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Repro Radios
 Welcome to an offbeat world populated by nostalgic receivers with a modern twist.

Page 26

Cincinnati Digital
 WYGY(FM) goes HD Radio and offers lessons for Susquehanna's conversion at other stations.

Page 8



Radio World

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The Newspaper for Radio Managers and Engineers

April 23, 2003

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XM, Sirius Focus on '04 Cars

Satcasters Hope to Surpass 1.3 Million Subscribers Total By Year-End

by Steve Blum

If everyone in the Boise, Idaho, market turned off their radios to listen to something else, local broadcasters would lose some or all of their access to nearly 400,000 listeners.

This would make headlines in Radio World. USA Today would run a snappy graphic of an expanding black hole.

In case you missed it, that was last year's news.

The two U.S. satellite radio companies, XM Satellite Radio and Sirius, finished 2002 with a combined total of just under 400,000 subscribers. By the end of 2003, it's likely the satellite guys will take an Orlando-sized bite out of the U.S. radio market with an anticipated 1.3 million subscribers.

The market leader is XM, with Sirius
 See SATELLITE, page 6 ▶

The Gritty, Sandy World Of Radio War Reporting

by Leslie Stimson

Covering war is a long way from being at the scene of a riot or reporting on the intricacies of local politics. Journalists and military experts likely will debate the policy of "embedding" at least until the next armed conflict. The reporters who took part are unlikely to ever forget it.

The conflict in Iraq introduced most Americans to a new name, if not a new

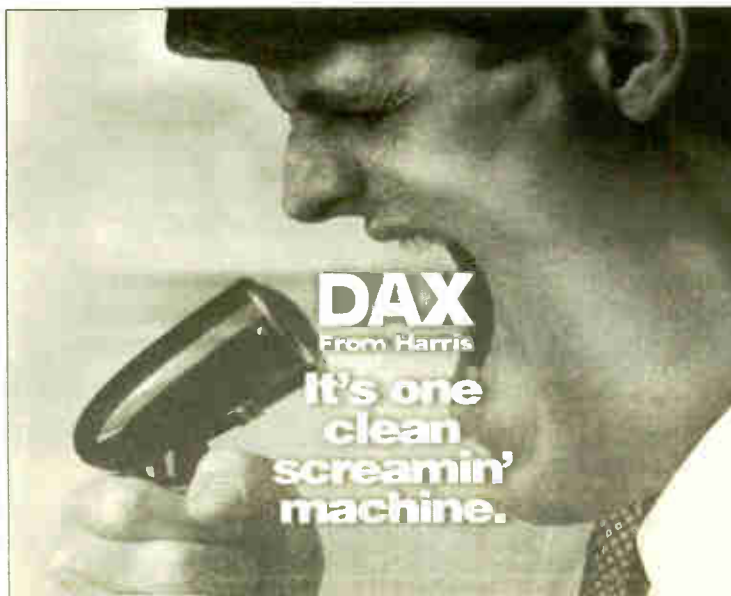
concept: that of embedded journalists. Radio World contacted several radio reporters via e-mail through their employers to ask about their experiences.

The Associated Press, ABC News Radio and Clear Channel Communications responded. Answers came from reporters working on an aircraft carrier and an air base and traveling with a tank division.

See EMBED, page 5 ▶



AP's Ross Simpson was assigned to the Marines of the 1st Battalion, 5th Marine Regiment.



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DIGITAL NEWS

XM Loses Money, Adds Subscribers

WASHINGTON XM Satellite Radio reported \$9 million in revenue for the fourth quarter of 2002, compared to \$532,000 in the fourth quarter of 2001.

It again lost money in the quarter. Its net loss before interest income, interest expense, depreciation and amortization decreased to \$97.3 million compared with a loss of \$113.2 million in Q4 of 2001.

For all of last year, XM reported consolidated EBITDA loss of \$318 million and a consolidated net loss available to common shareholders of \$515.9 million, or \$5.95 per share. In comparison, for 2001 those fig-

ures were losses of \$238.8 million, \$307.5 million and \$5.13 per share respectively.

For the first quarter of 2003, XM said it added 135,000 subscribers for a total of more than 483,000 subs by the end of the period. It hopes to surpass 1 million subs this year.

The company also introduced a family subscription plan in which second and subsequent subscriptions in a household are available for a reduced monthly fee.

Sirius Loss Grows

NEW YORK Sirius reported total revenue of \$685,000 and a net loss applicable to common stockholders of \$134.1 million, or \$1.74 per share for the last quarter of 2002. That compared with a loss of \$83.6 million, or \$1.52 per share, for the same period a year earlier.

Sirius launched its service nationwide on July 1, 2002, and had approximately 30,000 subscribers at the end of 2002.

Subscriber revenue of \$727,000 was partially offset by \$107,000 in costs associated with a mail-in rebate program. Average monthly revenue per subscriber was approximately \$10.82; excluding costs associated with a mail-in rebate program, that figure was approximately \$12.69.

Sirius Looks For CFO

NEW YORK Sirius has begun a search for a chief financial officer to succeed John Scelfo, who left the company on April 7. The company's finance and accounting groups will report to President/CEO Joe Clayton until a new CFO is named.

"John helped us through significant expense reductions and capital-raising efforts including our recent recapitalization. He has indicated a desire to move on to different personal and professional ventures and we wish him well," Clayton said.

Scelfo had been with Sirius since April 2001. He left to pursue an opportunity outside the telecom industry.

Sirius hired SpencerStuart to search for a CFO with public company operating experience to support the company's focus on rapid growth, market penetration and cost controls.

Hertz Expands Sirius Options

NEW YORK Hertz has increased the number of markets in which Sirius will offer its satellite radio service as an option in rental cars.

Airport customers in California and Florida, plus Hertz customers in Denver, Phoenix and Las Vegas already had that option. On April 1, Hertz and Sirius expanded the satellite radio options to rental customers in Atlanta, Chicago, Dallas/Ft. Worth, Houston and Detroit.

Additional markets will be rolled out, with a goal of 33 by July. Hertz also is expanding the number of models available with Sirius service to 28.

"We've had positive customer feedback from the initial launch of Sirius in California and Florida," said Brian Kennedy, Hertz executive vice president of sales and marketing.

—Leslie Stimson

THE AMAZING LITTLE MIXER

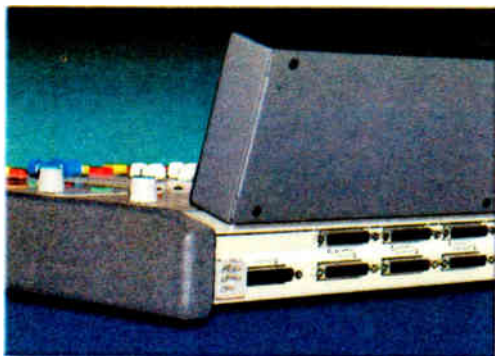


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RFA Looks to Whack Hackers

by Randy J. Stine

WASHINGTON Taking a proactive approach to protecting their information assets, Radio Free Asia technicians are reviewing security vulnerabilities and analyzing measures to prevent the spread of computer viruses and hacker strikes.

Steps have included a recent "hack day" exercise, in which friendly outsiders attempted to break into RFA systems. Technical managers say tighter system security is even more important now in light of political developments between the United States and North Korea.

RFA's all-digital broadcast headquarters in Washington has been described by engineers familiar with it as a "giant information system," networked with audio management systems, administrative systems and Internet services such as electronic mail and Internet broadcast streaming. The facility's integrated desktop design gives authorized users access to every in-house digital system.

That same access is what concerns RFA's technical staff. Among its goals: to restrict and deny any outsider's access to information.

RFA is a private nonprofit corporation that receives funding from the Broadcasting Board of Governors through a U.S. federal grant. It broadcasts in nine languages via shortwave radio and streamed audio to Asia.

RFA technicians say the broadcaster's convergence of traditional and digital broadcast technologies, and a dependence on cyber-connections for vital services, puts it at a higher risk of cyberattack.

Adding to the threat is the nature of RFA programming, which includes news, analysis, commentary and cultural programming directed to countries such as North Korea, where populations are denied access to full and free news media. RFA officials say with tensions between the United States and North Korea increasing, the threat of a deliberate cyber security breach is a major concern.

The push for tighter computer security for RFA and federal governmental agencies is meant to ensure thieves or terrorists will not be able to tamper with vulnerable data. RFA must adhere to the Government Information Security Reform Act, which requires federal agencies to have programs in place to detect, report and respond to security incidents.



Security Consultant Paul Flint

RFA's David Baden

As part of its external intrusion preparedness RFA participated with Radio Free Europe in a cyber security test earlier this year. Called Mutual Information System Security Test and Evaluation, technicians from both organizations mutually probed each other's networks (see sidebar).

"A third party installed black boxes and monitored the traffic. We reported what we did to try and get in and they did the same. It was basically hack day," Baden said.

Viral concern

RFA transmission is maintained on a private network, operated by the International Broadcast Bureau. RFA programming is fed via T1 lines from master control to the IBB Network Control Center in Washington. The signal is distributed over IBB satellite systems to RFA transmitter sites across Asia.

Tom Hallewell, RFA manager of network and information services, said the primary content delivery from studio to satellite on a dedicated T1 is not an area of concern.

"The greatest threat to our broadcast

"Anytime you broadcast off a digital platform, it's almost unavoidable that someone on the network is vulnerable to attack from the outside," Baden said.

RFA does its best to keep current on software and firmware updates, which can fix security vulnerabilities.

"Vendors are gradually cleaning up the glaring holes in their software and end-users are a lot more prompt in looking for and applying patches," Hallewell said.

RFA bureau offices and the Washington headquarters maintain bridgehead mail servers for electronic exchange. All e-mail traffic is sent to an internal server, which does a virus check, then routes it to individual bureau servers. Public origination access for RFA staff is handled in a decentralized way bureau by bureau, said Paul Flint, an independent security consultant specializing in broadcast security architecture.

In the past, RFA has been the target of "e-mail bombs," Hallewell said, that clogged mail servers.

The RFA's public destination Web site (www.rfa.org) is maintained on a separate ISP from electronic mail servers, Flint said.

"I consider that an added security architectural feature," Flint said.

RFA's overall goal of "information assurance" means the reasonable assurance of privacy and integrity of data and a commitment to testing and implementing solutions, Hallewell said.

Hack Day at RFA

"Mutual Information System Security Test and Evaluation" is cutting-edge when it comes to preventive security programs, said Paul Flint, a security consultant specializing in broadcast security architecture.

Flint, who helped coordinate the external intrusion preparedness project earlier this year for Radio Free Asia, said a final report on the undertaking is expected this spring.

"The RFA and Radio Free Europe mock hack was successful in very unpredictable ways. We have now created awareness to the requirements of the broadcast security architecture. Risk assessment is a defensive measure every broadcaster should consider," Flint said.

RFA's network firewall is an open-source software appliance that runs on off-the-shelf commodity PC hardware, he said.

"It allows for extensive configuration including forward and reverse proxy and many other features. Hackers hate this tool," Flint said.

"Forward proxy is a software gadget that takes your IP address in on one Ethernet port and spits it out on another port with a different address. Communication between two networks can then take place. Reverse proxy does the same thing but backwards."

Flint said RFA's "inside network is a private, non-routable switched fabric," which makes extensive use of open-source software in a secure manner.

— Randy J. Stine



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Baden says Radio Free Asia's computers are probed by outsiders daily.

RFA Chief Technology Officer David Baden said, "We hear rumors about certain countries turning up their bad-guy hacker activities."

RFA employs multi-layer authentication and numerous firewalls and locks to secure its network of approximately 230 audio workstations, 11 production rooms, 18 mini studios and master control studio.

"We see multiple attempts every day of people probing us. A lot of times it's probes from infected machines. When we see an unauthorized attempt, we report them to their ISP," Baden said.

operations would be if an attacker were able to get through our firewall and gain access to our audio servers and carting system," Hallewell said.

Hallewell said RFA became concerned about securing its computing environment after the "Code Red" computer worm attack in 1997. The cleanup from that attack required 120 man-hours, he said.

Anti-virus software is loaded on every machine in RFA's broadcast facility, including mail servers, file servers and gateway servers. Still, viruses remain a major concern for RFA technicians.

NAB: Solid Show, Fewer Feet

We'll devote space in several upcoming issues to the product and technology news from NAB. Some overall show impressions:

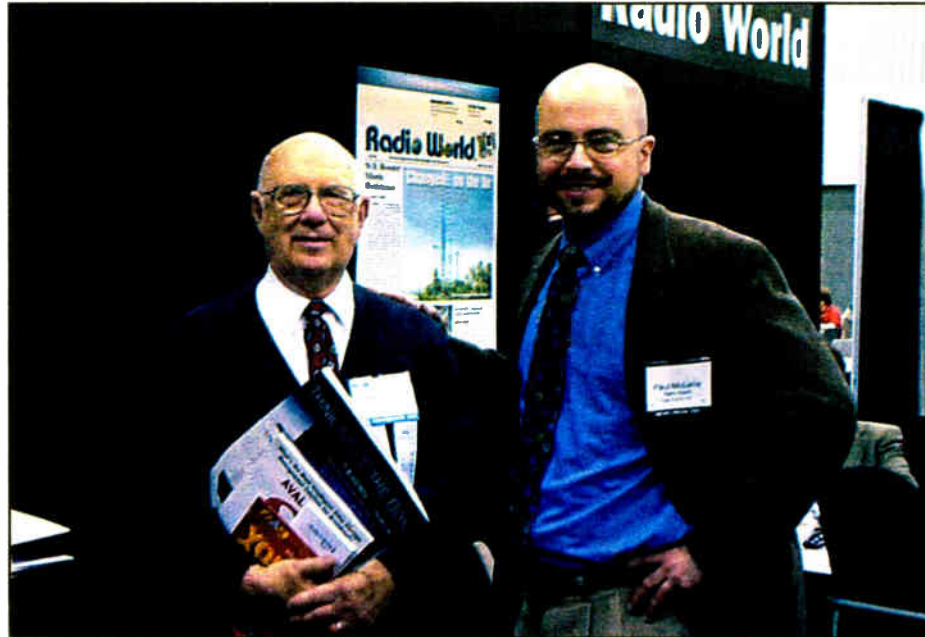
At 89,000, projected attendance was off about 3 percent from last year and 22 percent lower than the levels reached in 2000-01.

NAB typically releases an estimated total. The final number usually isn't issued until later, without fanfare, adjusted for late registrations, cancellations and duplicates. And we can't really judge the figures because NAB doesn't provide independent auditing of attendance.

But other major trade shows have seen traffic drop. Various reasons cited here include the economy, war, concern over SARS and, of course, radio consolidation.

Despite the slump, this show was one of the best in my memory for radio. Chat about HD Radio was constant. Numerous companies introduced products. Associated events like the Public Radio Engineering Conference and NRSC meeting were well-attended.

The floor featured plenty of interesting gear. We'll devote an upcoming issue to it.



John Reiser, left, accepted NAB's Radio Engineering Award during the show. We visited in the Radio World booth. (Like the haircut?)

From the Editor



Paul J. McLane

Will HD Radio catch on with stations? We need to see receivers. Meantime, as predicted, the first rush of signups seems to have slowed now that the earliest-adopting stations have taken advantage of Ibiqity's incentives. Most stations, it appears, will wait and see.

One station that did sign up is WGUC(FM) in Cincinnati; Chief Engineer Don Danko signed his license in the Ibiqity booth. Meanwhile, Matsushita Electric Industrial Co. said it will integrate HD Radio into Panasonic receivers for cars in 2004.

The data capabilities of HD Radio drew much discussion. Also garnering buzz was Ibiqity's demo delivering 5.1 surround sound in a car environment using NeuralAudio. One Ibiqity official told me it could be in the market for radio in a year and a half.

Separately, NPR has high hopes for the "Tomorrow Radio" project; I heard a lot of talk on this. The possibility of using the digital signal to broadcast two program channels will get a market test this summer.

And like Obi-Wan Kenobi coming out of retirement on the planet Tatooine, Leonard Kahn appeared. The oft-controversial AM stereo proponent said he has developed a new technology that will restore AM to 15 kHz by using digital processing. Engineers told us they wanted more details.

As far as this being a better approach than HD Radio, one attendee shrugged it off, saying, "Leonard Kahn? Where's he been?"

Get a sneak peak at our "Cool Stuff" Award winner list at



www.rwonline.com.

One notable trend is the confluence of consoles and routers. Numerous companies offer products in this niche, coming from wildly different directions. A router company might be offering new control surfaces. A console company is getting deeper into routing. A telco/codec company over yonder enters the fray. It should be an interesting couple of years.

While in Vegas, Eddie Fritts delivered a vote of confidence in the fall Radio Show. The NAB president told the NAB Daily News he is committed to the concept, although he said the makeup of that show may change "to focus more on sessions and networking opportunities."

Media ownership will remain hot. FCC Chairman Powell seems determined to issue new rules by June 2. He hinted that whatever changes are coming will not be wholesale, so don't expect total relaxation of limits.

Powell said deregulation has had its benefits. "People forget radio was on its knees before the '96 Act. I think a lot of radio survived because of these changes."

Evan Matsler, producer and operations assistant for Capital Public Radio in Sacramento, Calif., wins an ATI Nanoamp Series MX100 Mono Mixer in our New Technology Sweepstakes this issue. (You *did* sign up for the new contest that started in January, didn't you? Go to www.rwonline.com.)

The MX100 is a studio three-channel, selectable mic/line mixer with low-noise balanced inputs, phantom power, adjustable headphone program output and a metered low-distortion selectable balanced line/mic output. The prize includes a wall-mount power supply. Retail value: \$452.

Useful for studio engineering work, the MX100 can act as a portable mixer with avail-

able options including a carry case, gel cell battery pack, power supply and rack adaptors.



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The screenshot displays a comprehensive monitoring interface for a transmitter. It includes a 'Site List' showing 'ROCK 97.5'. The main area features a 'Status' section with various parameters like 'B1 Low Voltage', 'Main Power Out', 'B2 Power Out', 'Room Temperature', 'AC Phase 1', 'AC Phase 2', and 'Generator Phase 2', each with a color-coded indicator (green, yellow, red) and numerical values. To the right, there's a 'Event Log' with columns for 'Time', 'Type', and 'Message'. Below the status section is a 'Commands' panel with buttons for actions like 'B1 Low Voltage On/Off', 'B1 High Power', 'B2 Flament On/Off', 'AC Phase 1', 'Generator Start', and 'B1 Main Power On/Off'.

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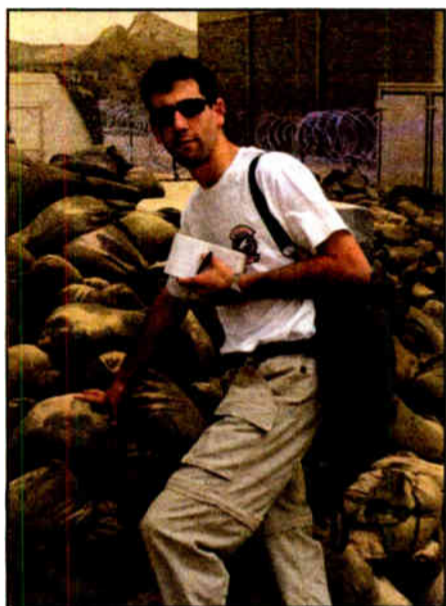


Embed

► Continued from page 1

Some 600 reporters were embedded at the start of the Iraq war. How many were filing for radio is unclear; many were handling several duties for their news organizations.

Throughout modern history, reporters have accompanied or followed military forces in conflicts, although this was the first time embedding has been tried on such a large basis. In Vietnam, reporters typically accompanied fighting units for short periods of time. In the first Gulf War, Americans got their news via a system of pool reporters plus some reporters who worked outside the "authorized" system.



Clear Channel's Aaron Katersky was with the 1st Marines Air Fighter Squadron 533.

Registered but unassigned reporters, called unilaterals, went to the war zone in the second Gulf conflict; but much of the news we have heard and seen from Iraq has come through embedded journalists who were assigned to eat, sleep and travel with specific units.

The military said it hoped to counter propaganda by the enemy by facilitating how reporters gathered information. Some critics of embedding said the reporters can see only slices of the story and that such an arrangement compromises journalists' efforts to remain unbiased; other critics feel such reporters can see and report too much for the good of the war effort.

Pragmatic news managers argued that by using both embedded and non-embedded reporters, they could assure diverse coverage.

Bonds

The Iraq experience suggests that embedded reporters do form bonds with military personnel.

A Clear Channel Radio executive quoted one Marine who said about reporter Aaron Katersky, "We all like Aaron a lot over here. He's become one of the guys ... although he's still putting up a little resistance to a 'high and tight' haircut."

Katersky filed for 40 of Clear Channel Radio's news/talk stations and occasionally for ABC News Radio.

When he replied to Radio World, he was at an airbase in Iraq with a front-line Marine fighter attack squadron. The 27-year-old was a morning-drive reporter for

Clear Channel's KTRH(AM) in Houston when he volunteered to go to Iraq to cover war for the first time.

"This is history ... it's what we do as reporters," he wrote. He expressed satisfaction with his access to the troops and said he attended pre-flight briefings, although he sometimes was unable to report on specifics such as his location, the number of planes on a mission or the type of weapons they carried. Such restrictions were in place for all embedded reporters, who agreed to the rules before the Department of Defense placed them.

Katersky filed using a Sony Portable Digital Mini-Disc Recorder model MZ-350 and a Motorola Iridium satellite phone. The phone has a patch cord that connects to the recorder so he could file wraps and raw sound via the satellite. The feed was down-linked into Clear Channel's national newsroom in Chicago, where his audio was incorporated into the material the network feeds affiliates.

Katersky saw missiles shot down and planes coming back to base without their bombs.

Finding time to file stories was challenging for Katersky and other reporters contacted, because electricity was rationed, according to Gabe Hobbs, vice president of programming for Clear Channel's News, Talk and Sports divisions. The power rationing also dictated when the reporter could charge the batteries for his satellite phone. The batteries usually hold a charge for a day, Hobbs said.

When the war started, the reporters at this particular base were blacked out and unable to file for a while. But "for the most part, they've been more open than we thought they would," Hobbs said.

He and other news executives said no censor was reviewing reporters' scripts before they filed, although the reporters were complying with the strictures agreed to in advance.

'Excellent' access

This self-censoring also was true for Associated Press personnel.

Staffers on the newsdesk where the Iraq were received also were aware of the restrictions and poised to hit the "dump" button if a reporter was filing live and accidentally revealed sensitive information, according to Ed Tobias, assistant managing editor for broadcast news.

AP sent about 30 embedded reporters to Iraq and had 200 in the Middle East overall.

Access was excellent, Tobias said, adding that one should not assume that the military was only showing what it wanted Americans to see. AP's Ross Simpson, for example, was traveling with a unit using Humvees. "Wherever that crew goes, he goes," Tobias said.

Simpson has covered wars before. From the back of a Humvee commanding a platoon in late March, he filed this report for AP: "The allies are dropping bombs all around us. Just as soon as we crossed the northern berm into Iraq from Kuwait, the radio came alive. We saw tracer fire and we heard the Javelin team being told to 'Take the shot. Take the shot.' The young men did and they killed that tank."

"All night long the artillery kept up a constant barrage. They rained shells over our heads into Iraqi positions about 10 to 15 miles away. Today, I saw what these units did to Iraqi forces. I saw Iraqi soldiers scattered in fighting holes ... blown out of those holes by

these high-explosive shells."

He and Katersky also spoke to Radio World of keeping their gas masks within arm's reach and wearing their chemical suits, loaned to embedded reporters by the DOD.



Jim Ryan of ABC News Radio on the Hanger Deck of the U.S.S. Constellation

Simpson brought an analog cassette recorder, a Marantz PMD 221, which promptly succumbed to blowing dust and sand. He used an Electro-Voice 635 microphone to record on his laptop digitally. He fed the material into a Comrex mixer system and sent live material using a satellite telephone.

Blowing sand reportedly was a significant hindrance to the operation of broadcast and computer equipment. Simpson protected his with plastic bags; Katersky used a duffel.

There were limits to the field reporting.

Tobias said AP had hoped to do more field production but was hampered by the desert conditions. The news organizations also said the RF environment

aboard ship near the military communications equipment sometimes prevented reporters from filing.

