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September 2008
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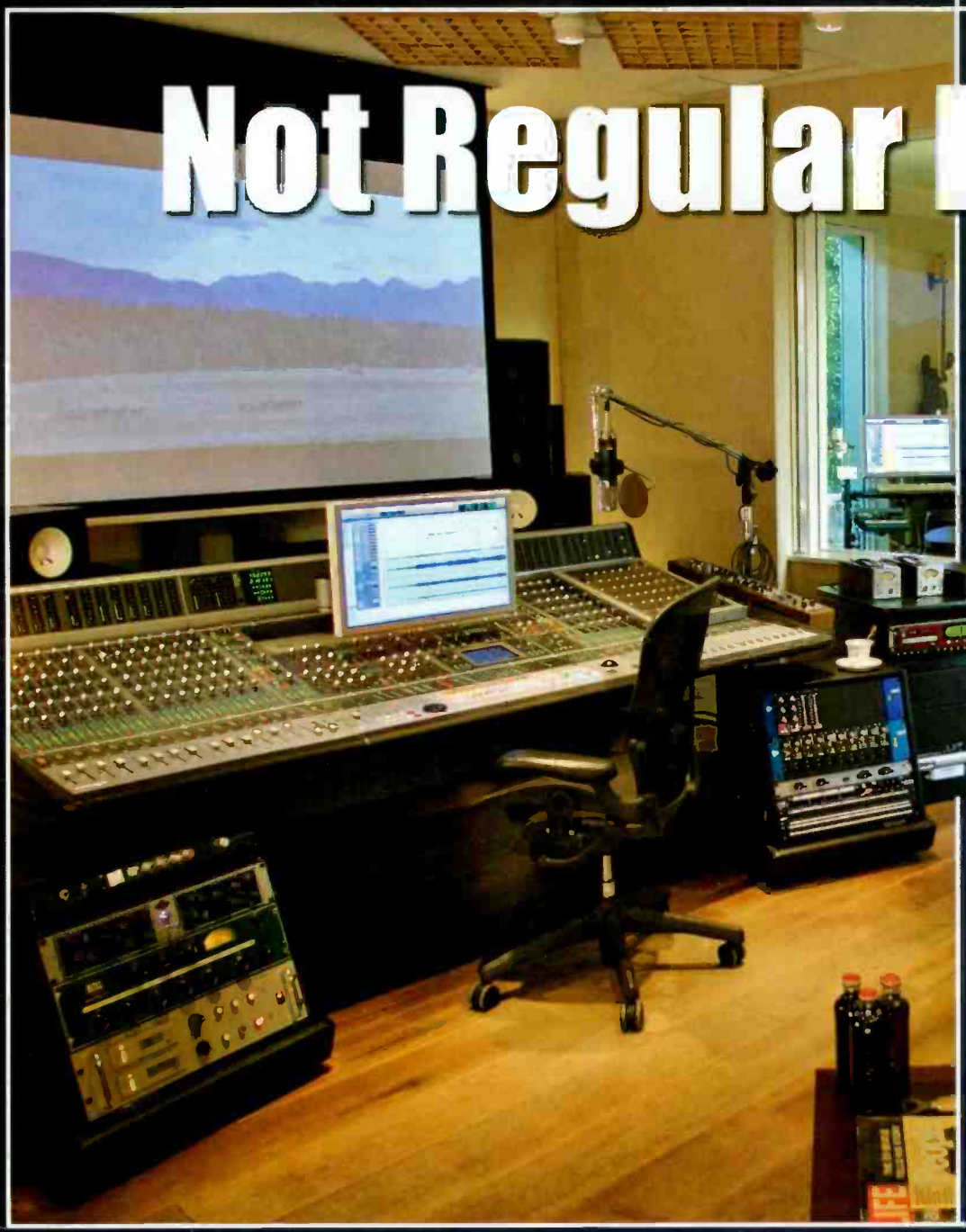

Not Regular Radio

Inside the studio for Martha Quinn Presents

READY FOR THE SHOW
NAB Radio in Austin

TRENDS IN TECHNOLOGY
Processing coded audio

A Penton Media Publication

E² Ethernet Audio Done Right

2008 PICK HIT Radio

MEET THE SQUARE

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E-SQUARE is Ethernet audio done RIGHT!

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88 I/O CONNECTIONS: E² has both DB-25s for punchblock interface and RJ-45s for point-to-point interface. All SQUAREs have 12 individually configurable opto-isolated logic ports that can be either inputs or outputs.

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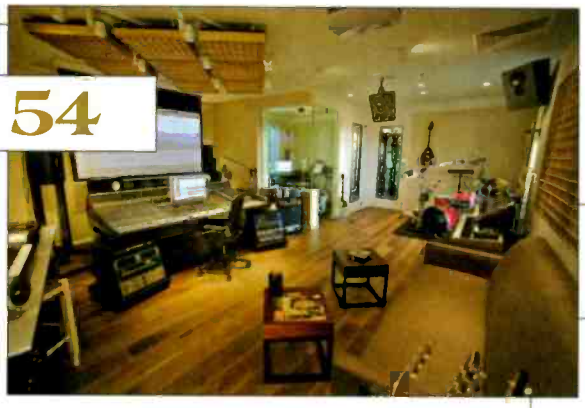

ON THE COVER

Martha Quinn's home studio is a multi-function facility meeting all her production needs, and more. Check out the full story on page 54. Cover design by Michael J. Knust.

Features

Columns

Departments

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Currents Online

Selected headlines from the past month.

SBE Elects Officers and Directors

Re-elected as the society's president is Barry Thomas, CPBE CBNT, vice president of engineering for Radio Lincoln Financial Media, Atlanta.

FCC Ponders HD Radio for Sat Radio

Should all sat radio receivers have HD Radio? Should all HD Radio have sat radio?

Wheatstone Promotes Tyler to Director of Sales

Tyler joined Wheatstone is 1996 as sales manager for the Audioarts Engineering product line.

BW Acquires Danagger Audio Works

BW takes over production of the Plan B while designer Rob Robson continues to service in-use products.

Dielectric Hosts Third Annual FM Engineering Conference

The event provided an opportunity for radio executives from around the nation to gather together and study new technologies and concepts in radio broadcasting.

AES Historical Events Trace Audio Evolution

The 125th AES Convention will be held in San Francisco at the Moscone Center Oct. 2-5, 2008.

NAB Radio Show Session Addresses Copper Theft

The Sept. 19 session at the NAB Radio Show discusses ways broadcasters can work with law enforcement officials and local communities to protect their facilities.

Site Features

A New Online Look

RadioMagOnline.com has a new look! All the great information you want is still there, plus we have added new features and new functions. Pus, it's easier than ever to find the resources you want.

Radio magazine Excellence Awards

Has your station redesigned its facilities in the last year? We want to recognize your talents, and the talents of integrators and studio designers with the first-ever *Radio* magazine Excellence Awards.

Industry Events

The *Radio* magazine Industry Events section lists upcoming conventions and conferences. Send news of your events to us.

Industry Links

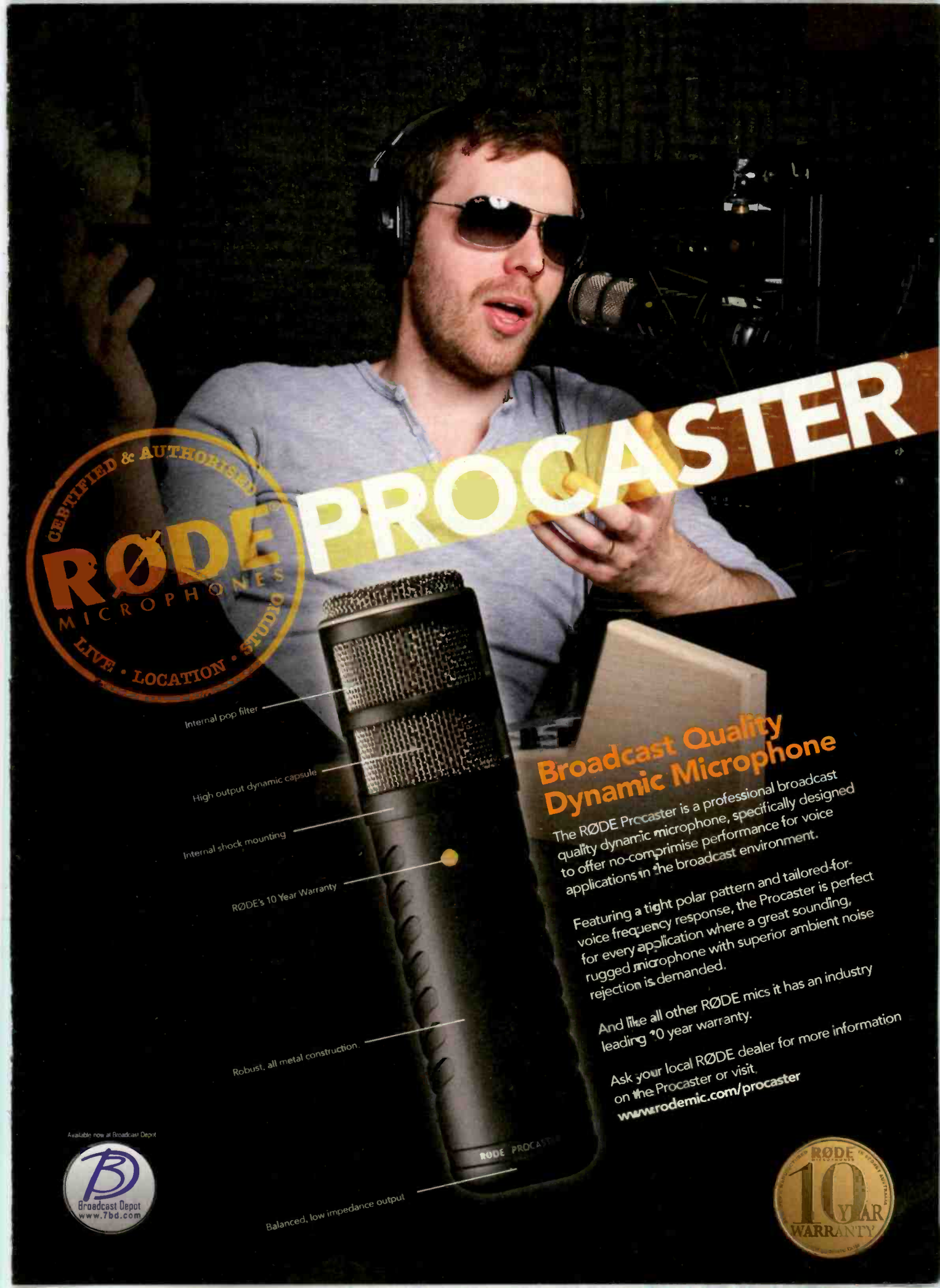
Schools, museums, associations and more.

Digital Radio Update Twice a Month

Stay up to date with the source of digital audio broadcasting news and information. The coverage extends to DRM, satellite radio and more. Subscribe today.

Advertiser Links

Web links to the advertisers in the September issue.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WARRANTY

STL white spaces?
Apparently so.

The digital rollout in radio is in full force, and will be covered in plenty of sessions at the NAB Radio Show and AES convention. And while HD Radio is the obvious leader, there are occasional blips from FM Extra still on the radar. So as we in radio move carefully along with our rollout, our TV brethren are hard at work ensuring that they are ready for their February deadline. The next five months will move very fast for them.

The TV transition causes ripples that extend far beyond a TV station's concern. Because the frequencies in the 700MHz band are being auctioned for new uses, these frequencies will no longer be available for auxiliary uses, such as wireless mics. This was further reinforced by the FCC's recent ruling to ban wireless mic use in this spectrum. Other TV bands are also at risk of new interference as attention turns to use of the so-called TV white spaces.

All this activity is forcing wireless mic users on a scavenger hunt for new spectrum. Unfortunately, it looks like radio could see a new threat of potential interference. This time, the threat is aimed at your STL.

Location Sound, an installer and vendor of pro audio production equipment, featured an article in its summer/fall 2008 newsletter about a new-found band that has nothing to do with TV or the DTV transition. The article also calls this particular spectrum wide-open and available for production use.

Where is this panacea of spectrum? It's hiding between 944MHz and 952MHz. How fortunate for wireless mic users that this piece of RF real estate is just waiting to be used.

The newsletter mentions that Lectrosonics, Shure and Sennheiser sell equipment for use in this band, but the company also notes that "this band is allowed for production use under the same regulations as the regular UHF wireless microphones." Since most non-broadcast wireless mic users have no knowledge of FCC rules, saying that the 950MHz mics fall under the usage guidelines as other mics is a misleading statement.

As I read the article, the claims of "no TV channels operating in this band" made me shake my head. But when I read, "In some areas, it is used as a station-to-transmitter [sic] link; however, with most stations using a fiber optic line for the link, the spectrum often goes unused," I was stunned.

Location Sound is using the band for wireless mics at a venue in the Universal Studios theme park. The newsletter continued, "An area scan in the 944 block showed it to be almost completely open. We could not believe it!" I can't believe it either.

The FCC database lists 82 licensed paths in use in Los Angeles. From the ground, STL and other links may not be so visible on whatever scanner the company used.

The Society of Broadcast Engineers has taken note of this use, and I expect something will be filed to protect the broadcast auxiliary services users trying to share the heavily congested 944MHz - 952MHz space. If you have experienced any interference with your STL or other link in this band, I hope you'll contact your nearest FCC field office and the SBE.

Chris Scherer

Want to read the newsletter?

www.locationsound.com/pdf/Newsletter.pdf

What's your opinion? Send it to radio@RadioMagOnline.com

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*Top: **Saskia Falken**, Heart 104.9FM Mid Morning Mix host broadcasting from Table Mountain.*

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Ground systems

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

The average ground system is quiet, dependable and retiring, performing its work efficiently, without demand for attention. Unfortunately, too many stations try to economize when installing or maintaining ground systems.

AM operation is generally based on ground wave coverage, although skywave coverage is often desired and implemented intentionally. The single vertical dipole tower around 90 degrees in height is the most popular AM radiator. When operated over the best achievable low-resistance ground system it is very efficient, with the phrase "low-resistance ground system" being the crux of the operation.

The most efficient operation of a vertical radiator requires mounting over a perfectly conducting plane surface. This is rarely achievable even with very low-loss conductors in the ground and high ground conductivity. Dry, sandy or rocky soil is generally the least satisfactory. Antennas mounted over bodies of water are not necessarily as effective: Water levels can vary and affect the effective length of the antennas. Pure fresh water does not conduct as well as saltwater.

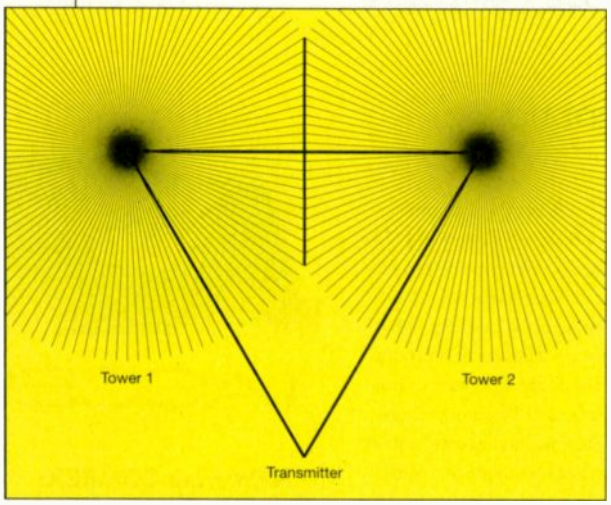

Figure 1. A typical two-tower array layout. The heavy lines between the towers and transmitter are 4" copper straps.

Standards

To provide a workable technical standard for comporison of proposed operations, and achievable results, the FCC developed basic minimum ground system specifications involving a specified minimum resistance factor. For years the the FCC's minimum requirement for a ground system has been 120 buried radials each one-quarter wavelength long, spaced 3 degrees apart around each tower base. The ground wires should be 8-gauge copper, sometimes Copperweld is used. Usually the radial array is buried about 8" below the surface of the ground. Any deviation from this is usually noted on the construction permit requiring a proof of measured radiation efficiency after construction is completed. In the 1980s the FCC began to adopt and conform to some of the regulations of the CCIR for the North American region.

More recently, shortage of available land and building restrictions have led to more exotic antenna and ground systems, and above-ground, elevated radials are not uncommon. Unfortunately, the large increases in copper prices have led to vandalism and thefts of ground system wire and copper.

Not just copper in the ground

Figure 1 illustrates a typical two-tower DA ground system. A buried copper strap connects the two tower bases. The 120 radials around the base of each tower are each the same length as the height of the tower. These radials will intersect midway between the two towers, and at this point a buried copper strap (at right angles to the copper strap joining the two towers) is brazed or hard-soldered to the intersection points. The intersecting radials need be no longer than the distance from an individual tower to the intersection point.

Soft lead tin solder should never be used. It disintegrates under earth chemicals and leads to disconnected radials and copper straps, and unexpected low efficiency.

In some cases, especially in very sandy or low conductivity soil, an expanded copper screen may be buried at the base of the tower. Squares of copper screen 24'×24' or 48'×48' (standard screen widths) are commonly used depending on ground conductivity and transmitter power.

An alternative to expanded copper ground screens is to bury 120 short, 50' radials interspersed at 3-degree intervals between the long radials. This alsa provides greatly improved low conductivity paths for the antenna current's return. Sometimes the ends of these short radials are comprised of copper strap forming a circle around the tower base. This is not essential, but it is helpful in low-conductivity areas. There is very little to be gained by running a copper strap around the ends of the long radials because normally the current at that point is quite low.

From the transmitter

A buried copper strap should run from the transmitter to each individual tower. To save money, this strap connection is sometimes omitted and the outer conductor of the transmission line is used as the return path for the antenna current. A flat copper strap has nominally very little inductance while a round transmission line outer conductor can have appreciable inductance. This strap should go directly to the base of the tower and be brazed to the copper straps on the four sides of the tower base.

Figure 2 shows a doghouse located within the tower fence. A copper strap should be run around the base of the building and connected by another copper strap to the ground ring around the tower base. Radials should originate at this ring, be brazed to this doghouse strap and continue out from the other side of the doghouse. Maintaining continuity is very important in this.

Metal fences around the tower base are far more satisfactory than wooden fences. Wooden fences absorb moisture and can cause changes in tower base operating impedance as the moisture dries and changes the resistance of the fence. The posts of metal fences must be connected to the ground system by means of copper strap. This ensures a stable electrical environment around the tower base and is important for the comfort of people touching the fence.

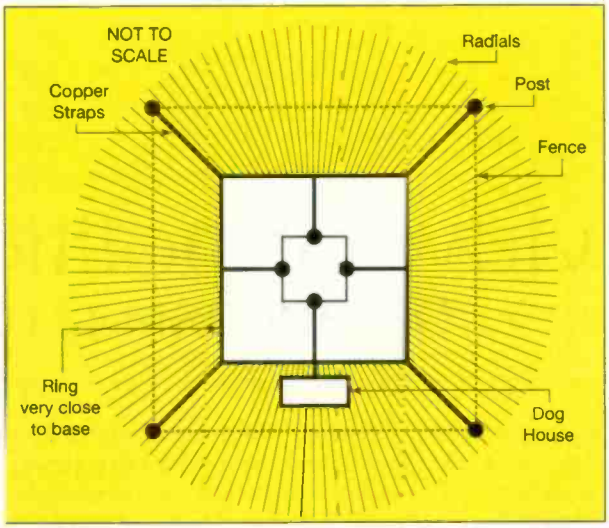

Figure 2. The ground strap at the tower base.

E-mail Battison at batcom@ohio.net.

Review of political broadcasting rules

By Harry Martin

The broadcast of political messages is covered by a complex set of laws and regulations. Station personnel involved with programming, sales and traffic should be aware during this election season that decisions about what ads to run, when to run them and how much to charge have broad implications under this regulatory scheme – summarized below:

Who's who? One of the first things stations need to do is determine which elections are likely to generate requests for advertising time. On Nov. 4, 2008, the general federal election will include races for the offices of the president, vice president, the entire House of Representatives and one-third of the Senate. State and local offices also will be part of the Nov. 4 election.

All candidates for federal offices are entitled to reasonable access on commercial broadcast stations. That is, commercial radio stations must sell time within certain limits to candidates for president, vice president and the U.S. Congress.

Dateline

October 1 is the deadline for submission of biennial ownership reports by radio stations in Iowa and Missouri.

On October 1 radio stations with more than 10 full-time employees that are located in Iowa and Missouri must electronically file their Broadcast EEO Mid-Term Reports (Form 397) with the FCC.

Also on or before October 1 radio stations licensed in the following states must place their annual EEO Reports in their public files: Alaska, Florida, Hawaii, Iowa, Missouri, Oregon, Puerto Rico, Virgin Islands, Washington and the Pacific Islands.

Candidates for state and local office have no similar right to reasonable access and stations can refuse to sell time for such races. If, however, a station sells ads to one candidate for a particular office, the equal opportunities rule requires that the station, on request, sell ads to all other qualified candidates for that office. Individuals other than candidates or their committees are generally not entitled to access. Stations are free to accept or reject issue ads as they see fit.

