts as part of your news/weather coverage; link to www.pollen.com and displaying the allergy forecast on your site.

Allied Tower **C10110**

Altronic Research Inc. **N1309**
On Display: 6612, 77150

Ambient Recording **N3728**

American Radio Relay League **Lobby 9**

American Tower **N3338**

APT (Audio Processing Technology) **N902**
Intro: WorldNet Oslo is a modular multi-channel/-interface codec in a 3U enclosure, up to 24 channels of audio and supporting E1, T1, X.21, ISDN and TCP/IP data interfaces. Delivers packetized audio via Ethernet port or connect LANs/WANs over timeslots on a synchronous network. Core algorithm is Enhanced apt-X, suitable for FM, DAB and HD services. Latency is suitable for STLs and studio-studio (STS) links; also, WorldNet Ohio is a 1U, V.35 / X.21 codec with a single integrated ISDN Terminal Adapter for backup, for STLs and STS; WorldNet Duo provides two discrete channels of audio simultaneously delivered to separate locations using independent data circuits; ACM apt-X Codec software provides apt-X encode and decode functionality with ACM-enabled applications; WorldNet Porto is a hand-held solid-state recorder using CompactFlash card.
Also: Licensing apt-X on DSP, WorldNet

SkyLink, WorldNet Rio, WorldNet Milano, WorldNet Tokyo, WorldNet Chicago, Adobe Audition Plug In, Soft apt-X.

Arena-Maxtronic Inc. SL2966
Intro: Rack-mount RAIDs for data protection.

Armstrong Transmitter N706
On Display: Solid-state, HD Radio-ready AM transmitters, solid-state and single-tube FM transmitters, analog and digital STL systems, passive RF products, custom RF projects.

Arrakis Systems N2022

Associated Press/ENPS SL2775

AT&T SL4740
Intro: Digital Content Management Service.

ATA Audio N4026
Intro: Scoop E-Z. Transmits broadcast-quality audio over POTS/ISDN/GSM. Unit weighs less than 4 pounds including batteries.
Also: Scoop Studio

ATCi/Antenna Technology C11222

ATS Communications C9441
Intro: Rock 'n Roller Multicart is a lightweight equipment moving vehicle that can be set in nine configurations; also, R12 All-Terrain Multicart has pneumatic wheels for a smooth ride over rough ground; RKR Multiclips are universal lavalier mic clips that hold one or two mics in any orientation, with wire strain relief grip, magnetic style available; Rowi clamps and Table Tripods; Voice Technologies IFB earsets. Wholesale and retail.

Audemat-Aztec Inc. N1426
Intro: FMB80's new feature, Scrolling PS, enables you to scroll dynamic messages (titles of songs, artist information) and mix these messages with the static call letters. Your listeners using a basic RDS car receiver without Radiotext will be able to read this information. The scrolling is carried by word.
Also: Navigator 100/1000, FM_MC4, AM Fieldstar, RDS FMB10, FMX410, FMX480, Goldeneagle FM/AM, IP2 Choice, IP2 I/O.

Christophe Poulain, VP, Business Development
19501 NE 22nd Rd.
North Miami Beach FL 33179
Phone: 305-692-7555
FAX: 305-682-2233
E-mail: poulain@audemat-aztec.com
Web Site: www.audemat-aztec.com

Audio Accessories Inc. C2928

Audio Engineering Associates N2436
Intro: AEA R84 DJV is based on the R84 "big ribbon" microphone. Optimized for voice work, the DJ Version delivers a big intimate sound that is articulate, smooth, bright and natural. Protected for close-up use, it is boom-compatible and will be demonstrated on LPB Quiet Booms. AEA R44 and R84 microphones use ribbon material manufactured for RCA.
Also: R44C classic radio ribbon; R84 accent and solo studio ribbon

Audio Ltd./MacArthur Group N2118

Audio Precision N2716

Audioarts Engineering N2802

AudioScience N405
Intro: The ASI8702 PCI Tuner card contains eight AM/FM radio tuners. Audio from each may be recorded to the computer's hard disk. Audio is available from a connector on the card bracket. Applications include station monitoring, logging and advertising verification; also, the ASI5044 PCI sound card contains four stereo analog and AES/EBU inputs and outputs with sample rates up to 192 kHz. Used with the AudioScience WAVE

driver, up to 12 play streams and eight record streams are available. Windows WDM Multi I/O (WDM-M) Driver for AudioScience sound cards allows sound card physical inputs and outputs to be utilized by DirectSound applications.
Also: ASI5111, ASI4342, ASI6114, ASI6244, SoundSlice

Audio-Technica U.S. Inc. N3712
AT3060 phantom-powered tube microphone, AT822 and AT825 stereo microphones, AT849 stereo boundary microphone, AT804 omnidirectional dynamic field microphone, 40 Series studio production microphones, 30 Series studio production microphones

AV Internacional N2728

Avid Technology SL4761

AVP Mfg. & Supply Inc. C2241

Intro: Versatile bulkhead panel system, offering various bulkhead configurations with choice of 30+ connectors; Percon Cable analog and digital audio and video cable.

Axel Technology SRL N2026
Intro: Falcon 50 six-band digital audio processor for FM and DAB; Macrotel Digital telephone hybrid; Digi-Ware software for TV and radio program management and playlist creation; DJ Pro modular system for automated radio broadcasting.

Azden Corp. N4016

B&H Photo Video SU11049

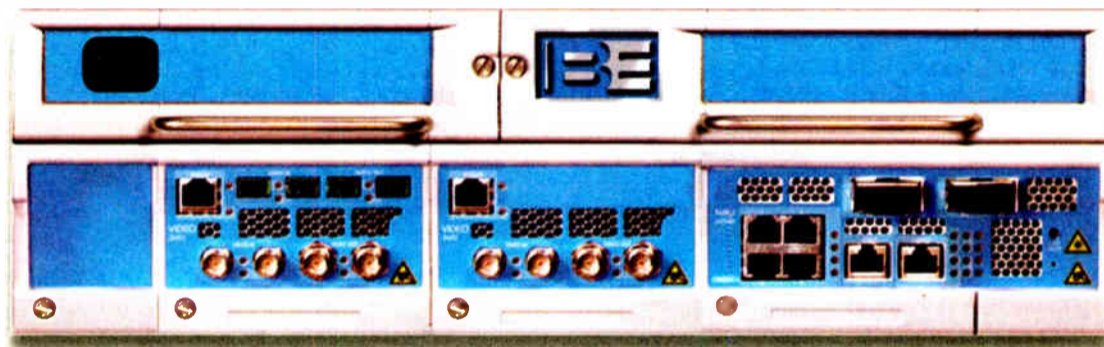
BBC Technology SU8469

Belar Electronics Lab N2012
New: FMMA-2 Wizard, Sentry 16 and latest version of Wizard for Windows software.

FMMA-2 has a DSP FM demod and improved filtering for HD Radio compatibility; Sentry 16 provides 16 channels of logic/level alarms; our latest software allows networked monitoring of multiple sites over WAN, LAN, VPN and the Internet.

Belden Electronics Division C3351
Intro: Brilliance RF500 and RF600 Low-Loss 50 Radio Frequency coaxial cables for use as antenna jumper cable assemblies and short antenna feeder runs in wireless communication systems, also can be used in (in-building) wireless applications such as internal communication systems and wireless LANs (WLANS/Wi-Fi); 7987A unshielded twisted pair (UTP) cable for the professional audio/visual installation market.

Bext Inc. N1202
Intro: XT 1000 FM Transmitter is frequency-agile, has low-pass/harmonic filter, can be



Big Pipe: This is not your father's STL.

Big Pipe is not just another studio-transmitter link. With scalable, bidirectional capabilities up to a whopping 45 Mb/s, you can interchange analog and digital audio, HD Radio data, Ethernet, serial data, video, and telephony via a wireless or wireline path. Scalable, flexible, and reliable, Big Pipe works just as well for studio facility interconnects and many other media transports needs. Because it comes from BE, you know that Big Pipe is designed for the realities of radio, including tight budgets and rock solid performance. Contact BE for details.



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used as stand-alone transmitter, with front-panel programmability in 10 kHz increments, soft start from RF mute, status and adjustable power output, automatic power control maintaining stable output at any preset level, main parameters available also on rear terminal board for remote control, available with optional stereo generator, optional compatibility with external references for custom phase locking in synchronous applications, LCD display for functions and parameters on front panel; also, FM high-power combiner systems and FM band-pass filters.

beyerdynamic C7604

Bird Electronic Corp. N722

Bittree Inc. C3355
Audio patchbays, patchcords, accessories

BlackBall Inc. SL5340
Intro: **BlackMagic Personal Edition Rich Media Storage for your audio, video and picture files (and all your other files too!). Desktop scales and integrates into enterprise deployments. Files are easily found with BlackMagic's powerful searching of typical file system info, BlackMagic metadata, metadata contained within a file and the contents of a file. Patent-pending delta versioning ensures every version of your file is available without chewing up massive amounts of disk space; BlackMagic Workgroup Edition Rich Media Storage, five users can access a BlackMagic desktop volume from any platform through a Web browser; BlackMagic Server Edition Rich Media Storage handles from 10 to an unlimited number of users access to a BlackMagic server volume from any platform through a Web browser or MS Windows file explorer; BB-Tuner, the most accurate tuner on the market, harnesses the power of a computer to process BlackBall's sophisticated, proprietary frequency identification algorithms. Stay tuned!**

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Boxx Technologies SL1755

Broaddata Communications Inc. C3133
Intro: The 250E/260E Series is a transmission system capable of carrying simultaneous unidirectional or bidirectional broadcast analog video, audio and/or data transmissions over single-mode or multi-mode fiber; also 1200 Series fiber-optic serial digital audio transport system.

Broadcast Electronics Inc. N1902
New: A broadband, high-frequency link capable of 45 Mbps and a software management and coding system for data applications transmitted over RBDS or HD Radio; also, an affordable migration path for next-generation HD Radio; and a new interface for AudioVault digital audio systems. **Also:** FM and AM transmitters.

Broadcast Microwave Services Inc. C1406

Broadcast Software International N2534
Intro: Simian version 1.6 radio automation software provides automated retrieval and display of weather forecast and conditions. The upgrade has increased functionality with features that include voicetracking, MP3 file handling, mixer control and HTML output.

Broadcast Software Solutions Inc. SU7173

Broadcast Store Inc. C2041

Broadcast Tools Inc. N1500
Intro: LOV II Loss of Video Switcher with quad audio switcher; DMS III AES digital monitor/switcher; PS 99 programmable time scheduler and the Console Controller 5 (CC-5). The CC-5 provides the solution for interfacing nonbroadcast consoles and DAWs to the broadcast studio. The CC-5 replaces the veteran CC-IIA console controller and the SS 16.16 crosspoint switcher. **Also:** ACS 8.2, SS 8.2, SS 16.4, SRC-32, Tiny Tools, SM III, AVR-8

Broadcast Warehouse N1710
New: DSPX FM, AM, digital radio and Internet streaming digital audio broadcast processor. **Also:** Low-power FM transmitters.

Broadcasters General Store N2718

Burk Technology N3702
Intro: ARC-16 Web Interface provides Web-based control and monitoring for the ARC-16 transmitter remote control system. Connected

ARC-16s can be linked to one interface to allow site control from a browser on any networked PC. LAN/WAN capability, alarm notifications by e-mail or SMS. Install at the transmitter, studio or anywhere Ethernet is available; also, GSC/VRC Web Interface brings IP capability to the GSC3000 and VRC2500 transmitter remote control systems, allowing site monitoring and control from a Web browser on the LAN/WAN; Lynx 5 software brings new features to the GSC3000 and VRC2500; also, a new tool is available in Custom Tools for on-screen trend analysis. A historical graph shows multiple channels for quick review and comparison without the need to view and print reports. Expanded options in Custom Views allow more customization; also, firmware version 5.6 for the ARC-16 transmitter remote control system. **Also:** GSC3000, VRC2500, ARC-16 transmitter remote control systems

Burli Software Inc. N3734
Intro: Updated single and multitrack audio editors for journalists; many other updates to this newsroom computer system for radio. **Also:** Burli Newsroom System

Burst Electronics Inc. C7614
Audio switchers, audio DA, passive A/V switchers, GPI-to-RS-232 converter

Calrec Audio Ltd N1012
Intro: Hydra audio network is in use alongside three networked Sigma 100 consoles at CNBC in New Jersey. It is an advanced networking and mic preamp system, which enables I/O resources to be shared through the range of Calrec digital consoles. **Also:** Alpha 100, Sigma 100, Zeta 100

Channel Master C12025

Chromatec Inc. SL5224
Chromatec AM-32VGA Audio Meter/Alarm System, Bel 5110 Broadcast Profanity Delay

Clark Wire & Cable C10013
Intro: Fiber-Optic Cable Breakout Reel for all-weather portable and remote use, includes military-grade tactical fiber that is crush-resistant, durable, lightweight, and flexible at all temps; DT12 Feedthru Breakout Box with DT12 connectors at both ends to extend a snake through this box to another location so multiple locations may be served with one snake run, the box includes male and female XLR connectors (paralleled) for each of the 12 audio pairs;

also, new patchbay products by ADC. The Unipatch series adds versatility with a minimum need for rack space; PPE series of audio patchbays; General/Carol power cables to provide replacement power cords for technical equipment.

Also: SPA22GS, RS22G2 ribbon stereo, 700-800-1300 series audio snakes, SPKR series speaker cable, Mink4 and Fieldflex mic cable, network cable

Clear-Com Communication Systems C7406
Intro: CellCom wireless intercom with digital matrix technology. Its 1-RU base station supports 10 wireless belt packs, interfaces with two channels of PL and four 4-wire/matrix ports, supports 10 transceiver/antennas that can be remoted up to 1,000 meters to create customized coverage zones. Belt packs have two volume controls for access to two communications channels, with three selector buttons to choose different pairs of channels, on-board programming of user parameters and a backlit LCD display for programming and belt pack status; RS-600 Series adds flexibility to a compatible belt pack design, has customized setup options programmable via the PC, onboard setup options viewable in the LED display and the ability to store up to four setups in memory. **Also:** Party-Line intercom systems, wireless intercom and IFB systems, headsets, interfaces, wireless microphones

Coast to Coast Tower Service Inc. N4028
24-hour emergency service, broadcast tower and antenna specialists

Coastal Satellite Inc. C11046

Coaxial Dynamics N4019

Coffey Sound N4022

Com-Tech srl RF Filters N1024

Comet North America N4210
On Display: Capacitors

Comlab Inc. N4610
Intro: Secure-IP multi-language Davicom MAC 2 site monitoring and control unit with multi-language feature allows the remote monitoring unit to send voice messages in the user's language. 128-bit encryption, the highest level of protection available for Internet communications. Access and control remote site equipment via the Web. Allows remote monitoring and control without increasing long-distance costs because alarms generated by the system are sent to a local server via Internet. **Also:** MAC2, MacNet, MacComm

Comprompter C9125
NewsKing RA, VoteMaster, SchoolMaster, ScoreMaster

Comrex N2722
Intro: Studio Telephone Access Center, aimed at stations with listener lines, talk shows and call-in segments. Incorporates two digital telephone hybrids handling up to four callers. STAC is offered in six-and 12-line versions with the ability to upgrade in the field. A control surface supports various producer and screener configurations. Features include IP-based call screening and control, auto-attendant and support of

NAB Fact: Monorail Service

The Las Vegas Monorail is scheduled to be operational, although at press time the launch date had been delayed. For more information visit www.lvmonorail.com.



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four control surfaces.

Also: POTS and ISDN codecs, including the Matrix, which sends high-quality audio over POTS, ISDN and GSM wireless connections; digital hybrids and studio telephony.

Continental Electronics N2402
See DRS Broadcast Technology

Continental Lensa S.A. N3134
Intro: AM solid-state digital transmitter, IBOC compatible, 1,500 to 100,000 watts; antenna tuning unit for digital operating, 1,500 to 100,000 watts; AM modulation monitor, featuring carrier shift measurement, negative and positive pick modulation; dummy load for digital operation, air-cooled, 1,500 to 100,000 watts

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Web Site: www.cecchile.com

Cooper Sound Systems Inc. N2424
Intro: CS208 v.2 is an eight-channel professional audio mixer with four main plus two aux outputs and communications features, optional internal A-D converters with AES/EBU outputs and eight balanced, pre/post fader outputs
Also: CS 104 ENG mixer

Corporate Sport N3828

Countryman Assoc. N3022

CP Communications N824

CPI -Eimac Division C2118
Intro: 4CM100,000G power tetrode for shortwave and digital shortwave DRM transmitters, uses multiphase cooling, high gain and Pyrolytic graphite grids. Mounting is in the standard SK-2011A socket.
Also: Power triodes, power tetrodes

Crown Broadcast IREC N712
Intro: Crown Omnia DP3, three-band digital audio processor available as an option on "T" Series transmitters, can be installed into Crown transmitters in the field as an upgrade; RTC Redundant Transmitter Controller allows the user to connect two Crown transmitters to allow for 1+1 or 1+N backup capability; Signal Clear FM250G designed for the requirements for low-power broadcasting in Europe, CE approved. Reduces the need for notch/cavity filters and circulators.
Also: FMX-DMS/RMS, translators with built-in receivers, transmitters with built-in audio processing and stereo generators. Equipment power levels from 30 watts to 4 kW.

CRT Custom Products Inc. SL2455
Intro: Alternative packaging for CD and DVD. Plastic Elmar trays adhered to board.

CTE International N1322

D.A.V.I.D. Systems Inc. SL2477
Intro: DigaSystem Latitude Edition is a scalable radio automation system for U.S. radio, enables broadcasters to record, manage, edit, schedule, automate, broadcast and distribute content. Basic setup includes three workstations, one server and networking components; software is installed, with up to 20 customization options. Core applications are based on DigaSystem code, allowing for sharing and transferring of files across systems. Components are designed to interoperate without third party-software. It is HD Radio-ready; also, BroadcastServer is the "all-rounder" for automation. Audio pieces, format elements, music, commercials are combined in a scheduler. Import modules provide content from music rotation and commercial scheduling. The On Air

application handles the transmission; Multitrack Editor 4 is a high-end audio production tool for the DigaSystem, featuring virtual track management and object-oriented production with unlimited tracks and clips, with a redesigned GUI.
Also: Database Manager, EasyTrackEditor, various tools for ingest and content distribution, DigaNewsPlayer, BroadcastServer, DigaWebSystem, DigaTravel, DigaSystem-Sequoia-Interface, utilities

D&C Electronics N2524

Dalet Digital Media Systems SL3842
Intro: DaletPlus Radio Suite provides broadcasters news production and music programming functionality that can be customized to meet the demands of their organizations. Developed on the DaletPlus media asset management platform, it manages newsroom workflows and metadata

for audio, wires, script production, editing, rundown management, broadcast and archiving.

Dasto N1326

Davicom N4610
Intro: See Comlab.

Dawnco Inc. C10943
Satellite and off-air antennas, LNBS, TI filters, block downconverters, digital and analog receivers, matrix switchers, fiber-optic transmitters and receivers, fiber-optic jumpers, nonpenetrating roof mounts, cables and connectors.

DB Elettronica Tele. N2038

Decisionmark SU7248

Delco Wire & Cable SU7062

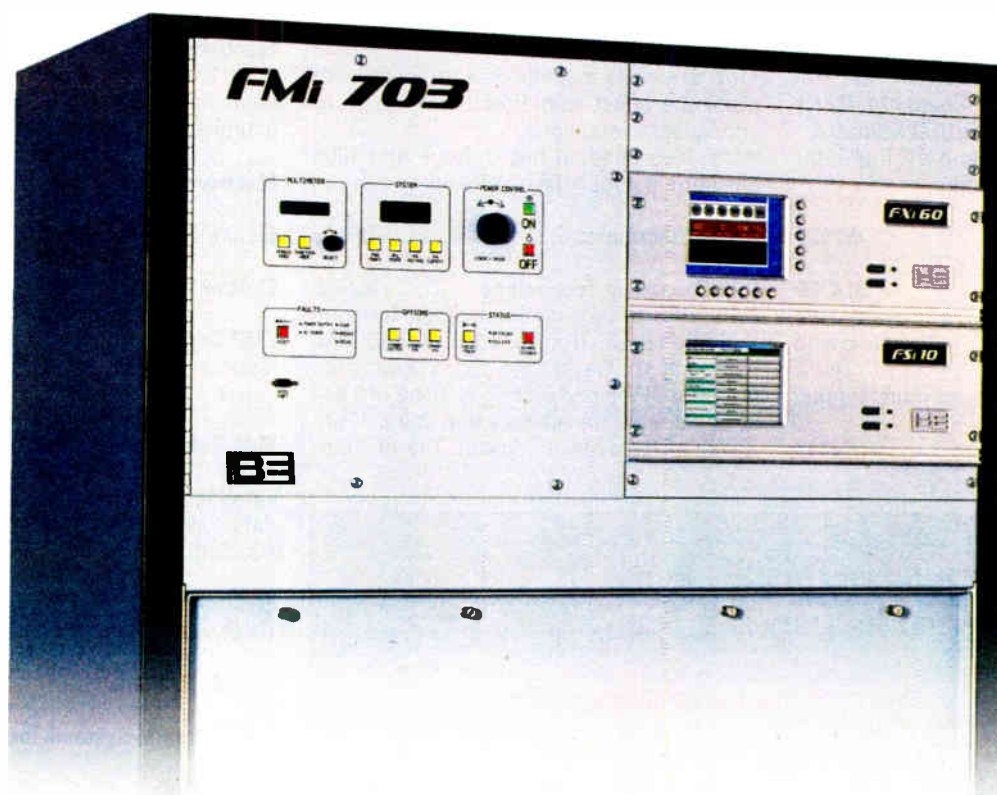
Delta Meccanica srl N2029

Delta RF Technology N602

Denon & Marantz N3026
New: Marantz Professional PMD670 Portable Compact Flash MP3/WAV Recorder permits 70+ hours recording on 1GB compact Flash cards or Microdrives and is compatible with linear PCM, and compressed MP3, MP2 (to MP3, MP2, WAV) and BWF audio formats. An EDL marking system permits creation and marking of files during recording, with variable bit-rate recording settings and user-adjustable sampling rates from 16 to 48kHz. A USB connection allows linkage to a PC or Mac for file transfer. SRP: \$899.99.

Dialight Corp. N2834

Dielectric Communications C7806



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World Radio History

Intro: DCP-E panel antenna is a multi-frequency broadband panel antenna array that operates across the FM band. It is designed to allow the stacking of numerous elements. The typical array will be several bays in a three-around configuration. This antenna is a lightweight, moderate windload flat-panel design. The array features a pressurized balun and requires no deicing under normal operating conditions; also, DCR-M quadrapole FM antenna now available with optional radomes for extreme icing environments. Radomes feature a very low windload approach enclosing the tips of each of the dipole arms thus addressing the critical areas of the antenna with a minimal change in tower loading. *Also:* Antennas, towers, lighting, monitoring, RF systems, transmission line, service.

Digidesign SL4761

Intro: The Pro Tools|HD Accel integrated production environment features sweeping sample-rate support, high-resolution audio interfaces and peripheral options, abundant track count and I/O capacity and routing flexibility; also, DigiDelivery secure global file transfer exchange system with military-grade encryption; Digi 002 and Digi 002 Rack FireWire-based Pro Tools LE music production systems; and a variety of console interfaces for Pro Tools systems, including ProControl, Control|24, Motor Mix and the Pro Tools Custom USB Keyboard. *Also:* Pro Tools LE, Mbox and DV Toolkit for Pro Tools LE software bundle.

