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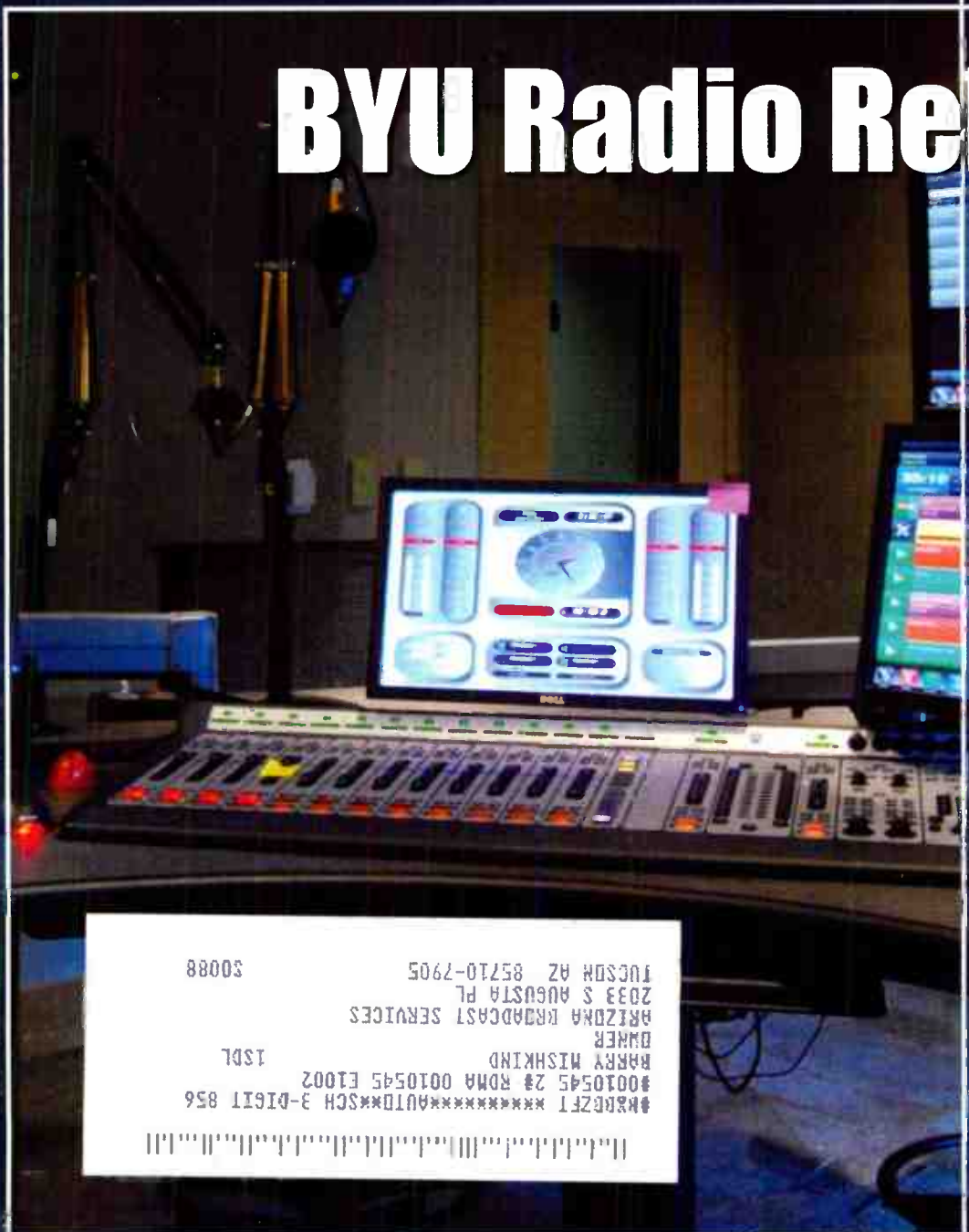

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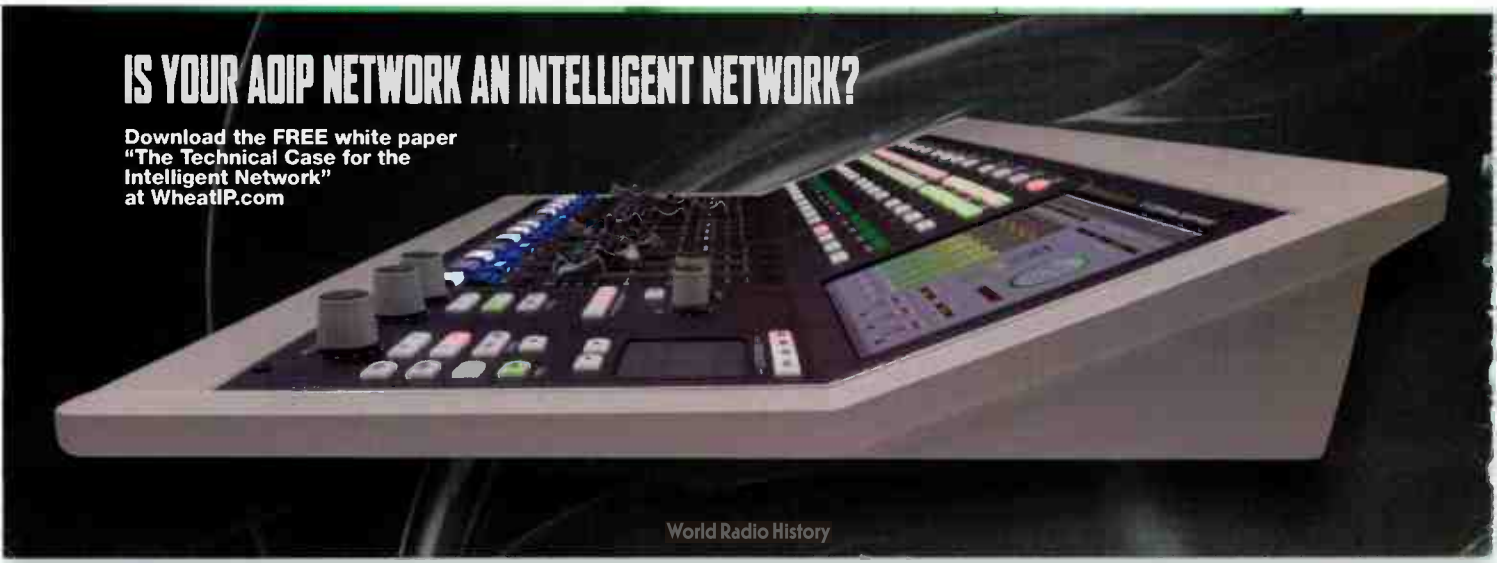

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ON THE COVER

Brigham Young University originates five radio streams from its new facility, including BYU Radio and KBYU Classical 89. Read more about the installation on page 20.

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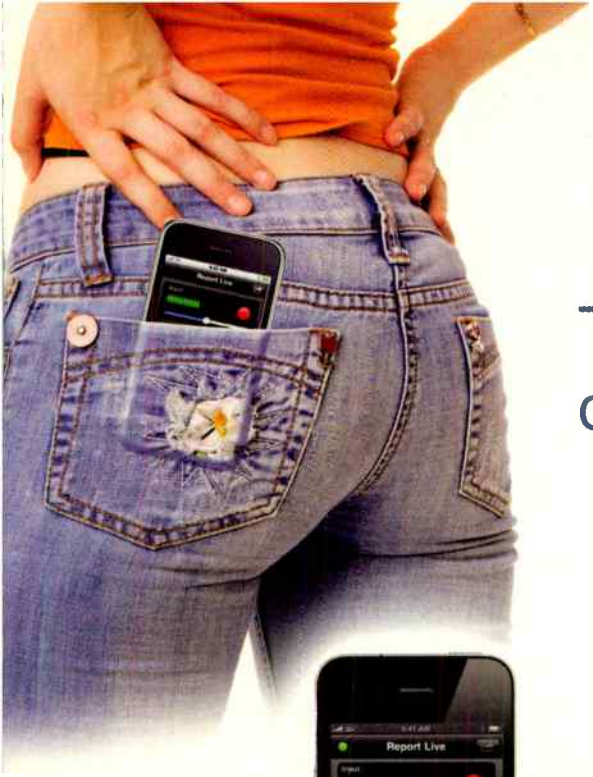

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Currents Online

Selected recent headlines from www.RadioMagOnline.com.

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Company employees and invited guests gathered on a Friday afternoon in New England.

IBiquity Launches Incentive Program for Radio Sellers

Stations using HD Radio multicasts in advertising programs can reap a reward.

FCC Releases Five Media Ownership Research Studies

The five studies were conducted by outside researchers and examine a range of issues that affect diversity, competition and localism.

Assistance Sought in Fighting Radio Automation System Lawsuit

Computer-based radio automation manuals and documentation from 1992 and 1993 are sought to contest a legal claim.

HD Radio Becomes Official Digital Broadcast Standard in Mexico

COFETEL originally recommended the IBOC standard in February 2011, but the recommendation then required the approval of the Mexican government's Commission for Better Regulation.

National EAS Test to be Held Nov. 9, 2011

FCC Public Safety and Homeland Security Bureau Chief Jamie Barnett noted that the test is essential to testing the effectiveness of the Emergency Alert System.

Find the mic and win!

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2011 Radio Show Engineering Program Announced

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Rep. Stearns Intros Bill to Enhance FCC Tech Expertise

H.R.2102 was introduced by Rep. Cliff Stearns as a companion bill to S.611.

Site Features

Pick Hits Videocasts

Watch demonstrations of the top 15 new products chosen by the Pick Hits panel from the 2011 NAB Show.

Newsletters Have the Latest Information

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The *Radio* magazine Industry Events section lists upcoming conventions and conferences.

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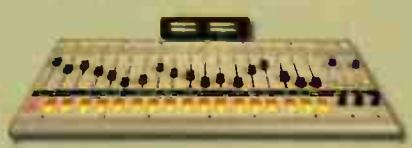

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Speak up on EAS

EAS is a tough subject. There are those who hold it as the ultimate form of public warning. There are those who consider it a non-working burden to stations. Most broadcasters fall somewhere in between.

I have always felt EAS is a noble effort, just not a well-executed system. It has the potential to be an effective way of distributing information before and after an emergency (although ideally before). EAS has an ideal function to get attention, provide the basic headline and to make the public aware something is happening. Once this is done, the established news and public information outlets can take over.

The basics of EAS operation are stated in the FCC rules. There are some inconsistencies, but these problems are slowly being worked out. Much of the system's inner workings are covered in individual state and local plans. Because of this, there are widely varying ideas and methods in place. Some plans are quite advanced and provide for state-wide communications networks. Some plans are little more than an EBS plan with some updated names.

Some believe EAS should be fully defined in FCC rules. Others believe the area plans should hold the details. Either approach presents difficulties, and this is yet another point of contention with creating functional EAS plans and networks.

In the end it comes down to the individuals writing, maintaining and executing the local plans. Those who serve on the committees to prepare these plans devote their time and energy for what is often a thankless job. Most of these groups seek input from stations and public services, and yet I hear regular complaints about how bad the EAS is. When I press for details on the problems, I always ask if the individual complaining was involved in preparing the area plan. The answer is almost always "no."

That's a problem. Those who complain about EAS but make no effort to fix it get whatever system others design.