What's what? One of the most important things a station can do prior to the election season is prepare a political disclosure statement – a written statement that will be provided to candidates that describes the station's political ad rates, time classes and sales practices. The disclosure statement is not technically required under the FCC's rules, but having a complete one distributed to key station personnel is essential for avoiding misunderstandings and mistakes in dealing with requests for political time.

How much? As part of preparing the disclosure statement, each station will need to determine the lowest unit charge (or LUC) to which qualified candidates are entitled. The LUC is the lowest rate of the station for the same class and amount of time for the same period. Not all political advertising is entitled to LUC rates. As a threshold matter, LUC rates only apply during the LUC windows. For the general election, the LUC window begins 60 day prior to the general election date (Sept. 5, 2008).

To qualify for the LUC rate, the advertising must include a use or appearance of a candidate whose voice or likeness is either identified or is readily identifiable in the spot.

Paperwork requirements. Stations must keep a political file for public inspection that includes records of all requests for political time made by or on behalf of any candidate and the disposition made of such requests. In addition, broadcasters must keep records of all paid political advertising that communicates a message relating to any political matter of national importance.

Disclaimer. This summary is by no means complete and should not be relied upon in making decisions about access to candidates or selling spots to candidates. Stations should contact the FCC and its publications, their state broadcast associations or counsel if there is doubt about how to deal with a political broadcasting issue.

Martin is a past president of the Federal Communications Bar Association and a member of Fletcher, Heald & Hildreth, Arlington, VA. E-mail martin@fhhlaw.com.

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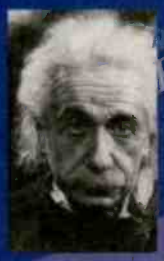

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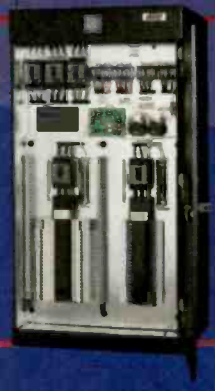

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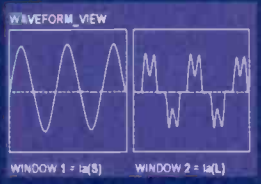

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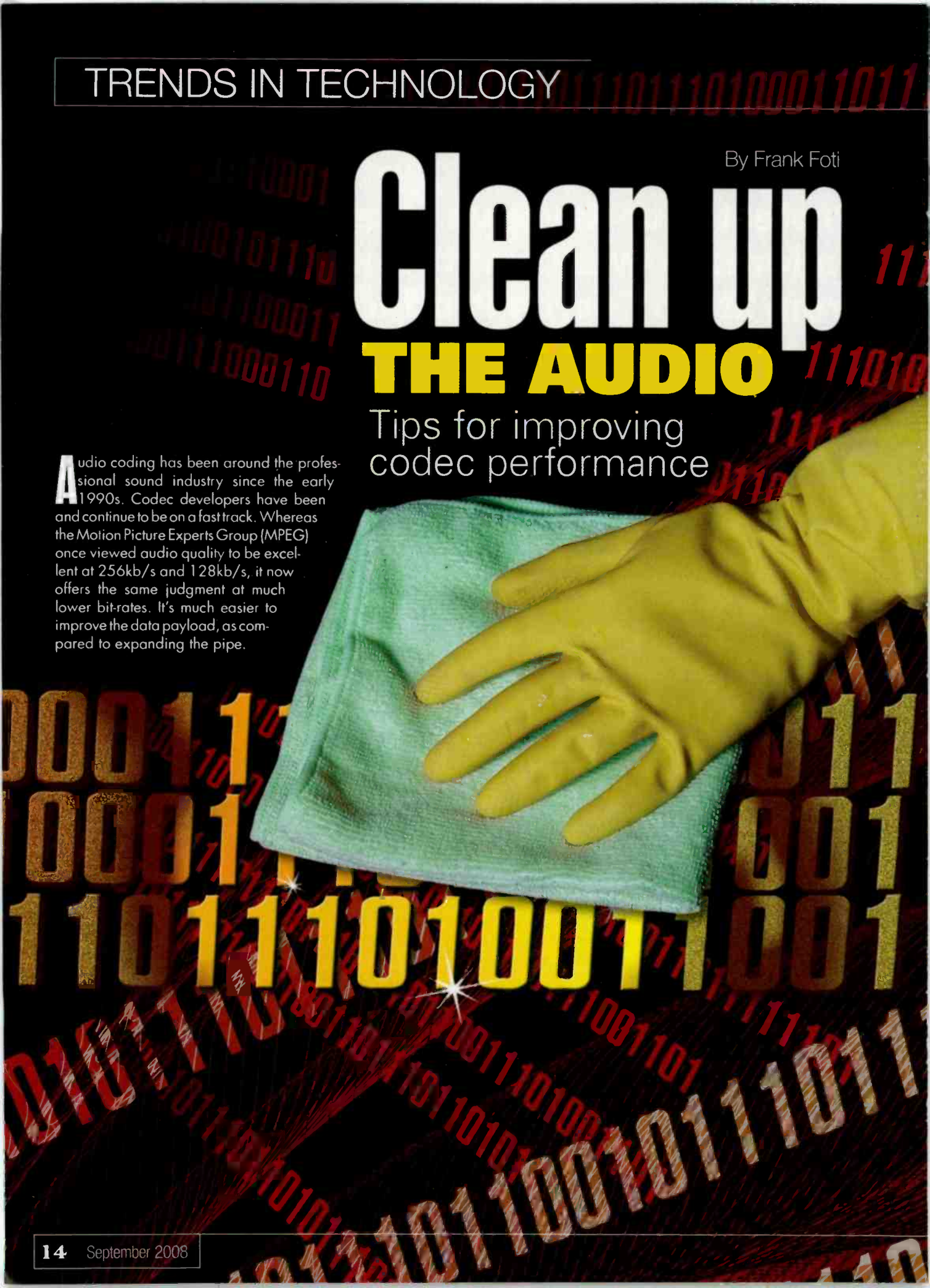
Power Quality Solutions Tailored To Protect *Your* Revenue Stream

By Frank Foti

Clean up THE AUDIO

Tips for improving codec performance

Audio coding has been around the professional sound industry since the early 1990s. Codec developers have been and continue to be on a fast track. Whereas the Motion Picture Experts Group (MPEG) once viewed audio quality to be excellent at 256kb/s and 128kb/s, it now offers the same judgment at much lower bit-rates. It's much easier to improve the data payload, as compared to expanding the pipe.



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Clean up THE AUDIO

To accomplish this requires using lower bit-rate codecs. Lowering the bit-rate increases potential degradation of audio performance. Advancement of codec design has allowed lower bit-rates to be employed, and most codecs sound decent at these rates, but they are much more fragile with regards to distortion and susceptible to artifacts. Due to the various types of codecs and lower bit-rates, getting a handle on the issues that annoy these functions is a moving target. The goal here is to seek out the gremlins and offer ways and means to avoid them.

All transmission systems suffer from some form of problem. The key to improving audio quality through a coded system is in locating the challenges and avoiding them. Take the FM stereo system – high frequency distortion and peak level overshoots were very common in early FM stereo generators. Both the pre-emphasis boost and sharp cutoff of the required low pass filters caused severe problems within the system. In-depth analysis of the system lead to the discovery of embedded pre-emphasis management and non-overshooting low-pass filters, which dramatically improved FM stereo performance.

While the concern for FM stereo was distortion and overshoot, coded audio suffers from sonic artifacts. These are the perceptible annoyances that bother the listener. Most sound anomalies are categorized as one form of distortion or another. Most common are harmonic distortion (THD) and intermodulation distortion (IMD). Coding artifacts are neither. When they are perceived, they occur due to inadequacies of the coding algorithm. Basically, this is the point where the encoder runs out of capability to reduce the audio data without the process of data reduction being heard. While there have not been specific technical terms assigned to describe these artifacts, they can be referred to as swishy-swirly, underwater-like, gurgle-like and sometimes synthetic-metallic.

Figure 1. The test setup used to analyze low bit-rate audio.

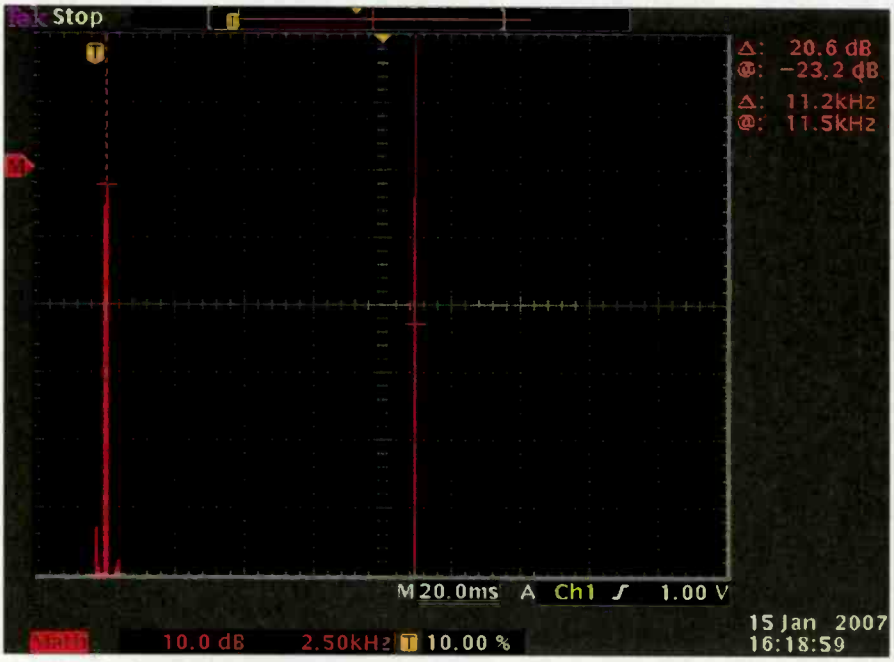

Figure 2. A spectral display of the 400Hz and 11.5kHz tone bursts at the output of the audio processor.

Prior attempts

Dedicated audio processors that utilize look-ahead limiting and bandwidth control improve sound performance, but still do not reduce artifacts enough at low bit-rates, especially below 48kb/s. HD Radio, satcasters, podcasters and netcasters employ bit-rates at 24kb/s and lower. Reducing artifacts at these low rates usually requires severe bandwidth reduction, which in turn dulls the sound quality.

Careful listening to lower bit-rate coded audio reveals discoloration – not necessarily artifact-like or distorted, but some type of degrading ghost-like product being carried along with the signal. Attempts

to remove it via signal processing seem to increase this characteristic. Listening to the output of the audio processor prior to the encode/decode section sounds very clean. Upon adding a codec to the scenario, the annoyance returns. This problem is observed with use of a common known codec for HD Radio (HDC) and various audio processors of different designers/companies. All produced the same results.

A clue to the problem is revealed when the timing in one of the audio processors is modified to reduce the amount of fast-limiting applied to presence and high frequencies. (This does not remove the limiting in this spectra, but changes the manner in which the limiter's timing responds to transient signals.) The audio immediately opens, along with clarity in the presence and high frequency range.

Considering modification to the timing of the audio processor leads to a change in sound, thought was given to the effect of processor-induced IMD within the codec. The following simple test was crafted to observe the effects of IMD through a codec.

Figure 1 illustrates the test setup. A multi-tone sinewave generator creates the source signals to stress the audio processor and codec. Frequencies were set to 400Hz and 11.5kHz. The output from the audio processor was routed in two directions – to the input of a multi-channel spectrum analyzer, and to the input of an HD Radio encoder. The encoder was routed directly to a corresponding decoder, and its output was connected to the other input of the spectrum analyzer.

The objective of this test was to observe whether or not any part of the dynamics function will generate distortion via the codec. The audio processor employed for the test was designed to condition audio in a coded environment. The back-end processing utilized look-ahead limiting in place of hard limiting/clipping. This reduced THD components in the codec and eliminated aliasing in the system. Tone bursts of the twin tones were used, as this would simulate the effects of transient activity in the source signal, as well as activate the fast-limiting functions in the audio processor.

Figure 2 is the spectral illustration of the tone bursts at the output of the audio processor. The twin-tones appear as would be expected. This is also the result when observed

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TC Electronic
818-665-4900
www.tcelectronic.com

Translantech Sound
212-222-0330
www.translantech.com

Vorsis
252-638-7000
www.vorsis.com

at the output of the codec when steady-state tones are passed through the processor and codec together.

Figure 3 illustrates the output of the codec's decoder. Notice the significant spectra around the upper frequency of 11.5kHz. Further investigation of the situation revealed that the transient activity upset the encoder and caused added modulation in the upper frequency domain. This is what was causing the added ghost-like product heard prior. Is this possibly the effect of the SBR function becoming upset at transient information? This diagnosis is subject for a deeper discussion.

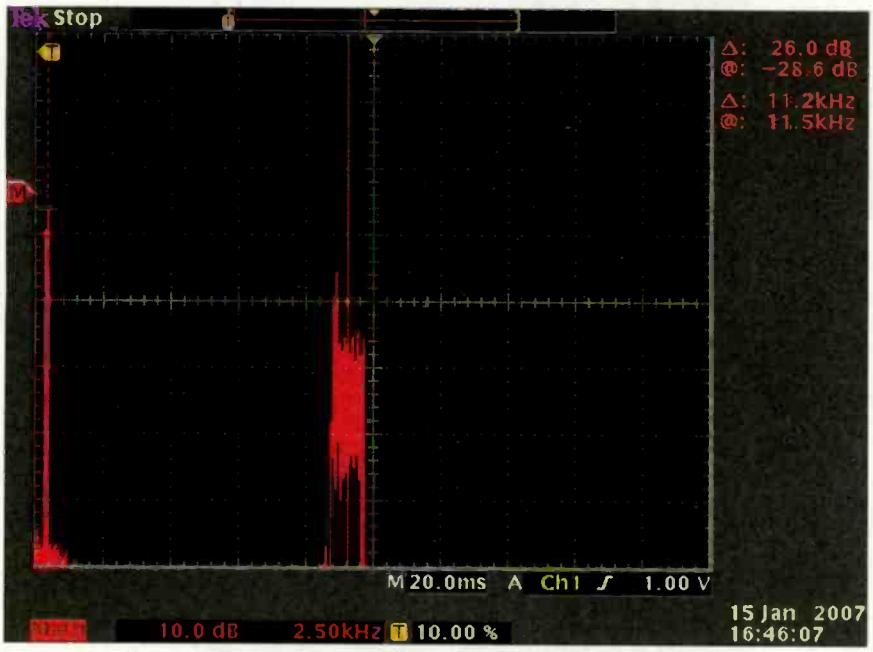

Figure 3. The output of the audio decoder.

The rigor of this test exhibited what appeared to be severe IMD in the signal. While broadcast source material does not contain transient twin-tones, it does contain plenty of dynamically transient signals within this frequency range. The extent of this added IMD is dependent upon the transients embedded in the source material. Additionally, fast-limiting time constants in the audio processor are capable of exaggerating, and/or creating this problem.

LoIMD

As with most discoveries, there's an answer. In the above case, further study of the presence and high-frequency limiting algorithms yielded a method to reduce processor induced IMD. Utilizing a proprietary new function known as *LoIMD*, the algorithm is capable of providing fast-limiting to control transients, yet without

agitating the encoder. When normal source content material is applied, the audio through the entire coded system is devoid of the ghost-like annoyances that were mentioned earlier.

The LoIMD function modifies the control function within a dynamics algorithm. Through internal analysis of the incoming dynamics, and IMD characteristics, the architecture of the control method is rearranged to provide a control signal that reduces, and sometimes eliminates IMD in the processed signal. The sonic result is cleaner sound for a given amount of gain control.

Headroom considerations

Another important factor regarding the coded system is headroom. Digital systems have an absolute maximum ceiling of 0dBfs. Theoretically, audio levels for transmission should be able to be set right up to this level. But, depending upon the encode/decode implementation, overshoots may occur. This is not consistent from codec to codec, but more so due to the implementation of the codec by various manufacturers. Additional input low-pass filters in the encoder may cause headroom difficulties. A well-designed encoder will ensure that any added input filter possess the same headroom as the system without generating overshoot that reduces headroom. Note: Most filter overshoot ranges from 2dB - 3dB, but can exceed this amount depending on filter characteristics.

It would be wise to test any codecs within a specified infrastructure to make sure that 0dBfs, is attainable without system overload or clipping. For this reason, setting the absolute peak level 2dB - 3dB below 0dBfs offers insurance to avoid clipping.

HD Radio has the capability to broadcast multiple content streams within the 96kb/s digital channel. Multicast requires the use of lower bit-rate audio coding. It is possible that extremely low bit-rate audio channels will exist, and require dynamics processing capable of consistent sound quality that yields low, or no sonic artifacts.

For those who wish to tweak on their own with existing processing equipment, the following should be observed:

1. Avoid dense processing that contains fast limiting time constants. Try to reduce the attack time on functions when 5dB, or more, depth-of-compression is desired. This will reduce upper frequency processor induced IMD.

2. Make sure the coding system provides full headroom. If the system clips on its own before 0dBfs, then reset the maximum input level to avoid system headroom problems.

3. Low bit-rates will benefit from bandwidth control. A static

Process or not?

By Chriss Scherer, editor

You wouldn't think of transmitting your station over the air without audio processing, but the same concept applies to an online stream. While competitive loudness isn't the primary goal, compensating for variations in audio level and general level consistency are important concerns. Orban has assembled a comparison of audio clips using its Optimod-PC 1100 to show processed vs. unprocessed audio with various encoding formats. *www.orban.com/products/streaming/optimod-pc1100/audio_clips/*

low pass filter will reduce artifacts. The tradeoff will be perceived high frequencies vs. quality. A specialized processor for coded audio will offer some dynamic method to accomplish this.

4. Do not use *any* final limiter that contains a clipper. The THD generated by the clipping function will cause more trouble than it's worth. Precision peak control is needed in the coded system. As mentioned prior, specialized processing for this medium will provide a look-ahead limiter to accomplish this task. If these four steps are followed, improved coded audio will result.

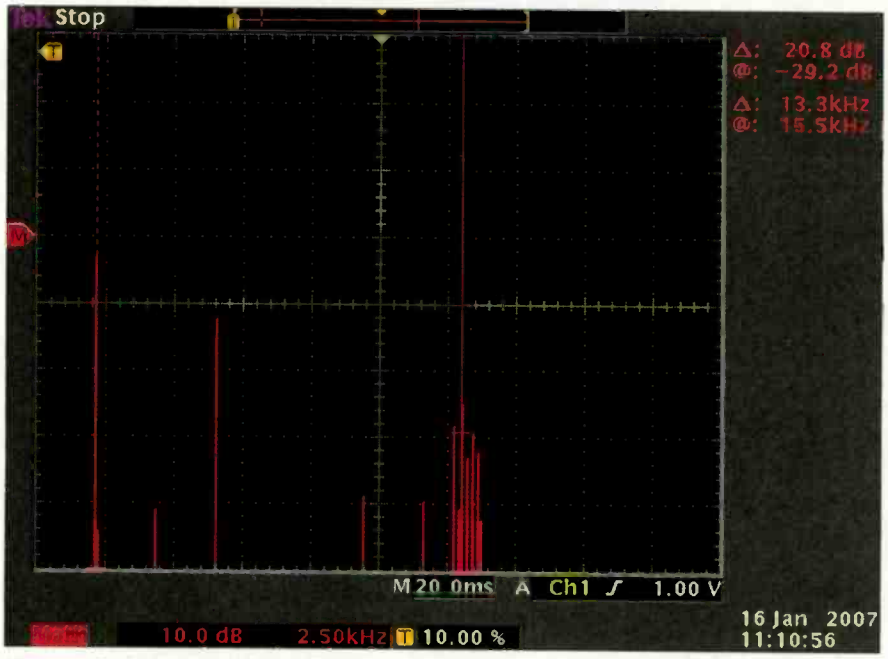

Figure 4. A 2kHz after clipping and being passed through a 15kHz low-pass filter.

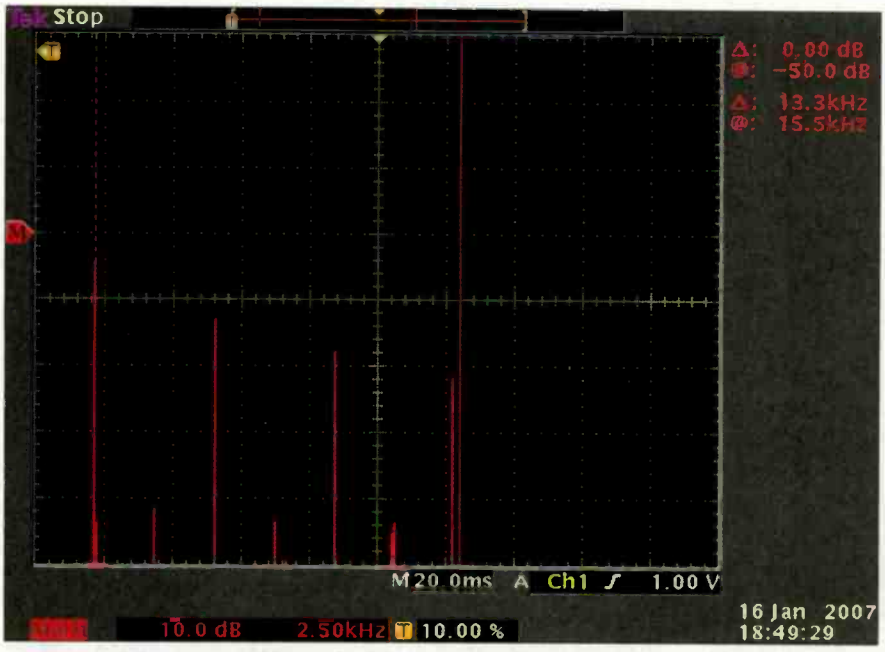

Figure 5. The same clipped 2kHz audio display prior to the audio encoder/decoder.