Digram N2522

Digital Juice SL4705

Intro: StackTraxx two-volume royalty-free music library featuring 80 compositions with the ability to turn layers on/off to create original mixes or to isolate individual tracks.

DK-Audio America C3843

Intro: PTO600M half-rack version of the MSD600M++ Master Stereo Display. The unit is modular and can accept analog, AES/EBU, SDI Embedded and HD Embedded Audio with the JellyFish surround display. MSD600M-Input/2 and MSD600M-Output/2 modules for the MSD600M++, PTO600M, PTO660M and PTO600M-LS accept BNC connectors and 75-ohm termination on the digital audio signal. These modules can be set for 110 ohm and balanced input or 75 ohm termination and unbalanced operation on the AES signals. The output module has been adapted so that it sends out higher signal levels. *Also:* MSD600M++, MSD100T, MSD200C, MSD600C-III, MSD600C-5.1

Dolby Laboratories Inc. SU10443

Dorrough Electronics C7814

Intro: Remote Control to access phase, correlation and other functions in the Loudness Meters *Also:* Loudness Meters

Dove Systems C1823

DPA Microphones Inc. N2536

Intro: DPA4071 miniature microphone with presence boost omnidirectional miniature condenser microphone. *Also:* 4035 headset microphone and 4066 miniature microphone headband.

Drake Electronics SU6776

DRS Broadcast Technology N2402

Intro: DRS Broadcast Technology, formerly Continental Electronics, will introduce the beginning of a line of solid-state FM transmitters. The 815D5 and 815HD5 is a line of 5 kW solid-state FM transmitters that use a "Pure Reliable Deployment" design. The RF com-

binning and splitting system is designed to withstand three times its operating RF requirements to ensure long-term service in harsh, often abusive loads. This line wields a combiner system that ensures that the most RF gets to the output in the event of single or multiple amplifier module failure. The 815 Series includes 12 rack units of available non-interlocked 19-inch rack space and ancillary equipment power outlets; also 418G, 100kW shortwave transmitter with a new control system and DRM readiness. *Also:* 816R Series, 802B Exciter, 418 Series

E-Z Up International C12010

Econco N1406

Intro: Medium- to high-power new and rebuilt power tubes for radio and TV transmitters *Also:* Power Tubes

EDX Wireless LLC N1122

AMW, AMDAT, Signal, EDX SignalPro, MSITE and TPATH network planning and antenna propagation software.

Electronica Quasar Tech Ltda. N1003

Electronics Research Inc. N3322, C5706

Intro: 970 Series constant impedance combiner and a dual-input side-mounted FM antenna for IBOC applications.

Electro-Voice C9106

Elenos N2726

Eletronika SRL N2031

EMR Corp. N1600

Isolators, cavity resonators, transmit combiners and IM panels.

EMS Satellite Networks C12325

Intro: High-speed, two-way Internet-via-satellite communications hubs and terminals based on the DVB-RCS global open standard.

ENCO Systems Inc. SU6764, N2426

On Display: DADpro32 and NewsBoss.

Encoda Systems C5617

E-N-G Mobile Systems Inc. C6444

Energy-Onix N4023

Environmental Potentials N604, C11744

Intro: Power-conditioning systems, including EP 2000 for removal of surge anomalies and high-frequency noise; EP 2500 main gate protection; EP 2400 rack-mount power protection and frequency filtering; EP 2300 low-order harmonics mitigation; and EP 2100 Series telephone, cable and Ethernet suppression with EMI/RFI filtering.

ERI-Electronics Research Inc. N3322

Intro: Dual-input side-mounted FM antenna for analog and digital IBOC simulcast operation is designed to accept inputs from both an analog and an IBOC digital FM transmitters. The antenna is dual polarized and thanks to the isolation between the analog and digital inputs, a circulator generally is not required; 970 Series FM Notch and Band-Pass Filters and Combiners offer improved temperature stability and higher power handling capability than competing designs. The cylindrical tank construction, fabrication and tuning deliver a product that meets specifications from cold start. *Also:* FM broadcast antennas, transmission line, towers, filters, combiners, and rf components.

ESE C2522

Intro: PC-471PCI time code interface card synchronizes PC clock to master clock or other time source; ES-110 provides stable GPS-based 10 MHz and 1 PPS time synchronization; ES-242U two-input, 12-output distribution amplifier for IRIG time code. *Also:* Master clock systems, audio and video

distribution amplifiers, SMPTE/EBU time code products, audio level indicators and interfaces.

Euphonix N3616

Eventide N704

BD500 and BD960 obscenity delays; also, fourth-generation broadcast loggers, the VR615B and VR778B, Linux-based, network-capable but not network-reliant. Dual 120 GB in a RAID 1 array; data is mirrored. DVD-RAM drive allows scheduling of archiving.

Federal Communications Commission N1031

Forecast Consoles Inc. SU11639

Masterail 2.0 modular console furniture system.

Genelec N4012

Active two-way studio monitors and subwoofers in stereo and multichannel configurations.

Gepco International Inc. C1429

Intro: 61801EZ 22-gauge single-pair wiring available in 20 colors for greater color-coding options.

Also: GA Series multipair, 5596 Series digital audio cable and X-Band multipair.

Groove Addicts SL5302

Intro: Adrenalin news package created for Viacom's WBZ 4 News in Boston; Brain Freeze presents a DVD and CD sampling of Groove Addicts commercial music and sound design work plus recent themes and image campaigns created for hit television and cable networks and programs; Groove Jingles custom jingle ID package — also available for syndication — created for smooth jazz WJZW Washington, Hot AC WBMX Boston, rhythmic oldies Magic 92.5 San Diego, Capital Radio London, N-Joy Radio Hamburg, OE3 Vienna, Radio FNN Hanover and BBC Radio 2 London. *Also:* Catalog includes the following libraries: Who Did That Music, Ignite, Gravity, Revolution, MindBenders, Lift, Unity, Image, Tuff, BPM, Fontana, Sound-Pol, Ready Steady Edit and Burning Petals.

Hamilton Metalcraft Inc. C2843

Intro: Made-to-order sheet-metal fabrication services in heavier thicknesses with no loss in precision and quality.

Hamlet Video International Ltd. C3243

Hannay Reels Inc. C10317

Cable reels.

Harris Corp., Broadcast Communications C1906

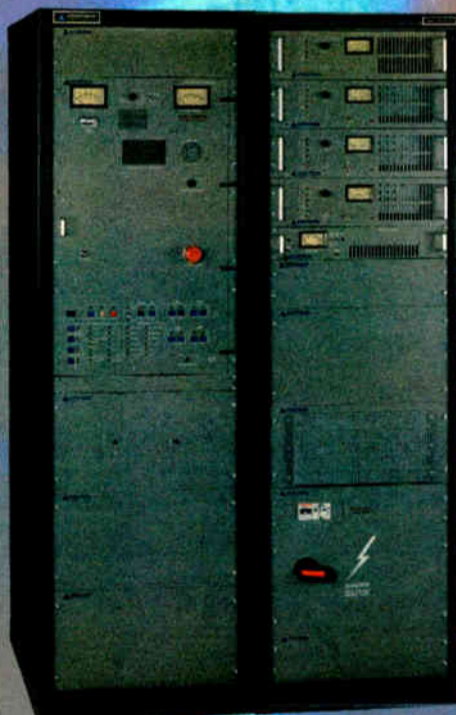
Intro: Mini-HD FM line of 10 to 700 W HD Radio transmitters for high-level and space-combining applications is available with the Harris-exclusive NeuStar option for enabling supplemental audio channels and 5.1 surround-sound applications; the ReCon Radio low-cost, facilities management system provides remote control and monitoring of broadcast, network and facility control equipment and can handle an unlimited number of status, analysis and control channels, including multiple transmitters at a single site, monitoring security alarms, RF controls and HVAC systems.

Also: NeuStar, BMXdigital, DAX AM transmitter, ZHD FM transmitter and PocketRec.

**NAB Fact:
Airport Bus**

The NAB provides bus service from the entrance of the LVCC to McCarran International Airport on Wednesday April 9 and Thursday April 10. Fare is \$5 per person, one way.

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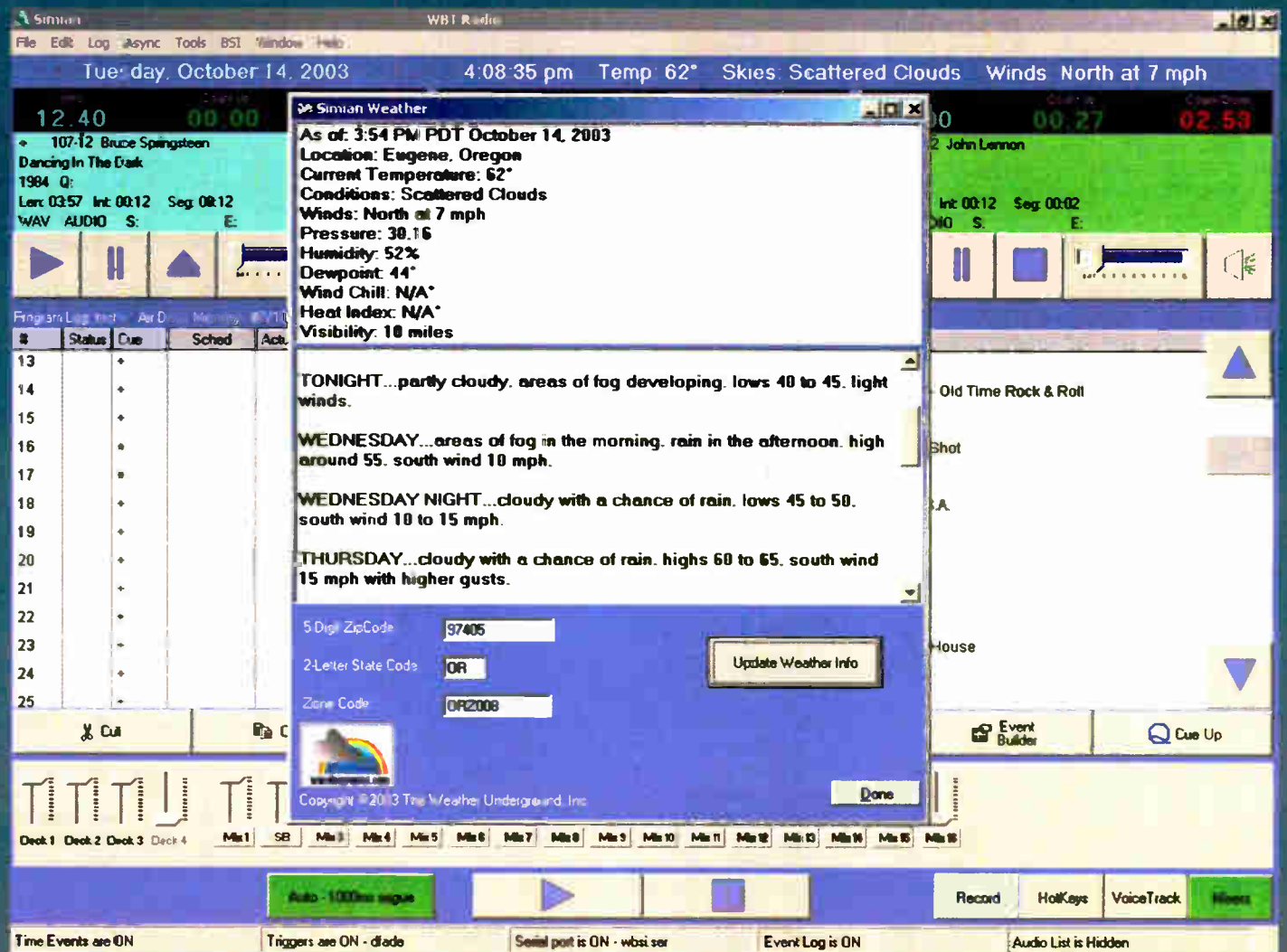
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New Simian 1.6



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Simian 1.6 is the result of input from numerous BSI users. Thanks to their input, Simian now includes an on-screen weather display that updates from the internet.

The new Simian also includes sophisticated new Voice-Tracking functionality allowing Voice-Tracking days in advance, even from remote studios, and an improved ability to verify logs before air play.

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World Radio History

- Harrison** N3016 Squareline, Whiteline and Prospec acoustic treatment solutions.
- Henry Engineering** N1100
Intro: StudioDrive on-air/production audio mixer fits in the drive bay of a PC and features six inputs, on-air program out, plus interface to PC soundcard, monitor system, headphones and telco line; also, PowerClamp transient voltage surge suppressors clamp spikes to within a few volts of the AC waveform.
Also: Matchbox HD, Superelay, USDA, TwinMatch, DigiStor-MP, MicroMixer, StereoMixer, Patchbox, Audio OnLine, MixMinus Plus and LogiConverter.
- HHB Communications** N2812
Intro: PortaDrive portable multichannel recorder records more than four hours of uncompressed eight-channel 24-bit, 96 kHz or more than 20 hours of four-channel 24-bit, 48 kHz audio to a removable 40 GB hard disk; PDRDSUF USB2.0/FireWire docking station for PortaDrive for fast file transfer with Mac and PC-based post production systems.
- Honeywell Obstruction Lighting** N3018
- Ibiquity Digital Corp.** N3334
Developer of HD Radio technology, which will transform analog radio to digital, enabling upgraded sound and new wireless data services. Investors include 15 of the nation's top radio broadcasters including ABC, Clear Channel and Viacom.
- IBC Ibertecnica** N2438
- IBM** SU9839
Radio asset management solutions.
- IEEE Broadcast Technology Society** Lobby16
- illbruck Inc./Sonex** N1800
Sonex, Fabritec, Contour, Harmoni,
- IMAS Publishing Co.** N2734, SU6570
The world leader in audio and video trade publishing for almost three decades. We reach professionals in eight languages and more than 100 countries, with true local content as well as news from around the globe. Our flagship publications often are referred to as "must-reads" for anyone in the broadcast and/or production fields. Also see Radio World.
- Independent Audio Inc.** N1300
Intro: Pearl Lab ELM-B figure-of-eight and ELM-C cardioid mcs for stereo recording feature linear capsule with more than twice the surface area of large-diameter round capsules for a consistent pattern; Pearl PML DT40 variable-pattern and CT40 cardioid tube mics; Sonifex Redbox RB-LC3 three-way power/light controller for studio light signaling; Redbox RB-DSS10 10-way 24-bit, 96 kHz-capable digital source select unit; RB-SS10 10-way stereo analog source selector/mixer; RB-DDA6W six-way word clock DA.
Also: Sonifex Net-Logger, Sonifex telephone hybrid, OKM microphones.
- Industrial Acoustics Co.** N3829
- InnovaSON** N2812
Intro: An upgrade to the Sy40 digital live mixing console, the Sensoft 8.1 software package adds features and flexibility, including the ability to configure the most suitable console layout and I/O arrangement. Consoles with Sensoft 8.1 will be sold as Sy40-8 units. An upgrade kit for existing Sy40 and Compact Live users is sold separately.
Also: InnovaSON SY40-8
- Inovonics Inc.** N3009
Intro: Model 712 full-function RDS encoder



Celine Dion performs at The Colosseum, a venue at Caesar's Palace built for her show. She's in town the week of NAB.

connects directly to station automation for song titles, contests and advertising, also supports dynamic PS in block or scrolling modes; Model 718 "DAVID-III" FM processor/stereo generator third-generation product with AGC, three-band compression and EQ, as well as new proprietary limiting and digital-synthesis baseband encoding; Omega_FM Rev. 3 software offers new features and functionality for the Omega_FM all-digital processor, including dual outputs for FM and DAB.
Also: Omega_FM, AM and FM modulation monitors, RDS encoders/decoders, FM rebroadcast receiver and analog processors.

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Santa Cruz, CA 95060
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FAX: 831-458-0554
E-mail: info@inovon.com
Web Site: www.inovon.com

International Association of Broadcasting Manufacturers (IABM) C1400

International Datacasting Corp. N2409
Intro: SR2000plus DVB/IP satellite receiver supports 256 ksym/s to 45 Msym/s for full carrier range, 10/100baseT Ethernet output, FlexKey encryption for data security, remote management and dual stereo audio decoder outputs; SFX Expansion Unit expands SFX2100 Series satellite multimedia server appliances to 2.4 GHz Pentium 4 operation with dual 10/100/1000baseT outputs.
Also: SuperFlex DVB/IP satellite receivers, SFX2100 satellite multimedia server appliance, SRA2100 satellite multimedia receiver appliance, Datacast XD content distribution software, NetManager and IP Encapsulator.

Italian Trade Commission N3331

Jampro Antennas & RF Systems Inc. C2514
Intro: FM Optimizer internally feeds FM side-mount antenna. Low Z bays and line transformers yield smooth, wide band pass with no field tuning. Certified for HD Radio. Medium- and high-power models. Use with up to 1/2-inch radial ice; radomes for severe locations; also, JAHD HD Radio dual-input FM antenna is based on a design manufactured since the 1970s, suitable for medium- and high-power FM stations wanting direct inputs for analog and digital transmitters. No digital injector and load needed. Available omni, pattern measured and FCC directional patterns; RCSF RF coaxial transfer switches available in 7/8, 1-5/8, 3-1/8, 4-1/2 and 6-1/8-inch sizes.

Jennings Technology LLC N3127
Vacuum capacitors, high-voltage capacitors, high-voltage RF products

JK Audio Inc. N4616
Intro: AutoHybrid small desktop autoanswer full-duplex telephone hybrid with XLR send and receive jacks, passive design and no

power required; RA4 rack adapter holds four AutoHybrids in 1U of rack space.
Also: RemoteMix Series mixers, THAT-2, ComPack, Broadcast Host, Inline Patch and Inkeeper Series digital hybrids.

JLCooper Electronics SU11336
Intro: The CS-Clipshot Tactile switch palette with 40 multicolored LCD buttons and a 2-x-40 backlit LCD display provides video clip access or audio playback triggering; eBOX is a 10/100baseT (Ethernet) to RS-232/-422(9-Pin)/-485 and GPI hardware interface that acts as a portal for controlling devices by IP addressable, point-to-point architecture.
Also: ES-SloMo universal instant replay controller, MCS-Pro Series and MCS Media Command Stations, Edit Suite Series, Media Control Station, synchronizers, interfaces and MIDI line amplifiers

Jubilee Products N1000

Junger Audio Studioteknik N819

Kathrein Inc., Scala Division C7817
Intro: YA7-FML (88-98 MHz) and YA7-FMH (98-108 MHz) five-element, heavy-duty broadband, folded dipole antennas designed for severe environmental situations available in center- or rear-mount versions, both are rated for 7 dBd of gain and feature a black anodized finish to help minimize ice accumulation in cold-weather locations.
Also: YA7 FM Yagi and PR-950 Paraflector.

Kathrein-Werke KG C7817A
DAB transmitting antennas, FM and TV broadcast antennas and systems, FM and TV combiners and filters and FM and TV turnkey solutions.

Kay Industries N1700
Intro: The Phasemaster Type T-R rotary phase converter with adjustable power output and built-in controls will operate any three-phase transmitter from a one-phase supply at locations when utility three-phase mains power is unavailable or too expensive to obtain; a load range controller maintains balanced voltage on all types of broadcast transmitters regardless of power requirements and built-in controls and surge protection facilitate installation.

KD Kanopy N4626

Kenwood Communications N1626

Kintronic Labs N3709
New: Kinstar low-profile antenna technology.
Also: Broadcast antenna systems and accessories for the VLF/LF/MF/HF bands.

Klotz Digital America N4216

KLZ Innovations N724

Konan Technology Inc. SL2159

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Intro: The Konan-AudioArchive system digitizes music from CDs and/or tapes and stores, searches and manages digitized contents through a network, optimizing audio asset management through information sharing and optimal DBMS-based information management.

KWS-Electronic GmbH C2588

Intro: AMA 300, 301 and 302 field-strength meters with color TFT or black-and-white tubes and printers for frequencies from 5 MHz to 2.15 GHz; components and accessories for FM, TV and satellite systems, including amplifiers, switches and outlets; software package for antenna network design, planning, maintenance and service.

Lakesoft N2836

Larcan USA C3846
On Display: FM translators/transmitters

Lawo AG N716

Intro: Zirkon and zirkonXL configurable compact mixing consoles for on-air and production; z4 digital minimixer; Nova73 HD scalable digital audio matrix; and mc2 production console for complex productions with HD technology and new functions.

Leader Instruments Corp C4142
On Display: PTO600C-III.

Lectrosonics Inc. N3316

Intro: UCR411A compact receiver has updated firmware and LCD features that include compatibility modes for use with earlier analog wireless transmitters; UH400 plug-on transmitter is an updated model that converts any mic with XLR connector to wireless operation; VR400 venue receiver is a modular six-channel wireless receiver in a 1 RU chassis with modular receivers. It has antenna distribution and includes LCD and USB interfaces; DM16/24 digital matrix mixer is a 16-input/24-output digital matrix with filters, compressor and limiter on each channel.

Also: AM8 auto mic/line mixer, wireless mic systems, audio matrix mixing, DSP audio processor

Lightning Eliminators C6239

Linear SRL N822

Location Sound Corp. N4322

Logitek Electronic Systems Inc. N3307

Intro: Updates to Logitek digital consoles, including two-stage talk show delay, silence sensing, input metering on every fader and compression displays on every fader where activated; Optical STL available as part of the Logitek Audio Engine for transferring 64 channels (bidirectional) of audio with no data loss or compression up to 10 miles; guest panels for Logitek digital consoles in rack-mount and desk-mount versions; router control panels for the Logitek Audio Engine in both RouteXY rack-mount and MatrixIP virtual versions; customizable intercom available as a stand-alone product or integrated with a Logitek digital console.

Also: Audio Engine X-Y router, Numix digital console, Remora digital console and audio level meters.

LPB Communications N2436

Mackay Communications C2023

Intro: Leading provider of secure, wireless, portable satellite communications equipment and airtime that can be operative in minutes to ensure timely reporting. Mackay offers Inmarsat, Iridium, MSV and Globalstar equipment and services, including turnkey audio and video broadcast solutions utilizing Nera WorldCommunicator GAN units.

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Web Site: www.mackaycomm.com

Mackie SL5913

Mager Systems N2431

Magnum Towers N4618

Manhattan Production Music C2935

Intro: Live Trax music library uses only live musicians and instruments, never any synth or samples.

Also: Apple Trax, MPM, Chesky Records Classical Series and Audiophile Sound Effects Series.

Marketron International C10310

Marketron Radio Sales, Marketron Radio Traffic and Marketron Radio Business Intelligence.

Marshall Electronics SU11614

MXL microphones and Mogami cable.

Marti N1902

New: GSM-compatible Digital Cellcast all-in-one digital mixer and cellphone remote unit; also, RPU and STL systems based on new RF synthesizer technology extending coverage and quality of remote and studio links.

Martinsound N2017

Mediatone Music C2245

Intro: The Studio Cutz Music Library consists of 40+ CDs of production music. It is licensed as a "lifetime synchronization buy-out" and the music includes live instruments and topnotch writing.

Medical Coaches MM227

Intro: Custom-built expanding-side trailers

with lightweight, all-aluminum main frame construction.

Megatrx Production Music N1327, SU7662

Merging Technologies N3731

Intro: Pyramix Virtual Studio 4.2 digital audio workstation offers real-time capabilities and a multitrack record/editing/mixing interface.