The current attention to EAS provides an opportunity for stations and individuals to become more involved in the national rulemaking as well as their local and state plans.

The FCC is currently seeking input on the latest proposed rulemaking. Take advantage of this chance to get involved. I have watched many online EAS discussions and see some good ideas presented, but unless those ideas are expressed to the FCC or to the area plan organizers, the ideas are lost. Not all comments will be rolled into a rulemaking, but if enough voices speak intelligently on an issue, the Commission can be persuaded.

Comments on the NPRM are due July 20. Reply comments are due Aug. 4. Speak up and help craft the next phase of EAS.

National test information

By now you know the first national EAS test will be sent on Nov. 9, 2011, at 2 p.m. EST. The test will be sent through PEP stations and the NPR satellite channel, and it will test legacy EAS (not CAP). The test will use the EAN code followed by 3 to 3.5 minutes of audio (not the president's voice) and the EOM. The test will not use the Emergency Action Termination (EAT).

The test will not be carried on NOAA Weather Radio.

Following the test, stations will report their results to the FCC. Some stations are worried that a failed test will result in a fine. While the FCC cannot waive enforcement of the rules, it has discretion in levying fines. The goal of the test is just that: to test the system. The test is not an enforcement exercise.

Radio magazine will post more details of the upcoming test as they are announced.

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RF safety

By Jeremy Ruck, PE

As the FCC becomes more environmentally minded, RF safety takes on a greater importance. Radiation seems to be a taboo word in America. We tend to give any mention of radiation a wide berth. While it is true that radiation can be harmful, it is important to remember that the stuff we are talking about in radio is not the same as that from power plants or bombs.

Radio radiation is non-ionizing. This means that when it strikes or passes through a material it has insufficient energy to ionize atoms. Rather, we see that radio waves typically cause changes in the vibrational and rotational configurations. In other words, radio frequency energy tends to heat a medium. Intuitively this should make sense, as this is the concept behind a microwave oven.

Our goal, then, is to reduce the potential for a similar effect in body tissues. To that end, standards have been developed over the years to describe and provide guidance toward minimizing the potentially harmful effects on humans. The latest revision of the venerable IEEE C95.1 standard is the 2005 revision, although the Commission still utilizes portions of the 1992 revision. The IEEE standard is not necessarily ubiquitous on a global scale, as other countries may utilize their own standards. Some of these are tighter than the IEEE standard, and some go the other way.

Other portions of the FCC's adopted procedures, including the exposure limits, are based on recommendations from the National Council on Radiation Protection and Measurements (NCRP). These requirements, available from the Office of Engineering and Technology section of the FCC home page, are the result of the National Environmental Policy Act of 1969. While some of the other portions of this legislation may be of dubious importance, the protection of personnel and the public from the generally undetectable hazards of RF radiation makes sense.

An example of improper sign placement.

Make a plan

To promote awareness of RF hazards and mitigate their effects at your facility it is necessary to implement an RF safety plan. Under such a plan you are definitively recognizing and defining the potential harmful effects, establishing procedures that employees and contractors must follow, and identifying physical areas that may be problematic for exposure. While a boiler-plate approach is a good first iteration for a facility, it is crucial to recognize that each facility is unique, and therefore will likely require a customized solution. These suggestions are not meant to be an exhaustive list, and it is recommended that you consult with a competent engineer when you build your plan.

Typically hazards can be split into two general categories: contact hazards and non-contact hazards. Contact hazards are situations, as the name suggests, where the human body comes into direct physical contact with the hazard. The archetypal example here is coming into contact with a hot AM tower. Exposure to physical contact hazards can be minimized through a combination of barriers, reduction in transmitter power and cessation of operation. The general result of a contact hazard is the RF burn (a.k.a. the rite of passage).

The broader category is the non-contact hazard. Here all areas where hazards may exist that do not require physical contact with the tower are examined. Non-contact hazards do not typically in themselves result in burns, although excitation of metallic clothing, jewelry and tools by high-intensity fields can result in material heating. The non-contact hazards tend to relate more to tissue heating and their effects. Some of these effects are not fully understood yet, and may not significantly manifest themselves for many years after exposure.

The exposure limits under this second category are divided into two conditions: uncontrolled environment condition and controlled environment condition. The uncontrolled condition relates to exposure by the general public, or to those areas where you have no control over the access or exposure of persons residing, working or traversing. The maximum permissible power density in such areas is lower by a factor of five than in the controlled environment. As part of the application process, the FCC requires all facilities to demonstrate compliance with the uncontrolled environment condition at ground level, unless it can be satisfactorily demonstrated that areas where the predicted power density exceeds this limit qualify as a controlled environment.

In the controlled environment, the facility has the ability to control the exposure of personnel who are known to be cognizant of the hazards of RF and the implementation of safety procedures. Because of these factors, a higher power density limit is permitted. If work is necessary in areas where these limits are generally exceeded, additional action must be taken, such as the use of RF suits, reduction in power or cessation of operation.

RF suits, while useful in some instances, should never be considered a panacea. While they can attenuate the RF inside to certain levels, tears, rips or other integrity problems with the suit render them unusable. Their initial cost can be prohibitive, and for most stations it usually is more cost effective to build

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in some downtime rather than make the investment.

Personal radiation monitors, while useful, can be costly to keep calibrated. They can also provide a false sense of security that can simply be eliminated with lock-out/tag-out. Rendering an antenna inoperable through this methodology leaves absolutely no question as to whether it is causing a problem in its vicinity. This ultimately is the best solution to any RF safety concern, and should be part of the implementation of any program.

What's your sign?

Any RF safety plan must include appropriate signage. There are three different types of signs with differing color schemes approved for FCC compliance. Blue signs represent areas where the uncontrolled environment condition may be exceeded, yellow where the controlled environment condition may be exceeded and orange where the controlled environment condition is exceeded. The signs demarcate boundaries between the varying levels. Posting multiple different colored signs at one location is inappropriate and confusing. A sufficient number of signs should be posted so as to be visible from multiple different vantage points at the site.

There are multiple ways to establish the appropriate boundary locations. For FM-only sites, the FCC's FM Model software can predict where the peak power density will occur. The equations in OET Bulletin 65 along with simple trigonometric identities can also be used. For more conservative results, assume the relative field in the vertical plane is 1.0 at all elevations when using the equations.

Finally a survey of the site could be performed. A survey, with a high density of measurement locations properly mapped will provide the best graphical illustration of the situation. Prior to the survey, however, ensure your consultant has fully studied the specific antennas and geometries to ensure appropriate measurement locations are not missed.

While an RF safety plan can be as simple as a de-energize/lock-out/tag-out plan or as complex as various combinations of antenna changes, the importance of crafting, using, and maintaining such a plan cannot be emphasized enough. Although accidents may still occur, those accidents will tend to be viewed as such, and not as willful negligence.

Ruck is a senior engineer with D.L. Markley and Associates, Peoria, IL.

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EAS news update

By Lee Petro

There have been significant developments relating to the Emergency Alert System (EAS) in recent months. First, the Commission announced that it will hold the first-ever national test of the EAS in November 2011. In addition, the FCC has released a Third Further Notice of Proposed Rulemaking (NPRM), in which the Commission proposes a comprehensive review of the current EAS structure, and what steps should be taken to integrate new technology into future versions of the nation's alert system. Finally, in light of the NPRM, and to a lesser extent the national test, it becomes more likely that there will be a further extension of the deadline to implement the Common Alert Protocol (CAP) messaging, now set at Sept. 30, 2011.

In February 2011, the Commission issued an order establishing the rules and procedures for the initiation of a nation-wide presidential EAS test. The Commission indicated that it would give at least two months notice before conducting the test, and also required that all EAS participants take part in the test. The results of the test must be logged by the EAS participants, and the test results are to be provided to the Commission's Public Safety and Homeland Security Bureau within 45 days after the test. This information is to be submitted electronically, and the individual results of the participants will not be released publically.

On June 9, 2011, the Commission announced that the national test will occur Nov. 9, 2011, at 2 p.m. EST. Therefore, it is highly advisable that all broadcast stations check their equipment and make sure it is in working condition. The test results must be submitted no later than Dec. 24, 2011.

Along with the announcement of the national EAS test, the Commission released the NPRM to seek comment on proposed rules to implement CAP messaging, and to consider updates to the rules in general. Primarily, the Commission sought comment on the necessary steps that it must take to overlay CAP messages with the current EAS system, while, in the meantime, looking to implement more modern alert technologies such as RSS feeds and other IP-based distribution platforms. The Commission is also seeking comment on the requirements on licensees to be able to receive and relay CAP messaging by focusing on the design of the EAS equipment.

In particular, the Commission sought more information regarding the possible use of intermediary devices by EAS participants that would receive the CAP messaging and translate the message into the format currently used by legacy EAS equipment. These intermediary devices may offer a more cost-effective approach for EAS participants to come into compliance while the Commission and FEMA are considering a more comprehensive overhaul to EAS. Special focus was paid to the FCC certification process for the new equipment, and whether the need for such certification will impact the timing on the new obligations for EAS participants. The Commission also sought comment on the specific revisions to the rules to take into account the reception and transmission of CAP messages.

In light of the numerous issues raised by the Commission in the NPRM relating to the implementation of equipment to receive CAP messages, the Commission sought comment on whether the prior deadline to implement CAP-compliant equipment should be extended. The Commission sought comment on whether the deadline should be extended to a particular date based on when CAP-compliant equipment is certified by the Commission, or whether there is another triggering date that should be used.

Comments in the proceeding must be filed by July 20, 2011, and reply comments are due by Aug. 4. It is doubtful that the Commission will be able to churn out new rules by Sept. 30, 2011. Therefore, in light of the NPRM raising questions as to whether the CAP-implementation deadline should be extended, and whether the use of intermediary devices could be used by broadcasters to come into compliance, it is more than likely that the Sept. 30, 2011, deadline will be extended to a point when the CAP-related rules become effective, and the equipment has gone through the certification process.

Petro is a member of Fletcher, Heald & Hildreth, PLC, Arlington, VA. Email: petro@fhhlaw.com.

Dateline

Radio stations located in the District of Columbia, Maryland, Virginia, and West Virginia continue to run license renewal post-filing announcements on July 1, July 15, Aug. 1, and Aug. 15.

Radio stations located in North Carolina and South Carolina run license renewal pre-filing announcements on July 1 and 15.

July 10: All radio stations place their second quarter issues/program list in their station's local public inspection file.

Aug. 1: All radio stations located in North Carolina and South Carolina file license renewal application and EEO program report. Non-commercial radio stations also file biennial ownership report (FCC 323-E). These stations must run license renewal post-filing announcements on Aug. 1 and 15, Sept. 1 and 15, Oct. 1 and 15. Radio stations located in California, Illinois, North Carolina, South Carolina and Wisconsin must place their annual EEO public file report into their station's local public inspection file.

Aug. 1: Non-commercial radio stations in California must submit their biennial ownership report (FCC Form 323-E).

