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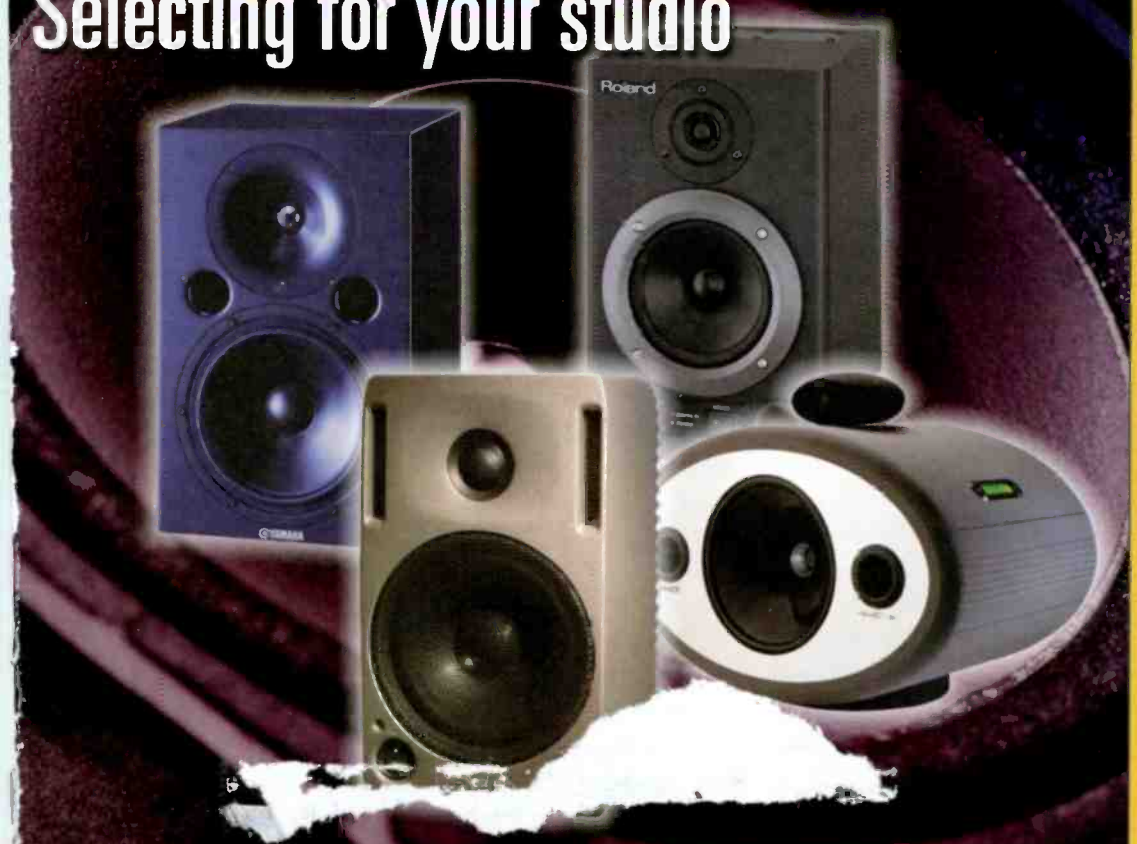

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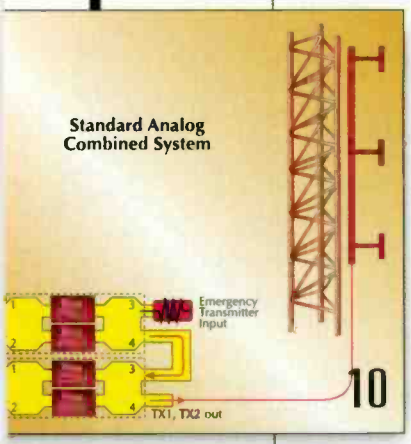

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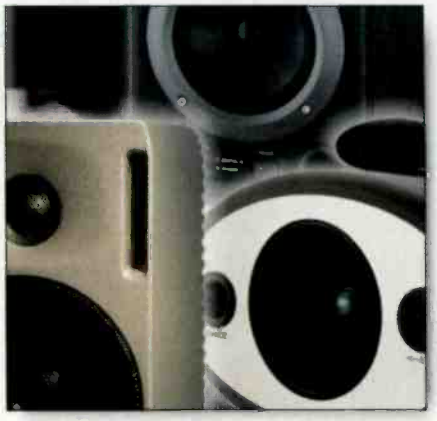

ON THE COVER:
The speaker is the one piece of equipment that has the greatest diagnostic benefits, but is most often given the least consideration. Cover design by Michael J. Knust.

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Currents Online

Highlights of news items from the past month

Auralex Acoustics, Terrasonde Form Audio Training Organization

The Institute for Audio Excellence specializes in the delivery of educational programs for the prediction, measurement and treatment of acoustics and audio systems.

NAB Announces Marconi Radio Award Winners

The awards recognize radio's outstanding personalities and stations in 19 categories.

Radio Stations Must Pay Royalties

The 3rd U.S. Circuit Court of Appeals in Philadelphia upheld the ruling of the U.S. Copyright Office.

Happy Birthday!

Congrats to Genelec, who celebrates its 25th anniversary and to SRS who celebrates its 10th.

Clear Channel to Install RBDS Generators in Stations

Clear Channel is launching the technology on 192 of its FM stations in the top 50 U.S. markets by the end of November.

Site Features

10 Years of Radio

Read the highlights from the last 10 years as covered in each issue, as well as visit the cover gallery.

Online Classifieds

This is the place to find a new job, sell equipment or find useful services.

October issue online

Read the entire issue online, plus find additional articles and information.

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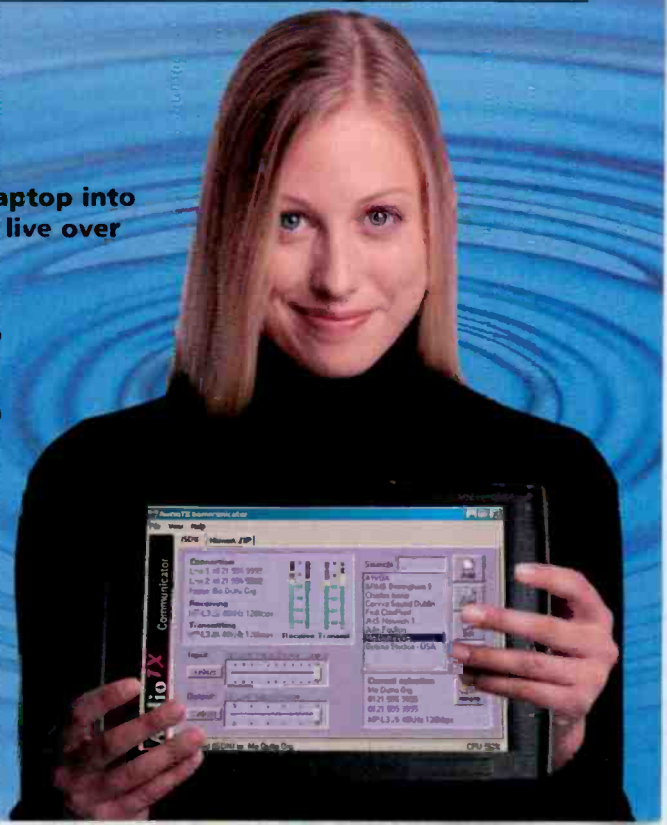

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A missed opportunity

The fall convention circuit is coming to a close, and the NAB Radio Show and AES Conventions played the leading roles. Add to this mix several regional and state conventions, and it makes for a busy time of the year. I try to attend as many of these conventions as I can, but it is impossible to attend them all.

The fall conventions don't carry the same big product introductions as the spring NAB convention, but there are a few bright spots. Some of them are covered in this issue's New Products section. Instead of new products, I find that the sessions and seminars at the fall conventions are the real gems of the shows. This year was no exception, but there was a different twist.

With a few exceptions, the sessions at the NAB Radio Show for the most part were a rehash of the topics from last year, with IBOC again taking the spotlight.

The surprising twist was at the AES convention, which hosted three radio-specific sessions. Attending the radio sessions at AES afforded me the opportunity to hear familiar information while I observed non-radio attendees learning something completely new.

The session on audio processing for broadcast included a panel of the leading names in broadcast processing, past, present and future. While the topic often incites strong passion from the participants, this panel was quite civil. There was a good deal of technical information presented, but unfortunately, the non-broadcast audience probably did not benefit as much as a broadcast audience would have.

If nothing else, the non-broadcasters may have gained some insight into what happens to an audio signal when it is processed for broadcast. Mastering studios have been borrowing from our bag of tricks with multiband compression and clipping for several years, which is becoming a problem as the cascaded processing heavily degrades the signal. The problem is compounded once any perceptual audio encoding in introduced to the signal.

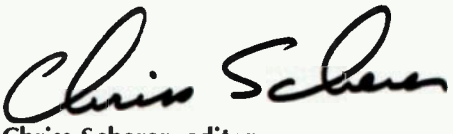
This will be a slow process for the studios to understand. They want their productions to sound the way things sound on the radio. Two years ago, I helped coordinate an AES paper on radio audio processing that was authored by Bob Orban and Frank Foti. I saw this year's panel as the next step.

Another panel looked at digital broadcasting in the United States. I had hoped that this last radio panel would really let radio shine. Unfortunately, the title did not accurately reflect the true nature of the material. There was an element on a multichannel audio broadcast in Germany, which was really a video broadcast channel with no video. I wouldn't call that radio in its truest sense.

The panel included Tony Massiello from XM Satellite Radio, David Layer from the NAB/NRSC and Leonard Kahn from Kahn Communications. I was disappointed that an Ibiquity representative was not present for a direct presentation, but Layer gave a good overview of the current status of IBOC.

From a typical AES attendee's point of view after attending the session, digital radio only means satellite radio. This is true today, but there was no clear indication that terrestrial digital radio is just moments away. To make it worse, Kahn went on about his Cam-D system, with no evidence or hard data to support that the system has been tested on the air.

The audio and consumer markets appear ready for the digital radio transition. But, we, as broadcasters, still have much work to do to educate and inform the masses as to the possibilities of terrestrial digital radio.



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Steve Kirsch of Silver Lake Audio: **"The feed was rock solid. I'm very impressed—it sounds much better than I thought it would.**

Collin Mutambo, Radio Simba, Kampala, Uganda: **"We are indeed quite impressed."**

But our personal favorite, from Jerry Dowd of Jefferson Pilot's WBT in Charlotte, NC. **"We hope to keep the betas until you get nasty with threatening letters."** Thanks Jerry. We'll take that as a compliment!

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IBOC antennas

By John Battison, P.E., technical editor, RF

Despite the hiatus in nighttime operation for AM IBOC, antenna research is continuing in an effort to comply with the FCC's existing requirements of two antennas for FM IBOC, and develop a system using one antenna that will satisfy the FCC's requirements.

The AM situation is still fluid while daytime operation is being practiced by a number of stations with varying reports of its success. Nighttime AM IBOC operation and the effect of skywave are still being examined. It appears that the most difficult problem to solve is the adjacent-channel situation, which is reported to cause considerable interference and signal degradation from daytime IBOC. Some engineers have reported that even strong, desired signals are being affected by adjacent channel hiss with subsequent listener loss.

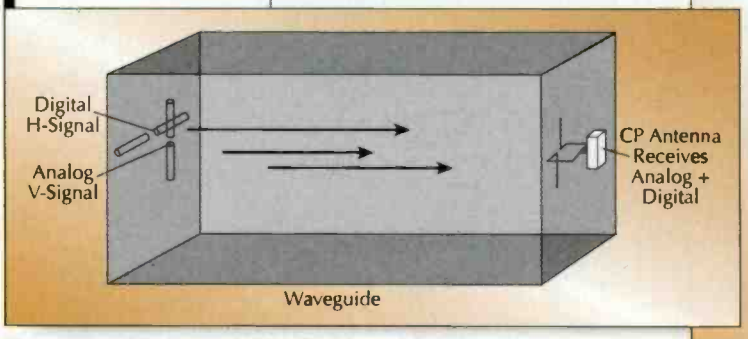

Figure 1. A simple coaxial RF signal combiner.