MGE UPS Systems SL1869

Intro: Pulsar EX RT true on-line double conversion power protection is optimized for reliability and longer backup times in high-density IT applications and server environments. Available in 2200 VA and 3200 VA power ranges, models feature a versatile form factor suitable for use in tower or compact 2U rack configurations; EPS 8000 true on-line double conversion power protection for critical high power applications. Features high energy efficiency, advanced

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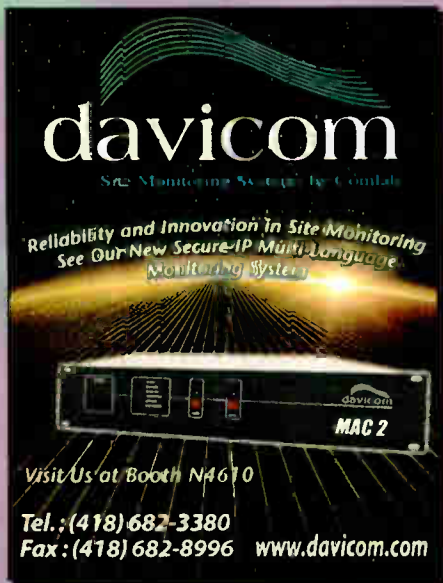
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ABS Trade Srl	N3326	Broadcast Warehouse	N1710	Electronica QUASAR-TECH LTDA	N1003
Acoustic Systems	N4108	Broadcasters General Store	N2718	Elenos	N2726
ADDER Technology Ltd.	N2736	Burk Technology	N3702	Electronika S.R.L.	N2031
Advertising Edge Inc.	N2016	Buri Software Inc.	N3734	EMR Corp.	N1600
AEQ, S.A.	N1312	Calrec Audio Ltd.	N1012	ENCO Systems Inc.	N2426
Aeta Audio Corp.	N3926	Coast to Coast Tower Service Inc.	N4027	Energy-Onix	N4023
AEV S.P.A.	N4122	Coaxial Dynamics	N4019	Environmental Potentials	N604
AKG Acoustics	N4018	Coffey Sound	N4122	ERI-Electronics Research	N3322
Altronic Research Inc.	N1309	Comet North America	N4210	Euphonix Inc.	N3616
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American Tower	N3338	Comrex	N2722	Federal Communications Commission	N1031
AMS NEVE	N1612	Comtech SRL - RF Filters	N1024	GCS	N4808
Anchor Audio	N3027	Continental Lensa S.A.	N3134	Genelec Oy	N4112
Aphex Systems	N1009	Cooper Sound Systems/Dan Dugan Sound Design	N2424	Harrison By GLW	N3016
APT- Audio Processing Technology	N902	Corporate Sport	N3828	Henry Engineering	N1100
Armstrong Transmitter	N706	Countryman Associates Inc.	N3022	Honeywell Obstruction Lighting	N3018
Arrakis Systems	N2022	CP Communications	N824	IBC Ibertecnica	N2438
AUDEMAT-AZTEC	N1426	Crown Broadcast	N712	IBiquity Digital Corp.	N3334
Audio LTD./MacArthur Group	N2118	CTE International SRL	N1322	Illbruck Inc./SONEX	N1800
Audio Precision	N2716	D&C Electronics	N2524	Independent Audio Inc.	N1300
AudioScience	N1000	DASTO	N1326	Industrial Acoustics Co.	N3829
Audio-Technica U.S. Inc.	N3712	DB Elettronica Telecomunicazioni S.P.A.	N2038	Inovonics Inc.	N3809
AV internacional SL	N2728	DELTA MECCANICA s.r.l	N2029	International Datacasting	N2409
AXEL TECHNOLOGY S.R.L.	N2026	Delta RF Technology	N602	Italian Trade Commission	N3331
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Belar Electronics Lab Inc.	N2012	Dialight Corp.	N2834	JK Audio, Inc.	N4616
Bext Inc.	N1202	Digiqram	N2522	Jubilee Products	N1000
Biro Electronic Corporation	N722	DPA Microphones	N2536	Junger Audio Studioteknik GmbH	N816
Broadcast Electronics Inc.	N1902	DRS Broadcast Technology	N2402	Kay Industries Inc.	N1700
Broadcast Software International	N2534	Ecomco	N1406	KD Kanopy, Inc.	N4626

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Kintronic Labs Inc.	N3709	Potomac Instruments Inc.	N2119	Sound Devices LLC	N3726
Klotz Digital America	N4216	Pristine Systems Inc.	N1026	Sound Mixing Pavilion Technologies for Worship	N1331
KLZ Innovations LTD	N724	Prodys Procesamiento Digital y Sistemas S.L.	N2726A	Soundcraft, USA	N900
LakeSoft	N2836	Professional Sounc Corp.	N3916	SRS Labs Inc.	N1502
Lawo AG	N717	Professional Sounc Magazine	N1123	STAGETEC (Salzbrenner Stagetec Mediagroup)	N2034
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Linear srl	N822	Quest Manufacturing	N4068	Superior Electric	N702
Location Sound Corporation	N5322	Radio Facts	N900	Symetrix Inc.	N1610
Logitek Electronic Systems	N3307	Radio Guide	N1200	T.E.M. SpA	N2128
LPB Communications Inc.	N2436	Radio Ink (Streamline Publishing)	N1029	TASCAM	N2418
Magnum Towers Inc	N4618	Radio Music License Committee	N3729	Telefunken SenderSysteme Berlin AG	N4612
Martinsound Inc.	N2017	Radio Systems	N2416	Telos Systems	N1416
Media Touch	N1018	RCS	N1622	Texas Instruments	N402
Megaltrax Production Music, Inc.	N1327	ROL Radio Oesign Labs	N2126	TFT Inc.	N2707
Merging Technologies	N3731	RF Parts	N1022	Thermo Bond Buildings	N1428
Miller & Kreisel Sound	N4613	RIZ - Transmitters	N2116	Tieline Technology	N3034
Moseley Associates Inc.	N1907	RTW Radio-Technische Werkstätten GmbH & Co. KG	N715	Toner Cable Equipment, Inc.	N5110
MUSICAM USA	N1006	PVR Electronica	N2731	Towerline Software LLC	N1023
National Religious Broadcasters	N1328	Pycote Microphone Windshields Ltd.	N3128	Trew Audio Inc.	N3826
National Weather Service	N4426	Sabre Communications Corp.	N1004	TriMediaOnline.com	N1134
Nautel Maine Inc.	N3362	Sanken Microphones/plus24	N3918	TWR Lighting Inc.	N2018
Netia	N2406	Schoeps Microphones	N3126	UNIMAR Inc.	N2129
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Nicom USA Inc.	N416	Screen Service Italia	N4312	Valcom Limited	N1002
OMB Sistemas Electronicos	N2709	Sennheiser Electronic Corp.	N2812	Visibility Solutions Inc.	N412
OMT Technologies	N709	Seratel Technology	N1016	V-SOFT Communications	N1305
ORBAN/CRL	N800	Shively Labs	N1606	Wheatstone Corp.	N2802
Penny & Giles Controls Inc.	N2118	Sierra Automated Systems & Eng. Corp.	N3705	WinRadio Software Inc.	N2523
Penta Laboratories	N2128	Smart AV Pty. Ltd.	N309	Worldwide Communications Consultants Inc.	N2523
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Micro Communication Inc. **C2025**
Intro: Constant impedance FM combiners and motorized coaxial switches.
Also: RF filters, channel combiners and antennas.

Microboards Technology LLC **SL3706**
Intro: BrighTech MediaBeacon digital asset management product line
Also: Pioneer storage products and Rimage disc publishing equipment.

Microspace Communications **C10643**
Intro: Point-to-multipoint satellite services for sending video, data and audio content from the United States to locations in Latin America. Utilizing Velocity technology, international services are secure, reliable and affordable.

Microwave Radio Communications **C3206**

Miller & Kreisel Sound **N4613**

Modulation Sciences Inc. **C3943**
 Composite Clipper, STLs, distribution amplifiers, StereoMaxx Spatial Image Enlarger, modulation monitors, SCA generators

Monitors and More **SU11739**
Intro: Flat-panel displays and accessories. LG Electronics: 42-inch LCD display. Ergo2000: 20.1-inch Panel Mount TBC Consoles: Starfire modular console.

Moseley Associates Inc. **N1907**
 Starlink SL9003Q STL, PCL-6000, DSP-6000,

Lanlink 900D, Maxlink, SL9003T1

MPEG Industry Forum **SL2152**

Multidyne Video & Fiber Optic Systems **C3151**
Intro: Hydra-8000 Series supports 768 channels of video, audio, SDI, HD-SDI, AES, data, intercom, IFB and telephone over one tactical cable for sports, ENG, field production, fixed installation. Transport up to 32 video and 128 audio channels in one RU with a maximum of more than 768 channels using one tactical cable.

Musicam USA **N1006**
Intro: Road Star offers bidirectional IP and ISDN audio, AAC, AAC-LD, MPEG 2, MPEG 3 and G.722 algorithms, linear uncompressed audio, eight contact closures and ancillary data. An auto-fallback system that keeps you connected when the network turns iffy. A Web server and a user interface all in a road-tough case with a four-channel mixer, 48 VDC phantom power, analog and AES/EBU inputs and outputs and a headphone monitoring system.

Myat **C1415**

MyWeather LLC **C9617**
Intro: Interactive online solutions from essential weather information to customized Web services and desktop applications. Private-brand patented weather solutions provide consumer interaction, revenue generation, targeted advertising and brand enhancement.

Nagra Audio **SU10424**

Narda Safety Test Solutions **C11628**
Intro: SRM-3000 is an RF radiation meter that performs narrowband analysis of multiple emitter sites. Broadcasters can measure the total energy at a site as well as their own energy to determine RF compliance. Users will be able to determine if, and where, they

exceed FCC rules; also, Nardalert XT is an RF personal monitor. Its frequency response follows the FCC limits for RF exposures and high-power versions are available for use with RF clothing; Narda Model 2600 is a solar-powered, wireless solution for monitoring field strength remotely.

National Religious Broadcasters **N1328**
 Connect with producers who reach 140 million listeners, viewers and readers monthly. NRB can introduce you to the people behind quality family programming and one of radio's fastest growing formats: religion. Opportunities include annual Exposition, named one of "The 50 Fastest Growing Trade Shows" by TradeShow Week magazine, weekly e-newsletter, monthly magazine, convention sponsorships and new directory. Register for daily drawing for a free portable DVD player.

National Weather Service **N4426**

Nautel Maine Inc. **N3302**
Intro: The 10 kW solid-state FM transmitter, the frequency-agile Virtuoso10, is available HD Radio-ready for low-level or high-level combined modes. Hot-swap modules and control and monitoring capabilities are standard; also, 1 kW AM broadcast transmitter, the Jazz1000, includes redundant amplifiers and universal switchmode power supplies. Features include HD Radio and DRM compatibility and an optional standby exciter; Maestro50, a digital FM exciter, uses direct-to-channel digital modulation. It is HD Radio-ready and operates in the following modes: HD Radio, HD Radio+FM or FM only. The Maestro50 includes a universal switchmode power supply and a graphical user interface.
Also: FM1, FM3.5, FM5, FM8, Q10, Q20, Q30, Q40, ND2.5, ND5, XL12, XL30, XL60, NA100

Nemal Electronics International Inc. **C2338**

Netia **N2406**

Network Electronics **SU11606**

Network Music **C2545**

Neumann USA **N2812**
Intro: BCM 104 broadcast microphone is a large-diaphragm condenser capsule with a cardioid directional pattern, switchable proximity effect compensation and high-pass filter. A second, pre-attenuation switch allows sensitivity to be reduced by 14 dB to optimize performance for circuits designed for dynamic microphones. Flat frequency response up to 3 kHz — higher frequencies have a maximum increased presence of 2 dB; also, TLM 127 studio condenser microphone is a switchable-pattern condenser microphone with cardioid and omni polar patterns. An optional power supply provides remote switching of omni, wide cardioid, cardioid, hypercardioid and figure-8 polar pattern. Based on the Neumann TLM 103, the mic features new K127 capsule. Frequency range of 20 Hz, self noise of 7 dB(A), max SPL 40 dB. Also includes 14 dB pad and 150 Hz high pass filter.

Neutrik USA Inc. **C5842**
Intro: AA Series, compatible with existing A Series. Design features larger surface contact, gold plating at mating contact area. Flammability rated UL94HB. 3 pin female PC mount only. RCA NF2D jacks and NYS373 plugs. The recessed phono jack is available in the "D" series style for universal mounting. The gold plated plugs feature the Neutrik "chuck type" strain relief. Both the jacks and the plugs feature color-coding for identification.

New England Satellite Systems **C3132**

Nicom USA **N416**

NKK Switches **SU7679**
Intro: HB2 series pushbutton switches feature quiet actuation coupled with tactile feedback. The HB2 series of SPST, momentary, quiet actuation, square pushbuttons fit any front-

panel design requiring an illuminated switch with a compact body and behind-panel depth. Red/green or red/yellow bicolor LEDs; also, KP series illuminated pushbutton switches come with a bicolor LED for bright red, green and amber illumination. Clear sculptured caps in three sizes; 17.4, 15 and 12 mm. The KP illuminated pushbutton is single-pole, single-throw momentary circuit rated at 100mA @ 12V DC.
Also: LCD displays.

Non-Stop Music Library **SU10315**
Intro: Production music library that offers music to network, local and cable television in all genres and styles. Offerings include the Non-Stop Music, Cavendish Music, Groovers Music, Pointe Co. Music, Media Music, Crashed Music, Countdown Classical, and JW Media Music.

Northern Technologies Inc. **C2230**
Intro: Single Phase UPS: Scalable for redundancy, power capacity or battery run time. Up to 20kVA. Intelligence is provided by system level and individual module microprocessor controls, increasing UPS functionality, communications and reliability. N+x parallel redundancy is achieved by adding power and battery modules that equally share the electrical load. In redundant configuration, a failed module will take itself off-line while the other modules continue to support the connected equipment. Communications capability for use with Liebert SiteNet UPS shutdown monitoring software.
New: MAC series hardwired surge suppression: 120, 240/120 or 208/120 VAC single phase, split-phase or three-phase remote status indication SAD and MOV surge protection; rack-mounted surge suppression: 120 VAC single-phase, 2 wire & ground 15 Amp EMI/RFI noise rejection SAD digital quality surge protection; PowerBay battery backup, DC power and equipment shelter.

Norsat Intl. Inc. **C12034**
Intro: Transmitters: new 4W KU and 2W and 5W C Band units, compliment 1W and 2W KU, KA transmitters available Q2; 3000X C Band 10 MHz LNB compliments 3000 Series PLL +-5, +-10 and +-25 kHz versions. LA-30 line amplifiers, commercial applications with adjustable gain.
Also: LNBs, BUCS, BDCS, LA30s

NPR Satellite Services **C11522**

Octave Systems Inc. **SL3700**

OMB Sistemas Electronicos **N2709**

Omnia, A Telos Co. **N1416**
Intro: Omnia audio processors for FM, AM, TV, HD Radio and DAB, Internet and audio production.

Omnimusic **C2151**
Intro: Flash*Point is a scoring library, creating production music for reality programming, investigative reporting and promo creation.
Also: Omni Blue Dot

Omnirax **C2014**
Intro: Custom studio furniture fabricated from high-pressure laminate and trimmed with T-molded edges. Can accommodate rack mountables, punch blocks; includes cable runs. Force 36 is a workstation for audio/video editing in a choice of melamine laminate colors. MSRP: \$1,990; OmniDesk Suite is an ergonomic workstation for audio or video editing; the Presto desk surface is wide enough for large keyboard controllers, control surfaces or smaller mixers, while providing eight rack spaces in two bays. The shelf above the rack spaces can hold computer monitors and nearfield monitors. Available in a choice of finishes starting at \$500.

OMT- iMediaTouch **N709**
Intro: iMediaTouch on-air system with new live assist features, satellite interfacing, non-proprietary architecture, console interfaces and now an affordable price, suitable for any format, size or cluster. Known for its ability to run and run without constant engineering supervision or IT management; also,

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Anything from a one-minute network spot during live time to a talk show lasting hours, you decide when it airs. Choose your own "best of" shows to be rebroadcast totally unattended over the weekend. The Replicator can record up to four different feeds at one time and can even begin playback before the recording is finished. Playback begins at your chosen time, or on demand.

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Register Data Systems

iMediaLogger, top-selling digital logger, software-based audio logging, archiving and storage, delivering the simplest way to manage e recording needs with one workstation; iMediaAccess offers a total solution for wide-area facilities. Send audio files to the remote location, play and manipulate the file once it's there. Also allows for distribution of play lists and schedules, covering not only the files to play, but how to play them.

Onan Corp. C3345

On-Air Systems Ltd. SL1264

Opticomm Corp. SU11304
Intro: DVX-5400 Multiverse compatible Series 4 channel uncompressed SDI one-fiber solution; Multiverse platform uses multiple division multiplexing to transport 1-144 channels of almost any combination of video, audio and/or data over a single fiber from one rack-mountable chassis.

Orban/CRL N800

PatchAmp C6140
Intro: PA-3200AHD multi-format audio distribution frame for high-density audio application. Up to 32-1x18, 64-1x9, or 128-1x4 in 4 rack units. Single DA Frame. Accepts all PatchAmp 1x9 or Dual 1x4 DA.
Also: PA-5032A, PA-3200A

Patriot Antenna Systems C12039
Intro: Mobile VSAT with Skewable Mount .76m - 1.8 m Ku-Band includes reflector mounted on base, one-touch auto-located controller, Cros-Pol filter/OMT, GPS and Fluxgate compass; also, Flyaway Antenna Systems .76m - 2.4m Ku-Band includes reflector, case(s), Az-El head, tripod, Ku-band feed horn, Cros-Pol Filter/OMT; 3.8 and 3.0 meter offset antenna linear or circular, Ku-Band or C-Band. Includes reflector, Az-El motorizable Kingpost mount, Ku-Band feed horn, Cros-Pol filter, OMT. Motorization kit available.

Pesa Switching Systems Inc. SU9530
Intro: Premiere routing switcher is a small expandable system available in matrix sizes based on 8x4, 12x8, 16x8 and 16x16, for multimedia applications in corporate, government, sports, entertainment and similar facilities. It can handle signal types including composite, Y/C, RGB, RGBHV and stereo audio (future releases will include SDI, HD-SDI, and AES/EBU). Included are RS232, USB, Ethernet and Pesa PRC connectivity along with Pesa Windows set-up software and a local control panel; also, Klikcontrol Internet router control system operates over Ethernet via TCP/IP and uses an Internet Explorer browser as the client interface. The Klikcontrol server communicates directly to the 3500PRO or Ocelot control system via RS-232.
Also: Cheetah, TDM3000, Tiger, Jaguar, Cougar, Ocelot, Bobcat, distribution amplifiers and conversion cards.

Phasetek N3722

Pilat Media C10313
Intro: Integrated Broadcast Management System integrates and streamlines program content, ad sales and traffic management operations.

Pineapple Technology Inc. N4110

Pinnacle Systems Inc. SU10160
On Display: Steinberg CuBase, Nuendo, WaveLab

Pioneer Electronics (USA) Inc. C9622

Potomac Instruments Inc. N2119
1900 Series Antenna Monitor, FIM-41 Field Strength Meter, AA-51A Audio Analyzer, SD-31 Signal Generator, FL-31 Tuneable Filter.

Prime Image C5634

Primera Technology Inc. C8228

Intro: Bravo II Disc Publisher, a CD/DVD duplication and printing system with -4800 DPI print resolution, USB 2.0, AccuDisc technology and Mac and PC compatible. Burns and prints up to 50 discs per job. CD and DVD/CD versions; Accent Disc Laminator Accent laminates inkjet printed CDs and DVDs.

Pristine Systems Inc. N1026
Intro: CDS32 for Windows XP Pro platform offers live assist, satellite automation, music-on-hard drive, Pocket PC remote control access, unlimited walkaway time, Web site updating and RDS output. It supports all traffic and music scheduling software, but also includes a spot set editor and music scheduler. CDS32 Satellite Automation is the right broadcasting system for those 24-hour-a-day, on-the-bird operations. CDS32 SAT makes news, talk programs, sports and music sound live at

all times. Everything needed for live and recorded satellite operation is included. It also has the capability to automate multiple satellite networks. CDS32 Live Assist is the perfect alternative for those stations not interested in automation or satellite features. Live Assist is the perfect replacement for aging cart machines. CDS32 PRO Music-On-Hard drive systems are designed to operate live or automated. Automatic Web site content generation gives a fresh, live feel to otherwise dull station Web sites. It features in-context "wet" voice tracking for a special live sound.
Also: CDS32 PRO, CDS32 SAT, CDS32 Live, Voice Trax, Music Plus II, CD-Trax, Audio Browser, Audio Crawler.

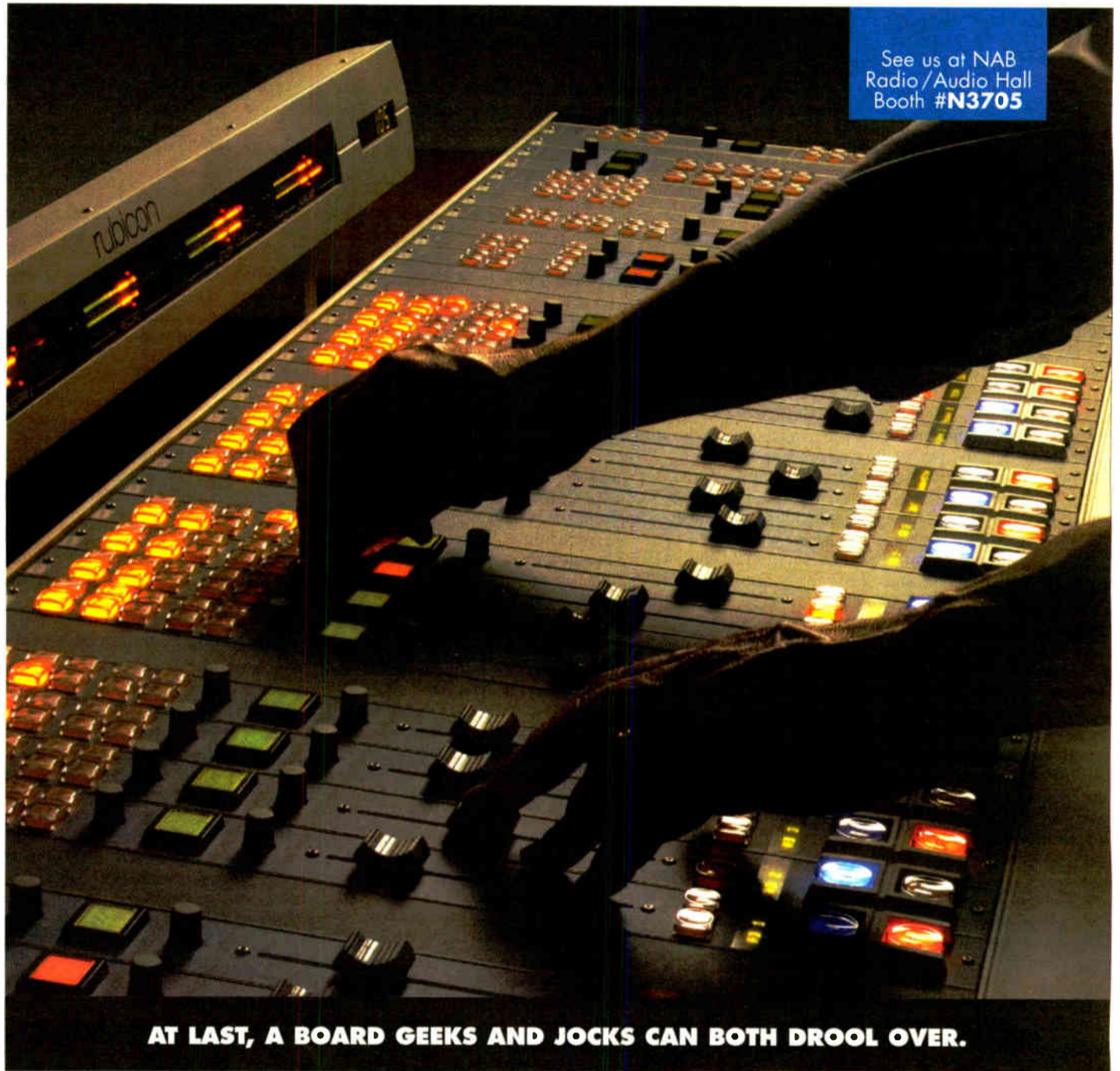
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Production Intercom Inc. C10307

Prodys N2728A

Professional Sound Corp. N3916
Intro: PSC AlphaMix portable audio mixer offers NP-1 battery compartment, power distribution for wireless, LED meters on each input channel, boom pole-mounted remote control; PSC DV ProMix 1 portable field audio accessory features mic preamp with variable gain, monitor amp with variable gain, headphone amp, line driver, LED meters and microphone powering (12T & 48PH).
Also: Adapters, equipment carts, distribution amps, cables, mixers, microphones, mic power supplies, DC power supplies, press mults, audio equipment.