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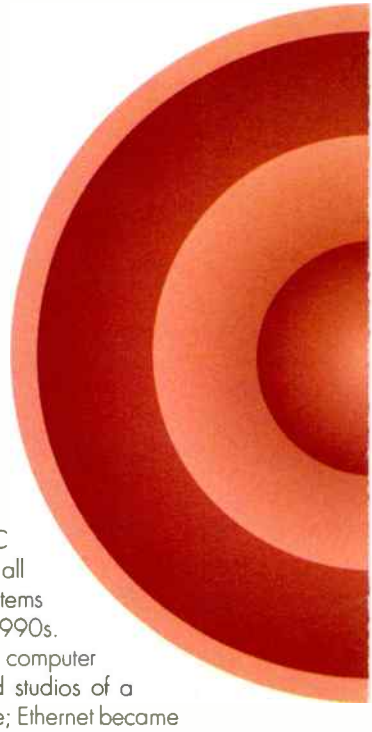
Digital Routing and Mixing

Here's what to consider in making the TDM vs. AoIP decision.

By Doug Irwin, CPBE DRB AMD



So with the economy turning around, and the immediate future looking (at least somewhat) brighter, perhaps the time is right to plan that studio rehab project, or perhaps that completely new facility that has been in the offing. When it comes to specifying and buying new consoles, what are the choices?

Going with analog consoles is still an option (Audioarts, Arrakis, Radio Systems, Mackie and others come to mind) but this time we'll consider the digital types.

Twenty years ago the state-of-the-art radio station not only used analog consoles, but analog routers as well. They were located in a separate room – typically called master control or some variant – and these routers took the place of rack upon rack of distribution amps, multiple-input-by-stereo output mechanical switches, and perhaps even patchbays.

Having a router system in place gave you the obvious advantage of quick and easy audio routing around the facility, and usually simplified the initial construction wiring as well.

After digital audio sources made their appearance around radio stations, digital routers soon followed. Even the analog inputs were digitized, though, and the router designs had changed drastically. It was no longer necessary for the console to actually contain the audio; all the switching/routing/mixing could be done inside the router itself. The console became no more than a user-interface, with a form-factor familiar to air talents. A PC attached to the system could control all the same functions as a console. Systems such as this appeared in the late 1990s.

As we all know, during the 1990s, computer networking around the offices and studios of a radio station became commonplace; Ethernet became practically ubiquitous. It should be of no surprise then that Ethernet later became an alternative to TDM (Time Division Multiplex) communications between nodes of a digital routing system (such as previously described). The audio-over-IP (AoIP) type system was born. This occurred in the mid 2000s.

TDM vs. AoIP

So as a potential buyer of a digital routing system, one thing you'll need to address is whether or not you want to make use of a TDM system, or go with an AoIP system. Perhaps it makes sense to first

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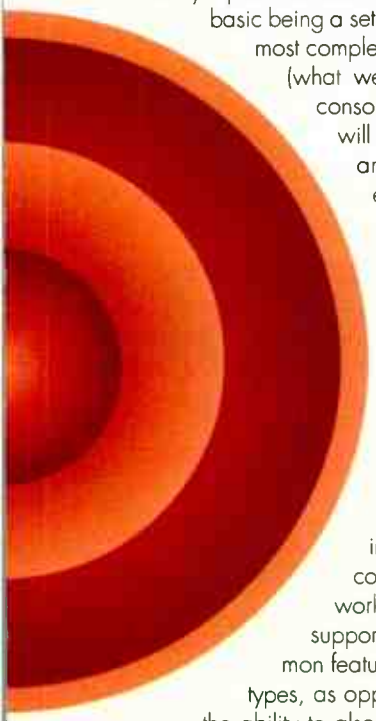
examine their similarities, and their differences thereafter.

Obviously the point of any router is to switch input sources and route them to destinations. Any digital router is going to be able to accommodate digital inputs (AES) as well as analog; likewise, any digital router will be able to provide output sources in either a digital or analog format. Both the TDM types and the AoIP types are built around a spoke-and-hub topology; what constitutes the hub is different between the types. (More on that later). Both types will have (as the terminal end of a spoke) an array of potential interfaces to the system – the most basic being a set of inputs and outputs, the most complex being a control surface (what we would typically call a console). The control surfaces will be similar to good old analog consoles in that each channel represents a source being added to a mix bus; however, digital systems provide flexibility so that the source for a channel can change based on router control. (Analog consoles would literally need their inputs rewired to do that – with the exception of pre-select inputs.) Both types will be configured via a computer workstation and as such will support off-site access. One common feature that I noted in the AoIP types, as opposed to TDM systems, is the ability to also route machine control in the same fashion as the audio is routed.



Differ in design

So let's take a look at the differences now. As I mentioned earlier, both systems will be built around a spoke-and-hub topology. TDM systems, being derived from their analog ancestors, are based around a router core or engine inside of which all the switching and mixing and routing is really done. So, any time point A (a source) is connected to point B (the destination) it routes through that router engine. (All roads lead to Rome.) TDM systems use proprietary communications means to connect the spokes to the hubs; no standards have been developed, let alone implemented. (They may use CAT-5 cable and RJ-45 connectors too, by the way, but it isn't Ethernet. It's just a smart way to make use of cable and connectors that are readily available.) In using TDM though, those manufacturers have built a system with a designed-in, minimum data rate that effectively guarantees how many audio channels can be moved back and forth along the spoke. Time slots in a TDM system don't compete with one another; they each have a job to do (move an audio stream in one direction or the other) and they do it with next to no latency.

AoIP systems differ from their TDM cousins in that they don't use a router engine as the hub of the system; what they use is a very fast, very common type of Ethernet switch that makes the Layer 1 and Layer 2 (in IT parlance) connections between nodes of the entire system. That is a fundamental difference between TDM and AoIP. The processing power needed to carry out the mixing/switching/routing functions in a TDM system is located at the heart (or star-point) of the system in the technical center; whereas that same processing power is distributed in an AoIP system, because the processors that do that work are located typically in the same studio as their associated control surface, connected via Ethernet.

The way AoIP systems distribute signals is via the wire. A source is available to any destination on the

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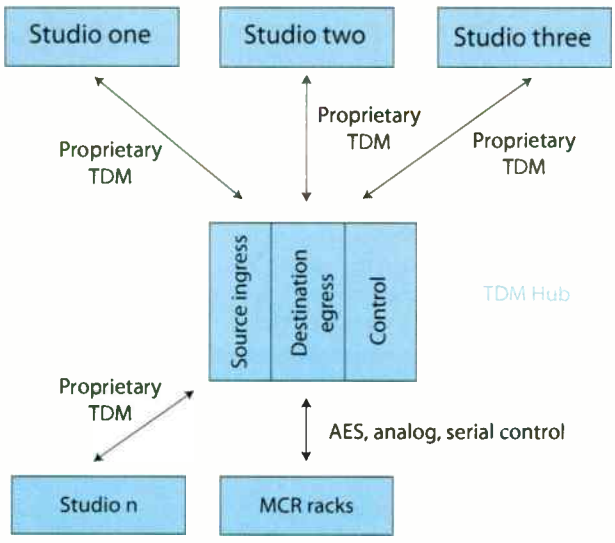
Digital Routing and Mixing



network because the source is multicast onto the network. Let me explain a little bit about what that means.

Recall that with a Layer 2 switch (like you see in use for the office network) any device can have a unicast connection to any other device that connects to the same switch. (Those two devices are going to need to be in the same subnet and the same VLAN as well.) A broadcast is a message that the Layer 2 switch floods throughout that entire VLAN. A multicast is a message that is meant to be heard by many hosts on the subnet (as opposed to a unicast, which is a one-to-one communication – and broadcast – which is heard by every host on the subnet). If every stream that represents an audio source is multicast on the local subnet, then any member of the multicast group will be able to not only hear that stream, but to further process it for use. This is fundamentally how the AoIP system types distribute audio. Whereas a TDM system has time-slots that are assigned to sources, and wired connections that carry specific signals to and from the router core, an AoIP system distributes audio over the shared network fabric.

Differ in practice

The sharing of the medium is the basic advantage of Ethernet (and IP communications in general). Fundamentally, networking multiple sources

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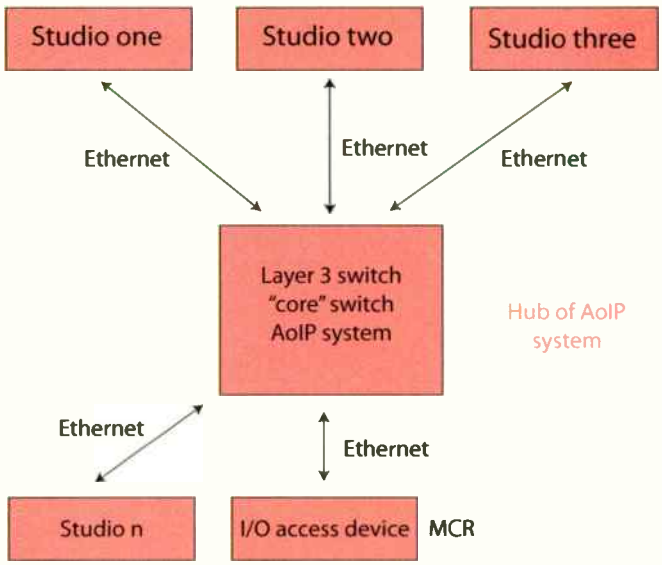
together is simplified by the use of Ethernet, mainly because of that fact that Ethernet is a standard. The fact that it is used so much means that many sources are available for its components, and many sources means lower prices. That's just economics.

There is a caveat with the shared medium though. Whereas a TDM system has a throughput delay that is insignificant, AoIP systems do have a very small amount of delay because of the shared nature of the medium. It takes a finite amount of time to build up the packets, for the Layer 2 switch to process them, and then for the destination device to reassemble all the packets in the correct sequence (because it is possible for them to get out of sequence as they transit the network). The amount of delay that is objectionable to the human ear has been studied thoroughly in VoIP engineering and what has been learned in that field applies to AoIP as well. While those delays are not insignificant they are manageable, and minimized in the system engineering.

Both TDM and AoIP systems are scalable in that they can be increased in size after the original design and installation is done. In a TDM system, typically another input card or output card will be installed in a frame when and if more inputs or outputs are needed. Those new cards essentially live in the hub of the system. AoIP differs here in that the inputs/outputs are never part of the hub of the system; they are always at ends of the spokes. A new input/output



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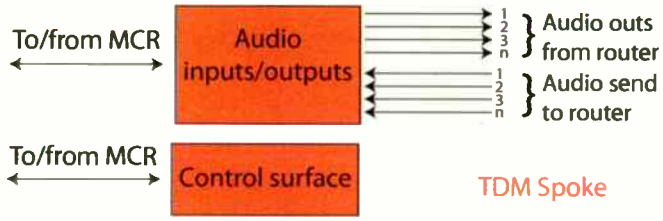
module would be added to an AoIP system by putting it in a rack somewhere in the facility, and then making it part of the network by adding a single Ethernet cable from it to the local switch.

In terms of wiring one type of system versus the other, it really comes down to your wire management style. Typically TDM systems are based on card-cages, with connectors that carry dozens of circuits at a time. For this reason they are typically landed on external punch blocks because the only real practical way to deal with those large connectors is to terminate all of their associated circuits at the same time during the installation phase. AoIP systems are based around smaller nodes that have fewer inputs and outputs (usually eight pairs of inputs and/or outputs). The installer could chose point-to-point wiring on all those nodes; or, like with a TDM system, all those circuit connections could be landed externally on punch blocks. It really depends upon how you want to organize the wiring. In either case, the number of ingress/egress points is obviously going to be the same for systems that have the same capability (i.e., 128 by 128 TDM vs 128 by 128 AoIP). In other words, wiring is wiring. Both systems can be as simple or complex to install as the installer desires.