In the FM field, an FCC decision determining the number and form of antennas allowed is still pending. The ultimate transmitting antenna configuration has a great deal to do with the type of transmitter installation and transmitter design, and has considerable impact on transmitter and installation cost. At first glance, it appears that a radiator for analog and digital signals would be the best because it should be the most cost-effective approach. However, the various combinations of combiner, isolator and antenna can add considerably to the cost of an installation.

The type of antenna selected is governed greatly by budgetary considerations as well as the number of stations feeding signals into the antenna. The panel-type antenna is possibly the most easily adapted antenna, but the decision to use it is governed by the number of stations involved. Interleaved standard radiators offer a cost-efficient alternative, provided that sufficient isolation between the analog and digital antennas can be achieved.

The commission is expected eventually to allow the use of separate antennas for analog and digital signals. This will probably make it convenient to use a station' s auxiliary antenna for the digital signal, provided that it is no higher than the main antenna, within a specified distance and sufficient isolation can be achieved. There is one caveat that must be remembered and followed—control of nonionizing radiation.

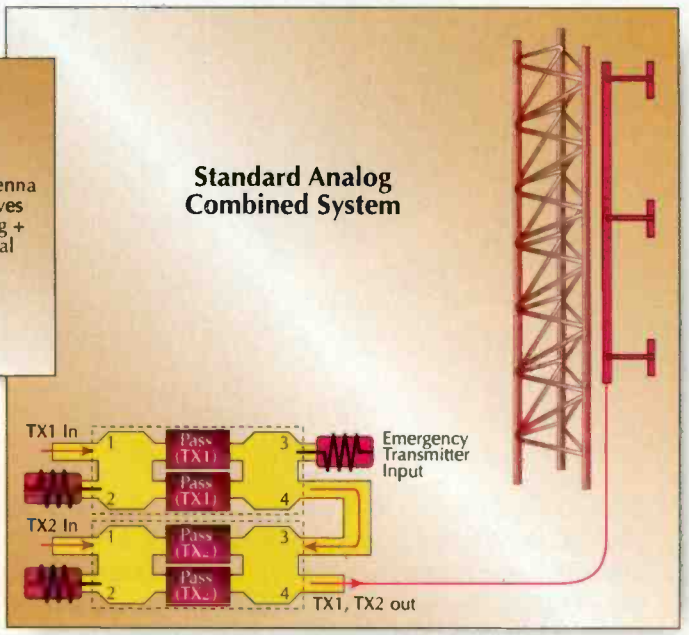

Figure 2. A typical single antenna with combiner circuitry.

When the original installation was designed, the environmental radiation values were calculated using the main antenna field to check for clearance, and the operation of both antennas at the same time was not envisioned. The addition of "X" kilowatts from the close-by auxiliary antenna may cause the RF field to exceed the safe limits for the various EPA RF levels.

As usual, the level of RF power has a tremendous impact on the cost of equipment. A circulator is essential when using separate antennas because there is usually an isolation of about 20dB. An isolator for a 500W-or-less digital transmitter costs around $4,000. However, an isolator for a 1kW transmitter would be about $13,000. Isolation is critical

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when using two antennas and anything less than a 20dB rejection can allow too much signal to feed back into the system with considerable effect on the isolator/combiner design and costs in addition to wasting signal power.

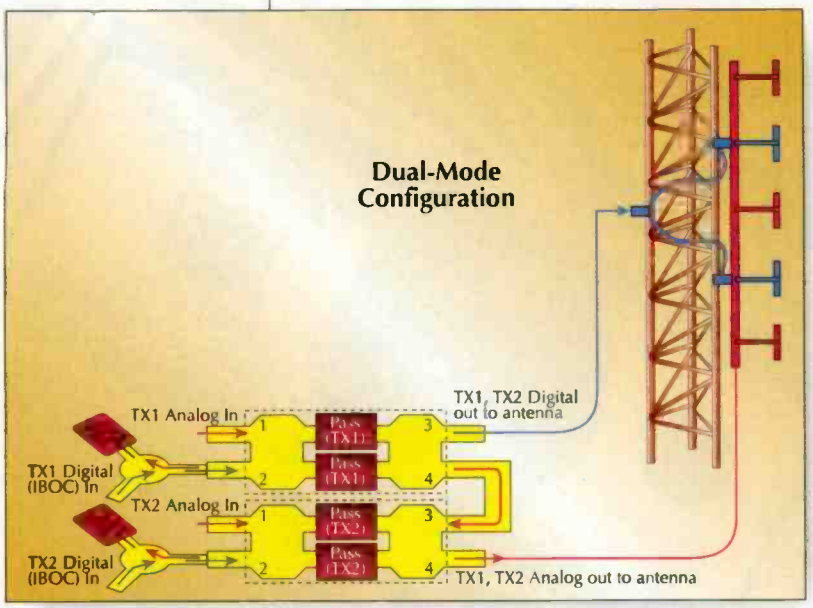

Figure 3. A typical interleaved FM antenna.

Variations on a theme

Figure 1 illustrates a coaxial RF signal combiner that consists of a cavity illuminated by two signals with different polarizations. One is the analog signal and the other is the digital signal. Mounted at the far end of the cavity is a circularly polarized receiving device that intercepts both signals and combines them into a single output.

Figure 2 shows a single antenna with combiner circuitry. Figure 3 shows an interleaved antenna. The separate transmission lines are shown together with the isolator. This is an acceptable way of converting to FM IBOC. Maybe the Commission's original objections to separate antennas was the consideration that one signal might enjoy better propagation conditions than the other and result in improper IBOC operation.

Interleaving standard FM antenna bays is a simple operation, and by adjusting the radiator location on the tower, identical centers of antenna radiation above average terrain can be achieved, thus producing effectively equal signal in most locations.

Put into practice

At the heart of Entercom's operation is the 200 ft. tower located 3,000 ft. above sea level on West Tiger Mountain near Seattle. Ten FM stations originate from this site. Their frequencies cover the entire FM band through a combination of Shively model 6810 antennas, ERI cavity-backed panel antennas and a pair of rototiller antennas.

For its IBOC tests, Clay Freinwald of Entercom uses the four-bay ERI antenna for the analog transmitter, and the two-bay rototiller auxiliary antenna for the digital signal. The vertical spacing between the antennas is between 15 ft. and 20 ft. There aren't problems from excessive power feedback through the isolator, although as power is increased it is possible that power feedback problems may be encountered. The ERI panel antennas have three input connectors. In preparation for further work on converting to IBOC, ERI added a fourth input connection to allow an additional digital input.

So far engineering evidence supports the use of a single antenna or a combination of two radiators for the transmission of IBOC signals. By the addition of more bays and rearranging the existing antenna so that interleaving is satisfactory, the antenna system costs can be kept to a reasonable level no matter whether one or two antennas are used.

E-mail Battison at batcom@bright.net.

Figures are courtesy of Robert Surette of Shively Labs.

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FCC examines tower impact on birds

By Harry Martin

Broadcasters may soon have to concern themselves with the effects their towers may be having on wildfowl.

As part of a broad government effort to establish environmental benchmarks, the FCC has opened an official inquiry into the "Effects of Communication Towers on Migratory Birds." The Commission says it is particularly interested in data detailing the causes of collisions involving migrating fowl and on practices that could prevent such mishaps. In addition, presumably in connection with this inquiry, the FCC has entered in an agreement with the State of Michigan and the U.S. Fish and Wildlife Service to facilitate an Avian Collision Study at selected towers used by Michigan in its public safety communications system.

The Commission has received evidence that more than 350 species of neotropical songbirds are vulnerable to collisions with communications towers. These migrators seem especially prone to fly into lit towers when visibility is low due to fog, rain or low clouds. The danger is greatest in the fall when birds fly south from their nesting grounds in North America en route to their winter homes in Latin America.

The Fish and Wildlife Service has already formed a Communications Tower Working Group involving governmental and private sector experts to develop and evaluate this and other research. The FCC inquiry supplements this broader government effort, allowing all sectors of the communications industry to offer insights. The Commission announced that during November and December, respectively, it would accept comments and replies in the inquiry proceeding.

The FCC's fledgling inquiry about migratory birds could lead to protocols for best practices and, eventually, new FCC rules on tower siting, construction and operations. Such rules, in turn, could lead to the filing of objections to particular tower proposals based on claims that the proposed tower might constitute a hazard to birds. The Commission has previously rejected such arguments when they were raised against particular applications. But in so doing, the Commission suggested that the complainants' concerns might be more appropriately raised in a rule making proceeding, rather than in petitions directed against individual applications. The time for such a rule making has apparently arrived.

In releasing its inquiry, the Commission suggested that it is acting on its own motion, presumably out of concern for the welfare of birds. The Commission does not mention that it has, for several years, been under significant pressure from a number of conservation-related organizations seeking FCC action to protect the avian population. Nor does the Commission mention that, as recently as April of this year, it was required by a Federal appeals court to respond to complaints about administrative foot-dragging in precisely this area. While the court concluded in July that the Commission had not delayed unreasonably up to that point, it is entirely possible that the new inquiry is being undertaken in partial response to the continuing prodding by conservation groups.

Whatever its motivation, the Commission has started a process that may lead to new rules. While the process will be lengthy and, before a notice of proposed rulemaking is issued, will involve the submission of convincing evidence of a real threat to the bird population by radio towers, the current proceeding bears watching. Broadcasters already face almost insurmountable hurdles in terms of FAA and local government approvals when they seek to build new towers of significant height. Adding a new layer to the regulatory mix—and one that will provide another effective means to block new tower construction—will further complicate the tower construction process.

Martin is an attorney with Fletcher, Heald & Hildreth, PLC., Arlington, VA. E-mail martin@fhhlaw.com.

Dateline:

Dec. 1, 2003, is the deadline for filing biennial ownership reports for stations in Alabama, Colorado, Connecticut, Georgia, Maine, Massachusetts, Minnesota, Montana, New Hampshire, North Dakota, Rhode Island, South Dakota and Vermont.

Dec. 1 also is the deadline for stations in those states to place their annual EEO reports in their public files and post them on their websites.

Radio stations in Alabama and Georgia must file their renewal applications on Dec. 1. Renewals are due for stations in Arkansas, Louisiana and Mississippi on Feb. 1, 2004.

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By Kari Taylor, associate editor, and Chriss Scherer, editor

Selecting Speakers

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Near or far

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One disadvantage of a far-field system is that the overall volume will tend to run higher, which may cause problems with audio leaking into other studios.

I have the power

Originally introduced as a convenience, self-powered monitors have evolved into complete systems that address the monitoring system as a whole. Any quality power amplifier can provide a flat, stable audio source for a passive monitor, but there may be some small inconsistencies that add or subtract from the system's overall sound. An active system will typically match the components for a flatter overall sound.

By placing the amplifier in the speaker, a line-level signal can be routed to the enclosure, which may simplify wiring. The drawback is that ac power must also be available at the enclosure.

Finding the right system for your installation needn't be difficult. The Resource Guide should provide some basic information to help you begin your pursuit.

Resource Guide

A sample of available speakers

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to small workspaces

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

Possible Remora Configurations

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

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

Remora-16: incorporates Remora-4 base unit with two 6-fader modules

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

You don't need to settle for less when designing small on-air or production rooms.

Logitek's Remora Digital Console brings you all the flexibility of larger consoles in a very small footprint. As a control surface for our Audio Engine digital router, the Remora offers you access to all inputs and outputs on the Audio Engine, multiple mix-minus busses, dedicated talkbacks, and more. Remora consoles give you fast, convenient tabletop installation—no need for cutouts or custom furniture designs. And, its attractive full color displays plus stereo LED meters give you all the information you need at a glance.

Try the Remora as a companion to our popular Numix console or on its own. You'll soon see why Logitek's Console Router Systems make sense for your facility.