Jim Ryan of ABC News Radio joined an aircraft carrier, the U.S.S. Constellation, in early March. The ship led a battle group into the Persian Gulf.

Hard news

Ryan said of his experience, "Hard news comes each morning when the rear admiral commanding the Constellation battle group briefs us on the previous night's sorties and answers our questions. We've also been taken to the normally off-limits areas of the ships, including pilots' ready rooms and flight-coordination facilities."

He had access to e-mail aboard ship and used a Sony MZ-B50 MiniDisc recorder for reports. He transferred audio into his laptop and used Cool Edit Pro to mix his pieces. Finished stories were in WAV file format.

"I use Music Match software I downloaded off the Internet to convert the WAV file to MP3, much more manageable in size. I transfer the MP3 to a formatted floppy disk, pop that into the ship's computer and send each story off as an attachment to e-mail. It takes about 30 seconds to send off each piece and I'm told the product on the other end is CD-quality."

"My other option is the Thuraya satellite phone I brought with me. Catching a stable signal is never guaranteed and the sound quality is sometimes questionable." 🌐



Millenium Consoles - The NEXT big thing

by
Mark Stennett,
V. P. Engineer
NEXT Media Group

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Satellite

► Continued from page 1

running a year behind in terms of subscribers and hardware development. The breakout hit of 2002 was Delphi's SkyFi plug-and-play XM radio. About the size of a pack of cigarettes, the SkyFi plugs into a car adapter, a home/office cradle and a custom boombox. With one subscription, you can listen to XM anywhere.

XM added 145,000 subscribers just in the fourth quarter of 2002. That's like saying everyone in the Charlottesville, Va., market signed up. My brother lives there, and he did. He unwrapped a SkyFi on Christmas morning, but couldn't listen to it until the next day because XM's activation center was overwhelmed. XM signed another 135,000 in the first quarter at 2003, ending March with 483,000.

Building subs

Sirius ended last year with 30,000 subscribers and a plug-and-play unit due in stores the first half of 2003. Manufacturers waited for Sirius' semiconductor supplier, Agere Systems, to ship its second-generation chipset in February.

Kenwood expects to get a Sirius plug-and-play unit into the pipeline by summer, which should put it onto store shelves in time for the fall selling season. Audiovox also has a Sirius plug-and-play unit in the works, but wants to sell through its first-generation inventory before releasing the second.

Not all manufacturers are happy with satellite radio, however. Retail price points have plummeted to the \$100 range, and have gone even lower at times. Sony, which brought the first XM plug-and-play unit to market in 2001, has pulled back.

One key mobile electronics manufacturing executive points out that XM and Sirius are moving towards the same subscriber acquisition model that DBS and cellular phone companies adopted, and not maintaining a hardware sales focus that would energize specialty audio retailers.

At best, driving down retail price



The home version of the XM Delphi SkyFi radio.

points to attract subscribers will appeal to big consumer electronic stores such as Best Buy or Circuit City. At worst, he says, retailers will all but abandon the category and force satellite radio companies to open their own stores, just like cellular phone companies had to do.

Slowly but surely, car manufacturers are warming up to satellite radio and could eventually provide a solid base for growth, even if aftermarket retailers pull back. General Motors, a significant investor in XM, is offering the radios in dozens of models this coming year. Chrysler is offering Sirius equipment for about \$300 an installation.

However, satellite radio is an option on all but the most exclusive models and is not likely to take off in the factory installed market until the 2005 model year. That's when auto manufacturers are expected to have access to significant numbers of integrated radios, which have satellite receivers built into the dashboard unit along with AM, FM and CD players. Currently, the actual satellite radio receiver is a plug-and-play module or a black box that has to be hidden somewhere in the car.

Satellite radio was conceived as an automotive product, but the popularity of home and office use has made plug-and-play units indispensable to a product line. Dedicated indoor units are also in the pipeline, and are expected to make an impact on store shelves in the second half of this year.

Changing your mind

Interoperable receivers, which would allow subscribers to switch back and forth between the services without changing hardware, have yet to be designed.

The FCC required that XM and Sirius offer interoperable radios at some point, and naturally both companies say it will happen. Eventually. Unless the commission changes its mind, which is what Sirius and XM would prefer.

There is no firm time line to meet that requirement, and if it were met, XM and Sirius would have to revise business plans.

Interoperability would likely create a bloody poaching battle. In Italy, for example, DBS subscribers can switch back between two providers, and the competitive heat has effectively forced a merger.

However, if Sirius and XM follow the same path as EchoStar and DirecTV, and

maintain separate systems while driving hardware prices down to insignificance, it might be possible to convince the FCC that consumers are better served.

Sirius, which has dropped the "Satellite Radio" portion of its name, is trying to expand its reach beyond consumers and audio services. It's targeting the commercial sector with a music package designed for health clubs, and previewing limited video capability for mostly backseat viewing. It's also demonstrating a data service that can provide localized weather and traffic information.

More features

Advanced services, including links to in-car information systems such as OnStar, are also on XM's radar, but won't enter the product development cycle until after the company tops the 1 million subscriber mark, a goal XM intends to reach by the end of this year.

With a head start of a year, a more advanced product line and a lower, \$10 monthly fee, XM has established a lead in the mobile electronics aftermarket. In the factory-installed sector, it has benefited from GM's involvement and from its more rapid chipset development.

It takes about a year to transform a new chipset into a car maker-approved product, and then six months to a year more to work it into an automotive assembly line.

One major original equipment manufacturer expects to have an XM integrated dashboard unit ready in time to catch the end of the 2004 model year and set up for full availability in model year 2005. A Sirius dashboard unit will follow about a year later, although Sirius hopes to accelerate the process.

Both companies recently refinanced and have sufficient funds to support operations for the near term. Several of XM's strategic partners, including Honda, provided additional cash, and General Motors extended the terms of its existing financing. Sirius was, in effect, able to convert its large debt into equity and raise additional cash, giving it a virtually debt-free balance sheet, but also driving down the price of its stock precipitously.

Both companies have moved ahead with their terrestrial repeater build-outs. Sirius has installed fewer than 100 repeaters, primarily in urban "canyons" and other built-up areas. Sirius uses a different satellite configuration and higher-powered repeaters than XM, and can get by with significantly fewer than XM.

XM's repeaters are more widespread, with about 600 installed in 72 markets. XM originally estimated it would need 1,200; now it believes it can make do with these and only install more where need and economic benefit can be demonstrated.

Moving forward, the companies face different challenges.

Sirius has to gain the same level of support from mobile electronics manufacturers as XM and figure out how to make a better case for its \$13 monthly fee. The danger is that XM will continue to widen its lead and establish itself as the de facto consumer standard.

XM took the market lead by successfully implementing a strategy that combines actively programmed music channels, third-party news and talk channels and exclusive content, particularly its NASCAR channel, with a lower subscription price and an aggressive retail presence. Going forward, it has to extend this

See SATELLITE, page 7 ►

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◆ NEWS WATCH ◆

ABC Labor Talks to Resume

War coverage comes before labor troubles. NABET-CWA and ABC Inc. agreed in the early days of the Iraqi conflict to postpone contract negotiations and extend their current labor pact. They cited the war and "the important role that ABC and its NABET-represented employees are playing in coverage of the conflict."

The existing contract was to expire at the end of March. About 2,500 workers are involved.

"The parties have decided jointly to extend the contract with a provision for full wage increase retroactivity until midnight, May 12, 2003," they said in a joint statement.

Harman Agrees To Restructure Orban/CRL Debt

TEMPE, Ariz. Calling it a "fresh start," Orban/Circuit Research Labs Inc. said it reached agreement in principle with Harman International Industries Inc. to restructure Orban/CRL's debt.

The deal involves the offering of new stock, a \$1 million payment to Harman this month and a new schedule of payments for the next five years. As part of the deal, Harman becomes a 19-percent shareholder in the manufacturing company.

Circuit Research Labs had purchased Orban from Harman in 2000; the debt dates to that sale. Jay Brentlinger, president/CEO and chairman of Orban/CRL, said Harman continues to be supportive.

"We will now have an opportunity for a fresh start to move the company forward... We especially welcome having a great company like Harman as a significant shareholder."

CRL said it would issue \$1.5 million in common stock to raise cash. It then must make a \$1 million cash principal payment on its outstanding debt to Harman by the end of April. Harman agreed to let CRL keep the rest of the money raised in the stock offering.

Harman also agreed to exchange \$3.5 million principal of the debt plus

an outstanding warrant to purchase shares of CRL stock, for enough stock that Harman will own 19 percent. And Harman will exchange the remaining \$3.982 million plus accrued interest due from CRL into a single, senior note with an interest fixed at 1.5 percent above prime rate.

Mandatory principal payments will be required annually for the next five years. Interest will be paid monthly; principal will be payable at the rate of \$250,000 per year for the first two years, \$500,000 per year for the following two years, and the balance due at the end of five years.

The transaction is conditioned upon the \$1 million payment due this month.

Public Radio Conference to End

WASHINGTON National Public Radio is ditching the Public Radio Conference. The upcoming conference May 14-18 in New Orleans will be the last in the current format.

In a letter to affiliates, NPR Executive Vice President Ken Stern and Vice President for Member and Program Services Dana Davis Rehm stated that "the growth of other significant public radio forums and meetings, declining attendance and recent financial constraints" drove the decision. NPR said attendance for the PRC is 60 percent of

what it had been at its peak, with a few hundred attendees each year.

NPR plans to survey members about what kind of show would work best, given that various events compete for attendees' time and attention, including NPR's Engineering Conference at NAB, the Music Personnel Conference and events coordinated by organizations such as the Station Resource Group, Public Radio Program Directors and National Federation of Community Broadcasters.

"While these meetings are not a substitute for the PRC, their practical value has led to a real and material drop in the strength of support for an annual industry-wide conference," the authors stated. Given the multiple opportunities for interaction in the public radio system, an annual PRC is hard to justify in tight financial times, they said.

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Satellite

► Continued from page 6
success into the factory-installed sector.

It also has to turn a critical corner in consumer acceptance by demonstrating that its success is not a short-lived fad but the leading edge of a sustainable, mainstream service.

Stan Kozlowski, senior vice president of retail marketing at Sirius and a key player in the introduction of several consumer electronics products over the years, believes that corner will come later this year at 1 million subscriber point for the overall satellite radio market, when pretty much everyone knows somebody who has one — or, to put it another way, once a block of listeners the size of Memphis drops off terrestrial radio's map.

WYGY's Digital Conversion Detailed

Susquehanna Station Provides Lessons for Group's Digital Rollout Plans

by Daniel Mansergh

CINCINNATI What if converting to digital broadcasting was as simple as flipping a switch?

bed for their implementation of Iquity Digital Corp.'s HD Radio system, WYGY fit the bill. With a grant of special temporary authority from the FCC in hand, WYGY began broadcasting IBOC



The analog and digital signals feed an ERI 10 dB combiner on the way to the ERI antenna.

This was the dream scenario envisioned by Susquehanna Radio Corp. managers when they considered whether to begin broadcasting an HD Radio signal on WYGY(FM), a recently-acquired station in the Cincinnati market.

Country-formatted WYGY, a 50-kilowatt Class B FM station, has the distinct advantage of being within earshot of the Mason, Ohio, headquarters of Harris Corp.'s Broadcast Communications Division.

When Harris engineers needed a test

on Oct. 16, 2002, albeit with no audio in the digital signal.

"It worked out well for us," said Gary Liebisch, radio transmission applications engineer with Harris. "We had previously worked with (collocated) WLW to test one of our AM transmitters, so we were familiar with the site." Even better, Liebisch said, "you can actually see the tower from our building."

The RF technical plant of WYGY uses a high-level combined design, with the digital signal from a Harris Z16HDs

transmitter and the analog signal from a Harris HT-25 CD transmitter feeding an ERI 10 dB combiner on the way to the ERI antenna. Feeding the combiner, the total analog power is 23 kilowatts, with 2,100 watts from the digital transmitter.

"It was easy," said Norm Philips, Susquehanna's director of technical operations, reflecting on the project. "All the hard work had already been done."

Project extension

Because the HD Radio RF transmission system was already in place, it was only a matter of supplying an appropriate audio feed to the transmitter.

"We had just finished building our new studios three weeks earlier," Philips recalled. "This was a logical extension of that project."

Susquehanna engineers installed an Intraplex T-1 system to provide a 44.1-kilohertz digital signal from the new studios to the transmitter site and an Omnia-6 DAB audio processor to complete the transmission chain.

The significance of the installation of this symbolic "missing link" was not lost on Telos/Omnia, headquartered in Cleveland, and Omnia founder and Telos Systems President Frank Foti was on hand to make final adjustments.

The installation reportedly went smoothly, and the station was up and running with HD Radio in about 20 minutes. The only outstanding technical issue related to the digital operation, according to Philips, is the "surprising amount of heat" generated by the reject load in the tight quarters of the transmitter room. He plans to relocate the load to an adjacent room to alleviate the problem.

One concern for early adopters of HD Radio that hasn't been a problem for WYGY so far is interference.

One consulting engineer contacted Radio World privately to say he heard

See WYGY, page 12 ▶

HD Radio, What It Is And Isn't

Shifting the Paradigm: IBOC Is Not Your Parents' Radio

by Guy Wire

It's amazing what some think HD-R will deliver over analog in the way of advantages and better performance — equally amazing that others believe the same digitally inspired innovations will instead be disadvantages and degrade radio listening everywhere. Even topics of new technology become political footballs passionately tossed around with spin and misinformation.

An engineer recently suggested on a popular list-server that after the hybrid conversion phase, we'd be able to turn off the analog modulation and replace it with all digital at the same analog power level.

Coverage would improve, he argued, and performance would be bulletproof.

See GUY WIRE, page 16 ▶



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GUEST COMMENTARY

Audio Processing Primer for HD Radio

by Frank Foti

The author is president of Omnia Audio/Telos Systems.

CLEVELAND The following is an excerpt from a paper written about audio processing for HD Radio. There are questions to be answered about this new transmission system. The following sections offer insight on some key areas that need consideration.

Sonic differences

Before considering processing for HD Radio, the technical differences between the mediums of HD Radio and FM analog need to be understood.

The most obvious difference is that HD Radio has a wider audio bandwidth of 20 kHz, as compared to FM analog, which only offers 15 kHz response, due to a limitation of the FM stereo system that we use.

Important: To achieve 20 kHz audio response with HD Radio, your audio processor must provide that response as well. This means that your processing must employ a base sampling rate of 44.1 kHz or above. Any processor that employs 32 kHz sampling, as a base rate, will not provide the full audio response of 20 kHz.

This is critically important in order to take advantage of the added frequency response. HD Radio was developed with the goal of providing CD-like audio. As we know, compact disc offers 20 kHz response, and the HD Radio system does as well.

Another significant difference is that HD Radio does not use any form of emphasis in the audio path, whereas FM analog uses 75 μ s preemphasis. The response of this HF curve yields a 2.2 kHz breakpoint resulting in a 17-dB boost at 15 kHz. This creates a hurdle for audio processors as they must manage the high-frequency gain generated by preemphasis.

The signal path for HD Radio is a flat response. There are two benefits relating to this:

1. The high-frequency content of the HD Radio system will sound cleaner! This occurs because, without preemphasis, there is no need to boost 15 kHz by 17 dB, thereby driving the HF spectrum deeper into the final limiter(s). This causes more processing side effects, such as intermodulation and harmonic distortion as heard with FM analog processors. HD Radio processors are operating on a flat signal, which dramatically reduces the depth of processing on high-frequency content. This definitely changes the effected perceived sound of the transmitted audio, which leads to the second item.

2. Due to the nature of the preemphasis boost, it creates what some industry insiders refer to as the "sounds like radio" effect. No matter how much processing they will employ, the aesthetic sound will differ and this is the major reason.

What transpires in the FM analog system is that the preemphasis boost usually is coupled into a final limiter design that employs some type of distortion control. The effected sonic result of this method yields the radio-like sound that many of

us are used to hearing. Processing for HD Radio will change all of this, as the HF content will appear dramatically more open and cleaner sounding.

The biggest difference between HD Radio and AM analog is the frequency response. To implement HD Radio for AM, the audio bandwidth of the analog channel must be further restricted to 5 kHz, as compared to the 10 kHz NRSC spectrum that has been in effect. This is necessary to eliminate any interference from the analog channel into the digital spectra.

That larger-than-life big phat sound is quite possible. But the synthetic smash-mouth sound characteristic of many FM analog stations is far less possible in HD Radio.

At the time of this writing, there are on-going efforts regarding the AM system for HD Radio. Therefore, it wouldn't be fair to delve too deeply into what can or can't be done regarding the analog and digital channels. As work progresses, more information will become available. For now, we'll primarily deal with the FM system.

Changed landscape

A processor for HD Radio has a completely different set of requirements.

The most important issue is in dealing with data reduced audio. The processor needs to be thought of as a partner with the audio encoder. In this case, the processor has the ability to understand, in advance, what needs to be done in managing the audio spectrum so that the least amount of coding artifacts are created.

It is possible to predict what spectral conditions will exist that can generate audible artifacts due to coding. Dynamic algorithms in the processor can offset these conditions and in many cases remove unwanted artifacts, especially at higher bitrates, such as 96 kilobits per second. In essence, the audio processor can improve the efficiency of the encoder.

While peak control is required in order to keep the modulation input from exceeding the full-scale headroom limit of the system, the aggressive function like clipping is not required, and actually becomes a deterrent to the codec process. There is the need for peak control, but the possibility for over-modulation is removed as the audio level cannot exceed digital full-scale of the encoder.

The end of clipping?

Precision peak control can be achieved using numerous methods.

Probably the most common is the hard limiter or peak clipper. By truncating the peak segment of the audio signal, precision limiting is achieved and over-modulation is avoided. Most audio processors designed over the last 20 years also employ some form of distortion masking means as a tool to suppress the total harmonic distortion (THD) that is created by the clipper. This makes it possible to uti-

lize more of the clipping function, which directly transposes into perceived over-the-air loudness.

Employing a clipper as a peak limiter in a HD Radio system will work with regards to precision limiting, but there are sonic penalties to be paid when considering the clipping by-products and the encoder. Any clipping process will yield harmonics of the fundamental source signal. Even with distortion masking employed, there will, at least, still be some second order harmonic content remaining.

It is this added content that, upon

entering the encoder process, adds to the audio spectrum and aggravates the encoder, which in turn yields additional sonic artifacts.

Looking ahead

There is another form of peak limiter that is the perfect companion for the HD Radio application: the Look-Ahead Limiter. It suits this application so well because, while it provides excellent peak control, it does so with very little, if any, harmonic content that can adversely affect the encoder.

Here is a quick look at how a basic look-ahead processor operates. In essence, the processor has the ability to calculate the peak level of a signal over a specified period of time. While that is occurring, the audio is delayed by a like amount. Then as the control signal is applied to the audio gain function, the audio peak is reduced at the precise time that the control signal reaches the maximum control level and the crest of the peak is reduced without truncation. This is how clipping is avoided.

Peak control is achieved without creating any harmonic distortion. In observing sine waves, there would not be any peak truncation during the period of processing. Unfortunately there is no free lunch! A basic wide-band simple look-ahead processor will not create harmonic distortion, but will generate intermodulation distortion, or IMD. This type of distortion has a different type of sound to it, sort of a busy quality and can be as annoying as harmonic distortion (THD) especially with music.

Integrating an audio processor into the HD Radio transmission path would appear to be straightforward, and in concept it is. But there are a few items that need consideration.

Of importance is the issue regarding the blend-to-analog mode in the receiver. Even though the HD Radio system has designed time diversity into the transmit/receive path, so the audio from both the digital and analog signals arrive at the same time, there is an issue of audio spectrum and phase relationships that must be considered between the digi-

tal and analog transmission paths.

Should there exist significant phase relationship differences across the audio spectrum of the HD Radio and FM analog signals, the blend-to-analog mode will not appear as a smooth transition. If this occurs, it will be perceived audibly.

Therefore it is imperative that the two audio processors employed for the HD Radio and FM analog paths have the same, or very close to the same, phase relationships across the audio spectrum. It is understood that the FM analog signal will possess less spectrum, as the FM stereo system will only allow a 15 kHz audio bandwidth. So it is essential that phase linearity exist over that range of spectrum between the two transmission paths.

Level normalization

A critical component to the HD Radio transmission system is the reference audio levels of the HD Radio and FM/AM-analog signals in the receiver.

The key issue here is being able to create audio levels that are perceived subjectively to be relatively the same, in average volume, when compared to one another. The listener experience could be adversely affected if the audio level abruptly changes when the receiver switches between either the HD Radio or FM/AM analog signal path.

How can this be normalized, and what are the operating levels required to accomplish this?

Based upon the results of a subjective test done at Ibiqity's offices in Maryland and New Jersey and Omnia's office in Ohio, it is recommended that to normalize the audio levels between the HD Radio and FM/AM analog signal paths, a 5.0 dB relational difference in level needs to be implemented.

This number, for FM operation, is derived from the 3.57 dB determined through subjective evaluation and approximate 1.5 dB of pad to allow broadcaster flexibility. To ensure proper blending, every HD Radio radio, independent of manufacture, will be required to have the same relative offset.

A tool, not a weapon

All too often, the application of processing in the broadcast chain is employed to a level where it's thought more so as a weapon. The new landscape that HD Radio offers, requires it to be considered more to be a tool rather than the arsenal that normally transpires.

Due to the ability of the processor to enhance or improve the efficiency of the audio encoder, it will act as more of a partner or tool to the transmission system. At low bit rates, processing actually will improve the intelligibility of the perceived audio.

Processing for effect is still possible, make no mistake. Creating the appearance of that larger-than-life big phat sound is quite possible. But the synthetic smash-mouth sound characteristic of many FM analog stations is far less possible in HD Radio.

As HD Radio continues to evolve, for both FM and AM, there will be more that to learn. Luckily, we were able to have access to the transmission system before deployment, with regards to processing, so hopefully we're a bit closer to what the system needs as compared to the rollout of FM stereo. It's a fair bet that additional research along with field experience will further the path for digital broadcasting.

RW welcomes other points of view. 

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Kahn: Rescind DAB Order

*He Says IBOC Could Be
A Step in AM Radio's
Destruction*

NEW YORK Scientist Leonard Kahn believes the FCC has made a grave mistake in authorizing stations to go on the air with in-band, on-channel digital audio broadcasting.

Calling IBOC a "flawed technology," Kahn, known to many for his work in AM stereo, says the FCC should form a panel to study IBOC. He has requested that the agency stay its order that authorized interim operations.

In a Petition for Rule Making and a request for Notice of Inquiry filed in late January, Kahn laid out his arguments.

Not detailed was Kahn's own technology proposal, called "Compatible AM Digital," announced subsequently at the NAB show. Details will follow in a future issue.

The following are excerpts from his filing.

"In its starkest terms, the MM-99-325 Rule Making can dramatically alter AM and FM radio as we know it, converting a service that almost every single American uses every day of the year, to a new form of unproven technology, whose AM version only works during daylight hours and occupies 1-1/2 times the current bandwidth.

"Furthermore, it is a major step in DAB proponents' avowed plan to fully digitize radio broadcasting which will render obsolete every single radio receiver owned by the public and require their replacement with even more expensive radios. In addition, the final plan (and even the interim plan) requires massive equipment and license expenditures by AM and FM participating stations, and these huge costs, as well as a dramatic increase in interference, may force many independent rural stations out of business. ...

"The instant Request for Rule Making calls for a major revision of procedures to be used to investigate any technology that is the basis for a requested change in FCC rules. Clearly, any major revision of procedures for evaluating technology will require substantial time and concentrated effort. Therefore, such a major effort would interfere with the commission's present schedule which includes many important proceedings.

"Accordingly, it is respectfully requested that the commission appoint a special Blue-Ribbon Panel of prestigious individuals who are experienced with the operation of the FCC, such as former commissioners.

"The most important task of this panel would be to recommend a substitute procedure for the present industry committees and industry associations, to advise the FCC that has been ineffective in providing technical support in numerous Rule Making proceedings. ...

"The Blue-Ribbon Panel would also be requested to opine on whether there is any significant public interest in replacing the present free AM and FM broadcasting system with a system which has the natural ultimate goal of rendering

See KAHN, page 14 ►

WYGY

► Continued from page 8
interference from WYGY to WORX(FM), Madison, Ind. on 96.7 MHz. But Philips says that the station has received no direct complaints of interference from listeners or other stations.

