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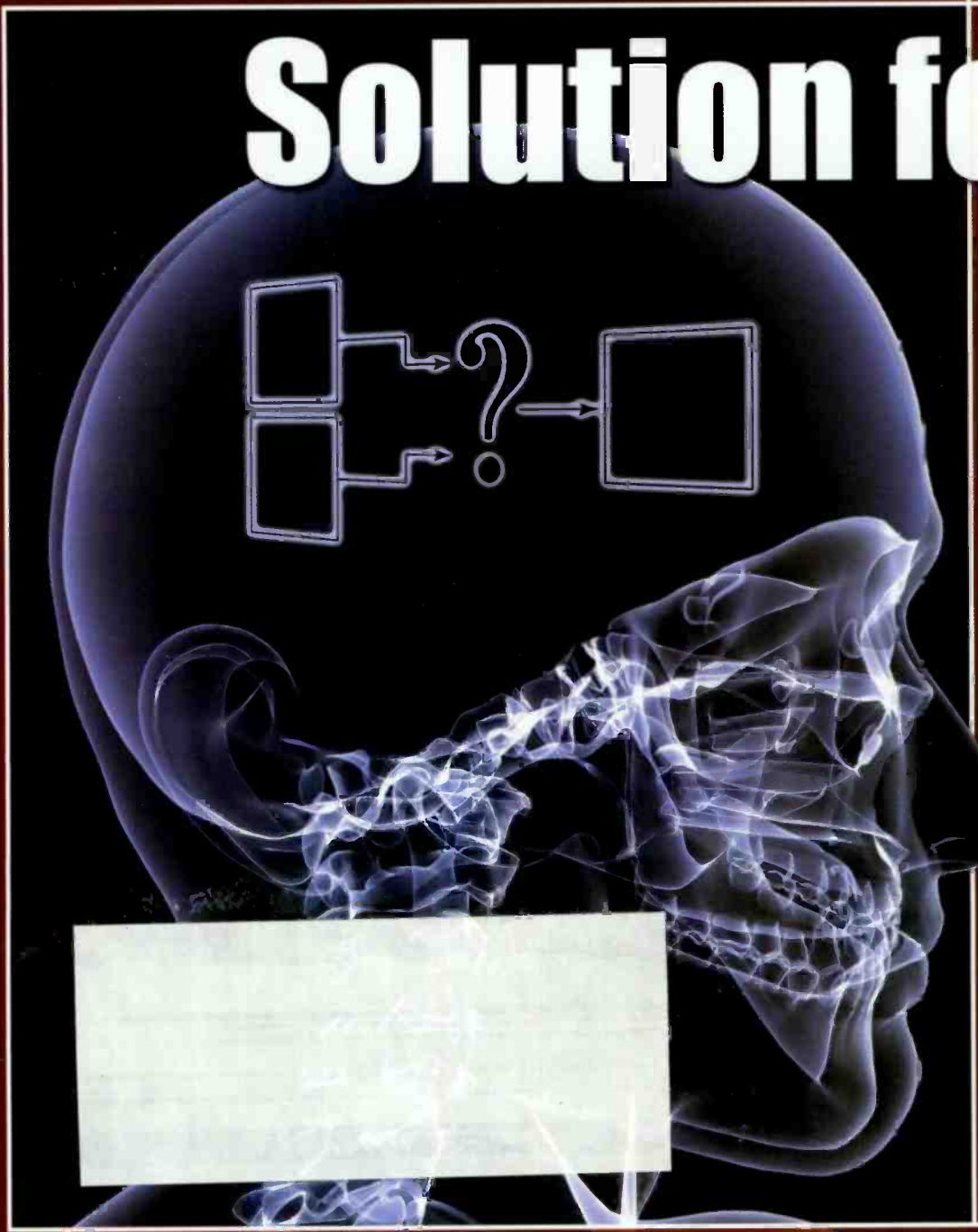

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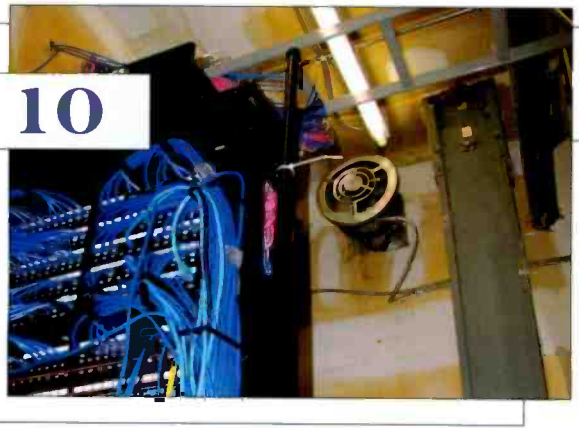

Columns

Departments

ON THE COVER

Making big systems work is usually a matter of filling the gaps with various gadgets. Turn to page 24 for more on these useful puzzle pieces. Cover design by Michael J. Knust.

Wireless Broadband Internet Remotes

"The first time out with the Tieline was a brilliantly simple experience for everyone involved. For lack of a better phrase, the codec just worked."

- **Christian Vang**
  Chief Engineer
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- **Grady Jeffreys,**
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CONTENTS ONLINE

Currents Online

Selected headlines from the past month.

FCC Opens Comment Window on PSRA/PSSA Rulemaking

Listed under RM-11384, the petition seeks to loosen the rules for stations operating during these periods. In particular, the petition proposes several points.

Harris Names Pannell Director of North American Sales for Radio Broadcast

Chris Pannell joined Harris in 2003 as a district sales manager, and was later named national sales manager for RF and radio systems and consoles.

NAB to Present First HD Multicasting Award at Radio Show

The award will identify and honor the producers of programming specifically created for HD Radio multicast channels. The award will be presented at the keynote session during the NAB Radio Show.

Liquid Compass Hires New COO

Amy Van Hook joins Liquid Compass from Entercom where she was director of digital operations. She will oversee day-to-day operations for the company.

FCC Issues EAS Order

The most significant change is the addition of the Common Alerting Protocol (CAP) as a key component to EAS. The protocol will be required for use once FEMA formally adopts it.

How Effective Was the Internet Day of Silence?

On June 26, 2007, thousands of Internet radio stations across America turned silent in symbolic protest of the increase in royalty rates proposed by the Copyright Royalty Board (CRB).

Site Features

Radio Currents Weekly E-mail

The latest radio broadcast headlines are posted every day, and those headlines are sent to you once a week. Stay up to date and subscribe today.

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.

NAB Radio Update Newsletter

Coming in September, the NAB Radio Update e-mail newsletter brings you everything you need to prepare for the NAB Radio Show.

Industry Links

A listing of schools, museums, associations and more. If it's about radio, it's on the Industry Links list.

Advertiser Links

Find Web links to all the advertisers in the August issue.

Industry Events

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

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A FAQ on CAP

In mid-July, the FCC released a second report and order and a further notice of proposed rulemaking concerning the Emergency Alert System. Part of EB docket 04-296, the action sets the framework for the next generation EAS system. The order covers a wide range of topics, and this month's FCC Update on page 22 details the ruling.

The Society of Broadcast Engineers, the now-defunct Partnership for Public Warning and other groups have worked to improve EAS, and the FCC has finally taken action. This action, however, raises many more questions that do not have simple answers. It also includes some requirements for broadcasters to make a capital equipment purchase.

One key item for broadcasters is that all EAS participants will be required to add Common Alerting Protocol (CAP) support. CAP provides a way to better encode information into the broadcast alert, but the details of interfacing CAP into the existing EAS is not completely defined. The result is that the FCC has raised more questions than it has answered. I have gathered some of these questions and compiled the best answers I am able to find at this time.

• *Stations will be required to install CAP capability once FEMA establishes a standard. Who is going to pay for all this CAP equipment?*

The broadcast stations, most likely. Right now, only two manufacturers offer CAP/EAS equipment. Sage has released the Endec HD, and TFT is distributing a CAP-to-EAS converter. Other manufacturers may also provide units.

• *How much will CAP equipment cost?*

The TFT 2008 lists for $2,195. The Sage Endec HD lists for $2,799.

• *Will this equipment be required for all stations in addition to the present EAS equipment?*

From what I can tell, yes.

• *When will stations have to have this installed?*

180 days after FEMA adopts CAP. It is unknown when that will be.

• *Can stations receive some kind of subsidy to purchase the new equipment?*

That's up to each station to determine. It's unlikely that the FCC will take this step. It's always possible that some petition under the Homeland Security banner could cover some of the costs.

• *How will a governor's message be tagged to indicate that it is a state-wide message?*

There is nothing in the EAS protocols that would react like a localized EAN; however, it appears that CAP can process a governor's message and handle it as needed. Stations will program the CAP function as they need to for their area. State EAS plans may authorize an existing event code, such as civil emergency (CIV) for a governor's message. It's also possible that a new event code may be created for this purpose.

• *The FCC seeks feedback on providing multiple-language messages within EAS. How will this be accomplished?*

This is completely unknown at this time. The concept has good intentions, but the practical implementation may be beyond the technical capability of most EAS participants and alert-issuing agencies.

It's encouraging that the FCC has finally taken action on improving the Emergency Alert System, but as you can see there are many more questions than answers at this time. What questions do you have relating to EAS and the new rules? Let me know and we'll find the answers.

Chris Scherer

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

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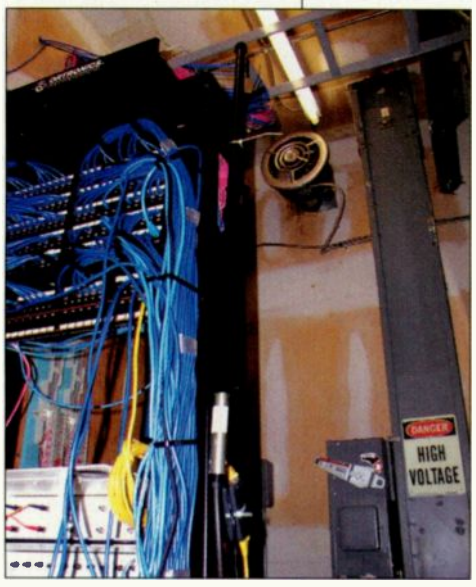
Planning a wireless LAN

By Kevin McNamara, CNE

Sooner or later you will want to consider deploying a wireless LAN around your facility; or maybe you already have one. In any case, there are some basic guidelines that must be followed to make the system perform to its maximum capacity and keep the network secured.

I'll discuss the basic steps to planning a wireless LAN rather than an overview of the emerging standards or the network topologies used. However, be aware of these technologies prior to purchasing any wireless LAN. While equipment conforming to the latest 802.11x standards might provide significant performance improvements and security enhancements, it may not be completely compatible with network interface cards based on earlier standards, resulting in poor performance.

The most common wireless LAN device is the wireless router. These devices have come a long way over the past 10 years. Consumer-grade routers costing $100 now have features found in much more expensive commercial devices, and in most cases also contain an integrated firewall and self-diagnostic features.



A wireless LAN antenna can be installed in an equipment room, although ceiling-mount models are available.

When deploying a large-scale wireless network you will likely use dedicated access points (AP), which are basically a means to bridge wireless Ethernet communications to either other wireless 802.11x devices or more commonly, the wired Ethernet network.

Define needs and objectives

The first and most important step is to understand how the wireless LAN will serve the facility. The obvious use would be to replace or supplement an existing wired Ethernet LAN to connect individual users to the network, but consider that the same equipment might also be used to connect two or more networks.

The next step is to define the type of applications to utilize network resources. Broadcast facilities present additional demands on networks when they also carry almost constant streaming digital audio and/or video streams. The design of a wireless LAN must take into consideration the aggregate traffic requirements of streaming data along with the number of users to estimate the peak traffic loads that will occur through a single access point.

You will also want to factor the number of users that will access the network at any given time. Will the users be stationary or will they need to move about the facility? This is important because the performance of an access point can be degraded if too many users are accessing simultaneously. In the case of roaming users, the access points will need to be carefully laid-out in order to maintain seamless coverage and efficient handoffs to adjacent points.

Once these issues have been defined, research and decide on the network architecture and standard to be implemented. While there are newer standards such as 802.11n with more range, faster throughput and enhanced security, consider previous standards that in some cases may be more appropriate due to compatibility with existing hardware and cost.