Logitek

Console Router Systems

Logitek Electronic Systems, Inc.
5622 Edgemoor
Houston, TX 77081 USA 713.664.4470 **800.231.5870** **www.logitekaudio.com**

Selecting Speakers

Portable and lightweight, the Hafler **M5** offers all the qualities of the TRM6 in a more compact, non-amplified package. Features include a frequency response of 70Hz to 21kHz at ±3dB; user selectable front-anel 3dB L-pad; crossover frequency of 4th order Linkwitz-Riley at 3.2kHz, tweeter overload protection; and five-way binding posts. The monitor's 5/8" thick MDF cabinet has an internal volume of 5.3 liters and a front firing slotted port tuning the system to 70Hz. The speaker offers a power handling of 20W to 200W with a nominal impedance of 6Ω. The monitor weighs 12 lbs. and its dimensions are 12.25" H x 6.75" W x 7" D.

www.hafler.com

The **LSR6300** series from JBL includes three models: the LSR6328P bi-amplified reference monitor with 8" woofer and 1" tweeter; the LSR6332 reference monitor with 12" woofer, 5" midrange, and 1" tweeter; and the LSR6312SP subwoofer. The LSR6312SP includes bass management circuitry and a full feature-set for multi-channel audio production. All models include mounting points for use with readily available mounting hardware and magnetic shielding. The frequency response of the LSR6328P is 50Hz to 20kHz and its crossover frequency is 1.7kHz. It

weighs 39lbs. The frequency response of the LSR6332 is 60Hz to 22kHz and its crossover frequency is 250Hz/2.2kHz. The frequency response of the LSR6312SP is 28Hz to 80Hz and its crossover frequency is 80Hz.

www.jblpro.com

Buyers Guide Online

For more information on speakers and other equipment, Visit www.beradio.com for the *Radio* magazine Buyers Guide, which includes manufacturer contacts, websites and product category listings.

Offering reduced HF diffraction effects, the Tannoy **Reveal's** 1 ¼" thick contoured MDF baffle provides a solid foundation for drive unit mounting as well as increasing overall stiffness. The drive units include a 1" soft dome tweeter and 6 ½" bass unit manufactured in-house. This speaker offers an average sensitivity of 90dB/2.83V at 1m. Its normal impedance is 6Ω and its frequency response is 65Hz to 20kHz. The monitor offers power handling of 50W/100W, and its recommenced amplifier power is 30W to 100W into 8Ω. Its crossover frequency is 3kHz. Its dimensions are 13.38" x 8.27" x 10.24" and it weighs 15.4 lbs. The speaker's finish is red satin baffle with grey suedette vinyl sides and back.

www.tannoy.com

The TC Electronic **Dynaudio Acoustics Air 20** combines Dynaudio 221 technology with digital TC technology. Integrating tweeter and mid-range technology, the design minimizes reflection effects from the console, floor or similar planes. The tweeter part uses a 1.1" softdome, a 1.1" aluminum voice coil and an oversized neodymium magnet system. This monitor features a 10" woofer using a one-piece molded polypropylene cone and a 4" aluminum voice coil. The monitor's frequency response is 31Hz to 21kHz, and a crossover frequency of 390Hz and 2,600Hz. The dimensions of the speaker are 22.63" x 12.2" x 15.5" and weighs 61lbs.

www.tcelectronic.com

Selecting Speakers

A bi-amplified nearfield monitor system, the Genelec **1029A** features a rugged, cast-aluminium construction and magnetic stray-field shielding. The vented speaker enclosure contains an amplification unit, including an active electronic crossover, overload protection circuitry and two power amplifiers—one for each driver. The input is made via balanced XLR female or 1/4" jack socket connector that can also be used in parallel. The monitor's free field frequency response ±2.5dB is 70Hz to 18kHz, and its crossover frequency is 3.3kHz. The speaker's dimensions are 9¾" x 5 15/16" x 7½" and it weighs 13.2lbs.

www.genelec.com

The internal components of the Yamaha **MSP10 Studio** are aligned within micron-tolerances, matched and tuned for the best possible performance. The 4Ω 8" cone woofer is driven by a 120W power amplifier, and the 8Ω 1" titanium dome tweeter has its own 60W power amplifier, resulting in balance between low-mid and high frequency ranges, a smooth high frequency response up to and beyond 40kHz, and an integrated waveguide that achieves uniform dispersion over 120 degrees. Line-level electronic crossovers feature steep 30dB/octave roll-off curves in low and high-pass filters. The result is minimal inter-modulation at the crossover point, and smoother performance in the critical midrange.

www.yamaha.com/proaudio

This digital reference monitor, the **DS30A** from Roland, adds 24-bit/96kHz digital monitoring to any studio. The monitor uses a 30W bi-amp design with custom crossover circuitry to deliver clear sound and flat frequency response. Features include nearfield monitors with flat frequency response; balanced XLR/TRS input for analog applications; 5" foamed polypropylene LF driver and 1" softdome HF driver, magnetically shielded; adjustable input level, low frequency and high frequency trims; and convenient front power switch. This speaker measures 7" x 9 7/8"x 11" and weighs 13.5 lbs.

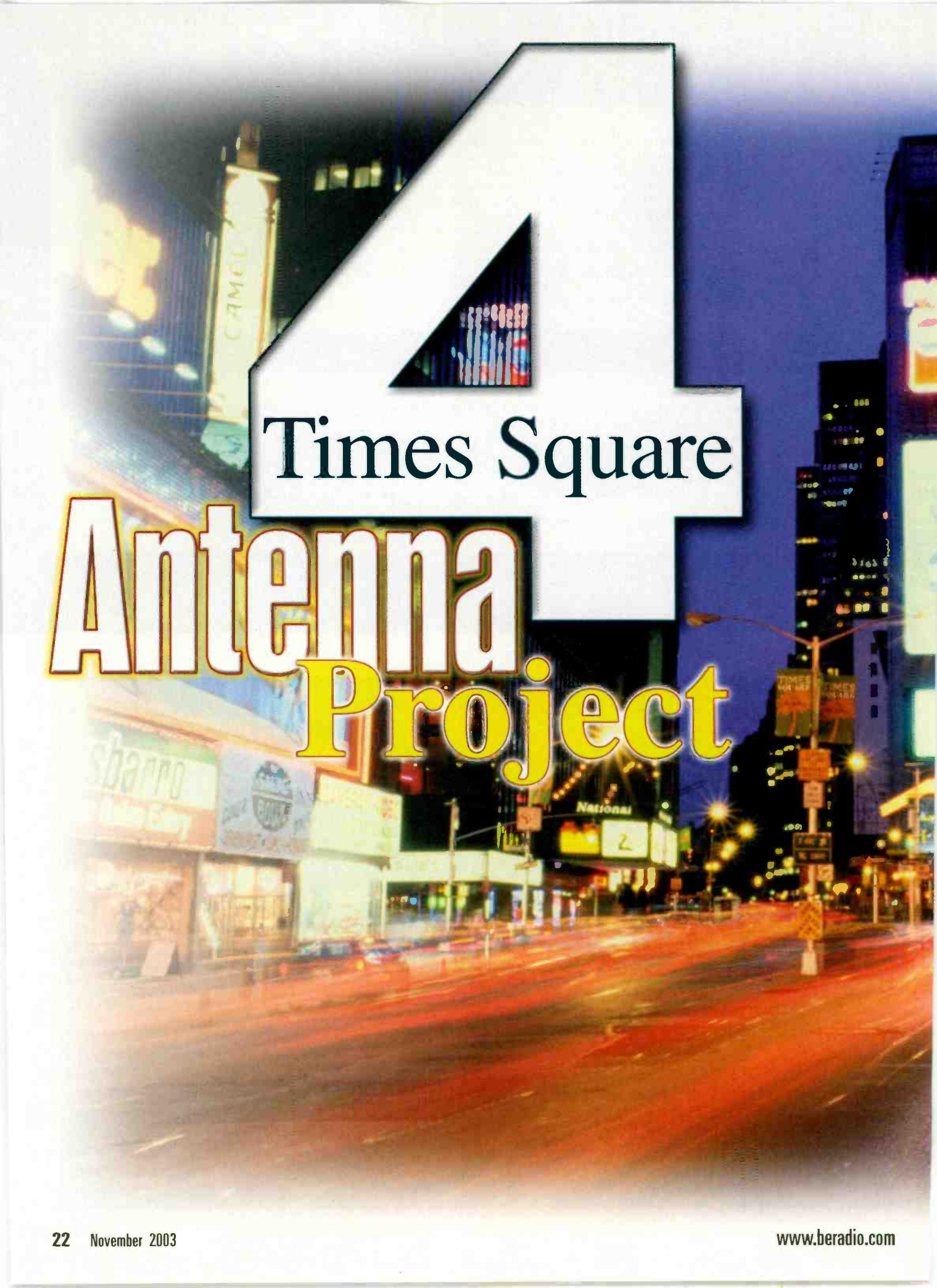
www.rolandus.com

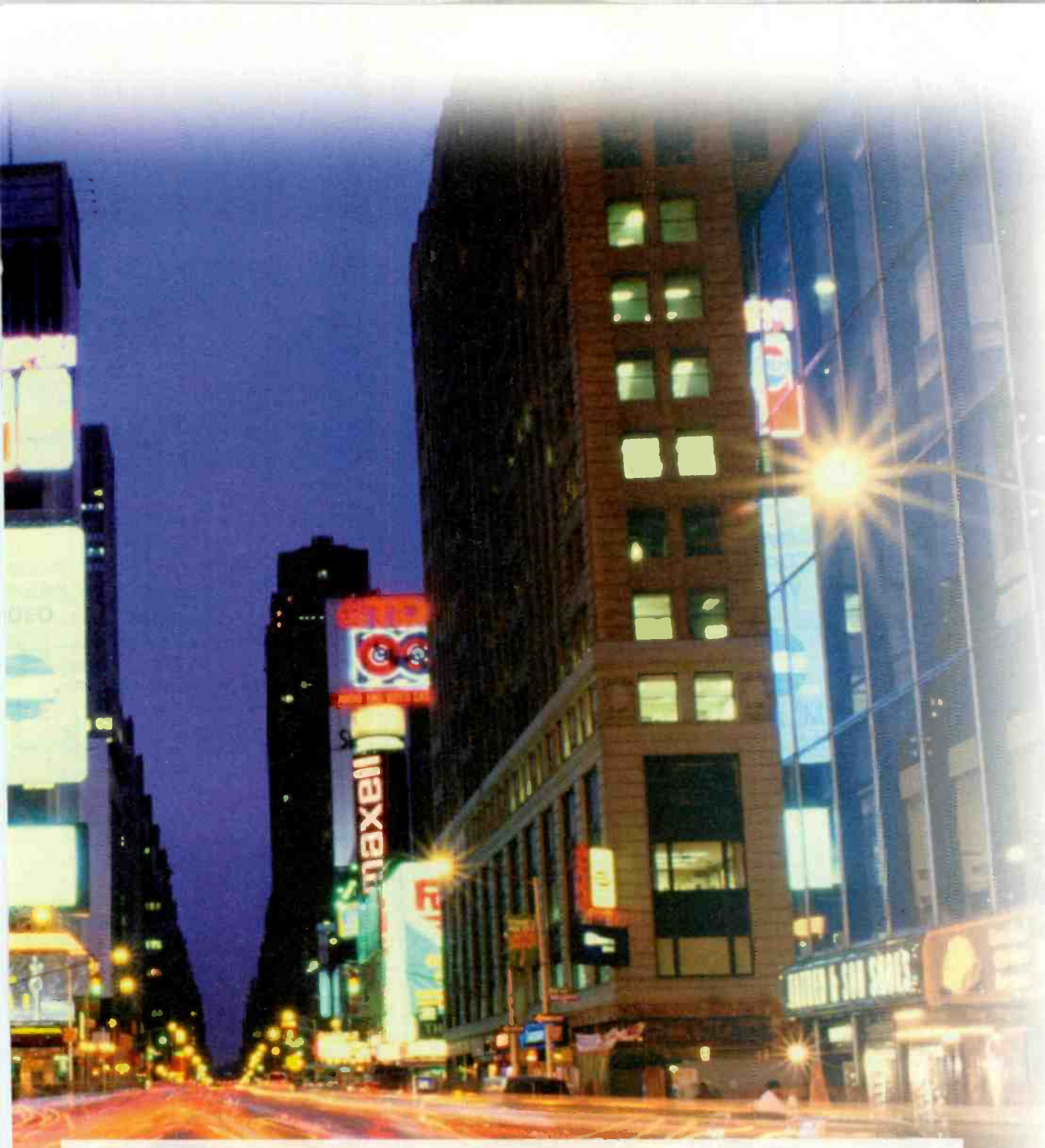
Blue Sky International **Big Blue** is a mid-field powered, three way, quad amplified, 500W monitor featuring dual 8" high excursion, hemispherical woofers, a low distortion 4" hemispherical midrange driver and 1" dual concentric diaphragm tweeter with integral waveguide for superior off-axis response. Powered by a dedicated low-distortion 100W amplifier for each 8" woofer, one low-distortion 200W amplifier for the midrange and one low-distortion 100W amplifier for the tweeter, this unit delivers clean and accurate sound with a frequency response of 40Hz to 20kHz. Big Blue measures 12" x 25" x 15" and weighs 80 lbs.