Aside from press releases and limited coverage in local media and industry publications of the Oct. 16, 2002, HD Radio launch, there has been no promotion of the digital broadcasts on WYGY. It doesn't make much sense to promote the technology to the listening public until HD receivers become available, Philips reasons, especially since "we don't even have a receiver yet."

'Black magic' time

For a short time, at least, Susquehanna engineers and management had an opportunity to listen to the digital broadcasts on a prototype Ibiqity receiver. Philips was pleased with the improved audio quality of the HD Radio signal, especially in the high end.

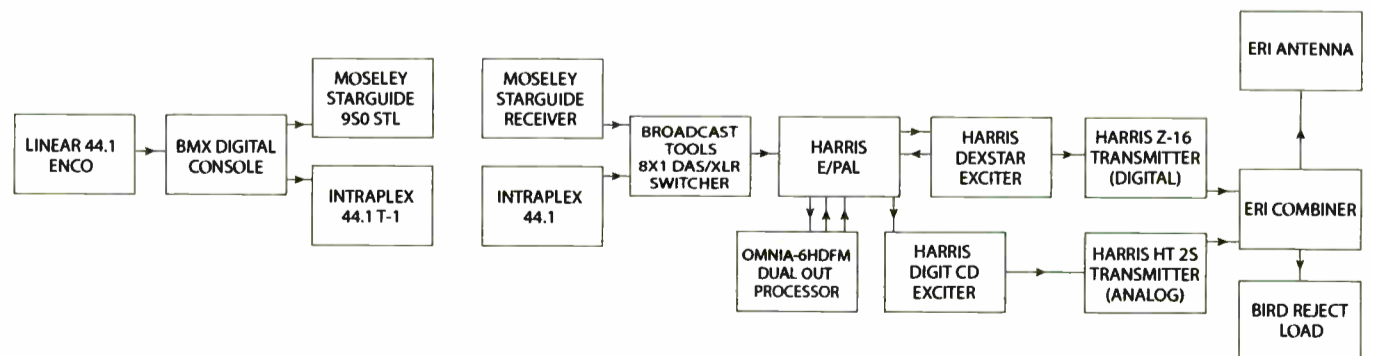
As with most A-B testing, he said, the differences between WYGY's analog signal and the digital were most pronounced when switching from the higher-quality (HD) audio to the lower-quality (FM) audio: "It sounded like something was missing when we switched back to analog."

Now Philips is waiting, "just like everyone else," for retail receivers to arrive on the market so he can listen to WYGY's digital signal again.

After putting his first HD Radio station on the air, Philips is clear about what makes a complex system such as this go together smoothly. "Have a factory engineer there to bless it," he recommends, since "there's still a little bit of black magic" involved in getting everything to work together.

Philips found that verifying the RF mask is more difficult than with analog, and because there's no modulation monitor to verify that the system is working properly, he believes the expense of having a factory proof conducted is money well spent.

Harris and Susquehanna were still working out equipment costs, both overall and for the proof, in early April. The original agreement for the equipment was between Salem and Harris; Salem owned the station when the gear was installed for IBOC test purposes. Now Susquehanna is using the gear 24/7 to run HD Radio.



WYGY(FM) Analog and Digital Air Chains

Susquehanna took advantage of Ibiqity's 2002 license fee waiver program for early adopters of HD Radio, so that fee was waived.

As more stations plan to come on the air with HD Radio, Philips would like to see manufacturers offer these services on a market-by-market basis, allowing several stations to share the expense of travel and engineering time by coordi-

WYGY Transmitter Equipment List

- ERI 10 dB Combiner
- ERI SPHX Antenna
- Harris HT-25 CD Analog FM Transmitter
- Harris Z16HDs Digital HD Radio Transmitter
- Harris Dexstar Exciter
- Harris Dexstar ePal
- Intraplex STL Plus
- Moseley Starlink STL (backup)
- Omnia-6HDFM Dual Processor

nating transmitter site visits.

As for the future of digital radio as a business, Philips is cautiously optimistic. Eventually, he forecasts, "it's a distinct possibility" that WYGY and other stations will broadcast an all-digital signal, once enough clock radios, personal stereos and other low-cost receivers are available in digital versions.

"But by then," he adds with a chuckle, "I'll be retired."

How the data broadcasting capabilities of the HD Radio system will be put to use is less clear. Philips is looking to Ibiqity, its data application development partners and data service providers to lead the way.

"There are so many schemes to make money with this," he said, but these plans seem to run counter to the recent downturn in existing data services businesses. "SCA revenue is drying up for everybody," he said, "and I haven't seen a business plan (for HD Radio data services) that makes sense."

The experience of WYGY's digital conversion is a tough benchmark to meet for Susquehanna's other stations. The group has inked deals with Harris to provide HD Radio equipment for its two San

Francisco FM Stations, KFOG and KSAN, and Philips is knee-deep in planning the build-out.

"We've got to do a lot more work in San Francisco than we did at WYGY," he said, citing concerns about air conditioning, physical space and transmitter line samples, as he starts thinking again about his current projects.

Looking farther down the line, Philips muses about Susquehanna's Class C stations in Dallas and Atlanta, where the digital conversion plans have yet to take shape.

"Separate antennas look like the way to go," for stations such as these where the power lost in a high-level combiner can be a

significant operating expense, he said, with a hopeful note in his voice. He's awaiting the results of experiments by Bonneville and other station owners using the space combining approach before making that decision.

Clearly, Philips has his work cut out for him. But he can always look back with fondness at how easy things were in Cincinnati. ●



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HD Radio Scorecard

Stations with one asterisk (*) have special temporary authority to broadcast HD Radio. Two asterisks (**) are confirmed on the air. Additions to the chart since last month are in bold. Some without asterisks may be on with experimental authorizations/limited testing. Others have ordered equipment or indicated a commitment to HD-R. Note, the FCC is moving to a notification-based procedure. List is partial. Are you on? Send us an e-mail to radioworld@imaspub.com.

Station	Freq.	Owner	Market
KCBS*	740	Infinity	San Francisco
KMRV	1450	Sellers B'cstg	Cedar Rapids, Iowa
KMRK	1150	Newspaper Radio Corp.	Denver
KNX*	1070	Infinity B'cstg	Los Angeles
KOAL*	750	Eastern Utah B'cstg	Price, Utah
KTNO	1020	Hispanic B'cstg	Los Angeles
KXNT*	840	Infinity B'cstg	N. Las Vegas, Nev.
WADO	1280	Hispanic B'cstg	New York
WBZ*	1030	Infinity B'cstg	Boston
WCHB**	1200	Radio One	Detroit
WCTC*	1450	Greater Media	New Brunswick, N.J.
WHSR	980	Beasley	W. Palm Beach, Fla.
WIND	560	Hispanic B'cstg	Chicago
WJLD**	1400	Richardson B'cstg	Birmingham, Ala.
WJNA*	640	S. Florida Radio	Royal Palm Beach, Fla.
WKAT*	1360	Spanish Media B'cstg	N. Miami, Fla.
WMTR*	1250	Greater Media	Morristown, N.J.
WOLF**	1490	Wolf Radio	Syracuse, N.Y.
WOR**	710	Buckley	New York
WOWO	1190	Federated Media	Ft. Wayne, Ind.
WPEN*	950	Greater Media	Philadelphia
WQBA	1140	Hispanic B'cstg	Miami
WRHB*	1020	New World B'cstg	Kendall, Fla.
WRHC	1550	WRHC Management	Miami
WRMR*	1420	Cleveland Classical	Cleveland
WSAI	1530	Clear Channel	Cincinnati
WSB	750	Cox	Atlanta
WTMJ*	620	Journal Broadcast	Milwaukee
WTWZ*	1120	Wood B'cstg	Clinton, Miss.
WVDB	860	Beasley	Philadelphia
WWFE	670	Finix	Miami
WWJ*	950	Infinity B'cstg	Detroit
WWJN*	1470	Beasley B'cast	Pompano Beach, Fla.
WWTR*	1170	Greater Media	Bridgewater, N.J.
WXGI	950	Gee Communications	Richmond, Va.
KBKS*	106.1	Infinity B'cstg	Tacoma, Wash.
KBSG	97.3	Entercom	Seattle
KDFC*	102.1	Bonneville	San Francisco
KEMR	105.7	Hispanic B'cstg	San Francisco
KFOG	104.5	Susquehanna	San Francisco
KIS	102.7	Clear Channel	Los Angeles
KISW	99.9	Entercom	Seattle
KKBT*	100.3	Radio One	Los Angeles
KKDV*	95.7	Bonneville	San Francisco
KKSF	103.7	Clear Channel	San Francisco
KLVE	107.5	Hispanic B'cstg	Los Angeles
KMTT	103.7	Entercom	Seattle
KNDD	107.7	Entercom	Seattle
KOIT*	96.5	Bonneville	San Francisco
KOST	103.5	Clear Channel	Los Angeles
KQEZ	100.7	Entercom	Seattle
KROQ**	106.7	Infinity B'cstg	Pasadena, Calif.
KSAN	107.7	Susquehanna	San Francisco
KYLD	94.9	Clear Channel	San Francisco
KZIA*	102.9	KZIA Inc.	Cedar Rapids, Iowa
WAAP*	107.3	Entercom	Worcester/Boston
WALR	104.1	Cox	Atlanta
WASE	103.5	W&B B'cstg	Elizabethtown, Ky.
WBEZ*	91.5	WBEZ Alliance	Chicago
WBOS*	92.9	Greater Media	Brookline, Mass.
WCAA	105.9	Hispanic B'cstg	New York
WCLV	104.9	Cleveland Classical	Cleveland
WCSX*	94.7	Greater Media	Birmingham, Miss.
WDHA	105.5	Greater Media	Dover, N.J.
WDMK**	102.7	Radio One	Detroit
WDRV*	97.1	Bonneville	Chicago
WDTW	106.7	Clear Channel	Detroit
WEDR	99.1	Cox	Miami
WFID*	95.7	Madiffie	Rio Piedras, P.R.
WFLC	97.3	Cox	Miami
WFOV	97.1	Cox	Atlanta
WHQT	105.1	Cox	Miami
WIVA*	100.3	Arso Radio Corp.	Aguadilla, P.R.
WJRZ	100.1	Greater Media	Manahawkin, N.J.
WJZF	95.5	Cox	Atlanta
WKIS*	99.9	Beasley B'cast	Boca Raton, Fla.
WKLB*	99.5	Greater Media	Lowell, Mass.
WKVS*	96.1	W.Va. Radio Corp.	Charleston, W.Va.
WMGC**	105.1	Greater Media	Detroit
WMGK*	102.9	Greater Media	Philadelphia
WMGQ*	98.3	Greater Media	New Brunswick, N.J.
WMJX	106.7	Greater Media	Boston
WMMR	93.3	Greater Media	Philadelphia
WMMX*	95.7	Greater Media	Philadelphia
WNEW*	102.7	Infinity B'cstg	New York
WNJA	95.5	Clear Channel	Chicago
WNWV*	107.3	Elyria-Lorian B'cstg	Elyria/Cleveland
WOJO	105.1	Hispanic B'cstg	Chicago
WPRM*	98.5	Arso Radio Corp.	San Juan, P.R.
WPWX	92.3	Grawford B'cstg	Chicago
WPYM	93.1	Cox	Miami
WQSX*	93.7	Entercom	Lawrence/Boston
WRAL**	101.5	Capitol	Raleigh, N.C.
WRAT	95.9	Greater Media	Pt. Pleasant, N.J.
WRIF	101.1	Greater Media	Detroit
WRMA*	106.7	Spanish B'cstg	Miami
WROR*	105.7	Greater Media	Framingham, Mass.
WRTO	98.3	Hispanic B'cstg	Miami
WSB	98.5	Cox	Atlanta
WTCK*	96.9	Greater Media	Boston
WTMX*	101.9	Bonneville	Skokie, Ill.
WUSF**	89.7	Univ. of So Fla.	Tampa, Fla.
WUSN*	99.5	Infinity B'cstg	Chicago
WVAF	99.9	W.Va. Radio Corp.	Charleston, W.Va.
WVAQ*	101.9	W.Va. Radio Corp.	Morgantown, W.Va.
WVAZ	102.7	Clear Channel	Chicago
WYGY**	96.5	Susquehanna	Cincinnati
WZAR*	101.9	Uno Radio of Ponce	Ponce, P.R.

Kahn

► Continued from page 12

obsolete all existing AM and FM radios.

"Furthermore, will the public accept an expensive service that may offer some possible advantages, especially when the system requires far more expensive radios? And is there justification for forcing broadcasters to pay substantial equipment replacement amounts as well as royalty fees for a new system that actually endangers their business?"

"The Blue-Ribbon Panel should also revisit the question of compatibility and investigate whether it should be an indispensable component of all new AM and FM broadcasting technology, just as it has been since the birth of radio over 80 years ago."

In the public interest?

"The Blue-Ribbon Panel should also consider whether DAB proponents' obvious ultimate goal of complete digitization of AM and FM radio broadcasting is in the public interest. In order to simplify the inquiry and avoid any engineering issues, let us assume, that somehow, miraculously, AM/DAB can serve every region of America, and provide that service after sundown, something that this petitioner, and even the sponsor's own engineers presently, have no reason to assume."

"Then given even such a miracle, can one believe that the public would still accept the loss of billions of dollars it has invested in radios that presently serve Americans so well in their homes and in their cars?"

"Are there any unique advantages of DAB that the average American will believe justifies rendering all of their radios useless? Can anyone believe that any such supposed advantage would compensate for the destruction of local stations, the main source of local news and independent voices that many Americans depend upon to keep them informed, especially during this crucial time when American can come under terrorist attack anywhere in our country?"

"Finally, the Blue-Ribbon Panel should answer the key question re AM DAB: If the technical experts conclude that there is no known method for providing satisfactory AM DAB after sundown, is this flaw sufficient, by itself, to necessitate the withdrawal of the MM 99-325 order?"

Technical issues

"It is the petitioner's position that such an unbiased engineering evaluation will conclude that, for at least the AM service: a) DAB signal is less robust than the existing analog system; b) DAB occupies more bandwidth, c) introduces more audible distortion artifacts, d) (and) introduces more holes in coverage; e) the digital channel introduces a programming fatal flaw, seconds of delay; and most importantly, f) (DAB) is totally unworkable for nighttime operation on the medium-wave AM band, a band which Americans depend upon over vast rural areas of our country."

"As one who has spent decades in the development of means for reducing the deleterious effects of fading, starting at RCA, it is my opinion that no digital system will ever, under normal reception conditions, compare favorably with analog single side-band (SSB) or even CSSB-type signals that are fully compatible with the over half a billion radios

Americans use every day of the week.

"The sponsor, even with access to the impressive facilities of Bell Labs, has spent over a decade trying to solve this nighttime problem without providing a single successful meaningful demonstration."

AM rules

"It is the petitioner's opinion that the three most recent major decisions covering AM broadcasting technical standards (digital audio broadcasting, AM stereo and, related to stereo, the rulemaking that reduced the fidelity of AM broadcasting from 15 kHz to 10 kHz) have all been seriously flawed."

"Both broadcasters and radio receiver manufacturers have all but completely abandoned AM stereo which, at one time, had such a bright future. Furthermore, in order for the FCC's selected AM stereo system to meet spectrum standards, the tone method of testing that had been used since the inception of broadcasting was replaced by a splatter test and, simultaneously, the audio response of AM broadcasting was reduced from 15 kHz to a maximum of slightly less than 10 kHz."

'Are there any unique advantages of DAB that the average American will believe justifies rendering all of their radios useless?'

"The instant Rule Making, MM 99-325, has the potential of visiting more serious harm to AM broadcasting than any other Rule Making has over AM broadcasting's proud 80-year history, and indeed, this Rule Making may be a step in its destruction."

"To put the effects of the authorized digital AM proposal succinctly, the DAB system operates only during daylight hours and requires 30 kHz of bandwidth, rather than 20 kHz."

"Even its supporters admit to these limitations, but on-the-air measurements show, as proven by one of DAB's supporter's publications (see WOR's Web page), that its bandwidth is not confined to 30 kHz, and actually produces interference energy many times greater than was acceptable under the commission's rules."

"Indeed, the spectrum photograph clearly indicates that this problem is not limited to first-adjacent channels when one considers that AM radios presently used by the public do not have infinite slope filters, nor are they free of intermodulation distortion. ..."

"The real advantage of a digital signal is that it will reduce the noise of signals that are above a certain signal-to-noise ratio, and thereby, further reduce the noise of low-noise signals. However, the penalty is that noisy signals are lost altogether. ..."

"Thus, in 'real-world' AM broadcasting, where the signal-to-noise ratio in many parts of normal service areas cannot support a digital signal, the situation will be devastating. Actually, digital proponents have claimed DAB will be more rugged than analog, but a sharp threshold signal is anything but rugged."

The entire filing is available from Kahn via fax at (212) 983-6432.

A satellite is shown in orbit, with three concentric arcs representing signal waves emanating from it. The word "always" is written in a large, black, sans-serif font, and the word "n." is written in a smaller, black, sans-serif font to its right. The satellite is a small, detailed model of a satellite with solar panels and antennas.

always n.

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The logo for NPR Satellite Services, featuring the text "npr satellite services" in white lowercase letters on a dark blue background.

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Guy Wire

► Continued from page 8

Early in this game, it's easy to overlook the details and misunderstand the reality of HD-R.

Truth and consequences

Let's get this straight. The digital carriers on both AM and FM HD-R have to be approximately 20 to 23 dB below the level of the existing analog carrier. It's got to stay that way to preserve the existing coverage areas of all existing stations, otherwise massive interference would result.

It's hard to accept, but digital modulation is really that much more efficient. Two hundred watts of digital covers like 25,000 watts of analog. Station power listings will likely disappear from logos, letterhead and advertising one-sheets in the coming era of HD-R; after all, "200,000 milliwatts" just doesn't hack it.

During the hybrid phase, existing receivers need to be able to reproduce un-degraded analog audio with the presence of digital noise in the passband. Suppressing the digital carrier 20 dB helps that considerably. When the last analog carrier is turned off years from now, the FCC may revisit this limitation in light of changing service contours vs. interference.

Many MP3s that sneak by on analog will be hideous tune-outs on HD-R.

We can't dispute the fact that weaker adjacent channel signals on AM will be harder to hear for many when HD-R gets rolling. Radio engineers and DXers love to listen to weak signals, well beyond protected contours.

The average consumer almost never does and could care less. Don't expect the FCC to have much sympathy or relief for interference complaints coming from the fringes. As with most existing interference issues in our analog world, buying a filter, a better receiver or antenna will remain the standard remedies.

Smoke and mirrors

Interference is a hot topic as HD-R rolls out. The issue often is clouded by smoke and mirrors. Too many analog receivers using sloppy IF and decoder designs can give the impression an HD station is splattering digital noise beyond its legal channel limits.

Don't be fooled by one receiver. The NRSC-specified occupied bandwidth RF mask for HD-R can easily be met by the new transmission gear out there. Marginally performing receivers are nothing new in radio. We can only hope that the Consumer Electronics Association will urge all radio manufacturers to build HD Radio-friendly designs from now on.

HD-R must employ audio bit-rate reduction to work in existing bandwidth-limited allocations. The debate over bit-rate reduced or compressed audio quality will never go away. Purists just won't let that happen.

Too many of us remember when audio codecs were first used to conserve bandwidth and recording space. SEDAT gave the process a bad name. But codec technology has advanced light-years and continues to improve almost continuously.

It's hard to accept, but digital modulation is really more efficient.

Dueling algorithms are a real issue, to be sure; yet in a world where consumers define high-quality audio as a down-loaded MP3, we are forced to face a bar that has been lowered on a different set of goal posts.

Audio quality has been subjected to an escalating and more insidious form of degradation right out of the recording studios. Almost all CDs now come "pre-processed," complicating the mission of well-meaning audio processing aficionados eager to deliver that knockout sound for their PDs.

Gain leveling, limiting, equalization tweaks and even clipping have already been burned into the source material. Digital sampling and compression

schemes just don't like clipped waveforms. Running your air product through another round of dynamic molestation before it hits the PAC codec creates yet another new challenge for HD-R — and a new realization.

Audio unprocessing

Almost every engineer who has test-driven IBOC and HD-R on their stations has told us that the task of processing the digital audio quickly becomes the need to *unprocess*. Otherwise the audio coming out the other end easily turns into a pile of dog doo-doo.

The more you adjust an Optimod 6200 or Omnia-HD to make it louder, the more you keep coming back to the old "less is more" imperative. Sure, you need to provide some automatic level control for noisy environments like moving automobiles. But beyond that, plenty of headroom and a little protection limiting are about all you really need.

Without the nemesis of pre-emphasis, processing HD-R for both AM and FM becomes a completely different challenge. The emperor's clothes are little more than a see-through cape in this age-old battle.

The more important processing controls you will want to optimize are the ones that clean up or conceal codec artifacts. HD-R on AM uses a compressed datarate of 36 kbps. That delivers a scant 3 percent of the original audio information in stereo; 97 percent is cleverly ignored.

FM HD-R uses 96 kbps. Just a few

years back, anything below 192 kbps was considered "marginal" for broadcast quality. Without question, MPEG and PAC have gotten better with every passing month, but innovative new digital processing tricks and products will mask

many of the sins of compression and help make the air sound even better. Those who attend the NAB show and seek this out will be rewarded.

Cleaning up

Even before your audio hits the processor, engineers and programmers preparing for HD-R conversion will help themselves the most by eliminating compression stages and reducing chances for dueling algorithms. Convert your stored music library and STL to all linear.

Fast workstations and big hard drives are now affordable. Insist on maintaining quality standards and closely monitor all imported audio sources, especially MP3s that arrive as e-mail attachments. Many that sneak by on analog will be hideous tune-outs on HD-R. As we're finding out all too often, all MP3s are not created equal.

A special plea to program directors: Don't embarrass yourself or your station by pounding HD-R with the same heavy processing you've become addicted to on analog. HD-R is your golden opportunity to make a clean break from the bad habits of the past.

Even the most unsophisticated listeners will be expecting digital radio to sound better. That means *cleaner* ... like their CDs and (gulp) their MP3s. Insisting on the tired, old, highly processed "radio sound" on HD-R will not impress your present listeners or win over any new ones. If you're having trouble with this, listen to XM or Sirius for some clues.

If you are lucky enough to attend NAB, look closely at all the new HD-R related products being shown.

This is truly the showcase year for HD-R. New antenna combining solutions to be shown will mean many master or panel antenna users will be able to reduce their transmitter and operating costs substantially.

Hang onto that backup or auxiliary antenna near your main. It might come in handy for HD-R. Ibiquity now says that closely maintaining the same analog and HD-R coverage patterns to support the 20-23 dB differential is turning out to be not as important as originally assumed.

As more field data comes in, the reality of existing pattern distortions caused by mounting structures and performance variations delivered by different radiator types already makes FM coverage a sloppy game of horseshoes or hand grenades. HD-R is proving to hold up well in pattern nulls and is impressively tolerant and robust. The FCC should be watching this closely and do all it can to establish technical specifications that enable a responsible yet easier and more rapid conversion to HD-R.



For covering yourself legally in the rollout period, STA requests are no longer needed. Simply send the FCC a letter within 10 days of turning it on, listing the basic transmitting specs and a contact name and number staff can call to follow-up on interference complaints (RW April 7, page 2). Curiously, antenna information is not required, at least not for this exercise.

Sounds like the commish is taking the path of least resistance here and will let listeners decide if they need help with interference, a new twist on "let the marketplace decide." There's no evaluation of specific station interference situations we thought might be undertaken before HD-R authority is granted, even for the more problematic AM band.

Leonard Kahn must be having a heart attack. It's a wide-open digital highway ahead for HD-R folks. Let's get busy.

Guy Wire is the pseudonym for a veteran radio engineer whose commentaries appear at www.rwonline.com.

NEWS WATCH

Ibiquity Completes First Upgrade

COLUMBIA, Md. Ibiquity Digital Corp. has introduced its first field-upgradeable commercial HD Radio software release for stations. The upgrade is covered under existing Ibiquity licenses.

HD Radio software version 1.3 offers upgradeable capabilities for IBOC exciter. Enhancements include advancements in audio compression technology and wireless data applications; this change does not affect consumer receivers.