AT LAST, A BOARD GEEKS AND JOCKS CAN BOTH DROOL OVER.

Fact is, SAS packs so much sophistication and capability into the depths of the new Rubicon™ control surface that even the most intensive major market



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programmer or board operator will swoon. Yet Rubicon is so intuitive, so comfortable, so easy to use, the weekend intern is sure to sound like a pro. Here's why:



Frequently used controls are always right at the operator's fingertips. And for the power-user, the multi-function "dynamic control matrix" provides quick access to deeper capabilities. In other words, Rubicon has a bucket load of features for the simplest or most complex of broadcast-related tasks.



And should you think form to precede function, you'll find Rubicon's clean, easy-to-understand interface wrapped up

within a custom-configured, drop-dead gorgeous frame.

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Promedia USA**SL1186**

Intro: 8x blank recordable DVD+R; 4x blank recordable DVD-R; CD/DVD jewel case; DVD case; slim jewel case; slim DVD case; CD/DVD cake box; 320 CD/DVD wallets; 208 CD/DVD wallets; 160 CD/DVD Wallets; 52X blank recordable CDR.

Propagation Systems Inc.**C1335**

Intro: PSI IBOC Digital Antennas, center-fed antennas in medium- and high-power configurations. Available in two- to 12-bay models. Antennas are capable of handling both analog and digital signals.

Also: Slant -V and R-tiller antennas

Prophet Systems Innovations**N3312**

Intro: PocketGen PDA software for broadcast to send sound files such as breaking news, weather, sports. PocketGen software provides recording to hand-held devices that interface to most automation systems. Record, insert, append and re-record options, digital file storage. Transfer files individually or in a batch.

Also: NexGen Digital, MusicGen

Quartz Electronics**SU9812**

Intro: Multifunction router supports SD and HD Video, analog and AES audio; Topaz video and audio routing switchers. New HD, SD, AV and AA models in 16x16 and 32x32 sizes. Redundant power supply option.

Also: Q256 ADDA Audio router.

Quest Mfg.**N4608****RackFrame.com****C3842**

Intro: RackFrame is a modular rack system. Build any size rack using three stock parts. Choose width, depth and height of EIA rack rail from one of 43 sizes in 1-3/4-inch rack unit increments; also, Local-Area Network workstations from Rack Frame are available in custom heights. Two width shelves atop a tabletop surface are positioned at a tabletop height of 28-1/2-inch. Shock protected 19-inch rack mountable equipment cases have an inner rack shell, surrounded with shock absorbing foam for shock-isolation while in transit. Eight- and 12-RU cases are 24-inch deep and include 2-inch foam-isolation along with front and rear lids and tapped rails with 3-1/2-inch swivel and locking casters; heavy-duty LCD flat-panel display shipping case conforms to most 17-, 18-, 19- and 20-inch flat-panel displays. Case is equipped with recessed, telescop-

ing aluminum shipping case, tow handle and heavy-duty 3-inch recessed wheels.

RackSaver Inc.**SL4017**

Intro: Configured to meet digital audio processing, editing and mastering needs in a professional studio environment, the RackSaver 64-bit Digital Audio Workstation is a 4U rack-optimized system with dual 64-bit AMD Opteron Processors Model 246, 4GB RAM, four 36GB Western Digital Raptor SATA hard drives, 3Ware RAID controller

Radio Facts**N900****Radio Frequency Systems****C8617**

Band II FM sidemount antenna (828 series), designed for FM broadcasting applications requiring circular polarization and low windloads, constructed of stainless steel for corrosion protection, and the parallel feed system facilitates customization of null fill and beam tilt to suit customer requirements. The series is available in a range of power ratings and bandwidths.



For a second year, golfers will tee up to benefit the family of the late Scott Beeler.

and NVIDIA Quadro 4 380XGL graphics card; RackSaver DCIN64 delivers theater-quality audio and video with digital preservation.

Radio Advertising Bureau**Lobby 12****Radio Design Labs****N2126**

Intro: RU-MX4 four channel mic/line portable audio mixer with compressor/limiter, metering, switchable phantom power; also, ACM-3 synchronous AM noise monitor; ST-PCR3 logic to pulse converter; TX-J2 unbalanced stereo RCA to mono balanced line level transformer.

Also: Stick-ons, Rack-ups, TX series, R-series, mixers, distributions amps, switchers, digital, control, test equipment, line amps, microphone products, power amps, processing, transformers and VCAs.

Radio Music License Committee**N3729****Radio Systems****N2416**

Intro: The Millennium-D Digital Audio Console is a 24-bit digital console featuring HTML-based setup and up to 10 aux or mix-minus buses; also, StudioHub+ CAT-5 connectivity products offer new interconnect hubs using 25 pair CAT-5 for space-saving inter-studio tie-lines; new high-density CAT-5 break-out solutions for most audio card and digital audio delivery systems.

Also: D1-2000 and T1-101 telephone hybrids, and DA-4x4a analog audio distribution amps.

Radio World**N2734**

The newspaper for radio managers and engineers is also the industry's leading and

longest-running source for news about IBOC, satellite radio and the digital transition. Contributors include Cris Alexander, John Bisset, Scott Fybus and Paul McLane. *New:* Radio World's Excellence in Engineering Award, honoring one individual for outstanding contributions to the industry, as voted on by our readers.

Radyne ComStream**SU11300**

Intro: TDR777 MPEG-2 DVB IRD; TDR60 MPEG-2 DVB IRD

Also: Broadcast receivers, audio uplinks

RapidText Inc.**C12011**

Intro: Transcription featuring timecoding, continuity scripts, as-broadcast scripts; dialog lists and spotting lists. Solutions include transcripts-for-sale Web sites, Webcasts. Typically 24-hour turnaround.

RCS**N1622, C6813**

Broadcast software, used by 85% of music stations, including 5,000 radio stations, TV music channels, cable companies, satellite music networks and Internet stations; also, real-time audio recognition technology.

RF Parts**N1022****Richardson Electronics****C1338**

Intro: Digitally compliant AM transmitters ready for HD Radio. "Analog today, digital tomorrow." Sender transmitters include an offer for on-site HD Radio services when a station decides it's ready to do IBOC or HD Radio; 1 to 200kW AM transmitters include PWM modulator two-crystal dual-phase design. Broadband modulates AM output modules. Identical plug-in RF amplifier modules may be removed and replaced on-air. HD Radio or AM stereo compatible; also, configurable LDMOS UHF power amplifiers for 50-, 100- and 200-watt Digital Applications. The AU series are LDMOS broadcast power amplifiers for analog and digital applications. Compliant with major international standards. *Also:* Portable Avcom frequency analyzers and RF generators for broadcast, satellite, cable TV, communications and wireless applications.

Riedel**C11210****Riz Transmitters****N2116****RTW GmbH & Co. KG****N719**

Intro: SurroundMonitor 10860-VID, surround sound vectorscope for video system environments; PortaMonitor 10641-VID 4-channel audio vectorscope for video system environments.

Also: SurroundMonitor 10800X, PeakMonitor, PortaMonitor, PPM series 1205

RVR Elettronica**N3031, N2731**

Intro: TEX-1000LCD Microprocessor-controlled FM Exciter/Amplifier features adjustable output from 0 to 1000W, multivoltage power supply and stereo coder in a 3U body, equipped with telemetry and remote control; also, digital STLs, the PTRL LCD and RXRL LCD, supervised by an internal microprocessor and come with telemetry connection for remote access and diagnostics. Both are capable of transmitting RDS, SCA and MPX or mono signals and work on frequencies of 220 to 960 MHz; the PJ1000M-C is a 1,000W amplifier that weighs less than 45 pounds and is 3U high; PJ2000M-C is a 2,000W amplifier.

Also: VJ3000, TEX-150, PJ-5KPSD/V1, PTX-30, RX1, URP, TRDS-4001, Oxygen Console, Falcon Processor, Blues 30, PJ500C, DTX2, DRX2, SDC-100, TEX-100, TEX-150, TEX-300, antennas.

Rycote Microphone Windshields**N3128****Rymsa****C2025A****S.W.R.****C2922****Sabre Towers and Accessories****N1004**

Intro: Pre-engineered lightweight guyed towers manufactured in 10-foot sections. These towers are available with a 12- or

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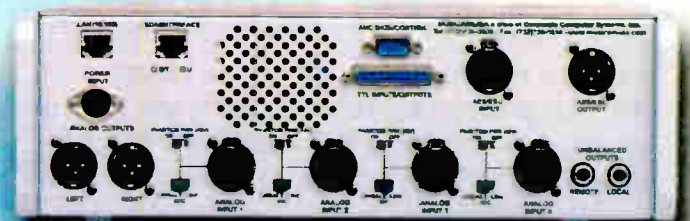
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Web Site: www.sabrecom.com

SADiE SU8426

Salzbrenner Stagetec Mediagroup N2034

Intro: Delec Audio and Videotechnik digital intercom system IC48 MKII; digital mixing console Aurus; modular digital routing system Nexus has a new set of I/O cards. AES/EBU input card with AES42 option for digital microphones allows connection of digital microphones to the Nexus and remote controls the microphones. Nexus can be used as audio interface for the digital mixing consoles Aurus or Cantus and offers a direct connection between the digital mic and the console.

Sanken Microphones/plus24 N3918

ScheduAll SU11611

Intro: ScheduLink with BandPlan is software to manage satellite and terrestrial networks. Bandwidth capacity management of events as well as billing with automated conflict checking and notification. Reporting for usage, costing and profitability information; also, NewsPlan handles assignment-to-air scheduling of story acquisition, managing personnel and resources, controlling costs and generating back-office financial reports. Shares data with systems like ENPS and INEWs; Edge, starting at \$995, is an entry-level scheduling and resource management software for smaller facilities that manages schedules for personnel, rooms and equipment. Ideal for radio, boutique post-production, production, universities and smaller government teleproduction; ScheduAll 4.42 is scheduling and resource management software that manages personnel, equipment and facilities, tracks costs and billing information.

Schoeps Microphones N3126

Scott Studios Corp. C2214, N3007

Intro: SS32X radio digital audio system, including new Lazer Blade phone recorder, Hooker song clip promo builder, Music Segue Editor, timing stretch and squeeze without pitch change and non-proprietary hardware; WAVE Maestro digital audio system with new (and old) looks, plays industry-standard files. Superb voice-tracker, live and automation. Audio Time Shifter for program delay
Also: SS32 digital audio system

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Screen Servica Italia N4312

Selectracks C2247

Intro: Production music, custom music services and indie artists. The production music catalog is a collection of music in a variety of styles. The focus is advertising and promo music with a concentration on tracks for major motion picture advertising and high-energy promos. Also jazz, electronica, acoustic rock and hard-edge rock cues. Scoring for production to include songs, themes and film or TV scores.

Sennheiser Electronic Corp. N2812

Intro: Evolution Wireless G2 Series with a broader switching bandwidth (36 MHz) makes 1,440 channels available. Changes have been made to the body-pack transmitters and mobile receivers, reduced in size by about 30%; also, HD650 are dynamic open-air headphones with a flat frequency response (10 Hz to 39.5 kHz, -10 dB) with natural dynamics, high resolution and smooth, uncolored sound, enhanced bass response, upgraded cable and reduced distortion in the high frequencies. A gold-plated 1/4-inch jack and 3.5 mm adapter plug included. MSRP: \$499.95; Evolution 900 Microphone Series comprises the E 935/E 945 vocal mics and the E 903 for snare/instruments to handle live performance environments.

Seratel N1016

Shively Labs N1606

New: Several products for multi-station FM antenna installations, including a low-wind-load four-port hybrid for broadband panel arrays that accommodates dual feeding of analog and digital signals and minimizes feed cables; also, a compact power divider unit that allows center fed antennas to be operated on either half; booth personnel will be discussing new techniques for HD Radio implementation for sidemount and panel antennas.

Sierra Automated Systems N3705

Intro: SAS Connected Digital Network: Complete integrated audio routing, console control and networking system for radio, film, television and entertainment; also, RIDLink RIDGrande Router/Mixer. The RIDLink has been upgraded to add onboard routing and mixing, 32 analog or digital in/32 analog or digital out, plus GPID and remote control, in one compact 2U frame.
Also: SAS 32KD Digital Audio Network, Rubicon Digital Console Control Surface; SAS Broadcast Intercom Systems.

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SintecMedia C10913

Intro: OnAir is an all-in-one solution for management of broadcast operations that accommodates multiple concurrent users at different locations. OnAir manages content acquisition, broadcast rights, long-term and detailed schedule planning, airtime sales, traffic, promotion planning, media management and process control.

SKB Corp. SL5618

Intro: Military-standard transport cases of lightweight LLDPE plastic for impact resistance as well as UV and solvent resistance. Gasket seals and pressure relief valves make cases waterproof, stainless steel hardware prevents rusting. Four sizes with a pull handle and wheels with options for empty, foam-filled or padded dividers on two sizes; also, 24-inch roto-molded shockmounts that meet most ATA and military standards; 3SKB-R910U and 3SKB-R916U come with eight each HM-245 elastomeric, high-damping shockmounts with a shear spring rate of 50 pounds/inch; Roto Shock Racks feature a roto-molded 20-inch-deep shell. A molded valance eliminates the metal valance on the outside of the case, coupled with a rubber gasket on the front and rear doors for water-resistant protection.

Smart AV Pty. N309

SMPTE Lobby 29

Society of Broadcast Engineers Lobby17

Solid State Logic N2412

Intro: C100 V1.5 is a digital broadcast console for on-air and live-to-tape production; C200 V2 is an adaptation of the SSL in-line console heritage with a dedicated knob-per-function control surface, suitable for creative mixing applications where hands-on access to a large numbers of controls is essential. Snapshot and dynamic automation, with mobile configuration available; XLogic Multichannel Compressor for 5.1 compression for HDTV, or postproduction stem outputs; XLogic SuperAnalogue Mic Amp provides four XL 9000 K Series mic preamplifiers in 1U with optional remote control. The mic amp is suited to Foley or speech applications; XLogic Channel packs the SSL XL 9000 K Series SuperAnalogue channel processing into a 1U unit.

Sonic Solutions SL4736

Sonifex Ltd. C5236

Intro: S2 is a small-format, modular analog broadcast mixer with digital I/O. Digital and analog input channels, simultaneous analog and digital outputs. Flush-mounted chassis, PFL/cue, fader-start operation, auto monitor mute on mic live, light switching remote outputs, optional EQ on input modules; also, RB-DSS10 is a 10-way digital source select unit in 1RU, 24-bit 96 kHz-capable, produces an AES/EBU and S/PDIF level digital audio output from 10 selectable AES/EBU or S/PDIF digital inputs; RB-SS10 is similar but has analog audio I/O and can mix the inputs to the output as well as route them; Redbox RB-DDA6W six-way word-clock distribution amplifier; RB-LC3 three-way power/light controller for radio and TV studio light signaling so "on-air" and "mic/live" signs can be powered and controlled remotely from a mixing console, it has three mains outputs that can be independently controlled and a telephone input so the lights can react from a telephone call.
Also: Net-Log audio logger, Courier Flash-card portable recorder, Redbox range of audio interfaces, HY-03 telephone hybrids.

Sony Electronics SL2769K, SU11051

Sound Control Room.com N4027

Sound Devices LLC N3726

Intro: Model 722 two-channel, portable, high-resolution audio recorder is a successor to portable DAT- and tape-based recorders, it records to its internal hard disk or CF medium and provides the convenience of file-based audio storage and transfer; also, Model 744T four-track, portable production recorder is for location audio-for-picture recorders.
Also: USBPre Computer Interface.

Sound Ideas C1651

Intro: Ear Candy 8 CD contains 300 imaging elements. Includes IDs and Logos, Hits, Attacks, Transitions, Drones, Alarms, Whooshes, Rewinds, Special Effects; Series 14,000 is a Comedy & Cartoon Series with character voices, one-liners, vocal effects, props and musical effects; Underwater Series is 500 effects that feature underwater recording: engines, paddles, explosions, spear guns, hits, screams, scuba gear, submarines, oceans, waterfalls and rivers; Sports Music & Elements are 274 tracks for a sports stadium or arena, includes U.S. and Canadian anthems, organ chants, fanfares, trumpet calls and sound effects such as arena announcements, crowd reactions, horns, hits and explosions.
Also: Sound Ideas collection of Sound Effects, Mix Broadcast Music Library.

Soundcraft USA N1018A

Intro: LX7ii console is an upgrade to the popular LX7 desk, uses new GB30 mic preamp and EQ section based on the MH3 and MH4 touring consoles. Designed by Graham Blyth, the EQ provides a steeper-than-usual slope on the LF and HF sections removing unwanted mid-frequency "mush" and delivering a clearer sound. It borrows the MH Series' looks and features a new frame,

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module ID graphics and eye-catching end-cheeks. Frame sizes of up to 32 mono inputs and four stereo inputs/returns with four groups, main stereo output and a dedicated mono output for center clusters. There are direct outputs on the first 16 inputs suitable for multitrack recording, and six auxes for flexibility for effects and foldback. The LX7ii mixes to seven outputs: four subgroups, plus the main Left, Right and Center (Mono) mix outputs.

Also: Compact 4/10, RM1d/s, B400, B800.

SRS Labs **N1502**

Intro: Digital SRS Circle Surround Encoder lets digital studios encode up to 6.1 channels of discrete surround into a two-channel matrix-encoded source that remains mono, stereo and surround-compatible. Based on the Circle surround technology used on ESPN, Paramount TV, HD Radio and hundreds of TV shows, Circle Surround encoding is compatible with all AV receivers (\$3,999); also, SRS Circle Surround TDM Pro is a plug-in for Pro Tools professional audio and post-production suites, featuring an SRS Circle Surround encoder and decoder for monitoring surround mixes. Encode up to 6.1 channels of surround sound into stereo delivery formats for television, music applications. Suited to production of 5.1 or 6.1 music content with delivery via industry-standard compact discs (\$795).

Staco Energy Products **C1211**

Stainless Inc. **C1818**

Stagetec **N2034**

Studer **N1018**

On Display: On Air series consoles.

Superior Broadcast Products **C1930**

Superior Electric **N702**

Intro: Stabiline PT1 Series of parallel design transient voltage surge suppressors provides all-mode protection against harmful effects of lightning, power grid switching and internally generated transients. Available in ratings of 25, 50, 80 and 100kA surge current capacities.

Also: Power quality products, uninterruptible power supplies, transient voltage surge suppressors, power conditioners and automatic voltage regulators.

Sure Shot Transmissions **C11722**

Swe-Dish Satellite Systems AB **MM108**

Intro: The Swe-Dish IPT Suitcase satellite system is a quick-to-air, one-person satellite system allowing live, 2 Mbps broadband transmission with external encoding unit from virtually anywhere. Compact: 26 by 18.5 by 11.4 inches, 86 pounds. Sets up in less than five minutes, GPS and compass, motorized antenna position; also, Swe-Dish DA90K Drive-Away is a small vehicle-mounted DSNG terminal that can be placed on a roof rack of a passenger car, a tailored mount on a larger van or elsewhere. The terminal can be automated with GPS, elec-



Fashion Show Mall on the Strip has completed the first phase of a \$1 billion expansion. The new Great Hall has an elevated stage and fashion show runway for multimedia presentations.

tronic compass and leveling device. Easy installation on standard vehicle roof rails, quick-to-air, GPS/compass, motorized antenna position.

Also: FA150K Fly-Away Systems.

Switchcraft Inc. **C3322**

Intro: Z version of its AAA Series XLR connectors. Reduced part count, wider cable range, stronger pull-out force; also, molded longframe patchcords that are flexible, low cap cable, AES/EBU digital ready, and rugged nickel-plated plug fingers for increased reliability; MVEZN patchbay combines 16 midsize video jacks rated to

3.0 GHz and 24 TTEZN audio jacks with the EZ Norm cam for quick normal re-configuration. Suitable for nonlinear editing suites that don't require full video or audio patchbays.

Also: AAA Series audio.

Symetrix Inc. **N1610**

Intro: AirTools 6200 Voice Processor is a DSP that handles dual-mono or stereo processing for mic or line-level signals. User-definable chains are configured from the front or a Windows interface and saved to one of 1,024 presets. Nine processes, including a new room simulator module, control gain, tone and

screen shows editing and automation information, including waveforms, XVGA output to optional monitor, jog/shuttle wheel for scrubbing audio and MIDI data simultaneously, surround mixing capabilities, 128-track MIDI sequencer with advanced editing modes available on the fly, FW-1884 FireWire control surface and audio/MIDI interface.

Also: GigaStudio 3.0 sampling workstation, AV-452 Presentation Mixer/Amplifier.

Tektronix **C7128**

Telecast Fiber Systems **SU9824**
Adder Audio/Intercom/Data Control Mux/Demux

Telefunken SenderSystema **N4612**

Television Systems Ltd. (TSL) **SU8752**

Intro: SLS-1P high output level with good quality sound. Suitable for broadcast audio-monitoring applications including racks, satellite, radio and outside broadcast. Also: AMU audio monitoring solutions.

Telos Systems **N1416**

ISDN, coded audio and telephone interface products for talk-shows, teleconferencing, audio production, remote broadcasts and intercom applications. Livewire audio over Ethernet system, 2101, TWOx12, 1x6 Talkshow Systems, Zephyr Xstream ISDN Codec, Xport POTS to ISDN Codecs, Profiler Logging

Tentel **C3942**

Tape tension gauges.

Teracom Components **C2538**

Intro: Quicksite is a gap-filler solution for digital terrestrial broadcasting. It is a broadband broadcast system in an environmentally controlled enclosure, complete with transmitter and antenna. System options available for UHF digital and analog TV, FM, satellite downlinks, receivers, rebroadcast modulators and amplifiers; also, RF Power Monitor is a measurement instrument for delivery with combiner systems; 2 kW DAB Filter 6 cavities with notches, available in a combiner unit with a maximum input power of 4 kW.

Also: Antennas, FM and DAB filters, FM and DAB combiners, monitoring system, RF components, couplers, patch panels, connectors, cable, engineering software.

Texas Instruments **N402, SL2169**

TFT Inc. **N2707**

Intro: Digital STL with six uncompressed channels. Also: EAS, STL, RPU.

Thales Broadcast & Multimedia Inc. **C4709**

Thales Components Corp. **C5406**

Telex Communications **C9106**

Intro: RTS Cronus digital DSP intercom; Telex Radiocom BTR-1 secure wireless intercom; RTS Virtual Intercom System, a Windows-based intercom panel to work with any RTS Intercom Matrix from the past 20 years. A functioning intercom user station connected via LAN/WAN/VPN/Internet requiring no hardware beyond your PC.