Typical studio, 1 to n

One definite advantage that AoIP systems seem to have over their TDM cousins is that it is possible to add a computer workstation to the network, and to then have access to its associated audio output and input stream(s) and control logic, for the entire network, by way of the installation of software drivers and network cable. For a TDM system, the alternative way (which is what we've been doing for years) is by installing sounds cards in computers, which can be an expensive proposition with high-end sound cards. A logic control interface from this

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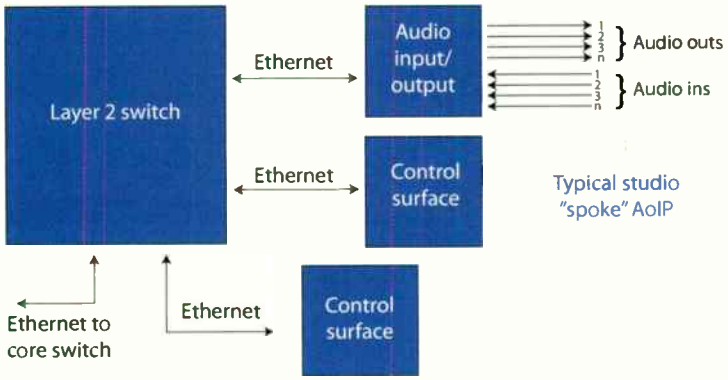

Typical studio "spoke" AoIP

same computer would likely be done via a serial connection, which of course represents more work and expense in the installation phase.

A natural extension of the AoIP network is into the STL portion of your facility. Having a WAN and/or LAN connection at the transmitter site means that devices on that end can become nodes in the system. In practice though, sharing a LAN for STL purposes means either using QoS (and all interim devices must support that along the route) or maintaining a totally separate LAN just for STL purposes.

The final decision

As I mentioned earlier, a TDM-based digital router is really an evolution from the analog router type that many of us grew accustomed to over the years, and as such, it is familiar, tried-and-true technology. If you intend to go with an AoIP system, you'll not only need to learn the details of the new system itself, but you'll also have to become much more familiar with networking in general. In this day and age that is certainly a good thing to do. If you don't already have a good handle on networking, ask yourself if you want to learn that at the same time as an entirely new console type and system type. If networking is just one of your IT skills though, then likely an AoIP system will be something to seriously consider. Finally choosing the type of system might boil down to your design philosophy: Whether you want to centralize the intelligence of the system in your MCR (as with TDM) or whether you want to distribute the intelligence of the system (as with AoIP).

Irwin is transmission systems supervisor for Clear Channel NYC and chief engineer of WKTU, New York. Contact him at doug@dougirwin.net.

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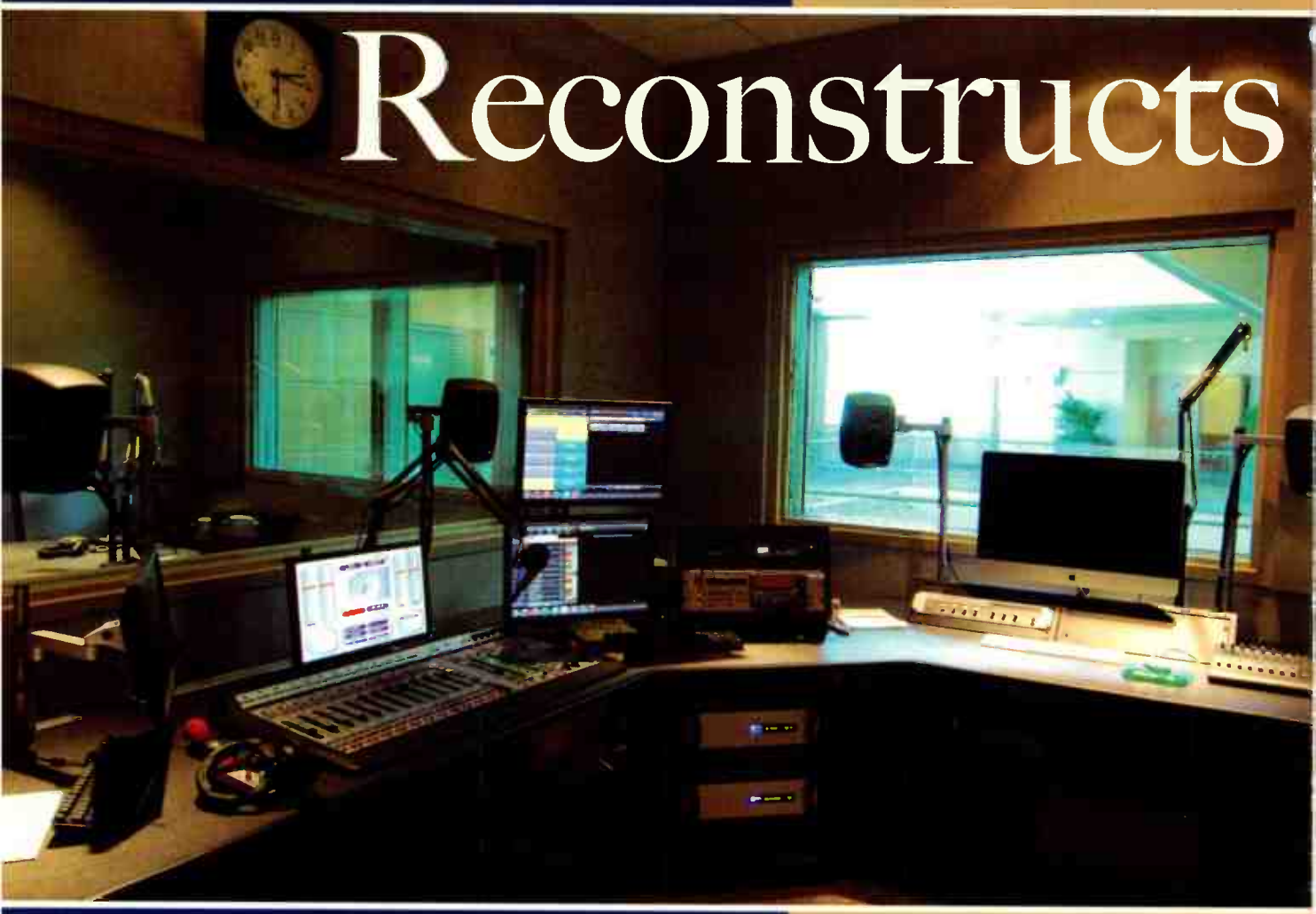
BYU Radio Reconstructs

By Chriss Scherer, editor



Brigham Young University builds a new facility for its five radio streams

Operating a combined radio and TV network is no simple task. Brigham Young University recently completed a facility upgrade of its radio and TV facilities to implement updated technology across all its broadcast channels as the operations moved to new facilities.

The radio and TV operation were in a collocated facility before the move, although there was a satellite office about five miles south of the campus that housed some administrative offices and TV post-production. Consolidating the content creation facilities with the distribution facilities brought some efficiency in transferring media between those services, and made collaboration easier with administrative functions.

BYU originates and distributes five radio streams from the new facility. BYU Radio is the heart of the operation. Launched in 2002, BYU Radio reaches an international audience with the best of BYU- and LDS-themed programming. BYU Radio is available on Dish Network, the Internet, selected radio and cable systems throughout the United States, and via satellite.

The BYU Radio library contains thousands of hours of lectures conferences, BYU sporting events, performance programming, and campus devotionals on a variety of subjects. BYU Radio

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BYU Radio

BYU Acoustic Design

By Richard Schrag

Acoustical design for the new BYU Broadcast facility involved all the customary issues: sound isolation, noise/vibration control and room acoustics. What made this project particularly challenging was the diversity of technical spaces that all live under the same roof.

The building has three TV studios, including one that is a hybrid space equipped with retractable seating for productions that have an audience. We were faced with having air-handling equipment located on the second floor immediately adjacent to the studios, with huge ducts traveling overhead to feed the rooms beyond. Our solution was to create a separate interior concrete deck for the main studio, so the ducts could be routed through the interstitial space without having their breakout noise impact the production activity below. Background noise levels in Studio A are below a Noise Criterion rating of NC-15.

The acoustical design is evident starting right at the front door, where the building lobby features large windows into BYUB's master control hub, with five independent pods surrounding a central monitoring console. The main floor also has production control rooms for video, audio, and camera shading; audio post production rooms, including voiceover booths; 10 video edit suites; quality control stations; and higher-quality final edit spaces also used for presentations. Each of these rooms has specific functional requirements, so the acoustical performance has to be tailored to match the room.

The radio station (located on the second floor, which incidentally adds a layer of complexity to the sound isolation design) has its own variety of different room types. There are on-air control rooms, talk studios, edit booths – even a performance space comparable to a recording studio, with audiophile-quality monitoring and an extremely quiet live room for the musicians. The performance studio by itself would have been an interesting little project, so keeping tabs on that design while simultaneously juggling a couple dozen others is what made this project fun – and a little nerve-wracking. ■

Schrag is design principal for Russ Berger Design Group, Dallas.

features a mix of peaceful and uplifting music and a variety of live broadcasts, including concerts from the Mormon Tabernacle Choir and sporting events.

BYU Radio Instrumental is a companion station to BYU Radio. It features LDS-themed music for international audiences as a Web-only service.

BYU Radio International offers two separate language services: Spanish and Portuguese. Like the Instrumental service, they are Web-only services.

KBYU-FM, Classical 89, broadcasts classical music from an extensive CD library, original productions, broadcasts of local and BYU arts groups' performances, as well as national and international programs. Classical 89 also presents coverage of local arts events, news from NPR and the BBC World Service, KBYU-FM morning and afternoon news, and several hours each week of Brigham Young University programs that include addresses from BYU devotionals, forums, Education Week, BYU Women's Conference and other events.

Clockwise from top: One of two on-air studios for BYU Radio and Classical 89, the control room for the talk studio, and a voice-over room.