President/CEO Robert Struble said the upgrade represents Ibiquity's on-going efforts to enhance HD Radio technology.

"Field-upgradeability is critical for expected future technology improvements in areas such as AM audio quality," he stated. "As Ibiquity Digital's audio compression technology continues to advance and new data services are developed, field upgradeability will allow us to provide broadcasters a constant stream of innovation."

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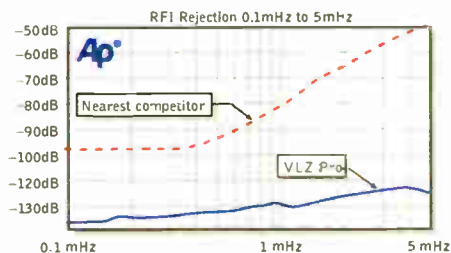
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Mackie 1202-VLZ Pro, 1402-VLZ Pro, 1604-VLZ Pro & 1642-VLZ Pro:

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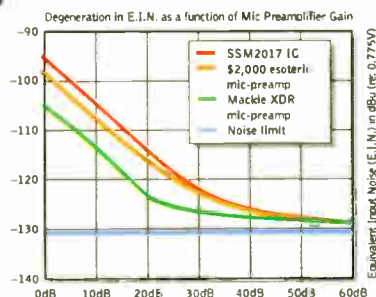


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As you can see, our VLZ Pro Compact Mixers have the best RFI Rejection of any compact mixer on the market today.

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World Radio History

A Launch PAD to the Future

Program-Associated Data Is an Important Feature of Emerging Radio Services

by Skip Pizzi

As the world moves to digital forms of entertainment and information distribution, the process of including identification data along with the content has become standard practice — except for radio.

Since the introduction of the CD, the concept of incorporating *metadata* ("data about the data") with audio material has become standard practice. Granted, all the CD really provided was cut numbers, optional index points and start/end times within the disc; but this was a big change from the analog days, where nothing of the sort existed.

PAD could help keep radio popular with younger audiences, who are becoming accustomed to metadata with their audio.

Unbeknownst to most users, however, each CD also included a unique identification code, which today is used by CD devices with Internet connections (i.e., computers, typically) to sync with Web-based databases that provide full song title, timing, artist and other information to the consumer for most published CDs.

Subsequently, other forms of digital delivery (including enhanced CD formats, DVD, MD, MP3 and other online formats, cable/DBS audio and satellite radio) have included this level of metadata inherently. As time goes on, the richness of such metadata continues to increase.

Today the most complete forms of metadata are found in online media players, which can offer CD cover art, discographies, song lyrics and links to other related resources, including e-commerce elements.

Promises, promises

The basic need for parity is the primary incentive for providing *program-associated data*, or PAD, in radio.

Like today's other media clients, radio needs a way to present this information to listeners while they are hearing a given piece of audio material. In fact, it can be argued that radio services (on-air and online) need this even more than packaged media players because the latter already have removable media and collateral packaging that can be consulted for the same data, but broadcast/Webcast services do not. (The current trend at many stations to provide little or no content identification in announcer continuity further extends the need for PAD in radio services.)

The convenience of being able to look at the radio at any time and identify the current content via text display clearly will be considered an added value and step forward in radio technology by lis-

teners, so it is an essential element of any next-gen service.

Meanwhile, the directly competing Webcast, cable/DBS and satellite radio services have developed methods of providing this feature in their receivers' displays, but terrestrial radio still hasn't managed to do so. There was an attempt to provide this for analog FM broadcast with RBDS, via its Radio Text (RT) feature, but this format never took strong root in either the broadcast or receiver environments in the United States. Even in Europe, where the nearly identical RDS service is far more popular, the RT feature is not widely used for dynamic content metadata.

So radio remains essentially a PAD-less service today. The next hope for resolution of this inequity is digital radio. In both the Eureka-147 and IBOC formats, a fairly rich PAD service is envisioned.

PAD explained

There are two components to any PAD service: *station or service information* (which remains generally fixed for any station) and *content information* (which can change frequently along with the programming on air at the time).

The static service information component can contain unique identifiers for each station, service name and format labels for searching and text display, technical data about the service (i.e., number of audio channels, coding format, etc.), and information about repeater frequencies or other associated stations.

Content information can dynamically present artist and title data for published music, or could involve more extended information such as tell-me-more text, URLs or other author and reference data for news/info content. It could also involve background info on the host and/or guests for a talk show, such as discographies, bibliographies, photos, etc., or the rich graphical data described earlier, if a suitable display were available.

On a more technical level, content information can also provide unique program identification codes for search engines, electronic program guides and automatic recording systems, thus enabling PVR-like functionality for radio.

In the current proposal for IBOC digital radio from Ibiqity Digital Corp., many of these elements are specifically accommodated. Service identification data is provided in the form of *Station Information Service* (SIS), while content-related elements are handled by the *Main*

Program Service Program Associated Data (MPS PAD).

The SIS data will include a station's name (both official call letters and a longer commercial service name, such as "Rock98Denver"), a unique ID number for the service, physical location data for the station and local time data.

The MPS PAD data will include fields for the title, artist, album and genre of a musical selection, plus a comment section. The latter can be used for numerous applications, so separate title and text fields are provided.

This allows a broadcaster to describe what the comment contains in its one-line title field (e.g., artist detail, artist or station URL, station request-line or talk-show phone number, etc.) separately from the actual contents of the comment.

Another feature of the Ibiqity system is a set of commercially oriented PAD fields, such as an advertisement or description of a product, the seller's identification, a URL for executing an e-commerce transaction via a backchannel, pricing information, transaction-method data and the expiration time for a transaction.

Finally, the MPS PAD message will include a reference ID that allows the message data itself to be uniquely identified. Note also that these PAD elements are granted their own dedicated bandwidth, and do not materially impact the bandwidth reserved for other, non-program-associated datacasting (sometimes



called NPAD).

Adding PAD to radio services could be critical to the ongoing health of broadcast operations, and help keep the medium popular with younger audiences who are becoming accustomed to receiving such metadata with their audio from nearly all other distribution methods.

The technology could also help to create new revenue streams for broadcasters with integrated hooks to e-commerce transactions embedded in commercials and other programming.

Although earlier attempts to add such functionality to analog FM were unsuccessful, PAD could be one of the most pivotal and influential features in the deployment of future digital radio services, aiding in both audience retention and business growth.

Skip Pizzi is contributing editor of Radio World.

A Pair of Helpful Phone Accessories

by Charles S. Fitch

Broadcasting isn't immune to the pressures of resource, cost and efficiency factors that assail most American business. We're asked to do more with less all the time.

Finding more efficient ways to use of existing resources is a continuing endeavor. One of the most powerful and underutilized resources is the telephone.

Recently, I have come upon two helpful and cost-effective phone accessories.

The first is a refined, flexible alarm dialer manufactured by United Security Products, model AD-2000. Purchased on the Web at a low price of \$137, this four-channel unit can be user-programmed via the front-panel keypad to respond to NO (normally open), NC (normally closed) or voltage goes high/low

See PHONES, page 20 ▶



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India Approves Community Radio

by Frederick Noronha

After years of delay, the Indian government has taken a decisive plunge. Community radio stations are being allowed on air across the country.

Like the LPFM process in the United States, the rollout has been the cause of some controversy in this country of more than 1 billion people.

In recent months, the federal government issued guidelines for setting up of what it calls small-scale community radio stations. These stations will be run out of educational centers, and the state has stipulated that content be confined to social, cultural and local issues that do not offend "good taste or decency."

Campaigners in India have been pressing for the opening of community radio. The government, wary of its implications, has shown hesitance so far. Finally it granted licenses, but only to elitist institutions of higher education, meaning not anyone can join the queue.

Speedy growth

India opened commercial FM broadcasting in the late 1990s. Many FM stations faced financial problems while being set up, as the bidding system used to allocate licenses led to unrealistic license fees.

Licensees would have to ensure stations promote 'national integration, religious harmony, scientific temper and Indian culture.'

But the current move could, if properly managed, give a boost to the flagging Indian radio industry, participants say.

Radio, once powerful in India, has suffered from the speedy growth of TV and imaginative video programming during radio's government-controlled tenure, particularly in recent years.

Officials of the state-run All India Radio, the dominant player in Indian radio which was recently granted a degree of autonomy from the government, expects "at least two universities" to sign memoranda of understanding for starting campus radio.

AIR Resources Head H.O. Srivastava told the Financial Express newspaper that letters have been sent to 400 universities and colleges detailing the campus radio program.

AIR plans to offer turnkey solution to these institutes, which would include providing transmitters, transmission towers, antenna, cable, playback facilities and helping them get a license. There is no license fee for campus radio.

A bureaucracy to set up and support the new category of service is being set in place.

Licenses will be issued by the federal Information and Broadcasting Ministry, the I&B. Clearances would have to be obtained

from the Ministries of Home Affairs and of Human Resource Development. The Wireless Planning and Coordination Committee of the Ministry of Communications will be responsible for allocating frequency spectrum.

Licensees would have to ensure that the stations promote "national integration, religious harmony, scientific temper and Indian culture."

Licenses would be given to established educational institutions and organizations



Two young North Indian men display a rough home-built broadcast setup.

AIR targets, by year-end 2004, some 300 to 400 campuses could be covered. But whether AIR will be able to achieve this, or if it will face stiff competition, remains to be seen.

Limitations

There will be several limitations on the new licenses. Commercialization and advertisements will not be allowed on community radio stations, and operating institutions must adhere to a general broadcasting code.

recognized by the federal or state governments, including universities of technology, management and residential schools.

News and current affairs will not be permitted, nor would election or political broadcasts. Also barred will be advertisements or sponsored programs.

Programs will have to focus on issues relating to education, health, environment, agriculture and rural and community development, and the format must reflect a local flavor.

Phones

► continued from page 18
alarms either continuous or momentary.

Recognition of the alarm goes out on any of eight telephone numbers, delivering either a user-recorded audio message or alphanumeric data for pagers.

A cell phone 'nest' accepts my cell phone and mimics a real phone.

The total digital audio recording length is 51 seconds, which can be subdivided into five segments (ID and a message for each alarm). Each alarm can be sent to any selected number in the "phone book"; the message repeat and number retries are programmable. Once received, an alarm can be disabled remotely.

Power for the unit is a convenient, nominal 12 volts DC (rated 9-18 volts DC). A jack for an external UPS battery pack is supplied. The programmed instructions and messages are kept in

long-term EEPROM memory.

This particular AD-2000 went to a remote site to inform multiple parties of tower lighting and security failures. The applications are endless — wherever one has an alarm and a telephone line. Our next unit is slated to go to an STL hop site to tell us when we have gone to battery, if we have toggled to the alternate hot standby or if the squelch has closed (loss of

incoming signal).

This unit is rich in features, with listen-in and two-way talk capability from a front-panel mic and speaker as well as telephone-line seize and external alarm output, to name a few. You can determine if this unit will be helpful by downloading an instruction book in Word at www.unitedsecurity.com/autodialers.htm.

USP makes a similar two-channel unit, the AD-2001, for about \$20 less.

Another helpful phone device is a Motorola accessory for my StarTac cell

Licensees also will have to follow the program code of AIR and ensure that due care is taken with respect to religious programs.

Programs cannot include anything encouraging superstition, denigrating women or children, affecting the integrity of the nation, criticism of friendly countries, obscenity, defamatory states or anything likely to incite violence.

In official terms: "The content must be confined to social, cultural and local issues and the format, subject, presentation and language must reflect and exude the local flavor and fragrance."

Each licensee would have to offer a bank guarantee to ensure timely performance of the agreement. And foreign personnel associated with a station would need governmental clearance.

Frequencies

Universities, colleges, schools and other educational institutions would be allowed to deploy transmitters with power levels of 50 W or less in the 87.5 MHz to 100 MHz frequency range. Licenses would be limited to three-year terms.

"In the event of frequency (space) not being available in this band, the exclusive broadcast band of 104 MHz to 108 MHz may also be considered, as in case of private FM broadcasters," according to a governmental statement. "The frequency band from 100 MHz to 104 MHz, earmarked exclusively for the use of AIR and Prasar Bharati (the state-funded authority that oversees AIR), will not be disturbed."

If more than one group applies for the same frequency, the Ministry of I&B will resolve the dispute based on "standing, commitment, objectives and resources of the applicant organization."

Licensees will be charged only the spectrum usage fee, as determined by the Wireless Planning and Coordination Committee. The Ministry of I&B will not levy any other license fee. 🌐

phone, a "Desktop Hands-Free Station," model SYN7979/98240.

This cell phone "nest" allows me to insert my cell phone, turned on and opened. The cell phone then behaves like a regular phone, ringing when a call comes in.

On the downside, you still have to use the cell phone buttons but the call ID feature is clearly visible and the buttons readily reachable.

The handset is comfortable and clear-sounding. A modular spring cord is provided; you can sub a longer one if you like. The speakerphone outgoing audio works adequately; the incoming audio is clear, crisp and loud using its 3-watt amplifier.

Best of all, the "nest" powers the phone and charges the battery while it sits there and the portable feature continues to be active. If you need to go out of the room while talking, pull out the phone and go. The cell phone reverts to normal operation seamlessly.

My cell carrier provides a huge prime-time minute allotment, and within the network all calls are considered local. This phone nest allows me to use those valuable minutes conveniently and flexibly without the annoyance of the bulk, heat and RF of the phone against my face.

My units (I bought two) were on super sale at two for \$70. A really helpful productivity accessory at a great price.

Visit these sites for more information:
http://www.unitedsecurity.com/us_distributors.htm
<http://cell-phone-accessories.com/syn98motdesh.html>. 🌐

FIRST PERSON

Toledo, Where Talk Was Cheap

by Ken R.

I don't care how well a talk host and his or her producer plan a program. It never turns out as expected.

When a jock is playing music the ingredients are locked in place. But talk shows always have three wild cards: the callers, the guests and strangely, the host, who must respond to everything instantly.

Much in the manner of office workers promoted to their own level of incompetence, I found myself "moving up," as our program director put it, from spinning platters to hosting a talk show on WOHO(AM) in the mid-1970s. No raise, of course, just more headaches — in other words, the typical radio job promotion.

I never did have great pipes. I still sound slightly adenoidal and often am mistaken for my wife by phone solicitors.

With a production budget not quite big enough to buy a box lunch, I was thrown into a new nighttime concept on our station called "Rap."

In those days, the term did not mean angry hoodlums gesticulating wildly in expensive videos about Ho's and killing policemen. It was a slang word for "talk."

The station spent about \$30 to build a fine kidney-shaped desk in a converted garage with just enough room for a few guests and a call screener behind a glass window.

'Amma be lugga ma falone!' shouted The Sheik in some language I didn't understand.

Our guests, when they were unfortunate enough to be touring the hinterlands, would show up in person as they passed through the dynamic metropolis that is Toledo. More likely they would phone in from ritzier hotspots around the country. Our guests often were entertainers, authors and once, a group of wrestling superstars just prior to their main event at the local arena.

Big-time professional wrestling was popular in Toledo, and whenever these gladiators came to town, all the bootless and unhorsed citizens would put on their best T-shirts, take their cars down off blocks and head to the armpit of the city, the Toledo Sports Arena.

"The Sheik," "Killer" Tim Brooks, a wrestling manager of uncertain geographical origin named Eddie Creachman and several other gentlemen with no necks crammed into our little studio to take calls from their fans and hype their upcoming event.

On the air they would scream at each other.

"I'm gonna get you tonight, Sheik!" shouted Brooks. "I'm gonna rub your face into the mat until you look like a plate of spaghetti!"

"Amma be lugga ma falone!" shouted

The Sheik in some language I didn't understand. But I knew he meant business from his verbal intensity and fist-waving gestures in the direction of Killer Brooks.

Veins popped out on temples. Faces turned red. The studio mics were set at their lowest levels yet everything was slamming into the red on the board.

These gladiators yelled at callers. Callers yelled back at the wrestlers. This went on for 15 minutes until I meekly interrupted to say, "We'll be right back with these professional wrestlers after this short break."

I turned off the mics, hit the commer-

cial and relaxed for a moment.

"Can I please have some coffee, Tim?" said the Sheik to his sworn enemy.

"Sure, Dave," answered Killer Brooks kindly. "You want some sugar with that?"

"What?" I piped up incredulously. "The Sheik speaks English? And you guys are friends?"

All the parties at the table sadly turned their heads and gazed upon me as one might gaze upon a hillbilly who had just fallen off a manure truck.

It was unthinkable to me that these bruisers were good buddies. During the break they spoke to each other about their kids, their wives, problems with their

cars and in fact much to my amazement, lots of other regular stuff.

The commercials ended. I turned the mics back on and said, "We're back with the wrestlers, who will be at the Sports Arena tonight at 8."

"And you'd better be there, you pencil-necked geek," one of them advised me at top volume.

Automation takes over

One of my fellow talk hosts who preceded me each evening on the air was an ordained minister named Harold Salverda.

He was not the typical churchy type of guy. He spoke plain English to teens with questions about sex in an era when this information was not readily available. He told many simple truths and listened to

See TALK, page 22 ▶



Up to...

Stepping

Many have realized the benefits of going HD Radio with BE, as orders for new equipment and system designs have poured in since last year. Entercom, Clear Channel, Greater Media, Crawford Broadcasting, Beasley Broadcast Group, WJLD-AM (first non-experimental AM station to broadcast HD Radio), and many more have chosen BE to help them prepare for the future—the HD Radio future.

"This is the future of AM radio, so this is definitely money well spent."

— Gary Richardson, Owner and Chief Engineer
WJLD-AM - First non-experimental AM station to broadcast HD Radio

"We're excited about the impact of HD on the future of Radio. BE's solutions have the flexibility to make our implementations easy and cost-effective."

— Bob Demuth, Vice President and Chief Technology Officer
Beasley Broadcast Group, Inc.

Broadcast Electronics was there at the beginning, the birth of HD Radio. And now we're leading the pack in implementation and design of real HD Radio systems for the real world of broadcasting.

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TECH TIPS

Check for RF Mixing Products

by Mark Persons

As more and more transmitters go on the air, the potential for illegal and harmful RF mixing products increases.

You don't have to be in a big market for this to happen. The phenomenon happens with AM transmitters and FM transmitters, and can even occur between an AM transmitter and an FM transmitter.

It's amazing how many watts of power can come down a transmission line, from an antenna, into a transmitter from a nearby station.

Any two AC (alternating current) signals can mix in a non-linear device to create mathematical sum and difference products. This is the engineer way of saying that, for example, two FM station signals can mix and be heard on four or more places on an FM receiver.

We know that receivers vary in quality and have their own sets of problems. For this discussion, let's examine how radio stations comply with FCC rules and regulations on their transmitted signals.

The FCC is letting stations take a "marketplace approach" as to how good or bad they sound. Of greatest importance is whether or not a station is keeping its signal within an allotted space in

the RF spectrum. That is where the term "RF mask" came from.

In the case of FM stations, all emissions must be at least 25 dB below carrier at 120 kHz away from the carrier frequency. At 240 kHz, any emissions must be down at least 35 dB. Beyond 600 kHz the power level of the transmitter determines the required amount of attenuation. The ultimate is 80 dB or more down from

a 5 kW or larger transmitter.

The idea is that licensees are allowed to use their allotted portion of the RF spectrum and must not interfere with other users in their portion of the spectrum.

Real world

Radio broadcast transmitters are designed, built and tested at factories to meet or exceed all FCC specifications. That is all well and good into a dummy load. The difference comes when the transmitters are delivered to a site and connected to an antenna.

That antenna is good for transmitting, but is equally good at receiving. It is amazing how many watts of power can

come down a transmission line, from an antenna, into a transmitter from a nearby station.

A transmitter power amplifier, whether tube or solid-state, makes an excellent arena for mixing RF signals. The PA is a non-linear device. You can get a mix that makes a station illegal from another station 5 miles or more away.

The formula for the most likely mix is 2A-B. That is twice one frequency minus the other frequency. For example, consider stations on 92.1 and 94.1 MHz. A signal from the 92.1 station gets into the 94.1 station causing an unwanted transmitted product on 96.1 MHz ($2 \times 94.1 = 188.2 - 92.1 = 96.1$ MHz.) Others include 2B-A, B-A and A+B.

It's easy to see on an RF spectrum analyzer. Connect to an RF sample on the output of a transmitter and set up the analyzer so that station is in the center. Sweep wide enough to include other stations in the area.

If a strong local station is 2 MHz below this station, you will see it 2 MHz to the left of center. Any mixing that happens in this transmitter will appear 2 MHz to the right of center. You may need a notch filter to reduce the carrier of the transmitter you are measuring so the dynamic range of the spectrum analyzer can be increased to over 80 dB.

Sure enough, you probably will see the unwanted mix product that could fall on a frequency near, or on top of, a weak station that is trying to get a usable signal into the area. In fact, there will always be mix products. It is just a matter of degree. Again, that degree is spelled out in FCC rules. Those are the same rules that

radio, where only two other people knew about his little game. Until now.

I'm not a believer in astrology, aliens, past lives or any of the topics that are bread and butter to the nutbar contingency. But one evening I found myself co-hosting a talk show with my good friend Bernie Quayle, a fellow WOHJ jock with a lovely British accent.

On this particular evening the subject was life on other planets. I invited Bernie to share the mic with me because he was

The cart cued up so the engineer hit it again.

"What makes you say that?" asked the prerecorded voice of the good reverend.

"You know this Liddy guy — I think he was in on it from the beginning. If it weren't for John Dean, no one would have ever known about that break-in," said the Polish housewife from East Toledo.

"Uh huh," said taped Harold, seemingly quite involved.

'Amma be lugga ma falone!' shouted The Sheik in some language I didn't understand.

"And another thing, Mr. Salverda," the caller continued, "Nixon ought to resign right now!"

"Are you sure of that?" asked the absent minister.

"You better believe it! Those guys are an embarrassment to the country!"

The engineer hit the cart one final time.

"I appreciate your call. We'll see what our other listeners think about it. Thanks for calling," said the pre-recorded voice of Salverda.

The panicked but relieved engineer hung up and threw in another commercial.

Salverda, who actually had been listening from around the corner of the screening room, walked back into the stu-

require harmonic attenuation of every transmitter.

FM transmitters are not the only ones. AM transmitters can have the same problem. The same math applies.

AM in FM

A common problem is an FM transmitter running at an AM site. If the AM operates at 1000 kHz, look for unwanted signals on the FM transmitter that are 1000 kHz (1 MHz) above and below the FM assigned frequency. Usually these problems happen when the AM signal gets into the composite input of the FM station exciter.

Checking for mixing products is an important measurement to make whenever a new transmitter moves into the neighborhood. The transmitters most vulnerable to problems are the lower-power ones that are getting a hefty signal from a nearby high-power transmitter.

See you down the road. I'll leave the soldering iron on for you.

Mark Persons, W0MH, is certified by the Society of Broadcast Engineers as a Professional Broadcast Engineer and has more than 30 years of experience. Visit www.mwpersons.com.

MARKET PLACE

Dummy Load Called Suitable for IBOC

Altronic Research is offering Model 6606/12, a convection-cooled resistor load. The OmegaLine Models 6606 and 6612 are terminators for 50-ohm coaxial transmission line systems.

"Manufacturers of transmitters, microwave components and power tubes as well as transmitting stations can be assured of ideal dummy load conditions during designing, testing, adjusting and aligning of transmitters or components," the company stated.

AC power is not required. Features include silver contacts on special film resistors to eliminate resistor failure. RMS power rating for continuous duty is 6 or 12 kW.

For information call the company in Arkansas at (800) 482-5623 or visit www.altronic.com.

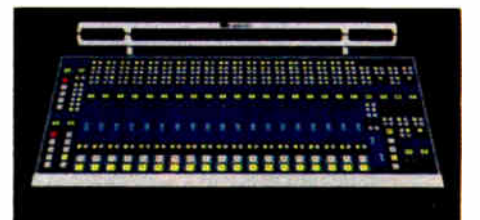
SAS Has Two New Consoles

Sierra Automated Systems is rolling out two consoles.

The Rubicon is a control surface that integrates into the SAS 32KD Digital Audio Network for its mixing, switching, level control and effects. It is modular, with customizable and programmable features. The company said it is aimed at medium and large markets.