Thermo Bond Buildings **N1428**

Intro: Pre-built and prewired transmitter shelters with lights, outlets, air conditioning, ventilation and ground. Available sizes include 8x10 feet, 10x12 feet, 10x24 feet, 20x28 feet and larger.

Tieline Technology **N3034**

New: GSM Wireless solutions, i-Mix 5-input 15 kHz POTS and POTS/ISDN codec, Commander 15 kHz POTS and POTS/ISDN codec and Patriot 15 kHz POTS codec.

Tower Engineering Corp. **C1210**



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Towerline Software N1023

Trenton Technology Inc. SL5252

Intro: The CP16 CompactPCI Single Board Computer uses the Intel Pentium M processor to provide maximum processing and thermal performance.
Also: Single Board Computers, Backplanes.

Trew Audio N3826

TRF Production Music Libraries C2925

Intro: Libraries include Bravo, Cobra, Dennis, Kool Kat, MP 2000, Musictrack, PowerSound, Pyramid, Spain Is Music, Stock, Supraphon Classical library and the PAN library of International Ethnic music. More than 50,000 selections: sound effects libraries, production elements. Special annual blanket program licensing is available, new releases are recorded monthly. Free catalogs and music sampler on request.

Also: Production Elements CD, Power Distortion with 492 broadcast production elements produced by Weirdoactivity. A demo is available.

TriMediaOnline.com N1134

Trompeter SU10621

T-Systems International GmbH C9613

Intro: Satellite services available include: Broadcast Contribution DAMA Service (BCDS); ATM: Asynchronous Transfer Mode Broadcast-Services (ATM-BS) with international/worldwide access; and Digital Radio Mondiale (DRM) to bring AM radio into digital era.

Also: Digital audio broadcasting.

TWR Lighting Inc. N2018

Intro: High-intensity lighting systems for broadcast towers and LED lighting systems for broadcast towers.

Unimar N2129

United States Broadcast C5446

Intro: Used analog and digital broadcast and production equipment and mobile truck dealer.

UNITY: Journalists of Color Inc. R718

Intro: UNITY 2004 is the third joint gathering of associations representing 7,000 Hispanic American, African American, Asian American and Native American journalists.

Utility Tower Co. 2422

Intro: Specialized Antenna Mount (SAM) designed to help enhance antenna performance.

Valcom Limited N1002

Intro: Free Standing AM Fibreglass Antenna.
Also: TIS Antenna.

Valentino Music Production Library C1652

Viaccess S.A. SU7079

Intro: Viaccess has teamed with RealNetworks to enrich its purple-DRM service platform with the latest version of Helix DRM technology. purple-DRM is Viaccess' multi-DRM platform for digital rights management across any delivery network (broadband Internet and mobile networks).

Video Equipment Rentals- VER SL4011

Intro: Complete line of audio systems including Cobra Systems mixers, amplifiers and speakers.
Also: Dynacord, Telex, Shure, EV, EAW, Mackie, Tascam, 360-Systems, Yamaha,

Videoquip Research Limited C2523

Intro: AM-4 Audio Monitor Panel provides facilities for monitoring two stereo analog, two stereo AES3 stereo digital and two SDI embedded stereo signal sources. Four high-resolution meters display VU and

PPM values simultaneously. Selected sources may be monitored using the built-in speakers or headphones, in stereo, left or right channel only, or summed mono. Selected inputs are available at the analog and digital outputs automatically. Phase error and silence detection provided; MDA-8 Modular Audio/Video Distribution System now offers digital 1x8 modules in addition to previously available analog modules. AES3 and AES3-ID modules provide one-input, eight-output distribution for the respective digital audio formats. SDI video module provides a serial SDI 1x8 distribution system. The MDA-8 chassis holds up to 10 modules, in any combination.
Also: VP-2 VU/PPM Meter, ADA-210 Audio Distribution Amplifier, SD-2 Silence Detector, SRC-1 Digital Audio Sample Rate Converter, FC-2 Digital Audio Format Converter, DSG-1 Audio Signal Generator, LM-2 Level Matching Systems.

Visibility Solutions N412

V-Soft Communications N1306

Intro: Probe 3 extends the Communications Probe series of propagation prediction software. It includes the features of Probe II, such as Longley-Rice, PTP, Okamura/Hata and coverage and interference studies for FM and TV. New tools include polygon creation tool, enhanced mapping and MIF import capabilities; also, AM-Pro is a grouping of routines in one program to calculate and map AM standard-band broadcast coverage and perform allocation studies. It uses M3 and R2 ground conductivity curves for daytime and skywave formulas for night. Calculate population within coverage contours, determine the upgrade potential of existing AM stations and find new frequencies; Pattern Workshop builds composite patterns from antennas aimed at various azimuths.

Patterns can be edited by entering relative field, dBk, kW or dB, or click on the screen and drag an azimuth point. Calculates RMS, checks dB ratios per degree azimuth and front-to-back ratios. Comes with a large antenna pattern library.

Also: Probe 3, AM-Pro, Pattern Workshop, FMCont, Contour, PlotPath, RFHaz, InterDLG, Duopoly.

Ward-Beck Systems Ltd. C1914

Intro: RLM24 24 Stereo loudness meters (48 audio channels) with silence sensor and alarm, dual redundant power supplies in 2 RU space.

Also: R2K Consoles, Serialboxx, PODs, AMS4, XTM4, 8200 Series, IMP Impedance Converters, MP Meter Panels.

Weather Central Inc. C9617

Weather Metrics C8925



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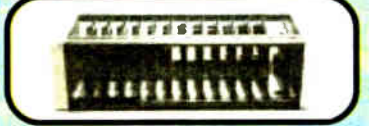


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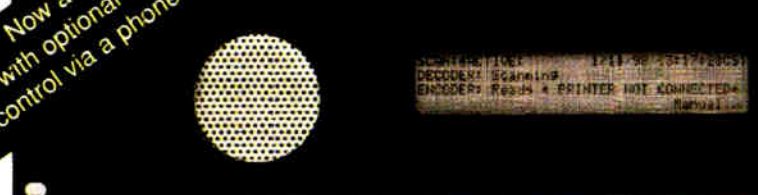
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Western Media C2938
Intro: Blank audio and disc media: digital audio tape CD-R/RW, DVD-R/RW, DVD+R/RW, DVD-RAM. Blank data storage media: HIC, QIC, 4mm/DDS, 8mm/Travan. Magnetic Optical Discs: DLT, LTO, SLR/MLR. Packaging/accessories; storage cabinets; CD replication; DVD replication; custom packaging. Also: DAT tapes, CD-R.

Wheatstone Corp. N2802
New: The Generation Series of Digital On-Air Radio Control Surfaces now includes Generation 3, 4 and 5 models, aimed at small to mid-size markets. The company also offers Gen 8 and Gen 9. Each can integrate with the Bridge digital audio network routing system; also, the Satellite Router Cage is a studio-sized router, using the card family approach of the company's Bridge product but scaled for individual studios; also, top-of-the line analog A-7000 radio on-air console. Open architecture allows modules to be plugged in any order for reconfiguration as format needs dictate. Modular hot-swap design is featured, as are call-in support using SPD-7000 phone modules. It is available with individual channel Bus-Minus IFB feeds.

Whirlwind C7819
Intro: The Whirlwind E Snake consists of E Snake Frames (ESF) and E Snake Control software. Two or more of these frames connected to each other through a 100 Mb Ethernet switch with CAT-5 or fiber optics replace the traditional analog multipair audio snake. Mic or line level; E BEAM Whirlwind E BEAM incorporates the latest laser technology resulting in an affordable solution for reliable Ethernet and CobraNet wireless transmission; E Desk is a hardware- and software-based digital audio platform that provides multi-channel audio processing in analog and CobraNet applications. Build systems containing virtual pieces of audio gear including mixers, processors, EQs, delays, controls.

WhisperRoom Inc. SL2172

Will-Burt Co. C6441
Pneumatic and manual telescoping masts, D-TEC

WinRadio Software N2523

Winsted Corp. SU10640

WireCAD C7211
Intro: WireCAD V3 - Building on its suite of affordable documentation tools, WireCAD version 3 provides improvements in the user interface including sticky wires, dynamic move, searchable equipment library and mechanical layouts. In addition, plug-ins are available to help with the early design phases including a facility layout tool, a system rat's nest function that allows the designer to create equipment connections in a list-based format and generate a drawing from the list, a patch-bay layout and designation strip tool. WireCAD Enterprise Admin Tools allow multiple users to work together sharing global and project specific information.

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Wireworks Corp. C7113

Wohler Technologies Inc. C6742
AMP series of premium rack-mounted audio monitors; VM series of audio confidence monitors; LM series of audio level meters, ALM series of audio alarms.

World Tower Co. C2916

WSDG - Walters Storyk Design Group C2223

Xiran, a Division of SimpleTech Inc. SL676

Xytech Systems Corp. C9739

Yamaha Corp. of America N2434
Intro: DM2000 is a surround-sound digital production console that supports up to 96

inputs, eight busses, 12 aux sends, plus a stereo output. Version 2 includes the ability to use the new Add-On Effects, advanced DAW control, enhanced automation, plus many features for broadcast and sound reinforcement; DM1000 is a compact digital console that supports up to 48 inputs, eight busses, eight aux sends plus a stereo output at 96kHz. Version 2 includes the ability to use the new Add-On Effects, ESAM editor control and many other features from DM2000 V2; Add-On Effects are new effects for the DM and O series consoles; Riedel Artist 1D is a solution for simple connectivity and long haul capability over fiber optic cable; PM5D is a Digital live production console. Also: PM5000, PM1D, O2R96, O1V96, AD8HR, DME64N, DME24N.

Z Technology C6840
Intro: Model R-507 programmable field-strength meter displays directly in dBuV/m

when used with a calibrated antenna and may be operated from the front panel or a new Windows Spectrum Display application running on an attached PC. The application provides a spectrum view of the analog or digital signal and a calibrated measurement of true integrated power. Also: R-506 Programmable Field Strength Meter, AM Broadcast Block Converter.

Zaxcom Inc. C7410
Intro: Zaxcom Digital ENG Wireless offers transmission of two full-bandwidth audio channels with one receiver and one transmitter using one 200 KHz RF channel; also, two new hard-disk recorders, Deva IV and V, available in 8- and 10-track models, for multitrack, high-bit rate-applications.

Zhongli Broadcast Technology Co. Ltd C10440
Intro: FM synchronized broadcast system; small MW antenna; digital FM transmitter; DVB-T.

Prophet Systems

Introducing

content

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ContentCheck is an advanced content delay system tailored for today's anti-obscenity climate.

NUMBERS	TYPE	POSITION	STATUS
001	Dump Start	000:36:000	X
002	Dump End	000:56:000	X
003	Spot Block	002:00:000	X
004	Spot Block	004:00:000	X

Now you can record, listen and edit your programs while they are happening, tailoring the programs to your audience, market and timeslot. With over 60 minutes of user configurable delay, you now have the power to edit even more than 7-20 seconds of content, so you can remove the whole joke, bit or segment from the show and still have the show sound professional. Non-destructive editing enables you to keep the show for audit purposes.

- ✓ Configurable for either compressed or uncompressed operation
- ✓ Works with most automation systems
- ✓ Over 60 minutes of user configurable delay
- ✓ Can also be used for logging delayed and non-delayed dayparts

NAB Fact:
Session Recordings

Certain NAB sessions are recorded and available for purchase. The Audio Recording Sales Booth is in the Upper Central lobby and Upper South Hall of the Las Vegas Convention Center.

Buying a digital automation system doesn't have to be complicated and expensive. Isn't it time to upgrade your old system to a Prophet?



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Radio World, March 28, 2004

Past columns are archived at www.rwonline.com/reference-room

What's Wrong With This Photo?

by John Bisset

Let's have a "can you spot what's wrong" photo. See Fig. 1.
See what you can find wrong. Look

Fig. 2 demonstrates a good reason to drop by and walk completely around your site. Severe winter can create major problems out of minor issues.
In addition to permitting water to

★ ★ ★

The mark of a good broadcast engineer is his or her commitment to education. This industry is changing so quickly that continuing education is a must.
For quite some time, it was primarily only the transmitter manufacturers, the SBE and NAB who sponsored the bulk of continuing education and training courses for broadcast engineers.

products, which are used to diagnose problems with RF cables/transmission lines and antenna systems. But the training will not be limited to Bird Electronic and TXRX Products. The company says a spectrum of courses will be offered, including market-specific applications, certifications, radio frequency theory/fundamentals and complimentary technologies.
For more information on the Bird courses, contact Peggy Volker at (440) 519-2050 or e-mail to pvolker@bird-technologies.com.

★ ★ ★



Fig. 1: What's wrong in this picture?

closely. You'll find answers at the end of this article.

★ ★ ★

Has it been a while since you've been to the transmitter site? That out-of-sight, out-of-mind attitude is easy to fall into, especially with the reliability of transmission systems.

enter the building, these rotted boards present an invitation to vermin and vandals.

Don't fix the site yourself. Yes, I know you can do it. The question is whether such a repair is a prudent use of your time. At today's engineering salaries, turning the job over to a handy man actually saves the station money — at least it should.



Fig. 2: Don't let severe weather of the past winter lead to major site problems. Do a thorough inspection.

Bird Technologies Group has announced a business unit titled Global Educational Services, in Solon, Ohio. GES will develop and deliver educational services across a variety of vehicles including classroom training, interactive CD-ROM and online.

The first series of classes made its debut at the end of February and centered around the Bird Site Analyzer and related

For as long as I can remember, the name "Enco" has been associated with a hard-drive automation system and related products.

There's another Enco, however. Enco Manufacturing, founded in 1940, is a supplier of machinery, machine tools and shop supplies.

If you head to the Internet and enter See WORKBENCH, page 49 ▶

NEW! StudioDrive makes your PC a studio-in-a-box!

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Zero Tolerance = More Delays

New Interest in Profanity Delays, Loggers Is Credited to Indecency Debate

by Lyssa Graham

Janet Jackson's breast and Clear Channel's fines have pushed awareness of indecency issues to new levels. In the weeks after the Super Bowl incident and a separate record fine by the FCC against Clear Channel, Bubba the Love Sponge lost his

job, industry superstar Howard Stern saw his affiliate list shrink and industry executives were grilled on Capitol Hill.

But one group, at least, might not be blamed for having fond feelings for Jackson or the FCC.

Suppliers and manufacturers of audio delay systems are reporting an increase in

sales that they attribute to the collective rush to prevent super-sized obscenity fines in the radio industry.

Tom Roalkvam, sales manager for BSW, said his office noticed a surge in interest almost immediately.

"We noticed right away a big change. We're hearing from people constantly looking for them, and they're in real short supply right now."

Roalkvam said that within a week after the Jackson stunt, "We were getting a lot of calls. The timing is such that I don't see many other events that it could have been."

Indecent savings

Jim Hauptstueck, resale products manager for Harris Corp., said his company saw the need for more delay devices and rushed to put together a better deal by ordering in quantity from its suppliers. Calling it "indecent savings," Hauptstueck said Harris was "trying to combine to create purchasing power not just for a single group but for multiple groups, to give them a better deal based strictly on purchasing power."

The early weeks following the Super Bowl, Hauptstueck said, saw a buying frenzy, creating a supply problem for stations and groups seeking delay systems.

"About 50 or 60 units in existence all went in one day," he said. "Now it's a matter of people stacked up looking to get units."

Hauptstueck said he was in touch with manufacturers "almost on a daily basis," to try to keep the supply of delay systems high enough.

Demand is high as managers and groups hurry to ensure that they don't face possible FCC fines brought on by obscene content.

A recent crackdown on such broadcasts resulted in the largest fine ever proposed for indecency, \$755,000 against Clear Channel Communications for sexually explicit segments broadcast during the Bubba the Love Sponge show during morning drive several years ago.

Following in the wake of the FCC's actions in the Super Bowl and Bubba cases,

Clear Channel and several other groups announced "zero tolerance" policies toward indecency. Releasing a "Responsible Broadcasting Initiative" in late February, the media giant pledged to ensure that material aired on its stations would conform to local standards of decency, also announcing plans for company-wide training and automatic suspensions for FCC rule violators.

Hours later, Stern's program was dropped from six Clear Channel stations as part of the group's zero tolerance policy. Stern is syndicated by Infinity.

"Clear Channel drew a line in the sand today with regard to protecting our listeners from indecent content, and Howard Stern's show blew right through it," said Clear Channel President and CEO John Hogan, referring to a show that included an interview with Paris Hilton's ex-boyfriend and a caller who used a racial epithet on the air.

Not just a blip

So what are stations and groups rushing to buy?

"The primary pieces are Symetrix 6000 and 6100AT, and Eventides," said Roalkvam.

Symetrix Sales Coordinator Paul Roberts said interest in delay devices spikes periodically, "whenever a jock pushes the edge in their program content" and gets caught, but this time the jump is bigger than usual.

"Every time the FCC sort of raises an eyebrow, we get a bit of a blip in sales," Roberts said. "This is a bit more than an FCC eyebrow. We're seeing more than a ripple, more like a small tidal wave."

Following the Super Bowl half-time stunt, he said, orders have been flooding in to his office. "People are thanking Janet quite a bit for the increase in sales," Roberts said.

Eventide Vice President of Sales and Marketing Ray Maxwell also reported a jump in business. Now on its fourth generation of broadcast delay devices, Maxwell said the company "absolutely" noticed an uptick.

He said sales of its BD-500 and BD-960 delay devices had been rising prior to the recent FCC crackdown, but the combination

See DELAYS, page 50 ▶

Workbench

▶ Continued from page 48

www.use-enco.com, you'll find 40,000 items in a catalog offering what's perhaps the largest selection of metalworking machinery, tools and shop supplies.

The latest catalog is impressive, but the most noticeable change is on the Web. Visitors to the site can find, view and compare products with real-time pricing and availability. Customers can create accounts online, check order status and track shipments.

Of particular interest to broadcast engineers is Enco's "lowest price" guarantee, a claimed 99-percent-in-stock inventory and a quick-ship program that ensures orders placed by 4 p.m. ship the same day.

★ ★ ★

While on the subject of shop supplies, take a look at Fig. 3. Klein, the rugged pliers and electrician's tool company, makes this container of Klein Kleeners, great for transmitter sites that have no water supply.

Have you studied Fig. 1? See how many of these you got right.

Foremost is the crack in the line's outer jacket. Water ingress into the line is never good. A rubber or silicon sealant should be used to "repair" the jacket.

If you mentioned tower paint, give yourself another point. Blistering and peeling paint will earn you a citation. And you can be certain that if the paint is going bad on the ground, it's not much better a couple hundred feet up. Make sure your tower inspections include a rigger with a paint chart.

Did your eagle eye spot the white tie wrap? The sun's ultraviolet rays deteriorate the white ties over time. A better choice for outside use would be black ties, which are more resistant to the ultraviolet rays. A bit more expensive, but the best long-term solution, is stainless steel wrap lock.

Among the things that are right: The coaxial cable is mounted with the appropriate tower hanger kits; and you can see an ice bridge, inexpensive insurance to protect lines from falling ice.

The ground kits aren't in view, but each line was grounded properly as it



Fig. 3: Keep a container of waterless wipes at your site.

Chris Kelley, market chief at Clear Channel's Salisbury, Md., cluster of stations, shares this tip. Chris points out that the wipes are impregnated with a cleaning compound that does a great job of getting grease and grime off your hands (and tools). No rinsing is required, and the wipes leave your hands clean of any residue.

Most electrical supply stores sell Klein Kleeners. The resealable container ensures the wipes won't dry out. Pick up a pail for each transmitter site.

★ ★ ★

comes off the tower.

So how does your tower site measure up? A cursory inspection doesn't take long, may save you a fine and could avert a catastrophe. Grab a bag lunch and plan to spend an hour at the site this week.

John Bisset has worked as a chief engineer and contract engineer for more than 30 years. He is the northeast regional sales manager for Dielectric Communications. Reach him at (571) 217-9386, or john.bisset@dielectric.spx.com.

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

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Delays

► Continued from page 49

of recent events and increased vigilance has driven sales higher in the United States.

"I think that what we're seeing in the U.S. is an increased vigilance on the part of the FCC to uphold local standards of decency," Maxwell said. "We offer a product that gives you a delay buffer that lives at the end of the chain and allows someone in the control room, when obscenities are uttered, to delete that obscenity before it airs."

MDOUK offers a software-based delay for Windows called "Arse!" that has up to 30 seconds of delay. It costs approximately \$970 based on current exchange rates.

Head of Sales Mo Dutta said the market for delays varies significantly depending on the country.

"In Western Europe, the use of delay systems has fallen quite significantly, maybe over a period of 5 to 10 years; there seems to have been a philosophical shift over that time," he said.

"Broadcast management expect their production and on-air staff to use more active techniques to stem the problems of obscenity or the broadcast of libelous content before they occur, such as better call screening, databasing of regular callers to talk shows using caller-ID aware systems, pre-studio briefings to celebrity guests who have the potential to cause a problem, training of on-air staff — basically just making better editorial choices in the first place."

However, he said dealers in Eastern European countries, particularly the new wave about to join the European Union, report that "the idea of using some kind of electronic prophylactic to guard against on-air accidents is pretty much as popular as it is in the U.S. ... Perhaps this again just reflects a greater degree of conservatism within their societies."

Dutta said his product offers a configurable "Wipe" feature that gives the opera-

tor "an added degree of confidence with something that came as close to being able to 'edit' a live radio show as is possible" — what Dutta called the "unachievable Holy Grail" for a profanity delay.

While sales of delay devices are up, will they continue to rise? Roberts said Symetrix sales volume has been "quite large, probably like four or five months worth of orders in the last month alone." He said the word from product representatives is that more sales are on the way.

"Dealers are saying a lot more sales are coming in now that station managers are scrambling to get delays in their stations."

Eventide also makes logging systems; at the upcoming NAB convention, it will debut the first Linux-based broadcast logger device, the VR-1615B.

"I think many broadcasters are (buying loggers) proactively rather than waiting for the FCC to require it," said Maxwell. "I predict we'll see more broadcasters doing that in the coming months."

Contractual changes

An increase in use of delay devices is not the only change coming to the radio industry. As part of its Responsible Broadcasting Initiative, Clear Channel jocks will share part of the responsibility for any obscene content that makes it on the air. Contract policies are being modified so that jocks share financial responsibility for fines incurred due to obscenities sneaking through on their watch.

"From now on, every contract that Clear Channel enters into with on-air talent will include this provision," Hogan said. "While that won't relieve Clear Channel from our responsibility as a broadcast licensee, we believe it will have a significant deterrent effect on indecent content."

AFTRA, the union of radio and television artists, reacted immediately with criticism to that initiative, saying broadcast owners should not blame jocks for failures of program policy.

ContentCheck Grows Out of Clear Channel Project

Here's another approach to a program delay, as pointed out by Jeff Littlejohn, senior vice president of engineering for Clear Channel Radio.

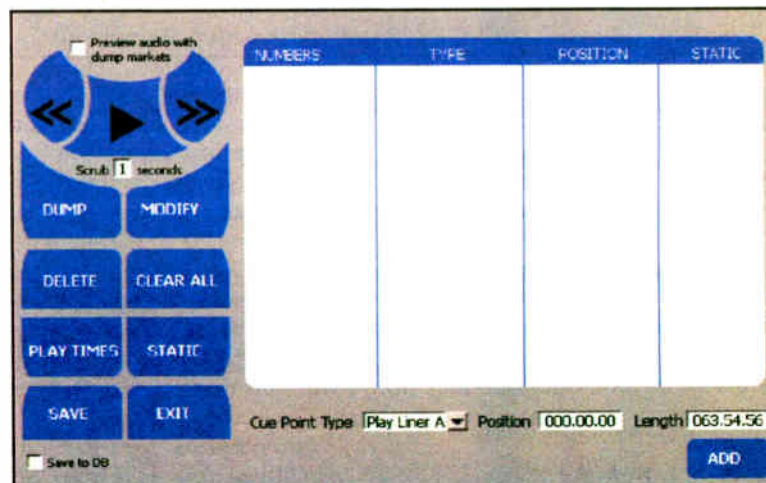
"Delays are great, but for the most part you have to be pretty quick on the trigger to make them work," he said. "And if a bit takes 2 or 3 minutes to develop, you really don't want to just cut out the punch line. You'd rather erase the entire segment."