Codecs and clipping

Sound media require peak control to avoid loss of headroom and eventual system distortion. Precision peak limiting accomplishes this. Hard limiting or peak clipping is used in conventional broadcasting, and it works quite well. The method does not technically degrade the system. (Overuse of final limiting is a subjective adjustment, and too much can degrade performance.) Suffice it to say that hard limiting does work as a precision peak controller within FM stereo and AM transmission.

The coded path offers a different set of challenges. It is not possible to overmodulate the system, as there is a precise peak ceiling of 0dBfs. Precision peak control is required, but the conventional method of clipping creates systemic problems, and those occur as aliasing products within the encoder. Figure 4 is an example of what happens to a 2kHz tone when clipped and 15kHz low pass filtered in a conventional audio processor used for FM stereo and passed through the HD Radio codec. This problem is consistent with other codecs too.

The cluster of energy that appears around 15kHz is aliasing components. These were caused by the 2kHz clipped signal from a conventional audio processor as the hard limited signal was routed to the codec. This is proof that all peak limiting for coded audio must use a limiting means that is void of THD content. Clipped waveforms are exceedingly high in THD. This is why the use of look-ahead limiting is the preferred mechanism for encoders. This style of limiter yields very low THD, and will not alias the system.

For reference purposes, Figure 5 is the same signal, prior to the codec. Notice how the odd harmonics line up as would be expected from a clipped waveform. The added strange content that appears around 15kHz in Figure 4 is what exaggerates coding artifacts when conventional style processing is applied to coded audio.

Research, testing, development and hopefully sound reasoning offered here now explain why coded audio performs as it does. Various signal processing and conditioning means can be used to bring life to coded sound. The test results illustrated here reveal that conventional compressors and limiters exaggerate artifacts. While signal processing, conditioning and peak limiting is required for coded audio, the processing must employ methods that do not contribute additional distortion aspects, as this is what degrades clarity and quality at low bit-rates, and sometimes even at moderate to higher rates.

Foti is president of Omnia Audio, Cleveland.

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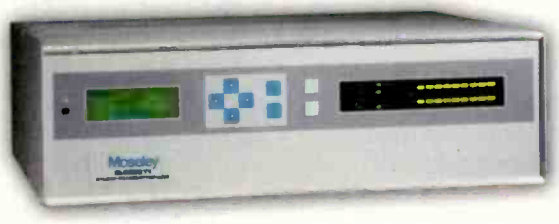

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The World's First

The Cleveland Institute of Music's Conrad Control Room gets THX certification

By Alex Kosiorek

The Cleveland Institute of Music (CIM) is one of the world's leading music conservatories. Located in the heart of University Circle in Cleveland, this institution resides among a number of other leading educational, medical, artistic and performance organizations including the Cleveland Orchestra, from which CIM draws many of its faculty. In the fall of 2007, CIM completed a $40 million campus expansion. As part of this development, CIM added the Fred A. Lennon Education Building and the newly expanded Robinson Music Library. One of the greatest additions undertaken for the project, Mixon Hall, is a marvel of technology, acoustics and architectural artistry. Designed by architect Charles T. Young of New York along with acoustician Paul Scarbrough of Akustiks, this 250-seat recital hall is wrapped in specially made glass, lustrous wood accents and architectural concrete. Utilizing new technologies in HVAC, this classic shoebox-fashioned hall is also one of the most quiet performance spaces in the world. With reverb times that can adjust from just more than a second to 1.6 seconds using special drapery, complemented by advanced lighting, audio and video systems, Mixon Hall blends sight and sound into an experience that is truly delightful for musicians and concertgoers alike.

A needed room

As the vision of Mixon Hall was being realized, CIM recognized the necessity of having a recording, production and broadcast studio, utilizing state-of-the-art technology, to match Mixon Hall and its many gifted performers. Thus began the design and development of the Robert and Jean Conrad Control Room, which became the first THX-Certified recording studio in a music conservatory worldwide.

To achieve this endeavor, several challenges needed to be overcome. Long before equipment choices were ever made, the room size and location were predetermined as part of the expansion project's overall design. The interior volume of the space designated to the control room was only about 2,650 cubic feet, located backstage to Mixon Hall and directly adjacent to an elevator. Consequently, multiple concerns existed. Thankfully, the combined efforts of Young and the acousticians of Akustiks and RPG ensured that the room's size and location were dually considered while design specifics were being debated.

The control room was designed in such a way that it sits on its own concrete slab, segregated from the rest of the structure. A raised floor rests on this concrete slab, insulating it from any acoustic

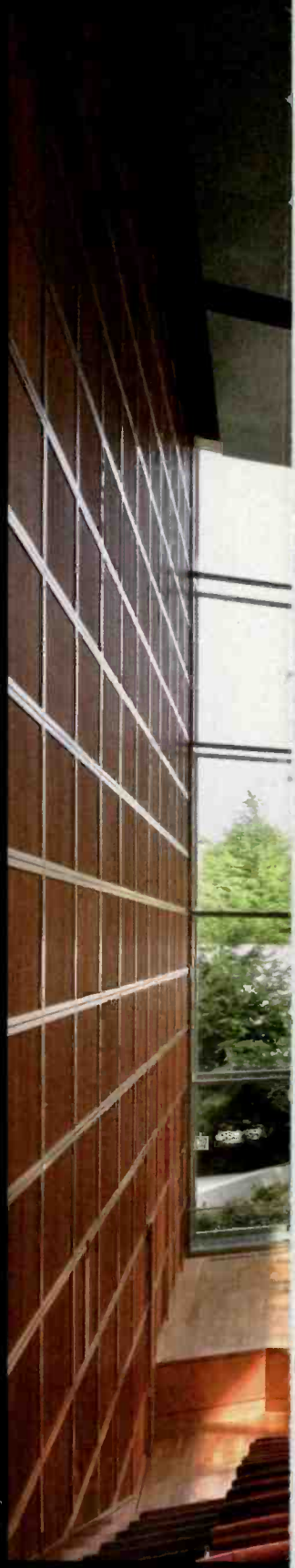
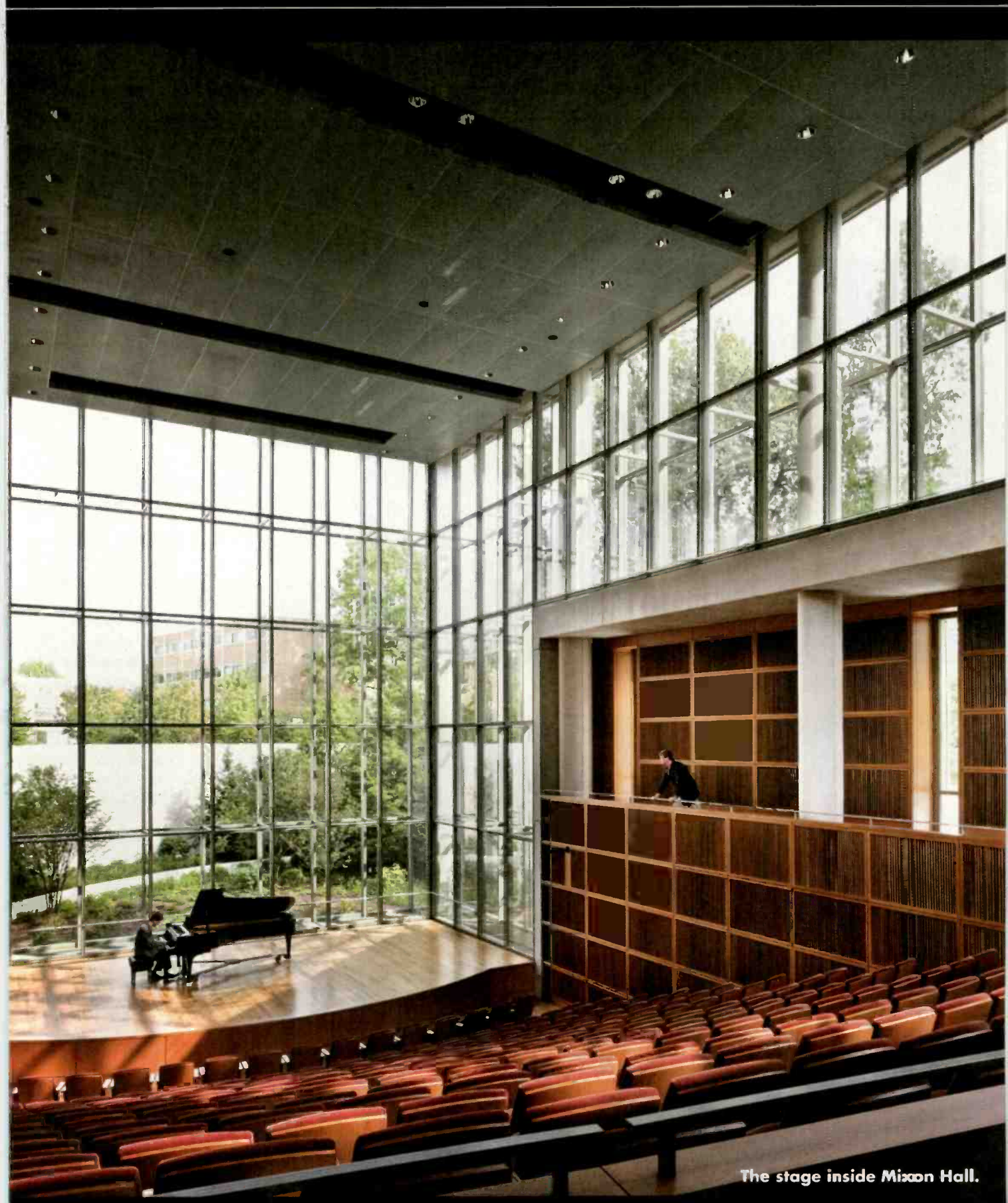


Photo by Scott Frances



The stage inside Mixon Hall.

The World's First

vibrations traveling to and from the control room. Upon this raised floor rest the walls of the control room, which were installed with sway bracing so the interior walls are isolated from the exterior framing and studs. Furthermore, the ceiling is isolated from the walls, and everything hanging from it (lights, acoustic panels, etc.) contains special sound isolators, which reduce vibrations being transmitted from one part of the structure to another. The studio was designed as a room within a room, and each structural component is acoustically dampened from every other, including the HVAC duct work. Similar measures were taken when fabricating the exterior of the room, and it was this kind of careful attention that successfully ensured that the control room would not be hampered by exterior sounds or vibrations (and vice versa).

Photo by Daniel Milner

The Robert and Jean Conrad Control Room

Kirstin Fosdick, multimedia production engineer, in the control room.

Meeting needs

With the basic structural design decided, the next phase was to imagine a control room that would serve both the current and future needs of the Recording Services department at CIM. This department produces 500-700 recordings of performances, rehearsals, sessions and broadcasts each year. With three full-time staff and more than 20 college students (2/3 instrumentalists, 1/3 audio majors), ease of operation – without detracting from production excellence – is crucial. In the past, the department dealt primarily with audio and stereo recording. However, driven by the new demands (coming from students, the school, broadcasters, distance learning and all the production values highly esteemed by these end users), surround sound production, advanced connectivity and quality video production were added to the department's repertoire. Careful forethought on how to select and implement these technologies became essential.

Although CIM's Recording Services staff was familiar with the many audio and video components available, they chose to collaborate with THX when making their selection. Adding THX's expertise guaranteed the production abilities of the control room would be exceptional and meet the exacting industry standards satisfied by all the other prestigious recording studios in the world. The THX team immediately went beyond measure with zealous energy, checking acoustic details and ensuring that only high-quality components, that would effectively perform tasks, were chosen.

One relatively simple decision was the selection of the audio console and core audio equipment. In keeping with CIM's pre-existing control room, which uses a Yamaha DM1000, a Yamaha DM2000VCM digital console was chosen as the new studio's focal point. The THX-approved DM2000 allows primary functions to be programmed reliably and securely for instant recall by student employees as well as provides the power and accuracy needed for complex productions. To capture and play back stereo content, a standard suite of components including a Tascam DVRA1000 high resolution recorder and Tascam CD Recorders was selected, which integrate perfectly with the DM2000's digital I/O options. Magix's Sequoia digital audio

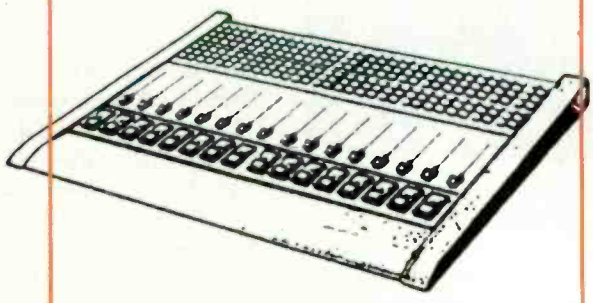
Nobody knows what the future holds.

(But there's a reason our logo is a crystal ball.)

Comdial Executech® PBX phone, *ca.* 1996. Comdial was one of the leading PBX companies in both sales and technology, with a million-square-foot assembly facility and over $7,000,000 in reported earnings. Comdial continued with traditional PBX tech and declining sales until filing for Chapter 11 bankruptcy protection in 2005, when all assets were acquired by **Vertical Communications**, a VoIP company.[1]

Cisco® 7970 IP Phone, *ca.* 2006. Founded in 1984 as a manufacturer of multi-protocol routers, Cisco began, in 1998, to promote VoIP technology to Fortune 500 companies as a more cost-efficient, feature-rich alternative to PBX phone systems. In just 10 years,VoIP effectively killed the traditional PBX; VoIP revenue is projected to reach $48 billion by the end of 2010.[2] Cisco annual revenue reached $35 billion in 2007.[3]

Axia Element broadcast console, *ca.* 2008. Founded in 2003, Axia is a division of Telos Systems, worldwide leaders in broadcast audio equipment. Axia was launched with the mission of bringing proven technology from the computer world – switched Ethernet, audio routing via IP, distributed network architecture – to radio. Using open standards and bulletproof Cisco routing technology, nearly 1000 Axia consoles have been built in just 5 years, making Axia the fastest-growing console brand in radio.



Generic TDM console, *ca.* 200x. Some radio consoles and routing systems are still based on Time-Division Multiplexing, developed in 1962. TDM was once the basis of most (if not all) digital PBX telephone systems. Consoles and routers based on TDM employ centralized "card cages" that require all inputs and outputs to be wired to a single location. Like traditional PBXs, TDMs typically rely on closed, proprietary code, and cannot be easily or economically changed or expanded when new operating criteria arise.

Santayana famously noted "Those who cannot learn from history are doomed to repeat it." Some people change when they feel the heat; others when they see the light. With that in mind, a quick comparison of telecom and broadcast technology reveals some common trends that broadcasters are finding hard to ignore.

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Technology

References: 1) EDGAR-online.com - http://sec.edgar-online.com/1995/05/12/00000023031-95-000001/Section12.asp - 2) Infonetics Research - http://www.infonetics.com/pr/2007/mul07.asp no.asp - 3) Wikipedia - http://en.wikipedia.org/wiki/Cisco

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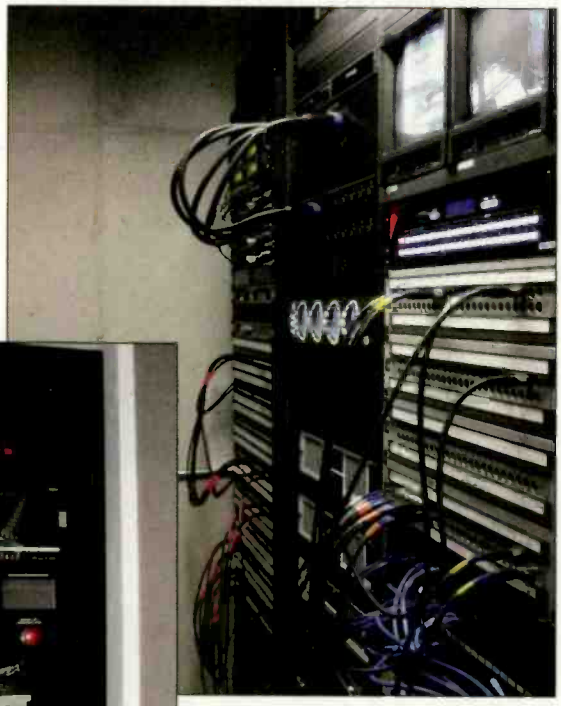

The stage manager's control station

Equipment racks in the machine room

workstation, running on a custom Sonica Systems XP Pro computer with Lynx I/O cards, was chosen to handle surround recording/production and multi-track content. Rounding out the audio components are 16 channels of precision Mytek Digital 8X192 high-definition analog-to-digital/digital-to-analog converters.

CIM's choice of video components was a bit more unusual. A mixture of consumer and professional equipment was selected to allow simple operations to be carried out while at the same time ensuring professional-grade (including HD) video production was possible. Sony consumer-grade DVD recorders were chosen to handle production of quick-reference DVDs, primarily because they are one of the few models able to defeat the auto-chapter feature upon recording. For professional video capture and production, the latest Apple Mac Pro (with two Quad Intel Xeon processors), equipped with an Aja Kona Card, was adopted to run the Final Cut Pro workstation along with various supplemental software and hardware. Rounding out the ensemble, to synchronize all the equipment and the various sync standards covered by the multitude of audio and video components, is a Rosendahl Nanosync HD.

Furniture needs

Before room design could truly go under way, audio and video monitoring and studio furniture had to be chosen for the Conrad Control room. Both became challenging aspects in design of the control room primarily because of its physical size. As with any studio, finding solidly constructed studio furniture that allows for optimal ease of use of the control room is crucial. Sound Construction and Supply, who produce solid and elegantly designed studio furniture, had a pre-existing design for the DM2000 that could be easily modified for the Conrad Control Room. However, monitoring took more finesse. In other control rooms, CIM utilizes precision-grade monitoring from ATC. However, the physical size of those monitors makes them difficult to use given the dimensions of the control room (approximately 16'7" L x 13'8" W x 11'8" H without acoustic treatment). Thus began the quest to find accurate and transparent mastering quality surround monitoring that could physically fit in the control. After listening to a wide variety of monitors, Lipinski Sound monitors and matching amplifiers were chosen. However, Lipinski's monitors had not been tested by THX, a process required to ensure studio performance and precision and provide their performance characteristics so to accurately plot how their acoustic properties would interact inside the room. This led to another fantastic collaboration where all components from Lipinski Sound, including the L-707 monitors, L-150 subwoofers and monoblock amplifiers were tested and THX approved. For video monitoring,

Equipment list

ADC digital/analog patchbay
AJA Kona LHe
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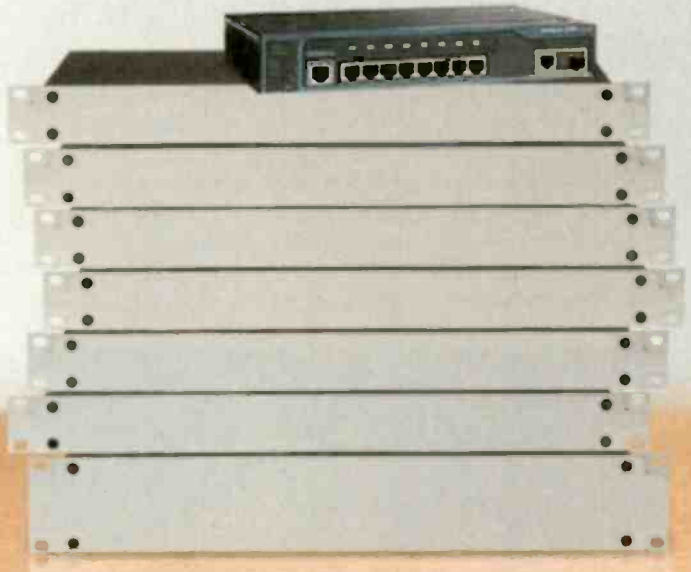
Apple MacPro, Final Cut Pro
Audio Arts Engineering 8400
Auto Patch Optima Series
Belden wire and cable
Burst Electronics BG-5CB
Cisco Systems Catalyst 3560G
Coleman Audio A-B 5.1
Dorrough 40A
Furman PL Plus Series 2
Gepco wire and cable
Henry Engineering Digimatch 2X6
Lipinski Sound L-707, L-301V, L-150, L-300
Lynx Studio Lynx Two, LS-AES cards
Magix Sequoia
Millennia Media HV-3R
Mytek Digital 8X192 ADDA
Neural Audio Downmix, Upmix
Neutrik connectors
Panasonic DMP-BD10A
Rosendahl NanosyncHD
RPG Acoustics Acoustic Treatment
Sharp LC46D62U
Sonica Systems PC Computer
Sony PCM-R500, RDR-GX355
Sound Construction and Supply Custom Studio Furniture
Tascam DVRA1000, CD-RW750, LA-80
Yamaha DM2000 with I/O Cards

Antiquated IP Audio



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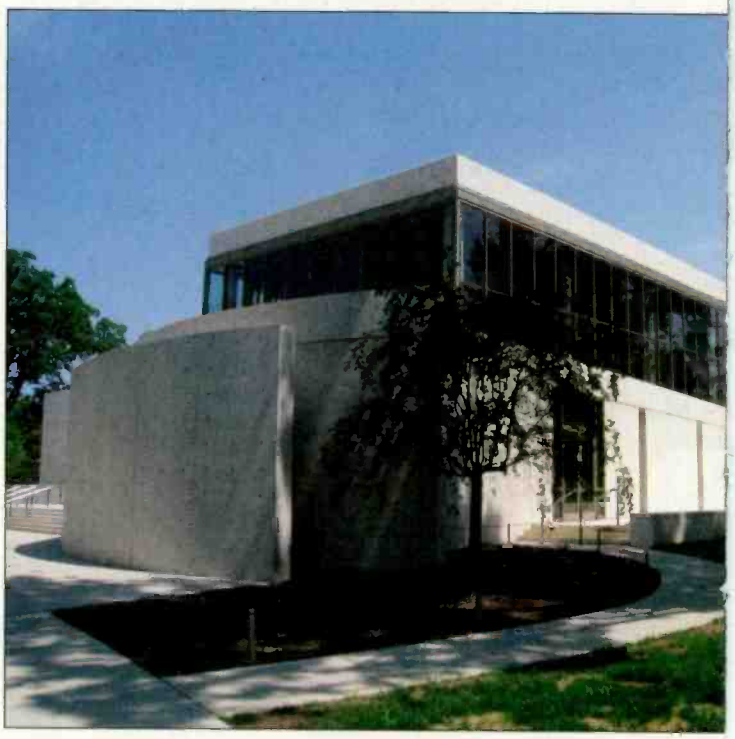
professional JVC monitors were used as well as THX approved Sharp LC46D62U HDTV.