Finally, consider the budget in the overall scheme. Costs can be significant depending on the objectives defined. In most cases the costs to deploy wireless will exceed that of hardwired LAN. Also consider the cost to support and maintain the system over its life. However, the flexibility fo a wireless LAN might make the investment a worthwhile business case.

Design the LAN

There are third-party vendors who specialize in the deployment of wireless LANs, but it is possible to implement the LAN with little or no support.

If the plan is to cover all or a large portion of a facility, then a site survey should be performed. The survey is not unlike any other coverage prediction study. It can be generated through theoretical analysis with specialized computer modeling, the placement of a test transmitter and making signal strength measurements made from deriving the actual strength of a signal at multiple points within the facility, or a combination of both methods. If you attempt this yourself you will need to purchase or lease an 802.11 signal analyzer to measure the field strength.

It helps to have a copy of the facility floor plan, which, if available in a digital format, can be imported into the analysis software to display the signal footprint over the floor plan. Many vendors of 802.11x equipment might provide free analysis for the placement of access points. Also, take into account obvious physical barriers that may limit

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A simple wireless router is a basic way to introduce a wireless LAN, but be sure the proper security is in place.

the propagation of signal to a particular area. These would include studio walls, metal racks and steel support columns.

Plan the configuration of each access point. 802.11x devices are channelized to specific frequency ranges in a group of 12 frequencies. Probably the most important item to be configured will be the selection of channels each access point will operate. Each adjacent access point should be set to a different frequency. The specific frequency generally doesn't matter provided it is not receiving interference from another access point on the network. In some cases interference may come from another 802.11x device nearby, cordless telephones or even microwave ovens.

Physically locating the access points may also present a challenge. In order to achieve maximum performance, the antennas should be placed below ceiling level. There is a wide selection available to suit most architectural requirements, such as low-profile ceiling mounted units or antennas that can be mounted to a wall or column.

The next problem is to make certain there is ac power available to the access point. Since many times the actual radio portion of the access point is located above the ceiling, an ac outlet will need to be added. Consider using access points powered through the Ethernet cable, which are called Poser over Ethernet (PoE). This eliminates the need for ac power. In most cases you still will need to provide Ethernet cables to the access points anyway.

Test the system thoroughly

Once the system is in place and operational, do not assume all the theoretical predictions are correct. Perform a final site survey to ensure the coverage is uniform, works properly between adjacent access points and provides the specified level of throughput for which the system was originally designed.

Handheld analyzers are relatively inexpensive, starting at under $1,000, and can store data that can be downloaded to a PC for more complex analysis.

The success or failure of a wireless network deployment is ultimately determined by user experience. Proper planning and implementation will ensure users have a reliable system that provides good performance and requires minimal operational support over its life span.

McNamara is president of Applied Wireless, Cape Coral, FL.

Insight to IBOC
August 2007 Part of the *Radio* magazine DAB Answer Series

Conditional Access for HD Radio

By Thomas Ruckteńwald

Two main concepts embody conditional access technology (CA): entitlement and encryption. The entitlement is an authorization; the encryption is a digital scrambling of the content.

The CA system sends an entitlement to a receiver, telling the receiver about the programming and all the necessary signals when a consumer registers to receive the entitled services. The system handles everything automatically once information is entered. The receiver obtains only its own entitlements because it is individually addressable by the CA system.

The broadcast contains encrypted program signals that the entitled receiver decrypts. The reconstructed content occurs without error or significant delay. The CA system sends information about how to decrypt the transmission along with the content.

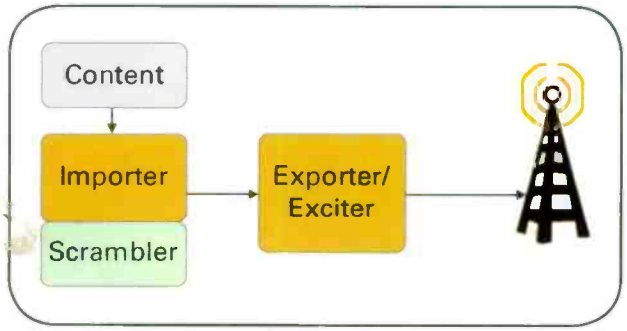

Figure 1. The conditional access Scrambler connects to the HD Radio Importer.

Both transmission and reception are a part of this system. The transmitter and the receiver have complimentary provisioning. The broadcaster transmits entitlements; the receiver recognizes only its own entitlements. The broadcaster transmits encrypted programming; if entitled, the receiver can decrypt the programming.

Conditional access defined

In many traditional CA environments, the service is offered by one single-platform supplier. All content, all services, all entitlements and all authorized equipment for that system originate from one source: the platform provider.

This is not necessarily true for terrestrial digital radio. Content suppliers, radio stations, and station groups will continue to compete independently. A CA system for HD Radio must be a distributed system that coordinates all of these entities, without business interference, so that any equipped receiver may possibly receive any of these broadcasts.

Every station or station group that deploys CA will have the same type of equipment and perform a similar encryption process. At the same time, each station or station group must be uniquely distinct and recognizable by any receiver. There can be no identity, channel identification, or programming ID duplication.

Open Mic

IBOC history, part 2

by Chriss Scherer, editor

While the HD Radio rollout still qualifies as being in its early phase, the technology itself was first demonstrated as a proof of concept in the early 1990's. The first successful fixed AM IBOC reception test was held on July 9, 1992, on 1660 AM from the Xetron facility in Cincinnati. The fixed mobile FM IBOC reception test was held Sept. 29, 1992, on WILL-FM in Urbana, IL.

In the last issue of Insight to IBOC, we began a conversation with Glynn Walden, currently the senior VP of engineering for CBS Radio. Walden, then of Westinghouse, Tony Masiello, then with CBS, and Paul Donahue, then with Gannet, were part of the team that laid the groundwork for the HD Radio system in use today.

Walden

Radio: Looking back over the past 15 years, what could have been done differently to accelerate the digital radio rollout?

GW: Consolidation was a distraction for a few years. There were some internal delays as well, and the merger of USA Digital Radio and Lucent brought some changes in strategy.

The cost of the HD Radio chip-

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Inside

A special supplement to
Radio
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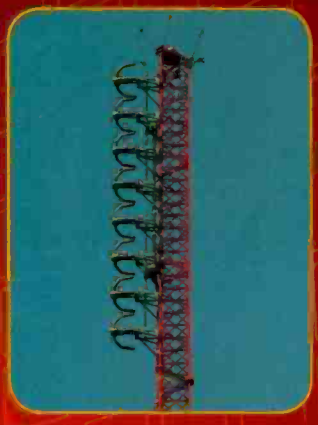

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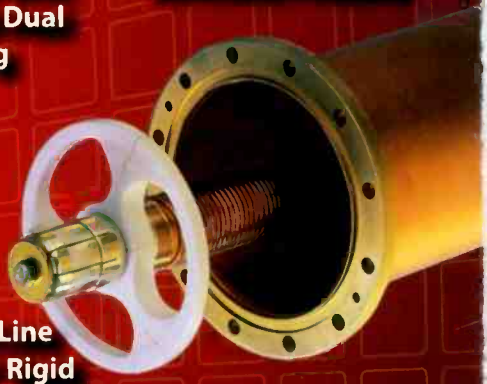

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Conditional Access

For the system to operate correctly, every radio must be uniquely identified so that its entitlements can be individually addressed to it. Consumers should receive only the programming they desire and only the programming that is intended for them. Each radio must perform with every broadcast source.

The first CA system created for HD Radio is called NDS Radio Guard. It was created by NDS as a technological development in cooperation with Ibiquity Digital. NDS Radio Guard equipment fits into the station and operates within the station's workflow.

CA in the station

The CA system incorporates into the existing HD Radio system. Only channels created by the Importer, secondary program services or the data channels may be encrypted because the main program will remain free-to-air. The V3.0 Importer (see Figure 1) will contain a new capability called the Scrambler. The Scrambler can be used to encrypt multiple channels, services, or programs simultaneously.

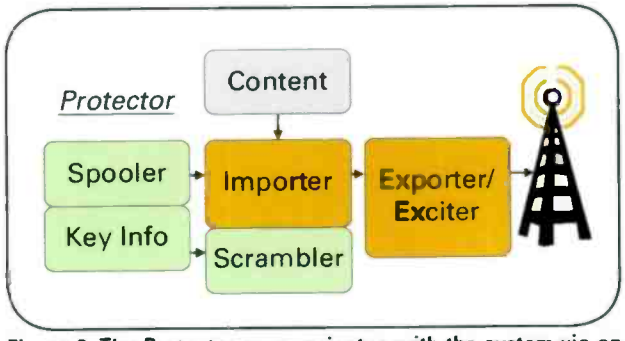

Figure 2. The Protector communicates with the system via an IP link.

NDS Radio Guard includes two additional components, the Protector and the Initiator. The Protector (see Figure 2) links directly to the Importer and Scrambler through an IP-based connection. For architectural efficiency, this function is collocated with the Importer. The Protector generates information about how the Scrambler is going to function. This information is constantly changing at a configurable rate. The Spooler is a carousel information buffer with data sent out through a narrow pipe, about 1kb/s channel, through the Importer.

The Initiator (see Figure 3) is a server that supplies CA administration to provide setup, parameter control and monitoring for the Protector. This server generates the radio entitlements based upon entered data and its local database. It can be physically located anywhere but must be a part of the IP network in order to control the Protector. The Initiator can control many Protectors, therefore a Network Operations Center (NOC) with just one Initiator is a realistic solution.

The National Resource Manager (NRM) (see Figure 4) is a universal component available to all stations. It

set started very high. Siport has independently developed an Ibiquity-based chip, which will help reduce the cost of the chips. This competition will help drive the rollout.

There will soon be more competition in the marketplace. You'll see the quality of reception and the quality of the product improve. There's a struggle to manufacture affordable HD Radio receivers with the current, expensive chipsets and expensive RF front-end.

It takes time to develop a technology. If Major Armstrong's company were still designing FM receivers, we wouldn't be where we are today. It was because of innovation—blend, high-cut, all the things that broadcasters don't like—all made FM listenable in the car. The original Armstrong system didn't work in a mobile environment, but innovation through competition made it better.

All is well during the WILL-FM IBOC tests. From left to right: Jeff Andrews, Gannett; Tony Masiello, CBS; Ed West, WILL-FM engineering; Dave Obergoener, Gannett; Alan Parnau, CBS.

Radio: What's the next step in the digital rollout?

GW: People don't understand why it takes so long to introduce this technology. Introducing a broadcast technology is not like introducing an Ipod. The Ipod is a closed system. Nobody cares if an Ipod is not compatible with anything else. But here we have broadcast services that have to be compatible with everything. You can't have radios that work in New York and not in California. Then you have all the dissenting voices and all the supporting voices constantly at odds with each other through the process. When you introduce a product like an Ipod, people can diss it all they want. All that matters is that they buy it.

But here, we have to arrive through a consensus process as something that will be acceptable to all parties before we can get the regulatory bodies to act on it. Radio needs to be ubiquitous, unlike an Ipod.

continued on page 4

Image credits:
FM IBOC test photo courtesy of Glynn Walden.

The *DAB Answer Series* is an ongoing series of supplements that covers the technology of digital audio broadcasting.

Insight to IBOC - a supplement to Radio *magazine*, August 2007,

Open Mic
continued from page 3

An Ipod only needs to work with Itunes if that's all they want it to. Cell phones are the same way. It's a closed system.

Radio: What is radio's strength?

GW: Radio has to be everywhere. Wherever a listener is, whatever device he has, we have to be there. Radio broadcasting now represents something like 38 percent of all Internet radio listening. We compete against thousands of non-broadcast streamers. Why? Because we have programming expertise. We're good at it.

Radio: We are content producers, and when radio stations understand the division between content creation and content distribution and become distribution agnostic...

GW: We should be distribution agnostic. We should be distribution to whatever means we need to be to get to our listener. I saw this very clearly for TV 10 years ago, and I see it for radio now. TV should look at itself as a program supplier and forget about over-the-air television. It's a different paradigm. TV only reaches 15 percent of its audience over the air. It's going to be a very long time before radio reaches only 15 percent of its audience over the air.