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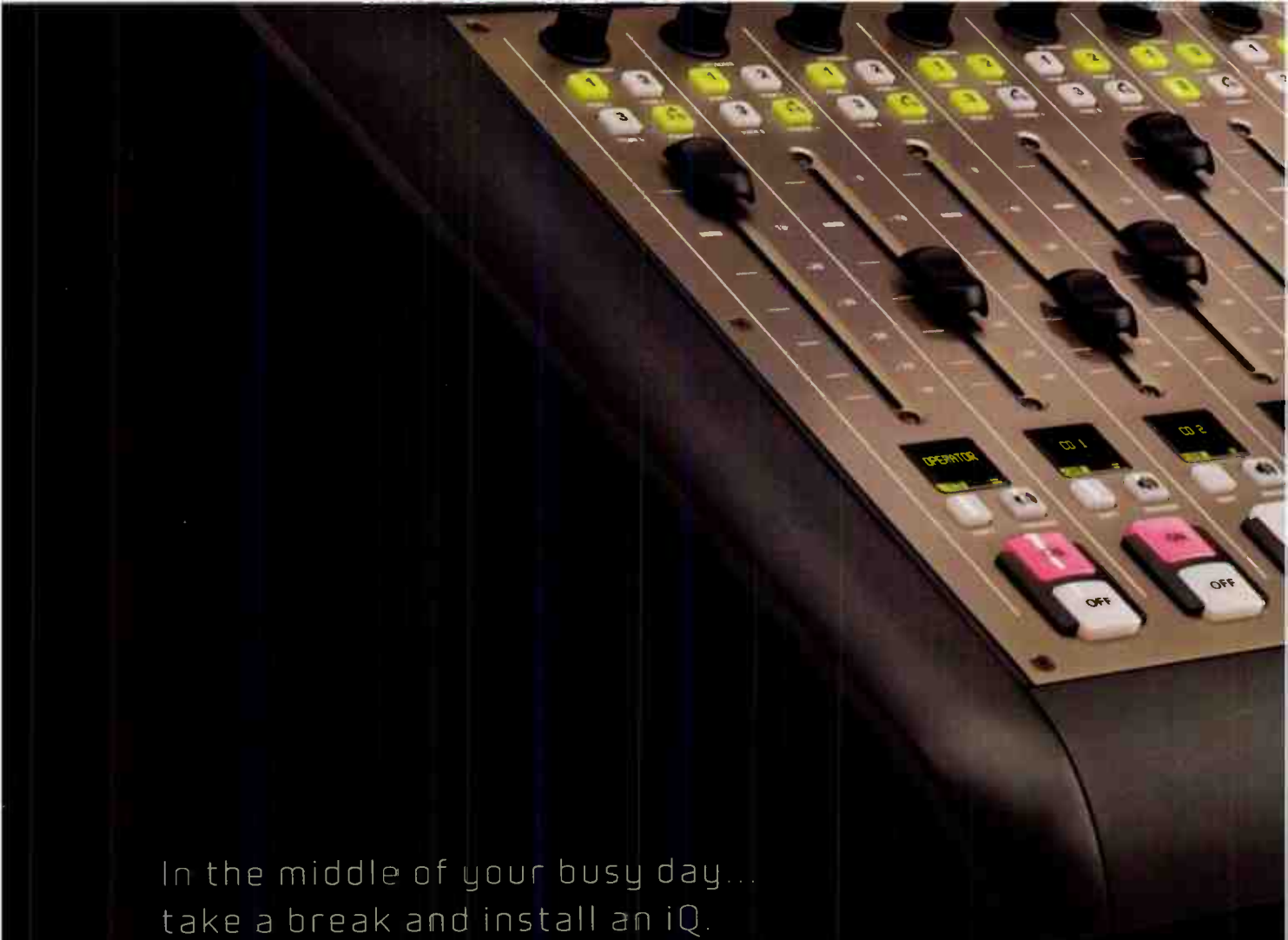

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BYU Radio

Project planning

Given the variety of audio programming, the station had a goal to increase the quality and quantity of content for its distribution channels. At the center of this plan was a networked audio infrastructure, which provides easier access to any audio source from any studio. Very little equipment from the old facility was used in the new facility.

The new plans also included additional space for audio production. The old radio facilities included two on-air rooms and two small post audio rooms. The new facility retained these spaces, but added a musical performance recording studio and a talk studio that can accommodate multiple guests.

There are two on-air studios: One for BYU Radio and one for Classical 89. Attached to each is a small producer/news room. In addition, there are two post-production spaces and two voice-over rooms.

The control room and live studio for the recording studio.

The recording studio can host a small ensemble or other musical group, and the recording studio can go live to air if needed. There is also a 260-seat theatre where live musical events can be produced, and any of the radio stations can take a live feed of the event.

WideOrbit Automation is used for the on-air storage and playback, and ProTools handles the production work. In time, the WideOrbit system will be integrated with organization-wide media asset management (MAM) system.

As part of the move, BYU began to ingest its library of CDs into the automation system to support a completely file-based operation. The Axia audio network also integrates into this

Equipment List

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BYU Radio

More BYU Broadcast

BYUB is a television, radic and Web media production and distribution operation serving local, national and international audiences. In addition to KBYU-FM and the BYU Radio services, the University provides BYU Television, KBYU Television and BYU Television International.

KBYU-TV is a local PBS affiliate serving Utah and Southeast Idaho.

BYU TV is available throughout North America on the Dish Network, DirecTV, and on 503 cable systems across the country. It broadcasts BYU sporting events, original documentaries, musical and dramatic events from BYU and the LDS Church and more.

BYU Television International, launched in March 2007, is multilingual service available in Spanish, Portuguese and English. It is transmitted to the Salt Lake City market and carried on cable and satellite systems in every country in South and Central America.

Create is a service from American Public Television that is received via satellite and currently passed through with bug branding. ■

An on-air studio from the guests' point of view.

file-based system and simplifies routing and resource sharing. The networked audio system also allows the announcers to be flexible in where they go in the air.

The combined radio/TV operation shares office spaces, but some production facilities are shared as well. The TV side has two ProTools rooms to complement the one radio ProTools room, but all three are shared by both sides.

Radio also has access to all three television studios. One TV studio accommodates a live studio audience. Tie-lines between the TV audio network and radio network to allow simulcast of events originating from that location.

Beck Associates integrated the facility, and consulted on the final design. BYU involved Ascent Media in the initial design phase of the building, while VCBO Architecture and Okland Construction built the facility. Russ Berger Design Group provided acoustic guidance.

BYU Radio will be available on Sirius XM starting July 1, 2011.

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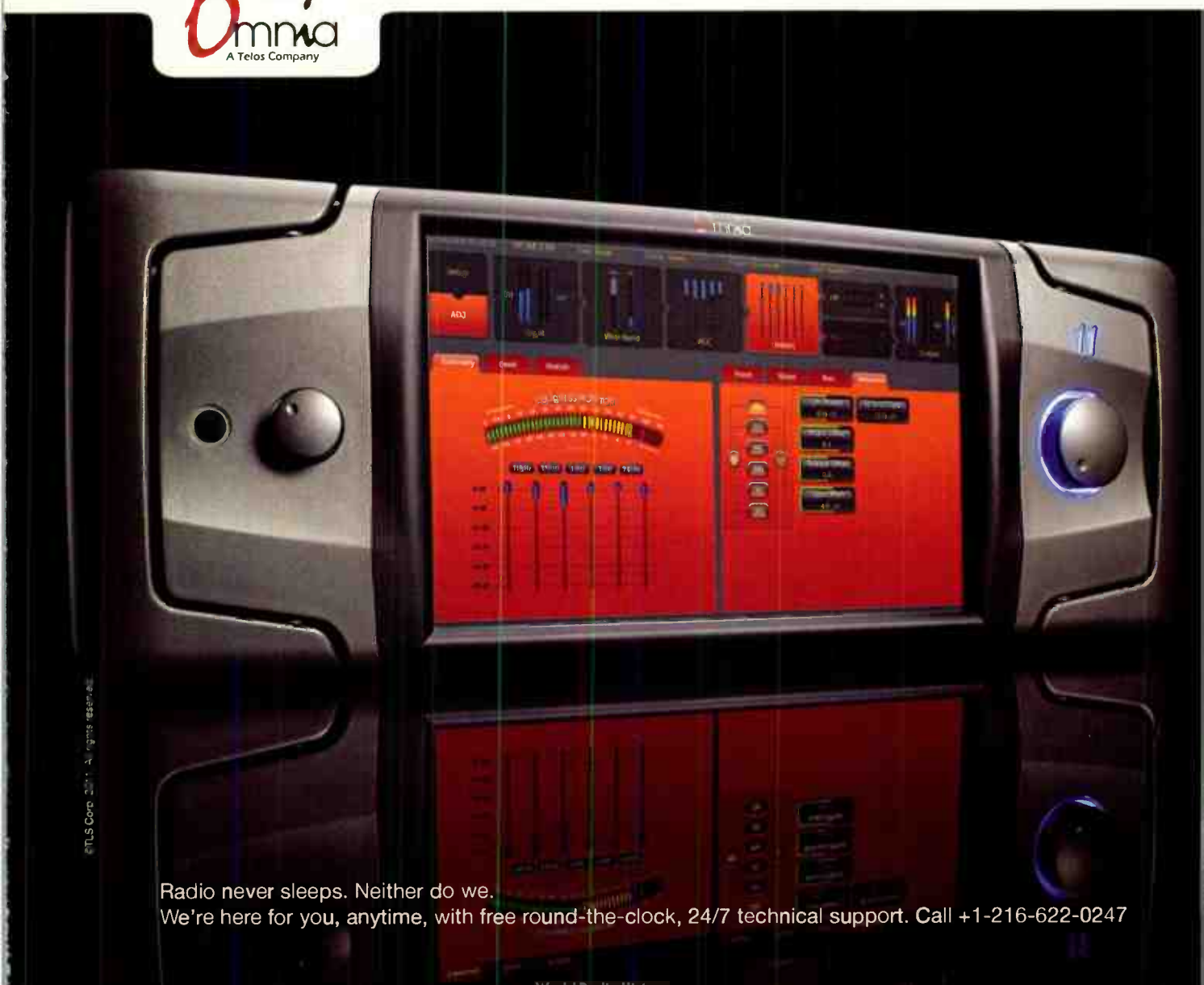

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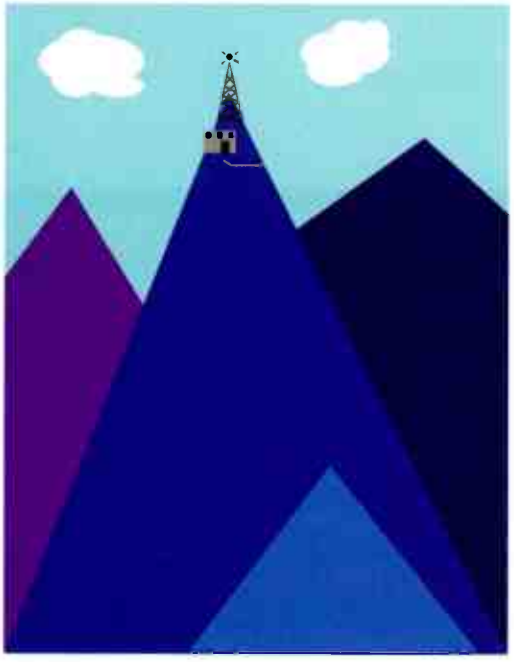
By Doug Irwin, CPBE AMD

Fixed cellular terminals

Some rural transmitter sites are so rural they can't support a reliable connection to the PSTN. It's clear that a transmitter site needs a telephone – at the very least for safety sake, but also for communications needs such as a dial-up remote control. Perhaps you are soon to be stuck with a transmitter site like this, or perhaps you've already got one and you need ideas. If so read on.

In the old days before the cellphone network came in to being, you had to rely on a pair of wires running down the hill to the nearest B box. (This is was even worse when you had a stereo pair running down the hill.) That was often fraught with peril, especially in the winter; lines could get noisy, or knocked out all together and the telephone company couldn't make it out because of muddy roads. Ahh, the good old days!