"Prior to parting ways with Bubba, we had Prophet Systems develop a delay to deal with our concerns ... it worked so well that Kevin Lockhart decided to market it as a retail product." Supplier Prophet also is owned by Clear Channel; Lockhart is president.

The product is called ContentCheck; it works as a standalone system or with Prophet's NexGen or other automation systems.

"This delay isn't for everyone," Littlejohn said, "but if someone has a really 'on-the-edge' morning team, I think it's a perfect fit. While it will allow up to a one-hour delay, I think most people would use it as a 5-10 minute delay ... which allows plenty of time to edit, but also keeps it timely."

For information, visit www.prophetsys.com/lines/Broadcast/contentcheck.asp.



Lessons of the BritDAB Invasion

As Digital Radio Succeeds in the United Kingdom, The Rest of the World Should Learn Why

The relatively slow progress of digital radio services worldwide has been noted frequently on these pages and elsewhere. This has been affected both by extended policy debate, as in the United States, as well as by sluggish commercial deployment, as in Europe.

Now that it appears the U.S. market is finally moving into the commercialization stage for digital radio, it's worthwhile to examine the European market, where DAB has been commercially available for several years, to see if any lessons in avoiding further indolence can be learned.

If you build it ...

As it turns out, a bit of a controlled experiment appears to be emerging in the European DAB environment.

DAB's success varies country to country, but a clear standout so far is the United Kingdom, where DAB now is a major hit, and appears on its way to killer-app status. Meanwhile, most other European countries are reporting fairly stable but slow growth. What's making the U.K. experience so different?



The Dixons outlet at London's Heathrow Airport offers a range of DAB portables.

Not surprisingly, "It's the services, stupid." The U.K. is the only country where a substantial number of radio services are available *exclusively* on DAB. In fact, there are now more DAB-only services in the U.K. than DAB simulcasts (the latter simply duplicating existing AM/MW or FM channels).

Of the 362 DAB services operating across the U.K., 190 are only available via DAB, while 172 are simulcasts, as reported by the Digital Radio Development Bureau, a trade association formed by the BBC and commercial DAB operators promoting DAB in the U.K.

The pivotal role of quantitative growth in new media adoption by consumers has become a familiar refrain to readers of this column, although it bears repeating, having apparently been proven once again. The single and universally most influential driver of acceptance for new delivery formats is the availability of exclusive new services. Simple quality enhancements only appeal to an enthusiast fringe, while the existence of additional content not accessible via other means appeals to mainstream consumers. The U.K. has obviously decided that the

chicken-and-egg cycle should be broken by offering new services first, and this appears to be a successful strategy.

As the DAB-only services have emerged in Britain, a closely correlated rise in receiver sales has taken place, with a reported DAB penetration increase in U.K. homes of 222 percent during 2003. More than 300,000 DAB receivers were sold last year in the U.K., with most occurring during the holiday period at year's end.

Dixons Group, a leading U.K. elec-

tronics retailer, reported that portable DAB radios outsold portable analog receivers in its stores during the 2003 holiday season, accounting for 85 percent of portable radio revenues. (This category includes tabletop portables as well as personal/pocket radios.)

Many new and less-expensive receivers also became available in 2003, some selling for as low as ?65 (~\$120). This trend is expected to continue and accelerate in 2004 and beyond.

Cross-promotion

Another key factor in the U.K. appears to be a fairly well-coordinated See BRITDAB, page 52 ▶

The Big Picture



Photo: Gary Hayes, BBC

by Skip Pizzi

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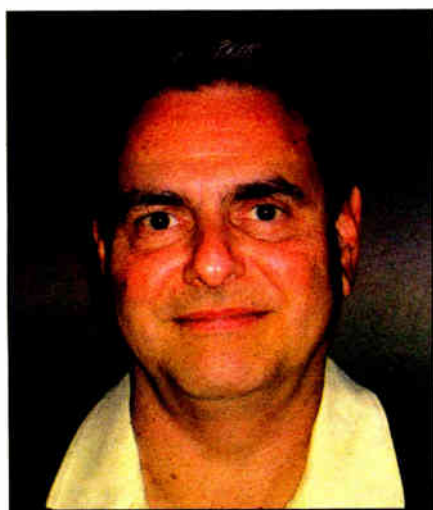
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Through Practice Comes Success

The New Certification Sample Test Software Is SBE CertPreview, Available at NAB

by David Carr, CPBE

The Society of Broadcast Engineers' Program of Certification was established in 1975. It did not take long to identify the need to offer an example of the test procedure and materials. Sample tests were created so that an applicant could



David Carr

determine if he or she was prepared to take the certification exam. These sample tests covered the areas in which the applicant would be tested and provided feedback on any area in which the applicant was lacking.

Thirteen years ago, the first version of the certification study guide was introduced. It was on a floppy disk and in a DOS format. Subsequently, the Certification Committee updated the questions on the actual tests to reflect the more modern technology that broadcast engineers were experiencing.

Changing the actual test questions meant that the committee also had to update the sample questions as well. The

original study guide program had been written in such a way that updating the sample questions was difficult to accomplish — if not impossible. To provide certification candidates with up-to-date material in a timely manner, the Certification Committee decided to revert to a paper-based sample test.



CERTpreview

Certification Sample Test Software

Yes, for a short period, the study guides were distributed in paper form. While this was a technological step backward, the committee felt that it was more important to provide useful and current data to the applicant regardless of the medium used.

Resources can be somewhat limited in a volunteer organization, so the paper alternative was devised to meet the demand until the technical obstacles could be cleared. The Certification Committee began developing new software to facilitate the replacement of questions to reflect current technology. Once this was accomplished, the study guides were once again released on floppy disks, still in DOS.

This DOS version continued to be a popular tool, and while the material was updated, the technology of the world was quickly leaving DOS behind. This led the Certification Committee to pursue the latest technology for its distribution. There

were ongoing discussions about how best to accomplish the goal of updated software, which led to members of the Certification Committee to begin work on developing an updated product.

CertPreview

Now that product is here. The new SBE certification sample test software is called SBE CertPreview, and it will be available at NAB2004. The software runs on Windows, and will be distrib-

uted on a CD-ROM.

With the change, we leave the limitations of the old operating system behind, and we are able to expand on the software's functionality. CertPreview will allow us to present the most current sample test questions. As the committee adds or replaces actual test questions, similar



questions will be added quickly to the sample tests with a shorter turnaround time.

The CertPreview platform makes it possible for the Certification Committee to upgrade to newer software versions as well. As we continue to develop the program, the software will be enhanced to provide feedback to the applicants to better prepare them for the exam. Previously, applicants would simply be informed that they had answered the sample test question right or wrong. Now applicants will be informed immediately if their answer is correct or not.

If incorrect, the software will reveal the right answer before it moves on to the next question. Plans are already being made for future upgrades that will make it possible not only to provide the correct answer, but also the calculations or nec-

See SBE, page 53 ▶

BritDAB

▶ Continued from page 51

PR blitz that has heightened DAB awareness nationwide.

The BBC frequently mentions its DAB offerings — it currently pro-

U.K. also carry some DAB channels as audio-only services, which allows many Britons to sample the DAB services through their TV systems before purchasing a receiver.

The presence of a well-funded evangelism group in DRDB also has helped mobilize a coherent promotional strategy. A recent survey indi-

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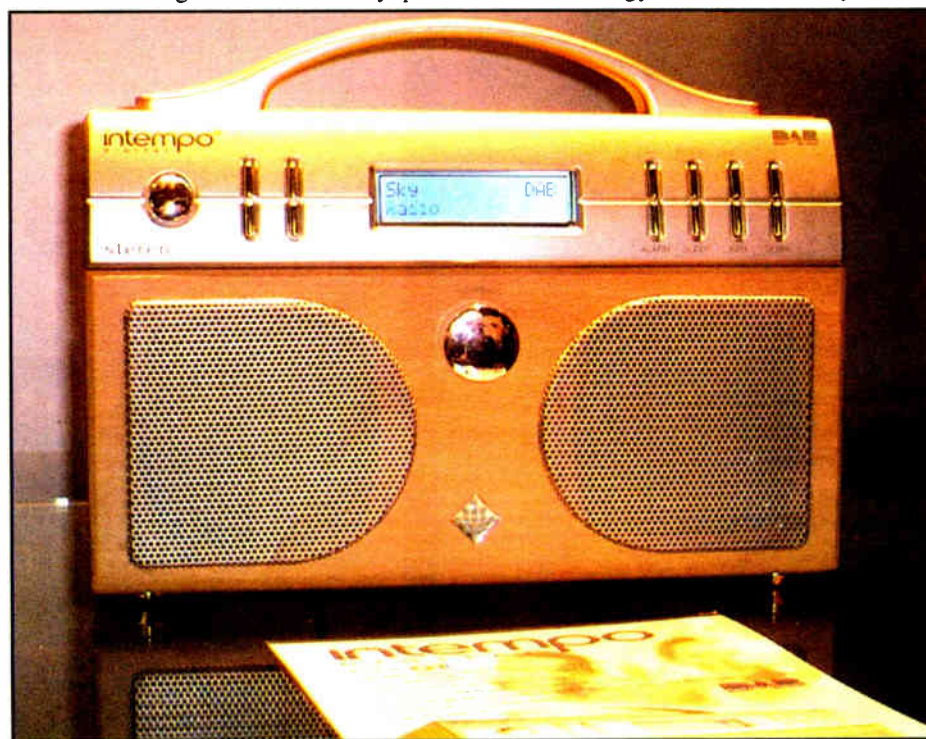


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The Intempo PG-01 digital radio offers FM and DAB. It sells for the equivalent of about \$220.

vides five DAB-only, full-time services — on its other radio and TV channels, and its commercial counterparts do the same for their DAB services. Radio Times magazine, a popular TV and radio program listings publication, includes numerous articles on DAB, and gives away a DAB radio every week as a prize in its "Letter of the Week" contest.

Digital television systems in the

cated 43 percent of the British public knows about DAB, which equates to 25 million people.

Across the pond

Naturally, the U.K. and U.S. broadcasting businesses are dissimilar in many ways, so some of these processes will not translate well.

The most important distinction is how new services will be offered. In an

SBE

► Continued from page 52

essary explanation of how the correct answer was determined. Similar enhancements will be added as CertPreview is distributed and users provide additional feedback.

Various types of tests

CertPreview will be available to aid applicants studying for Certified Broadcast Technologist (CBT), Certified Broadcast Networking Technologist (CBNT), Certified Audio Engineer (CEA), Certified Video Engineer (CEV), Certified Broadcast Radio Engineer (CBRE), Certified Broadcast Television Engineer (CBTE), Certified Senior Broadcast Radio Engineer (CSRE) and Certified Senior Broadcast Television Engineer (CSTE).

Like the previous versions, the sample questions will cover several topics, such as FCC rules and regulations, basic electronics, troubleshooting, digital theory, audio, video, AM and FM RF, TV RF, satellite technology, microwave systems, safety, supervision and management, and computer networking fundamentals.

CertPreview will permit the applicant to take various types of tests within a given certification level. The stan-

IBOC environment, all primary audio services are inherently simulcast. Therefore the only new services possible in U.S. digital radio are those that will be carried in the datacasting part of the IBOC service. These could include text, graphics and secondary audio services (for example, those envisioned by the Tomorrow Radio project; see RW, March 1).

But to enable a U.K.-styled leveraging of service growth in U.S. digital radio, IBOC's "auxiliary" datacasting services must be receivable by the majority of IBOC radios in the marketplace. If IBOC datacasting features are only included on a rarefied breed of high-end receivers, then the strong penetration impact of new services exhibited in British DAB will never occur in the United States.

Of course, first-generation IBOC receivers will not include this capability, as it is not yet fully determined or standardized. When completed, however, the FCC should take the same approach it does for other incremental improvements, introducing a phase-in schedule by which the new feature must be included in product offerings — such as was done for closed captioning on analog TV, and as is underway for digital terrestrial and cable tuners in DTV sets — ultimately reaching 100 percent of all new receivers sold. This could significantly enhance and accelerate the adoption of IBOC digital radio in the United States, and lead to greater listener satisfaction with American terrestrial radio services.

The U.K. is certainly doing something uniquely right in its launch of digital radio services, and the rest of the world should take heed.

Skip Pizzi is contributing editor of Radio World.

ard test is made up of questions from a specific category, such as FCC or RF. The comprehensive test simulates an actual test, providing questions from

exam experience.

CertPreview will be available in April and can be purchased for \$27 per test level, plus \$3 shipping and handling.

846-9000, send e-mail to lbaum@sbe.org or write to 9247 North Meridian Street, Suite 305, Indianapolis, IN 46260.

You can also view a demonstration of CertPreview and purchase a copy of it at the SBE Booth, central lobby No. 17, at NAB2004 in Las Vegas.

The SBE Program of Certification has accomplished many significant achievements over the past few years. Through these efforts, the Program of Certification is experiencing heightened interest in what certification can do for the broadcast engineering profession. As broadcast technology evolves so do the tools we use. CertPreview is one of those tools.

Carr is a member of SBE National Certification Committee. He served as the chairman of the committee from 1996 to 1998.

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all categories included in the specific certification test for which you are preparing. Applicants can also set a time limit to simulate fully the actual

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Cascading Algorithms and HD Radio

by Tom Vernon

It's been a slow train coming, but HD Radio is happening. If your station has already invested in this technology, you may be preparing to kick back and enjoy hours of pristine sound.

While HD Radio is capable of delivering unsurpassed audio, you need to understand some of the issues related to cascading algorithms in order to reap all the aural benefits this medium has to offer.

In a perfect world, everyone would use uncompressed digital audio all the time. The downsides to uncompressed audio, however, are the amount of bandwidth required to transmit it and the comparatively large size of the files, which require more hard disk space. Compression of digital audio files is necessary to send audio files around economically in the real world.

Problems can arise when a station receives audio files from different sources, not knowing how those files were recorded, and how many and what types of codecs they have been run through. Coding systems are based on a psychoacoustic model of what people can and cannot hear; they are designed to keep processing artifacts below the threshold of perception. When an audio file is compressed several times, howev-

er, there is a good chance that this threshold will be breached, and sound degradation will become audible.

Squire

While the perils of cascading algorithms have been known since the early 1990s, the addition of HD Radio to the chain, which itself uses digital algorithms, raises new concerns for those charged with maintaining the station's audio quality.

While the perils of cascading algorithms have been known, the addition of HD Radio, which itself uses digital algorithms, raises new concerns.

For example, Jon McClintock, commercial director for Audio Processing Technology, a codec supplier, notes that some difficulties have been experienced with DAB in Europe.

"While the problems of multiple psycho-acoustic passes have long been known, the reality only hit home when digital stations went live. In the U.K., a number of listeners complained of 'muddy' or 'tinny' sounding audio from com-

mercial stations with DAB." McClintock said that, with proper precautions, other networks in Europe were able to deliver CD-quality audio.

"Do you know where your audio has been?" asks Herb Squire, vice president of engineering and operations for DSI RF Systems Inc.

Squire, who is performing real-world tests of various codecs through AM and FM IBOC systems, adds that as much as possible, stations need to know the ori-

gins of source material and be aware of what compression has been used on incoming audio files. Issues related to codecs and HD radio are a wide-open area for research.

"We're in unknown territory, so I'm not sure what I'll find," he said. "There will probably be some combinations of codecs that will work well with IBOC, and other that won't."

He adds that the problem of cascading algorithms will be especially pressing for all-news stations, who must take audio feeds from many sources in a variety of formats and get them on the air quickly.

Music stations with uncompressed digital libraries are not immune from such problems, however, as some record manufacturers have announced plans to distribute new releases via MP3. Squire plans to present the results of his tests "Dueling Algorithms Meet IBOC" at the NAB show in April.

Hidden trap

Robert Reams, chief technology officer and co-founder of Neural Audio, said that the problem of cascading algorithms is troublesome because it can remain hidden for so long.

"Errors in cascading algorithms are an exponential function, and often the problem is hidden until it hits the final codec." Stations may receive audio files that sound acceptable, but have poor quality when played over the air.

The best way to prevent the degradation of cascading algorithms is to make sure the initial recording is free of hum and noise. The traditional analog culprits, ground loops, flicker or thermal noise, do not exist in digital. But there are still ways that noise can make its way into the digital signal, among them video/computer monitor EMI "spew" captured by live microphones, preamplifier noise and noise or hum in external music or commercial content.

Reams said that while there may be few analog outposts in today's digital stations, those that remain must be maintained to exacting standards.

McClintock of APT recommends four steps to avoid audio degradation: avoid more than two passes of psycho-acoustic based algorithms for files in the digital plant; use 256 kilobits per second for ISDN links; use 384 kbps for storage and networking; and use at least 256 kbps for distribution networks.



Degraded audio isn't the only reason to be concerned about hum and noise in the system.

All of the new digital transmission systems allow for the transmission of non-audio content such as ancillary data, text or control signalling. This data is held in a separate buffer and merged into the output bit stream using space in the reservoir buffer when it is not required for audio.

"If the codec is busy dealing with audio hum and noise," Reams said, "the result is slower updates on text, visual aids, control signalling or other revenue-generating features of the digital broadcast."

Processing with care

Audio processing in the digital realm is another area where care needs to be exercised.

Frank Foti, president of Omnia Audio, said that devising a processing scheme for HD Radio requires a different mindset than what was applied to analog transmissions.

The most important difference involves dealing with data-reduced audio. In HD Radio, the processor needs to manage the audio spectrum in the most efficient manner.

"The processor needs to be thought of as a partner with the encoder," Foti said, "much in the same way an FM analog processor works together with the stereo multiplex encoder."

The goal of processing in the HD Radio world is to improve the intelligibility of the perceived audio. Although processing for effect is still possible, the concept of using the audio processor as a weapon to blow the competition away does not apply to HD Radio. "Once you've reached digital full-scale," Foti said, "there is simply no more to be had."

Because a station's HD Radio and analog signals will run in tandem, either two audio processors or a dual HD/analog device will be required. More important, though, is the need for them to work together as a system.

Even though HD has been engineered so the audio from both the digital and analog signals arrive at the same time, audio spectrum and phase relationships must be similar on both the digital and analog transmission paths. If there are significant differences, the blend-to-analog action in the receiver will be abrupt and jarring to listeners.

Another concern is to understand thoroughly the audio routing layout for a digital transmitter installation. Foti said that the HDC system employs a master clock to sync everything to the

See CASCADING, page 55 ▶

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World Radio History

MILE STONES

NAB Audio Cart Turns 40

The radio industry will pass a notable anniversary this fall, but one unlikely to be observed by too many people. The NAB cart turns 40.

One of the many purposes of peer organizations such as the National Association of Broadcasters is to set standards in a given field to permit interchange and to unify business practices.

Some standards are forward-looking, such as the HD Radio specifications, in which we had a standard before the first HD station came on or receivers were built. Then we have backward-looking standards in which an industry development or practice is formalized.

An example of the latter is the NAB audio cartridge standard.

"Carts" — endless-loop 1/4-inch tape packages that could be played back without rewinding or rethreading — had been around the industry in various proprietary forms from the late 1950s.

The NAB standard, though, was published in October of 1964 — 40 years ago this fall.

This detailed standard dictated not only a cartridge's physical dimensions and construction — carts came in multiple sizes — but also through performance requirements, the quality of the tape inside.

As in the story of Goldilocks, there were three cart sizes, AA, BB and CC, for increasing play lengths.

Surprisingly, the NAB standard did not set any standard playing times; but cart vendors quickly focused on play time (and hence recue time) that most perfectly matched radio's typical needs, such as the ubiquitous 40-second cart for 30-second commercials.

The standard further defined the playback machine capabilities, including track configuration; audio levels; flux record density; cue, logging and control tones (frequencies, levels, duration, etc.); flutter; phase differential in stereo; noise level; distortion; and response.

With the surety of this standard, a multitude of manufacturers entered the field, and cart machines appeared quickly, becoming de rigeur in virtually every radio station in the nation.

Today, with the conquest of computers and their cost-effective, transparent, voluminous hard-drive memory, the cart machine has been sent to the Dumpster.

A cottage industry continues to provide and repair machines and cart tapes for stalwarts who like the familiar convenience of having audio events segregated on a separate, reliable storage medium.

— Charles "Buc" Fitch



Yesterday's state of the art, tomorrow's museum piece. Photo courtesy The Cart Guys, www.cartguys.com, which also rebuilds and reloads tapes.

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The PORTADISC portable MiniDisc recorder combines exceptional sound quality, a rugged, dependable MD drive and a full complement of professional features including a 6 second pre-record buffer, 40 second memory buffer and lockable controls. Comprehensive connectivity includes balanced

XLR Mic/Line inputs, RCA/phono line outputs and coaxial and optical digital I/Os. An On-board sample rate converter is included and Mic inputs feature switchable attenuation, bass

An intuitive menu structure makes it easy to configure the PORTADISC for your precise requirements. There are five user programmable set ups so you can switch quickly for different recording applications. The large illuminated display also provides clear metering, margin indication and track, time and battery information while working in the field.

Cascading

► Continued from page 54

44.1 KHz sampling rate the system uses. Transmitter manufacturers have their own methods for audio routing and sync. The two need to work together, or problems will develop.

"Ensuring that your processing is operating in sync with the system, and is set to the correct sampling rate, will positively affect on-air audio quality."

HD Radio is capable of bringing CD-quality sound to FM, but it is not simple as flipping a switch. This is fresh territory for everyone, and there may be some codecs that work better than others in conjunction with HD Radio gear.

As much as possible, broadcasters need to know the origins and coding schemes for all external audio files that are coming into the system. Don't neglect the remaining analog gear in your station. Analog standards are higher than they ever have been.

Finally, remember that processing for the HD Radio plant requires not only gear that was designed to work with audio codecs, but properly matching the HD Radio and analog signals so that transitions from analog to digital and back in the listener's receiver are smooth and seamless.

For further information, visit www.hhbusa.com

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Studio Sessions

Making News
With Marantz

See page 58

Radio World

Resource for Radio On-Air, Production and Recording

March 28, 2004

PRODUCT EVALUATION

New Classic Mics From Heil Sound

by Alan R. Peterson

Heil Sound is known for Peter Frampton's talkbox (the wah-wah guitar part from "Show Me the Way"), knockout home theater technology and some of the best amateur radio mics made today.

When a company has rocker and ham buddy Joe Walsh (WB6ACU) as a product endorser, it just might have something worth talking about.

Or talking into.

Heil Sound tapped into its expertise in ham radio microphones and rolled out two dynamic mics with a decidedly vintage twist: the Heritage, which echoes the lines and vibe of the old Shure 55 "Elvis" mic; and the Classic Pro, which resembles the RCA 74B ribbon mic.

Both sport response of 40 Hz to 18 kHz, nifty looks and modern innards that make them suitable for use in both the live broadcast studio and production rooms.

They also are remarkably affordable. The Classic Pro lists for \$269, while the Heritage clocks in at a pleasing \$188.

While I have a couple of quibbles, I would enthusiastically recommend these microphones for anyone outfitting a nostalgia/adult standards station, any sort of broadcast museum operation and for any studio that wants to recreate a 1950s vibe. Rockabilly just doesn't feel right in front of a Neumann.