Also new is Indigo, an analog modular console. "Unique on an analog console is the tight integration with SAS routers," the company stated. "Indigo can be equipped with individual router input select directly on the input module, where it is most convenient and flexible."

For information contact the company in California at (818) 840-6749 or visit www.sasaudio.com.



Talk

► Continued from page 21

his callers intensely and tried to help them with their problems.

His show was not about religion; it was about life.

But Salverda had a wicked sense of humor, and he had this idea that anyone could run his talk show for a brief period.

One night, prior to hitting the airwaves, he recorded a tape cart with five cuts on it, in this order:

- 1) "Hello, you're on 'Rap' with Harold Salverda."
- 2) "What makes you say that?"
- 3) "Uh-huh ..."
- 4) "Are you sure of that?"
- 5) "I appreciate your call ... we'll see what our other listeners think about it. Thanks for calling!"

During a commercial break, he handed the cart to his engineer and told him he was leaving the building. The engineer had no idea when, or if, the host would return.

Coming out of the spot break, the engineer pushed the button for line four and simultaneously started the cart. The first cut played with Salverda saying, "Hello, you're on 'Rap' with Harold Salverda."

The caller, who could hear the cart down the phone line, said "Harold, I think these Watergate crooks ought to all be thrown out of office. What they did was terrible!"

Here, Hold This Light Bulb

by John Bisset

Scott Dennis runs InfoTech Alaska in Anchorage. He tells about a studio technician who was training in RF. One day, visiting a transmitter site, the tech started to walk inside the fence of the 10 kW tower. Scott stopped him when the tech was about two feet from the tower.

Scott had seen this trick at KJNP in North Pole, Alaska, "God's 50,000-Watt Voice of the North." The station mounts fluorescent tubes on the fences around the towers. It is an impressive visual demonstration of RF density.

Scott has mounted tubes at the base of AM towers to make sure everyone knows the towers are energized. I've also seen

transmitter output, then draw the bulb away from the RF source. The dimming of the light corresponds with the weaker RF the further you get from the transmitter.

can of expanding foam will keep weather as well as insects and rodents out of the transmitter building. Don't forget outside coupling unit boxes.

Fig. 1 shows a gap between the door-frame and cinderblock wall, properly sealed. It's important, however, that the person doing the sealing have a little common sense. Fig. 2 shows what happens



Fig. 1: Spring is a great time to weatherproof your transmitter site ...

To keep him mindful of RF, Scott then told the trainee to bring along a fluorescent tube on subsequent visits. The tech had to carry the tube with him as he got close to the fence.

It was particularly bright around his hand. The rule was that if the tube lit, the tech was to light out!

tubes used to provide added light when the staff is bridging a tower impedance in the absence of electricity for conventional lighting.

At AMs with collocated studios and transmitters, the bulbs make an impressive demonstration of how radio waves propagate. Hold the bulb close to the



Fig. 2: ... but don't overdo it from outside. 'It just keeps takin' the foam, boss!'

Such demonstrations also earn the respect of your staff. I remember one sales manager's eyes popping out when he saw me holding this "lit" fluorescent tube, not connected to any AC source. It's a great demonstration for Cub Scout and Brownie tours, too.

when an unsupervised intern is turned loose with a can of expanding foam. He decided to plug the hole from the outside. "It just keeps takin' the foam, boss!"

Hey, at least the inside of the cinder blocks are insulated too.

Spring is a great time to consider weatherproofing your transmitter site. A

If your SBE chapter is looking for a great meeting, contact the folks at Fluke Corp. See WORKBENCH, page 26 ▶

Plug-in installation.

Mix and Match!

Henry Engineering's NEW rack-mountable "blue boxes" are now available in a compact 1/3 rack-width! Mount 3 units in only 1 RU of rack space!

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Actually, we're giving away equipment, but there's enough of that in the rest of this ad so we thought we'd cut to the chase and show some filthy lucre.

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giving
away
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each week in free
merchandise
for 30 weeks!**



Set the wayback machine to 1973, the year Irv Law founded BSW.

Coat lapels could be measured in square yards. FM was transforming rock music from 3-minute pop hits into 10-minute extended versions with drum solos.

Talk radio meant back-

announcing after a set. And crossover was something inside a speaker. What a long, strange trip it's been.

We're saying "Thank You" for your continued business by giving away *thirty* \$1000 merchandise prizes over the next 30 weeks! Order anything from April 1st through October 26th, 2003 and you're automatically entered.*

Or sign up at www.bswusa.com.

From all of us here at BSW, we're grateful to you, our customers. We look forward to serving you for *another* 30 years!



Putting together these fantastic prize packages has required a few slightly dangerous secret meetings, but most of our staff is still accounted for (pending a search of various international airports and smoky cabanas).

* No purchase necessary. See web site for complete rules.

Giveaway Prize!
May 5-11

Aardvark



10-In/Out Computer Audio Interface

Aardvark's 10-in/10-out ultra-low-latency Direct Pro Q10 has 8 XLR mic/preamp and line inputs and tons of studio-friendly features like 4 effects inserts, phantom power, 2 guitar Hi-Z inputs, headphone and monitor outs with level controls, S/PDIF, MIDI, a shielded PCI card and a full version of Cakewalk's Pro Audio 9.0.

The prize winner also gets a Behringer B-2 high quality studio condenser mic, a cable and a stand. Enter today at www.bswusa.com!

DIRECTPROQ10	List 1099 ⁰⁰	829⁰⁰
B-2	List 189 ⁹⁹	149⁹⁹

Giveaway Prize!
May 12-18

RANE



Advanced "Perfect-Q" Graphic EQ

Rane's DEQ60 graphic equalizer features "Perfect-Q", with extremely low ripple between adjacent bands and output response that precisely matches sliders. **Features:** selection between Perfect-Q or standard response; low/high-cut filters; 8-segment meters; XLR, 1/4" and Euroblock connectors.

The prize package also includes a Furman PLPLUS surge protector/interference-reducer with pop-out rack lights and an SKB Rack4 4U molded rack case with front rails and rear access.

DEQ60	List 1,099 ⁰⁰	799⁰⁰
PLPLUS	List 229 ⁰⁰	159⁰⁰
SKBRACK4	List 119 ⁹⁵	80⁰⁰



Pro Single Space MiniDisc Recorder

The MDS-E12 is a professional MiniDisc deck with RS-232C and DB-9 control interface capability, plus record/play relay control I/O. **Features:** high-quality 24-bit converters; ATRAC type "R"; LP mode; 10 multi-access "Hot Start" memories; variable-speed $\pm 12.5\%$; PS/2 keyboard input of remote and track/disc titling functions; 6-second pre-record buffer; auto track marking; RCA and XLR analog I/O, coax/optical digital I/O. Order today.

MDS-E12 List 945⁰⁰

699⁰⁰

SONY.



Robust 100 Watt Amp Only \$199⁰⁰!

The SLA-1 Studio Linear Amplifier from ART is a robust yet compact power amplifier, designed to provide clean, quiet power with ultra-low noise and distortion, in a compact 1U rackspace unit. The SLA-1 is rated at 100 watts RMS/channel at 8 ohms. It features a Toroidal Transformer, XLR and 1/4" inputs, a ground lift switch, Power, Clip, Signal and Protect LEDs; frequency response of 10 Hz-40 kHz; silent fan cooling/heat-radiating fins; rugged, steel chassis.

SLA1 List 279⁰⁰

199⁰⁰

ART
APPLIED RESEARCH AND TECHNOLOGY

000 Giveaway! It's our birthday

Giveaway Prize!
May 19-25

dbx



Optimal Processing/EQ for Live Audio

The DriveRack 260 from dbx provides full bandpass and crossover configurations as well as independent output processing and a full time RTA for live sound applications. It offers two independent channels of processing power with a linkable 28-band graphic EQ, dbx stereo compressor module, feedback eliminator and the 120A Subharmonic Synthesizer on the input, with a six channel output system that includes parametric EQs, limiters to provide protection against speaker blowouts and alignment delay, delivering optimal, all-inclusive processing in a completely scalable system.

The prize package also contains a great pair of Sony headphones with a 25-foot coiled extension cable (not included with purchase).

DBX260 List 999⁰⁰ CALL FOR PRICE
MDRV700DJ List 149⁰⁰ **109⁰⁰**

Giveaway Prize!
May 26-June 1

SHURE



Condenser Mic and Vocal Processor

The Shure KSM44 is a multiple pattern, dual large diaphragm condenser mic with extremely low self-noise (7dB); a discrete, transformerless preamplifier, fast transient response; 15 dB pad; 3-position low-frequency filter; complete with suspension shock mount, pouch and aluminum case.

The prize package also includes a mic cable and the dbx ProVocal, an all-inclusive voice processing toolbox with a high-quality preamp, compressor/limiter, effects, S/PDIF output. Enter at www.bswusa.com!

KSM44 List 1393⁰⁰ **699⁰⁰**
PROVOCAL List 499⁰⁰ **299⁹⁵**

SHURE

Rugged Studio Condenser Mic

The very economical Shure KSM27 is a great-sounding side-address cardioid condenser mic. Designed for studio use but rugged enough for live applications, it has a 1-inch diaphragm, extremely low self-noise, and an extended frequency response. **Features:** subsonic filter that eliminates rumble; switchable 15 dB pad for handling extremely high SPL; 3-position switchable low-frequency filter; integrated three-stage pop protection grill; internal shock mount reduces handling noise.

KSM27SL List 575⁰⁰
299⁰⁰

Frequency-Agile Wireless System

Featuring the industry-standard SM58 microphone cartridge, Shure's ULXP24/58 handheld wireless system is wireless the way it should be. The frequency-agile ULXP automatically selects open frequencies for you from the over 1400 selectable, pre-programmed ones available. **Features:** 5-segment RF meter; advanced multi-function LCD; squelch adjustment; removable 1/2 wave antenna; frequency and volume lockout; transmitted (TX) audio indicators; mic/line level switch; XLR and 1/4" outputs with level control; 1/2 rack design.

ULXP24/58 List 1312⁰⁰
829⁰⁰

AUDIOARTS ENGINEERING



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FREE Phone Module
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of the New Audioarts
R55 Console
(a \$614 value!)

Modular 12-Channel Console Packed with Performance

A truly no-nonsense unit with plenty of usability, the Audioarts R55 modular console has 12 channels and 4 busses and offers a monitor module with control room, studio, headphone and talkback functions and an output module with program, audition, pre- and post-mono fader outputs, plus independent meter selection. Flip up the hinged meter bridge and everything you need to access is right there: DB-25 I/O connections, calibration trim pots and console logic dipswitches. Its counter top design fits almost anywhere, with dimensions of 26" W x 25-1/2" D x 8" H

(2-1/2" in front), and it has rugged steel frame construction. **Features:** built-in cue speaker/amp and headphone jack/amp to save on outboard gear; built-in event timer; external meter input; mic logic included on line modules for use with line-level mic inputs; stereo program and audition busses plus two mono output busses.

With the purchase of your new R55, we're even throwing in a FREE phone module valued at \$614.00! This is an exclusive BSW offer!

R55 List 5,695⁰⁰ CALL FOR PRICE



Incredible Value Headphone 5-Pack

Five Sennheiser HD202 headphones for \$89.00! We're not kidding. These durable, sealed-ear headphones provide solid bass response, good insulation from outside noise and have a convenient cord take-up. A BSW exclusive!

HD202PKG **89⁰⁰** **SENNHEISER**



Silence Monitor

The Broadcast Tools Silence Monitor III is designed to monitor any stereo or two independent mono sources, generate alarms and transparently switch to back-up source equipment when silence is detected. **Features:** front panel, remote control and relay monitoring; silence detection of -23, -25, -35 and -45 dB; defeatable alarm; relays for most remote functions.

SMIII List 259⁵⁰ **229⁰⁰** **BROADCAST TOOLS inc.**



Portable Cassette Recorder w/XLR

The PMD222 is a mono 3-head portable cassette recorder. **Features:** 7.5 hours recording on three D-size batteries (AC power supply included); jack for direct telephone recording/playback; switchable limiter; built-in mic and speaker; variable speed; line in/out; cue and review; automatic or manual record level; XLR mic input.

PMD222 List 519⁵⁰ **395⁰⁰** **MARANTZ**

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'Repro Radios' Are a Hit Online

by James Careless

Old-time radios: for many people, they are the essence of nostalgia. Hence, it's not surprising in this post-9/11 world that these receivers turn up in rec rooms, offices and themed restaurants. Now, many of them also come with cassette and/or CD players included.

Welcome to the slightly offbeat world of "repro radios," a market where old and new are fused to suit customers' nostalgic yearnings and their insistence on modern technology.

Need proof? Just type "repro radios" into a search engine like Google, and you'll get hundreds of hits. (When Radio World did it, we generated 80 pages of links.)

Reproduction or retro technology is taking off in a number of sectors, such as radios, record players and jukeboxes. So who's buying?

"The radios go to customers who use them to decorate; the turntables to those who decorate and want to play Mom's or Dad's old 78s," said Leland Faber, owner of www.all-unique.com.

"The jukeboxes go to the young rich entrepreneurs for their game rooms." (Are there still young, rich entrepreneurs?)

As for the repro telephones, pedal cars and lava lamps found at www.all-unique.com? Clearly, the market for nostalgic products is broad.

Today's Crosley

Back to repro radios. Look across the Web, and chances are you'll run across a wealth of Crosley-branded units: the snappy Crosley Metro tabletop, the famous Art Deco Bluebird with its circular glass face, and, of course, the full-sized Crosley floor/console radio. (Other famous names can be found, such as Philco and Grundig, though the selection

is not as broad.)

Crosley is the venerable radio line started by Powel Crosley in the 1920s. Renowned for making radio affordable to the masses — he's been called "The Henry Ford of Radio" — this company's receivers were American-design standard-bearers in the first half of the previous century.

retro was cool," said Bo Lemastaus, the company president. "We began by making a copy of the famous Atwater Kent radio. We thought that it would be just too neat to use an antique-looking case, and fit it with modern technology inside.

"We licensed the Crosley name a few years later because we wanted to make products that tied into a venerable yet



Reproduction Crosley Metro

Crosley doesn't make radios anymore, although it's still in the appliance business. Today Crosley radios are designed, manufactured and sold under license to Crosley Radio, a division of Modern Marketing Concepts (www.modernmktg.com) of Louisville, Ky.

"We started making repro radios back in 1985, so we were retro long before

existing radio business," he said. "Our first Crosley reproduction was the cathedral-style 1920s-vintage Harco."

Today, www.modernmktg.com sells the Harco for \$34.95, along with a range of other repro radios, jukeboxes, telephones and record players. The Crosley Harco also is sold by dealers such as Universal Radio (www.universal-radio.com).

Although Universal Radio is known for world-band and amateur receivers/transceivers, president Fred Ostermann also offers 20 Crosley radios, jukeboxes and telephones online.

"I saw the Crosley line at the Consumer Electronics Show a few years ago and was very impressed by the quality of their finishing and authentic appearances," he said. "Although the repros' audio isn't quite as rich as the original radios' sound, it's still very good."

For Bo Lemastaus, audio quality is important. He knows customers won't be happy with his repro radios unless they sound as good as they look.

Looks sell

Still, it's the appearance of the Crosley repro radios — the illusion that they're actually the real thing — that sells these products. To get the appearance right, today's Crosley Radio starts with an actual old-time radio, one that it selects by contacting "five or six key collectors around the country," Lemastaus said. "We'll look through their inventory and their collections for ideas. Once we find a model worth reproducing, we'll use the original as the basis for our blueprints."

Once the outer shell is specified — including a hardwood case, authentic wood veneers and reproduction tuning dials, knobs, and glass plates — the electronics are designed.

Typically the company will model the layout of the radio chassis around the external controls, for appearance's sake. Then, if a cassette/CD player is to be added, it will be located in an easy-to-conceal location; under a lid, for example. From here, the radio plans are sent offshore for assembly by a manufacturer in China.

But why add modern electronics to an old radio? In some cases, the purchaser wants only the appearance of nostalgia, not the sound or feature set.

See RETRO RADIO, page 27 ►

Workbench

► Continued from page 23

The company has announced its training course schedule for the year. A copy can be obtained at (800) 44-FLUKE or online at www.fluke.com/2003caltraining.

Test equipment manufacturers and their reps are great sources for interesting and relevant SBE programs.

In the Feb. 1 *Workbench*, we related an anecdote about an FCC inspector who wanted to do harmonic measurements in the null of a directional array.

Sheldon Daitch is with the International Broadcasting Bureau in Washington. Funny as our story was, Sheldon inquires how a series of harmonic measurements should be performed when an AM station uses a directional array.

I'd always heard that such measurements should be made in the major lobe, as described by the station's RF proof. Sheldon writes that it seems simple to make these measurements with a non-directional facility; but for the same reason that the harmonic radiation content in the null does not match the harmonic levels produced by the transmitter, how does one select the proper point to measure harmonics when the facility has a directional array? He speculates that you could go



Fig. 3: This is an unpleasant reminder that we work with lethal voltages in radio.

around the pattern and take several measurements. But who's to decide if some don't meet spec?

If the lit fluorescent tube mentioned earlier doesn't earn some respect, maybe the hawk's claws in Fig. 3 will.

Bill Tennant, chief engineer with Moody Broadcasting in Chicago, encountered this

grisly sight. The claws are gripping the slant-wire AM feed on WMBI's old tower. The bird's right wing must have made contact with the grounded tuning box, which is out of the frame of the picture.

The hawk was not to be found. Was he vaporized?

I worked at one of the first folded unipole AMs here in Washington. In fact, the father of the folded unipole, John Mullaney Sr., did much of his uni-

pole design work at this station, which was then WPIK. Jack Mullaney, John H.'s son, continues his father's work with Mullaney Engineering.

There are a number of advantages to using unipoles for AM, but the sometimes-high voltages at the base feed point demand that safety be exercised.

To give you an idea of the voltages developed in these feeds, at WPIK there was a sign next to the vacuum output capacitor. It said the voltage had been measured at that point and it pegged a 50 kV full-scale meter, the highest-range meter they had available at the time.

One day, during a routine transmitter inspection, my assistant discovered a small set of bird's feet, perhaps belonging to a sparrow or starling. As in Fig. 3, the bird was gone; just the feet remained.

The moral to these stories is that we work with lethal voltages and we must never take our duties for granted or let safety take a break. There's a reason the FCC gets so upset at operators who don't have fences around their towers.

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

Submissions for this column are encouraged and qualify for SBE recertification credit. Fax your submission to (703) 323-8044, or send e-mail to jbisset@harris.com.

Retro Radio

► Continued from page 26

However, in many instances the addition of a CD or cassette player is precisely for reasons of authenticity: insert a recording of an old-time radio program, and your repro radio can sound as retro as it looks. Vintage radio show recordings are available widely on the Web and in bookstore chains. Amazon.com sells them.

Put it altogether and repro radios have what it takes to be a solid niche market performer.



The retro/repro market includes more than radios — here, a payphone.

“Everyone wants to own a piece of the past,” Lemastaus said. “However, actually finding an authentic vintage radio in good order is not only difficult, but expensive. So rather than expecting people to pay \$1,000 for old technology, we provide them with an authentic-looking working reproduction — often with additional features unheard of in 1930 — at a reasonable price.

“After all, even nostalgia has to work within a budget.”

How to Submit Letters

Radio World welcomes your point of view on any topic related to the U.S. radio broadcast industry.

Letters should be 100 to 300 words long; the shorter the letter, the better chance it will be published in full. We reserve the right to edit material for space. Longer commentaries are welcome but may not reach print as quickly.

Include your name, address and contact information, as well as your job title and company if appropriate.

Send letters via e-mail to radioworld@imaspub.com, with “Letter to the Editor” in the subject field; fax to (703) 820-3245; or mail to Reader’s Forum, Radio World, P.O. Box 1214, Falls Church, VA 22041.

MARKET PLACE

Harris Shows VistaMax

Among new products introduced by Harris Corp. at the NAB convention is VistaMax, a scaleable and dynamic Pacific console system that it says was designed for facility-wide audio management and console networking.

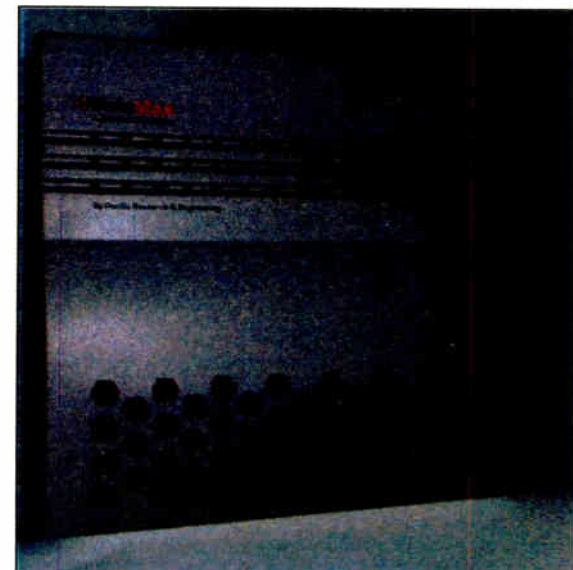
Harris describes it as an intelligent hub that enables console resources and audio assets to be shared throughout the network. Audio is connected to one console in the networked system but becomes available throughout the facility. It is marketed as a cost-effective alternative to existing networked systems.

The system connects BMXdigital or other consoles to its hub via fiber or CAT-5 connections.

“This platform significantly simplifies network audio management, altogether eliminating or reducing the need for standalone routers, distribution systems and long multi-pair bundles that have traditionally created ‘homet’s nest’ wiring messes,” Harris stated.

The company also announced a small digital console, the Expresso, and a new AM transmitter line called DAX, in 1 to 6 kW, suitable for analog/HD Radio use.

For information contact the company in Ohio at (978) 486-9000 or visit www.harris.com.



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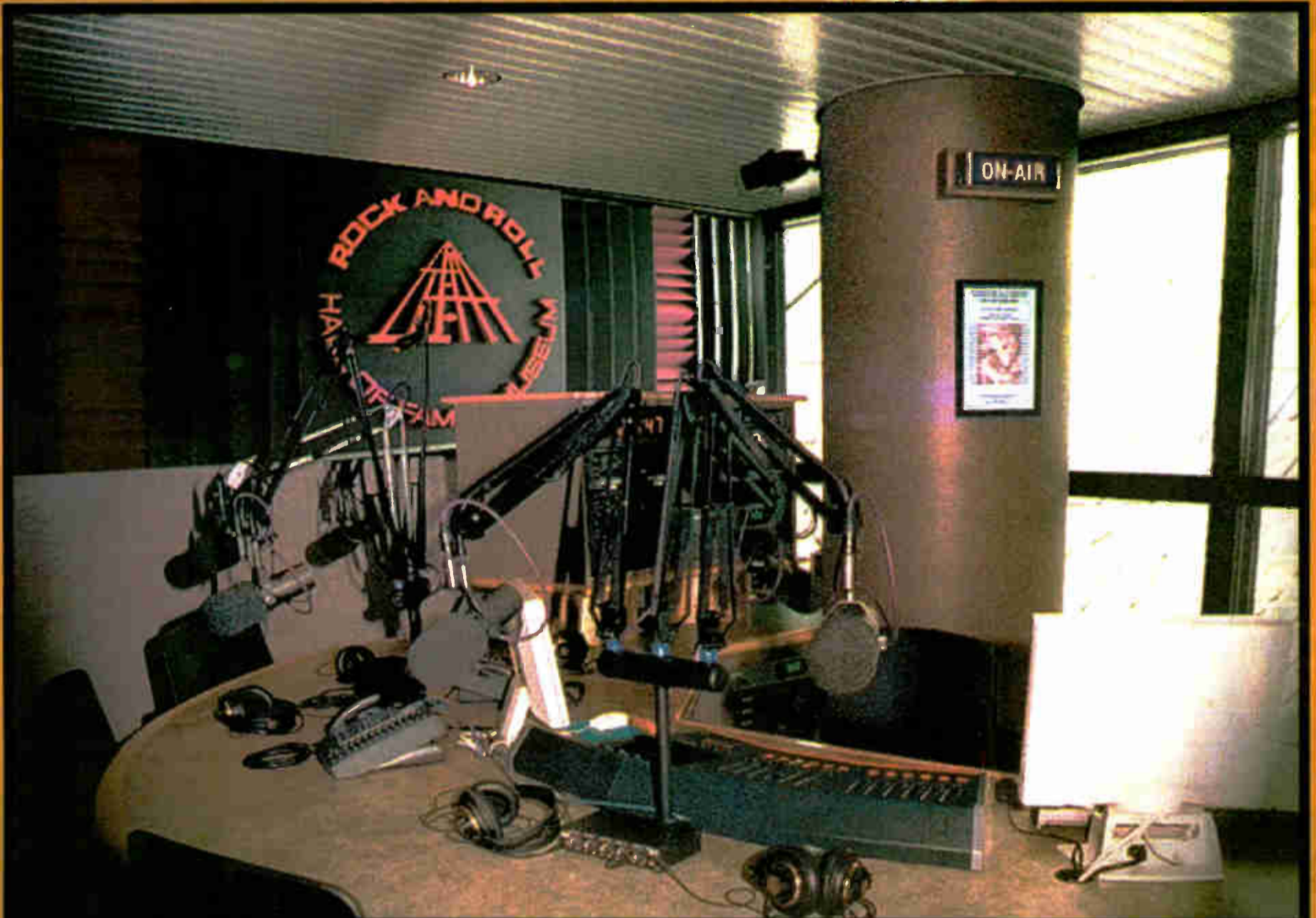
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Allan Freed Radio Studio/Rock and Roll Hall of Fame Museum, Cleveland



Alien Multimedia Studios, Indianapolis



MTV's Making the Band, New York City



NAB Tradeshow, Las Vegas



Studio Sessions

Travis the
V/O Guy

See Page 33

Radio World

Resource for Radio On-Air, Production and Recording

April 23, 2003

TIPS AND TRICKS

A Rundown of the ABCs of ENG

by Mark Greenhouse

Electronic newsgathering or ENG is a science unto itself, demanding special equipment and techniques. A remote engineer needs to be mobile. This entails a backpacker's mentality and the physical strength to carry the equipment.