When cell sites became more and more prevalent it wasn't long before engineers wanted to use them for remote-site communications. Still, it wasn't easy, even in the analog-cell days. Today PCS has replaced all of that, and the device that you need to consider is known as a Fixed Cellular Terminal. There are multiple vendors for this type of device, but one that has been around a while is Telular. Its website lists the various units, but of special interest is the SX7T which can make use of GSM or HSDPA and is reportedly carrier agnostic. This device not only allows you to connect a plain old telephone, but also allows you to set up a small LAN and make use of it as an Internet connection (assuming your carrier supports that).

As anyone who has tried to use a cellphone at a mountain top site knows, often coverage is spotty (if it is there at all). It always seems that there are too many cell sites for a phone to choose from, and none are really good enough for a decent call. So if you elect to go with an FCT, make sure you get one with antenna connectors on it so that you can use an external antenna. (The SX7T allows for this, with type TNC connectors).

Telular SX7T

Directional antennas for cellphone use are easy to find – try Cellantenna for example. It's clear that before you purchase an antenna such as this you'll need to know which band your carrier uses. Mount the antennas outdoors, and then by experimentation you should be able to determine which cell site to point leave the antennas pointed at.

If you happen to have a radio link with T-1 capability at your site already then your choices are more favorable. The Harris/Intraplex system has plug-in modules for its mainframe that will pass voice-data; they can be configured for OPX or even for ring-down. The modules are VF-15 (FXO) and VF-16 (FXS). The Worldcast Oslo also has FXO/FSO plug-in modules for its frames that will handle voice data.

A final option to consider is Internet connectivity provided by means of an unlicensed, spread-spectrum link from your studio to the transmitter site. (As anyone who has used a link such as this knows, your results may vary, even day to day.) Once you've done that, set up a VoIP service such as Vonage (as one example). This kind of service comes with a small Ethernet to POTS converter; all you need do is to give it an IP address, connect it via Ethernet to your Internet connection, and plug in a telephone. No need to open ports on a router that you may have, because the converter box establishes a connection with your provider, using port 80, and keeps it open.

Resources

Cellantenna
cellantenna.com

Telular
www.telular.com

Vonage
www.vonage.com

Irwin is transmission systems supervisor for Clear Channel NYC and chief engineer of WKTU, New York. Contact him at doug@dougirwin.net.

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Mackie
Onyx Blackbird

By Chris Wygal, CBRE

Radio production facilities are interesting places. Hard-hitting, high-quality audio production can (for the most part) be accomplished with tried-and-true stereo in and out. Occasionally, however, multitracking is needed. For example, I recently recorded a university chamber choir to be used on a special radio program on our network. For the best recording (in this case), I ended up tracking five mics. When this type of project occurs, especially when pristine audio is a must, FireWire technology is my immediate go-to. The Onyx Blackbird from Mackie is a fantastic solution for making a PC or Mac workstation a 16-track (or more) recording powerhouse.

A few facts

The Onyx Blackbird lives in a 1RU chassis and interfaces via FireWire. The Onyx name is derived from Mackie's high-end line of microphone preamps, which the Blackbird uses on all eight analog inputs. The first two Onyx preamps have an 80Hz roll off, and can be switched between mic and line. Two insert jacks allow for external processing of inputs one and two. All eight inputs have 48V phantom power available. Six other inputs can be used as mic or line. Up to four Blackbirds can be linked via FireWire for a total of 32 controlled inputs. (Up to eight Blackbirds can be inter-connected for up to 64 inputs.) The Blackbird will sync internally, but will also accept a word clock reference via BNC jacks. Optical Toslink ADAT lightpipe S/MUX II) inputs and outputs are located on the rear of the unit with sampling rates from 44.1kHz to 96kHz. The power plug-in is a simple IEC cord. For analog monitoring, stereo main, alternate and monitor outputs are found on 1/4" TRS jacks.

Each analog input has a familiar Mackie gain control knob with the "U" indication. When set at U (unity), the incoming gain structure is not affected. However, the mic inputs can be ramped up 60dB, and the line level inputs can be attenuated 15dB or amplified 45dB. Each input has a dual-colored LED that indicates good input levels by lighting as green. The LEDS will turn red when the inputs are overdriven. Inputs 1 and 2 have high-pass filters, and a Hi-Z switch that allows for proper impedance matching when plugging a guitar directly into the 1/4" line input jacks. The direct monitor section allows musicians or vocal talent to monitor inputs 1 and 2 prior to the Blackbird's digital processing or routing. This allows for zero-latency, and can be monitored in stereo or mono. The direct monitor section works in tandem with the monitor level. The monitor output can feed powered monitors or amplifiers via 1/4" jacks on the back of the Blackbird.

Two sets of headphones can be used on the front panel, with individual level control. Audio from an onboard mix or custom mix from the Blackbird Control software can be routed to the headphones with the push of a button. A green LED on the front panel indicates whether the Blackbird is receiving acceptable clock sync as a standalone un't or from its host.

The back of the Blackbird is a busy yet simple place. There are two Firewire jacks for host control and connection to another Blackbird, two BNC word clock jacks for syncing and four optical Toslink jacks for ADAT I/O. Alternate L/R out jacks provide an unbalanced output for a headphone amp or external audio device. The balanced main out jacks can be used in live applications when a mix of the Blackbird input channels is needed. The monitor jacks correspond with the monitor control previously mentioned on the front of the Blackbird.

Control freak

A 1RU preamp with multiple I/O options, gain control and some monitoring features is cool. If the preamps are pristine, that's better. Having full software control of up to four units on an intuitive on-screen virtual control surface along with the aforementioned amenities is the berries.

The Blackbird Control software is an easy-to-use matrix mixer that makes internal audio routing and control a breeze. Upon installation, the user

Performance at a glance

1RU

IEEE FireWire interface

Analog and Toslink ADAT inputs

Blackbird Control virtual matrix mixer GUI

No latency during recording and monitoring

World Radio History

will probably not need to pick up the manual. A familiar mixing console pops up on the screen with 18 faders, mutes, pans, solos and several outputs. There are 18 inputs faders because two are added for monitoring the DAW or editing software. The fader levels are manipulated by clicking and dragging, or typing the decibel value in the fader level text box just above the solo buttons. The first eight faders correspond to the analog mic/line inputs. Faders 9-16 are for the ADAT inputs. Each fader can be labeled accordingly by double-clicking in the source text block. All the input channels have detailed high-resolution meters alongside the faders. Each channel has a peak indicator that can be reset by clicking the clear peaks button.

The output section of Blackbird Control is comprised of main mix, alt mix, phones 1, phones 2, ADAT 1-2, ADAT 3-4, ADAT 5-6 and ADAT 7-8. Selecting each output (by single-clicking on it) will cause the fader setup to change according to user settings. This is indicative of the matrixing nature of Blackbird Control. Any input can be routed to any output. Each output has a set of level faders and can have its own input routing structure. The ability to control routing inside the Blackbird has virtually endless capabilities. If the guy listening to Phones 1 needs more kick drum, that task is easily accomplished. If the Mic/Line 6 level is overdriving an audio software recording channel, that too is easily fixed with a simple "click and drag." Each mix scene can be saved, loaded, copied and pasted. A reset button will revert the unit to factory defaults on a tab-by-tab basis.

In addition to the mixer tab (on the top left of the fader section) is the settings tab, which opens up a world of internal nuts and bolts for properly setting and interfacing Blackbird Control in any given scenario. Clock settings, sample rates, buffer size, WDM settings, latency adjustment and firmware updating are a glimpse of what can be controlled under the Blackbird's hood. Just like the rest of the unit, the settings are intuitive and not too complex. The Blackbird can be up and running in minutes. As an added note, near zero-latency during monitoring and recording is an added (and valuable) bonus.

The Onyx Blackbird is an effective and nifty way to control and route audio for DAWs and PC or Mac-based audio editing software. Installation takes minutes, and several driver options work in any operating system/editing software environment. With clean Mackie preamps onboard, and an intuitive layout and design, any engineer will find the Blackbird a valuable tool. If an efficient step up to non-linear multitracking I/O and control is needed, Mackie has more than met the needs of the radio production crowd.

Mackie

P 800-898-3211

W www.mackie.com

E productinfo@mackie.com

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

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Belar FMHD-1

By Doug Irwin,
CPBE AMD DRB

During the course of my career I've worked on many projects and dealt with lots of problems, many of which involved measuring a station's modulation or an injection level.

"What does the Belar say?" seems to be the phrase I most often thought or uttered during those occasions. Indeed, the company with the longest history in making modulation monitors for broadcast has got to be Belar Electronics. Its IBOC monitor is known as the FMHD-1, and it measures all the pertinent IBOC parameters, along with the standard analog items we're accustomed to. There's not enough room to address all its features, but I'll emphasize a few.

Let's start at the front panel. As you can see, the device is 2RU high, and the front panel includes a 640 x 240 pixel display and the rotary encoder wheel. There's also a headphone out. The rear panel is where all the important inputs and outputs are located.

There are eight analog output connectors, each of which can be assigned to any of the decoded audio streams including the analog modulation. Assignment of the outputs is done via the popup menu.

There are also three AES-3 outputs (75Ω unbalanced) that can be assigned to any of the decoded (or demodulated) streams associated with the station to which the monitor is tuned.

Continuing along the top row, there are two separate analog composite outputs, along with two digital composite outputs that include SCLK, FS and SDATA.

Along the bottom row we have the RS-232 connector (male, so you may need a null-modem cable to connect to it); a DB-15 for access to four form-C relays that can be used to signal outboard equipment to alarm conditions that are user programmable; the Ethernet connector; and two sets of RF inputs. Note that you can use an antenna connection (if you use the monitor at a remote studio location) or you can use the dual high-level RF inputs if the FMHD-1 is installed at the transmitter site. You can combine the output from a separate digital transmitter with that from an analog transmitter right in the monitor device itself. You'll have to make sure the ratio of analog vs. IBOC is correct.

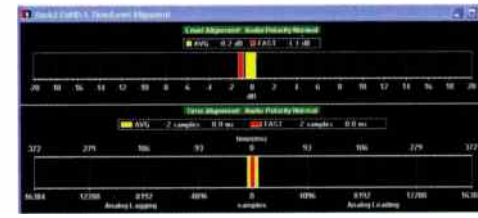
Measurement data can be accessed from the front panel, or, you can put it on a remote network and access it via IP, as I did. If you are in front of it, you'll control it completely with the rotary wheel; in that case you can also use the rotary wheel to access the popup menu to change certain settings in the unit. These include RF input selection, the composite bandwidth filtering, spectrum analyzer settings, and finally other configuration settings such as the IP address of the unit, and the sources that feed the various audio outputs (such as the headphone out).

Performance at a glance

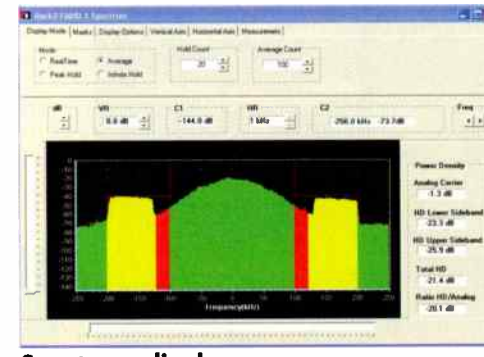
- Frequency agile
- Off-air reception or high-level inputs
- Meters analog and IBOC parameters
- Simultaneous analog and digital outputs
- Spectrum analysis
- Bit error rate display
- Four user-assignable alarm outputs
- Ethernet or RS-232 control

First page

Popup menu



HD delay



Spectrum display

World Radio History

Most useful features

As someone who deals with IBOC transmissions every day, I want to emphasize the features of the FMHD-1 that I feel are most useful. I installed the unit at the top of our building in New York, fed by an antenna that is 560' above the ground, looking right at the Empire State Building.