Even the people listening online now are listening to us. 38 percent of Internet radio listeners listen to streamed broadcast radio stations. I think that's going to grow. We're just getting started. When we get our HD2s up in addition to our main channels, that's going to be additional broadcast channel also available on the Internet. I think that we're going to have even greater opportunity there.

Listen to more of this interview online at RadioMagOnline.com. Cick the podcast link.

Conditional Access

ties competitive stations and all radio receivers into a cohesive global system. The NRM verifies station authenticity, provides unique CA service identification, verifies and signs radio entitlements, and holds the database of all radios. It is predicted that the radio database could reach one billion units for the U.S. All communication between the NRM and any Initiator in the system is via IP through a virtual private network.

Radios and receivers

The radio must be able to decrypt the encrypted content transmission in real time. To do that, the radio must know how the content was encrypted and it must already have the information it needs from the system to decrypt it. In a secure system, the information about decryption and how the content was encrypted is only available to authorized receivers. The authorization comes from entitlements embedded within the broadcast. Through an entitlement, the receiver knows that it is supposed to receive the encrypted signals and how to obtain the decrypt information.

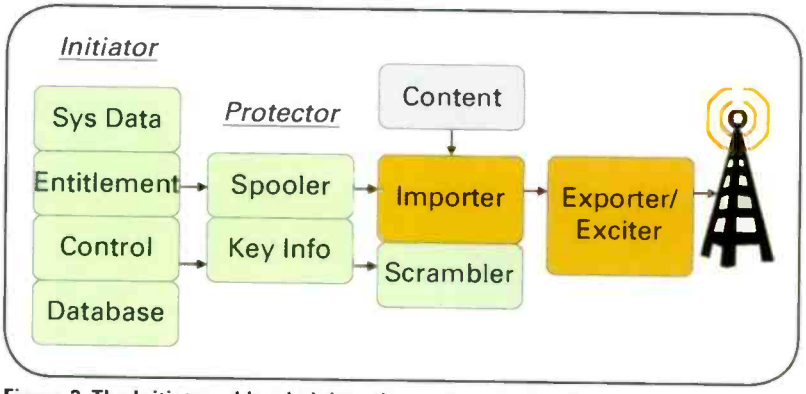

Figure 3. The Initiator adds administration and monitoring functions to the system.

Addressing radios in a system that can receive information from multiple broadcasting sources requires something special. Every radio must be unique to the system, even though many may come from the same manufacturers. The most efficient technology that makes every radio unique is serialization.

Each radio is individually serialized through the decoder chip. Each decoder chip contains some unique codes and embedded secrets. The chip/radio identification can be accessed through an activation sequence on the radio. When the consumer calls or registers via a website with the radio information, the system individually addresses that radio.

NDS, as the CA manufacturer, automatically provides the serialization information to the decoder IC manufacturers. The NRM also knows all the serialization information. Servers, located at chip manufactur-

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Audio output is uncompromised, with an over-sampled D/A converter driving Class-A biased audio outputs. HD Radio™ stereo separation is better than 90dB, and THD+N is less than 0.005 percent. The M3 gives you full-time digital audio, even when tuned to an analog station, so you can monitor or record any station's audio in the digital domain. "Split Mode" monitoring lets you easily pinpoint errors in analog-to-digital delay, level and phase matching. Each tuner has a separate menu-adjustable output level setting, and a front panel lockout feature keeps errant button pushers from changing your settings.

The M3 addresses the issue of alarms in an intelligent fashion and employs proprietary heuristic algorithms which won't be fooled by pink noise or tones, and will generate alarms when real program silence is detected in HD Radio™ or analog broadcasts. Unlike external silence-sense units, the M3 can also trigger an alarm on loss of RF Carrier, OFDM Lock, RBDS data stream, PAD data stream, Multicast Available, and Delay Bit. You can set sensitivity for both Audio and RF Carrier Loss, and set Alarm Delay for all alarms to match your format. Contact your authorized DaySequerra Distributor today!

DaySequerra M3 features and benefits

- Three AM, FM and HD Radio™ Multicast tuners in a 2RU enclosure
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- Displays and decodes HD-1 through HD-8 PAD data and analog RBDS data
- Each VFD displays Signal Strength and Multipath
- Displays HD Locked, Multicast Available, Delay Set and Tuner Alarm
- "Split Mode" provides easy to use HD Radio™ digital-to-analog signal, time, level and phase monitoring
- Three separate antenna inputs for multiple Rx antenna feeds; internal jumper links for single antenna feed
- Synthesized, pushbutton tuning for AM and FM bands including HD-1 through HD-8
- Each tuner has 20 preset stations for AM and FM bands
- Balanced analog audio outputs at +4dBV on XLR connectors, level adjustable
- Menu controlled output level adjustment–independent for each tuner
- Transformer-isolated 110 ohm digital audio output on XLR connectors–5.1 Surround capable
- Full-time digital outputs, even when tuned to an analog station
- Six rear panel mounted assignable alarm relay contact closures for each tuner
- Front Panel control lockout feature to prevent unauthorized changes to setup
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ers and connected to NDS, program the data that individualizes each HD Radio decoder chip. This process is done for other broadcast systems and is well known in integrated circuit manufacturing.

With the proper radio ID information, the receiver obtains its entitlements and automatically turns on in a very short period of time.

Operational changes

Applying CA can be as simple as turning it on for specific multicast channels and leaving that to run until the station decides otherwise. The system will also support constant change. Operational personnel access the user interface to perform required CA changes, to apply CA to specific programs or channels and to change the setup at their discretion. One program may be encrypted but the next program may be free-to-air.

Because of the new channels and new programming opportunities, automation systems will need to control the HD Radio equipment as well as the multiple playlists. The automation system may provide one place to access and setup the entire station system.

Data entry is another future operational reality. When the consumer registers his radio, the radio ID information is critical for entitlement. However, this registration process is an opportunity to learn more about the consumer, which will be extremely valuable for the station advertisers.

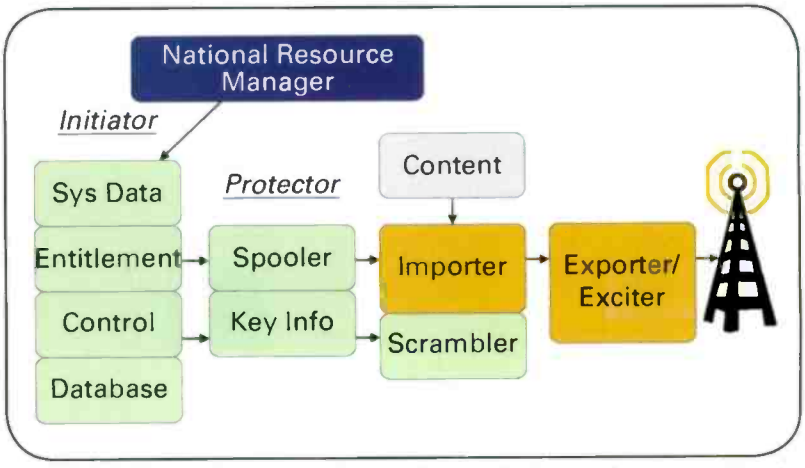


Figure 4. The National Resource Manager has the final supervisory control for the integrated CA system.

The NDS Radio Guard CA equipment can entitle several thousand radios. Should entitlements exceed this, the station or station group might consider a subscriber management system (SMS), a subscriber or membership software that can be integrated with the CA system, or a private company that specializes in customer handling. The system accepts registration information from operations personnel, entries from an SMS system, or from a Web portal that allows the user to self-register.

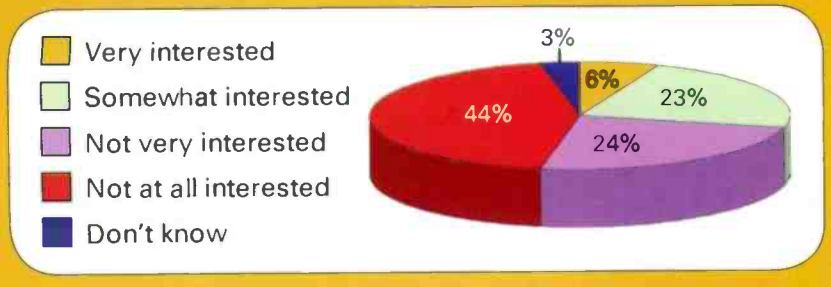
Rucktenwald is director of data applications delivery for NDS, Costa Mesa, CA.

Sample and Hold

Awareness is not the same as interest

By Chriss Scherer, editor

More stations are adding HD Radio transmission equipment and multicast streams. Many stations continue to air the "HD Radio: Discover It!" spots provided by the HD Digital Radio Alliance as part of its on-air campaign to promote the technology. According to an Arbitron study, the effort is having a positive effect on awareness.



Arbitron surveyed radio listeners 12+ in January 2006 and again in January 2007. When asked if they had heard or read anything recently about HD Radio, the 2006 results showed that 14 percent of listeners knew about HD Radio. In 2007, the same question resulted in 26 percent of radio listeners saying they were aware of HD Radio.

So now that awareness has risen, does this translate into a greater listener interest in HD Radio? Unfortunately, no. The responses lean to more than 2/3 of the respondents not having any interest in HD Radio. It seems that the consumer awareness campaign needs to shift into a consumer interest campaign.

Base: 12+ Source: The Infinite Dial 2007: Radio's Digital Platforms; Arbitron

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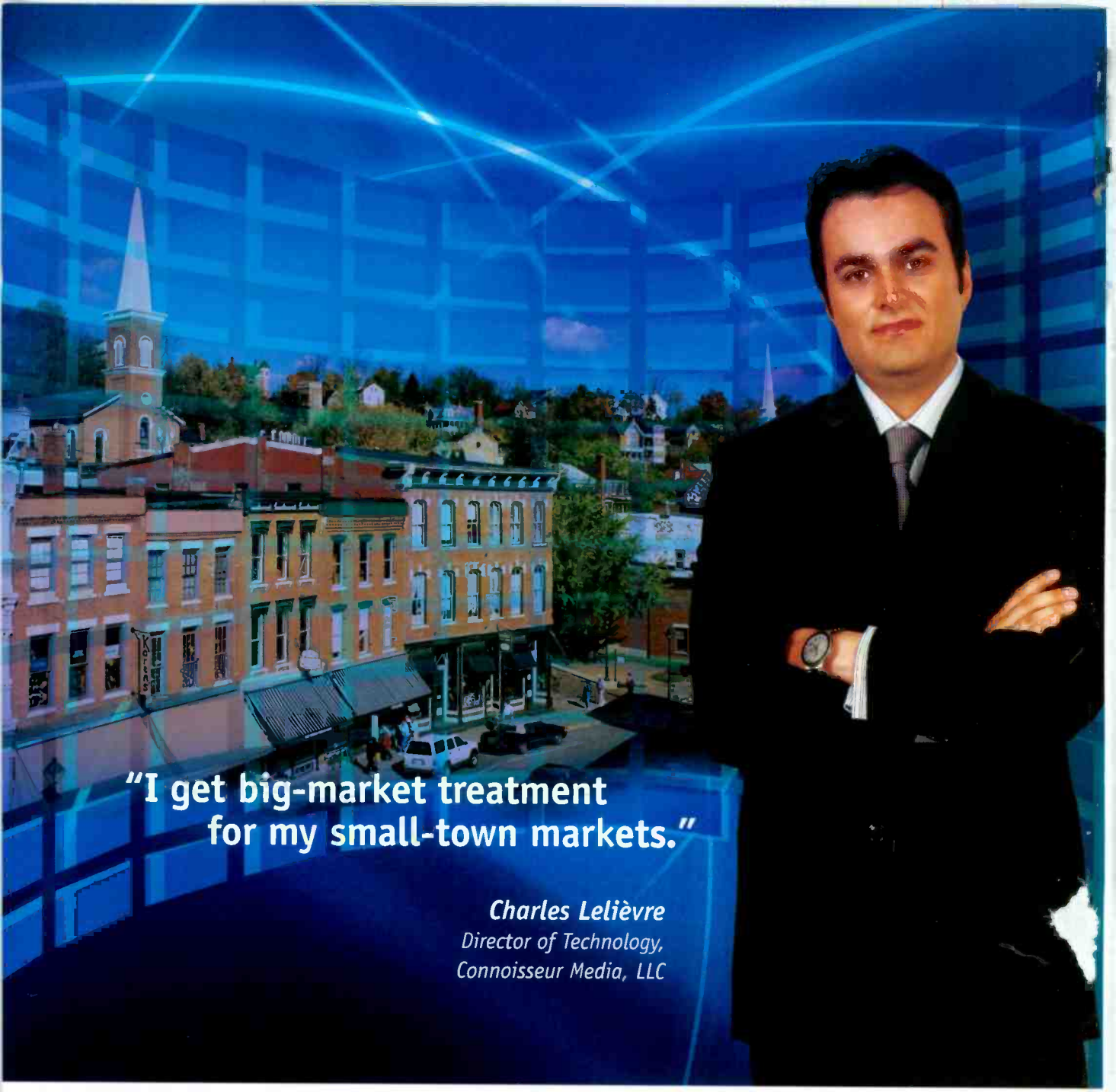

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FCC launches EAS makeover

By Harry Martin

Acting in a proceeding that began two years ago, the FCC has adopted rules upgrading and modernizing the Emergency Alert System (EAS). Also, the agency is seeking comment on some new proposals including expansion of the system to include state and local governments and to make sure non-English speakers and disabled persons are reached by emergency messages.