www.abluesky.com

The JBL **4208** is a two-way monitor with a shielded 8" woofer and titanium dome tweeter. Key features of the speaker include a multiradial baffle that aligns the acoustic centers of the high and low frequency transducers; transducers that are magnetically shielded to allow placement near tape recorders. The frequency response is 60Hz to 20kHz (±2dB) and its frequency range is 38Hz to 21kHz (-10dB). The speaker's sensitivity is 89dB SPL and it offers a normal impedance of 8Ω. The monitor's crossover frequency is 2.6kHz and its transducer complement is 8" LF. The continuous power capacity of this speaker is 75W and the peak is 300W. This speaker weighs 20.5 lbs and comes in a gray matte vinyl enclosure.

www.jblpro.com


4
Times Square
Antenna
Project



By Conrad Trautmann, CPBE

The Durst Organization, the real estate management company of the Condé Nast Building, also known as 4 Times Square in New York City, has undertaken the massive project of tripling the height of the tower high atop its building in the center of Times Square. Located between Rockefeller Center (home to NBC and Sirius Radio) and the Empire State Building, 4 Times Square is coming into its own as a premier transmission facility. The loss of the World Trade Center has left New York with few options for transmitter sites, and the construction of any alternate sites, such as the proposed sites on Bayonne, NJ, or Governor's Island tower, seem to be far off, if they happen at all.

4 Antenna Project

It's a pleasure to tour the 4 Times Square site because it was designed and built to be a transmission facility from the start. Many downtown office buildings and skyscrapers were never designed to house an antenna farm or high-powered transmitters. The result is a great deal of structural retrofitting, transmitter installations in what were intended to be office suites, shortages of power, lack of adequate air conditioning and challenges when mounting antennas and meeting current wind-loading specifications.

Additional steel reinforcements were needed to increase the structure's strength.

In contrast, 4 Times Square incorporated these basic design goals and more into the building. In fact, the tower was part of the architectural design and is part of what gives the building its unique look among the other buildings in the New York City skyline.

The renovation project eliminates the old 132-foot tower (which has already been removed) and replaces it with a 385-foot tower capable of transmitting for every licensee authorized in the New York area. It will act as a main transmission site for some and an alternate for others. The height above ground to the top of the tower is 1,118 feet. The tower starts at the base as a 12-foot face and is square in design. It then tapers to an eight-foot face, then a five-foot face and finally a four-foot face. An eight-sided octagon pole is mounted at the top for a UHF antenna. The tower is being constructed by ERI, who is also the lead contractor on site for the installation. ERI is assisted by the New York Ironworkers Local 40 and the IBEW Local 3 for the electrical work.

From the bottom to the top, the antennas that will be mounted to the tower are channel 2, a master for channel 4 and 5, the master FM (a six bay, half-wave spaced), a master for channels 7 through 13, a master for channel 24 through 45, a master for channels 40 through 60 and finally a pole-mounted UHF for channel 68. All of the TV antennas are DTV-ready.

All of the TV antennas and transmission lines are provided by Dielectric with the exception of the pole-mounted UHF antenna and its transmission line at the top for channel 68, which are provided by Andrew.

The TV combiners and the radio antenna transmission line is supplied by Myat.

The FM panel antenna is being manufactured by Shiveley. It is a model 6016 – Modified. It has twice as many dipoles as a standard 6016. Having these additional dipoles mounted half-wave spaced reduces downward radiation. Considering the possibility of the entire tower being used, maintaining safe levels of radiation into the building is an important feature.

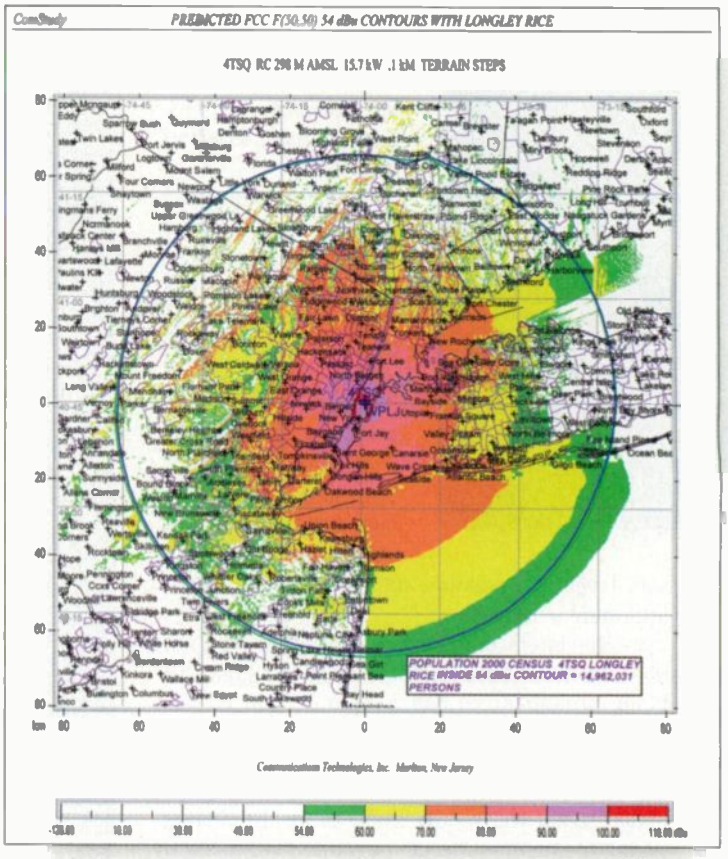
Another interesting aspect of the design of the FM Master is the fact that it is IBOC ready. In addition to being broadband, it has a separate port on the combiner for digital transmitters. The result is that the number of bays, wavelength spacing, gain, elevation pattern and centerline of radiation of the digital signal will be the same as for the analog signal. The antenna design provides 30dB to 36dB of isolation between the analog and digital signals.

4 Times Square is coming into its own as a premier transmission facility. Photo by Rob Donahue.

4 Antenna Project

Tower lighting is being handled by Flash Technology. Strobes will be used during the day and red lights at night, all of which will be tied together and flash simultaneously.

Current clients at the site include back-up transmitters for Clear Channel's WHTZ (100.3), WKTU (103.5), WAXQ (104.3), WWPR (105.1) and WLTW (106.7). Also using the site as a back up are WNYC (93.9), WPAT (93.1) and WSKQ (97.9). Columbia University's WKCR (89.9) is moving to the new antenna once it's completed. Univision is moving four TV stations to the new tower, channels 40, 41, 53 and 68, and ABC/Disney channels 7 and 45 have signed up as well. Channels 41 and 68 are analog signals while 40 and 53 are DTV. Channels 53 and 68 will be primary transmission sites and 40 and 41 will be back-ups.



Comparison of the coverage of WPLJ from the Empire State Building (green) and the predicted coverage from 4 Times (blue).

John Lyons, manager of communications and broadcast operations for the Durst Organization, has left no stone unturned when it comes to the site design. Involved in the conceptual stages of the building design and having had years of experience with the Empire State building Master Antenna Committee, he knew what was needed to attract broadcasters to the building. Items of interest to engineers include auxiliary power and HVAC. The building has two diesel generators for a total of 3.4MW of power with a third generator being added, which will bring that total up to 5.4MW. Power is three-phase at 480V. The site also has 800 tons of air conditioning, with no shortage of air to keep things cool. The fire sprinklers are designed with a pre-action system, keeping the pipes dry until water is called for by the fire alarm system preventing any mishaps with leaks or failed heads.

The layout of the building by floor has all mechanical on the 49th floor. The lower and upper mezzanines (in-between 49 and 50) are for TV transmitters. The 50th floor is the main roof, which can hold 40-50 seven-foot racks for two-way and

Workers set the channel 68 Andrew Trasar Antenna to the top of the tower. The workers are leveling it while it is supported by the ginpole. This antenna is the final piece of the tower. Photo by John Lyons.

communications customers. The 51st floor is for the FM transmitters and combiners, and the 52nd floor houses the TV combiners. Transmitters can be installed in the open or rooms can and have been built for customers who desire the security of a private room.

Increasing the strength of the structure to hold the additional weight could have been a nightmare or even impossible at some locations. However, at this site it involves some additional steel reinforcements going down a few floors tied to the main framework of the building, all of which were readily accessible with a little bit of core drilling. The new steel is being welded into the existing building structure at various points determined by the structural engineers. New base steel is being hauled up the side of the building with a derrick.

Completion of the project, including the installation of the tower and all of the antennas was finished on Oct 2, 2003. Testing has begun with completion slated for sometime this fall.

Trautmann is senior vice president of engineering for Westwood One Radio Networks, New York.

The Best 10 Years of *Radio* magazine

2002 & 2003

Over the past 10 years, radio has grown and evolved. Instead of carts and magnetic tape, digital storage and delivery is the norm. As we continue our retrospective of the past 10 years of *Radio* magazine, we look at the years 2002 and 2003. Since our first issue in January 1994, the radio industry has changed in many ways. In our final installment, we give you the last pieces of the highlights that have made our industry what it is today. Through it all, *Radio* magazine has been there. We thank you, our readers, for your ongoing support. Our first 10 years were great; the next 10 years will be even better.

Timeline

2002

- The FCC seeks comments on the NRSC FM IBOC reports.
- The FCC rewrites the EEO rules again.
- The FCC begins reviewing local radio ownership rules.
- Phase two of the Arbitron PPM tests begins.
- Ibiquity identifies the initial IBOC markets.
- Ibiquity submits AM test results to the NRSC.
- Sirius launches service.
- U.S. Copyright Office rules on streaming costs for radio stations.
- The FCC amends the EAS rules to include AMBER alerts.
- The EIA/TIA tower standards revision G begins development.
- NOAA Weather Radio gets new automated voices called Craig and Donna.
- Ibiquity brands IBOC as HD Radio.
- The NRSC begins its process of setting an IBOC standard.
- The FCC launches the FCC University training program.
- The FCC approves IBOC for station operation.
- Digital Millennium Copyright Act comes under review from the Library of Congress.
- Motorola unveils the Symphony Digital Radio concept.
- The FCC approves digital modulation for BAS.
- *Radio* magazine wins the magazine industry Ozzie award for best cover on the May 2002 issue.

2003

- IBOC rollout announced for 40 stations in early part of the year.
- NPR initiates the Tomorrow Radio project.
- Radio magazine relaunches its website with enhanced features.
- The FCC lifts the STA requirement for IBOC transmission.
- Delphi and Philips begin working on software radio project.
- The SBE launches radio operator certification.
- The FCC requires prior coordination notification procedures for BAS usage.
- Digital Radio Mondiale begins service.
- The NRSC suspends IBOC evaluation because of audio quality problems.
- SBE Certification attains NSSB recognition.
- The FCC adopts new radio and TV ownership rules. Congress quickly moves to change them.
- National Weather Radio adopts a new voice again, this time called Tom.
- Ibiquity unveils the HDC codec, which replaces the use of PAC; the NRSC resumes its evaluation process.

More online
See the Pick Hits from 2002 and 2003 and a gallery of past covers. Click on the link at www.beradio.com.