Wear soft-soled (silent on hard floors) shoes and loose fitting weather-appropriate clothing. Take a hat with a brim. Get

those bifocals you have been avoiding. Put a bandana in your back pocket for cushioning the fishpole or mopping your sweaty brow. Last, carry small denomination bills to pay for taxis and water from street vendors — a \$20 bill will cause you problems.

A basic recording kit should include the following gear: recorders, microphones, monitors, cables, power supplies and miscellaneous odds and ends on

which I will elaborate.

Recorders are a good place to start. I recommend either one DAT recorder and one MiniDisc recorder; two MiniDisc recorders; or one cassette recorder.

For microphones, I recommend either an AudioTechnica AT835 shotgun microphone and an ElectroVoice RE50N/D omnidirectional microphone.

For monitors I like to use a pair of

See TIPS, page 32 ▶



Contents of a Typical ENG Remote Kit

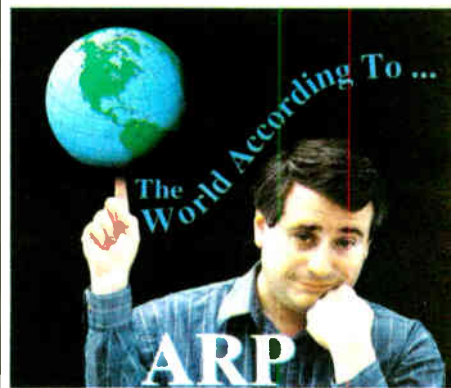
Photo by Ted Mebane

Disk Space: The Final Frontier

by Alan R. Peterson

It does not take much for me to overthink even the simplest matters.

I take trivia contests way too seriously. I believe beeswax is the best stuff around when it comes to polishing and waxing bees. I ponder the significance of the sugar cube and wonder why the Domino Sugar people don't come out with sugar dodecahedrons "for a truly *different* cup of coffee."



And heaven help us if a station puts me in charge of a simple promotion like a T-shirt giveaway at the mall. Within a half-hour, I'll have been on the phone to arrange for a marching band and an Air Force flyover.

So it should not have come as any surprise that the latest innovations in computer technology had set me off on yet another obsessive-compulsive quest for the ultimate answer.

I am talking about hard drives.

I enjoy reading what the futurists have to say about what's-next for computers.

See ARP, page 30 ▶

Digitally Diverse Omega_FM - \$5880

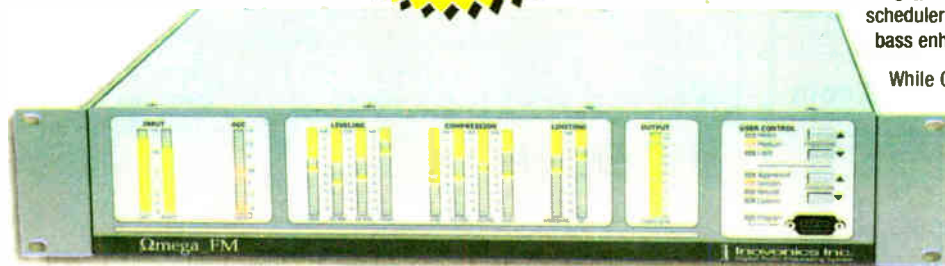
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While Omega_FM's composite/MPX output feeds your existing FM exciter, the fully independent AES/EBU digital output can be configured for flat, 20kHz response with programmable delay. This allows a single processing chain to impart a common 'sonic signature' to simultaneous FM and DAB transmissions. The inherent audio quality limitations of FM (15kHz cutoff, plus pre-emphasis and its attendant 'protection' limiting) will not compromise the digital broadcast.

Despite its modest price, Omega_FM challenges the versatility and performance of any processor on the market. Even if you are delighted with what you're using now, see your preferred equipment supplier for a comparison demo at your station.



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Hear It... Processing doesn't get any better than this.

ARP

► Continued from page 29

Back when I was tooling around with my Pentium 233 and heard about the 2 GHz barrier coming down within a few years, I started drooling. Now the stakes are around 3.0 GHz and getting higher, and I am up to my ankles in drool.

Recently, while checking out computer factoids on the Ziff-Davis Net (news.zdnet.co.uk), I was surprised to read about magnetic experiments now being explored by two professors at the State University of New York at Buffalo. Their efforts could, within seven years, lead to a 1 PB disk drive. So you know, a PB is a Petabyte, which is the same as 1 million GB.

Out comes the calculator

Let's let that one sink in and simmer for a few moments ... 1 million bytes, times 1 billion. Right now, the most typical drive we would find on our own machines is about 40 to 60 GB, and the concept of a mere *terabyte* or two on the audio server is almost beyond comprehension for some.

So we are only seven years away from potentially having a Petabyte mounted on a single drive. Just what does that mean in terms of capacity and what on earth are we going to do with it all?

My math is a bit rusty these days, and actual drive capacities are hardly ever fully realized anyway — put a new 120 GB drive in your PC and watch it report about 111 GB back to you. But let us have a little fun with these numbers.

It never really works this way in real life, but typically, a single minute of

uncompressed CD-quality digital audio occupies about 10.6 MB, depending on whom you talk to. Simplified a little, that means about 56.4 seconds of audio fits into a nice round 10 MB.

Dropping in a zero the way our second-grade math teacher showed us how, it is seen that 100 MB will just about hold 564 seconds, or around 9 minutes 24 seconds. Bump it up to 1 GB (1,000 MB) and we are good to go for right around 94 minutes of CD-quality audio.

XM Satellite Radio claims you can listen to the same station cross-country. Hell, under my plan, you can listen to the same *song* cross-country!

Let's cut to the coda, as musicians say. Take that 1 GB of drive capacity and multiply it by 1 million to represent a Petabyte. You may have to go into your kitchen drawer and pull out an unused mantissa or two, but give the math a fair shot.

On paper only, that 1 Petabyte drive appears to be good for 94,000,000 minutes. Boil it down and see how this drive is theoretically large enough for *178 years of CD-quality audio!*

Wait, we're not done. Let's add a little gentle data compression to our music to (snicker) conserve drive space. Maybe some MS-ADPCM or MPEG; either way, let's make it a simple 4:1 compression. Your hard drive is now up to well over *seven centuries* of music capacity.

The two most blatantly ridiculous aspects I find of all this: First, it is likely the drive will only carry a three-year warranty; and second, defragging said disk drive is a task likely to be completed by your descendants.

So that means ...

This is why sick minds are never given powerful toys.

Once I had these numbers in hand, it set my mind to wand'rin' and pond'rin'

how these developments can only come to radio's rescue.

First, as the only limitation to this drive is what I now call the "178-Year Rule," popular songs no longer need to adhere to any formula regarding time.

At one time, popular songs were only about 2-1/2 minutes in length, determined early on by how much music would literally "fit" on the surface of a 78-rpm record before hitting the lock-groove at the end.

Over the years, plenty of songs bent the rule before it finally broke. The singles "Hey Jude," "Like a Rolling Stone" and "American Pie" all come to mind. Move into 33 rpm-Land and the trailblazers include "Time Has Come Today," "Stairway to Heaven," "In-a-Gadda-Da-Vida" and dozens of others.

Now, with a 1 Petabyte drive, the time limitation no longer applies. New songs can be as long as one wishes them to be.

coordinates are for that beauty mark on her face.

That sort of capacity means every station in your cluster can keep its music library on one drive. Given a very generous 2,000-song music library per station, with each song being an average five minutes, an eight-station metro combo would only eat up 80,000 minutes on that drive — a mere 55 days worth of music. This still leaves around seven generations worth of room for commercials.

Was it Robert Klein or Albert Brooks who, back in the '70s, did the fake commercial, "Now you can own every song ever recorded?" The good news about this huge drive is you could conceivably have a radio station that is able to store and play every song ever recorded!

Using 8:1 MPEG compression, our 1 Petabyte drive can hold about 14 centuries' worth of audio. A library can be stocked for an all-request radio station that truly is able to play anything at all.

Imagine a typical quarter-hour, segueing from "Racing With the Moon" by Vaughn Monroe to a 16th century lute etude, then a snappy round of 19th century railroad songs like "Gandy Dancer's Ball" leading you into the Vaudeville era favorite, "Mr. Gallagher, Mr. Sheen," topped off with a Green Day medley.

Okay, the drawbacks

Sure, it won't all be peaches and cream when this drive comes out and some new station comes on the air with the "Hits of the 1600s, 1700s, 1800s, 1900s and Today."

First, all-request shows would be a joke. That Garth Brooks song you just phoned in won't be played until your second grandchild gets fitted for his first dentures. There wouldn't be any "two-hour turnover," so if you missed a song because you were in the shower, tough luck.

Don't even get me started on "Best Of" weekends or "Class Reunion" shows: "Here's one for the class of '01

On paper only, a 1 Petabyte drive appears to be good for 94,000,000 minutes, or theoretically large enough for nearly 179 years of CD-quality audio.

We can finally go back and write additional verses to the 1:50 Box Tops' hit "The Letter." A Beach Boys tune truly can last "all summer long." A song such as "Stairway to Heaven" would suddenly be too *short* to be a good bathroom tune.

Don McLean will be able to get back in his Chevy and revisit that levee when it's *wet*. Alternative bands that record five-minute songs in one key can actually explore what it's like to change to a new key and keep playing.

My friends at XM Satellite Radio claim you can listen to the same station cross-country. Hell, under my plan, you can listen to the same *song* cross-country!

That Web experience

A drive that huge can also store some pretty detailed — though insignificant — minutiae regarding artists, sent downline to Webcast listeners. It is one thing to tell your listeners how many albums Sheryl Crow has released since her debut. It is quite another to tell them what the GPS

... 1801, that is!"

You will never find that one song that the intern misspelled as it was entered into the computer. And the file name/number of the song will be several hundred digits long. Good luck if your automation system still uses the old DOS 8.3 file-naming convention!

However, we should consider one last optimistic point about the coming of the 1 Petabyte disk drive when it gets here.

You won't need those RAID units filling the racks back in the server room anymore. Just locate the drive in the cafeteria and run an 80-pin ribbon cable down the hall to it. With every bit of station audio archived to a single component, a 1 Petabyte drive running 24/7 would also get hot enough to function as the burger grill in the employee lunchroom.

Al can be reached at alanpeterson@earthlink.net and has two words for anyone wishing to verify his math: "Geek Check!" 🌐

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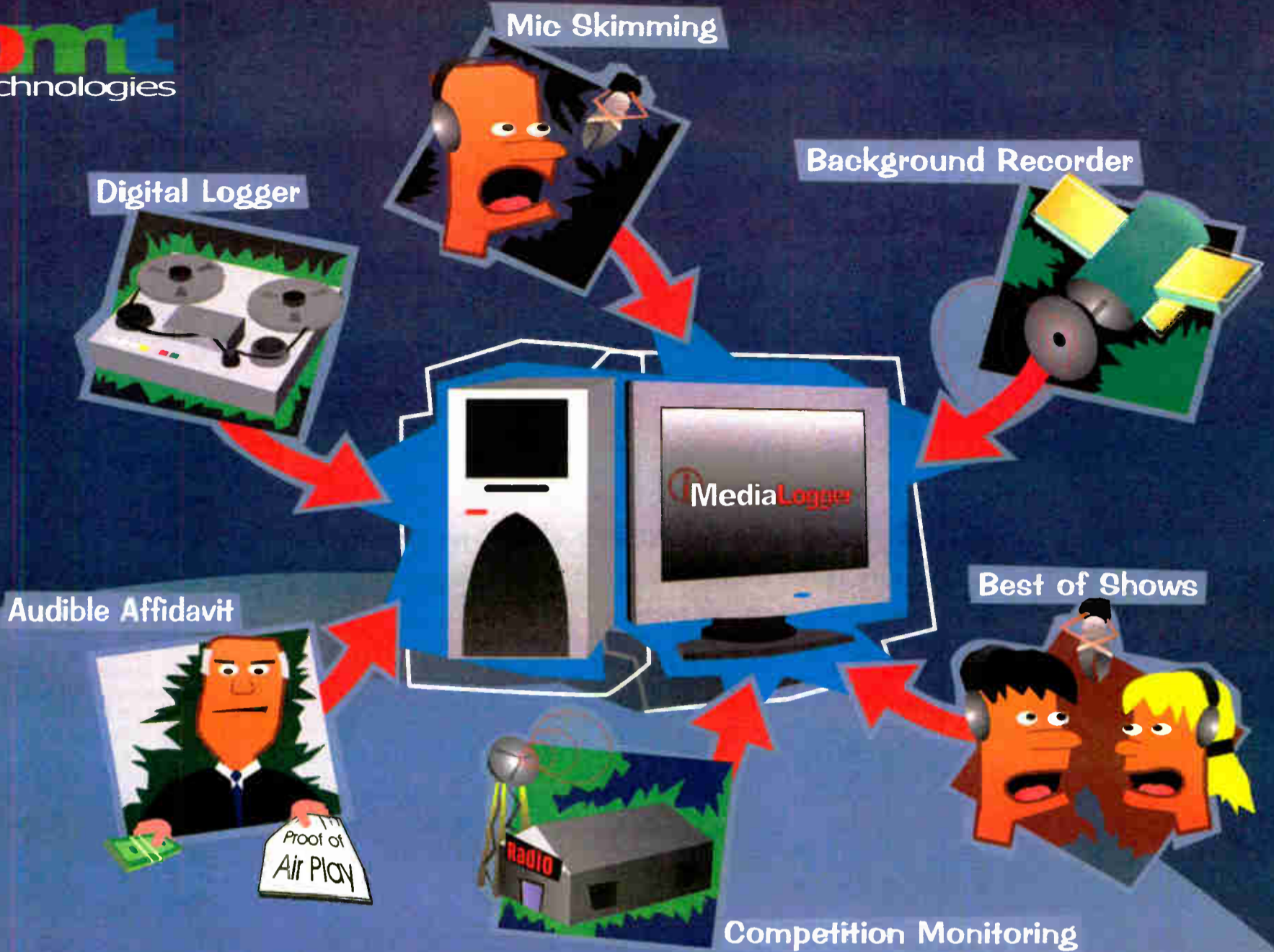
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- Schedule time or closure based recordings
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Tips

► Continued from page 29

Sony MDR 7506 headphones. I keep several cables in my kit: one female XLR-to-male 3.5mm mini-plug cable; one male XLR-to-3.5mm mini-plug cable; one 3.5mm stereo mini-to-mini cable; and a 25-foot female-to-male XLR cable. Be sure to use the Sony-type 3.5mm plugs; the Switchcraft 3.5mm plugs are too large and will break the jack in your device.

I bring these power sources: one A/C-to-D/C power supply each for DAT and MiniDisc, and 10 or more AA batteries. I also bring more media than I think I will need for each recording device.

A variety of miscellaneous gear is essential to the basic remote kit.

Fishpoles and goosenecks

A fishpole, which is a telescoping tube that allows you to attach a microphone to one end, lets you get the mic closer to the sound source than would be possible if it were handheld. Carry along one 50 dB line level-to-mic level attenuator in case you have the good fortune to plug in to a multibox, which is a distribution panel provided at the event.

Also pack a 6-inch gooseneck, which is a bendable extension for the end of your fishpole; a Rowi clamp, a C-clamp that allows you to attach a microphone to a lectern or desk; and a pistol grip (for the AT835 shotgun mic), a shock absorber that reduces mechanical noise transmission to the microphone.

You will want to have a zeppelin for outdoor use, a device that houses your microphone and diffuses gusts of wind so that the mic does not pick up undesirable thumping and rumbling; two pop filters (one for each type of microphone); five feet of duct tape rolled onto a Sharpie magic marker; one Leatherman-type multi-tool; and a battery tester.

When one considers the expense of travel and time, batteries are no place to economize. Do not risk the loss of your

recorder for the price of two AAs. Buy a battery tester. Change batteries every gig and carry spares. If you will be in a cold environment place several extra sets of batteries in your pockets close to your body. If possible, keep the recorder in your pocket.

MiniDisc and DAT recording

Pay special attention to the audio level meter on your recorders. If you are using MiniDisc you want the loudest moment of your event to go all the way up to -4vu (volume units) on your recorder's volume meter. The majority of your level will be around -12vu.

Have your cassette deck recalibrated every three months, and at any time you change brands of tape.

MiniDisc should not be your first choice in recording a live musical performance or historical event. DAT or analog open reel would be a higher-fidelity choice.

Digital audio tape recorders are actually tiny videocassette recorders. Because they do not use any data compression, DAT recorders are a good choice for complex foreground recording — musical performances, for example.

If you are using DAT, again you want the loudest moment of your event to go all the way up to -4 VU on your recorder's level meter. The majority of your level will be around -12 VU.

Always exercise a new DAT tape before recording on it. Simply put it in the machine, press fast forward to the end, and then rewind it. Be aware that unlike an analog cassette tape, you can-

not turn a DAT tape over and continue recording on the other side.

It is important to relieve the stress on your recorder's tiny jacks by plugging the cable in and then taping the cable with duct tape to the body of the recorder, leaving a small loop that allows the cable to maintain a straight relationship to the plug and jack. Getting into the habit of doing this will minimize connector failure in the field.

You might consider using a cassette recorder if you are traveling to an area of the world that does not have ready access to MiniDiscs or DAT tapes. Cassettes are available everywhere —

machine to play the tapes back, as those tapes can only accurately be reproduced by the device on which they were recorded.

The reason so many microphone manufacturers can comfortably coexist is because of the special character each type of microphone possesses.

Reporters primarily use two types of microphones — shotgun and omni.

The Audio Technica AT835 is an electret shotgun condenser microphone powered by AA battery. The AT835 picks up only what is directly in front of it, making it an excellent choice when interviewing an individual in a crowd or noisy environment.

Sensitive to noise

This microphone is extremely sensitive to handling and wind noise, however, so a pistol grip shockmount and zeppelin are essential.


The ElectroVoice RE 50ND mic is good example of the latter, an omnidirectional dynamic.

As an omni mic, the E-V would be a good choice for recording an interview in a quiet space as well as gathering ambience. It is relatively insensitive to handling noise and wind.

If I had to choose only one microphone it would be the A-T 835 shotgun. It produces most intelligible recordings of conversation. As these tools fulfill differing needs, if it is at all possible an ENG kit should include both shotgun and omni microphones, as well as their accessories.

Good post-recording habits are important. You should label every piece of recorded media. For cassettes, pop out the safety tabs after recording the tapes cannot be accidentally erased. Engage the lock on the back of DATs and MiniDiscs (it is located on the spine).

Never throw away a master. Make safety copies of precious stuff. Keep all tapes and recorders away from metal and magnets — including speakers, amplifiers, electrical equipment and power cords. Keep your media out of the heat, humidity and direct sun. Protect recorded media in a clean, dry, dust-free place.

Mark Greenhouse is a broadcast recording technician for National Public Radio who has recorded with National Geographic's "Radio Expeditions." 

even if you have to resort to buying a prerecorded one and recording over it.

The basics of cassette maintenance are to clean the tape path, demagnetize the heads and calibrate the recorder.

Choose one brand of tape you will use exclusively when you record. TDK SA90 is a good choice. Take a cassette and the machine to a local hi-fi shop and have them calibrate the recorder for that specific brand and model of tape. Then have them align your Dolby noise reduction unit. Playback of different brands of tape does not need recalibration for each type — it is the recording electronics that need it.

Have your cassette deck recalibrated every three months, and at any time you change brands of tape. Since TDK SA90 is a high-bias chromium dioxide tape, be sure your recorder is always set to Type II.

If you record cassettes using Dolby or DBX noise reduction systems, use the noise reduction for both recording and playback. Also, plan on using your

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Equipment List

This list contains my personal recommendations for the equipment that makes up a basic ENG kit, including prices I was able to find by shopping around.

MiniDisc recorder:	Sony MZ-B100	\$310
DAT recorder:	Sony TCD-D8	\$700
Cassette recorders:	Sony D-5	\$650
	D5 Pro 2 with XLR connectors	\$1,000
	Marantz PMD 430	\$480
Microphones and accessories:	A-T 835A	\$275
	Pop filter	\$20
	EV RE50 N/D	\$189
	Pop filter	\$20
Headphones:	Sony MDR 7506	\$165
Pistol grips and zeppelins:	Lightwave Systems pistol grip	\$250
	Lightwave Systems zeppelin	\$200
Miscellaneous:	Fishpole	\$75
	Battery Tester	\$20
	Leatherman	\$35

The Changing Face of Voice Work

by Travis

It has been awhile since I've written an article for Radio World. The voiceover industry has changed quite a bit since my last piece appeared, and this seems like a good time to discuss some of the changes.

My agent called recently with an audition. She explained that the producer of the project needed to have the audition recorded and sent on cassette to the production office.

Just two years ago that would not have been an unusual request. But I was amused that the producers of this project wanted me not only to mail the audition, but that they wanted it on cassette.

I have not sent anything to anyone on cassette for quite some time. If the material needs to be sent via mail, I usually burn a CD.

A year ago, I would not have considered not having a cassette machine in the studio. Today, cassettes truly are obsolete.

I recorded the audition in my little "mini-studio" and prepared to dub it to cassette. I still have a pile of about 50 blank cassettes sitting on a shelf in my studio.

I picked up a tape from the top of the pile and, wiping off the dust that had accumulated, placed it in the cassette machine. I pressed the "Record" and "Play" buttons, and — nothing. The machine was dead. The VU meters still responded, but the tape didn't move.

"Haven't used that machine for awhile," I mumbled to myself. Well, no problem, I still have another cassette machine, I'll just record it there.

I put the tape in the other machine and had the same problem.

Two dead cassette machines. One is about seven years old and the other is close to 15. The last time I tried to use them, they both worked.

I quickly burned a CD and ran over to my girlfriend's studio. She teaches singing and has a little studio for recording students. Fortunately she has a CD player and a working cassette machine. I dubbed from the CD to the cassette and mailed it off.

On the way to the mailbox I tried to figure out whether I should shell out the hundred dollars or so for a new cassette machine or whether I should attempt a repair. Both machines probably need new rubber belts. Or I could just borrow my girlfriend's studio when and if I ever need a cassette machine again.

I tried to figure out when I had last used a cassette machine. It must have been at least a year-and-a-half. I also realized it had been a couple of months since I had mailed or FedEx'd audio to anyone; most of the time I send audio material through the Internet.

This brought home to me just how much the business has changed recently.

A year ago, I would not have considered *not* having a cassette machine in the studio. I needed one for all kinds of reasons. Today, cassettes truly are obsolete.