The new EAS rules are designed to facilitate delivery of emergency information across a variety of platforms in a digital format and to provide improved access for disabled persons. The change likely to have the greatest impact on broadcasters is the FCC's adoption of the Common Alerting Protocol (CAP) for all EAS participants. The CAP system standardizes the delivery of text, audio or video alerts via broadcast, cable, satellite and other communications systems. The idea is that when an emergency occurs, the local, state or federal officials who need to distribute immediate word of the emergency should not have to waste time configuring their alerts for multiple different delivery platforms. The new protocol streamlines their ability to get the notices out as quickly, to as many people and through as many communications means as possible.

While the shift to CAP will require some adjustments on the broadcast side, the required changes are not effective immediately. Participants will have to adopt the CAP system within 180 days of FEMA's adoption of CAP standards. That has not yet happened, so at a minimum, broadcasters will have until the end of the year and probably longer to take the necessary steps.

Dateline

On or before October 1, radio stations in Alaska, Hawaii, Oregon, Washington and the Pacific Islands must file their biennial ownership reports with the FCC.

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

Local addition

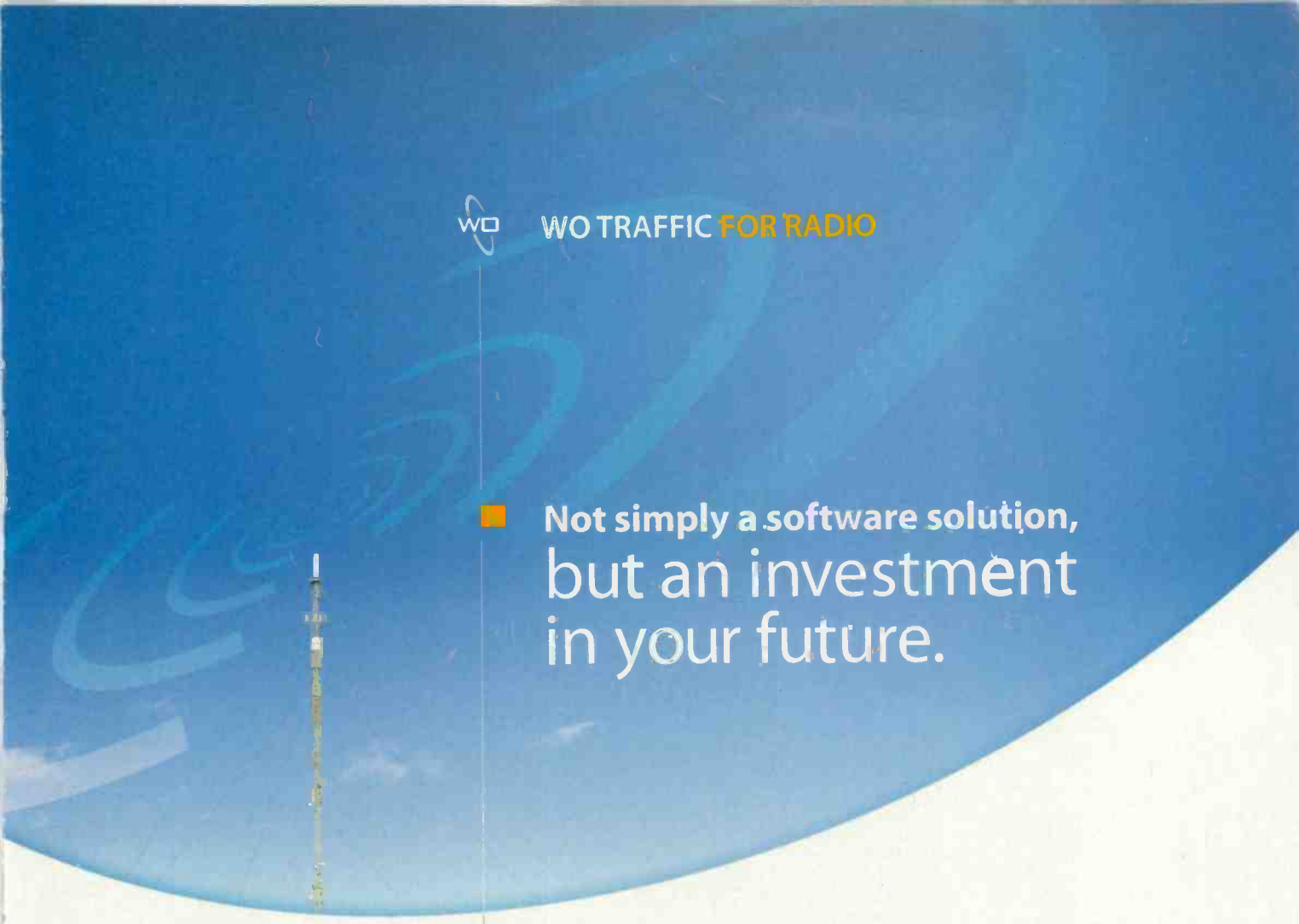
The Commission has also expanded the EAS requirement to mandate that EAS participants transmit alerts originated by state governors or their designees. Historically, the mandate has been limited to national announcements initiated by the President. And further expansion may be in the works: In its further notice of proposed rule making (FNPRM) on EAS, the Commission is seeking comment on whether EAS participants should also be required to transmit alerts from local and county governments.

As noted earlier, the FNPRM also seeks comments on whether special EAS alerts should be provided to non-English speaking people and persons suffering disabilities. In this context the FCC also seeks comments on:

- The need for testing of the EAS system
- The need for reporting requirements regarding emergency responsiveness
- If a need is found, the nature and extent of such reporting requirements

The Commission previously ordered the Public Safety and Homeland Security Bureau to convene at least one meeting on improving EAS service to disabled and non-English speaking persons. The stakeholders were given one month's notice, until the end of June, to submit a progress report on these discussions into the record of the rule making proceeding.

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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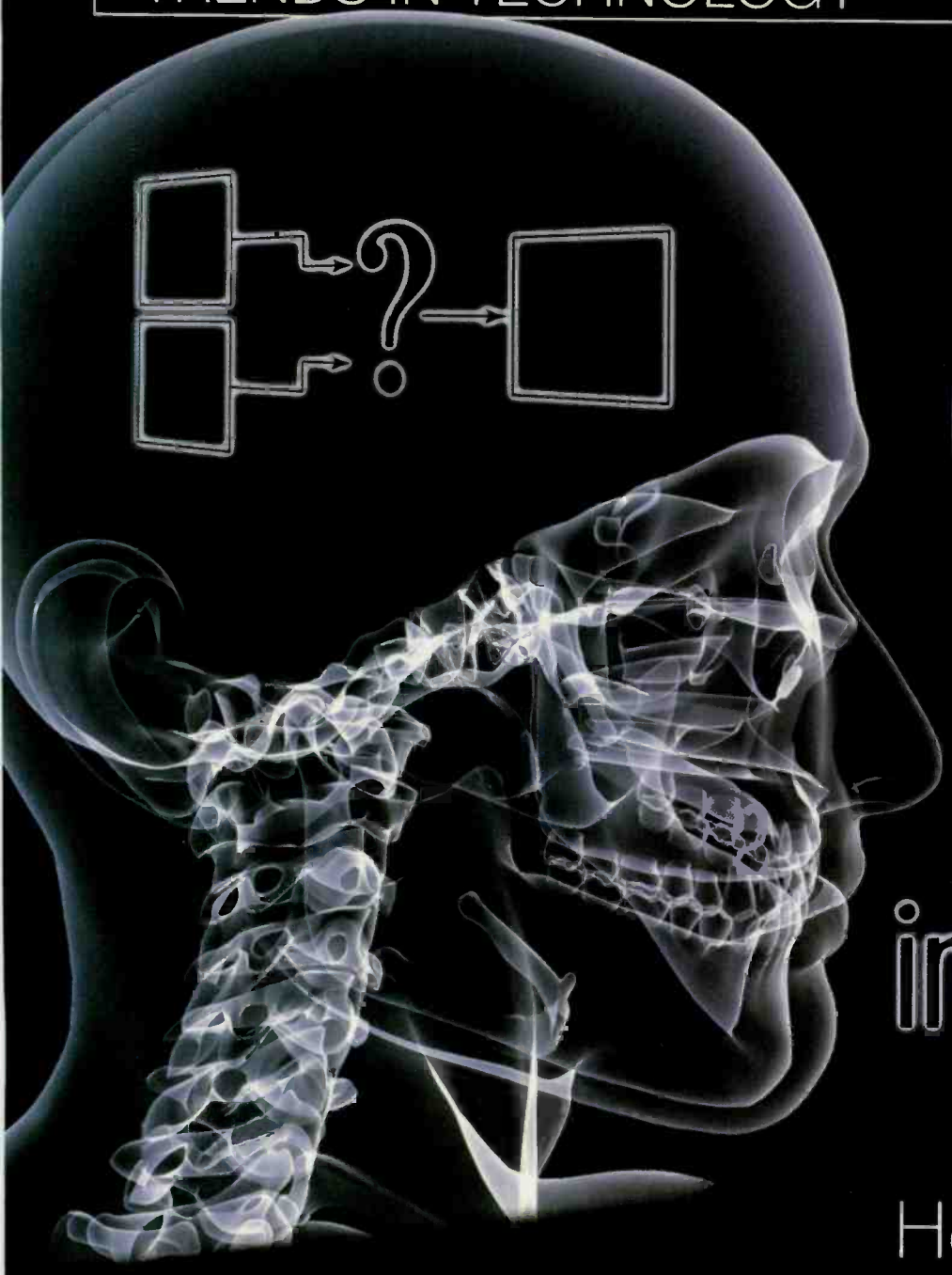


Gadgets, widgets and interfaces

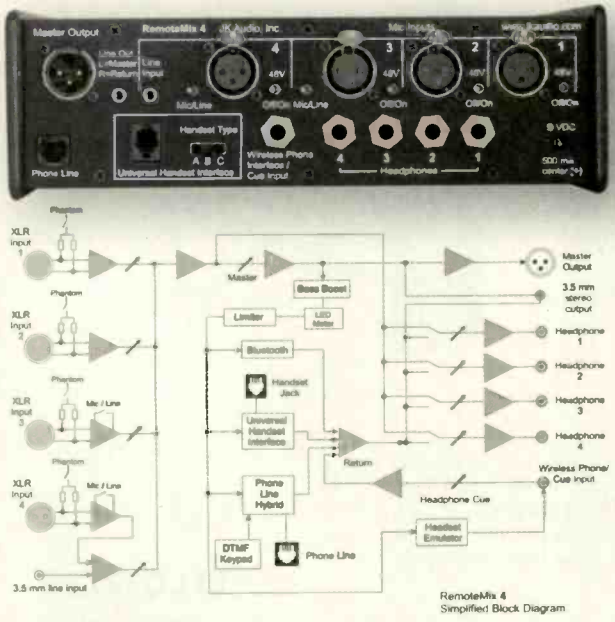
By Doug Irwin

Handy devices that simplify regular tasks

Broadcast engineering has always been a systems engineering type of job; we assemble large systems made up of dozens of pieces of equipment made by disparate manufacturers and then, through patience and diligence, expect the entire thing to work on a 24-hours-per-day, 7-days-per-week basis. I have written extensively about the large individual blocks of the typical broadcast system—consoles, transmitters, antennas and so forth—but as we all know, that isn't all that goes in to a typical broadcast system. There are unique circumstances in every radio station—some physical, some due to specifically requested functionality—that cannot always be addressed by the features of the major components of the system. What becomes necessary in many cases such as these are special devices—we'll call them gadgets in this article—that fill in those gaps and provide the last little piece of the puzzle that makes the system complete.