With the primary furniture and components chosen, it was time to finalize the interior room design. Steven Martz and Andrew Poulain of THX went to work outlining where the components should reside for optimum use. Every aspect was examined by the THX team, who primarily focused on room design and acoustics, equipment performance, integration and speaker placement. Eventually, studio plans were drafted, finalized and approved for installation.

The interior acoustics utilize RPG Modex Broadband plate absorbers, Abflector acoustic panels and an array of their diffusion



CIM Mixon Hall exterior

products. The products transformed the room into an exceptionally comfortable studio space. With acoustic treatment complete, the studio furniture and monitoring was installed appropriately. The Yamaha DM2000VCM and other key components were connected to what CIM production employees have affectionately nicknamed "the brain". A narrow and confined room, it is a machine room designed in tandem with the Conrad Control Room and Mixon Hall, but that is not all. The machine room is also the central point through which all the audio and video interconnectivity throughout CIM passes including the pre-existing control room for CIM's Kulas Hall, Pogue Lobby and the student lounge. The room is also connected to CIM's Kulas Center for International Education and Patrick Audio Recording Center, which provide distance learning and audio instruction respectively. The brain also houses the majority of audio and video systems including wireless microphones and amplification systems for Mixon Hall. Wiring consists of thousands of single pairs of Belden or Gepco digital audio cable, high-definition coax cable along with CAT 5E and CAT 6 (all terminated through digital-grade ADC patch panels). Non-terminated (dark) fiber has also been installed throughout to ensure that as new technologies become available, they could be easily integrated.

Testing

Once the studio was complete, Andrew Poulain of THX performed real-world testing of the studio, using both proprietary and commonly found acoustic testing software and hardware. Monitors and furniture were maneuvered into their ideal performance locations. After two complete days of testing and extensive listening, the Conrad Control Room received the honor of becoming the first THX-Certified PM3 (professional music) control room to exist in a music conservatory in the world. Like other esteemed studios in the world that have received this coveted certification, the THX certification ensures that the room acoustics, speaker positions, equipment performance and systems are calibrated to provide an ideal production environment for aspiring musicians and engineers.

The THX Certification and interconnectivity allow for a variety of unique abilities both to the Conrad Control Room and beyond. Various locations throughout the building are able to control functions such as the stage director's control station located just off of Mixon Hall's stage. The connectivity continues to allow CIM's Recording Services the ability to further advance productions including more than a dozen live broadcasts each year, as well as other broadcast events. Complete with audio, video and appropriate sound treatment, one of Mixon Hall's dressing rooms easily converts into an announce booth. Live broadcasts can be transmitted via audio over IP, Internet and legacy ISDN codecs. To ensure a variety of productions are possible, many features of Mixon Hall can be controlled directly from the Conrad Control Room including two Millennia Media HV-3R eight-channel remote control microphone pre-amplifiers, an array of remote control status/security cameras, a Panasonic professional video camera, as well as the hall's acoustic draperies, video projection system and more.

The THX certification successfully enables the Conrad Control room to record and produce surround content accurately, including that from Mixon Hall via some Schoeps microphones. This unique ability presented one last challenge: How would surround content be delivered to students, the majority of who receive their recordings on CD (or stereo-only DVD) and radio listeners. To resolve this issue, the proven system of Neural-THX Surround was implemented.

The Neural-THX Surround professional digital audio production products allow real-time encoding of surround content while preserving the rich envelopment and image detail of surround sound into a format 100 percent compatible with stereo. This allows for the surround content to be used in CDs, radios, portable digital music players and digital music downloads – all formats CIM Recording Services produces.

CIM's investment to achieve THX certification, utilize Neural-THX Surround and build a studio with a high caliber of audio, video and production equipment allows the Conrad Control Room to offer students, faculty and staff the ability to produce recordings with the greatest attention to quality and detail while using cutting edge technologies, all while keeping ease of operation while maintaining production excellence a reality.

Kosiorek is director of recording services at the Cleveland Institute of Music.

DEEP IN THE HEART

The 2008 NAB Radio Show heads to Austin

By Erin Shipps

I don't think there's a more fitting place to host the NAB Radio Show than the Live Music Capital of the World. Music has a way of bringing people together and radio plays a big part in that. Coming together for this year's show, Sept. 17-19, are more than 100 exhibitors with hundreds of products to showcase. You'll see wattmeters, exciters, combiners, STLs, routers, transmitters, processors, Web servers, and more. Not to mention the variety of services you'll find courtesy of companies like Stream On!, Jetcast, MySimBook.com and Stream the World.

Providers like these will play a vital role in the future of radio, as a strong Web-presence is becoming nearly mandatory for all stations. You'll see a focus on this idea in many of the sessions this year. From streaming to podcasting to on-demand audio, be prepared to learn a lot about new technologies. This year the NAB has also hooked up with Hip Cricket, sending mobile alerts of your favorite sessions to your cell phone 15 minutes before they begin. Now you have no excuse to be late!

The NAB Radio show is bringing a lot of things together this year, including people you just love to see every once in a while. Join us for what is bound to be an enlightening experience.

Mini IP audio router
Logitek

Jetstream Mini: The Jetstream Series includes IP-based audio routers that provide audio I/O, mixing, processing and audio distribution needs for radio applications. The first in the series, the Jetstream Mini, provides enough capacity for one 24-channel radio console. Logitek's existing control surfaces – Mosaic, Artisan and Remora – provide the user interface to the Jetstream. One Jetstream Mini unit provides eight I/O card slots that accommodate five types of I/O cards: four mic preamps (with phantom power); four stereo analog line inputs; four stereo analog line outputs; four stereo AES or S/PDIF digital inputs and four stereo AES or S/PDIF digital outputs. Also included are 12 GPI and 16 GPO contacts; four RS-485 ports with AES cue audio; 2 GbE Ethernet ports and redundant power supplies in a single two rack unit enclosure.

800-231-5870; www.logitekaudio.com
info@logitekaudio.com

Station services
Burk Technology

Installation and integration services: Burk Technology offers installation and integration services. Broadcasters looking to expand or redesign their remote monitoring and control capabilities can now look to Burk Technology for integration services tailored for specific station, group or network needs. Burk has hired Ben Allen as applications engineer to work directly with users to assure smooth system integration from initial specification to operator training.

800-255-8090; www.burk.com; sales@burk.com

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IP DUAL AUDIO CODEC

- Includes LAN, ISDN U & S/T, and X.21 interfaces standard
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- Built-in Web Browser for control and monitor from remote locations
- Comes fully loaded with every available algorithm included

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- Based on Suprima: Includes many of the same features
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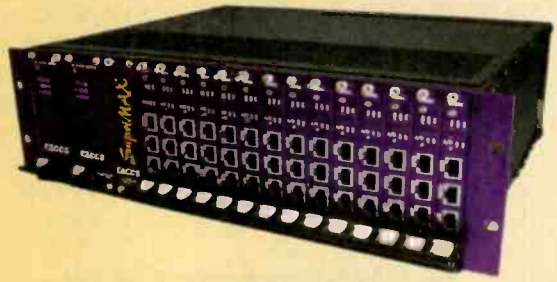
- Lightweight & rugged design

SupriMAX

UP TO 14 IP AUDIO CODECS IN A 3U RACK



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UP TO 4 IP AUDIO CODECS IN A 1U RACK

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- Redundant Power Supplies
- Fully loaded with every available algorithm included
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Ethernet audio system
Wheatstone

E²: The E² System is designed to interface with Wheatstone's existing line of E-Series control surfaces including the new Evolution 4 control surface. The flexible E² system is comprised of linkable units or squares that communicate with one another via a single CAT-5E/6 cable connected to standard layer 3 Ethernet switches. The E² Digital Engine handles all of the mixes from the E-Series surfaces while housing the DSP power and managing the distribution of PGM, AUX, and mix-minus buses throughout the system. 12 Universal Logic ports are encased in the single rack unit which is equipped with front-panel access to real-time control features such as IP setting, up time, network traffic and logic status. Web/PC software user interfaces provide remote access and control.

252-638-7000; www.wheatstone.com
sales@wheatstone.com

Digital STL
APT

Worldcast Horizon HD: The Worldcast Horizon HD is a duplex stereo codec that enables broadcasters to deliver analog and digital content from studio to transmitter site. With both a T1 and Ethernet interface, broadcasters can utilize existing T1 links for the analog stream transport and send their digital content as a UDP stream embedded in the T1 link, eliminating the need for additional bandwidth and cost. At the remote/transmitter link, the digital content is presented back on an IP port. As a fully duplex device, Worldcast Horizon HD allows off-air monitoring or an independent channel to backhaul RPU feeds and satellite downlinked audio. An RS-232 port is available for PAD and contact closures for remote control.

800-955-APTX; www.aptx.com; info@aptx.com

AM transmitter
Nautel

NX50: For high-power AM broadcasting, the new NX50 is the next generation of the company's 50kW transmitter. The NX50 supports all HD Radio or DRM modes with an internal DRM or Exgine IBOC generator. The NX50 provides adaptive precorrection, 2.7MHz Direct Digital Modulation, and 88 percent efficiency. It features Nautel's new Advanced User Interface (AUI), a 17" color LCD screen with a wide range of configurable displays. The AUI includes real time locus measurement, an instrument grade spectrum analyzer, IBOC modulation analyzer, module-level monitoring and control and logging of all functions. The AUI can be controlled by touch screen or via a mouse and keyboard. In addition, users have 100 percent remote access to transmitters via a Web browser.

207-947-8200; www.nautel.com; info@nautel.com

Remote control system
Davicom/Comlab Telecommunications

Micro MAC: Micro MAC is designed to handle the remote-control and monitoring needs of small repeater or booster sites. I/O capability includes eight metering, eight status and eight relays, and communications is achieved over dial-up or IP networks. The Micro MAC operates with the same Graphical User Interface as other MAC products, so personnel can easily control all sites, from the smallest to the largest, with a unit from the Davicom MAC family. The Micro MAC is just as intelligent as other MAC units with extensive condition-driven and event-driven programming capabilities. It boasts the industry's widest choice of communication means, including: voice/DTMF, PC, fax, e-mail, pager, text messaging, SNMP and Web browser. It also allows easy access via a Blackberry or smart phones.

418-682-3380; www.davicom.com
info@davicom.com

Telephone hybrid
AEQ

TH-02EX: This digital telephone hybrid has an incorporated frequency extender and is capable of operating with single or dual lines. Independent line-level or multiplexed outputs are provided by its multiplexing capabilities. Working with dual lines permits telephone multi-conference, allowing the on-air personality and two callers to talk and listen to each other simultaneously. Feedback is eliminated by the digital hybrid. No adjustments are required to operate.

800-728-0536; www.aeqbroadcast.com
sales@aeqbroadcast.com

Standalone Web server
OMT Technologies

Web Secure+: This stand-alone Web server works with OMT's Imedialogger digital logger. When combined, these provide a media recording and distribution center for audio asset storage, secure access and centralized content management and distribution of logged content to share with internal personnel and offer to public radio listeners. Web Secure+ utilizes a MySQL database and is interfaced with PHP and Perl script applications. It uses a Linux OS to provide a highly efficient software application suitable for Web appliance and server applications.

888-665-0501; www.omt.net; omt@omt.net

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Multi-Function Portable Audio Codec

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General features:

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- Remote audio over any IP network, right out of the box
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- PSTN/POTS and ISDN TELCO modules available now - more coming soon

Unique design features:

- User configurable digital mixer (cross-point and summing)
- Analog mic and line inputs
- Dynamically processed analog inputs (DLPs)
- Mic phantom power

Additional features:

- Independent Main Program and Coordination / Talk-Back channels
- Advanced user interface & crystal clear color display
- Optional high-power Li-Ion battery
- Built with ABS material and includes a transparent protective cover
- Complete mobility: Use with shoulder strap or place on a table top
- Compatible with most manufacturer's codecs both in IP (N/ACIP EBU Tech3326) and ISDN
- Superior performance at a very competitive price

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- Automation Software For ON-AIR, Production, And News
- Multiplexers, A/D Converters, Monitors, And Digital Commentary Systems For Large Or Small Sporting Events

For prices and demos call:

Toll Free: 1-800-728-0536
Tel: 1-954-581-7999

web: www.aeqbroadcast.com
email: sales@aeqbroadcast.com

Medium power FM constant impedance combiner
ERI-Electronics Research

Model 955-8: ERI has extended its product line of low- and medium-power FM band pass filters and FM combiners with a new constant impedance version of its 955 Series. The module is suitable for either analog or IBOC FM transmission applications. It is designed to be floor-mounted and is shipped completely assembled in an integrated support frame for easy installation. The individual modules are configurable to be hung from transmitter room ceilings or stacked in a support frame if individual site conditions require it. The individual combiner modules, depending on configuration, can accommodate individual station output power levels up to 10kW.

812-925-6000; www.ERIinc.com; sales@ERIinc.com

Stratex Networks STL
Harris

LE3000: The Harris Stratex Networks LE3000 license-exempt radios offer wireless STL support for radio broadcasters unable to secure a dedicated T1 or a 950MHz RF connection between the studio and transmitter site. The easy-to-install, frequency-agile radios offer bidirectional T1/E1 and Ethernet ports to secure connectivity to an Intraplex chassis at both ends. The bidirectional support is ideal for HD Radio broadcasters who require reliable, two-way communication to support Ethernet-TCP traffic, along with STL and TSL (transmitter-to-studio link) audio, control data and telephone connectivity between the studio and the transmitter site.

800-622-0022; www.broadcast.harris.com
broadcast@harris.com

Ad trafficking
Liquid Compass

Traffic My Ads: Creating a new revenue channel with streaming requires the time, attention and focus of properly trained individuals. Because this is not always possible, Liquid Compass has created a division that focuses solely on providing professionally managed ad trafficking for all streaming and Web advertising. With Traffic My Ads, just send traffic requests directly to the team to do all the work. Stations no longer need to worry about hiring or training new staff to manage streaming media initiatives, learn a new application to manage and traffic in-stream commercial inventory or oversee sales executives to ensure that ads are scheduled properly.

303-839-9400; www.liquidcompass.net; info@liquidcompass.net

Signal processor
Vorsis

AP2000: The AP2000 is the successor to the Vorsis AP1000 31-band audio processor. Essentially a complete redesign of the original product, the AP2000 hardware is equipped with 30 percent more DSP horsepower, a completely overhauled five-band AGC, new voice distortion management technologies and a new, high-performance distortion managed clipper. The five-band AGC now incorporates Sweet Spot Technology (SST), a Vorsis exclusive, which manages the behavior of the five-band AGC in real time to ensure that it always operates within its sweet spot. SST is a completely new way to manage the five-band dynamics controller to maximize the consistency of the station's on-air presentation, no matter what the source material or audio levels from source to program source.

252-638-7000; www.vorsis.com
sales@vorsis.com

Realtime noise reduction
Izotope

ANR-B: The ANR-B uses Izotope's noise reduction technology to intelligently identify and suppress environmental broadband noise, hum, phone line artifacts and more. Unlike other noise reduction systems, the ANR-B detects noise in real-time and adapts to changing noise over time, allowing for automatic operation with little to no input required from the user. Designed to suit a wide range of broadcast applications, the two channel ANR-B features broadcast connections including analog and digital I/O, LAN for advanced parameter control, and MIDI for remote automation. Presets are available for common applications while simple controls and clear meters help to quickly customize settings for unique situations.

www.izotope.com; izotope@izotope.com

Streaming audio program
Stream On

Stream On!: Using the Ogg Vorbis encoder, Stream on Fiber saves a station time and money while generating more revenue and listenership through Web streaming. Stream on Fiber is simple to use: Attach audio into the encoding appliance. It features an independent audio player, no maintenance is required and there are no encoder licensing costs.

951-801-2309; www.streamon.fm
services@streamonfiber.com

StudioHub+ Inside

Plug and play your next installation with Radio Systems Millenium Broadcast Consoles now with StudioHub+ inside – the Broadcast Wiring Standard.

ANALOG Two inputs per channel with fully agile - mic thru line sensitivity on every input • Soft touch, LED lit ultra-wear rubber keypads • Two stereo program buses with TEL mix minus bus output • Up to four additional mix-minus outputs available • Full metering and monitor section • Up/down clock/timer with master sync capability • Complete GPI channel remote control provided for all A & B inputs • Available in 6 / 12 / 18 / 24 channel frame sizes

DIGITAL AES / EBU or analog on any input channel • Mic thru line sensitivity on every analog input • Soft touch, LED lit ultra-wear rubber keypads • Two stereo program buses with TEL mix minus bus output • Ten fully programmable mix-minus outputs — standard • All outputs provided in analog and digital simultaneously • LED VU or PPM metering and full monitor section • Up/down clock/timer with master sync capability • Complete GPI channel remote control provided for all A & B inputs • Available in 6 / 12 / 18 / 24 channel frame sizes

NETWORK Six IP audio Livewire channels with LCD selectors • Local input channels with two inputs per channel / analog or digital / mic thru line • Soft touch, LED lit ultra-wear rubber keypads • Two stereo program buses with TEL mix minus bus output • Ten fully programmable mix-minus outputs – standard • All outputs provided in analog and digital simultaneously • Full metering and monitoring • Up/down clock/timer with master sync capability • Complete GPI channel remote control provided for all A & B inputs • Available in 6 / 12 / 18 / 24 channel frame sizes

ANALOG is good. There are over 4000 analog Millenium consoles in service today and we continue to manufacture and ship analog consoles every day. That's because these boards are inexpensive, sound great (with specifications that rival and exceed many digital designs) and have enough features for many small and medium market applications. For more demanding applications, our analog consoles optionally can be equipped with additional mix-minus outputs, distributed output busses and redundant supplies making them even more capable and still a great value.

Going DIGITAL is a process. Radio Systems eliminates some of the stress with our **no charge** Digital upgrade program. For the life of your console we will swap any analog plug-in card for a digital one (or vice-versa) allowing you to gradually transition your studio to digital. And, from day one your Millenium Digital console will output pristine digital audio to feed your air-chain processor and produce up to ten fully configurable mix-minus feeds.

At Radio Systems, our NETWORK is IP Audio by Livewire®. We've adopted this proven multi-channel standard from Axia® and installed it in our digital consoles. But we left local inputs as well to create the perfect hybrid of stand-alone and network capabilities. This way Millenium Network consoles easily mix local studio sources and connect to all Livewire enabled devices using standard Ethernet switches.