You read it in Radio magazine

Sharing Resources

While consolidation of station ownership has relaxed, consolidation of the facilities for these market groups continues. The May 2002 cover story investigated the various elements of consolidating equipment and facilities, combining staffs from several stations and evaluating the consolidated staffs strengths and weaknesses.

"There are no hard-and-fast rules of thumb regarding the number of engineers on a staff. Instead, consider function: what each staff member will do, and how much of that there is to do within the entire group of stations."

High-performance audio

With digital terrestrial radio gaining acceptance, the transition to a completely digital air chain is increasing in popularity. However, analog audio technology is still in wide use and can provide a high-quality signal path when given the proper care and attention. The November 2002 cover looked into this issue in great detail through the entire audio chain, from mics and recorders to the input of the exciter and transmitter tuning.

"Upgrading to the next level of quality involves making changes to the electronics of your system's components. Before going that far, continue listening to your station and see to it that you've conquered all the easy problems."

Running Interference

The transition to IBOC has begun for some stations while many are still in a sit-and-wait mode. As final adjustments are made to the complete system, the road taken to get here has been a long one. Many different tests have been conducted in the lab and in the field. All this data has been used to develop the IBOC system to make it what it is today.

In the April 2003 issue, we reported on the Ibiquity and WOR-AM efforts from the end of 2002 as they tested the effects of nighttime interference between adjacent-channel AM stations. In this case, New York's WOR on 710 and Cincinnati's WLW on 700 were the test subjects.

The Best Selection
TV & Radio antenna systems

FM Educational Circular Polarization Antennas.

Model	No. Bays	Max. Input Power	Price
MP-1	1	500 W	$250
MP-2	2	800 W	$650
MP-3	3	800 W	$950
MP-4	4	800 W	$1,250
MP2-4	4	2,000 W	$1,750
MP3-5	5	3,000 W	$2,250
MP3-6	6	3,000 W	$2,700

FM Low Power Circular Polarization Antennas

Model	No. Bays	Max. Input Power	Price
GP-1	1	1,500 W	$350
GP-2	2	3,000 W	$1,350
GP-3	3	4,500 W	$1,800
GP-4	4	6,000 W	$2,500
GP-5	5	6,000 W	$2,900
GP-6	6	8,000 W	$3,500

FM Medium Power Circular Polarization Antennas

Model	No. Bays	Max. Input Power	Price
SGP-1	1	3,000 W	$650
SGP-2	2	6,000 W	$2,450
SGP-3	3	8,000 W	$3,500
SGP-4	4	8,000 W	$4,300
SGP-5	5	8,000 W	$5,100
SGP-6	6	8,000 W	$5,900
SGP-6R	6	15,000 W	$6,500

Please Contact the OMB America Sales Department for other antenna systems configurations

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Omnia Audio Omnia-4.5am

By Watt Hairston

With 50kW, two new transmitters and an unbeatable tower and ground system combination, WSM, Nashville, already puts a terrific signal into nine states during the day. We cover about half the country and perhaps a little more at night. To be honest, we weren't looking for a new audio processor. We were pleased with out existing audio processor.

About a year ago, I became aware of the Omnia Audio Omnia-4.5 audio processor.

Performance at a glance

- 96kHz sampling rate, 24-bit resolution
- Five-band pre-limiter crossover
- Adjustable, over-sampled five-band limiter
- Non-aliasing, distortion-canceling clipper
- Bass management low frequency enhancement system
- 10/100baseT Ethernet port
- PCMCIA card slot

I was asked by Omnia if I would be interested in trying it on WSM. For me, a day at the WSM transmitter is almost like a day off, so I was open to the idea to experiment.

I installed the Omnia-4.5am processor in the rack under the existing processors and put it on the air. After some tweaking and level setting, I went to lunch. On the way out of the transmitter building my cell phone rang. The midday announcer asked me what I had done to the audio. He was ecstatic and remarked that it sounded great in the studio and in his car.

After lunch and more listening, one small change was made to reduce the level of the mid-bass. Even after the change, the bass was still deep, powerful and punchy—just right to sweeten and add some meat to the live and recorded country music for which WSM is famous.

Most notably, the WSM audio is exceptionally clear—more so than I thought was possible with the constraints and challenges of the NRSC curves and mediocre radios. On most any program material, WSM is both the loudest and cleanest station on the Nashville AM dial. The clarity of the audio at such high modulation levels is probably as much due to the solid-state AM transmitters, as it is to the processing, but the Omnia-4.5am most certainly makes the most of what those transmitters can do.

I was also pleased with something that didn't happen after we switched to the Omnia processor. We air the *Grand Ole Opry* on Friday and Saturday nights; a weekly tradition since 1925. The *Opry* engineers can be a fussy bunch. In the past, if I made a change or two that I thought were improvements, I would often hear about it during the *Opry* or the Monday afterward—and not always in a friendly way. After I installed the Omnia, no one from the *Grand Ole Opry* complained about the change in audio. This time we actually received compliments from the *Opry* staff. That's a lot coming from them.

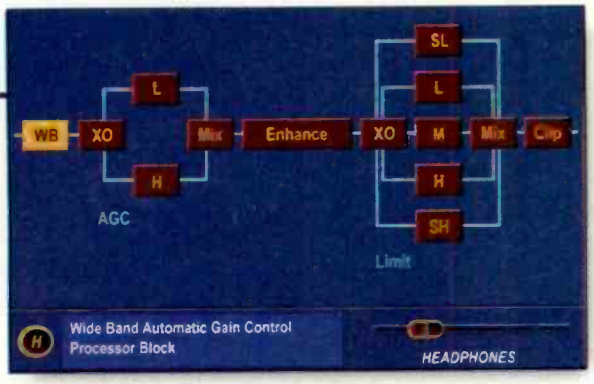
Taking control

The flywheel control is an easy-to-use interface. Menu items are displayed on the screen. By turning the wheel, options and menus are presented. Selections are made by pressing the wheel. The menu structure is so easy to follow that I didn't read the manual before starting. Overall, I found the transition from an analog processor an easy one to make. There is so much control that any aspect can be modified.

There are many processing presets already loaded, which provide a good base reference from which to start. As these are modified, settings can be saved and recalled as needed. In addition, settings can be recalled on a daypart schedule to fit changes in programming.

As far as the overall sound of the unit, I am most impressed with the low end. The bottom end is clearer and sounds better. Overall, the sound is more open and sounds like it is not processed, when in reality it is somewhat aggressive.

The Omnia 4.5 can be accessed remotely through an Ethernet port or through the RS-232 port. A modem can be



The signal block diagram of the Omnia 4.5 as displayed on the unit's screen.

installed in the PCMCIA slot as well. In addition, a GPI can be used to trigger processing changes.

The unit sports a 96kHz sampling rate with 24-bit resolution; a selectable, four-frequency high pass filter; a selectable multi-stage phase rotator; a two-band AGC and wide-band AGC; a five band pre-limiter crossover; an adjustable, over-sampled five-band limiter; a post multi-band limiter mixer and a non-aliasing, distortion-canceling clipper. In addition, it features the Omnia Bass Management low-frequency enhancement system; an optional Space-EFX stereo enhancement control; discrete, adjustable balanced analog audio outputs; an adjustable, front-panel, high-drive headphone output; an AES3 output selectable for 32-, 44.1-, 48- or 96kHz; an AES3 synchronizing input; a 10/100BaseT Ethernet port and a PCMCIA card slot to save and load software presets.

I admit that I was pleased with the sound of our previous analog processor and was hesitant to try the Omnia 4.5 when it was offered. Now that I have seen how good it can sound and experience the depth of control, I'm glad I made the switch.

Hairston is chief engineer of WSM-AM, Nashville.

Omnia Audio

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Editor's note: *Field Reports are an exclusive* Radio *magazine feature for radio broadcasters. Each report is prepared by well-qualified staff at a radio station, production facility or consulting company.*

These reports are performed by the industry, for the industry. Manufacturer support is limited to providing loan equipment and to aiding the author if requested.

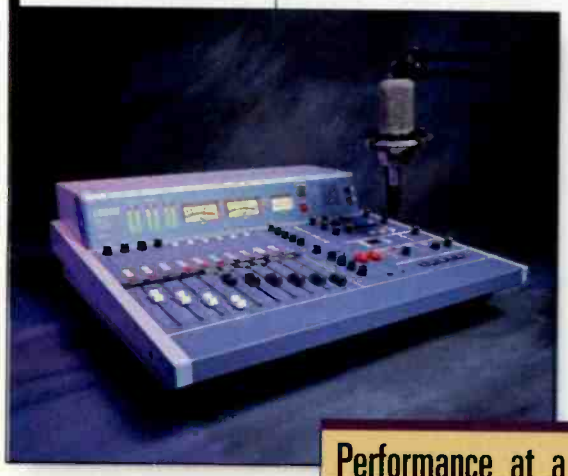
It is the responsibility of Radio *magazine to publish the results of any device tested, positive or negative. No report should be considered an endorsement or disapproval by* Radio *magazine.*

Otari DB-10

By Tom Atkins

In this ever-changing world of radio broadcasting, there are some tough decisions to make. Which manufacturer of audio consoles to choose and should it be digital or analog are among the toughest.

Weighing in at just 47lbs, the Otari DB-10 digital console features 10 input faders and a host of bells and whistles that make this console flexible. The first four channels are designated primarily for microphones, using mono analog inputs only. The input sensitivity of -66dBu to -10dBu can accommodate some line-level sources with a small audio pad. The remaining six faders can be configured to accept six stereo or two mono analog inputs, or four AES/EBU channel pairs, or two S/PDIF input channel pairs on the A or B input of the fader. This gives the console a total of 16 active signal paths.



Each channel includes a three band EQ and a compressor and limiter. The low and high frequency bands can be set for peaking or shelving, while the mid frequency is a band sweep type. The HF range is 5kHz to 16kHz, the MF range is 200Hz to 12kHz, and the LF range is 50Hz to 500Hz. All of the EQ channels have a Q range of 0.1 to 15 and a gain range of plus or minus 18dB. The compressor/limiter for each channel has a broad range of control. With adjustable attack and release time, compression ratio and threshold level, it is suitable for gentle gain riding to all-out, full throttle, suck-the-announcer-through-the-microphone sound.

If a mixture of digital source sample rates is causing some distress, not to worry. Every channel that accepts a digital source has sample-rate convertor built in. The console itself can lock to an external clock or its own internal master clock. It offers sample rates from 32kHz to 96kHz. The specifications of the console rates the input delay time as 0 to 20ms. However, while speaking into a microphone connected to the console and listening to the consoles headphone output, the delay was not noticed.

On the output side, the DB-10 features two program buses, two aux, two telephone and two digital mix-minus buses. Channel assignment to these buses is done through the use of assignment buttons on the console. The multiple buses make the console mix-minus friendly. For those needing a digital output, each of these buses can be routed to either the AES/EBU or S/PDIF outputs of the console. Also included are two headphone outputs with separate assignment and volume controls. The output level seemed to have plenty of volume while driving my MDR-7506 headphones.

Performance at a glance

- 24-bit A/D conversion
- Balanced analog, AES-3 and S/PDIF I/O
- Dynamics available on all inputs
- As many as 64 inputs with four units
- Built-in LCD display
- Password-protected software setup
- Multiple setups can be stored
- RS-232 for setup storage

Easy configuration

One of the main features of this console is the powerful yet simple to operate software setup. Most of the parameter settings of the console are set up through a password-protected LCD setup screen and setup buttons. EQ, compressor/limiter, bus assignments and fader starts are programmed through this LCD screen. There is also a software setup recall system included in the console that can store 99 memory snapshots plus nine console settings and 20 compressor/limiter settings. Connect a computer to the console via a RS-232 port, and the user can externally store and retrieve settings from the console.

Other options of this console include a separate rack-mountable power supply, a five-station intercom, an internal monitor or cue speaker, which also works with the intercom, pre-fader listen assignments on each of the input channels, two analog program meters, three stereo LED bar graph meters for the aux buses, a phase meter and the ability to cascade as many as four DB-10 consoles, providing up to 64 channels. When multiple consoles are cascaded, the intercom and program buses are shared across the cascaded consoles. There is also an emergency button that connects one microphone and one stereo line input to the main output program bus, in

case there is a catastrophic failure of the console.