RemoteMix 4

Introducing A Field Mixer That's Outstanding In Its...um...Field



RemoteMix 4
Simplified Block Diagram

Combining a four-channel field mixer with a four-channel headphone amplifier, a phone-line hybrid, a universal PBX handset interface, a wireless phone interface and Bluetooth® Wireless Technology to connect to cell phones and portables, the RemoteMix 4 is ready to work just about anywhere you are.

Use it as a phone-line hybrid, calling into your studio talk show hybrid. Use it as a front end mixer for your POTS, ISDN or IP codec. Or use it as a combination broadcast/IFB mixer. No matter how you use it, you'll find that it's an incredibly versatile mixer.

Plus... IT SOUNDS GREAT! A soft limiter prevents overdriving the phone line interfaces, while the mixer XLR output is pre-limiter (full range), meaning you have a feed for every need. Bass boost adds a bit of low end before sending the signal down the phone line to provide that "how'd you get it to sound THAT good over POTS lines" nudge. There are convenient 3.5 mm send and receive jacks for recording the show or mixing in your MP3 player.

The RemoteMix 4 can be powered by batteries or the included AC adapter, so you'll never lose a connection -- even during a loss in power!

We think we've done our homework with RemoteMix 4. And it'll be in your hands in plenty of time for the fall sports season.

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Gadgets, widgets and interfaces

As the years have passed and the broadcast industry has matured, there has been less and less time for the typical station engineer to design and assemble the final gadgets that complete the entire system. With the typical engineer now handling IT issues, and in many cases, multiple stations, the days of in-house design and construction have, at the very least, waned. I have seen quite a few home-brewed devices such as consoles (and even the original Ampliphase transmitter), and I have designed and built many gadgets myself, but I can scarcely remember the last time I built anything.

With this trend have come more and more small broadcast equipment manufacturers making gadgets to fill in those tiny system gaps. There are many manufacturers producing hundreds of gadgets, and it would be impossible to highlight them all, but I'll share some select units I have used myself or believe would be useful to fill many of the little gadget gaps around a radio station.

A plethora of utility devices exist to interface audio sources and destinations

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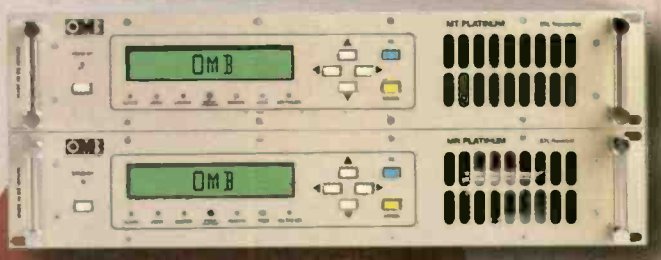
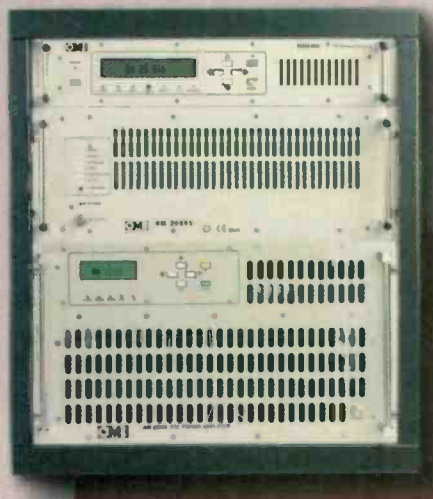


MT/MR PLATINUM

>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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Gadgets, widgets and interfaces

A need fulfilled

Not surprisingly, most of the gadget makers are expatriate broadcast engineers themselves. Henry Engineering may be the oldest of these companies, and it makes what is probably the quintessential gadget: the Logiconverter. This device has four opto-isolated inputs and four isolated relay outputs. This allows two units to be connected electronically without the physically touching. The unit has front-panel programming allowing the user to have either latched or momentary outputs from continuous or momentary inputs. A single input can also be used to control two outputs; and conversely, two inputs can be used to control one output.

Henry makes a device that solves a more 21st century issue is the USB-AES matchbox. This little unit provides AES audio in and out of a computer by way of the USB connector. It has balanced and floating (transformer isolated) inputs and outputs and will work with any operating system that supports USB 1.1 or higher. 48, 44.1 and 32kHz sample rates are all supported with 16-bit word length.

Another long-time player in the gadget field is Radio Design Labs (RDL). I think its most famous product is probably the STA-1 Stick-on balanced-to-unbalanced converter. (How many consumer-grade cassette decks made it in to radio stations after this unit came out?) However, the company makes dozens of other things such as the ST-

Resource Guide

Selected manufacturers of gadgets and interfaces.

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Arrakis Systems
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ACR1 audio-controlled relay. This unit has a DPDT relay controlled by a line-level audio sensor. The audio sensitivity on this particular one is -30dBu to 0dBu, and the time adjustment ranges from 0.5 to 5 seconds. Power is provided by an outboard 24Vdc power supply.

Not everything RDL makes falls under the Stick-on category, though. Take, for example, the FP-MX4 mic or line mixer. This device has four inputs. Each can be set for mic or line level sensitivity to feed a single bus with a line-level and a mic-level output. Power is provided by an outboard 24Vdc power supply (better known as a line lump or wall-wart). The device itself is designed to be mounted on a panel of some sort and is quite small.

Broadcast Tools has an extensive line of gadgets for the broadcast engineer. Take for example the SM-III Plus silence monitor. This is a 4x2 audio switcher (although it can be programmed to operate as two separate 2x1 switchers) that will detect silence on a primary audio feed and then switch to the second set of inputs after a programmed delay time. The silence sensitivity is adjustable, as is the return-to-normal delay time. Alarm outputs are also provided via form-C relay contacts.

Another device made by Broadcast Tools that I have used time and time again is the SS2.1 passive switcher. I'm partial to the BNC version, and I use it as a composite switcher. This device is simply a 2x1 switcher that is controlled by the front panel or by remote control. It is completely passive—the main input is passed through to the main output even with no power applied (since it is just relays after all).

> Not surprisingly, most of the gadget makers are expatriate broadcast engineers themselves.

One product I have seen used with great success is the Circuitwerkes AC-12 rack-mount phone coupler bank. This is a frame that can hold up to 12 auto-couplers, each of which can be fed from one of two audio inputs (balanced and bridging). The couplers themselves have LED status indicators to show when the line is ringing and when they've connected. Each coupler has a 600Ω balanced output as well so that you can use it to drop off audio from a remote site in addition to the more familiar auto-coupler function. Another useful feature is the relay contact that each coupler has, indicating when the unit is online.

Speaking of telephone stuff, Circuitwerkes also makes a handy DTMF encoder gadget known as the Genr8. Through its optically-isolated inputs it generates DTMF tones by way of relay contacts, switches, or other logic. Using RS-232, the Genr8 can be controlled by a computer running a terminal program; programming the device is made simpler by way of a Windows-based program. Since the device includes an audio mixer, the DTMF control tones can easily be added to the payload audio.

New needs, new devices

Broadcast Devices has a broad line of devices for broadcast engineers. One particular device undoubtedly created in response to a need generated by HD Radio is the CTD-300 composite-to-AES converter. This device takes a composite input, such as that provided by a legacy radio STL receiver, and provides an AES3 output suitable for insertion into the HD Radio program chain. The sample rate is selectable to 32-, 44.1-, 48- and even 96kHz. Separation spec is 40dB from 50Hz to 15kHz, the obvious limiting factor being the quality of the composite signal coming in to the device. I should also mention that there are two AES outputs provided on the rear apron. (Take the second output, convert

Gadgets, widgets and interfaces

to audio, and you have a simple way to listen to a backup STL with no need to actually put it on-air.)

Broadcast Devices also makes the CMP-300 composite mixing and distribution system. This device has three composite inputs, each with variable gain into a single-bus, and then three outputs with individual gain controls. If you've ever tried to run multiple SCAs into an older exciter (or STL transmitter) with only one SCA input, you'll quickly see how handy this gadget is.

Titus Labs may not have the name recognition of some of the other gadget makers, and its 3DRX may not really qualify as a gadget because it's a very functional AES switcher. This 1RU

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device has two AES3 or 75Ω AES3-ID inputs unbalanced inputs and is primarily used to detect problems on the main input (for example loss of lock, other data errors, and perhaps most importantly, loss of decoded audio) and then switches to the secondary input manually or automatically after a user-programmed amount of time. But wait—there's more. If the 3DRX detects problems on both AES inputs, it will switch to the third input source: a set of analog inputs. It converts the analog input to digital with an internal A/D converter so that it can continue to provide an AES output. The 3DRX also has a passive failure mode. With no power applied, the main input will pass through to the output. The switching and alarm functions are available via a D-sub connector on the rear panel.

Titus also makes the Web-Rem, an IP-based remote control with a built-in Web server. User access is via the Ethernet connector, and controlled devices connect to the Web-Rem via a D-sub connector. The Web-Rem uses relays and open collector outs to provide control, and accepts analog inputs from the controlled devices, so it can provide telemetry to the remote user.

Rane makes many devices that fall in to the gadget category. My favorite device is the SM-26B mixer. This is a single-rack unit line level mixer with six mono inputs and a separate stereo input on the rear panel. Each mono input then has its own gain control and its own pan control, allowing the user to either use the mix bus in a stereo mode or a dual-mono mode. It fits the bill for just about any outboard mixing function.

Some gadgets pack powerful tools into very small packages that can be tucked into a rack or mounted on a rack room wall.

Rane also makes the SAC-22 active crossover network. This device is built around a Linkwitz-Riley filter that provides phase-coherent outputs from the low-pass and high-pass filters. Primarily this device would be used to bi-amp monitor speakers, which could be very handy in a studio-build or PA function. It could also come in handy for audio processing functions.

Warnings and alerts

The first unit I noticed from DM Engineering is its Pager-Dialer. This is a small box with two input ports. The unit is programmed to seize a phone line and to dial a pre-programmed phone number in response to the input port stimulus. The numbers dialed and the DTMF strings sent may be the same or different for the ports depending upon the way the unit

is programmed. This could be a very handy unit to use when a call-out function is needed, but you don't want to pay the freight for a full-blown remote control.

Another interesting device by DM Engineering is the Studio Hotline Multi. This is a multiple-line (up to 12 lines) ring detector that drives a flasher system. (One ring detector can drive up to five separate flashers.) The flashers are then located either in the studio or office space for the station; personnel are alerted to incoming calls by means of differently colored LEDs and distinctive audible indications.

In this day and age of broadcasting, most of us are consumed

Resource Guide

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323-851-6860
www.littlelabs.com

Lucid Technology
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Neutrik
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RCI Custom Products
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www.sbsfm.com

Sine Systems
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Some of the most useful gadgets are full interfaces, such as the Titus 3-DRX audio switcher and the DM Engineering Studio Hotline phone and door annunciator.

by the typical engineering functions such as studio and transmitter maintenance-often in addition to managing IT around the station. The days of home-brewing in-house design and construction of unique devices have for the most part disappeared. The most simple broadcast system—a studio mixer followed by an STL, followed by the transmitter—will encompass 100 percent of the system in many cases. But add remote broadcasting capability, for example, or syndication, or the generation of sports networks and the big building blocks no longer make up the whole system. Ultimately the success of the unique system will be dependent upon your knowledge, experience and creativity. Fortunately there are plenty of equipment manufacturers to fill in the gaps and provide the kind of gadgets that make up the last 1 or 2 percent of the overall system.