You need to install WizWin on a computer so you can access the unit over an IP network. There is a small configuration associated with that. Afterward you have access to all the measurement data the unit generates. The first page view you will likely view is the basic one that shows the frequency, whether or not you are actually transmitting IBOC, and what streams are available. You can rapidly read the SIS and PSD associated with all the IBOC streams you are transmitting. One parameter that has to be checked on a regular basis is the analog vs. digital delay sync.

The spectrum display is useful and interesting as well. As I said, the measurements were taken off-air, and wouldn't be good enough for proof measurements. However, the settings comply with NRSC-G201A quite well, so after a proof is finished, you could have a lot of confidence that performance is remaining constant by using the spectrum display from the FMHD-1.

As an analog receiver, I found the demodulated base-band was incredibly quiet – at least an order of magnitude better than the off-air tuners we're using for an air monitor. I don't see specifications for the amount of quieting performance for this radio; my ears just say that it's awesome.

As a user I only have one complaint with this unit – and that is the setting of the IP address. To do that, first download another small piece of software from Lantronix, learn how to use it, and then use it to figure out the IP address of the FMHD-1 as it comes from the factory. You then use that same software to change the IP to what you want. It's rather awkward. Fortunately, you'll likely have to do that only once.

The analog and digital outputs are available simultaneously on the rear apron – configured from the popup menu. My only wish for an additional feature for the FMHD-1 would be the ability to stream audio outbound via IP. Using the device while on our network allowed me to connect it to an outside antenna with lots of signal – but unfortunately in that mode I'm not able to enjoy the sound of this device. By plugging a pair of headphones in to the front of the unit (or otherwise routing audio out of it) you're going to hear the very finest level of detail in your transmitted signal.

Irwin is transmission systems supervisor for Clear Channel NYC and chief engineer of WKTU, New York. Contact him at doug@dougirwin.net.

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Belar

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World Radio History

by Erin Shipps, senior associate editor

High-resolution USB mic
Blue Microphones

Yeti Pro: The first USB microphone combining 24-bit/192kHz digital recording resolution with an analog XLR output, Yeti Pro offers XLR recording with Blue's custom condenser capsules set in a proprietary triple array. Yeti Pro maintains zero-latency headphone output with volume control for direct monitoring, adjustable microphone gain control and a mute button. Featuring a mic stand thread, Yeti Pro can be mounted on a stand or positioned at the desired angle with the included custom-designed desk stand. The microphone is PC and Mac compatible, and also includes an XLR stereo breakout cable for analog recording.

818-879-5200; www.bluemic.com

Headphone amp
Glensound Electronics

GS-HA011: The GS-HA011 has a transformer-balanced input, and a secure, recessed adjustable gain. Input is via XLR with a loop through for linking multiple units. Headphone outputs are available on 6.35 and 3.5mm jack sockets, and they are wired tip and ring to allow connection of regular headphones (with audio on both ears) or a single ear piece. Volume is adjustable to headphones from 32-1k ohm impedance. A 9V PP3 battery gives over 18 hours of use, or an external dc power source can be used.

+44 1622 753662; www.glensound.co.uk; sales@glensound.co.uk

Mid-field three-way monitor system
KRK Systems

Rokit RP10-3: Designed to deliver full range professional performance in a mid-field monitor package, the ROKIT RP10-3 features an integrated low-frequency driver and cabinet design to deliver true bass response down to 35Hz. The system also offers a unique rotatable tweeter/midrange speaker mount plate that ensures accurate acoustic alignment for vertical and horizontal installation.

954-316-1580; krksys.com; orders@krksys.com

IP codecs
Systembase

C500ip, C600ip: The Systembase C500ip range of digital audio codecs deliver performance and reliability for professional real-time audio applications. Both models incorporate the fast apt-X Sub Band ADPCM compression system with a coding delay of only 2.8ms at a sampling rate of 48KHz, as well as Linear PCM and G.722. The C510ip ISDN model also supports G.711 coding algorithm to provide compatibility with other codecs. Additional design features include 24-bit analog and AES audio interfaces. The analog interface is electronically balanced resulting in a high Common Mode Rejection Ratio (CMRR) for a significant improvement in performance. The C600ip is designed specifically to deliver reliable audio in a professional broadcast environment. It supports both X.21 and IP connectivity allowing it operate in various configurations. Remote management is via the Web server or SNMP-based platforms.

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Chairman and CEO
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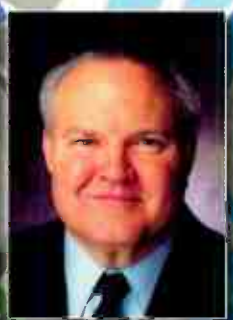

Panelist:
Bruce Reese
President and CEO
Hubbard Radio

Moderator:
Lew Paper
Partner, Dickstein
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Opening Remarks:
Marci Ryvicker
Director, Wells Fargo
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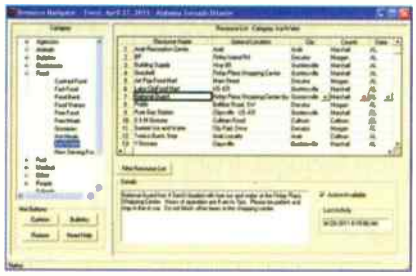
Broadcast audio processor

Inovonics

David IV: This processor for FM and FM/HD Radio broadcasting features an all-digital, DSP-based design. Comprehensive audio processing includes gain-riding AGC, five bands of dynamics compression and equalization, stereo enhancement and sub-bass augmentation, plus Inovonics' PIPP limiter. Processing is integrated with a high-performance stereocoder (stereo-gen) that includes active and metered RDS combining. The DAVID IV can accept analog and AES-digital inputs, and has two separate composite/MPX outputs in addition to both analog and AES-digital line outputs. The line outputs can be configured for either FM or digital radio transmission characteristics. It may be set up and controlled using the front-panel graphic display and jog wheel, or connected directly to a network for full TCP/IP control over all parameters with a PC and supplied software.

800-733-0552; www.inovon.com; info@inovon.com

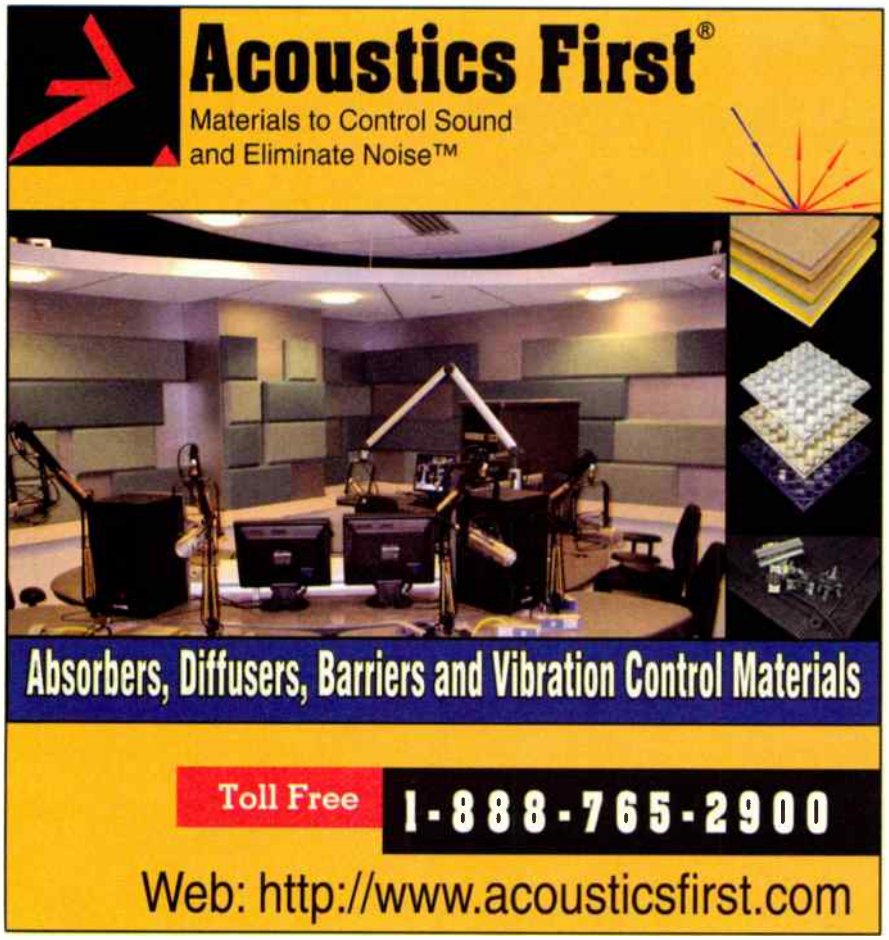


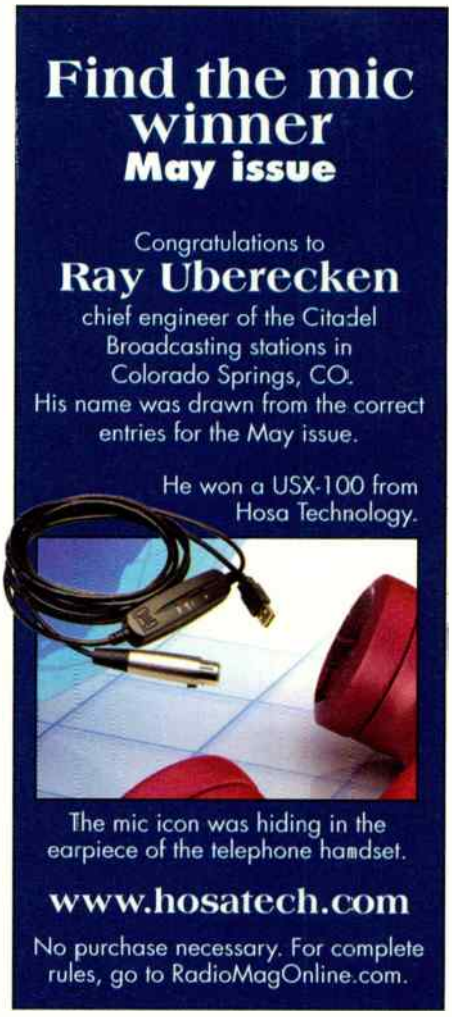
Emergency management software

Riverview Software Solutions

Disaster Resource Navigator: This application provides an organized method of keeping track of important information and offers quick navigation of local resources providing important services such as shelter, food, water, ice, generators and fuel. With the Disaster Resource Navigator, this information is just a mouse click away saving valuable time for the broadcast staff, listeners and viewers. The software design is based on an actual four-day disaster event that took place in Alabama in April 2011.

256-486-3397; www.riverviewsoftwaresolutions.com





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Digital recorders

Olympus

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RMXdigital accessory

Harris

RMXengine: An auxiliary device for PR&E RMXdigital on-air and production consoles, RMXengine provides automatically generated mix-minus signals – a process that eliminates voice echo for live ca'lers – for every fader on the RMXdigital console. The RMXengine also enables advanced dual-console operation for dual-anchor studio operation. The device gives more options to board operators andproducers by providing a mix-minus and IFB talkback channel on every fader of the RMXdigital console. This more than quadruples the amount of mix-minus and IFB talkback capabilities on a typical 28-channel RMXdigital.