This console performs well in the production room, remote production truck or even a live production environment. However, even though it is billed as an on-air console, it falls short of being one. One of the drawbacks is that there are no remote start buttons. Remote starts in the DB-10 are accomplished through the use of fader starts. Also, when a microphone input fader is moved off of the bottom peg, the monitors dim. Both of these problems can be cumbersome and almost disastrous for most on-air applications. Adding to this is the absence of detents on the faders keeping them from accidentally being bumped into the on position. Otari assured me that the problem is being addressed. One other shortcoming is that there is a D/A conversion whine appearing on the headphone outputs. It is noticeable even with program material being played on the console. Once again, Otari said the problem is being worked on.

Given this, I am sure that once the mentioned problems are taken care of, the Otari DB-10 audio console will follow in the fine tradition of quality and reliability that we have known to come from Otari.

Atkins is vice president/director of engineering of Backyard Broadcasting, Baltimore, MD.

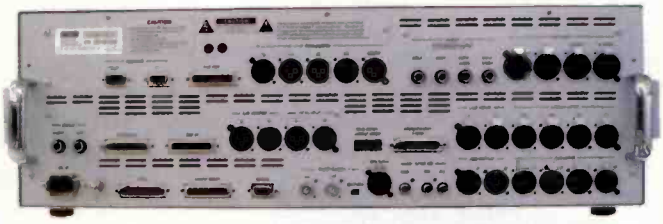
Otari

P	800-877-0577
F	615-255-9097
W	www.otari.com
E	sales@otari.com

Editor's note: *Field Reports are an exclusive* Radio *magazine feature for radio broadcasters. Each report is prepared by well-qualified staff at a radio station, production facility or consulting company.*

These reports are performed by the industry, for the industry. Manufacturer support is limited to providing loan equipment and to aiding the author if requested.

It is the responsibility of Radio *magazine to publish the results of any device tested, positive or negative. No report should be considered an endorsement or disapproval by* Radio *magazine.*



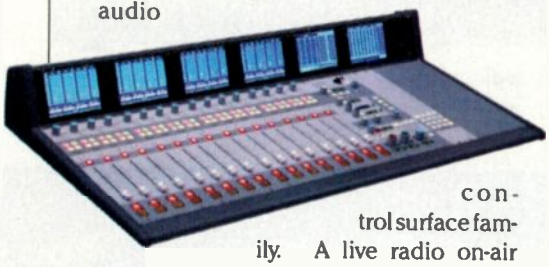
The console's audio, control and data connections are on the back panel.

New Products

By Kari Taylor, associate editor

Digital audio console
Wheatstone

Generation-5: The G-5 is the newest member of the Wheatstone Generation-9 digital audio



control surface family. A live radio on-air board, the Generation-5 offers a low profile, thru-counter console design intended for those broadcast facilities that don't require EQ or DSP functions. Available in small to large mainframe sizes, it is fully compatible with Wheatstone's Bridge Router digital audio network system.

252-638-7000; fax 252-637-1285
www.wheatstone.com; sales@wheatstone.com

Media workstation
Steinberg North America

Nuendo 2.0: This workstation offers multichannel architecture through the entire signal path. Every input, audio track, effect, group and output now offers as many as 12 discrete channels, making it ready for full-scale 5.1, 7.1 or even 10.2 productions. To make routing in the project more transparent, inputs and outputs are organized so the user can customize multichannel input/output configurations and switch between them. Several input and output buses can be used at the same time, with any type of configuration possible. And any track can be routed to and from any of these buses. It even allows switching between multiple monitoring configurations and can simulate a variety of end user monitoring environments.

818-993-4161; fax 818-678-5199; www.us.steinberg.net

Convertible patchbay
Switchcraft

NPB 555: These patchbays are supplied with 48 modules, each containing two jacks manufactured using the company's contacts and switches. At the front of each module is a small screw switch that can be used to change the normalling of each module to full, half or non-normalled. The screw switches feature a strong detent spring and are covered by a plastic strip to prevent unwanted changes. Suitable for analog or digital signals, the patchbays can be supplied wired or unwired and in three rack heights: 1RU, 1.5RU and 2RU. Unwired patchbays have jacks with solder or wire-wrap terminals and are available with the choice of tie-bars or support trays for cabling. Wired patchbays have internal connections made with 110Ω cable and are terminated on the rear panel to EDAC, Cannon DL, Switchcraft's punch-down (IDC style) terminals or three-pin connectors.

773-792-2700; fax 773-792-2129; www.switchcraft.com; sales@switchcraft.com

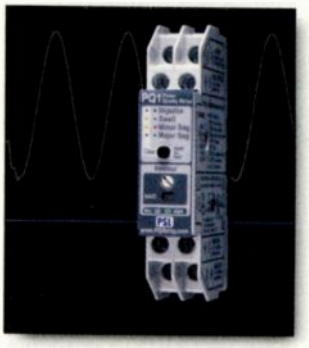
Digital microphone amplifier
Sonifex

RB-DMA2: The RB-DMA2 consists of two independent low-noise microphone

preamplifiers for converting microphone-level signals to AES/EBU or S/PDIF digital outputs. A common application is to use it when adding a microphone input to a digital mixing console.

207-773-2424; fax 207-773-2422
www.independentaudio.com; info@independentaudio.com

Miniature sensor
Power Standards Lab



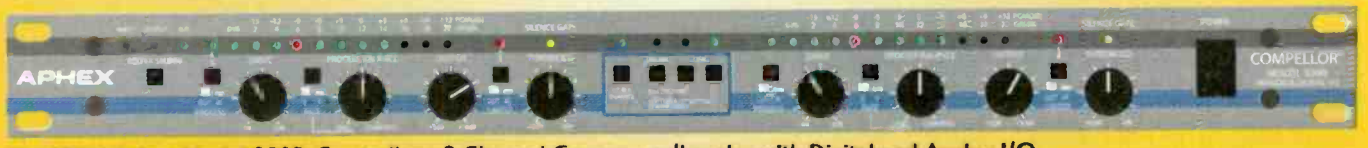
PQ1 Power Quality Relay: This power quality relay announces when disturbances on the power line are damaging or disrupting transmitters, broadcast computers and other sensitive systems. Less than 1/10 of the size of traditional power quality monitors, this system offers a simple interface: ac power in, relay contacts out. Stations can use it as a diagnostic tool, or it can be built into larger automated systems, including remote transmitter control systems as part of a remote diagnostic system. The unit detects common power quality events, such as voltage sags, interruptions, voltage swells and high frequency impulses.

510-658-9600; fax 510-658-9600; www.PQRelay.com

Swishing and swirling audio is the sad result of bit rate reduction combined with the wrong processing. Unless all sources, storage media and transmission systems are linear the audio will be bit rate reduced at least once, probably several times. Each pass generates more artifacts. Lower quality processing, multiband compression, limiting and clipping can make those artifacts even more apparent. But level control is still essential.

Introducing the new Compellor® 320D - the world standard AGC is now available with both digital and analog i/o. For almost two decades the Compellor has sustained its unrivaled reputation for 'invisible' operation. The same cleanliness of circuitry and intelligence of processing algorithms that make it 'invisible' also make it perfect for processing in the digital domain. The Compellor will not 'unmask' the masking from upstream reductions and it will feed a signal that will sail through downstream reductions.

The 320D fits any plant from all digital to all analog and anywhere in between. Perfect for all HD applications, the Compellor 320D will help keep your great audio great at a price that won't wipe you out.



The NEW Aphex Model 320D Compellor - 2 Channel Compressor/Leveler with Digital and Analog I/O

APHEX SYSTEMS *Improving the way the world sounds℠*

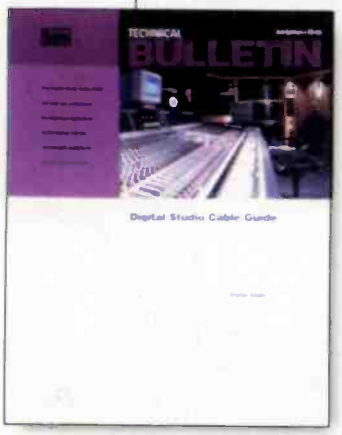
11068 Randall Street, Sun Valley, CA 91352 U.S.A
818-767-2929 Fax: 818-767-2641 www.aphex.com
Compellor and Aphex are registered trademarks of Aphex Systems

AM transmitter
Armstrong Transmitter

X-500B: This 500W digital-ready, solid-state AM transmitter features about 90 percent PA efficiency and 80 percent overall efficiency. It is an optimized multiphase modulator capable of 150 percent positive modulation. The transmitter offers a compact design and was created to easily accept IBOC signals. Three preset power levels and full remote control capability are also features, as well as 600W RF modules for extra reliability and headroom and high-efficiency switching power supplies.

315-673-1269; fax 315-673-9972
www.armstrongtx.com; sales@armstrongtx.com

Cable catalog
Belden



Digital Studio Cable Guide: This 16-page, full-color bulletin offers information to help designers, specifiers and installers of cabling systems for the A/V, broadcast and entertainment market sort through the challenges posed by the ongoing digital revolution. The bulletin also discusses the future of digital transmissions and installation issues.

800-BELDEN1; fax 765-983-5294
www.belden.com; info@belden.com

Digital/analog silence sensor
Danagger Audio Works

Plan B Plus: Building on the capabilities of the original Plan B Silence Eliminator, this silence sensor incorporates an additional level of audio failure detection and backup. An extra set of passively switched analog and digital audio inputs allows automatic connection to an alternate live program feed, such as an STL, dial-up codec or off-air receiver. If incoming program feeds are down, an internal CD/MP3/DVD drive provides continuous replacement audio while a built-in voice remote control alerts station personnel. Delay range is four seconds to 10 minutes, and users can program a unique system ID number into each unit for multi-site installations. Like the Plan B, the Plan B Plus can also act as a stand-alone remote control/listen line or interface to external remote control systems.

888-892-8346; fax 250-763-2902
www.danagger.com; info@danagger.com

Digital sampler
Network Pro Marketing/Digital Music

Digisam: A touch screen-controlled digital sampler, this product can store thousands of audio clips. Once a clip is selected, playback is instant and audio can be loaded and stored from any source. It has redundant, mirrored hard drives to prevent data loss. Should data ever be compromised on one drive, the system uses the data from the mirrored drive without interruption and without the user even knowing until a screen prompt alert appears, all in real time. It features a 24x CD reader, analog and S/PDIF inputs. The sampler supports 16-bit/44.1kHz audio up to 24-bit/96kHz audio and does not use compressed files. As any clip is loaded into the system, a waveform of that clip is displayed, which on completion may be edited for start and stop points as well as named and stored anywhere.

310-648-6677; fax 310-648-6678; www.networkpromktg.com

High-power amplifiers
Tapco

Juice: The amplifiers include the J-800, J-1400 and J-2500. Power output is 800W, 1,400W and 2,500W respectively (at 4Ω bridged). All amplifiers include easily switchable mono/stereo/mono bridged operating modes, as well as separate speaker outputs for channel A and channel B. A third Speak-on output is provided for mono bridged applications. A 30Hz subsonic filter ensures low-frequency speaker protection. The amplifiers share the same compact chassis, measuring 15.7" deep in a 2RU enclosure. All amps include handles for easy transportation and protection of front panel controls, defeatable clip limiter, front panel signal and overload indication and XLR and TRS inputs for flexible connections.

425-487-4333; fax 425-487-4337
www.tapcogear.com
sales@tapcogear.com

Mixers
Nady Systems

SRM Series: Seven mixers make up this series: six mic/line models and one powered unit. The mixers are designed for a wide range of professional applications from live music and remote broadcasts to production studio use. The mixers can be rackmounted or used as compact desk consoles. The series includes the six-channel SRM-6, SRM-8 eight-channel version, SRM-12X 12-channel model and the SRM-14X that offers 14 channels. The CMX-16A has 16 channels and features as many as 20 input channels (including aux returns plus two RCA tape inputs). The 12-channel MXE-1212 features 16 built-in selectable echo and reverb effects. The PRM-400, which is a six-channel, 200W-per-channel stereo powered mixer with internal DSP effects, also functions as a desk console or is rackmountable, and is useful for small venue live sound reinforcement applications or remote broadcast PA.