Irwin is the chief engineer of WKTU-FM, New York City.

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Tips, tricks, hints and more

By John Landry, CSRE

Label strips simplify updates

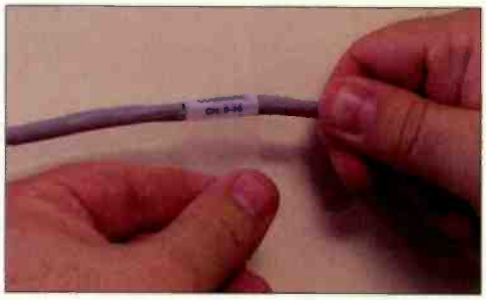
Distribution amps and many other types of equipment can provide multiple outputs seldom accessed once set, which makes it that much more troublesome when a change must be made. Writing on the unit itself with pencil or marker looks bad, and a label stuck on the unit is hard to update. A more sensible alternative is to use a plastic labeling strip with an inserted paper legend. Some of these strips include Uline (www.uline.com), Holdex and Slip Strip (both found at www.holdex.com). Check industrial supply and wholesale outlets as possible sources.

Label it

Proper labeling is important. How many times have you gone to a transmitter site and the most important switch has a faded masking tape label scrawled by someone years ago in the wee hours of the morning? One common solution is a label-maker, such as venerable Brother P-Touch. But how do you place labels in places where the P-touch labels won't stick? What if they just won't fit? In many cases, it's possible to use your PC.

MS Word, Excel and most other printing programs can be used to print self-stick, plain paper or transparency labels in more sizes and fonts than anybody could ever need. With some careful measuring and setting up, a template for just about anything can be made. Patchbays, control surfaces and even PC keyboards can be fitted with a durable and easy-to-read overlay legend. I have had very good success with regular Scotch transparent tape. Some people like the look of clear cellophane packing tape, too (although I find it yellows with age). Similar paper labels can be attached to cables and wire using clear tape covered with clear heat-shrink tubing. These wires will still be readable years later.

If you have created templates and want to share them, send them to us. We'll post them in the Engineer's Notebook at RadioMagOnline.com.



Wire label covers

The old manner of applying wire labels involved clear heat shrink over the label. This is fine if the shrink is placed on the cable before the connectors are added, but a simpler method is to use self-laminating labels. These include a clear section covering the label to keep the text from being rubbed off. These labels can be run through most printers, and many of them can be easily removed if the cable's identity changes.

Make some test jigs

When a piece of equipment fails, taking time to make a test jig only delays the diagnostic process. A bag of audio adapters is an easy way to make conversions, but a few specific test adapters can aid troubleshooting. XLRs and other connectors to clip leads are a good generic tool. Also make jigs specific to less common connectors, such as Euroblock or Phoenix connectors.

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

Do you have a tech tip? Send it to us at radio@RadioMagOnline.com.

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Americom RENO

Seven Stations in a New Facility

The tower behind the Americom Reno facility, erected by PNR systems, includes nine Comsat STL microwave dishes that beam to nine transmitters between five transmission facilities. A lack of T1 lines to the transmission sites along with rugged terrain made microwave STL a must.

By Bill Schulz

The roadmap to HD Radio broadcasting can be planned in from various starting points. While some operations have the luxury of initiating an all-at-once upgrade, most are forced to start either at the studio or the transmission site.

In the case of Americom Reno, a seven-station, medium-market radio operation in the heart of Nevada, our path to HD Radio starts at the studio. Our recent move to a new facility is not the classic example of consolidation, bringing multiple stations in different facilities under one roof. All seven stations (KRNO-FM, KODS-FM, KLCA-FM, KCTQ-FM, KBZZ-AM and KJFK-AM; and Scott Communications-owned KWNV-FM, for which Americom Reno provides programming, operations and engineering sources) were centralized in our previous facility as well. Instead, the move tells the story of a growing station group requiring more on-air and production flexibility as it lays the groundwork for HD Radio.

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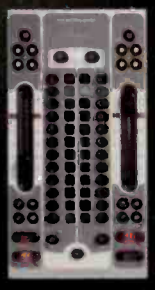

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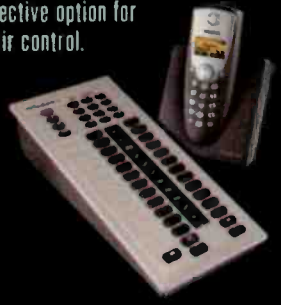

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Americom Reno

The KODS-FM studio is centered around a Harris Netwave console and Prophet Nexgen automation. Rack equipment at KODS includes Denon CD players and a Gentner Digital Hybrid II phone system. A Harris World Feed panel for plug-in systems is integrated into the top of this rack.

The opportunity to move came with somewhat of a push when our previous facility, a high-rise rental in downtown Reno, was sold. The move was welcomed, as it allowed us to upgrade our technical platforms and IT department in a larger facility instead of forcing everything into the dwindling space of the high-rise. Our parent company purchased a business plaza and had the existing area in the center of the building completely restructured and reformatted. (Tenants were retained on the outer edges of the two story plaza).

The facility layout is simple, with administrative offices, sales team, and the traffic and billing department located downstairs, along with various conference rooms, a telephone bank and a gigantic sales pit for large business meetings. The second floor is dedicated to programming, with seven control rooms, two production studios, one talk studio and a technical operations center (TOC).

The move was completed over the course of several weeks, with Harris leading the technical relocation project. The stations went on the air in a staggered launch, as a new tower was erected behind the facility to accommodate transmissions—currently all analog. This included multiple microwave dishes for STL with an array of antenna systems.

Harris was selected to lead the project because of a long relationship that included our previous relocation project. Harris provided all the integration work in both facilities: As the only radio outlet for our company, we have only one contract engineer and a handful of volunteers. A group of Harris engineers led by Hal Welch came in beforehand to perform a full job analysis, and Welch's familiarity with our previous system made the move and integration process that much smoother.

All seven on-air studios feature Harris Netwave-12 digital on-air consoles, with Vistamax Envoy networking for audio/program routing and source sharing. A Harris rep analyzed our routing needs, pertaining especially to our satellite programming and two AM stations for live talk routing, and determined the Envoy was the appropriate platform for this facility. All on-air and production studios have Envoy frames tied to the main Envoy system in the TOC.

The Harris Netwave consoles (16 channels, 12 faders) work the same way as the larger RMX Digital console but offer a more attractive price point. Sources are added to the console simply by sliding off the back panel and punching in the source. Typical sources for the on-air Netwaves include mics, four Prophet Nextgen automation buses, two Tascam CD players, Telos or Gentner phone systems, and two routing buses from production.

The last two faders on the Netwave boards are dial-ups

A rack row in the technical operation center houses the on-air processors, RF monitoring equipment and EAS encoders/decoders.

Traffic reporter and on-air talent, Trey Valentine at work in Production 2.

for Envoy, allowing the studio to dial up any source in the building. We can block certain programming to specific consoles using Envoy. This means that if only one station will ever air a specific program received via satellite, it won't appear on the Envoy dial-up function in other studios. We typically include 15 potential sources per fader. This cuts down on time spent flipping through channels on the Envoy to call up the appropriate source.

All studios have a World Feed Panel, a utility panel designed by Harris encased in a wood frame. TV crews and live bands can plug directly into this panel, which can also be used for temporary audio sources such as Ipods or laptops. The World Feed Panels provide a variety of input jacks (RCA, XLR, 1/4", 1/8").

Operators can manipulate the audio from these World Feed Panels through a direct CAT5E wiring connection to a Netwave console. The panels connect back to TOC over the same CAT5E wiring, and can therefore be used in any room that runs cabling to and from TOC. The panels are very portable, so a large band or syndicated show that cannot fit into a studio can create a show from the first-floor conference room. The World Feed Panel plugs into the floor and sends the audio back to TOC and into the main Envoy frame, where it is then routed onto the appropriate studio destination.

Routing and control

The Prophet Nextgen system provides automation services for all studios. The complete system for each studio comprises one main and three auxiliary pods. A Broadcast Tools four-input switcher connects to the Prophet computer so the operator can bring the system up through Envoy if the control board goes down. Envoy also provides redundancy for the consoles during Netwave maintenance, and the Prophet system is flexible enough that we can automate all seven stations from my desk if any unusual maintenance issues arise.

The Broadcast Tools switcher can also be utilized to override on-air programming. In case of an emergency, we can air a live news feed to any station.

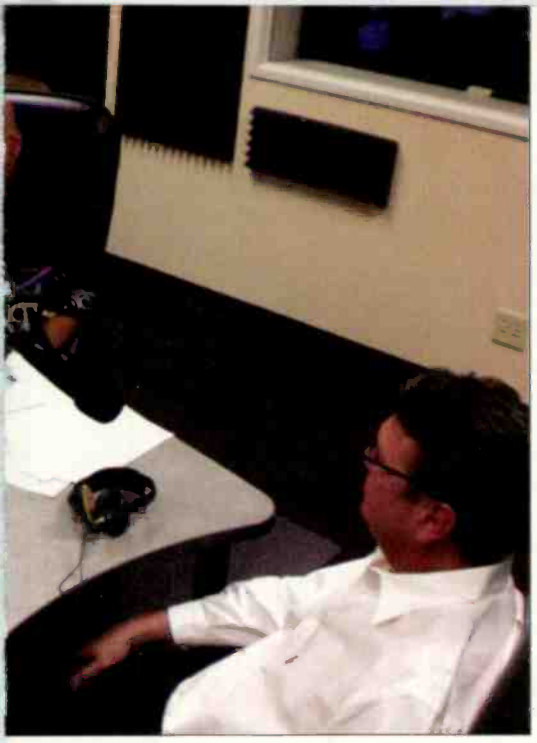
Our mass production room measures 16.5' x 9.5', and the secondary room measures 9.5' x 8'. Both use Netwave eight-channel consoles. At first glance these might seem far less powerful than the 32-fader Mackies we used for production in our previous facility. Since most of our production is mixed in the IT department these days, we decided to install smaller consoles in our new production

Americom Reno

Bill Schulz hosts the morning show from the KCLA-FM air studio.

studios to provide plenty of production capability but also provide space for other systems.

Each production room uses a Shure SCM268 mixer to control multiple Sennheiser MD-421 and Audio Technica microphones. Two Prophet buses are utilized on the board as opposed to



Talk show host Panama hosts *The Panama Show* from 9 a.m. to noon Monday-Friday from the KBZZ-AM talk studio. The custom talk table features countertop-mounted delay systems.

the four used in the on-air boards. Two routing buses for Envoy, a Numark CD player, and ProTools editing system round out the sources. Material can go directly to air via Envoy; otherwise it is ingested into Prophet or burned to CD for later use.

We decided not to connect our Prophet system to the Internet because of virus threats, although we can connect manually when required. MP3 files from production sessions are dumped into Adobe Audition audio editing computers prior to being sent to air, ingested into Prophet or burned to CD. Each production studio is also outfitted with a Protools system for production flexibility, but the Audition systems are our primary editing systems.

Solid foundation

Each on-air and production studio features Harris Quickline II furniture. The main furniture piece adds a double guest wing in the production rooms and several FM studios to provide plenty of room for guests to stretch their legs.

The Netwave console and Prophet systems sit atop the main furniture surface, along with various on-air and production components. The KLCA studio, for example, uses a 360 Systems Shortcut for live effects. The Shortcut is wired directly to the Envoy frame in the studio. A 360 Systems Instant Replay has also recently been added to this studio. Most on-air studios also feature Airnet machines and Adobe Audition digital editors on the Quickline surface for production assistance, meaning each on-air studio can also act as a production room when necessary.

Each Quickline II piece features a turret for cable runs and built-in mountings for XLR jacks and mic booms. Built-in headphone jacks are installed in both host and guest positions. These are very solid phone jacks dropped into the surface with a rugged design that won't break down within six months. Our older furniture used quick-solder jacks for headphones that broke down often, so this was a positive change for show hosts and the engineering staff.