The appearance of the Classic Pro is



Heil Classic Pro Microphone. The mic flag can be customized with adhesive letters ordered when the warranty card is sent in.

meant to suggest the lines of the RCA 74 microphone rather than the RCA 44; the models are easily confused.

Both rhombic (kite-shaped) in appearance, the latter model had the three-line "art deco" trim and tilt thumbscrews among other features, where the 74 was mostly unadorned. A more contemporary example of the model 44 would be the R44C from Audio Engineering Associates (\$3,550).

The internal construction is the first point where these microphones differ. The 44 and 74 models were ribbon velocity microphones. These are wonderfully natural sounding units, but are fragile and difficult to service if needed. Replacement ribbon material can be expensive and hard to come by, and an untrained technician could be showered with flying parts if the grille is opened.

Heil Sound got around this by using a cardioid dynamic element that offers response up to 18,000 Hz. Hearing this mic in action, I was reminded of the response found in a Sennheiser 421, but with a touch of "sweetness" dropped in. Sure enough, according to notes from President Bob Heil, the dynamic element in this microphone received a +4 dB boink between 3.5 and 5 kHz.



Heil Heritage Microphone

The mic element is ringed with a sorbothane rubber mount to minimize any vibration that might be transferred to the element. In fact, work the mic up close and you will get a strong whiff of tire rubber.

Where the old RCA mics had silk screens inside the mic grille, Heil Sound instead put in a thin layer of blue open-cell foam. This, along with a pop screen force-fit over the dynamic element, offers some fairly decent immunity against plosives. A simple capacitor soldered across an SPDT slide switch adds some low-cut to the mic output.

The location of the mic element actually falls just under the bend in the rhomboid-shaped grille. Speaking just below that bend places the voice directly into the element.

Overall construction of the Classic Pro differs greatly from both the RCA original and the AEA recreation. The body of the Classic Pro is of light-

Product Capsule:
Heil Sound
Heritage and Classic Pro
Dynamic Microphones

Thumbs Up

- ✓Pleasing replicas of classic mic models
- ✓Up to 18 kHz response
- ✓Inexpensive and fun to show off

Thumbs Down

- ✓Inadequate blast immunity on early Heritage models

Price: Heritage: \$188;
Classic Pro: \$269

For information from Heil Sound, contact the company in Illinois at (618) 257-3000 or visit www.heilsound.com.

weight die cast zinc. The original used steel and brass castings and employed a heavy magnet to support the microphone ribbon element.

Doing the same here would have placed the Classic Pro way out of a reasonable price range as well as made it too heavy to be supported by a contemporary spring-arm microphone boom.

The Classic Pro comes with a CB-1 base that suggests the styling of original RCA desk stand, and the cast aluminum mic flag can be customized with adhesive letters ordered through Heil Sound after the warranty card is sent in. Very cool.

It should be noted here that broadcast use will dictate that this microphone is run through a processor. Once EQ'd, tuned to a jock's particular voice and heavily processed, it becomes hard to distinguish the sound of this microphone from many others.

In which case, you would probably go for one of these mics just for its classic appearance and durability compared to ribbon units. But there is nothing wrong with that; if this mic pulls a good performance out of your announcers, mission accomplished.

Besides, at better than one-tenth the cost of a genuine ribbon microphone, you can afford to buy more than one.

Finally, should you decide to look into one of these mics yourself, be sure you request the Classic Pro. If you ask simply for the "Classic," you will receive the model designed for Amateur radio operation, which contains different internal elements.

Heritage

With the Heritage mic, you too can play the "Skinny Young Elvis" from the postage stamp.

While not an exact replica of the original Shure Series 55 Unidyne II microphone, there is enough going on here to offer a

See HEIL, page 61 ▶

Studio Solutions

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PRODUCT EVALUATION

L.A. Reporter, Marantz Make News

by Christopher Springmann

It is crime-time today in Los Angeles, and KFI's Eric Leonard's got 'em all on the air: alleged child molesters; alleged wife-and-husband murderers (take your pick); and alleged brutal cops. It's all in a day's work at one of America's most listened to news-talk station. KFI at 640(AM) is owned by Clear Channel and has a cume of 1.6 million.

Leonard, 27, an eight-year veteran of covering flamboyancy, flakes and fires, is a news director's dream: young and hungry, with a sixth-sense for breaking news; creative under relentless deadline pressure; and possessing an awesome technical ability that translates to great on-air sound.

The office

His new dark-tinted-window Ford Explorer, affectionately called "The Office," sports eight antennas, a GPS never-lost moving map with voice system; two scanners, three cell phones, a mixer and dual two-way radio systems — one a wide-band FM system for filing — all driven by a dual-battery 12 V system and a 110 V generator.

The Office's radio is usually tuned to the competition. And the competition is fierce, evident as we rolled to a typical media circus "news conference" featuring Michael Jackson's sycophants and apologists.

The CNN studio-on-wheels dominated the scene. Resembling an armored car with a giant dish on top, the rig dwarfed the six other local and network TV trucks with their immense auger-like telescoping antennas. So many reporters, correspondents and camera operators crowded this sidewalk scene, they were literally layered on stepladders.

Leonard surveyed the event, placed his microphone with the others in a 12-inch-wide disk on a light stand. The disk had 14-plus multiple holes sized for hand mics, resembling an old ice cream cone holder. This "Larry Greene" special was the invention of a frustrated soundman grown weary of gaff-and-duct taping mics together

Marantz PMD670

On the other end of the mic, Leonard ran his XLR plug into a Marantz PMD670 solid-state recorder, which records audio on Flash cards.

Unlike MiniDisc recorders, even the

\$1,500 and above variety, which transfer audio into editing systems in real time, the Marantz audio files drag-and-drop through a USB connection. Slow transfer times in the L.A. market mean only one thing: you are not competitive, so get out of the way.

Finished with recording, Leonard clev-

erly cradles the PMD670 in the Explorer's now-turned-upside-down steering wheel. Pressed for time, just minutes before the top of the hour, he locates the desired tracks from his handwritten notes, moving back-and-forth swiftly with the Marantz's arrow keys.



erly cradles the PMD670 in the Explorer's now-turned-upside-down steering wheel. Pressed for time, just minutes before the top of the hour, he locates the desired tracks from his handwritten notes, moving back-and-forth swiftly with the Marantz's arrow keys.

Edit on-the-fly

Dumping cuts into the Sony, Leonard gives the audio a quick check, then finishes the broadcast copy. Seconds later, he calls the KFI studio, gets levels and, mic in hand, breathlessly starts the broadcast from the Explorer's front seat.

The PMD670 was exposed to smoke and ash, splashed with water and sticky orange fire retardant and dragged down dusty roads.

— Eric Leonard

Alternating effortlessly between five VOs and four audio clips by jogging buttons on the MiniDisc unit, Leonard rocks a quick :30 to the station's hungry news-talk junkies. It is a stunning fusion of art-and-technology. And he makes it look easy.

Leonard then drags-and-drops the Marantz audio into his laptop, saves to the hard-drive and burns a backup archive CD so he can locate audio for future programs. It is all cool and seamless.

Satisfied with his CD, Leonard erases the 1 GB Flashcard and he is good to go. Always eager to learn and share, Leonard grabbed my PMD670 and programmed the unit through the file/algorithm selection for max quality recording in stereo, 44.1 kHz, .WAV, the necessary combination for the CD burn.

"Now, our newsroom system digitizes at 22.050 kHz/16 bits, which sounds fine on AM radio but falls apart on FM because of the low sampling frequency," Leonard said. "We avoid any compression because of 'artifacts' in the studio-to-transmitter link. MP2 compression is more gentle, about a 10:3 reduction, than MP3, absolutely the best choice for preserving audio quality while conserving storage space."

As of this writing, Leonard has used the PMD670 for five months and he reports that it has not "erred, crashed or failed to operate or complete a record-

ing," despite a "pretty decent field bashing" during the Los Angeles forest fires.

"The PMD670 was exposed to smoke and ash, splashed with water and sticky orange fire retardant and dragged down dusty roads," Leonard said. "The next week I had it in freezing temps and it still delivered."

Frustration with MD recorders

Leonard chose the PMD670 as the answer to frustrating experiences with consumer and pro MiniDisc recorders.

"I had three concerns when considering an HD or solid-state recorder," said Leonard.

Battery endurance was crucial. It had to operate for a full day in the field on a single charge. Second, the recorder had to operate as a standalone unit offering the field cueing and editing functions available on cassette and MD records, as Leonard does "hot playback" on the air, rolling in sound bites. Of course he also needed the ability to transfer audio files drag-and-drop to a computer.

Third on Leonard's wish list was the desire for a manual record level control and decent mic pres, with at least 60 dB of gain. "Any less and those 'talking heads' who move off-mic at press conferences are lost," he said.

Product Capsule:
Marantz PMD670
Professional Solid-State Recorder

Thumbs Up

- ✓Fast random access to files
- ✓On-board EDL-type editing
- ✓Good mix of analog and digital I/O plus USB transfer
- ✓Low battery consumption

Thumbs Down

- ✓Limiter attack is slow in some cases
- ✓Noisy mic attenuator

Price: \$899.99

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The PMD670 more than answered Leonard's wishes. His first set of eight AAs ran more than 10 hours. The recorder allowed tracks and cue points to be marked, shuttled to with ease, with near-instant playback. "The Marantz has the fastest playback-start-from-pause I've ever used."

Leonard said that the mic preamps on the PMD670 offer plenty of gain. While the manual level control works fine, the lengthy attack and fall-off time on the ALC setting is unacceptable for most applications — likewise for the limiter.

He went on to say that the limiter does not kick in nearly fast enough to prevent over-modulated utterances. Far better, suggested Leonard, to set levels at -20 and allow peaks around -12, thereby preventing everything but the "gunshots" from slamming the meters.

Another issue Leonard has with the unit is with the 20 dB mic attenuator, which introduces a lot of noise when it is switched in.

"This probably isn't a problem for target users who run omnidirectional dynamic mics, but could be an issue for users intent on recording concerts or high-quality dialog with condenser mics using the unit's phantom power," said Leonard.

The bottom line? "The whole point of using the PMD670 is, of course, the digital file transfer. I often edit my stories in the field using the laptop, then transmit files directly to the audio server at the station over a wireless Internet connection," Leonard said.

"The PMD670 streamlines this process by giving me near-instant access to the recorded files. I can do drag-and-drop audio editing in less than half the time it took with conventional real-time transfers."

Oh, Number Four on Leonard's wish list? A dish atop his Explorer and a producer riding shotgun, like "Tank" in the Matrix.

"I could be so much more productive then!" said Leonard. This news guy isn't content to just kill the competition in L.A., he wants to bury them, too.

Thanks to Location Sound Corp. in North Hollywood California and the KFI news ops for their assistance with this article.

Christopher Springmann is executive producer of "Health Rhythms," a daily radio program broadcast on the Voice of America, American Forces Network and 115+ public radio affiliates.

PRODUCT GUIDE

Intelix Upgrades Mic/Line Mixer

The Intelix 8002MCP-FP mic/line mixer was designed for broadcast vehicles or for other applications where rear access to the mixer is limited.

Upgrades have been made to make the unit more rugged and user-friendly. Pushbutton channel gain and mic/line pad controls have been replaced by toggle switches, which the company says are more durable and easier to see and activate in areas with low lighting, such as broadcast vehicles.

The 8002MCP-FP has eight-channel, dual bus mic/line mixing, compression and limiting, actively balanced inputs and outputs, a dual-function LED VU meter, phantom power, a headphone out, AC or DC power and XLR connectors.

For more information from Intelix in Wisconsin, call (866) 462-8649 or go to www.intelix.com.



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PRODUCT EVALUATION

Yellowtec: Ah, You Hockey PUC!

by Stephen Murphy

The PUC USB audio interface from Yellowtec looks less like a professional audio product and more like, well, a street hockey puck.

Despite the unit's playful looks, the plug-and-play PUC (\$345) has a number of features that indicate its worthiness in the professional production and broadcast arenas.

Features

The Yellowtec PUC, distributed by Harris Corp., is a two-channel self-contained external computer audio interface for use with desktop, notebook or other USB 1.1-enabled computers. The unit is powered through the Universal Serial Bus so no external power supply is needed.

The interface utilizes 16-bit Delta Sigma analog-to-digital and digital-to-analog converters, and supports standard



sample rates from 8 kHz to 48 kHz. A-weighted signal-to-noise is typically 88

dB at the A/D and 95 dB at the D/A converter.

The PUC is truly plug-and-play in that it requires no installation of drivers other than those automatically loaded by the host operating system. The interface is compatible with PC-based systems running Windows 98 or higher and Mac systems running OS9 or higher.

The USB connection on the PUC is the "B" type (square) commonly found on external devices; Yellowtec includes an A/B USB cable that terminates in an A-type USB connector (thin and flat) for interfacing with most computers.

With the exception of a 1/8-inch stereo headphone jack, audio connections are made via the optional breakout cable, which attaches securely to the PUC via a DB25 connector. Electronically balanced analog audio I/O is provided through Neutrik XLR-F and XLR-M stereo pairs. Digital audio I/O is through a pair of heavy-duty RCA connectors (SCMS-enabled S/PDIF format). Yellowtec also offers an AES/EBU ver-

Heil Sound has made mics that not only have some cool "Oh Wow" factor based on their appearance, but have responses every bit as good as any professional dynamic broadcast microphone made today. Treat them with the same respect you show any serious piece of broadcast gear and a Classic Pro or a Heritage microphone could last for ages.

You may notice, as I did, that the boxes the microphones are packaged in state, "Built by those who care in Fairview Heights, IL, USA." A closer look on some boxes may reveal a sticker that says "Made in China." Heil himself assured me that these mics are indeed assembled right here in Uncle Sam's backyard, from parts made in numerous regions around the globe. Evidently, the stickers refer to the boxes themselves as being made overseas.

In some respects, Heil Sound reminds me of Noble & Cooley, an old manufacturer of drums hidden deep in the maple forests near where I used to live in Western Massachusetts.

You may never have heard of the company, but N&C originally made marching snare drums for the Union Army in the Civil War. Some are in museums today.

For years afterwards, the company prospered as a maker of toy drums, then dove into the professional music market in 1980. In spite of being an unfamiliar name in some circles, Noble & Cooley now makes one of the best-sounding and cleanest recording snare drums in the industry.

In saying this, I am not comparing Heil Sound mics to toys. Rather I am drawing a parallel to the company's line of mics diverting from an original intent: Heil started serving professional audio and musicians, aided the amateur radio marketplace, then returned to pro audio. The Classic and Heritage microphones have roots in the microphone line Bob Heil created to clean up ham radio voice transmissions.

You may never see these mics displacing RE-20s en masse in major radio facilities, but Heil has said some are making the switch. These are really terrific at what they do, they don't cost a lot and they are the coolest-looking things for miles around.

Heil

► Continued from page 56

close feel. The chrome finished steel body hefts like a shot put and just begs for a close-miked *thangyewwurymuch*.

The same blue foam is used inside the mic body for protection against wind-blasts. The initial production run of the Heritage showed inadequate pop immunity compared to the Classic Pro. Bob Heil has addressed this and current units are better protected. If you shop for a Heritage, buy one of the newest ones.

Amusingly enough, the Heritage actually has slightly better frequency response than the mic that inspired it: the current Shure 55 scopes out from 50 Hz to 15 kHz, while the Heil unit goes 40 Hz to 18 kHz. Most folks will never hear that extra 3 kHz, but it is there.

A recessed flat-buttoned slide switch turns the mic on and off, compared to the standard slide switch found on the original Shure. A lockout screw allows the switch to remain on at all times, thereby eliminating forever the pained calls of "Is this on?" and "Can you hear me?" uttered into 55s by school principals since the 1950s.

The mic shell comes apart with five screws if need be, but the only time you might need to do that would be to replace the foam many years from now (or to put in a newly refined pop filter, should Heil Sound offer one as a retrofit to the early units).

The heavy chrome finish is applied as it is on Bob's Ford Thunderbird restoration: a copper plating, buffing, then two layers of chrome plating. This "show-chrome" finish should last for years.

Unlike the Classic Pro, which has its own cable soldered into place, the Heritage has an XLR socket to accommodate a standard mic cable, and the hefty CB-1 base is likewise available for this mic as well.

Good vibrations

I like the styling of this mic, but admittedly I went for the sound of the Classic Pro. I ended up buying both.

I hate overusing the word "vibe," but these microphones bring lots of it to the table.

Product Capsule:
Yellowtec PUC
USB Audio Interface

Thumbs Up

- ✓ True plug-and-play installation
- ✓ Portable
- ✓ GPI-controllable functions

Thumbs Down

- ✓ 16-bit/48-kHz max
- ✓ Undefeatable SCMS
- ✓ Default level calibration set to German standard (international standard of 0 dBFS = +18 dBu requires GPI to set)

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sion of the PUC (\$455).

The breakout cable includes a female DB9 connector labeled "Aux In" for GPI control of advanced features. GPI-controllable features are: Zero Latency Monitoring (ZLM), which feeds the signal appearing at the analog inputs directly to the analog outputs, bypassing computer processing delay; Digital Bypass (BYP), which feeds the incoming digital signal directly to the digital output and excludes signals originating from the computer; and International Level (INT LVL), which sets the analog level to the standard 0 dBFS = +18 dBu. The unit as shipped is set to operate at the German standard where 0 dBFS = +15 dBu.

In addition to the GPI-controllable functions, PUC features a few other functions that could prove useful in automated environments or for unattended transfer operations: auto input sensing, where the analog input is overridden when digital audio is detected at the input; and incoming sample rate auto-detection (provided the incoming signal is at 32

See YELLOWTEC, page 64 ►

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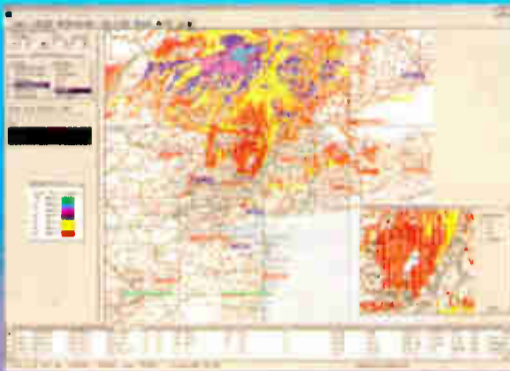
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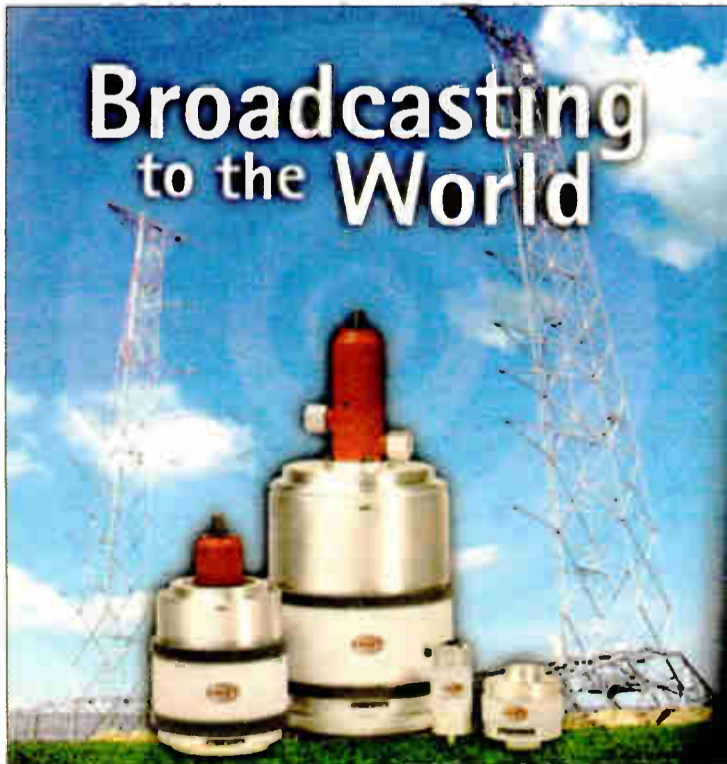


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If It's for Free, Then It's for Me

by Alan R. Peterson

Every now and again, I like to talk about subjects where I get to apply my sense of frugality.

Not that I am proud of it, but my stinginess has served me well on more than one occasion, especially those times when work was scarce and I had to be creative with house-brand macaroni and cheese.

I last tapped this topic a couple of years ago, mostly in the form of a disguised rant. This time out, though, I want you to be the beneficiary of the Scroogier side of my psyche and explore the landscape of free products, software and other goodies that I have discovered floating around out there on the World Wide Web.

I have been stuck too many times in an audio project where I needed to obtain a DSP effect I did not have. Instead of doing the conventional thing and driving to the music store to see what was avail-

able, I'd fire up the Net to look for its free equivalent.

My favorite freebies are the effects and the music generating software tidbits that can be found everywhere.

Solution, combining a preemphasis generator, compressor, expander and limiter. Nullsoft also has a paid-for version that adds CD ripping/burning and MP3 encoding for less than \$15. For most of your needs, however, the free version is enough.

Winamp already has a playlist editor



Fig 1. From Jolly Olde England, the free Sonicart player

me several times. Get yours at arrakis-systems.com/Page16A.htm.

Funny noises

My favorite freebies are the effects and the music generating software tidbits that can be found everywhere.

I have to give the first tip of my hat to a small company called Izotope, which gives away a little plug-in called Vinyl (Fig. 3). This processes any audio file into sounding like a scratched, noisy 78-rpm record or what passed for "hi-fi" back in the '50s. Right now this is my favorite processing plug-in and



Fig 2. Ed FM: Don't confuse it with that bowling alley guy on TV.

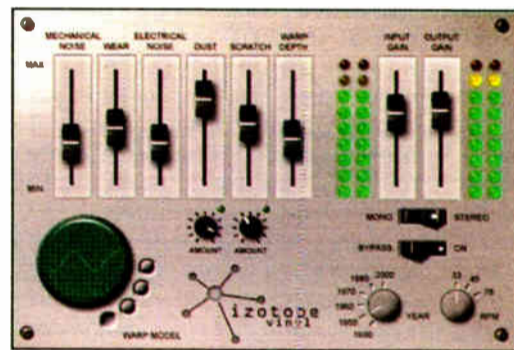


Fig 3. Izotope Vinyl: The world is your '78.



Fig 4. The free Crystal Synthesizer, a bargain even if it were for sale.

I don't go the pirated or cracked route. I hate to see my own work lifted and posted on the Web, so I do my best to seek out goodies that were written and posted for the sole purpose of free distribution.

Many of these are just fun, some are fairly dopey and many will make you a better production genius.

As I have said before, I would be hesitant to hitch your entire radio station's survival on any one of these. Please do not rip out your \$110,000 digital audio management system and put in Winamp on a 233 Pentium II just because you can. Remember what they say about free things: You get what you pay for, so be judicious in your decisions where and how to use these suggestions.

If nothing else, at least you will have a good time with these.

First in line

Seeing how I mentioned Winamp right up front, let's begin with that.

The Nullsoft company began in the late '90s when Justin Frankel came up with a media player that would be available for free all over the Web. It caught on fast and became a favorite audio player for lots of folks, with its uncluttered interface and ability to play lots of audio formats.

Today, Winamp is still free, it is now up to version 5.02 and plays almost all audio and video files thrown at it, including some real esoteric ones like OGG and OKT (it cannot run Quicktime or Real media).