StudioHub+® is the glue of our entire console line. Use our award-winning CAT-5 wiring system to simply and quickly plug any source into any console channel. Or, easily configure custom talent panels and even interstudio tie line connections. And its value doesn't end after the installation is over. RJ-45 connectors allow new sources to be added at any time and makes trouble shooting easy.

radio SYSTEMS

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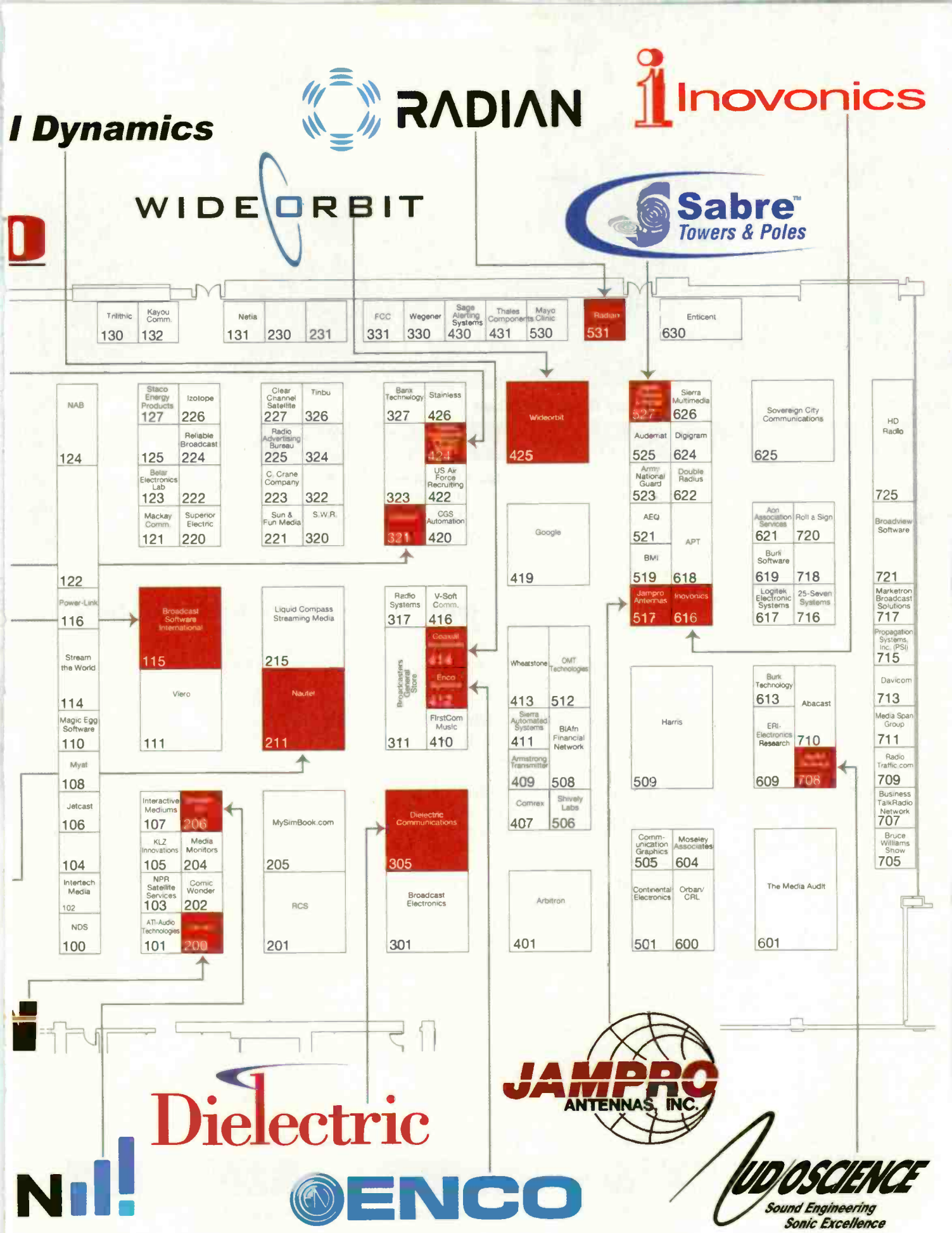
DEEP IN THE HEART

The 2008 NAB Radio Show Map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DEEP IN THE HEART

The 2008 NAB Radio Show Sessions

Tuesday, Sept. 16	
4 p.m.-6 p.m.	**Meet and Greet Reception**
Wednesday, Sept. 17	
8 a.m.-9 a.m.	**Renting AM Tower to Non-Broadcasters – Practical Tips for Managers and Engineers** – Garrison Cavell, Erwin Krasnow This presentation for managers and engineers alike provides practical, easily understood insight into the game of renting space on your AM station's directional or non-directional tower. Topics include liability issues, leasing "gotchas," planning for shared use, understanding each other's needs, FCC consideration, and (simplified) technical issues.
9 a.m.-10 a.m.	**Psycho Acoustics: Is Jim Loupas Crazy When He Says Branding with Sound Will Make your Radio Station More Successful?** – James Loupas In today's ultra-competitive market, branding with sound is a potent weapon in the radio broadcaster's arsenal. Processing is part of it, but not all of it. Come learn the five ways you can make your sound a unique brand in your market.
10 a.m.-11 a.m.	**FM Boosters – Opportunities and Challenges** – Stan Salek Examples of both successes and failures will be presented, along with consideration of performance expectations when FM boosters are designed for IBOC digital radio compatibility.
11 a.m.-12 p.m.	**Advances in Remote Control Technology** – Tony Peterle One area of broadcasting that has lagged somewhat behind the technological tidal wave is remote facility control, but that is now beginning to change. This workshop presentation explores the new technology being applied to remote facility control.
1 p.m.-2 p.m.	**This Just In...The Latest on PPM** – Chuck DuCoty, Doug Abernethy, Pierre Bouvard and Bill Weston From Houston to New York (with Philly in between), PPM has kept the industry talking. Our panel will address all the PPM issues, including the current data and subsequent rollouts, as well as status reports from markets using PPM.
1:30 p.m.-3:30 p.m.	**NRSC Meeting**
3:30 p.m.-4:30 p.m.	**State of the Industry and Keynote Address** – David Pogue and David Rehr *New York Times* columnist and Emmy-winning technology correspondent for CBS News Sunday Morning," David Pogue, will deliver the keynote address, offering a unique perspective on the opportunities evolving technology brings to the future of radio. NAB President and CEO David Rehr will make the Show's State of the Industry Address.
4:30 p.m.-8 p.m.	**Opening Reception on Exhibit Floor/Exhibit Halls Open**
Thursday, Sept. 18	
7:15 a.m.-8:45 a.m.	**Radio Show Breakfast: One-on-one with FCC Chairman Martin**

8 a.m.-9 a.m.	**Next Generation IP-based Audio** – Tag Borland Recently available protocols allow multicasting systems, like digital mixers, to automatically find and select the many settings required for network communication. Start planning for the coming change.
9 a.m.-10 a.m.	**High Bandwidth Capacity RF STL/TSL Connectivity** – Lawrence Miller and James Moody This session will examine and present possible solutions for high bandwidth studio-to-transmitter, studio-to-studio and transmitter-to-transmitter connectivity problems. Modern broadcast data connections were not even contemplated when the FCC drafted the rules that govern STL connectivity. Those rules have not evolved with the demands of technology, and broadcasters are now faced with a connectivity dilemma that often dictates looking beyond Part 74 to Part 101 of the FCC rules.
9 a.m.-5 p.m.	**Exhibit Floor Open**
10 a.m.-12 p.m.	**HD Radio Measurements Workshop** – David Maxson Some of what will be covered in this special workshop includes the HD Radio signal and spectrum, the HD Radio Mask evolution, the current state of the rules, what is PSD and how do you measure it and analog signals versus digital.
2 p.m.-3:30 p.m.	**The Embedded Exporter Technical Panel** – David Layer, moderator; Tim Anderson, Daniel Dickey, Ted Lantz, Scott Martin, panelists In this session, the differences between the previous generation of Exporter equipment and the new Embedded Exporter will be explained, with a focus on how this new technology promises enhanced reliability and a greater feature set while at the same time substantially lowering the cost of upgrading to HD Radio technology.
3:30 p.m.-5 p.m.	**Radio Marketplace Reception**
6 p.m.	***Radio* magazine ART Awards Reception**

The 2008 NAB Radio Show

Friday, Sept. 19	
8 a.m.-10 a.m.	**High-Power IBOC Technical Panel** – Geoffrey Mendenhall, Jeff Detweiler, Daniel Dickey, Ted Lantz, Gary Liebisch, Milford Smith and Mike Starling In June, a group of radio broadcasters asked the FCC to allow FM broadcasters, at their option, to increase the power in the digital portion of their hybrid IBOC signals by up to 10dB. In this session, a panel of technical experts will discuss this proposal, explaining the potential impact on existing facilities as well as how to best design new facilities for higher power operation.
10 a.m.-11 a.m.	**The HD Radio EPG Project** – Rick Ducey, Adrian Cross, Joseph D'Angelo, David Maxson and Skip Pizzi One of the advanced features supported by the HD Radio system is transmission of an electronic program guide (EPG). The NAB technology advocacy program, has a team of technical experts from BIA Financial Network, Broadcast Signal Lab and Unique Interactive working with Ibiquity to develop the business requirements, system architecture and specifications of an EPG suited to the HD Radio market for local broadcasters. During this one-hour presentation the EPG project team will discuss their plans and progress to date.
11 a.m.-12 p.m.	**Copper Theft at Broadcast Sites** – Sterling Davis, Bob Brand, Chuck Carr and Steve Davis Copper theft is becoming a major concern for many broadcasters around the world. Not only are facilities being vandalized, but many times the outcome results in lost airtime. This panel session addresses the scope of the copper theft issue and focuses on ways broadcasters can work with law enforcement to protect their assets.
12 p.m.-1:30 p.m.	**NAB Radio Luncheon**

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then you should think again !

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www.arrakis-systems.com

970-461-0730

WEB 2.0

By Joe Dysart

Technologists busily re-inventing the Web say radio stations can look forward to an Internet where it's much easier to collaborate, innovate, and manipulate data and software on a wide variety of Net-friendly devices.

Driving this change – a trend loosely referred to as Web 2.0 – will be the rapid and widespread adoption of social networks by radio stations and other businesses. Employees will seize on to these networks to collaborate internally, and listeners will use them as an active part in forging direction on all aspects of a station's identity.

Indeed, technology market research firm Forrester predicts that business investment in social networks designed for customer and client input alone will reach nearly $1 billion annually by 2013, as corporations capitalize on a trend first popularized by companies like MySpace and Facebook. Entry level social networks, in the form of radio station blogs and simple discussion forums that invite and publish comment from visitors, are already popping up on the Web. The Bob Edwards Show heard on Satellite XM's XMPR, for example, has its own community discussion board, as does NPR-affiliate 89.7 FM, WKSU, (www.folkalley.com/community/forum) and 90.1 FM, WMPR (www.wmpr901.com/messave_board.php).

In addition, more full-blown social networks – miniature replicas of MySpace and Facebook – are expected to become increasingly common. Clear Channel Radio, for example, launched its online community portal www.erockster.com this past spring. The social network features a discussion board, blogs, member-uploaded photos and videos, as well as on-air, online and on-

MEAT & POTATOES WITH SOME PRETTY COOL BELLS AND WHISTLES.

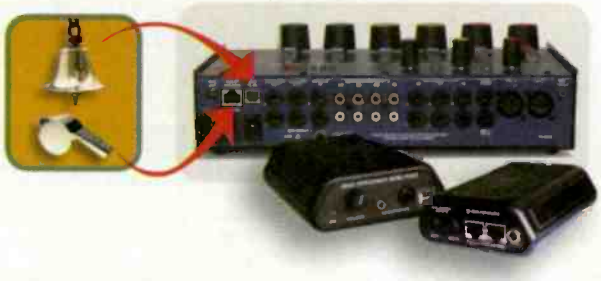
Finally, a super compact ultra-portable broadcast mixer that's perfect for any job you want to throw at it. It's loaded with the staples big professional radio consoles have to ensure your shows come off without a hitch. And unlike the big boys, it's got a bell and whistle or two that make it the essential centerpiece part of any ad hoc studio.

Intuitive and easy to use, with large color-coded controls and bright LED meters, it gives you superb audio quality with ten mic and line-level inputs across six mixing channels for real versatility. And you can seamlessly add a guest announcer with their own headphone mix with our optional Multiphones MiniPod (bell).

With its built in DA/AD audio codec via a USB port (whistle), simply connect the SixMix to any USB-compatible computer and you're on the air. Use your favorite software to serve up tunes or any recorded program material through the SixMix. Push your program back to your computer for recording or streaming. Need to send a separate feed to another PC or server? There's even a dedicated S/PDIF port to handle it.

Factor in its cue speaker and automatic monitor muting, mix-minus output, comprehensive headphone and monitor systems, plus a wealth of output options and it's clear to see that SixMix will transform your laptop or desktop computer into a full-fledged professional broadcast studio.

SixMix. You're on the air.



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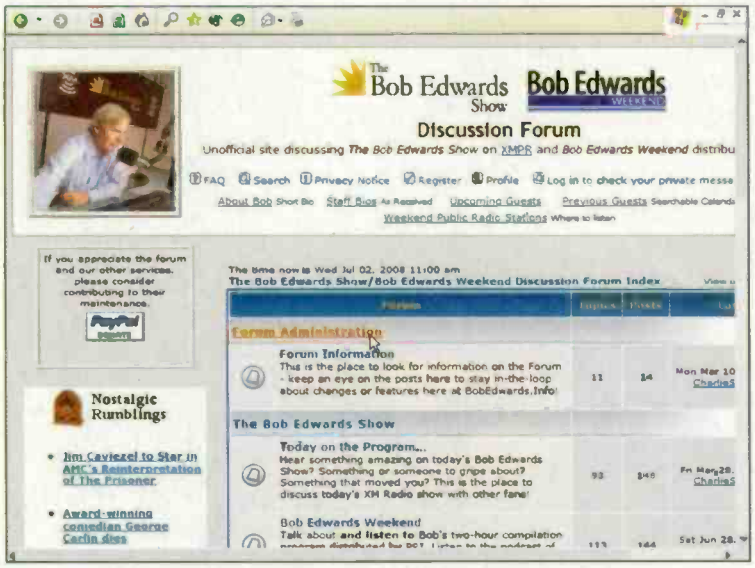
demand music that targets 13-34 year-olds. Members also get to influence erockster.com's content by inputting their preferences on the site.

"Our main focus will be on quality and we're going to give a lot of bands that don't have a chance to be heard on the radio that opportunity," says Eric Szmanda, erockster.com's chief producer. Initially, radio stations will be able to source software for building these social networks from small and nimble boutique providers like Neighborhood America and Leverage Software, which offer tool suites that bundle together the most popular facets of social networking, such as profile creation, blogs, discussion forums and content uploading and sharing, according to Forrester.



The Bob Edwards show reaches out to Web users with its own discussion board.

But by 2013, expect the biggest guns in the software industry, including SAP, IBM and Microsoft, to fully incorporate Web 2.0 tools in their product lines, says G. Oliver Young, author of the April 2008 Forrester report, "Global Enterprise Web 2.0 Market Forecast: 2007 To 2013."

"SAP, IBM, Microsoft and others are already beginning to give away Web 2.0 functionality for free to drive use of their core applications and value engines," Young says. "Microsoft's SharePoint has a lightweight wiki (a network-based collaboration tool), while IBM is now offering social networking mashup technology through its Lotus Connections and Lotus mashups products, respectively." (Mashups are tools that enable users to combine data from previously disparate databases, which often reside in different software applications.)

Meanwhile, equally influential in the re-invented Web will be a new approach to computing where most – if not all – of a company's software applications will reside on the universally accessible Web, rather than locked

away on mainframes or on individual PCs – a concept known as cloud computing.

Emblematic of this trend is Microsoft's new Live Mesh, software, which is being designed to link together all of a company's Internet devices – including desktops, laptops, Mac computers, cameras, mobile phones, media centers and digital picture frames – for instant collaborotion.

Essentially, the software will enable a radio station to synchronize all data and applications across all devices as much as possible, enabling all of those devices to become aware of each other as long as each is linked to the Internet via a wire, or via Wi-fi, according to Amit Mital, Microsoft's general manager, Live Mesh.

A radio station using a full-blown version of Live Mesh, for example, would be able shoot an interview on-air with a hot star, automatically video stream that on the station's website and to listeners' cell phones, while simultaneously having the video crop on-screen at a presentation the station is giving at an industry trade show.

Currently, Live Mesh only links Windows-based PCs connected to the Web via wire or Wi-fi, although plans are in development to enable firms to link mobile phones and Mac computers within the same Mesh, Mital says.

Of course, in its ideal form, cloud computing will not be driven by a just one major company like Microsoft, or favor the linking of devices that run on one type of software, according to Tim O'Reilly, CEO of O'Reilly Media, a computer book publishing firm that also hosts conferences on Web 2.0 (www.web2expo.com).

Instead, the purest implementation of cloud computing will enable any computerized device a company uses to simultaneously interconnect with every other computerized device in a company's technology arsenal, O'Reilly says.

A new social network from Clear Channel, erockster.com borrows a page from MySpace and Facebook.

That ethic – a business-world based on the premise that all software should be able to easily run on all computerized devices, regardless of what company creates that device or software – is another major component of the re-invented Web, often referred to as open source computing.

Folk fanatics regularly drop into the "Folk Alley" discussion board, affiliated with NPR-affiliate WKSU.

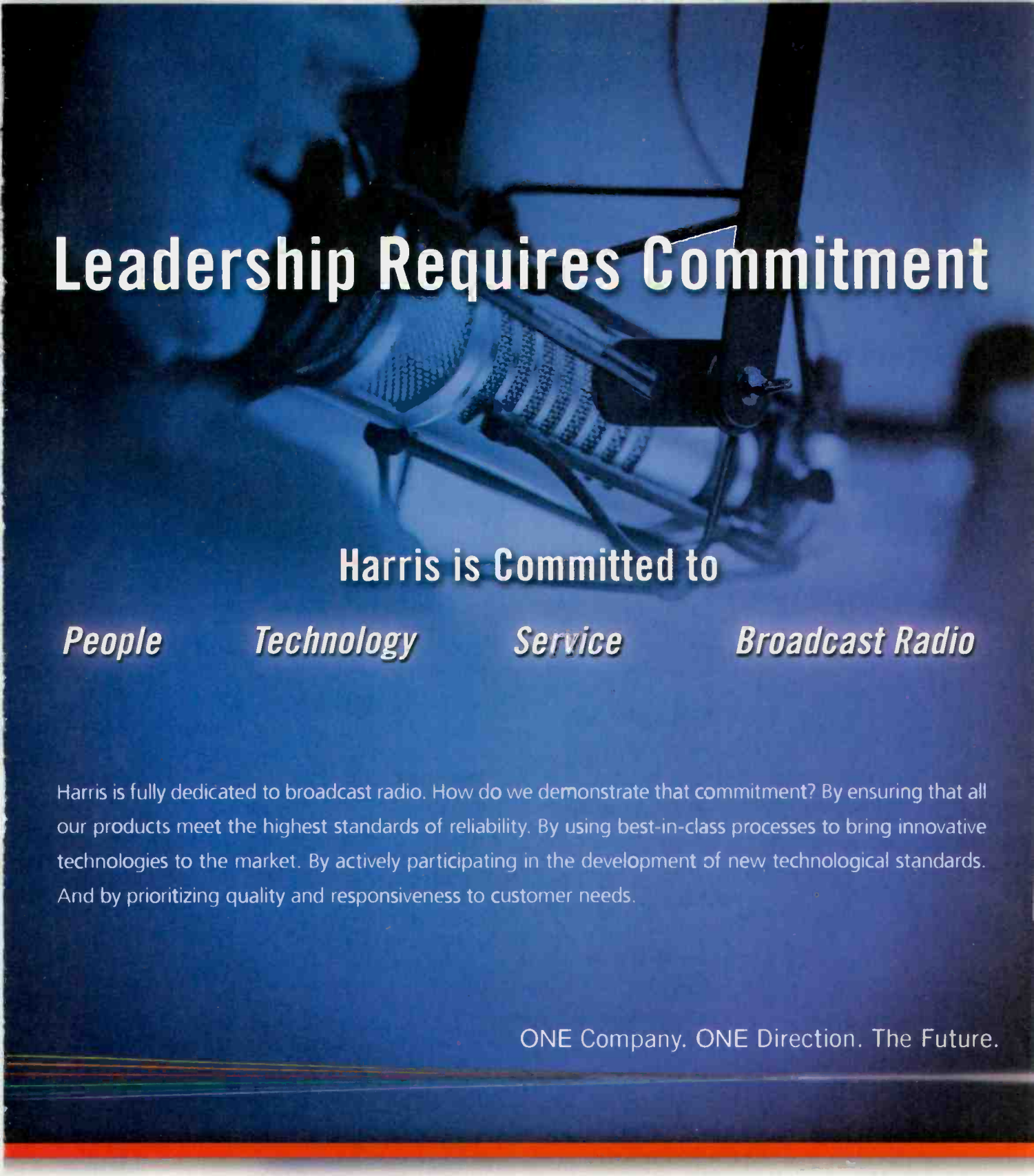
Most technologists point to the Linux operating system – an alternative to Microsoft Windows that is free, owned by no company in particular, and is specifically designed to encourage innovation by anyone and everyone who is interested in enhancing the system – as a key example of that ethic in action.