800-622-0022; www.broadcast.harris.com
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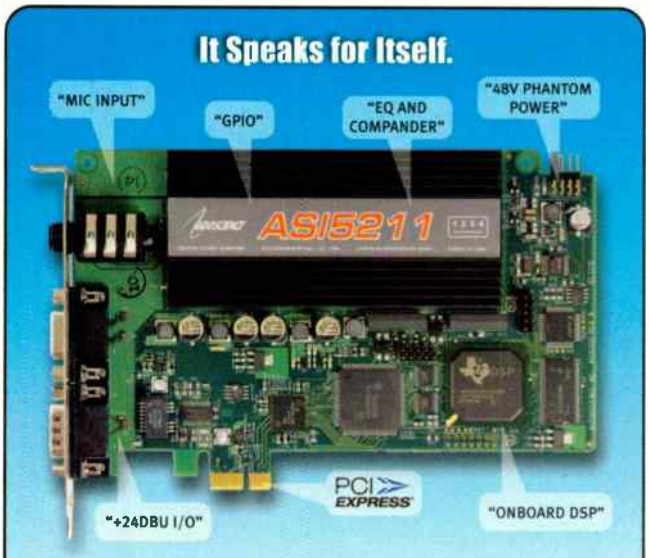
Audio processors

Drawmer

MX Pro Series: This 1 RU analog processor series includes the MX30 compressor, MX40 four-channel gate, MX50 de-esser and MX60 channel strip. MX30Pro removes unwanted noise below a pre-set level. Each channel consists of a variable threshold gate. MX40Pro noise gate features Peak Punch circuitry, adding unique dynamic enhancement. MX50Pro features split-band and full band de-essing. The fully variable frequency control operates from 800Hz to 8kHz. Functioning as a studio grade mic pre-amp, Program Adaptive gate, de-esser, compressor, limiter, three-band EQ and multi band tube saturation stage, the MX60Pro offers many user options.

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



The ASI5211. Not another dumb card. With a microphone input, including a low noise pre-amp and 48V phantom power supply, on-board DSP, increased analog I/O level of +24dBu and a new GPIO that adds two opto-isolated inputs and two normally open relay outputs, the ASI5211 is one smart card. And considering it's priced the same as cards without all these features, it's one smart choice, too. For information, call +1-302-324-5333 or email salesasi@audioscience.com.

ASI 5211 features:

- +24dBu balanced analog and AES/EBU I/O
- 24bit A/D and D/A converters
- 16, 24, and 32bit PCM formats
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- Windows XP, 7 and Linux drivers

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UPGRADES and UPDATES

The **TFT** Model 3320 CAP-to-EAS Converter, manufactured by **Alerting Solutions**, received official notification of approval by FEMA's Integrated Public Alert and Warning System (IPAWS) Conformity Assessment Program. (tftinc.com)...**iBiquity Digital** is offering cash incentives to reward radio stations that use the HD Radio multicast channels in their clients' on-air advertising campaigns. Sales teams can submit their stories of campaign success using the multicast channels at hdradioalliance.com between June 15 and Aug. 15, 2011. (ibiquity.com)...**RCS** has released the latest version of Zetta. New features of the software include a new Layouts Manager, new and expanded User Rights and pPrivate and public layouts, which can also be locked to prevent editing. (rcsworks.com)...**Tieline** conducted tests of its Bridge-IT IP audio codec via IPv6 by successfully transmitting live bidirectional stereo audio over multiple international hops using IPv6 infrastructure during the June 8 IPv6 Day. (tieline.com) ■

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305-249-3110; www.aptcodecs.com; ussales@worldcastsystems.com

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VRM Box: A headphone monitoring system featuring patent-pending VRM (Virtual Reference Monitoring) technology, VRM Box is a high-quality 24-bit/48kHz USB audio playback interface. Powered through a computer's USB port, it also features a digital (S/PDIF) input, which supports sample rates up to 192kHz. The accompanying software lets you choose your mixing environment and the virtual speakers you wish to monitor on, then processes the audio before feeding it in real time to the hardware.

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888-MY-GE-LED; www.led.com; info@led.com

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

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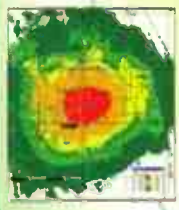

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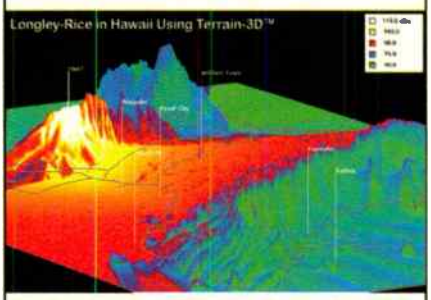

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World Radio History

Contributor Pro-file

Meet the professionals who write for *Radio* magazine.

This month: Sign Off, page 50

Erin Shipps
Senior Associate Editor
Radio magazine
Overland Park, KS

As a college student, Shipps developed an interest in radio when a friend of hers suggested she work for a local radio station (KHCA in Manhattan, KS). She was one of two disc jockeys for two years in the early 2000s. She began as associate editor of *Radio* magazine in July 2007. She completed her bachelor's degree in Journalism, emphasis in magazines, in 2005 and was previously associate editor for a string of antique farm equipment magazines and copy editor for a classic motorcycle magazine in Topeka, KS.

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

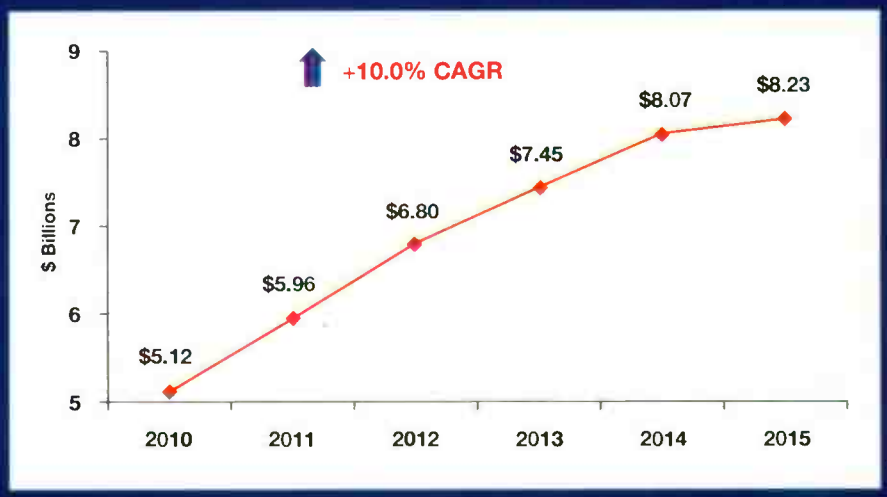
World Radio History

by Erin Shipps, senior associate editor

Sample and Hold

Local Search Revenue Growth

BIA/Kelsey forecasts local search advertising revenues will increase from $5.1 billion in 2010 to $8.2 billion by 2015, representing a compound annual growth rate (CAGR) of 10 percent. Driving this growth in ad revenues is a continuing increase in local search activity. By 2015, the firm expects 30 percent of search volume will be local in nature.



Source: BIA/Kelsey

Advertising Q2 2011

Second-quarter spending increases by advertisers are leading to strong gains in a number of leading advertising categories, including automotive (domestic), finance, retail and telecom.

The National Spot Radio Market is pacing up 1.4 percent in 2011's second quarter compared to the same period last year as five of the six market group segments are showing increases. In addition, early third-quarter pacing numbers are up more than 7 percent compared to the same period in 2010. That comes after a 4 percent decline in national ad spending in this year's first quarter.

Katz Media Group remains very optimistic about radio's outlook and long-term growth. Radio's incredibly strong daily reach, time spent with the medium, and overall ability to be America's companion offers advertisers the unique opportunity to reach engaged consumers. What's more, the radio industry has moved aggressively to expand into online, on-demand, mobile and digital broadcasts, offering broadcasting and online clients a greater ability to capture a larger share of advertising dollars in the digital space. Below are the largest individual advertisers within each core category for the second quarter.

Retail	Home Depot, Walmart, Supervalu, Safeway, Kohl's, Staples, Jos. A. Bank
Automotive	O'Reilly Auto Parts, Dodge, Jeep, Shell Oil, Chrysler, Chevron
Finance	Geico, Allstate, PNC Bank, JP Morgan Chase, American Family Insurance, Bank of America, Navy Federal Credit Union
Telecomm/ Utilities	Verizon, Comcast, US Cellular, AT&T, Tracfone Wireless, Frontier Communications, Cricket Communication, QWest
Consumer Products	Scotts, Boars Head, Central Garden & Pet Company, Carrier Bryant Heating & AC, Kellogg's
Professional Services	Kaiser Permanente, Portfolio Media Mgmt, LCA Vision, Horizon BCBS NJ, Dial Global
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Source: Katz Media Group

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AIRAURA IS THE BEST ON-AIR PROCESSOR YOU CAN BUY

Programmers and engineers everywhere are telling us that CLEAN is just as important as LOUD. That their on-air signal needs to be able to handle multiple formats with the cleanest possible sound - without sacrificing loudness. It's been Vorsis' mission from day one to put CLEAN both before and after LOUD to give you the BEST possible signal. And we do it by giving you less.

How do we do it? We've developed several technologies that are radical departures from conventional on-air processing. The big surprise is that all of them hit your program material with less processing rather than more.

Using one-step Smart Control AGC processing rather than two, we eliminate the need for using a broadband AGC and can skip an entire processing step. This results in significantly less processing and distortion.

Comparison Between Conventional & Vorsis SST Multiband Systems

Conventional Multiband System
Four step process

Broadband AGC → Multiband AGC Compressor → Multiband Limiter → Clipper

Vorsis SST Multiband System with Feed Forward
Three step process

Multiband AGC Managed by our SST → 31-Band Limiter → Clipper

Feed-Forward signal control instead of feedback eliminates processing errors by adjusting the signal before it enters a processing step, not correcting it afterwards. When the smart control of the AirAura AGC and clipper are combined with the real time information provided by feed-forward technology, true anticipatory processing results.

Finally, AirAura uses our Chronometric Restoration™ template to restore detail to your audio. By controlling signal timing during multiband processing we are able to retrieve far more existing sound detail than traditional processing.

Add up the differences and you can see that AirAura is a very different broadcast audio processor, built with a unique philosophy to process less and process smarter. But don't take our word for it. We've got tons of testimonials available. Call or email us at the contact info below to arrange to hear the cleaner sound of the AirAura with your own ears.

CLEANUP
YOUR ON-AIR SOUND IN THE RATINGS

Put the Vorsis CleanUp Crew to Work In YOUR Studio. You Won't Believe The Difference In Your On-Air Sound Or Listenership.

Download a FREE whitepaper or watch video about the AirAura at RadioCleanMachine.com

To set up a demo call Mike Erickson at 252-638-7000 X127 or email us at CleanMachine@wheatstone.com

WHEATSTONE VORSIS

AIRAURA
THE RADIO CLEAN MACHINE

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World Radio History