The 12.5' x 16' talk studio features a Harris Smoothline talk table with a long countertop. A full-blown cabinet at the end of

the talk table features an Airnet machine, with a conduit leading to the Telos telephone system on the countertop. The cabinet also features Shure SCM268 microphone mixers, rackmountable Symetrix501 on-air processors, and AirTools 6000 broadcast on-air delay systems—all locked behind a door, out of sight and out of mind.

The set-up in Production 1 shows the typical console and automation system layout in each studio.

The cables are run through turrets to connect to the components used for our live talk programs (two per day, one for each AM). Harris also added Pro Booms (i.e., fancy mic booms) with a sleek appearance, and added a sunken interface for the delay system, complete with a dump button. A Henry Engineering Superely was also added to toggle back and forth between our two AMs for monitoring.

The Smoothline piece features three separate positions at the talk table with room for five. There are two host positions on each side of the table: One side looks into the KBZZ studio, while the other side looks into KJFK. The guest position at the end of the table looks down the length of the table, and the table adds an Envoy frame for audio routing if necessary.

The Envoy system also allowed us to better organize the TOC. Many engineering rooms have walls and walls of punchblocks. Our back wall is very clean with much less wiring. The Envoy design utilized a basic punchblock system—very user-friendly for engineers and easy to swap connections when necessary. The CAT5E trunk cables were custom-made by Harris at its Quincy facility. Welch and his crew pulled all the wires from the individual rooms using a wire tray and ran them neatly and professionally into the TOC.

Behind the scenes

Eight custom Harris equipment racks house the TOC equipment. One rack is completely dedicated to Envoy, with a second rack devoted to our Prophet Systems utility machine and the Prophet Nextgen dual servers and DRR. The Envoy acts as a traffic cop, receiving all the signals in the facility and routing them to the appropriate device. It includes a list of commands that tells the system where to route specific signals. That list is controlled through the utility machine, which talks to Envoy, Prophet and the Netwave consoles.

All major external programming enters our facility through Starguide satellite receivers. Five Starguide devices in the TOC receive and decode the signals, mostly from Westwood One, Jones Radio Network and CBS feeds. Most of these signals are then transported over CAT5E wiring to Envoy. Raw signals can go straight to air; signals with coding issues are routed to Prophet.

Optimod on-air processors (8100 to 8500) with spatial enhancers and an XT chassis are installed across racks 3 through 8, along with the five Starguide satellite receivers. The Optimods are the last devices in the signal chain.

An HVAC system on the roof feeds a unit positioned in the center of the TOC ceiling, providing an open air dump into the room with plenty of cool air to the keep the equipment in top operating form. A Staco STCSC3001 UPS system provides the power supply for all the TOC equipment, and the Harris equipment and Prophet system came with dedicated UPS systems. Our staff installed a CAT generator outside, which sits on a concrete slab and provides plenty of juice to the facility in the event of a power outage.

The location of this building offers a direct line of sight to our tower and antennas. The tower, erected by PNR Systems, adjoins directly to the rear of our facility and includes nine microwave STL dishes: one for each station plus two backup dishes. The Comsat 6' STL grid dishes were provided through Harris with tower coaxial cabling from Andrew. Microwave STL connections were necessary due to terrain issues and lack of telephone lines to most of

The front entrance to Americom Reno. The first floor houses the administrative and sales operations; programming operations and technical engineering is centralized on the top floor.

our transmitter sites.

The dishes connect directly to the TOC, with a quarter-inch coaxial cable to the room, and a 1-1/4 coax run down the side of the building, approximately 350 feet from the tower. A trench was dug in the parking lot for a conduit to run cable from the side of the building to the tower. The nine dishes beam to nine different transmitters at five sites. Our largest transmitter site, with KDOS, SLCA and KRNPO, are located on Slide Mountain.

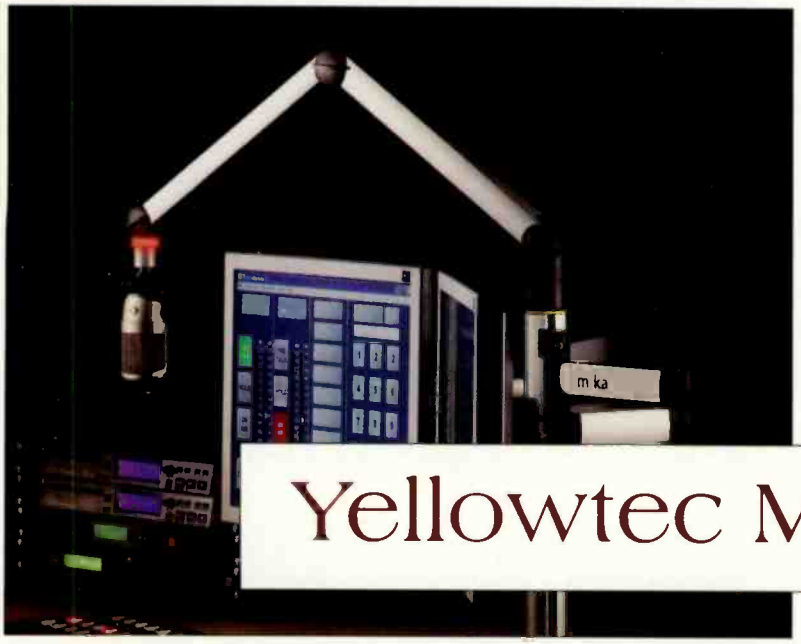
Our STL system is designed with an HD Radio broadcasting future in mind, with plenty of capacity and power coming off the dishes to handle HD Radio signals. first step of this process was to fix everything at home first, moving everything to non-compressed audio that is of better audio quality and is 100 percent compliant with HD Radio. We could immediately tell the difference in audio quality when we switched from our previous automation system to the new one.

Our automation system will also allow us to initiate datacasting in the near future, with Envoy taking a direct data feed from Prophet and pushing those text-based streams to air. With our studio systems in place, we appear to be in excellent shape for an HD Radio future, and seemingly ahead of many of our broadcasting peers in the Reno market.

Schulz is director of programming and operations, Americom Reno.

Equipment list

360 Systems Short/Cut
50-Pair Krone blocks
Adobe Audition
Audio-Technica mics
Broadcast Tools four-input switchers
Comsat STL antennas
Denon CD players
Digidesign Pro Tools
Electro-Voice RE-27 ND
Gentner Digital Hybrid II
Harris 3x6 headphone amps; Integrator racks, Netwave, Quickline II, SmoothLine, Vistamax Envoy
Henry Engineering Superelay
JBL Control 1
Mackie HR626 powered reference monitors
Middle Atlantic 500 Rack Screws
Numark CD players
O.C. White mic booms
Orban Optimod 8100 and 8500 audio processors
Panduit Minicom patchbays
PNR Systems tower
Prophet Nexgen
Radio Systems BOB1024
Sennheiser MD421
Shure SCM268, Popper Stopper
Staco STCSC3001 UPS
Starguide satellite receivers
Symetrix Air Tools 6000, 501E
Tascam TEACD01UPRO CD Players
Telos 1x6



Yellowtec Mika

by Gary Wachter

An important facet of the recent KKDA-FM studio reconstruction was creating a highly functional, yet unconventional looking studio. I was seeking a new approach to the predictable time-honored wisdom in regards to microphone arms. What has been a given for decades would look like a holdover from the Jurassic Period in the new control room.

Various attempts have been made in conventional arms to suppress the groan and twang of springs. But they can still be heard when the arm is moved or bumped. Not to mention they produce their own resonant melody when the speakers are cranked up good and loud.

Searching the Internet turned up a radical new design: Mika by Yellowtec in Germany. This is exactly what I had been searching for and more. The style was simple and streamlined, resembling a sleek robotic arm.

The construction consists of hollow, rounded, rectangular side tubes with internal linkages. Three joints and a swivel base provide movement in all directions. Color finishes are available in natural aluminum or dark gray. The two main segments of the arm are each 15.75 inches long capable of supporting a sizeable microphone and mount.

The construction consists of hollow, rectangular tubes with internal linkages. Holdback friction is set by a finger adjustable clutch plate on each of the three moveable joints. It can be locked tightly in place or set to offer slight resistance to accommodate various weights of microphones.

Performance at a glance

Supports microphone and mounts up to 4.5 lbs

Sleek styling

Easily adjustable tension

On-air indicator

Many mounting options for microphones and LCD displays

Mounting options

In the K104 studio, the arms are mounted directly in the resin countertop with flush mounted stainless steel bushings. Holes of 7/8" diameter accommodate the 2 3/4" long threaded sleeve, which is held in place by a large nut underneath. A plastic sleeve buffers the moving arm from the fixed base bushing. This further reduces friction and wear by eliminating metal-to-metal contact.

Another mounting option offered by Yellowtec is a table clamp for securing on the edge of counters without the need to drill a hole.

Also worthy of consideration is a 17" riser post for extension over monitors and other obstructions. This is not just any plain extension pole, but a distinctive aluminum extrusion with four vertical slots the entire length spaced 90 degrees apart. These unique slots support additional mounts for LCD monitors, copy stands or multiple microphone arms. It can support one microphone arm directly at the top. This pole must be mounted into the countertop surface with a desktop mounting kit. A very clean, uncluttered solution built right into the riser post!

The arm can support microphones up to 4.5 lbs. We use the Shure SM7B, which weighs in at 1lb 11oz, with no problem at all. The standard length

The mic cluster installed at KKDA.

The Mika boom has an illuminated ring to indicate that the mic is live.

arm works out for talent and guest positions but is just a little uncomfortable for the long reach over the board. Yellowtec will be adding an extended version later this year.

Good connections

The microphone cable is already installed internally in the arm. Generous slack is provided at each end. The cable exit location is $2^1/_2$" above the mounting bushing and can be soldered to a 3- or 5-pin XLR connector.

Why consider a 5-pin XLR? The newest version has the option of a built-in tally light above the microphone mounting threads. The additional two wires power a ring of red LEDs. This can be used as a live mic on air or recording indicator for the talent that can't be missed.

In the KKDA-FM control room, the Mika arms have been used around the clock since October of 2006 and are holding up very well. I could not be more pleased with the quality of construction and superb support provided by Yellowtec.

Yellowtec

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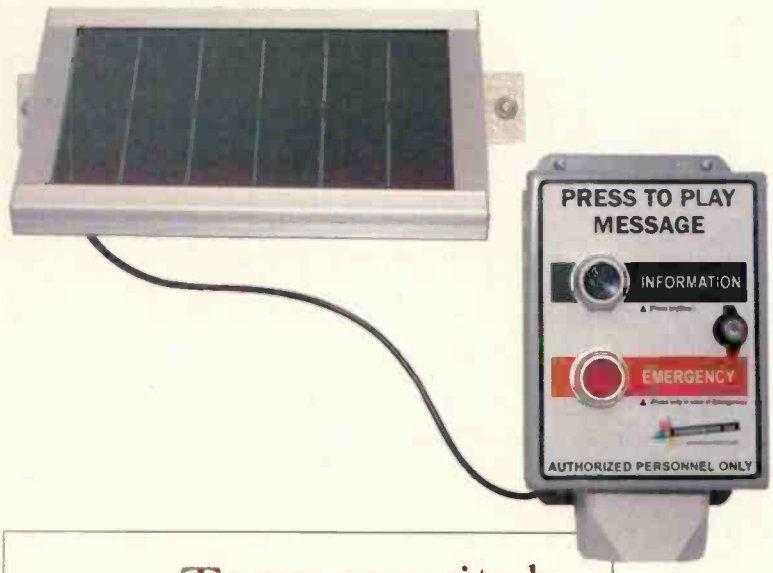
Wachter is director of engineering of KKDA-AM/FM and KRNB FM, Dallas.

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.



Towerswitch Collocom-2

By Richland Towers Property Management Team: Melissa Anderson, Pam Merritt, Julie Martin, Dan Greive and Jill Sermon
www.richlandtowers.com

Tower owners and managers are faced with a variety of safety issues. Everything from FCC RF radiation compliance, OSHA hazard awareness, unauthorized tower climbing/access and site security can pose a threat. Safety is the number one priority for Richland Towers as we design, build and operate our facilities. We strive to provide our tenants, vendors and subcontractors with the most up-to-date information about our facilities through a variety of means ranging from facility managers, written safety policies, site signage, remote monitoring and access control, vendor/subcontractor qualification processes, and the Towerswitch Collocom-2 solar datalogger.