But more recently, extremely influential technology companies like Yahoo! have decided to embrace the ethic as a core business philosophy. In fact, Ari Balogh, Yahoo!'s chief technology officer, says the company is literally in the process of re-wiring itself from inside out to ensure that independent software developers will easily be able to develop new applications for the Yahoo! community – and instantly post those applications to Yahoo!

In practice, Balogh says this added openness will result, in part, in an ever-increasing number of data mashup tools, which will enable Yahoo! users to combine data available on Yahoo! in new ways for highly specific research needs.

An individual radio station embracing this same ethic, for example, could enable an enthusiastic listener to post a mashup tool on the station website that could be used to automatically find and post links to blogs authored by other listeners who absolutely love certain on-air personalities – or anything else about the station.

Finally, another cornerstone of the re-invented Web will be the increasing proliferation of computerized sensors programmed to continually update the Web with



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time-sensitive data, according to O'Reilly. Essentially, these sensors will eliminate the drudgery of inputting such data by hand.

O'Reilly points to vehicle traffic analysis systems like Dash Navigation and Microsoft's still-in-development Clear Flow as pioneers of this trend. Both software solutions rely on GPS devices embedded in a large number vehicles to automatically relay data to Web-based software, which is used to analyze traffic patterns and suggest alternative to routes for drivers.

WMPR's message board has hundreds of discussion threads.

As the future Web rolls out, we will all be asked to contribute our sensors, to help drive a wide array of analysis software tools residing on the Web, O'Reilly says.

Unfortunately, there is a dark side to all this frothy innovation. As more and more data and software applications migrate to the Web, there is a real threat that ultimate control of most of those applications and data may become centralized in the hands of a few, large technology companies, O'Reilly warns. "We need to watch that," he says.

Fortunately, those who believe that everything new is not necessarily better can take solace in the prediction that the revolutionary tool that made the Web possible, the Web browser, will most likely be around for a long time to come – despite the fact that competitors like the Iphone are beginning to crop up.

The reason? Despite the fact that the Web browser is "so nineties," the tool is such a ubiquitously entrenched part of the Web experience for users across the globe, it makes no sense to re-invent the wheel. "There's really no incentive," says Mark Andreessen, founder of Netscape, the browser that played a pivotal role in the emergence of the Web.

Joe Dysart is an Internet speaker and business consultant based in Manhattan.

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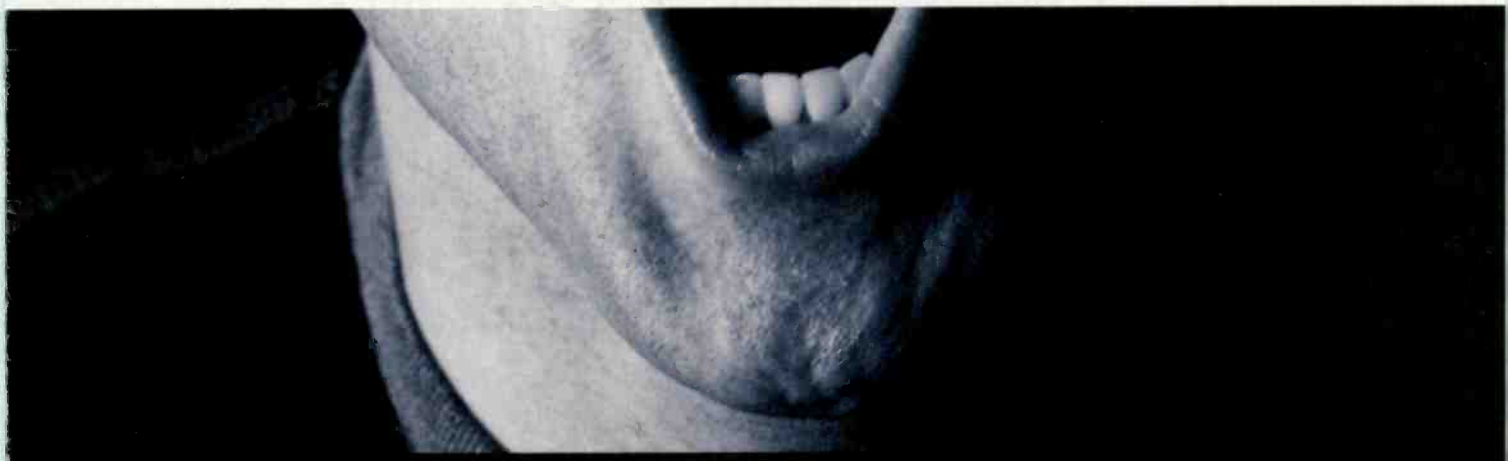

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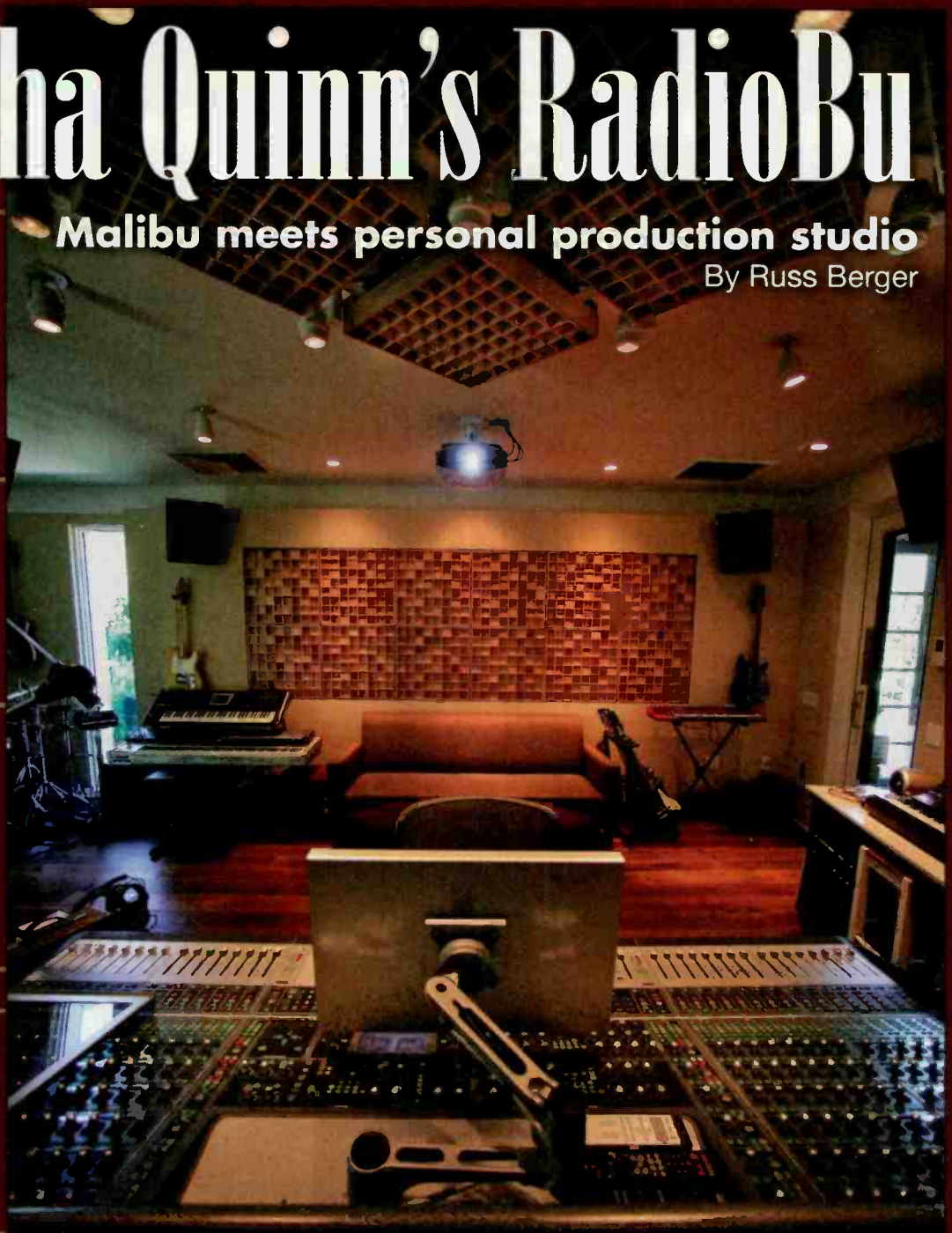
Martha Quinn's RadioBu

Malibu meets personal production studio

By Russ Berger



Having a custom-built personal studio was once a luxury that on-air radio talent could not experience. With the move toward computer-based digital recording technologies, more and more on-air talent are finding that owning their own personal studio is now within reach.

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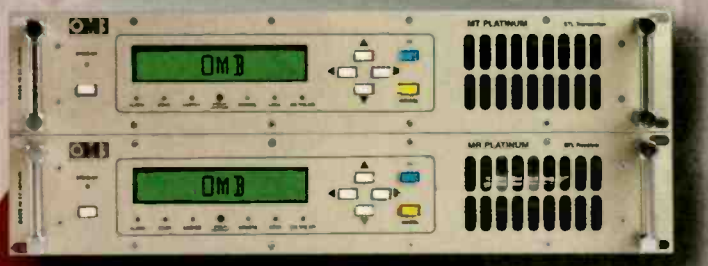
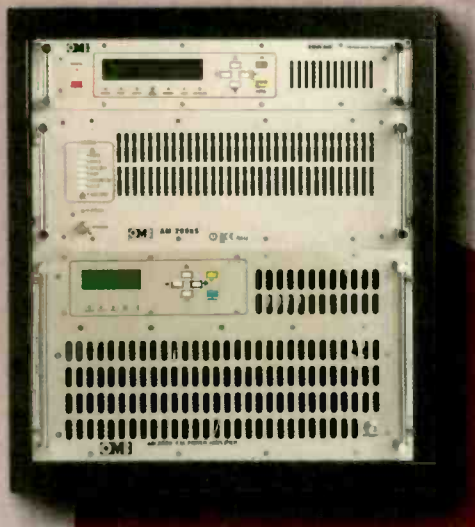


MT/MR PLATINUM

>1GHz is a high-performance Studio-to-Transmitter Link. It is made up of the 5W MT transmitter externally synthesized in 10MHz sub-bands with a step of 100KHz, and the MR double conversion receiver, that is externally synthesized, too. The MT is microprocessor controlled, and includes LCD display for the visualization of the most relevant transmission parameters (frequency (6-digit), forward and reflected power, modulation level), balanced Mono, Stereo (MPX). The MR receiver has the same visualization system as the transmitter. It includes balanced Mono and Stereo (MPX) outputs. Furthermore, the MT/MR Platinum STL includes a jumper in order to get a proper operation with digital signals.



EM 2000

is a 2000W FM transmitter made up of the EM 25 DIG exciter (or EM 20/30 exciter) and the AM 2000 FM amplifier. AM 2000 includes eight 300W high-efficiency MOSFET technology amplifying modules, fed by 2 independent switching power supplies, which are made to withstand the working conditions. The amplifying modules work independently thanks to a power combining structure that provides high isolation between them.

EM 10000

is a 10000W FM transmitter made up of the EM 250 COMPACT DIG exciter and three control units which combine the power of six AM 2000 FM amplifiers. AM 2000 includes eight 300W high-efficiency MOSFET technology amplifying modules fed by 2 independent switching power supplies, which are made to withstand the working conditions. The amplifying modules works independently thanks to a power combining structure that provides high isolation between them.

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Martha Quinn's RadioBu

Primarily designed for music production, RadioBu serves the needs to produce Martha Quinn's radio show.

One such talent is former MTV VJ and current Sirius Satellite on-air personality, Martha Quinn. She and her husband, show engineer and former Fuzztone member Jordan Tarlow, were looking for a space to handle all the production work for her show, *Martha Quinn Presents*, that simultaneously would allow them to keep their own hours as opposed to renting studio space in Santa Monica. Jordan and Martha contacted my firm, Russ Berger Design Group, to design their own personal radio and post production studio in Malibu, CA, which they eventually dubbed RadioBu.

Bearing in mind that *Martha Quinn Presents* offers listeners a mix of music from the 80s along with interviews and performances by artists from that era, we anticipated a few design challenges involved in creating the new studio space to serve all these applications. For instance, it would need to be able to accommodate in-studio interviews as well as ones via ISDN, in-studio performances, and voice-overs. For Jordan's purposes, the space had to accommodate music production and his composition work for TV commercials and film trailers. We combined our knowledge of the design and operational needs of a typical broadcast production studio with some

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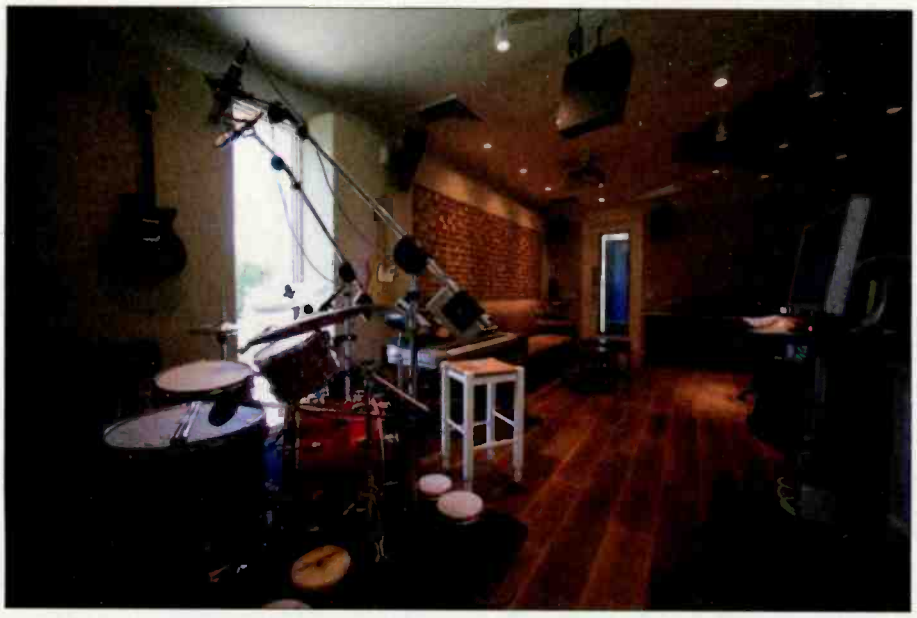
of the techniques used when designing smaller personal recording studios.

Since Martha's program is pre-recorded, transmission equipment did not factor into the design of RadioBu. However, the existing layout of the new space was not conducive to accommodating studio functions and their support spaces. As a result, changes needed to be made. A small storage area was built at one end of the structure and an entry vestibule at the other end, to tie it together with the traffic flow of the rest of the space. The bathroom and pantry were updated to better accommodate show guests and clients.



The open performance space is well-suited to live playing on *Martha Quinn Presents*.

With this layout, we were able to make some of the rooms serve a dual purpose. The entry vestibule doubles as a separately conditioned equipment and machine room area, dedicating more of the larger room area to the studio where Martha and Jordan now spend most of their time. The completed 1,100 square-foot facility features a main control room, a large glass recording booth, a machine room, kitchenette, bathroom and lounge. In the control room, we allotted ample space for live interviews and performances, as well as recording musicians. Jordan can easily monitor the show at the console while the group is performing to the side. The control room area is also large

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enough to accommodate a custom broadcast table for multiple-guest, in-studio interviews.

We employed several different acoustical techniques to ensure recordings would not be affected by outside noise. The shell of the space was beefed up to improve sound transmission loss to and provide adequate isolation from neighboring areas. Field fabricated acoustical treatments were used for their superior control over sound propagation in the room and for their clean look. We used a combination of Part Science Space Arrays and Space Couplers to distribute and diffuse energy throughout the mix position and improve surround imaging. Due to the acoustical constraints of the existing structure's low ceilings, we deployed a Part Science Space Coupler cloud to improve the performance of absorptive ceiling material and to tame low-frequency energy at the mix position.

An isolation booth sits to the right of the mixing console.

As its namesake implies, another element that played into the design of RadioBu was the gorgeous Malibu weather. Since it's beautiful most of the year, everyone agreed it would be great to work in the rooms with the doors open. Not wanting to compromise room isolation, we decided to utilize space planning to achieve our goal. The entryways at each side of the studio and control room areas act

as sound traps when the doors are left open. It also allows the cross breezes to cool the occupants and inspire creative efforts. The outdoors was further incorporated into the space by employing glass doors and numerous punched openings to flood the control room, studio and both entries with natural light.

When it came to selecting equipment for the space, Jordan made the decisions. Since he would be using everything for his work on Martha's show as well as his own commercial composition work, he decided on a 32-channel Digidesign Icon D-Control ES with 48 channels of IO for in/out, Aviom Pro 16 monitor mixing system, API and Valve front end, a rack of vintage Eventide Clockworks, Sony DRE-S777 Convolution Reverb, Precision Kinetics surround monitoring with PK Ubertones, Genelec 1031s, and Yamaha NS10 monitors, as well as an ISDN setup from Telos. With the ISDN setup, Jordan is able to conduct remote interviews and performances with the Sirius studio in New York City and other studios across the country.

For live performances and composition projects, Jordan also incorporates his large collection of vintage microphones (Neumann, AKG, Shure, and EV), vintage guitars, synths, amps, drums and recording equipment. A 92" acoustically transparent screen with a Sony 1080p projector was installed for Jordan's commercial work. The addition of the Precision Kinetics custom surround monitoring solution, crafted to match the studio's production needs, has made RadioBu the first studio in Malibu to offer 7.1 monitoring.

Though we usually do not get involved with the actual selection process of the equipment installed, our designs always include detailed information regarding speaker placement, console location, projection screen, projector location and wire management. We worked directly with Jordan on the placement of moveable racks, specific to the equipment he owns, to avoid generating unwanted reflection paths. All in-room racks were specified to be less than 3' tall and were typically located on either side of the workstations for easy access.

The resulting space has been a huge success for Martha and Jordan, meeting each of their individual studio needs. In fact, RadioBu recently hosted its first in-studio performance with Curt Smith and the other Tears for Fears members. Because the band was able to be in the same space as Jordan, it was easy for him to monitor the performance while simultaneously giving them their cues.

There will always be design challenges to overcome with each and every new project we take on. For RadioBu, we believe we met these challenges while incorporating Martha and Jordan's specific needs into the design of their new creative space while also reflecting their lifestyle.

Russ Berger is President of Russ Berger Design Group, a design and consulting firm, based in Addison, TX.

Tips, tricks, hints and more

By John Landry, CSRE

Change in seasons

As the seasons change it is time to consider seasonal checks and fixes at the transmitter site. The hazards of wildlife (plant and animal varieties) will subside with the cooler weather. Just as in spring, it is a good idea to spray around doors and windows with some wasp spray to deter these pests from hibernating in the transmitter building. And since field mice and other vermin will also seek refuge from the cold, any cracks or crevices should be sealed to keep them out. As an extra measure, traps can be set to catch anything that does find its way in, which will prevent trouble later on in the form of gnawed wires and other vermin damage.

The transmitter ventilation system should be inspected and all motors and dampers lubricated, drive belts replaced and controls checked for proper operation. The intake and outlet temperatures of the transmitter air should be measured and noted for reference. Any filters in the system should be cleaned or changed – bear in mind that foam filters decay and fall apart. Consider swapping these types of filters with either pleated paper or fiberglass types; these are often more readily available at hardware stores and home centers, and are cheaper than foam types.

Run a security check: all gates, doors and other points of entry should be locked with working locks. Large sliding gates should be greased. Padlocks can be weather-proofed by soaking them with WD-40. This often prevents them from freezing in the winter. Another old trick is to make a cover for the lock out of a piece of a rubber inner tube. Be sure all perimeter lighting is working properly, and if they operate on a timer, reset the turn-on time as the darkness falls earlier.

If the transmitter building has supplementary heat, make sure there is fuel in the tank for it. If there is a back-up generator it is time to make sure it, too is winterized and has fuel.

Some cool tools

Extech Mini IR thermometer (Extech 42500): This gun-type thermometer will read the surface temperature of an object without touching it. It is handy for finding hot spots inside a transmitter or for finding bad components on a circuit board.

Steel letters and numbers (McMaster-Carr 8600T42): How many keys do you have? How do you tell them apart? Labels wear off. Paint sometimes works, but you need 80 different colors. Manual etching is really tough on something so small. These steel numbers and letters 1/8" high will allow easy identification of any keys. Just hold the die and tap it with a hammer. For security reasons, I never use call letters on the keys, but the last 4 digits of the site phone number. And there is a jig that will hold the die still (McMaster-Carr 86805777) so the finished work will look better.

Paladin Tools long reach BNC extractor (Paladin Tools 1907): Anytime you have a rack-mounted piece of equipment, there is usually a BNC or F connector on it you can't grab with your hand. This long-handled tool will slide around the connector and hook on. A slight twist will get it unhooked.