Just a year ago, when a client or potential client said they were in a hurry for audio or an audition, I would suggest that we send the audio over the Internet. I would spend considerable time explaining how this is done and reassuring the producer that everything would work.

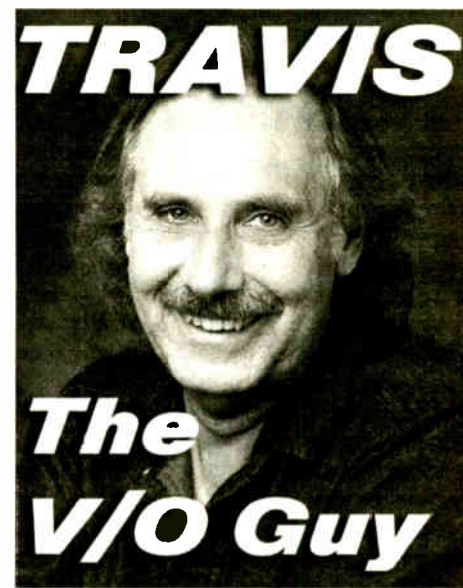
Today, only a year later, it is usually the producer who tells me to send the audio over the Internet. Everybody involved is comfortable with the concept

and knows how it works.

Just a couple of years ago, the vast majority of voiceover professionals I knew did not have their own studios. Today, most of those same individuals now have some sort of "professional" recording setup at home.

What is really surprising to me is that most of these people were scared to death of computers, the Internet and anything technical. But today they are calling me asking for advice on such things as audio interfaces, software and lots of other things they did not have a clue about in 2001 — and using them with reasonable expertise.

See TRAVIS, page 39 ▶



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PRODUCT EVALUATION

Omega_FM Processor Powers Up

by Dennis Martin

Audio processing has matured considerably since the days of the Gates Level Devil and CBS Audimax/Volumax, and the advances have most often been microprocessor-related.

The Inovonics Omega_FM Digital FM-Airchain Processor, now with software version 2.0, is diminutive in size at just 2RU, yet is a full-featured audio processor/stereo generator that uses a single-board computer or SBC to perform its "number-crunching" duties.

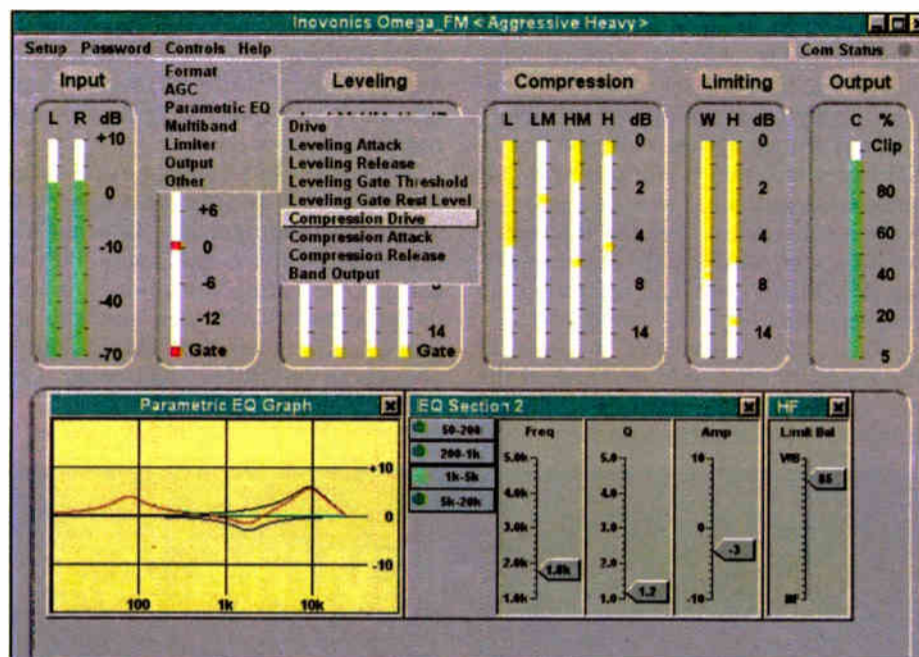
The SBC, a front-panel board, a pair of analog/digital I/O interface boards and a power supply are its principal internal components.

Simplified approach

This simplified design approach differs from that found in common practice. According to Inovonics, "Processing is performed entirely within the digital domain without application-specific DSP chips or modules. No hardware upgrades are necessary for future updates."

That statement is proved true by the significant features added by software v2.0: an advanced AGC, a fourth parametric EQ section, bass enhancer, scheduler function and remote control via modem.

The equivalent block diagram on the Omega_FM illustrates familiar elements: AGC, parametric EQ, bass enhancement, leveling, compression, wideband and high-frequency limiting and spectrum-fil-



tered composite clipping. But looking further, we learn how elements have been refined in a way that would be difficult to achieve without digital technology.

The Advanced AGC section uses a complex, multiple-slope level correction function to ride gain on the input signal and keep it within an optimal range for subsequent processing operations. Small level corrections are done slowly, but large changes are performed at an accelerated rate.

When the signal level falls below a preset level, the AGC returns to 0 dB

(unity gain) rather than just gating at an inappropriate gain level. A rather unique feature is the ability to inhibit its gain function: The AGC will still reduce high-level signals, but low-level signals will not be amplified. This can be extremely useful in classical and sports formats where it might be undesirable to raise low-level signals.

Four independent, yet identical sections of state-variable parametric equalization allow for precise sound tailoring. Center frequency is adjustable from 50 Hz to 20 kHz, Q from 1 to 5, and amplitude from -10 to +10 dB. Because EQ sections do not always combine in a predictable manner, a graph shows the resulting curve along with the response of each EQ section.

Psychoacoustic circuit

A psychoacoustic bass enhancement circuit is said to accentuate and phase-align harmonic components of low bass fundamental frequencies using a proprietary algorithm. Not to be confused with parametric or other EQ, this feature increases perceived bass without a corresponding increase in peak modulation.

Even though this enhancement is audible on all speakers — large and small — vehicle sound systems in particular will notice the effect.

In radio, there is certainly no shortage of "EQ-rich" or "spectrally diverse" source material. Because most stations favor a degree of uniformity, four-band leveling section of the Omega_FM works to minimize the differences. Described as a multiband AGC, leveling is slow, nonobtrusive and gated.

The four-band compression section is in part responsible for increasing program density, which is a major contributor to perceived loudness. It operates at a rapid rate to reduce the amplitude range and provide dynamic graphic equalization of the signal.

Peak limiting is two-tiered using separate wideband and high-frequency processors to assure absolute peak control. Dynamic operation of the wideband section is controlled by a floating gain platform that allows fast release of instantaneous peaks to the platform value, while the platform itself releases at a slower rate. Meanwhile, the downstream high-frequency limiter subdues high-frequency peaks, especially those caused by pre-emphasis.

Finally, adjustable composite clipping with spectrum filtering further improves loudness. Sometimes shunned because of potential ill effects, composite clipping can significantly increase loudness. But, without proper implementation, there can be a penalty to pay that includes pilot modulation and spurious emissions well outside spectrum of the composite signal.

According to company literature, "The Omega_FM incorporates a unique output filtering algorithm that protects both the 19 kHz stereo pilot and the spectrum above the 53 kHz top edge of the multiplex signal."

Powerfully simple

The device caters to novices because of its straightforward operation, but advanced users will no doubt like its level of tweakability.

Fourteen LED meters display input level, AGC, leveling, compression and limiting action and output level. Four pushbutton switches allow you to select from factory-programmed processing presets. Absent are jog wheels and soft keys.

Rather than format-specific options, the user can select from Light, Medium and Heavy processing versions of Natural, Smooth and Aggressive signatures. These nine choices support a surprising range of possibilities from subtle to audacious. If one preset is not the perfect one for your format, it will certainly serve as a well-defined starting point.

The flexibility of the Omega_FM will reveal itself when a compatible PC is connected to the front-panel DB-9 connector (or remotely via modem). Using supplied software, the user has access to the full range of controls — nothing is hidden or inaccessible.

**Even set
for moderately
aggressive processing,
it is clean and crisp.**

You can adjust the AGC (attack, release, gate threshold, maximum gain, etc.), EQ, multiband (drive level; leveling attack, release, threshold, rest level; compression drive, attack, release; band output; and bass enhance), limiter (wideband drive and time constants; limiter balance; high frequency limiter time constants; and pre-emphasis), multiplex (clip point and filtering), and numerous other options — I counted a total of 47 processing parameters (excluding EQ). A signal generator is included for setup.

On the rear panel are 10 connectors: analog inputs and outputs (XLR), digital input and output (AES/EBU on XLR, S/PDIF on BNC), analog composite output (BNC) and a DB-9 connector for remote modem access.

Due to its overall simplicity, the Omega_FM was installed and on the air faster than any other processor I have worked with in recent times. And one of the factory presets proved to be an excellent starting point. The software was easy to navigate, and allowed me to dial in on the exact air sound that pleased the PD

See OMEGA_FM, page 35 ►

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Omega_FM

► Continued from page 34 and air talent alike, which I saved as a custom preset.

Even with moderately aggressive processing, it is clean and crisp, without the grunge or shrillness sometimes associat-

ed with digital processing. It is competitively loud and the spectrum above 53 kHz is as comparably clean as other processors I have used.

One of the biggest challenges of an audio processor is the human voice. Both male and female voices are natural-sounding, and I have found it unnecessary to preprocess the condenser microphones.

The short signal path and software-based processing contribute to the device's modest latency (program signal delay) of 10.5 ms, which has created no problem for our air talent who monitor off-air while on microphone.

The manual, which is amusing at times, thoroughly explains the nuances of audio processing and the complexities of the Omega_FM in an easy-to-read fashion. Despite its completeness, a chart that summarizes key adjustments and their



effect (e.g. "if you want a brighter sound, reduce HF Attack time") might prove helpful for those who are intent on finessing the unit to the ultimate point of perfection.

A missing feature that has been long on my wish list is a band output solo function. While it is essential that you listen critically to the entire mix, being able to monitor individually the output of each processing band could aid in one's fine-tuning efforts. I would also like to see

pilot output and RDS input jacks added.

Audio processing will continue to be subjective, and competition remains fierce. During bench and on-air tests, the Omega_FM without fail proved itself a formidable contender. Despite its surprising low list price of \$5,880, the Omega_FM is a full-featured processor capable of producing a highly competitive air sound.

Dennis Martin is the chief engineer at KPWR(FM)/KZLA(FM) in Los Angeles.

Product Capsule:
Inovonics Omega_FM
Digital FM Airchain Processor

Thumbs Up

- ✓ Easy to use, yet full-featured
- ✓ Advanced users can access all parameter adjustments — nothing is hidden
- ✓ Affordably priced

Thumbs Down

- ✓ A few reference charts in the manual would be helpful
- ✓ Pilot output and RDS input jacks are missing

Price: \$5,880

For information from Inovonics, contact the company in California at (831) 458-0552 or visit www.inovon.com

PRODUCT GUIDE

Ram Mic Boom Riser Hides Mic Cables

The MBR-12 12-inch mic boom riser from Ram features a hollow center to hide mic cable, has a bolted shaft to base, requires no screws and is suitable for use with Corian-type bases.

It is made of black anodized aluminum and fits most microphone booms. XLR adapters are optional.

For more information call Ram in Illinois at (847) 487-7575 or visit www.ramsyscom.com.



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• PRODUCT GUIDE •

Products for Radio Air & Production Studios

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

Mackie Revives Tapco Name

The Tapco 6306 six-channel mixer is the first in a new Tapco product line by Mackie. The \$199.95 mixer is marketed as making professional audio accessible. The Tapco 6306 features low-noise mic-preamps, two instrument inputs, a stereo aux return to monitor, two aux sends, eight-segment LED metering and separate phones and control room level controls.

The Tapco name dates to 1969 when Greg Mackie introduced his first six-channel Tapco mixer designed for rock and roll applications. According to the company, that model redefined the small-mixer market at the time thanks to its headroom and price.

For more information contact Mackie in Washington at (425) 487-4333 or visit www.mackie.com.



Compact, Easy to Install Media Storage Solution

Even with music collections moving to digital files on hard drive, stations and production studios need storage solutions for media.

Russ Bassett Corp. offers the ProMedia GemTrac system, aimed at broadcast facilities and pro A/V production houses.

Part of a family of ProMedia products, the GemTrac System is marketed as a flexible and secure approach for storing multiple media formats.



The system has two banks of four, five or six high-capacity sliding storage drawers suspended from and linked by an overhead smooth-sliding track. Advantages include no floor-mounted tracks that may become tripping hazards, easier installation over carpeted floors, and easier relocation to another area if space and location needs change. Major components are preassembled and installation requires no more than 12 bolts.

Another advantage is efficiency in using floor space, the company says, promising more storage space in an approximately 25-square-foot area than other systems. Units are stackable. Material can be accessed with a single footstep and within arm's reach; staggered drawer handles optimize storage space and safeguard hands when opposing drawers are opened.

The system is covered with a 10-year warranty. Price range, depending on configuration, is \$6,000 to \$10,000.

For more information contact the company in California at (800) 350-2445, (562) 945-2445 or visit www.russbassett.com.

PRODUCT EVALUATION

Arrakis Nova Board Added to Mix

by Alan R. Peterson

Over the past couple of years I have had the opportunity to review small, budget-conscious mixers from LPB, Harris and Autogram. Each one filled with features and functions favored for broadcast use.

Last year, Arrakis Systems introduced the Nova 10C radio console. More than just "a little mixer," this one is ready for analog or digital sources, has built-in telephone mix-minus capabilities, control logic and an innovative Program/Cue switching method that minimizes front-panel clutter.

It also is wired primarily for unbalanced -10 dBu consumer-type CD players, MD decks and simple computer soundcards. Hooking up a Nova 10C is no more difficult than clapping together a home component stereo system. Most important, it addresses many of the shortcomings I had noted when reviewing other small broadcast mixers.

Even at 10 dBu down, the Nova 10C is a pro radio console with replaceable faders, socketed chips, hardy input switches, digital I/O and easy service access.

Philosophy

So why another itty-bitty radio mixer? And why do it digital?

Primarily, not every station requires the latest and largest networkable digital consoles. Smaller stations, simple voice booths, remote promotional vehicles, unattended AM studios and facilities that will likely never need a big-budget digital console still need small, basic mixers.

While pro-level CD decks are the first choice for broadcast use, consumer-type units (and even home DVD decks) are less-expensive alternatives that turn in acceptable service, and then can be replaced when worn out.

Turn your nose up if you must, but that is the reality today. And as most decks have a S/PDIF output, they can talk directly to the 10C in digital language.

Sometimes you are obligated to settle for an MI-type mixer and a bunch of add-ons. How many production rooms have Mackie-style mixers with Broadcast Tools mic controllers or homemade relay boxes? How much do we dislike running up two faders for a stereo source? And don't we miss having a cue channel?

Sure, we can and do work with them. But we have become so used to the "real" board in the on-air control room that working an MI mixer feels like a compromise.

Sometimes a simple reasonable board is needed for an automation or satellite system, with some live-time versatility added in. The Nova 10C handles relay closures tripped by an automation computer for automated channel control.

Not surprisingly, Arrakis Systems touts the Nova 10C as the perfect companion to its DigiLink Free and DigiLink+Plus automation lines. Again, with the console's ability to talk S/PDIF, you may go directly from soundcard to mixer to keep things really clean.

Finally, stations on the edge of the galaxy cannot always keep an engineer on duty, so a fully decked-out digital masterpiece may not be properly cared for. Arrakis engineers designed the Nova 10C to be wired up, fine-tuned and main-



tained by non-engineer types.

The Nova 10C maintains the Arrakis heritage oak-sided look. Ten P&G faders top off 10 rectangular on/off keys with accompanying LEDs.

This small mixer rides fairly high. If you are used to console edges that melt into the laminated furniture, the Nova 10C will have you arching your wrists to run it.

Two knobs on the meter bridge are clearly marked for headphone and monitor. Rear-panel RCA jacks allow the connection of an external amplifier or active monitors and a headphone distribution box. Six "vegematic" buttons on the meter bridge select audio to be monitored in both the headsets and speakers.

In fact, except for a pair of XLR mic inputs and a few D-sub ports, the back panel is populated almost exclusively by analog and digital RCA jacks. Running CD decks and a PC to the mixer entail little more than using the very cables that came packaged with the units.

You may continue to use existing cart decks already in the studio, but you may need to go the unbalanced route and pad down the levels to keep the 10C from distorting. Besides, you will likely notice the difference in quality between carts and CDs or other digital sources, so upgrading to a computer-based spot storage system should be considered.

S/PDIF cables are good for only about 30 feet, even with the best cable for the task. If you are going digital all the way in your facility, try to keep the line short.

Cue up

The 10C uses a novel approach to place sources in Cue and Audition. By pressing a Start key twice with the fader pulled down, that channel's LED will begin to flash. That source is now in Cue.

Via the Autocue feature, cue audio can be heard through the monitor and headphones or through a dedicated cue speaker. This option is selected in software.

For airing phoners, the flashing LEDs also indicate the sources being recorded off-line or those cued up to go. The 10C has internal mix-minus capability, so the addition of a hybrid/phone interface is all that is needed.

The double-hit also lets you use talk-back between two Nova and non-Nova

consoles. Flash the main mic LED and you can talk to another studio.

You may see more than one LED dimly glowing when a channel is off. Arrakis engineers trickle a very low current through the LEDs so a channel doesn't cause an audible pop when energized.

Although extremely low, the current may be enough to softly illuminate one or more LEDs. This is only visible in dark rooms anyway and not on every console, so it is of no real concern.

We get the 10C to do our bidding by connecting a PC to an RS232 data port on the back panel and installing a simple program for setup and calibration.

Digital decision

With the software, decide which inputs are the digital ones (3, 4 or 9, 10), what to feed down the two mix-minus phone busses, and how to trim up the analog levels on each fader when your sources don't always agree on what "0 dB" should be.

It is here you can also set whether you want Autocue or a dedicated cue speaker, and how to fire the output closures to trip external decks; pulses or continuous closure.

These come out on the D-sub connectors, along with input logic that lets you turn channels on and off remotely, perhaps from a mic turret. The open collectors can only handle 50 milliamps, so don't wire turntable AC power or on-air light current directly across them.

Serviceability was a prime design consideration in the 10C. Loosen four screws, remove four others, and the top plate comes off. Inside is a motherboard containing all components, with the

See ARRAKIS, page 41 ▶

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The upgraded SS 2.1/TERM III & BNC III switcher/routers are improved with new front panel switches. They may be used as a desktop device, and are equipped with mounting holes for wall mount installation or may be installed on the new RA-1 "Rack-Able" 1RU mounting shelf.

The new "Rack-Able" SS 4.1 III switcher replaces the popular SS 3.1 while adding a fourth stereo input channel and front panel control. We've kept the best of the SS 3.1 features and added a few more.

The new Silence Monitor III improves on the features of the original SSM, with front-panel control, removable screw terminals, "Plug & Play" installation, built-in program switcher, restore timing delay, aural alarm and relays for most remote functions. Now rackable!

The new SS 8.1 II switcher replaces the popular 6x1 with the addition of two more stereo input channels and GPI, while keeping the price the same! The SS 8.1 II may be desktop, wall mounted or installed on the new "Rack-Able" mounting shelf.

The new RA-1 (1-RU rack shelf) provides mounting for three tri-rack or two half-rack "Rack-Able" configured products. The RA-1 is pre-drilled for flush and recessed product mounting. The RA-1 is furnished with filler panels and mounting hardware.

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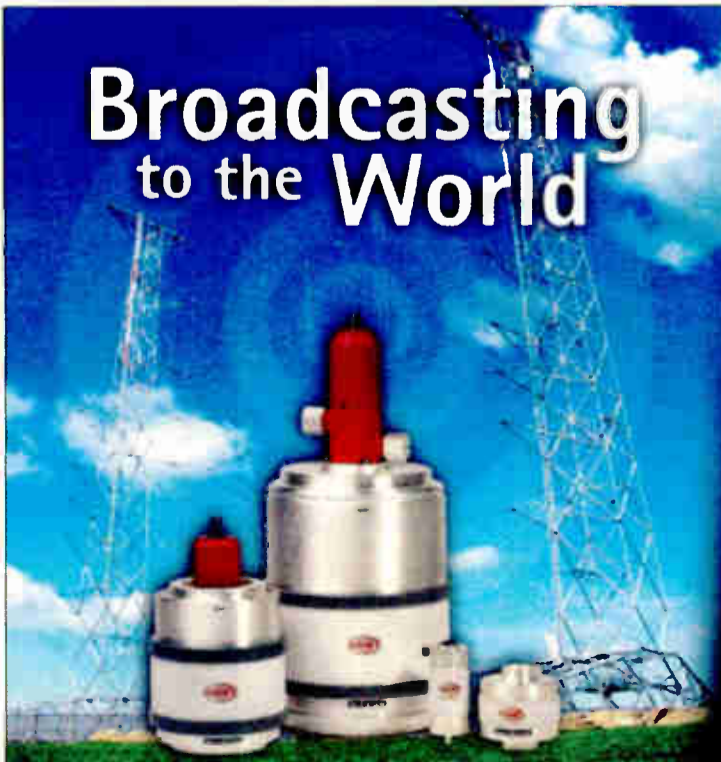
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Travis

► Continued from page 33

Even in my own case, a year ago my own studio was used mostly for auditions and demo work. Being a former studio owner, I truly have no desire to get back into the "studio" business. About a third of the work I do today, however, is accomplished in my mini studio — despite the fact that I prefer to work in an outside studio.

The quality of my work in an outside studio is always better. When I do not have to concentrate on the technical end, I can put my energy and concentration into the performance; my mind is not jumbled up with levels, starting and stopping, filenames, etc. The work goes faster, too, because I don't need to play back everything I record to check it. I find that having the producer and the client on the other side of the glass is a tremendous benefit.

However, a few clients typically in such a hurry there is often no time to book a studio. The client will e-mail me a script that just received approval and ask if I can send them a file by the end of the day — or sometimes even in just an hour or two.

They say that performance quality, in their case, is not nearly as important as getting the material quickly. I understand their position, and, as it is a question of keeping the gig, I oblige.

Go global

Another thing that has changed is the geographic location of my clients.

Because audio can be delivered through the Internet instantaneously, it does not matter where they are located. I have done voiceover work for clients as far away as Europe in the last year.

Of course, for years we have had ISDN, which allows us to do remote sessions between two properly equipped studios. But now that we have the Internet and the ability to e-mail anyone audio files instantly, doing sessions for people thousands of miles away is becoming much more commonplace than ISDN ever was.

This change works both ways. A couple of months ago a client called me to let me know he would be using someone else for his productions who would do them for half what I charged. He wanted to know if I would match the price. Because his new voice was living in an area where the cost of living is much lower than southern California, he could afford to work for considerably less.

I wished my now-former client good luck with his new voice talent and let him know there were no hard feelings (I lied). I actually was glad that this client was going away; he was always nickel-and-diming me, and I never felt good about the projects I did for him. It is always better to be proud of the work you are doing.

In southern California, where traffic congestion is getting worse every year, I have had several clients who are not willing to leave their offices to go to a session. As a result, I have ended up doing quite a few telephone recording sessions in which the client and producer never show up at the studio but arrange a conference call into the studio and direct me over the phone. In such cases the producer typically had planned to be present but decided at the last minute he or she could

not leave the office.

I am trying to talk one studio into arranging some sort of two-way "Internet video" for these situations so

reaction to my read.

One other change in the last year: about a third of my work has been on projects that will play on the Internet,

couple of years ago but it did not. It is good to see this finally happening. I expect voiceover for the Internet to expand and provide all of us with a lot of work in the coming years.

The changes in the last year to the voiceover profession happened not so much because of new technology introductions — the technology has been available for half a decade — but as the result of the technology finally being accepted by studios, producers and clients.

Now that almost everyone in our business is online with high-speed connections, and that so many people now know how to use the "new" technology, I expect we'll be seeing even more change to our industry in the upcoming year.

Reach the author via e-mail to travis@announcing.biz.

I was amused that the producers of this project wanted me not only to mail the audition, but to provide it on cassette.

that I can at least simulate having the producer and client on the "other side of the glass." It really is better when I can see the producer's face to gauge

e.g., training, product introductions, Web pages and Web media with professional voice talent.