621-644-4466; fax 510-652-5075
www.nadywireless.com

STL
Bext

LD STL series: Featuring a menu-based, front-panel digital display, frequency programmability and clear audio, the 10W LD STL series is a new addition to the existing composite STL line up from Bext.

619-239-8462; fax 619-239-8474
www.bext.com; sales@bext.com

New Products

Multitrack digital audio suite
Digigram

Xtrack 4.3: New features in Xtrack 4.3 address the increasing requirements for collaborative audio production. This product supports project exchange using the AES31-3 EDL standard. AES31-3 provides a format standard for interchanging audio files and editing data, compatible with multiple computer and proprietary hardware platforms. The system also complies with AES46, more commonly known as Cart Chunk, to ease interchange among various broadcast systems. Based on the .BWF file format, the AES46 extension is a non-proprietary standard that allows additional metadata to be attached as an integral part of a .WAV file in the form of chunks or integral units of data.

703-875-9100; fax 703-875-9161
www.digigram.com; input@digigram.com

Acoustic treatment
Realtraps

Realtraps: These broadband bass traps greatly reduce low frequency standing waves. They also feature angled front panels that serve as diffusers to minimize flutter echoes and ringing. The bass traps are complemented by absorbers based on rigid fiberglass that tame midrange and high frequencies. All traps are offered in two heights. Models LB7 and HB7 are 2' wide by 7.5' high, and together absorb the entire bass range starting below 20Hz. Models LB6 and HB6 are 6' high and operate down to 24Hz. These units are also portable; the same traps can be moved easily between rooms if needed, or rearranged within a room to vary the sound.

860-210-1870; www.realtraps.com
sales@realtraps.com

Multi-effects processor
Yamaha

SPX2000: Inheriting the user interface and common programs from its predecessors, this multi-effects processor provides 96kHz audio DSP and new reverb algorithms with smooth, transparent decay. The processor offers 123 presets and as many as 99 user presets can be saved. The LCD display has been updated to offer five backlight color variations which may be assigned to user programs. Preset programs are colored by effect type for instant recognition. Rear panel connections include XLR and 1/4" I/O analog connectors with cut/boost switches, AES/EBU XLR I/O digital connectors, BNC word clock in, and MIDI in/out/trough, plus USB and to host connectors for use with remote control, computer, digital consoles or MIDI devices.

714-522-9000; fax 714-522-9522
www.yamaha.com/proaudio

Music library
Firstcom Music

EVO: This approach to production music features new talent, new sounds and massive amounts of music on each volume. The initial library will consist of 10 enhanced CDs with Quicktrax DVD-ROMs featured on selected volumes. Quicktrax on DVD-ROM offers users sub-mixes in .AIF format that can be copied into production instantly. The EVO website offers users downloadable bonus tracks and provides the opportunity for users to offer creative input on the library's future releases. Additionally, the website features information related to each eCD including composer information, links to related discs and a link to Firstcom's signature search, audition and downloading engine Musiquick Online.

800-858-8880; fax 972-242-6526
www.firstcom.com; info@firstcom.com

PC audio test
Audio Precision

APP-2010: The test application establishes the control methods for the device under test, and this setup is then saved to a configuration file. The application also connects to the PC digital bus, enabling the instrument to stream digital audio to and from the PC directly with measurement access to all of the DUT digital domain signal paths and sub-paths. The test application can also establish host-client computer connectivity using the Windows DCOM implementation. This allows the host computer to test a DUT mounted in a client or target computer, which requires only a network connection and a small utility application.

800-231-7350; fax 503-641-8906
www.audioprecision.com; sales@audioprecision.com

Transmitter access via IP
Burk Technology

Web Interface: A Web interface for IP-based transmitter remote control, this interface allows users of the GSC3000 and VRC2500 transmitter remote control systems to monitor and control remote sites using a standard Web browser and an Internet connection. Drill-down displays are accessible on the Web, and e-mail alarm notifications may be sent to PCs, pagers, cell phones and other mobile devices. Lynx 4 software can also connect to the Web interface, allowing simultaneous software and Web sessions over the Internet. The Web interface integrates with the existing LAN, and the device is SNMP enabled. The system can be installed at the studio, transmitter site or wherever an Ethernet connection is available.

800-255-8090
fax 978-486-0081
www.burk.com
control@burk.com

Disposable dehydrator
Andrew

DDH010: This fully automatic indoor/outdoor dehydrator is suitable for pressurizing flexible jumpers and short, high frequency waveguide runs between pole-mounted transmitters or receivers

and antennas in low-volume transmission systems from 0.01 to 4 cubic feet. The unit's sealed compressor and desiccant enclosures ensure minimal maintenance and a working life of as long as five years. The unit uses automatic pressure sensing to activate and deactivate the compressor, operating only when it needs to for maintaining pressure in the transmission line. Power consumption is less than 3.5W in operation. It can provide 0.3 to 0.5 psi of pressure.

800-DIAL-4-RF; fax 708-349-5444
www.andrew.com
rose.wolski@andrew.com

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Audio engine controller
Logitek

Route-XY: An input and output selector for the Audio Engine, this is a digital audio router with a card cage architecture. Users plug in cards for the desired number of analog and digital inputs and outputs, networking with other Audio Engines and DSP audio processing capabilities. Analog inputs to the engine are automatically converted to digital and digital inputs are automatically converted to the desired sample rate. All routing and mixing is done in the digital domain. Users can select any input to any output. Source and destination locations are indicated on the LCD panel, along with the unit's current mode of operation. As many as 12 Route-XY units may be connected in series and connected to an audio engine port.

877-231-5870; fax 713-664-4479
www.logitekaudio.com; info@logitekaudio.com

Digital audio workstation
Tascam/Teac Professional

SX-1LE: Designed for multitrack production, this digital workstation is based on the SX-1, and provides professional features such as 16-track 24-bit recording, 40-input surround mixing, touch-sensitive moving faders, a VGA output and 128-track MIDI. Other features include a 40-input, 32×8 digital mixing console; 5.1 surround mixing; 16 high-quality phantom-powered XLR mic inputs; 16-track uncompressed recording at 48kHz/24-bit; six-channel stem recorder and two displays to view the waveform. MIDI and automation data, SMPTE timecode input and a built-in CD-RW drive are also included.

323-726-0303; fax 323-727-7635
www.tascam.com; tascamlit@tascam.com

Mixer/console
Behringer

Eurorack UB2442FX-Pro: This compact mixer features 16 balanced high-headroom line inputs with dedicated gain controls on stereo channels 13-16, 10 studio-grade IMP invisible mic preamps, and a musical three-band EQ with semi-parametric mid band plus switchable low-cut filter on all mono channels. There is also an integrated 24-bit digital stereo FX processor with 99 virtualizer presets. These consoles lend themselves equally to live and studio use. It is also useful in recording studios as well as MIDI-studio applications and small-size PA applications or remote broadcasts.

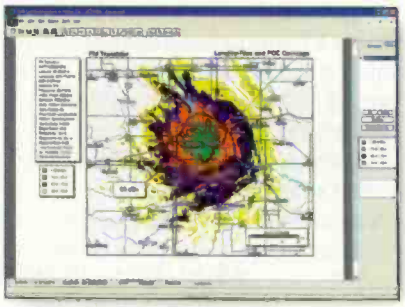
877-672-0816; fax 425-673-7647
www.behringer.com; support@behringer.de

Cassette recorder
Denon Electronics

DN-780R: This unit's redesigned cassette mechanism provides completely independent A/B deck operation, flexible input and output connections, an optional balanced XLR input/output board and a variety of wired-remote connection terminals. The recorder provides the flexibility of completely independent deck operation. This independent functionality, coupled with twin inputs and outputs, allows for advanced playback and recording scenarios, including the ability to play or record two signals at the same time; the ability to use one deck for playback while recording the same or a separate signal to the other deck; relay play and record feature, which cycles through both sides of deck A and then both sides of deck B for four sides of uninterrupted playback or recording.

973-396-0810; fax 973-396-7459; www.denon.com

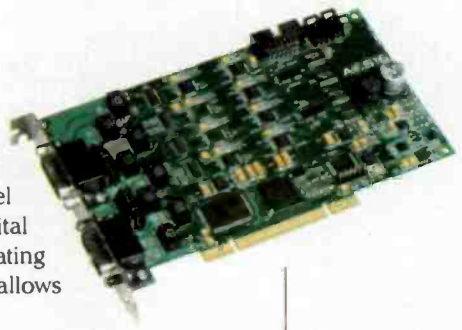
Terrain analysis software
V-Soft



Probe 3: The interface of this software program has been redesigned to enhance the overall usability of the program, including a new look with an upgrade to Windows XP themes. The software maintains all the features of its predecessor, the Probe II, and adds new tools, such as a polygon creation tool that allows users to define a shape on the map and then calculate its area and population, as well as a D/U Ratio Study that allows for color-coded D/U ratios to be plotted on a map. The software also includes a new database search engine, allowing the user to search the database by criteria such as service type, licensee, city of license or distance. It supports NAD27 and NAD83 data, includes a new mapping engine, plots census density using gradient shading and imports MIF files as a separate layer to be plotted on the map.

800-743-3684; fax 319-266-9212
www.v-soft.com; kmichler@v-soft.com

Multichannel sound card
Lynx Studio Technology



AES16: This interface offers 16 channels of 192kHz, 24-bit AES/EBU digital audio. The half-size PCI card offers sample rate in single-wire and dual-wire AES modes. It is shipped with a hardware-based 32-channel digital mixer, which is controlled by its own software application. Designed to integrate digital consoles, multichannel A/D-D/A converters, hard disk recorders, digital audio workstations and other digital audio equipment, the product is compatible with Windows and Macintosh operating systems. The unit incorporates Synchrolock, a proprietary Lynx technology that allows the interface to output low jitter digital audio from severely degraded signals.

949-515-8265 x 205; fax 949-645-8470
www.lynxstudio.com; sales@lynxstudio.com

Audio matrix switcher
Kramer Electronics

VS-1616A: This switcher is a 16x16 audio matrix switcher for balanced audio stereo signals on detachable terminal block connectors. It is compatible with balanced and unbalanced inputs and outputs. The switcher is controlled via the front-panel touch switches, via their serial RS-232 and RS-485 ports. The user-friendly LCD display makes operation even easier, and 16 preset memory locations provide quick access to the most frequently used configurations. The unit includes Windows 95/98/2000/NT control software. The system may be used as a single unit, or it can be expanded up to 96x96 inputs/outputs. It can be configured into a multi-signal switcher system including digital and analog audio and RS-422 control switchers.

888-275-6311; fax 908-735-0515
www.kramerelectronics.com
info@kramerelectronics.com

Workbook
Wind River Broadcast Center

The Broadcaster's Bigbook: These workbooks are useful for maintaining a public inspection file. By standardizing station operations, the workbook can help licensees avoid violations. The Control Room workbook provides help in daily operations, technical services, logs and inspections and FCC compliance. The Public File workbook helps keep information in the public inspection file up to date. Sections include the public file rulepart, notice and non-notice applications, ownership reports, public station donor files, certifications and forms.

970-669-3442; fax 970-663-6081
www.windriverbroadcast.com
info@windriverbroadcast.com

New Products

www.beradio.com

Upgrades and Updates

Sony Pictures Now Shipping Sound Forge

Version 7 of Sound Forge software, the company's digital audio editor, is now available. This is the first new professional software release from Sony Pictures Digital Networks since it purchased all of Sonic Foundry's desktop production software assets in July 2003.