Automatic changeover

A backup generator should be installed with an automatic changeover switch and power loss sensing relays. However, many installations may only have a generator. Or in a few cases, a portable home type generator can be used to keep a backup transmitter of up to 1kW on. Remember there is no excuse (even in an emergency) to disregard safety practices. The loose wiring of even a small generator to a power panel is not only unsafe but dangerous. If not done properly, the generator can be destroyed when the regular power comes back on. If you are in one of these situations, there is a safe and quick way to install a manual changeover.

Industrial disconnect switches are available from Square-D and other electrical manufacturers in sizes that can handle up to 100 amps. Many are in enclosures. Simply wire the wiper of this switch to the main circuit breaker panel (totaling not more than the capacity of the switch), and one side to the regular power and the other to the generator. A status indicator for the regular power should be installed. It can be as simple as a relay plugged into an outlet, or if the site will be staffed during the outage, it can be an incandescent bulb (compact fluorescent bulbs should not be used since if the power comes back under voltage they may not light).

Landry is an audio maintenance engineer at CBS Radio/ Westwood One, New York.

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P.I. Engineering
X-keys Desktop

By Chris Wygal

With the help of a PC or Mac, finishing nearly any type of project is quicker and easier than ever before. Computers have increased productivity, and the day-to-day use of laptops and desktops has caused the repeated use of the same mouse clicks and keystrokes. Rummaging through drop-down menus is slow and cumbersome, and while keyboard tricks like CTRL+O can help speed things up and forego the use of menus, imagine having one key that can trigger a command or start a macro. That type of luxury and a few other handy features are now made available from P.I. Engineering with the use of X-keys Desktop.

X-keys Desktop is a 20-key, 4" x 7" USB keypad that connects to any Windows 2000 or later PC or Mac OS-X machine. By installing the supplied Macroworks II (or Ikeys for Mac) software, the keypad can be programmed to reduce commonly used keystrokes or other repetitive tasks down to the virtual touch of a button. Macroworks II installs quickly and runs unobtrusively, displaying its icon in the Windows taskbar, and allowing continual programming and use of the keypad whenever needed. The programming switch (on the side of the unit) when pushed up, will open the device programming window. Hitting a chosen button on the pad, and then performing the desired keystroke will record that action to the X-keys unit for future use. As an example, since the term X-keys is used repeatedly in this article, I programmed the left uppermost button to type "X-keys" into the word processing document each time that button is pushed. I also programmed the next button over to be the save button. Instead of finding and clicking the appropriate icon, or navigating the mouse pointer to File-Save, I programmed the CTRL+S keystroke into X-keys, and saving the file became a one-button ordeal.

Performance at a glance

- Quick USB connectivity
- Customizable labels
- Compact size
- Fast programming and configuration
- Eliminates difficult keystrokes
- Automates repeated tasks

Opening commonly used programs is achieved by accessing the device's programming window and dragging an icon from the desktop to the desired button on the X-keys keypad, as displayed on-screen. Likewise, files and folders can be dragged from the Windows desktop or file structure onto a key to create a shortcut for opening the file or folder. An Insert Menu also allows the user to browse to files or folders and to create a shortcut. Using this feature, a button will open a user-defined file or folder. In the device programming window, the Legend Maker will indicate how each key on the unit is programmed. Fonts and text colors can be selected, and the current key layout can be printed. In hidden mode, the device programming window will stay out of view while programming each X-keys key.

Out of the box

Each key has a removable clear plastic cover that provides a protective covering for customizable labels. The blank adhesive legend sheet stickers can be written on, or a preprinted legend sheet representing popular key strokes or commands is available. X-keys Desktop has two programmable layers; green being the primary layer, and red being the second layer, allowing each of the 20 keys to pull double duty. Application Specific Layers can be created to allow certain keystrokes to work only when using certain programs. The green and red layers are most important for keystrokes common to the operating system.

In audio editing environments where the same computer-based processes and editing techniques are repeated on a day-to-day basis, X-keys can drastically cut down on menu navigation, keystrokes, and general mouse clicking. While it will simulate a mouse button click, it will not simulate

mouse movement. Pre-defined keyboard shortcuts can be combined into a one-button macro command. As an example, in my favorite audio editing software I have already designated the keystrokes CTRL+D, H and N to perform the dynamics processing, hard limiting and normalization steps respectively on a typical voice file. Using X-keys, one button tells each process to happen. The only caveat is that each process may take, depending on the length of the file, three to four seconds to complete. X-keys has a delay feature that will allow a pause before continuing to the next keystroke. So when editing a 30-second voice file, dynamics processing, hard limiting and normalizing each take about three seconds. With that in mind, the text string for the one-button command looks like {ctrl+d}<return>[Delay 3.0]h<return[Delay, 3.0] n<return>. The <return> command is necessary because OK must be clicked to start each process. Of course, this text string does not have to be typed in. Letting X-keys record each step is the most practical way to store the macro.

The Record/Edit Macro Window displays the text strings that XKeys uses in macro and keystroke programming.

X-keys Desktop also has a repeat feature that will repeat a keystroke or macro numerous times at different rates. The user selects a delay period and repeat rate. When the key is first pressed, the macro is fired. After the delay period, the macro is repeated at the rate specified until the key is released. The X-keys Desktop is packaged with two vertical double keys and one horizontal double key. Double keys allow for multi-key functionality. It also has a key puller for removing single keys for the installation of double keys.

Devices that speed up and make our daily tasks easier to manage are becoming more and more popular. While these devices are fun, they are usually less than practical, and certainly not necessarily productive. The X-keys Desktop is a practical and fun device that makes lengthy, repetitive and routine keystrokes as simple as a push of a button.

Wygal is the programmer, engineer and Web designer for WRVL in Lynchburg, VA.

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 Device Programming Window allows for easy on-screen setup of the XKeys Desktop.

Armstrong X-1000B

By Terry Suggs

I provide contract engineering services to a 1kW Christian station in Norfolk, VA. For several years, the station needed to replace its transmitter. Ongoing repairs to the old one became a problem because it was difficult to obtain the necessary parts. After several bouts with this problem, we discovered that the company providing the parts was going out of business. This is when the search began to find a replacement.

At first, I was a reluctant to consider Armstrong because I was not familiar with the company's products, but after an extensive search, Armstrong offered the best in pricing and packaging. The transmitter was shipped within a week and installation was seamless.

The Armstrong X-1000B transmitter is a compact solid-state AM transmitter that can provide up to 1kW of RF power. The dual 600W RF modules provide some extra headroom for up to 1.2kW output. The modules can be removed while the transmitter is operating to keep the station on the air. The unit can be set for three different preset power levels. The modules are capable of up to 150 percent positive modulation.

Each module has a power indicator to show it is operating. The transmitter itself has indicators to show the presence of the bipolar 20V power supplies and a VSWR and interlock fault. A rotary knob selects the power level setting (high, medium, low), or it can be placed in the remote position to change power remotely.

Performance at a glance

- Up to 1kW output
- HD Radio compatible
- Three power level settings
- Greater than 90 percent RF PA efficiency
- Up to 150 percent positive modulation
- Occupies 7RU

The front-panel multimeter shows PA voltage and current, forward and reflected power, audio level in and the power output of each RF amplifier.

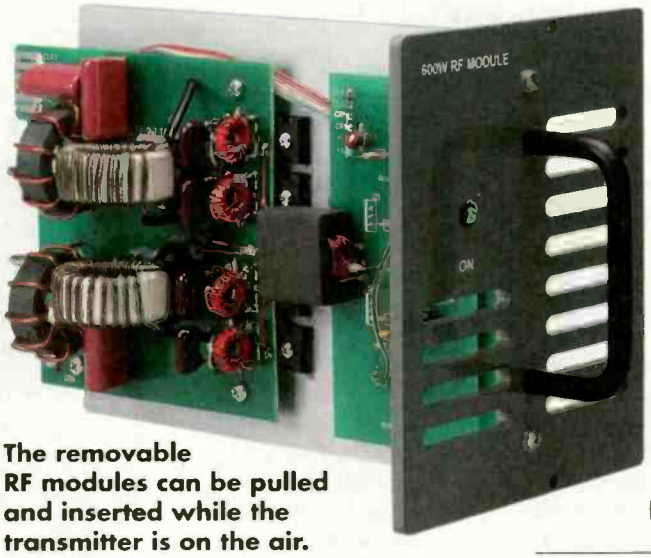
The rear panel includes the 600 ohm active balanced audio input, the ac power connection (190V to 260Vac) and circuit breaker, the RF output on an N connector, the external RF input to inject a digital signal, and the DB-25 remote control connector.

Installation and operation

Because of its small size (7RU), the transmitter can easily fit in an equipment rack. The same rack could house the station's audio processors and other equipment as well. It weighs 96 pounds, so it should not be mounted too high in the rack or the rack could tip. Likewise, I would not mount it too low to keep it away from the floor, where it could take in excessive dirt and dust.

One feature that caught my eye is that there are no air filters on the intake. The transmitter relies on the surrounding air to be clean. Because of this, it's important to clean the unit as needed to maintain proper cooling and air flow. The transmitter itself is very easy to work on. All parts are easily accessible, and the pull-out RF amps simplify access.

The transmitter has built-in lightning protection on the RF output. To function properly, two ground connections must be made: One for the electrical



The removable RF modules can be pulled and inserted while the transmitter is on the air.

ground and one for the RF ground. These must be terminated at the grounding stud mounted on the back of the transmitter.

All routine maintenance is outlined in the owner's manual, which I found to be well organized and complete. I have only encountered one problem with the transmitter when the power supply developed a problem after six months of use. When I contacted Armstrong, arrangements were made to send a replacement by overnight delivery.

I also like the 24-hour, free technical support from Armstrong. If a problem arises that I am not certain how to fix, a phone call is all it takes.

Armstrong Transmitter

P 315-673-1269
W www.armstrongtx.com
E sales@armstrongtx.com

Suggs is the owner of TL Communications, Norfolk, VA.

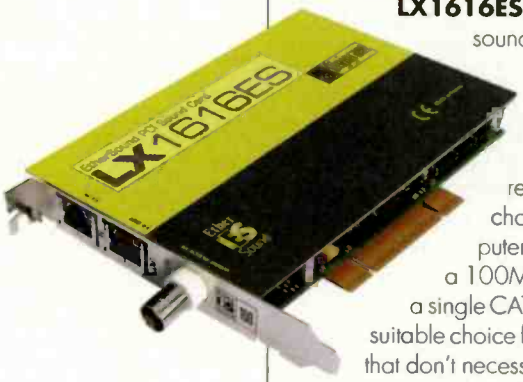
Editor's note: Field Reports are an exclusive *Radio* magazine feature for radio broadcasters. Each report is prepared by well-qualified staff at a radio station, production facility or consulting company.

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.

by Erin Shipps, associate editor

PCI network sound card
Digigram



LX1616ES: Little sister to the LX6464ES sound card, which can exchange simultaneously 64 channels from and 64 channels to an Ethersound network, the LX1616ES can transmit and receive up to 16 Ethersound channels, thus connecting computer-based audio applications to a 100Mb/s Ethersound network via a single CAT5 cable. The LX1616ES is a suitable choice for direct-to-disc applications that don't necessarily require as many as 64 channels, but still require maximum flexibility to play and/or record selected ES-100 audio channels using a single CAT5 cable. A scaled-down version of the LX6464ES, LX1616ES offers an ideal starting point for price-sensitive applications, particularly since it can be upgraded on the fly from a 16/16 channel count to 32/32, 48/48 up to 64/64 through firmware updates. The combination of a PC equipped with an LX1616ES soundcard and an Ethersound-enabled digital mixing console results in a powerful and cost-effective multitrack recorder.

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

Recording microphone
AKG

C 214: The C 214 offers a single-capsule, cardioid-only design that delivers similar performance to the dual-capsule C 414, but with only one diaphragm. Thanks to its 20dB attenuation pad and AKG's ultra-low noise electronic design, the C 214 can be used in sound fields as high as 156dB SPL. The C 214 features an integrated capsule suspension system that minimizes chassis-borne noise and resonances for even greater sonic accuracy. The C 214's double mesh, all-metal grille protects the capsule and ensures high RF immunity without affecting acoustical performance. The C 214 has road-tough construction quality with a modern scratch-resistant finish, a dent-resistant, metal grille and a gold-plated XLR-type output. It comes complete with a spider-type shock mount, windscreen and metal carrying case.

818-920-3212; www.akg.com
akgusa@harman.com

Guying systems
Phillystran

HPTG-I: A substitute for metal guy wire cables, Phillystran manufactures fiber ropes, strands and braids from fibers such as Kevlar, Twaron, Technora, Vectran, Spectra, Dyneema and Zylon. Tower guys can be installed for use with break strengths up to 252,000 lbs. with cable diameters ranging from 0.17" to 2.08".

215-368-6611; www.phillystran.com; info@phillystran.com

Tabletop CD player
Stanton Magnetics

C.324: The C.324 is designed for DJs who want to scratch CDs like vinyl. It features MP3 and CD audio playback with onboard file and folder browsing, onboard pattern and real-time sequencer for drum machine-style performances, seven on-board digital effects, and a sleek slot loading CD mechanism with LED for quick loading of CDs into the unit in low-light situations. The C.324 has added responsive trigger pads that offer real-time sample/loop sequencing. This means that trigger patterns can now be recorded in real time and looped instantaneously. Drum machine-style sequencing effects also bring a new twist to live DJ remixing. Using the C.324, sequences can be created in seconds compared to minutes using drum machines.

954-929-8999; www.stantonmagnetics.com; info@stantonmagnetics.com

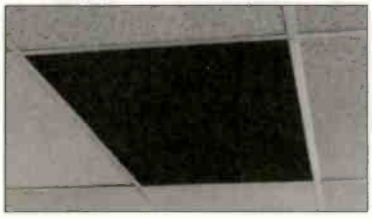
NEW PRODUCTS

CD/DVD duplicator
Disc Makers

Forte: The Forte is a stand-alone unit that does not require a computer. Its 20x DVD±R/40x CD-R drive features a 25-disc input/output capacity. The machine boasts a 160GB hard drive that stores up to 31 full-size DVD images. Throughput is 7 DVDs or 14 CDs per hour. Its small footprint and quiet operation make the machine suitable for any workspace size.

856-661-5532
www.discmakers.com
andre@discmakers.com

Acoustic ceiling tiles
Auralex Acoustics



T-Coustic: Auralex's acoustic Ceiling Tiles can easily be installed into new and existing drop and suspending ceiling grids, and are ideal for upgrading in-room sound quality by controlling ambient noise and reducing noise transmission. The fabric-faced acoustical panels, which are available in standard ceiling grid sizes, can be customized in terms of size and thickness to meet any project's requirements. With an overall noise ratio coefficient of 0.80, Ceiling Tiles are available in standard white and black color options. The tiles are also available in custom colors on special request.

317-842-2600; www.auralex.com
auralexinfo@auralex.com

NEW PRODUCTS

Light duty refastenings
Rip Tie

Rip Wrap: Rip-Tie Rip Wrap can be used to bundle low voltage cables instead of nylon wire ties or tape. Many manufacturers are recommending soft-hold hook-and-loop ties for use with sensitive data cables. These ties are very inexpensive and weather resistant. Continuous and perforated rolls are available. Polyester construction makes this wrap ideal for outdoor installations.
800-348-7600; www.riptie.com
sales@riptie.com

Equipment rack
APW Mayville

Glide and Turn: The Stantron Glide and Turn rack, features all-steel construction and is ideal for professional A/V applications. It is an excellent choice for professional facilities and consumer applications where the user prefers to keep the rack hidden from view when not in use. The rack is designed to fit into a wall as part of the architectural design, or inside a closet, although it can be positioned virtually anywhere. The upper part of the rack slides out in a cantilevered manner, and can be rotated to reach the back of the rack where the bulk of the cabling and connections reside. Available in sizes from 10RU to 30RU, all Glide and Turn racks can accommodate 19" rack-mountable equipment and can accommodate all of Stantron's standard 19" rack-mount shelves, accessories and filler panels.
800-558-7297; www.apwmayville.com

NEW PRODUCTS

Three-sided on-air light
Markertek

Three-way Light: This three three-sided on-air light, which allows a full 180 degree view of the light when lit is available in 110Vac and 12Vdc configurations. The 12Vdc model features LED strips and is 3.125"W × 5"H × 2.375"D and weighs 0.5 pounds.

800-522-2025; www.markertek.com
sales@markertek.com

High-power tetrode
Thales Broadcast and Multimedia

TH 394: This tetrode, intended for the high-power FM radio broadcasting market, is specifically designed for the combined broadcast of digital and analog signals for IBOC. The use of air-cooling simplifies transmitter production, while reducing maintenance costs. The TH 394 tetrode delivers average analog power of 25kW, and average digital power of 2.5kW in combined broadcast mode with 10 percent IBOC. It offers 66kW of peak power.

413-569-0116; www.thales-bm.com
mricher@thales-bm.com

Laser-engraved panels
Laser Panels

Custom equipment panels: A custom project can look like a professional job when a clean connector panel is part of it. Laser Panels can cut and engrave metal panels to complete the finished look of any project, whether it's a custom rack panel, and outlet/gang box cover or the faceplate for a hand-made device. Available in several anodized metal colors or stainless steel, the panel engraving is filled in white. Brushed finishes and other options are available.

877-348-4300; www.laserpanels.com
info@laserpanels.com

Digital recorder for Ipod
Alesis

Pro Track: Pro Track provides convenient, direct-to-Ipod stereo digital recording in a portable, handheld form. Users can capture live audio anywhere and anytime. Pro Track's smart design integrates the Ipod into the recorder, with includes sleds to securely mount supported models. Two high-quality condenser microphones are built-in, fixed in XY stereo configuration for high quality field recording. Pro Track also offers a pair of combination XLR 1/4" inputs for connection of external microphones and line sources. When running on plug-in power using the included adapter, Pro Track supplies 48V phantom power for power condenser microphones.

800-5-ALESIS; www.alesis.com
info@alesis.com

Compact stereo headphone amplifier
Henry Engineering

Multiphones Minipod: The Multiphones Minipod is a compact headphone amplifier that can easily be installed just about anywhere. Minipod is small and lightweight with rounded corners, perfect for mounting under a countertop. Even if bumped into, it won't scratch clothing or legs. It can be used as part of a Multiphones network or as a stand-alone headphone amp. A multi-listener network of Minipods can be built without a Multiphones Master unit: Just use CAT-5 cables to daisy-chain them together.

626-355-3656; www.henryeng.com
info@henryeng.com

File transfer software
Applied Answers

File Genius: File Genius replaces insecure FTP and e-mail file transfers. An intuitive interface works through a Web browser and does not require set up, hosting or maintenance. It provides security for all environments: SSL encryption, SHA hashed file directories, no password storage, no cookies, a proxy file system for layers of security, no FTP or other protocol port access, no session pages published all over the Web with links to download files, and hidden site addresses that cannot be found in search engines or site explorers. There are also no usage limits.

888-753-2245; appliedanswers.com; inquiries@appliedanswers.com

Sleeving machine
BTX

Expand-on: This patent-pending machine eliminates the tedious process of applying expandable sleeving to a cable bundle. Designed to work with cable bundles of nearly any length and sleeving ranging from 1/2" to 1 3/4", this machine reduces the time it takes to apply expandable sleeving from hours to a few minutes.

800-666-0996; www.btx.com; info@bi-tronics.com

USB cardioid condenser microphone
Audio-Technica

AT2020 USB: The new AT2020 USB offers studio-quality articulation and intelligibility. It plugs into a computer's USB port. The AT2020 USB is based on the design of Audio-Technica's AT2020 cardioid condenser microphone. Like the AT2020, it features a low-mass diaphragm, custom-engineered for extended frequency response and superior transient response. Audio-Technica's state-of-the-art design and manufacturing techniques ensure that the microphone complies with the company's renowned consistency and reliability standards.

330-686-2600; www.audio-technica.com
sales@atus.com

Master clock generator
Drawmer

M-Clock Lite: The Drawmer M-Clock Lite is a simple, high quality AES Grade 1 master clock generator. It offers a streamlined and future-proof clock that syncs to rates up to 384kHz with an accuracy to 2ppm. In addition to the internal precision word clock, an external clock input allows the user to select an alternative clock source without having to re-route clock cables. M-Clock Lite features 10 word clock outputs, eight at the rear plus two on the front panel for easy access when the unit is rack-mounted.

702-365-5155
www.drawmerusa.com
sales@transaudiogroup.com

Optical recording media products
Falcon Technologies International

Falcon Media Pro: FTI has created a full line of recordable CD-R, DVD-R and Blu-ray discs to accommodate a wide range of needs and applications. Flagship FTI technologies contributing to the company's performance advantage include a 24k gold reflective layer that gives its CD-R and DVD-R media an archival life spans of more than 300 and 100 years, respectively, Ultra Hard Coat (UHC) scratch resistance protection, printable disc surface options of unmatchable quality, and ultra-performance inorganic alloy recording material for Blu-ray discs.