Third-party authors have written some amazing (and free) plug-ins that integrate nicely with Winamp, changing it from a simple audio player to a vocoder or a scratch mixer. One such freebie is Sound

to arrange audio events, and with a free overlap segue plug-in added, can sound as tight as any jock on the block. But warning, Will Robinson: if Nullsoft ever comes up with a giveaway "wall of carts" player that works on a cheeseball PC, everybody out there making similar products will have a bad night's sleep.

Details at www.winamp.com.

Other companies have jumped on the free cart player concept as well. Babyfishmouth Software developed Sonicart (Fig. 1) for Ipswich Community Radio in the U.K. This combines a 10-slot cart player with a playlist generator that can preload audio events for the live jock. <http://home.freeuk.net/babyfishmouth/>

Also from the land of fish and finger-pies comes Ed FM, more a free automation system than a cart deck. The interface is a little clunky (Fig. 2), but as The Chips used to sing, "Whattaya want for nothing? Rubber biscuit?" See it at www.edfm.co.uk.

Topping the list of free radio automation software has to be Digilink Free from Arrakis Systems. Love it or hate it, the thing really works on a good computer and is downloaded by someone every day. I am sure wish list items arrive in the Arrakis e-mail box every morning, and features like a three-bar voicetracker and a more comprehensive Help menu have been suggested by

you'll have a laugh or two over it as well. You can even add some 60 Hz hum and warp the record just the way you want it. Grab a copy at www.izotope.com/products/audio/vinyl/#

Analog tape used to give you that cool *murp* sound when a reel was stopped cold. Contemporary singers and musicians use this as a musical effect in their recordings. And now TapeStop from TbT Audio Software does it for you. Hear an audio example and get your own VST plug-in for free from <http://hem.bredband.net/tbtaudio/tapestop.html>

You can fill your computer up with every last effect you would ever want with a visit to www.mda-vst.com. Here you can glom onto multiband compressors, vocoders, tape flangers simulators, EQs and some nasty distortion plug-ins.

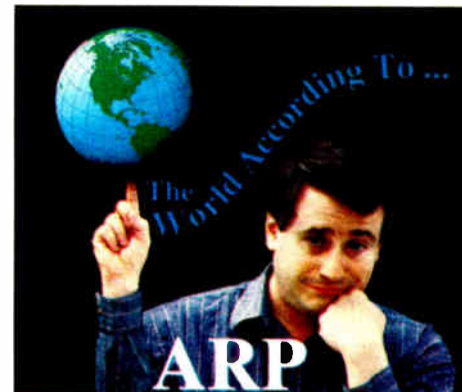
Be aware these are VST plug-ins, so unless your audio software is compatible, you will need a VST-to-DirectX wrapper so program such as Cool Edit/Audition can use them.

Tunes

I think more than anything else these days, I am finding myself pulling down free virtual synthesizers and other music makers.

I want to be able to create my own skating rink organs; or recreate famous musical licks from Van Halen's "Jump" or the nasty buzzy electric piano from Queen's "You're My Best Friend."

I don't feel much like visiting eBay and



parting with several hundred bucks for classic keyboards, so I go fishing for their software cousins. I am rarely disappointed.

I have said before that production folks should have a working knowledge of music and some familiarity with an instrument. Even if you don't, these freebies can still open up creative avenues to you when the production library lets you down.

The sound of a ratty, out-of-tune piano (think elementary school music class) always cracks me up, and the one I use the most is the mda Piano VSTi from the same folks who brought you those plug-ins a few paragraphs back.

This company also makes a pretty good free electric piano for those "Just the Way You Are" moments, or when you are in a Styx "Babe" mood.

As long as I am stuck in the '70s, the Cheeze Machine is a great emulation of those old "string" keyboards from that era, and the Ticky Clav recreates Stevie Wonder's electric clavichord sound. Start at <http://bigtick.past-notecut.org/index.php> and follow the links.

For a giant "Cry Like a Baby" organ sound, I depend on the free ZR-3 drawbar organ from Rumpelrausch Täips (<http://rumpelrausch.de/vst/>). Lastly, one of the greatest noisemakers I have ever

downloaded: the Green Oak Crystal (Fig 4), which is a challenge to program, but absolutely spooky in what it can do. I still cannot believe the author gives this thing away for free <http://www.greenoak.com/crystal/>.

Roll your own

One freebie I haven't really tried yet is Synthedit, but I am looking forward to finding the time to do so. A significant number of free music generators found on the Web were created with this program, then were set loose on the world.

Author Jeff McClintock wove together what might be described as a Lego set for creating modular synthesizers. Pull up a block, add a path connecting one block to another, hit a key and stand back.

I am told this is actually shareware, but it can be used to build your dream sound for a few days before paying the man 20 whole dollars. Pull it down and give it a ride (www.synthedit.com/default.htm)

Tell you what; even for a stingy production nut like myself, I think \$20 for a synth and \$15 for a CD/MP3 maker is not too much of a hardship. And with a stack of freebies keeping me busy this winter — and hopefully you as well now — I think we'll both be turning out some amazing sounds this spring.

Here's pinchin' pennies at you, kid. Alan writes from Washington, D.C., and yes, he knows the Blues Brothers released "Rubber Biscuit" in 1978, but the Chips did it first in 1956. Who's your daddy now?

Yellowtec

► Continued from page 61
kHz, 44.1 kHz or 48 kHz).

Here are your installation directions for the Yellowtec PUC interface: plug in the USB cable and stand back. A few seconds later, PUC is recognized and fully operational.

I tested the PUC on four purposefully different PC-compatible computers (notebooks and desktops running Windows 98, 2000 and XP) with the same results. Although I did not get to try the PUC on a Mac, installation is said to be as simple as on its PC counterparts.

The PUC has several advantages over similar internal PCI card interfaces. The most obvious is that it does not require installation in a PCI slot, saving effort, internal computer resources and eliminating IRQ sharing issues. In short, it has a minimal impact on the operations of existing computer configurations.

The self-powered interface is easy to share among multiple computers, and, at around one pound (not including cables), the PUC is easily taken on the road. Because PUC needs no external power supply (wall wart etc.) and is tethered only by a USB cable, it can be placed anywhere in the production room, and away from the noisy computer environment. Yellowtec recommends a maximum USB cable length of five meters or about 16-1/2 feet.

Sound quality of the PUC in general was quite good and compared favorably to several other far more expensive interfaces (operating at 16 bits) that I referenced during the evaluation. The internal headphone amp sounded fine and was suitably loud for typical desk-

top use in an office environment. It would be nice if Yellowtec included a simple attenuation potentiometer on the unit so headphone level can be adjusted independently of the program outputs.

Other items on my wish list for the PUC would be that it ship at the international standard for analog I/O of 0 dBFS = +18 dBu instead of the German standard. As part of the appeal of this unit is its ease of installation and simple operation, it should not require users to use GPI to attain the standard operating level. It is, however, possible to compensate for the difference within an audio application.

Plug-and-play ease

The implementation of undefeatable SCMS (consumer Serial Copy Management System) on the digital I/O is also highly questionable on a product designated for professional use.

Overall, I was impressed with the PUC's ease of operation and sonic performance.

It was unexpectedly liberating to install a product that required no installation — truly plug and play! Although the PUC is limited to maximum settings of 16 bit at 48-kHz operation, it is ideal as a flexible audio interface solution for desktop editing stations and remote acquisition/editing on notebooks.

Creative techs should take a close look at the PUC's GPI-controllable rudimentary routing functions, automatic sample rate sensing and automatic analog/digital input switching. I can think of several situations where the Yellowtec PUC would be an ideal solution for unattended operations.

Stephen Murphy, former editor of Pro Audio Review magazine, is an engineer/producer with 20 years experience in audio, radio and video production.

PRODUCT GUIDE

Eventide Ships New Plug-Ins

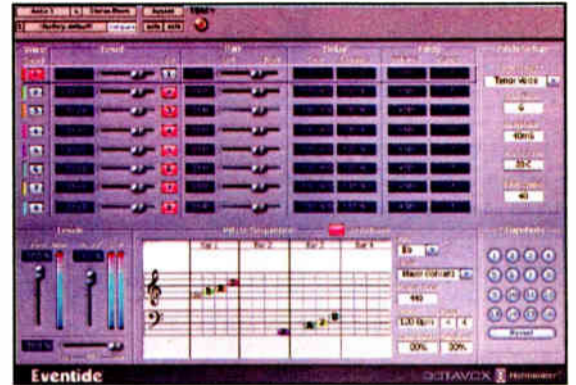
Eventide has begun shipping Reverb and Octavox Harmonizer diatonic pitch shifter plug-ins for Pro Tools for Mac v5.1.3 or greater.

The plug-ins, launched shortly after Clockworks Legacy plug-ins, are based on the Orville digital audio effects processor.

According to Eventide, the plug-ins provide the flexibility and tone-shaping capability that high-end studios have enjoyed using the company's hardware processors, but at a more affordable price.

The Octavox costs \$595 and is the first Harmonizer eight-voice diatonic pitch shifter plug-in. The Reverb is \$695 and has reverb algorithms that include halls, chambers, plates, rooms, ambience and lo-fi effects.

For more information, call the company in New Jersey at (201) 641-1200 or visit www.eventide.com.



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Studer has released Version 3.3 software for the consoles that use its D950 processing core: the D950 M2, Vista 6 and Vista 7.

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V3.3 provides the Vista 6 live broadcast console and the Vista 7 production console with a multi-operator facility option; a clipboard library that allows individual settings or whole channels to be stored; and a snapshot preview function that lets the user compare an upcoming snapshot simultaneously with current settings.

For more information from Studer, contact Harman Pro North America in California at (818) 920-3212 or visit www.studer.ch.

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Marti R-30/150 R Series receiver, 161.67, 161.73. Ken Kuenzie, KRMS, 5715 W Hwy 54, Osage Beach MO 65065. 573-348-2772.

Marti RPT-15 RPU transmitter with two 5 element yagi antennas. Good shape, with manual, on 161.64 Mhz, \$600 or BO. Maynard Meyer, KLQP, 623 W 3rd St., POB 70, Madison MN 56256. 320-598-7301.

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Delta RCS1V, studio and transmitter units. Bob Burkhardt, WBAA, 712 Third St., W Lafayette IN 47907-2005. 765-494-3968.

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Microdyne 1100-ZPR satellite/TV receiver with Macom video Cipher II descrambler. Ken Kuenzie, KRMS, 5715 W Hwy 54, Osage Beach MO 65065. 573-348-2772.

Standard MT-620 tri standard international satellite receiver C band on Ku, \$75. Peter Russell, Bowdoin College, Sills Hall, Brunswick ME 04011. 207-725-3066.

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Symetrix T1-101 (2). Ken Kuenzie, KRMS, 5715 W Hwy 54, Osage Beach MO 65065. 573-348-2772.

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◆ READER'S FORUM ◆

Radio World, March 28, 2004

Overlooked Backup Options

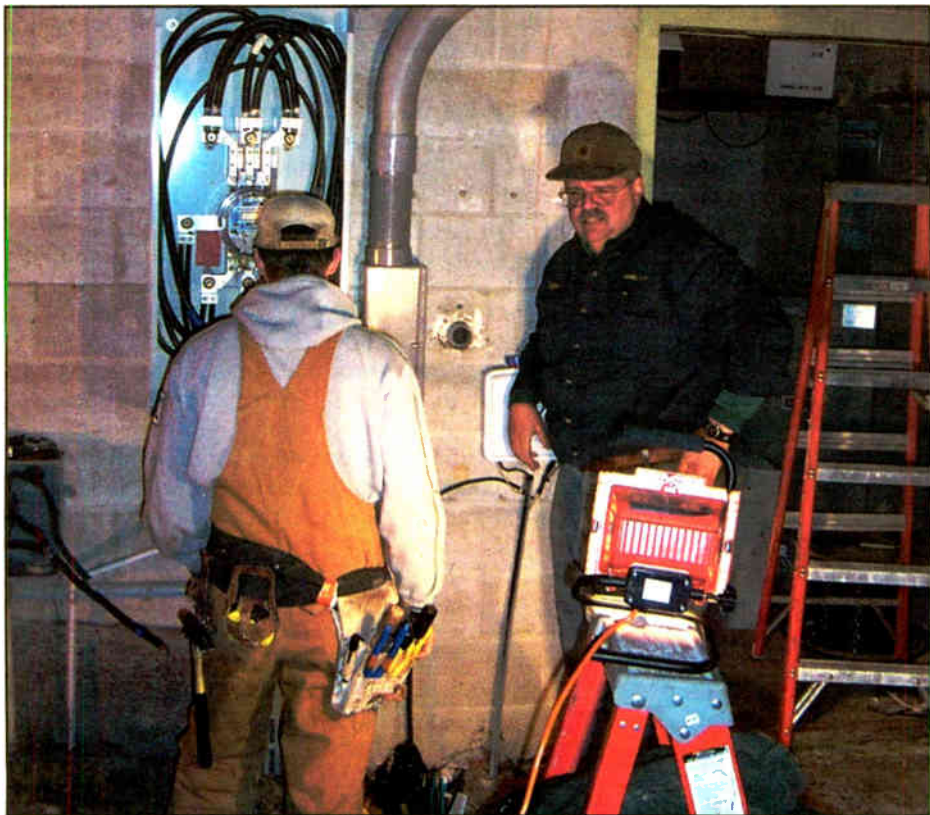
James Careless' article "Backups Keep Stations on the Air" (Jan. 14) is interesting, informative and pertinent. However, in one respect the article is misleading, as it provides limited information on available backup generators.

The author writes, "If a station can get by with 45 kW or less, a gas-powered generator, such as the Generac Power Systems Inc. Guardian is an option." The

must be paid to kVA ratings.)

WXPR(FM) Public Radio in Rhinelander, Wis., recently installed a Kohler 100 kW LPG automatic backup generator at its unattended rural transmitter site. Fortunately, the generator was ordered from Kohler about a month before the big Northeast blackout in August 2003. WXPR had previously installed a Generac Guardian automatic backup generator at its studios in Rhinelander to keep the suite of UPSs going indefinitely.

Before choosing the generator, we



Harry Krapil, right, of Krapil Electric Inc., and employee Jamie Stafford connect the original electric utility meter socket to the new master service disconnect panel (out of sight at the right) during the turnkey installation of WXPR's Kohler 100 kW LPG automatic backup generator at its transmitter site in Sugar Camp, Wis.



Preliminary installation work is done inside the WXPR transmitter building on the automatic transfer switch.

implication is that the largest available liquefied petroleum gas generator is limited to 45 kW, and no other manufacturer is mentioned. (By the way, attention also

received quotes from a number of potential vendors who offered 100 kW or larger LPG generators from Kohler and Generac, both manufactured in

Wisconsin, and Kato-Light, made in Minnesota. Kohler offers standby LPG generators rated up to 110 kW/138 kVA and natural gas generators rated up to 840 kW/1050 kVA. The other brands also are available in larger LPG capacities.

One other backup power requirement WXPR has is our unattended microwave repeater, located midway in our STL. The power need at the site is less than 200 watts, so we run it on a UPS with about a two-hour battery capacity.

Two hours would be plenty of time to take a small gasoline generator to the site, but we can't be sure to get word of a power failure there. There's no phone line at the repeater; to install one would cost us \$400 or more a year. We are planning to install a CircuitWerkes subsonic tone modulator/demodulator pair on the base band to signal a power failure alarm to the Sine Systems remote control at the transmitter, which automatically calls out alarms to three different phone numbers.

Fuel supply also must be considered.

Winter temperatures may get down to and stay far below 0 degrees Fahrenheit, where diesel fuel will likely gel. A tank heater (LPG) is needed, and coolant and battery heaters on the generator also are wise.

The author quotes the Radio Netherlands manager's optimistic assertion that eight hours of diesel fuel on hand, plus short notice delivery of four hours worth, will provide plenty of generator operating time for local authorities to restore the power grid. *Not* in most U.S. areas, I'd say.

With severe weather or unexpected major power grid failures, outages could extend for days. The fuel supplier could be prevented from resupplying due to lack of power at the fueling station or impassable roads. Moreover, heating needs and homes are going to get higher priority for refueling than a remote transmitter site.

Elmer A. Goetsch
Chief Engineer
WXPR Public Radio
Rhinelander, Wis.

Fasten Your Seatbelts ...

When riding roller coasters, sit back for the ride up the hill and then brace yourself for the long ride down.

So it is in every radio station or group I've seen taken over by accountants and investors. Now that the giant conglomerates have the heady days of buyouts and venture capitol behind them, I would suggest making sure the safety bar is locked in position.

In recent issues of Radio World, I've read discussions about big radio groups cutting back on their sponsorships of community events that don't turn a profit. Short-term business decisions to pump up the quarterly reports condemn huge groups and their stockholders to a downward spiral.

There's a concept that accountants and stockbrokers don't grasp: community loyalty. It means: I buy time on your radio stations because your radio stations support community events, which in turn boosts my image. If the radio stations stop sponsoring events, the willingness of local businesses to support those radio stations dissipates. The result is less community visibility.

Ratings aside, advertisers have ways of knowing if a station is an effective buy, especially when attendance at the station's events begins to drop. If it sponsors fewer events, fewer local businesses buy time, which results in fewer listeners, etc. With better alternatives like CD changers and satellite radio, the ride down should be quicker and bumpier.

All those folks in the expensive suits better make sure they have something to fall back on in a few years besides stock in their own company. This big bunch of high rollers is about to take that bumpy ride to the end of the line.

Michael Baldauf
The Technology Department
Pueblo, Colo.

Mt. Wilson and the FCC

Radio World's Dec. 17 front-page story ("Will Mt. Wilson Stations Pay?") is a "heads up" to multi-site broadcasters and their general managers. It does well in summing up the state of affairs at Mt. Wilson.

Prior to the FCC's surprise visit to Mt. Wilson in July 2002, cooperation among broadcasters was less than optimal. Now the Mt. Wilson broadcasters and their general managers are eager to cooperate with each other regarding broadcast site safety and security issues.

At the Mt. Wilson site, there is a United States Post Office near the center of the antenna farm, and the U.S. Forest Service owns the road leading to the complex. Broadcasters asked themselves, "Who will fence in the post office? Who will put up a locked gate on the U.S. Forest Service road? Who will monitor the activities of the various construction contractors that are almost always working at the site?" The FCC said that its concern is with the broadcasters and not these others.

Now at the Mt. Wilson antenna farm, there is a fence around the complex that does not block access to the post office. The complex's access gates are locked and the U.S. Forest Service site access road is "Closed." Cooperation among Mt. Wilson broadcasters has taken one big step forward.

Heads up, broadcast general managers and tenants of other multi-site installations. Cooperation among broadcasters is in your and the public's best interest.

Edward Hollis, CBRTE, CBNT
Chief Engineer
Marketplace Productions,
KPCC 89.3 FM
Los Angeles

◆ READER'S FORUM ◆

New Life for Old Transmitter

Radio hobbyists recently illuminated a classic AM transmitter rescued from a discontinued site in Florida as they prepare the rig for a new life on the shortwave ham bands and a display of broadcast technology at the Radio History Society in Bowie, Md., near Washington.

The 1951 Collins 300-G shown is the identical model first used by Washington-area stations WYRE 810 and WUST 1120 when those stations went on the air after World War II. Both of those transmitters are already providing a means of nostalgic storytelling on the ham bands, having joined about 15 additional examples of the 300-G nationwide now in private hands.



Engineer Tom Mackie, W2ILA, lights up the filaments on a quad of jumbo type-810 glass triodes in a vintage Collins broadcast transmitter.

An update on the pursuit of vintage AM in ham radio circles.

Hams learned of the Florida transmitter, from WFOY 1240 St. Augustine, as part of a loosely formed network of amateur radio operators who repair, restore and convert Collins, Gates, RCA, Western Electric, General Electric and other vacuum tube rigs from the Standard Broadcast band for use now in hobbyist service.

The pursuit of vintage AM within ham radio has been highlighted with brochures handed out the past few years at the NAB's annual convention, in local SBE news blurbs and in Radio World with the June 2001 article, "Chrome and Glass Shine Again" (visit www.rwonline.com/reference-room, click on "Special Report" and follow the link to June 2001).

Paul Courson
Amateur Radio WA3VJB
West Friendship, Md.

Patent Law

Regarding Skip Pizzi's article ("Acacia, Eolas: IP Landmarks," Jan. 14), Skip's bias — employment — comes marching through when he compares Eolas and Acacia in the same breath. Clearly, Eolas' Michael Doyle is a long-standing inventor with a credible history who remains with his work.

At what point, and for what amount of money, do society and the PTO invalidate the effort and the genius of discovery?

Bob Heckler
General Manager, Host
WXBH(AM)
Cobleskill, N.Y.

Low Power Is Welcome

As a seasoned broadcaster, I am delighted to see the emergence of LPFM and LPAM ("Could Low Power Morph to AM?" Jan. 14).

The success of these facilities is the big question, but it's a breath of fresh air into a dimly stale medium controlled by a handful of super-mega conglomerates.

The local atmosphere we all grew up with died as a result of media consultants, advertiser ratings that hold far too much emphasis and formula formats that virtually ruined quality and original broadcasting. The low-powered new kids on the block

are like putting the mom and pop back into a lost, fast-food approach practiced by the corporate world. Have you ever tried to contact upper management or ownership? They are so isolated, even their own mothers don't stand a chance.

Much to the chagrin of NAB, this is a way for locals to get back on the map. And once more, history is repeating itself. I applaud these new low-power stations and wish them success. The listening community wants to be plugged into local events, businesses and community activities. You can run only so many ads for hair restorers and Name-A-Star.

I turn down the volume until local interest and news or the main programming returns. I then have to keep from shouting back at the radio in disgust at the misreading of copy and mispronunciation of words.

Local programming represents a potential for something. The idea of local broadcasters, uncontrolled by mega giants, is exciting and promises to bring community back into the picture. The big boys should take a lesson from this and realize what's really at stake.

John Curtis
J. Curtis Communications
Los Osos, Calif.

LP Eye for the FM Guys

We wrote here years ago that NAB and other opponents had rushed to condemn low-power FM before all the facts were in, then went about producing evidence to support their preconceived notions.

Recently, the FCC-commissioned Mitre report showed that "LPFM stations do not pose a significant risk of causing interference to full-service FM stations or FM translator and booster stations operating on third-adjacent channels."

That report wasn't perfect, as its critics say. But we feel that Mitre's conclusions are correct.

The FCC and Congress have heard that LPFMs will not be the death of the radio dial after all. The commission is urging Congress to lift the separation restrictions, saying it will investigate claims of interference on a case-by-case basis.

We agree and encourage all parties to work toward a smooth integration of services that may bring new vitality to our medium. The time is right.

Radio, easily stereotyped by the image of a goofy morning zoo with bathroom sound effects and potty-mouthed announcers, has become a symbol to many people of what's wrong with media consolidation. Our industry does so much that is right and good. But how has it appeared in national headlines lately? With red-faced apologies on Capitol Hill, and quivering at the threat of license revocations and spectacular increases in fines.

We could do a lot worse than associate ourselves anew with small stations that broadcast for a few miles, offer unexpected and diverse on-air talent, and feature content of interest to their immediate neighborhoods. LPFMs are a lot closer to the ideals of radio as first conceived than most broadcasters probably care to admit.

The Communications Act of 1934 affirmed radio's philosophy of serving "the public interest, convenience and necessity." Small, localized services are not a threat to that philosophy, rather they are a part of it.

We have no illusions that LPFM stations are somehow immune to the same programming traps that have snared so many bigger broadcasters. Many will sound unprofessional. And what's to say that LPFM stations won't cause an indecency ruckus of their own? Yet they deserve their chance to succeed.

Various sources put the number of LPFMs now on the air at 225-300. Tiny stations are moving on to the dial. The world isn't falling apart.

In the spirit of radio, let's welcome our new neighbors. We might even learn a thing or two.

— RW

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