I had expected this to start occurring a

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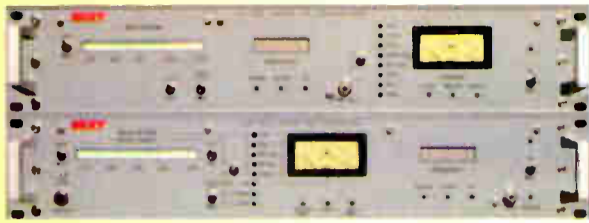
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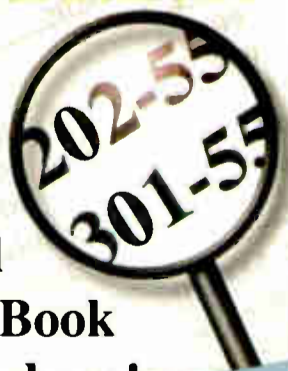
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Arrakis

► Continued from page 37

linear faders and rotary pots mounted for easy service on the top plate.

The P&G faders require some uncommonly simple care. Rather than contact cleaner sprayed into a dirty fader, the errant unit is removed and run under warm soapy water! The guide rods may be lubed if required, but a dip in some Palmolive does the trick.

Be aware though that general repair is limited. Analog chips are socketed and easily replaced, while the digital IC complement should only be serviced by those with solid engineering chops. No schematics are provided because of the relative complexity of the mixer.

On the upside, the 10C uses the new high-performance SSM2019 mic pre-amp chip from Analog Devices to deliver superior performance on the mic inputs.

Ruminations

The feel of the 10C is very much the same as on larger consoles. The full-length throw of the faders and the ruggedness of the chassis give the mixer a confident feel.

The console has only one main Program bus. The meters are dedicated to that function and cannot be switched. If you are auditioning a source from outside like a remote feed and need to check its level, good luck.

Product Capsule:
Arrakis Systems Nova 10C
Radio Console

Thumbs Up

- ✓ Analog and digital in a small frame
- ✓ The feel of a larger console
- ✓ Full I/O logic
- ✓ Easily serviced, although limited serviceability
- ✓ Configurable through software

Thumbs Down

- ✓ -10 dBu output only
- ✓ Audition bus cannot be metered
- ✓ Best for small-budget operations

Price: \$2,495

For information contact Arrakis Systems in Colorado at (970) 461-0730 or visit www.arrakis-systems.com.

PRODUCT GUIDE

AEQ Caddy Now Shipping

The AEQ Caddy is a multichannel A/D and D/A converter that includes 12 converters to transform two analog audio channels to one AES/EBU digital stereo channel and 12 converters that transform one AES/EBU digital stereo channel to two analog audio channels.

The large number of converters included in this unit saves space and money and permits circuits to be left free for later expansion, the company said. The Caddy incorporates an AES 11 sync input and has a sample rate converter at all digital inputs.

Applications include radio and television broadcast, production and central control rooms and transmission centers.

For more information contact AEQ in Florida at (954) 581-7999 or visit www.aeqbroadcast.com.



Danagger Goes to Plan B

Expect to hear more about "Plan B."

Danagger Audio Works announced that its Plan B Silence Eliminator is being distributed in the United States by Broadcast Supply Worldwide and Broadcasters General Store.

Canadian distribution is through All Electric Pro Audio. The company is also in talks for a European contract.

The product will be shown at the upcoming NAB show by BGS.

The Plan B Silence Eliminator protects against dead air and technical outages. It detects loss of a program feed and provides backup programming from its multiformat disc player. It contacts station personnel by telephone, reports the failure with a pre-recorded voice and allows connected equipment and itself to be controlled via a remote phone keypad.

When the program feed is restored, the unit fades, stops and cues the disc to the next track. The player can play MP3 encoded discs, CDs and CD-Rs. Stations can create non-repeating backup programming of 44 hours from one disc.

For more information contact the company in British Columbia at (888) 892-8346 or visit www.danagger.com.

BUSINESS DIGEST

Sookoo Founds ATA Audio

Fans of Aeta Audio products, take note: ATA Audio now has the exclusive license to make and market the Aeta Audio codec line and pro audio line in North America.

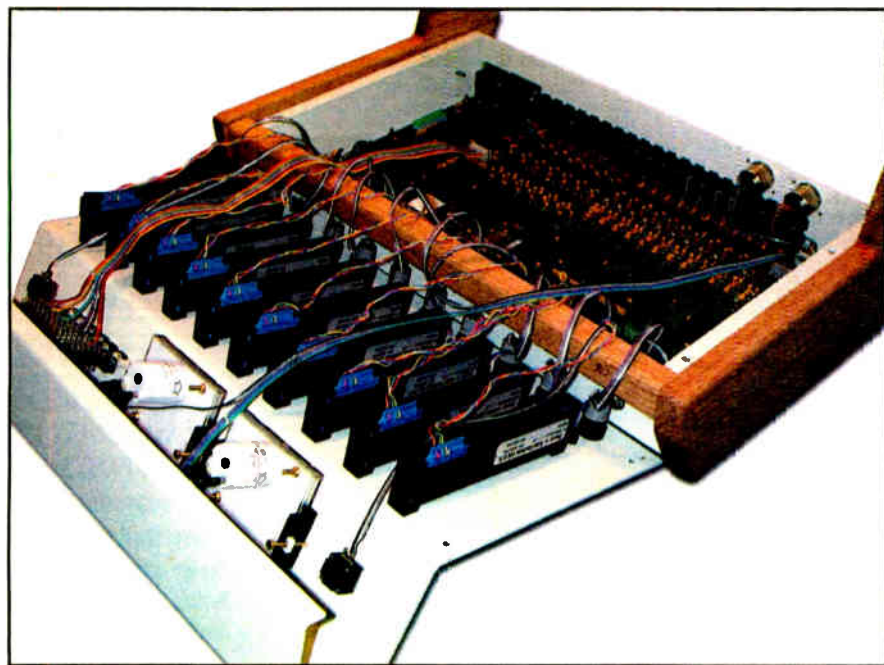
The founder and president of ATA Audio is Alvin Sookoo, former general manager of Aeta USA, which was the U.S. subsidiary of Aeta in France. With the licensing agreement, ATA Audio was formed to manufacture the Aeta product line in the United States and market and distribute its products here and in Canada. ATA Audio started off manufacturing the Scoop E-Z and Scoop Studio codecs.

"ATA Audio intends to build on the customer and dealer relationships established by Aeta Audio and by manufacturing the codecs in the United States, further improve the product line to meet the North American market needs," the new company said in a statement.

ATA Audio has made some modifications to the products to make them more suitable to the North American market. It also plans to continue tech support and service for existing Aeta products. The first of the ATA Audio codecs are being demonstrated at NAB and will be made available soon, Sookoo said. Additional products are expected to be available this summer.

The AETA head office is in France, which continues to handle sales in Europe and Asia, marketing under the AETA name. The AETA U.S. office closed Dec. 31, 2002. While AETA will market and distribute its products in the U.S., ATA Audio will retain AETA's dealers, including Crouse-Kimzey, Harris and Bradley Broadcast, among others, for its distribution network, he said.

For more information, contact ATA Audio in New Jersey at (973) 659-0555 or visit www.ataaudio.com.



Inside View

One unfortunate aspect of this being a -10 dBu console is that the Program outputs are also -10 dBu. On long cable runs from the studio to the processing rack, a balanced +4 signal would be more desirable. An IHF-to-Pro converter such as the classic Henry Matchbox works wonders here.

It is obvious to most, but unbalanced cables used in studio wiring must be kept as short as possible. Running a long RCA-type shielded cable through the cabinetry to a punchblock and back again is just asking for trouble and boatloads of hum.


The manual includes excellent details on how to eliminate hum, including star grounding to copper strap. Again, obvious to most, but remember the Nova 10C was built for

Of all the small radio mixers I have tried out, the Arrakis Systems Nova 10C really targets what is important in the studio: not only to users, but technicians that have to soap up the faders and replace the dead CD decks. The digital feature is an unexpected bonus and the construction of the mixer is solid and robust.

I have yet to see it talk to the DigiLink+Plus software, but for live jock performance, it does what the more expensive medium-sized boards do and is simple to set up and use. If you require a digital console, but not an immense one, this is worth your attention.

Alan Peterson is a longtime RW columnist and technical adviser. Direct e-mail messages to alanpeterson@earthlink.net.

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AUDIO PRODUCTION

Want to Sell

ATI audio distribution amplifier 2016-1, approx 10 avail as a result of studio renovations, \$500 ea +shpg. Mike Raley, 704-523-5555 or email: Mraley@bbradio.org.

AudioArts 8400 distribution amplifier, 7 available as a result of studio renovations, \$500 ea +shpg. Mike Raley, 704-523-5555 or email: Mraley@bbradio.org.

RTS 416 distribution amplifiers (2), has slight problem pushing +4, \$350 +shpg. Mike Raley, 704-523-5555 or email: Mraley@bbradio.org.

TFT 713 AM frequency & modulation monitor, \$1500 +shpg. Mike Raley, 704-523-5555 or email: Mraley@bbradio.org.

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BE R/P cart machines (2) stereo units, as is, \$95 ea; (2) mono units as is, \$90 ea. Mike Raley, 704-523-5555 or email: Mraley@bbradio.org.

Nidec motors for Audicord "E" Series (10), 117v 6H 3.1w 0.2amp 12p & 600rpms, will sell as is for \$20 ea, working condition, just noisy. Mike Raley, 704-523-5555 or email: Mraley@bbradio.org.

Want to Buy

Cart machines R/P, used in working order. Mike Cardillo, 151 Morgan St, Cranston RI 02920. 401-942-8341 or mondomikeradio@aol.com.

COMPLETE FACILITIES



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Want to Sell

Ramko 8 channel console, 2 with multiple inputs. Aud/pgm circuits, good working condition, \$250 +shpg. Howard McDonald, Spokane Cable Radio, 2928 East Grace Ave, Spokane WA 99207. 509-536-6205, mstringtown@aol.com.

ATI Vanguard Series sound board, 8 channels, \$275 as is +shpg. Mike Raley, 704-523-5555 or email: Mraley@bbradio.org.

AudioArts A-50 8 channel with slides (2). Used in light recording, in excellent shape but will sell as is for \$900 each +shpg. Mike Raley, 704-523-5555 or email: Mraley@bbradio.org.

AudioArts R-60, w/about 8 slides on it with room for 4 more. Used in light recording, \$2750 +shpg. Mike Raley, 704-523-5555 or email: Mraley@bbradio.org.

BE Spotmaster 8M100A audio console. Very little know about this board, will take \$75 or BO as is +shpg. Mike Raley, 704-523-5555 or email: Mraley@bbradio.org.

Schafer 5 channel mixer, very nice, but goes as is, ready to ship w/manual, \$75 +shpg. Mike Raley, 704-523-5555 or email: Mraley@bbradio.org.

Want to Buy

Looking for studio on-air & production mixing consoles. Jack Le Duc, American Comm, 133 North Superior St, De Pere-Green Bay, WI 54115. 920-338-9022.

LIMITERS/ AUDIO PROCESSING

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1990 Generac 100kW 30 generator, propane, good condition, \$10,000. Barry O'Connor, KDES, 2100 Tahquitz Canyon Way, Palm Springs CA 92262. 760-325-2582 x237.

Onan 7.5 KW generator, propane with transfer switch, \$3000. Barry O'Connor, KDES, 2100 Tahquitz Canyon Way, Palm Springs CA 92262. 760-325-2582 x237.

Vintage 45 rpm record collection. Early 1950's, Big Band, Easy Listening, some Country. Write for list & prices. Howard McDonald, Spokane Cable Radio, 2928 East Grace Ave, Spokane WA 99207. 509-536-6205, mstringtown@aol.com.

Fidelipac "On-Air" light, we have some in Spanish too. \$25 ea +shpg. Mike Raley, 704-523-5555 or email: Mraley@bbradio.org.

HollyAnne HU-961 EAS unit, BO. Ken Diebel, KHMB, 1707 Louisa St, Rayville LA 71269. 318-728-2370.

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Inovonics Map II multiband processor, \$500, as is +shpg. Mike Raley, 704-523-5555 or email: Mraley@bbradio.org.

Proteck 20 MHz spec analyzer, A-3502. BO. Mike Raley, 704-523-5555 or email: Mraley@bbradio.org.

QEI ARC-27 automatic remote control, \$200 as is +shpg. Mike Raley, 704-523-5555 or email: Mraley@bbradio.org.

Vintage editions of the NAB Engineering handbook. 3rd (1945), 4th (1949), 5th (1960) and 6th (1975) editions; complete and in very good condition. Will sell as set or individually. 540-887-7354 or email: bbetlej@mbc.edu.

Zercom 25 Hz TP-XT dual tone detect & notch filters (3), \$50 each as is +shpg. Mike Raley, 704-523-5555 or email: Mraley@bbradio.org.

Want to Buy

45s, albums, rock & roll, R&B, Doo-Wop, looking for promo's for old time radio shows. Mike Cardillo, 151 Morgan St, Cranston RI 02920. 401-942-8341 or mondomikeradio@aol.com.

Old radio jingles, air check from RI radio station only, call letters OK. Mike Cardillo, 151 Morgan St, Cranston RI 02920. 401-942-8341 or mondomikeradio@aol.com.

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Wegner DN86 digital audio receiver 3944.1 MHz, \$300 as is +shpg. Mike Raley, 704-523-5555 or email: Mraley@bbradio.org.

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Elcom Bauer 601 & 610 FM transmitter, 14kW and harmonic filter. Removed from service in May 2002, \$5000. Gene Michaels, WWUS, 30336 Overseas Highway, Big Pine Key FL 33043. 305-872-9100.

Harris FM25K, 22 yrs old, includes transmitter, power supply and tube, no exciter, tuned to 104.5. Ran good until replace in 2/03, \$10,000. John Huffman, 541-298-5116.

QEI 675 FM exciter 5-20W, frequency agile, \$4500 +shpg. Curt Marker, Gospel Opportunities Inc, 130 Carmen Dr, Marquette MI 49855. 906-249-1423.

QEI Quantum "E" 300W transmitter & exciter combo, frequency agile, \$4000. Curt Marker, Gospel Opportunities Inc, 130 Carmen Dr, Marquette MI 49855. 906-249-1423.

Transmitter parts: Peter Dahl Collins 21F modulation transformer, new in original crate, \$300. Steve Callahan, WRNI, Providence RI, 401-521-1290.

Model BC-5H transmitter. Serial #85640, M-6521, 5000/1000 watts, RF line imp 50 ohms, audio in 600 ohms, 230 volts, 3 phase, 60 Hz. Keith Holland, WHPY, 911 West Main St, Clayton NC 27520. 919-553-6774.

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28	Auralex	www.auralex.com
38	Autogram Corporation	www.autogramcorp.com
32	Belar	www.belar.com
40	Bext	www.bext.com
21	Broadcast Electronics	www.bdcast.com
27	Broadcast Software Int'l (BSI)	www.bsiusa.com
37	Broadcast Tools	www.broadcasttools.com
24, 25	BSW	www.bswusa.com
4	Burk Technology	www.burk.com
38	Circuit Werkes	www.circuitwerkes.com
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38	Gorman Redlich	www.gorman-redlich.com
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11	Harris	www.broadcast.harris.com
23	Henry Engineering	www.henryeng.com
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15	NPR Satellite Services	www.nprss.org/rw
39	OMB	www.omb.com
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5	Radio Systems	www.radiosystems.com
40	Raduga Automation	www.raduga.net
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ACTION-GRAM

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Please print and include all information:

Are you currently a subscriber to Radio World?
 Yes No

Signature _____ Date _____

Contact Name _____

Title _____

Company/Station _____

Address _____

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Zip Code _____

Telephone _____

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Make: _____ Model: _____

Brief Description: _____

Price: _____

WTS WTB Category: _____

Make: _____ Model: _____

Brief Description: _____

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*Closing for listings is every other Friday for the next month's issue. All listings are run for 2 issues unless pressed for space or otherwise notified by listee.

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◆ READER'S FORUM ◆

GUEST COMMENTARY

Tracking the Radio Industry

by Tom Carpenter

Despite the ongoing outcry from legislators, regulators and the public at large, Clear Channel Communications continues to insist that voice-tracking — the remote pre-recording of entire airshifts from remote locations — is no big deal. According to John Hogan, CEO of Clear Channel Radio, this is just entertainment, and those who aren't on-board with the plan are "dinosaurs, resistant to change."

Of course, Clear Channel uses voice-tracking for more than just "entertainment" reasons. This is business. By paying announcers to pre-record liners and announcements in a few hours, rather than broadcasting live in a studio, Clear Channel saves lots of money. Voice-tracking announcers are paid a fraction of what a live announcer makes. And of course, there are fewer announcers overall as jobs are eliminated market by market.

Local deception

In order to save money, Clear Channel sacrifices the uniquely local nature of radio. Radio is a medium that has always been particularly well-suited to serve the needs of local communities. Music can be programmed to suit the tastes of local audiences. Radio, when used to its maximum advantage, can be the best source of local news, weather and information. Homogenized, however, it loses that value.

In a bizarrely ironic way, Clear Channel's use of voice-tracking recognizes the value of localism. By doctoring up voice-tracked air shifts, Clear Channel attempts to deceive local audiences into thinking that they're listening to live and local radio. As the Wall Street Journal reported last year, voice-tracking announcers use "cheat sheets" to clue them in to local places, events and pronunciations.

Clear Channel pre-tapes request and dedication calls, so that they can air the calls later in other markets. If a listener calls a Washington, D.C., oldies station to request that a local disc jockey play a Stevie Wonder song for his wife's anniversary, that telephone call may later be aired in Detroit or some other market, without disclosure that the call was not a local call. And it is axiomatic that local communities are not well-served by programming and media content built on deception.

A dangerous problem? Serious concern? It could well be when local radio needs to change course and immediately inform communities of emergency situations, weather crises or other problems in the moment. If there is no one actually in the local station, that can't happen.

Certainly, there is value to having national or regionally distributed programming. Radio is made richer with the availability of popular syndicated shows that reach multiple markets. However, the misrepresentations and falsifications of Clear Channel's use

of voice-tracking are quite a different matter.

In the Clear Channel behemoth, entire radio stations are operated without a single live and local announcer. This might be what critics refer to when they charge that Clear Channel is *killing* local radio.

Cautionary tale

Those critics are bringing more pressure to bear on Clear Channel. As part of the FCC's current review of television and radio ownership regulations, unions, consumer advocates and public-interest groups point to Clear Channel as a cautionary tale of media consolidation gone awry. Those concerned, including AFTRA, note that some of the most problematic byproducts of "media gigantism" are such practices as voice-tracking, eroding localism in favor of cookie-cutter formats and canned announcements.

Last summer, AFTRA worked closely with U.S. Senator Russ Feingold, D-Wis., and other congressional leaders in developing legislation that would effectively undo much of the damage wrought by the deregulating Telecommunications Act of 1996. Legislators on both sides of the aisle have examined Clear Channel's vertical and horizontal integration, and have grilled Clear Channel CEO Lowry Mays about various business practices including allegations of payola with regard to playlists.

On a grassroots level, AFTRA members are taking a definitive stand against voice-tracking. Though it means money from out of their pockets, New York AFTRA members working at Clear Channel stations have unilaterally agreed not to export voice-tracked shifts to other markets until Clear Channel guarantees they will not import cheaper announcers from smaller markets into New York.

In AFTRA negotiations in other cities across the country, announcers working at Clear Channel stations are fighting to keep as many live and local shifts in place as they can. Nationally, AFTRA has launched a Keep Radio Live campaign (www.keepradiolive.org) to educate and engage the public about what voice-tracking means for their communities.

Respecting the history and tradition of local radio does not mean that critics of voice-tracking are dinosaurs. Valuing radio's ability to deliver uniquely local programming does not mean that we're "out of touch." Understanding that it is necessary for broadcasters to serve the communities where they broadcast, on airwaves given to them by the public, does not amount to standing in the way of progress.

Not serving those communities, on the other hand, brings progress and democracy to a halt.

Tom Carpenter is the national director, news and broadcasting, for the American Federation of Television and Radio Artists (AFTRA).

◆ READER'S FORUM ◆

Calling all radio buffs

New Jersey has its own radio museum and it is being built as we speak in the historic Condict House in Dover. A subsidiary of The Dover Area Historical Society, the museum is interested in collecting airchecks and memorabilia such as trinkets, memos and pictures — anything N.J. radio!

Along with the hopes of presenting airchecks and displays of all of New Jersey's radio stations, NJRM intends to establish a low-powered on-air radio station, host speeches from well-known radio personalities, host a reunion dinner for everyone ever involved with N.J. radio and be a growing library for the past up to the present.



A logo from the 1970s.

But to do all of this, we need your help. NJRM desperately needs donations of airchecks, memorabilia, photos, articles and histories. We also need people willing to join the committee in "vice presidential" positions to organize and manage the museum. And of course, we need monetary help as well — \$15 buys a year's membership as a museum sponsor.

But, by then, maybe we will all be getting our radio via repeating 802.11 towers with Winamp on our Palm Pilots.

— Christopher Maxwell

The museum is operated and managed by a group of radio professionals from all over the Garden State, from on-air people to engineers and program directors. But to prosper and grow, we need donations of radio memorabilia and people who are crazy enough about radio to help us build, no matter where you live.

With your help, and the help of your

radio friends, NJRM will grow into one of America's premier radio museums and will also have one of the largest memberships of radio people in our country.

For more information, please email me at njrm@webtv.net and consider lending your help to us in any way you can.

Carl M. Van Orden
NJRM Project Manager
Dover, N.J.

IBOC's white elephant

Skip Pizzi thinks "Tomorrow Radio Could 'Save IBOC'" (RW, March 1) and does at least recognize the alleged increase in sound quality is so microscopic that saying IBOC will help radio is like saying special effects saves Star Wars from the damage caused by Jar-Jar Binks.

First of all, if the FCC had just waited a little longer and had implemented IBOC as a software-defined radio standard instead of accepting a hardware-defined system that is hardwired to be inflexibly obsolete in just a few years, this would not be a problem.

Second, it would not be a problem if the FCC had acted on the Pentagon releasing the L-Band of 1452-1492 MHz and accepted a software-defined radio standard on that band that could start off with a BIOS in receivers that accepts the Eureka-147 broadcast pattern.

Then as time goes by, and new codecs are invented, the transmitters could have flashed the BIOS of receivers and they could have divvied up their signal anyway they want.

Broadcasters could have flashed the receiver BIOS and ended up with no data and five audio talk streams, or narrow the broadcast bandwidth in order to avoid co-channel interference in short-spaced situations.

But alas, Ibiquty was in such a hurry to get this white elephant out of the barn on the flawed assumption that people



give a crud as to whether the music is digital or analog. You tell me, do you prefer Beethoven on your digital cell phone or on the phonograph? Can you hear the difference over the engine noise or the office noises?

NPR has pointed out over and over that only different content will make a difference. The only advantage to NPR now for IBOC is going to be the ability to legally jam an adjacent college radio station or GodCaster. But then again, Reverend Wildmon and his Crusading Theocrats can turn right around and jam NPR stations the exact same way.

Looks like a lose-lose situation to me. Those of us who hanker for stations to fulfill the founding mission of the CPB "to create a forum for voices that would otherwise go unheard" is to hope for a relatively quick death of IBOC.

Maybe then we can move to an intelligent digital audio broadcast standard. Eh, by then, we could just use the European system.

But then again, by then, maybe we will all be getting our radio via repeating 802.11 towers with Winamp on our Palm Pilots. So maybe it'll be a moot point as

the broadcasters kill off that waning interest by jamming each others signals and reducing the variety available even as wireless internet increase the number of options there. Ya, go IBOC! Good for the Internet industry.

Too bad poor people can't afford these options. Wonder when the advertisers will notice the only audiences left have no disposable income (or they would have purchased wireless Internet radio options, satcaster service and/or an MP3 playing car radio).

Christopher Maxwell
Vice President
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Letters

Send letters via e-mail to radioworld@imaspub.com, with "Letter to the Editor" in the subject field; fax to (703) 820-3245; or mail to Reader's Forum, Radio World, P.O. Box 1214, Falls Church, VA 22041.

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