Sound Forge 7.0 includes new features and enhancements such as DirectX plug-in automation, automated time-based recording, audio threshold record triggering, VU meters for recording and playback, enhanced spectrum analysis tools and several noise generators.

www.sonypictures.com

Scott Studios Intros SS32 for Linux

SS32 for Linux features the same look, feel and features as the Windows versions, but provides new security, support and safety. Stations running SS32 for Linux can switch to SS32 for Windows free if they aren't completely satisfied with all of its features.

www.scott-studios.com

VBEngineering Offers Transmitter Support

VBEngineering has been authorized to sell replacement parts for all CCA, CSI and SI transmitters. Many parts are in stock now and ready for shipment. Also available are all of the schematics and manuals for these companies' transmitters.

www.vernonboyce.org

Patriot Antenna Systems Offers Antenna Upgrade

Patriot Antenna Systems is offering an upgrade path for its commercial-grade, receive-only offset antennas to become transmit dishes at any time in the future. Users can purchase a tx/rx feed assembly and to upgrade the antenna in the field. The upgrade can be used on Ku, Ka or C-band systems.

www.sepatriot.com

AKG Extends its Three-year Warranty

AKG has extended warranty to some of its small-diaphragm condenser microphones, including: C391B, C451B, C451B/ST, the C 480B and all Ultra-Linear series capsules (CK 61, CK 62, CK 63, CK 69), SE 300B and Blue Line capsules (CK 91, CK 92, CK 93, CK 94, CK 98), C2000 B and the new C1000 S to a period of three years.

www.akgusa.com

Zephyr Xport Software Upgrade Adds G.722

New Version 2.0 software for Zephyr Xport is a free download for Xport users, and includes several enhancements and new features. Zephyr Xports with ISDN can connect via G.722. ISDN calls can now be made from one Zephyr Xport to a second Xport, using Low Delay MPEG AAC-LD coding.

www.telos-systems.com ■

Mixing software
Visiosonic

PCDJ FX: The FX boasts more than 100 new features and effects not found in the company's PCDJ Red dual audio-file player. In addition to giving DJs, producers and engineers the ability to add programmable echo, chorus, flange, reverb and compression, the software also offers a powerful three-band equalizer with infinity kill buttons for all bands, enabling DJs to isolate, drop or boost vocals or bass lines with the click of a mouse. Radio personnel can use the loop editor with its graphic stereo waveform display to perform laser-precise adjustments to loop lengths, cue points and loop tempos.

727-799-3828; www.visiosonic.com
customerservice@pcdj.com

Graphic equalizers
Furman Sound

Rackrider series: The single-channel RR-131 and dual-channel RR-231 divide the audio frequency spectrum into 31 bands, each spaced 1/3 of an octave apart, while the dual-channel RR-215 divides the spectrum into 15 bands, each spaced 2/3 of an octave apart. Each slider allows an EQ adjustment of ±6dB or ±12dB, depending on the setting of the range switch. All models are built using compact 20mm sliders, allowing a full set of 30 or 31 sliders to fit in a single rack space. The sliders are center detented for quick identification of the zero setting. Because the exact EQ setting chosen may alter the program's overall loudness, level controls are provided on sliders that trim the gain over a 10dB range.

707-763-1010; fax 707-763-1310
www.furmansound.com; info@furmansound.com

audio recorder/player
Nagra

ARES-PII: The machine provides rugged reliability to environmental extremes of temperature, humidity and shock in a hand-held design. The DSP and audio PCBs have been replaced to create the ARES-PII. The ARES-PII can emulate an RCX220 via USB as an external PCX sound card or as a FAT16 machine recognized via USB as a removable hard disk. Features of the unit include: flashcard-formatted FAT16, any files from the directory can be individually deleted, markers can be inserted during record and playback and linear PCM recording.

615-726-5191; fax 615-726-5189
www.nagra.com; contact@nagra.com

Reader Feedback

More on the MITRE report

Reading your editorial regarding the LPFM third-adjacency report, I couldn't help but wonder that the "great translator flood of '03" has all but rendered the point moot. Indeed, if the third-adjacency restriction hadn't been imposed at the onset of LPFM licensing, a number of viable allocations could have gone on the air in the greater Cleveland market. But if even half of the translator applications recently filed with the Commission are licensed, potential slots for new LPFMs will be nearly wiped out, third adjacency relief or no. Many of these applications filed in our local area are on second, not third adjacent channels.

Can anyone explain how this blatant abuse of the FCC's somewhat Byzantine translator rules is going to serve the public interest? I worked with a local high school trying hard to set up a school radio program and had to explain that there were no LPFM allocations available. Can someone now explain to them why it is that the same geographic area can support licensing of not one, but a half dozen translators?

Mark Krieger, CBT
contract engineer
Cleveland, OH

Good show

I just wanted to thank you for posting a link to our website and mentioning the dates of our conference in the *Radio* magazine Currents Online Weekly E-mail newsletter.

This year's event was fantastic with more than 170 attendees. We had engineers from coast to coast and an attendance increase over last year of 20 percent.

We have already started to plan for September 17, 18 and 19, 2004.

On behalf of the executive of the CCBE I thank you for helping get the word out to make our most successful conference to date.

Harrie Jones
president
Central Canada Broadcast Engineers

Quality audio for IBOC

After reading your editorial in the June issue, I decided to record and send you an audio sample. The short MP3 that I sent is a standard C-Quam analog AM station, received in Toledo, OH, using just a loop antenna. Toledo is 82 air miles from the CFCO 10kW transmitter site in Chatham, ON, Canada. Toledo is not in CFCO's primary area of coverage. The audio was received on a Fanfare FTA-100 tuner and recorded directly to a Philips home CD recorder without any equalization. Despite using the loop antenna, I was quite impressed with the relatively low noise level and decent stereo separation, as well as the frequency response.

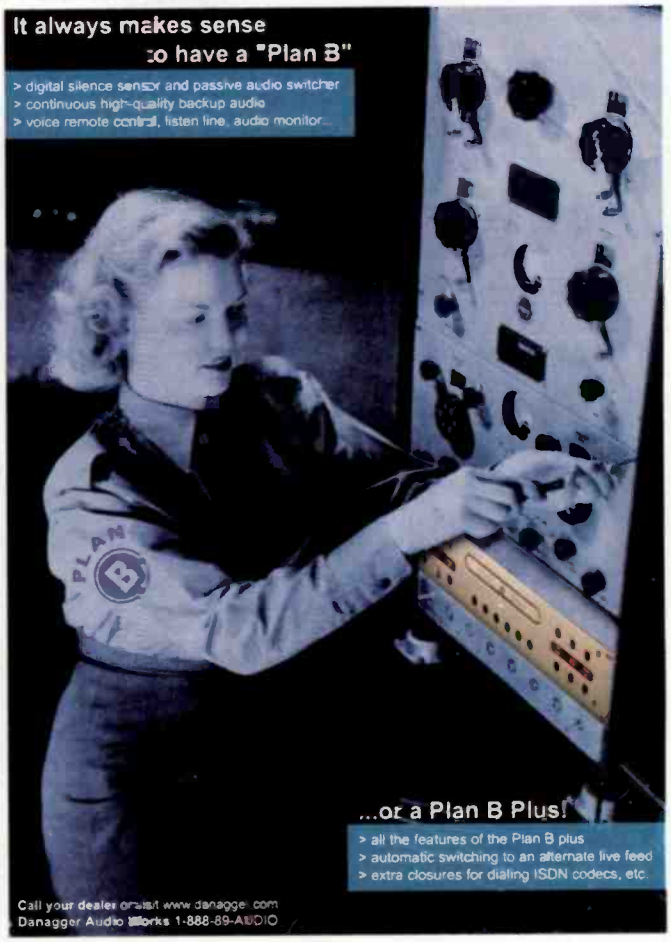
After listening to CFCO and WJR in AM stereo on this tuner, I'm convinced that if all the effort devoted to creating a broadcast system with dial-up Internet quality audio—the IBOC scheme—was instead invested into making a decent AM receiver, broadcasters would be saved a ton of money. Broadcasters should consider putting their money into purchasing a tuner/radio manufacturer that could produce superb AM radios, just like Crosley Radio did while owning flame-thrower WLW-AM (hint, hint Clear Channel). The broadcaster's company could build a tuner with an AM section similar to the Fanfare with frequency response to the 10.2kHz limit with a 10kHz whistle filter, throw-in a noise-blanker, stereo AM, and then work on DSP decoding to further improve noise issues, as is done with the Motorola Symphony or Omega chipsets.

If the developers still want to go proceed with IBOC on the FM band, they could make a tuner/radio that would include the new "HD-AM" with features listed above and an IBOC-FM. To help current AM stations avoid wasting money on their experimental IBOC/HD Radio hardware, Ibiquity could write the software code to generate C-Quam with the existing IBOC hardware, thereby keeping their broadcast system compatible with the millions of existing Chrysler minivan soccer-mom car radios listening to Radio Disney in AM stereo.

John Pavlica
systems engineer
Innovative Controls Corporation
Toledo, OH

Send us your comments:

If you have thoughts or ideas you would like to share with the Radio staff, please send them to beradio@primediabusiness.com



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Contributor Pro-file

Meet the professionals who write for *Radio*. This month: Field Report, page 30.

Watt Hairston
Manager of Engineering
WSM-AM
Nashville

Hairston's first job in broadcasting was in 1963 while attending high school. Since then, he has worked in various capacities with AM, FM, SW and TV stations. He has worked with more than 200 radio or TV stations as engineer, transmitter supervisor, chief engineer, director of engineering or consultant. Prior to WSM, Hairston worked at WMAK and WLAC in Nashville as engineer or chief engineer. He is now seven years into his second tour of duty at WSM. Hairston is active in amateur radio and his call sign is K4WRF.

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Written by radio professionals
Written for radio professionals

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Shaping radio today and tomorrow

By Kari Taylor, associate editor

That was then

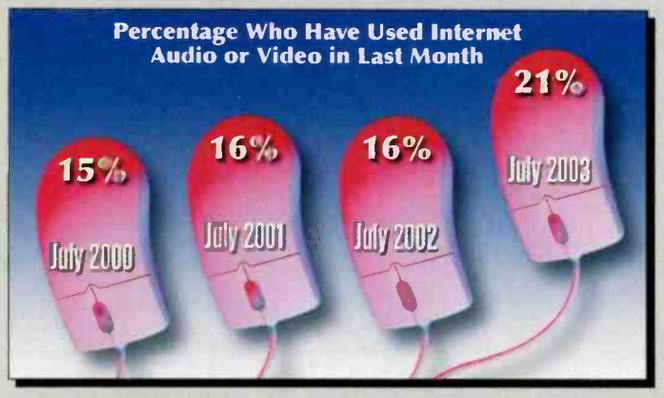
In 1985, the Studer A820 analog master recorder was designed to "meet the demands of tomorrow's computer-controlled audio production facilities." Multiple onboard microprocessors controlled all operating subsystems, including capstan drive,

spooling motors and audio parameter settings. Once the dc capstan motor starts, a closed loop servo system monitored tape tension and real inertia to provide acceleration and braking.

The A820 incorporated Studer's new generation of phase-compensated audio electronics, available with transformer or active balanced inputs and outputs. A dual thumbwheel shuttle/edit control made tape-cut editing easy. One wheel would winds tape in either direction at increasing speeds, while the other precisely positioned the tape for editing.

Sample and Hold

Internet Media Usage on a Steady Rise



Base: Total Population 12+

Source: 2003 Arbitron Inc./Edison Media Research

Do you remember?

After eight months, the laboratory tests of digital radio broadcast systems were winding down at the NASA Lewis Research Center in Cleveland in November 1994. At the same time, several other unilateral tests of digital radio systems were being performed.

In Canada, the Eureka 147/DAB system had focused mostly on the single-frequency networking capability of that system, whereby the same signal can be transmitted on the same frequency from a number of transmitters with contiguous coverage zones. This allowed a moving receiver to continue to listen to a single program by transparently shifting from one transmitter's zone to another without retuning.

Also, AT&T was testing its in-band/adjacent-channel (IBAC) system on-air in Princeton, NJ, and intended to test its in-band/on-channel (IBOC) system that it developed with Amati. The system used low-level combining so that the on-channel digital signal was mixed with the analog FM signal at the exciter.

USA Digital Radio's tests of its AM and FM IBOC systems were also going on at this time. Private bus tours were provided to NAB and NRSC officials for mobile listening in Cincinnati and Chicago. Videotapes were presented at the World Media Expo and they represented the first successful public presentation of mobile IBOC performance.

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