+971 7 244 6943; www.falconrak.com

Automation controllers
Actiontec Electronics

Zcontrol: While originally designed for home use to centrally manage electronics such as lights, security cameras, thermostats, motion detectors, and other devices, this control gateway can be adapted for remote sites as well. Zcontrol will allow users to control all devices through a common interface or the Internet. The first generation of the Zcontrol will be a stand-alone unit that can be accessed by PC or cellphone. Additional versions will be integrated into Actiontec's wireless routers and DSL gateways.

408-752-7700; www.actiontec.com

Audio distribution amp
Axel Technology

Parrot: The Parrot is a high performance audio distribution amplifier with one stereo input and eight stereo outputs. It features both XLR-balanced and RCA outputs, which are individually buffered. Audio input is via XLRs. Using internal jumpers, the Parrot can be re-configured as a 1x16 distribution amp. With a stereo input, the Parrot can output mono or stereo signals, depending on the individual setting of each output pair. Each balanced output stage incorporates high-current line drivers capable to always deliver optimal signals to a number of locations even down long cable runs and with low load impedance. Parrot features a hardware bypass (via relay), which connects the input pair to the output 1 XLRs in case of ac power failure.

+39 51 736555; www.axeltechnology.com
info@axeltechnology.com

5.1 surround sound production library
Blastwave FX

Revolver: This all-in-one collection of 1,000 hi-definition 5.1 surround sound imaging elements, compositions, drones and trailers are distributed on six DVDs. Each sound was originally recorded at 24-bit 96kHz to ensure the highest quality then delivered as 24-bit 48kHz broadcast WAV files. And each file comes as an additional MP3 for quick referencing. Revolver is a click-and-drag library that is conveniently cataloged with embedded metadata for easy search and retrieval in Pro Tools, Avid, Sound Miner, Net Mix, Itunes and other popular sound library search engines.

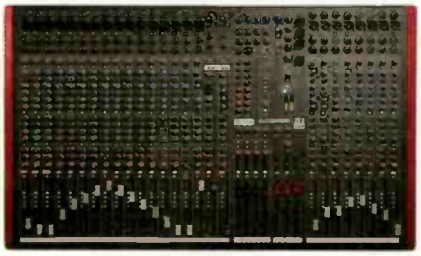
www.blastwavefx.com
info@blastwavesfx.com

Studio master clock
ATI Group

MCDA-112: The MCDA-112 can generate a perfect sync reference of 32, 44.1, 48, 88.2, 96, 176.4 or 192kHz, or can accept and regenerate an external reference to feed its 12 individually buffered BNC outputs. The MCDA-112 accepts AES, Word Clock or Super-Word Clock as external inputs and provides Word Clock or Super-Word Clock at its outputs. Front-panel controls and indicators include External Clock Format Select, Sample Rate Select, Output Clock Format Select, Input Termination, Clock Source and Front Panel Lock. The MCDA-112 derives its internal clock reference from a 24MHz precision oscillator and divides down to produce the output clock, thus minimizing errors, rather than multiplying up from 44.1 or 48kHz. A VCO receiver system regenerates input clock signals to remove anomalies and insure an ultra-low jitter output.

800-922-8001; www.atiaudio.com; sales@atiaudio.com

USB-equipped mixers
Allen & Heath



Zed 4-Bus series: Similar to the smaller Zed-14, the 4-Bus series features the same high performance Duo Pre padless preamp, which is a quality microphone circuit and an optimized line input circuit, rather than one pre-amp handling both mic and line signals. It uses a two-stage design with carefully controlled amounts of gain in each stage, offering high headroom and a low noise, clean signal path. The Zed 4 bus series has a responsive four-band, two-swept mids EQ with in/out switch, six aux sends (two pre, two post, two pre/post), four sub groups, direct outputs on each mono channel, separate L, R and M main buses, 100mm long throw faders, two matrix outputs, and a talkback facility to auxes or LRM. The connectors are placed on the top surface for easy plug-in and patching, and the construction, with individual circuit boards nutted to the top panel, is identical to Allen & Heath's professional touring mixers.

800-431-2609
www.allen-heath.com/US

UPGRADES and UPDATES

Axia Audio has released version 2.5.2g software for its family of analog and AES/EBU Audio Nodes. Version 2.5.2g introduces Mono Mode, continuous software monitoring, visual identification of allocated sources and front-panel hardware volume control for Router Selector Nodes. (www.axiaaudio.com)...**BW Broadcast** has acquired Danagger Audio Works and the Plan B line of dead-air prevention devices. BW will work with Danagger to design a series of new products, including an updated version of the Plan B. Support for legacy Plan B products will be handled by Danagger. (www.danagger.com)...**V-Soft** has developed a system that allows a user to gain authentication through an online Web server in addition to the physical local or network key. With this option, if a key is stolen or lost, V-Soft would disable the missing key on the Web server and issue a new key with a new number. (www.v-soft.com) ■

Kudos on EAS

While sitting in an airport I read your viewpoint in the June issue. I agree with your statements about the engineers against the owners, I also agree that it will be the engineers that will be expected to make EAS work, so why should they not have a hand in developing the replacement system? As the EAS chairman for Central Indiana, I know how much time goes into making a broken system work. We did it originally 15 years ago when EAS came around and then again to adapt Amber into the system.

Thanks for bringing the new EAS to the top of mind for many people in our industry who keep forgetting that we are here to serve the public first (especially in times of disaster) and to make money for our shareholders/companies second.

Dan Mettler
senior VP engineering, Central/NE Region
Clear Channel Radio

VIEWPOINT CSCHERER@RADIOMAGONLINE.COM

The next step in EAS

Between terrorism and natural disasters, attention to public warning has never been greater. The term public warning means different things to different people, but you're hard pressed to meet anyone who does not support the general idea of having an effective way to reach the masses when a crisis occurs.

The FCC has an open rulemaking to update one aspect of public warning: the Emergency Alert System (EAS). The current EAS has been in use for more than 15 years, and by itself, it is an improvement over the EBS, but it still has shortcomings.

EAS from a government perspective was a way to transmit a message from the president to the public. States, regions and cities have adapted the system to fit other needs. Some have done it well. Some have not done it at all. The government has also not given its full support of EAS.

Now that the FCC has opened the topic for discussion, the SBE, NAB, National Alliance of State Broadcast Associations (NASBA) and FEMA are working to decide where to go to develop the next generation of EAS.

In May, the Homeland Security Emergency Communications, Preparedness and Response Subcommittee, of the House Committee on Homeland Security, held a hearing for an update on FEMA's progress on updating the public warning system. Also in May, the FCC held a summit to discuss the current state and future of EAS. Both events highlighted past and current shortcomings. Both presented ideas on the future of EAS. Neither has shown where EAS is really going.

One element that will be included in an EAS update is the Common Alerting Protocol (CAP), as the FCC order mandates. Simply put, CAP provides a better way to encode data about an emergency for dissemination to the public. CAP can include images and more descriptive text to better inform recipients about a plan of action.

With all this said, I keep hearing that it's too soon to tell what the next generation of EAS will look like. In some ways, I understand that. There are lots of ideas being shared and solutions to current problems being proposed, but there are not yet any firm goals being presented to accomplish this improved EAS.

One important point to keep in mind is that EAS is part of public warning. EAS is not the only form of public warning. Broadcasters should focus on their own role in public warning and let others determine how the other aspects will function and interact. This is one area where I see progress being thwarted. The grand plan is good to keep in mind, but broadcasters must focus on their own piece of the project.

Many broadcast engineers seem to have taken personal ownership of EAS. This is ironic, because most broadcast licensees have not. Many licensees see EAS as a requirement. They understand their responsibility to the public, but they want to provide warnings with the minimum intrusion to their business operations. If the engineers push a system through without the licensees taking an interest, any proposed improvement will still be met with resistance.

For the owners, this hands-off approach will yield a system they don't like. Many engineers argue that because the engineer has to make it work in the end, the engineers should design the system. This automatically puts the engineering side against the owners and managers.

Not to oversimplify, but if the owners don't care, then why should the engineers?

With the NAB and NASBA involved, there is a conduit to the owners. I have not seen any activity from the owners through these groups yet. It is my hope that the NAB's and NASBA's efforts will be recognized and acted upon. This will result in an improved EAS, not just a replacement.

What's your opinion? Send it to radio@RadioMagOnline.com

8 June 2008

This is one of the best commentaries [June 2008 Viewpoint] about radio's role in EAS that I have ever read. It could not have been written any clearer.

Bobby Adams
president/CEO
GSS Net

A bad idea

I think this promotion for a $50 rebate by the HD Radio Alliance is very ill conceived. The problem I have with the rebate program is that it requires the consumer to 1) have a cell phone and be willing to reveal its number, and 2) have texting service on that cell number, and send a text message to Ibiquity.

This application then opens the consumer to (in the Alliance's words) up to three promotional text messages a week from the Alliance. This is revealed in the fine print, but nowhere called out boldly. There is no alternate method for the $50 rebate according to the folks at 866-915-2797 who are managing the promotion for the Alliance.

So what's my beef? Well, they have the right to set the rules as they see fit. But, one has to dig in the fine print to see the targeting by text ads. I think this is deceptive. It seems counterproductive to me, to engender all that ill will once folks started receiving those ads. Additionally, if this is a promotional campaign, these restrictive rules leave out a large number of potential buyers of the radios. Just think of all the older folks out there that could benefit with additional radio programming, but don't have cell phones, or cell phones with texting.

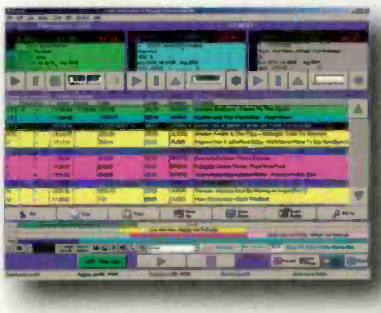
If HD Radio is to ever succeed, then it needs the broadest base of users, not a narrowly targeted subset.

Bart Cannistra

Broadcast Software

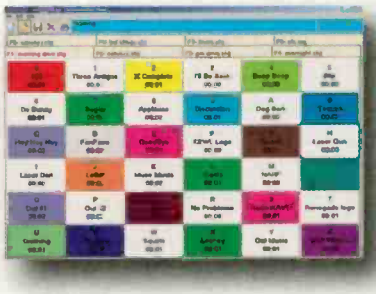
1-888-274-8721
www.bsiusa.com

Radio Automation



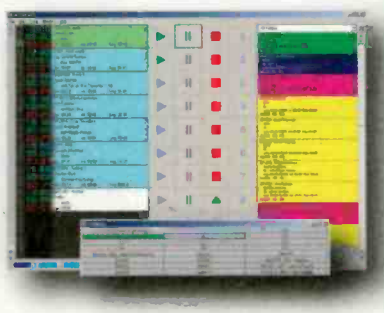
Simian - radio automation and digital play out system

Instant Audio



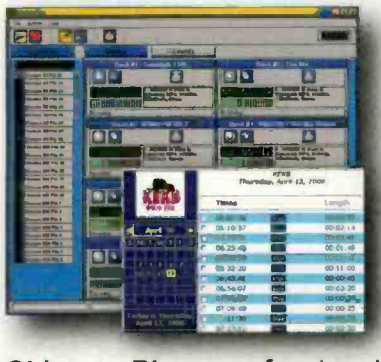
Stinger- instant acess to 288 'rapid fire' audio files

Digital Cart Player



WaveCart - the original on-screen cart machine

Audio Logging

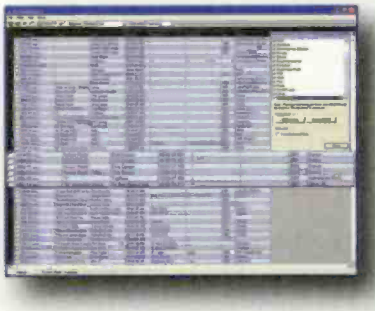


SkimmerPlus - professional audio logging and skimming

Full PC Systems

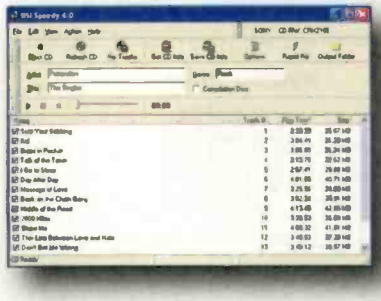
Complete PC systems - with hardware and music

Music Library



MusicStore - thousands of ready to play (tagged) songs

CD Ripping



Speedy- professional CD to PC ripping and file tagging

Sound Cards

AudioScience - built for broadcast, pro sound cards

Remote Control

Trigger & Relay Devices - for GPI/O & remote control

Broadcast Software International
503 E. 11th Avenue
Eugene, OR 97401 USA
Direct: 541-338-8588
Fax: 541-338-8656
www.bsiusa.com sales@bsiusa.com

BSI

A little extra padding

Yesterday, I was working on a cue tone decoder system. I have a stack of Digiciper IRDs that have a cue tone out but the signal is way too hot for the DTMF decoder. I was feeding the signal into an analog audio DA and had the gain jumper at -12dB which was still too hot. I needed another 10dB or so of attenuation but I needed it at 600 ohms input and output. After a Google search I found the pad calculator in the Engineer's Notebook at RadioMagOnline.com.

I ran the requirements through the calculator, went to the annex to get the parts, put it together and it works perfectly. Thanks for the great resource.

Chris Spacone
Global Digital Media Exchange

Perfect on IP

Just finished the great article on IPV6 in the August issue. There was a lot of info in a little space. Overall, the perfect size article and a wonderful topic.

Please forward my appreciation to Kevin McNamara as well if you don't mind.

Barry Thomas, CPBE CBNT
president
Society of Broadcast Engineers

Correction

The table of contents in the August 2008 issue inccorectly identified the author of the PRN Facility Showcase. The article was written by Harrill Hamrick. The correct byline was listed on the article itself.

GALLERY

CLASSIFIEDS

FOR SALE

HELP WANTED

SCOTTY, WE NEED WARP SPEED NOW!

A growing enterprise, Sovereign City Communications, LLC™ seeks a Chief Broadcast Engineer to oversee our new, state-of-the-art facilities. The successful candidate must have experience in network radio and in start-up situations. A working knowledge and/or experience with Axia, Audio Vault and Music Master broadcast systems a plus. Ideal candidate is 1/3 MacGyver, 1/3 Scotty, 1/3 Einstein. Minimum 3-5 years experience preferred. Sovereign City is an equal opportunity employer. Submit resume to: **jobs@sovcity.com**

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Contributor Pro-file

Meet the professionals who write for *Radio* magazine.
This month:
Facility Showcase, page 54.

Russ Berger
President, Russ Berger Design Group
Addison, TX

Russ Berger's past experience in the studio as musician, engineer and owner gives him insight as a consultant into all aspects and phases of facility design. He currently serves as president of the National Council of Acoustical Consultants. Berger has more than 2,500 design projects to his credit, including NPR headquarters, Whitney Houston's personal studio, Sweetwater, NFL Films headquarters and Sony Music. Berger is also *Radio* magazine's technical consultant on broadcast acoustics.

Radio
THE RADIO TECHNOLOGY LEADER

Written by radio professionals
Written for radio professionals

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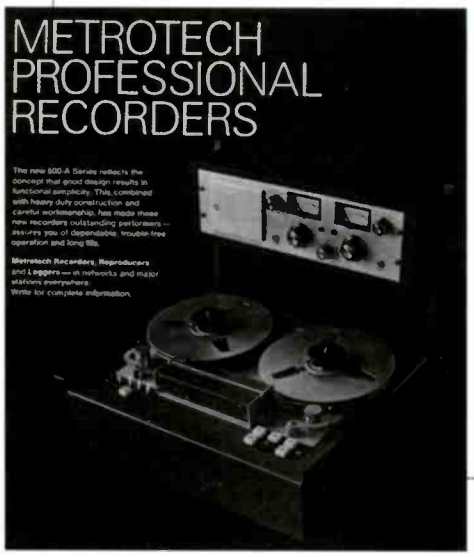
ADVERTISER INDEX

This index is a service to readers Every effort is made to ensure accuracy but *Radio* magazine cannot assume responsibility for errors or omission.

by Erin Shipps, associate editor



Do you remember?

Professional recorders have come a long way since the days of reels and tape. Now you can take recorders with you pretty much wherever you go and computer-based software makes editing much easier. But in 1969, recorders like this Metrotech 500-A were good options. This ad states the longevity of this particular machine, which is relevant as reel-to-reel machines were used well into the 1990s, and I'll bet your station still has something similar tucked away.

Sample and Hold

The consumer electronics industry will see overall shipment revenues top $173 billion in the United States in 2008, according to new data released by the Consumer Electronics Association. The semi-annual *U.S. Consumer Electronics Sales and Forecast* shows CE shipment revenues will grow by 7.3 percent this year, reaching more than $183 billion by 2009.

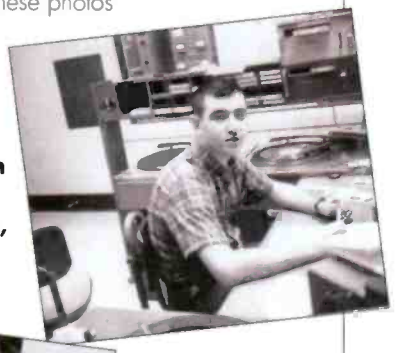
This latest forecast increases CEA's projection for 2008 shipment revenues, last updated in January 2008, by $2 billion. Leading the way are digital displays, with shipment revenues approaching $28 billion.

Providing greater perspective on the industry, the mid-year edition of the *U.S. Consumer Electronics Sales & Forecast* brings forward brand new forecasts and analysis. Included for the first time is a technology penetration forecast for U.S. households. Leveraging CEA industry forecasts and consumer research, this analysis illustrates the maximum market potential for core CE technologies. The forecast also features a global perspective. In a joint effort from CEA and GfK research, worldwide retail sales forecasts for 12 major CE categories is included adding insight on global CE sales volumes and growth.

Source: Consumer Electronics Association

That was then

Burt Fisher is a world traveler. He has been to Egypt, France, Scandinavia and Switzerland. He has seen much of the world's history, but radio ties run deep in his history. He sent us these photos from the 1960s.



WOCB AM/FM Cape Cod with Burt and huge 16" transcription turntables and spotmaster carts, circa 1967.

Burt at WOCB with an old TTY UPI machine.

Burt at WOCB with the owner's (Wes Stidstone) dachshund. Pictured are a Gates 5kW transmitter and an RCA AM BTF1B (he believes) in the foreground. The RCA transmitters are 1kW and 250W (standby).

E² Ethernet Audio Done Right

2008 PICK HIT Radio

MEET THE SQUARE

The Wheatstone E² (E SQUARE) gives you the convenience of Ethernet audio without all the IP hassle. It just *knows*. The built-in Setup Wizard lets you configure an entire system with just your browser and a laptop. Unplug it when you're done and there's no PC between you and system reliability.

SQUAREs are totally scalable: use one as a standalone 8x8 studio or transmitter site router, with browser access from anywhere. Plug two together and have a standalone digital snake. Add a fanfree mix engine and build yourself a studio using analog and digital I/O SQUAREs.

All the power is *in* the SQUARE. Distributed intelligence replicates all configuration data to every unit. Profanity delay and silence detection are done *in* the SQUARE. Even virtual mixing (w/automation protocol) —it's *in* there; all with real front panel meters, 32 character status indicators and SNMP capability.

88D I/O: 8 digital inputs and outputs. You can headphone monitor and meter any of the SQUARE's inputs or outputs in real time. The 32 character display gives you all the information you need about your audio and system configuration. And because you can operate in either 8-channel stereo or 16-channel mono mode, 16 channels of metering are provided.

88E DIGITAL ENGINE: Just plug an E-SERIES control surface or GLASS E computer interface into this engine and get all the mixes, mic and signal processing you need. Fanfree, so it can stay in the studio where it belongs.

88A I/O: 8 analog inputs and outputs. You can bring a new SQUARE up in seconds and of course use the front panel encoder for your X-Y control. Front panel status LEDs give you continuous link, status, and bit rate information as well as confirmation of any GPIO activation.

Because the E² system doesn't rely on a third party GUI, tech support is straightforward (and 24/7). Likewise, system operation doesn't require external PCs for continued full functionality. Best of all, 1 Gigabit protocol eliminates the latency and channel capacity restrictions associated with older technology.

E-SQUARE is Ethernet audio done RIGHT!

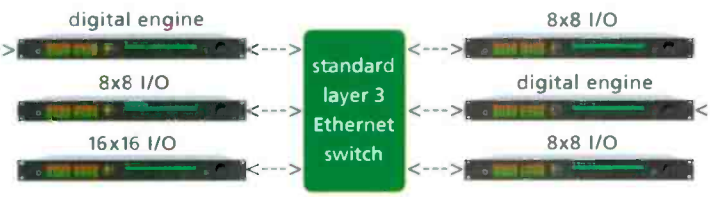
88AD I/O: 4 analog plus 4 digital inputs and outputs—perfect for small studios or standalone routing.

88 I/O CONNECTIONS: E² has both DB-25s for punchblock interface and RJ-45s for point-to-point interface. All SQUAREs have 12 individually configurable opto-isolated logic ports that can be either inputs or outputs.

Studio 1

E-SERIES control surface

STUDIOS DONE EASY!



Studio N

www.wheatstone.com

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