Simply put, the Collocom-2 is an easy-to-install, solar-powered device used to play an audio message. Detailed information about safety requirements and emergency information for the tower facility, as well as warnings to un-authorized personnel, are a few of the custom messages that can be recorded. Richland Towers' Collocom messages include information on height of the tower; Antenna Structure Registration Number (ASR); style of tower and description (i.e. candelabra, etc.); elevator operating procedures where applicable; 24/7 contact information for corporate office; RF and high voltage warning notice; notification of required personal protective equipment (PPE); site address, and telephone number.

Performance at a glance

- Customizable information messages
- Multiple buttons for informational messages and emergencies
- Adjustable volume control
- Weather-proof enclosure
- Solar-powered operation
- Optional footswitch activation

Installation

Messages are loaded into the unit as an audio file via the memory card that slides in and out of the unit. The speakers are of good quality and the volume can be adjusted to a very loud announcement that can be heard over most site noise. The messages are played back to the listener in the order the user chooses by following the naming convention of the audio file specified in the setup manual provided. Messages can be changed or updated by recording a new message and copying the audio file to the memory card, or on demand by pressing a button inside the device and using an external microphone.

The Collocom can operate on a standard ac power feed and optional solar power. The unit is housed in a weather-proof, locked enclosure. Pressing large buttons activates the playback of the pre-recorded messages. An optional foot switch can be installed on platforms, ladders and other areas where a warning message may be needed. The devices can be installed in a variety of locations such as poles, walls or fences. Richland Towers has installed the devices in elevators to remind the tower crews of important safety information while operating the elevators. The installation manual is easy to understand and in most cases, installation takes less than one hour. Towerswitch provides continued technical assistance for the products, as well as a five-year limited warranty.

Richland Towers has installed more than 16 Collocoms in our top markets including Dallas, Houston, Orlando, Atlanta, Sacramento, Nashville and Knoxville. We view these units as an

The unit installed at one of Richland's sites.

added insurance policy, and by using them, we have lowered the possibility of potential accidents and misuse of our tower facilities and elevators. Based on the Collocom's reliable performance and ease of installation, Richland Towers will install additional devices at our locations in New York City, Los Angeles and Tampa.

Towerswitch

P 954-428-0244

W www.towerswitch.com

E info@towerswitch.com

Greive is director of property management; Anderson, Merritt and Martin are property managers, and Sermon is the senior director of business operations for Richland Towers.

Editor's note: Field Reports are an exclusive *Radio* magazine feature for radio broadcasters. Each report is prepared by wel-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.

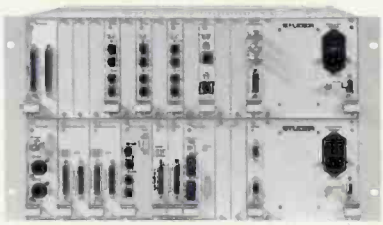
by Erin Shipps, associate editor

Codec
Telos Systems

Zephyr/IP: Zephyr/IP uses Agile Connection Technology (ACT) to continuously adapt to network conditions, minimizing the effects of packet loss, varying bandwidth and jitter. ACT's error detection and concealment routines, dynamic buffering and other techniques work together to provide stable IP audio connections. This codec features I/O including AES/EBU, analog and a Livewire Ethernet interface for direct integration with Axia IP-Audio networks as well as LAN, WAN and Wi-fi networks. Other features include studio-grade 24-bit A/D-D/A converters transmission bit rates from 16kb/s to 256kb/s and a Telos-hosted Z/IP Server service for look-up of and connection to other Zephyr/IP users worldwide.

216-241-7225; www.telos-systems.com
telos-info@telos-systems.com

Audio router
Studer



Route 6000: Based upon the SCore Live DSP core and D21m I/O system, the Route 6000 processing and routing system accommodates up to 1728x1728 inputs and outputs. The main DSP Core is highly suited to space-conscious installations. With an internal D21m I/O system with up to 192 inputs and outputs, it occupies 6RU, while multiple cores are simply interconnected using CAT5 tie lines.

818-920-3212; www.studer.ch
sales@studer.ch; kholmes@harman.com

Single-channel mic preamp
Joemeek

Six Q: Based on the company's Burr-Brown IC, this single-channel mic preamp provides three bands of EQ, an optical compressor and analog and digital outputs. The unit's mic input impedance is 1.2kΩ and line input impedance is 20kΩ. Other specs include 10dB to 60dB variable gain, 70dB common mode rejection, 0.001 percent distortion, and a 15Hz to 70kHz (-3dB) frequency response. The unit can operate on 115V or 230V power and consumes 30W. The digital output provides a 24-bit signal at 44.1kHz, 48kHz, 88.2kHz or 96kHz sampling rate via AES3, S/PDIF electrical and S/PDIF optical outputs.

877-563-6335; www.joemeek.com
www.pmiaudio.com; sales@pmiaudio.com

1kW transmitter
Bext

P1000: The Bext P1000 is a 1kW transmitter approximately the size of a shoebox, designed as a transportable spare or emergency unit. It is packaged specifically for portability – not just small and lightweight, but also mechanically engineered for maximum ease of portability and capability to withstand abuse during transportation.

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

AES audio switcher
Titus Technological Laboratories

3-DRX: This audio switcher integrates a two-input AES3 switcher and a 24-bit stereo A/D in one unit. Possible applications include EAS insertion or an automatic audio switcher. The 3x1 switcher includes two digital inputs that can be ordered as AES3 or AES3-ID inputs. The third input to the 3DRX is a stereo analog audio input. The unit will automatically switch to the secondary digital input if the primary digital source fails. A tertiary stereo analog source will automatically be switched to if the two stereo digital streams fail or have a loss of audio on the digital data stream. The stereo analog inputs are digitized at 24 bits and 32-, 44.1- or 48kHz sample rate. The unit can also be accessed by remote control. In case of a power failure, an internal direct relay bypass is provided to connect the digital AES input one to the AES output.

860-633-5472; www.tituslabs.com

Mixer
Soundcraft USA

UREI 1601E: The 1601E's effects section is built around a core of five effects (filter, delay, pan, cutter and flanger), but also has a set of 25 combo presets in five banks. The effects can be individually assigned to each channel, and a bpm fx cross-fader allows the DJ to select the desired blend of effect and original sound with a wet/dry mix. Two effect parameter controls provide a unique way of modulating key parameters of each effect currently selected, plus there are five selectable effects speeds from 1/4 to 2/1.

818-920-3212; www.soundcraft.com
soundcraft-usa@harman.com

Interference reducer
Nautel

Precision AM GPS Synchronization Unit: This unit is designed to reduce interference between AM stations operating on the same frequency, primarily during evening and nighttime operation. The device uses GPS signals to automatically lock multiple, remotely located AM transmitters to a common frequency/timing reference. Audible and sub-audible beats between the local station's carrier and remote carriers are eliminated.

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

NEW PRODUCTS

Small diaphragm mic
AKG

Perception 150: The Perception 150 professional 1/2" diaphragm, externally biased condenser microphone is the first in the Perception Series to be a front-address model. It offers a frequency range of 20Hz to 20kHz. The all-metal body aids in the rejection of RF interference, freeing the unit to be used along with wireless microphones or other communications equipment. There is also a switchable pre-attenuation pad allowing 10dBs of increased headroom, preventing the output level from overloading mixer input stages.

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

Portable audio recorder, transmitter
You/Com Audiocommunicatie

Parrot: This hand-held unit for the roving reporter records and is also a communication device. The recordings are stored on a removable SD memory card in MP3 format. This gives more than four hours of high quality recording on a 256MB memory card. The unit is battery powered and operates for eight hours. Recordings can be sent as a file to the studio without using a PC, but using a Bluetooth enabled device over the GSM network, to any location. By connecting a laptop or PC, the recordings can be sent over the Internet. The unit also includes Bluetooth connectivity to establish a connection via a cell phone or other device. The line output can be used to send a recorded item over an ISDN, POTS or IP codec. Markers can be set within an audio file. During recording, the playback markers can be set or removed. The audio between two markers can be regarded as a clip, when in clip mode. When connecting a USB cable, it will function as an external sound card of your PC or laptop.

+31 15 262 5955; www.youcom.nl

UPGRADES and UPDATES

RCS has released version 2.7.2 of Nexgen Digital. Nexgen 2.7.2 includes RIAA reporting functionality, which makes it easier for stations to report airplays for royalty purposes. (www.rcsworks.com)...***Axia Audio*** is now shipping Iprobe, a set of tools for network maintenance and diagnostics to manage, update, and remotely control Axia IP audio networks. (www.axiaaudio.com)...***V-Soft*** has released a version update to its FM Commander allocation software. Version 6.3.0.4 adds several new features to the frequency-searching program. (www.v-soft.com)...***Netia*** has added enhancements for added networking, distribution and scheduling capabilities to Radio-Assist 7.5. The updates include U-Share network management, Feed-In IP Mode and Axia IP-Audio support. (www.netia.net) ■

On-air console
Klotz Digital

Decennium: As part of a networkable audio routing system, the Decennium standard console is supplied pre-configured to simplify installation and set up. The console is modular and expandable, and the configuration software allows it to be customized as needed. The Decennium audio engine includes on-board DSP to provide voice processor, parametric six-band EQ and dynamics on each channel. Each channel strip features a rotary encoder with integrated push button and a 16-character display that can be used for source selection and channel-related parameter settings. The control surface is available in 4-, 8-, 12-, 16-, 20- and 24-fader frames.

678-966-9900; www.klotzdigital.com; sales@klotzdigital.com

Audio vectorscope
RTW Radio-Technische Werkstatten

Digital Monitor 10500: The DigitalMonitor 10500 is an audio vectorscope, peak program meter and status monitor that interfaces to professional digital production environments such as video editing suites, workstations or broadcasting studios. The instrument is connected via XLR connectors and accepts signals up to 24 bit, 96kHz. All essential parameters and displays are permanently visible. Supplied as a tabletop unit with an adjustable stand, the monitor also can easily be converted for front-panel mounting. For remote viewing of all measured values and parameters, the built-in VGA output may be used to connect any standard CRT or TFT monitor.

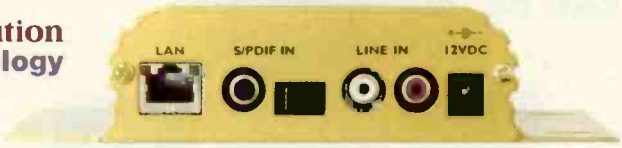
+49 221 709130; www.rtw.de

AES 42 digital mic interface
ATI Group

DMI-8: The first eight-channel AES42 digital microphone interface, the 1 RU DMI-8 accepts inputs from eight AES42 digital microphones and streams their audio signals via Cobranet or Ethersound over ordinary CAT5 cable. The system is bi-directional, permitting remote control of gain, pattern, transient limiting, rolloff and more, along with phantom powering and tally lights for each mic. The DMI-8 provides individual AES3 outputs for each AES42 input and includes an ADAT Lightpipe port containing all eight mic signals. It comes complete with ATI Digital Mic Management software permitting real-time control of all performance aspects of eight digital microphones from a remote laptop PC, allowing the recording engineer to optimize microphone performance during live events and broadcasts. Multiple DMI-8 units can be networked to support more than 128 channels using standard Ethernet interfaces.

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

IP audio distribution
Barix Technology



Instreamer: With Instreamer, stations can be set up for distributed audio and deliver music and announcements from room to room, house to house, over international borders and oceans to the intended destination.

866-815-0866; www.barix.com
info@barix.com

Music library
Non-Stop Music Library

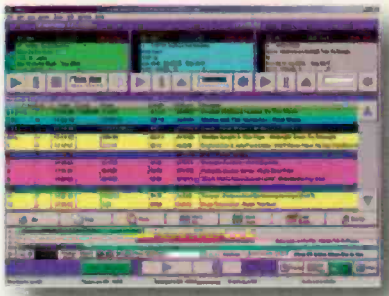
Amphibious Zoo: Amphibious Zoo is a five-CD set of contemporary music: Disc one includes high-energy electronic beats and loops; disc two features a wide-ranging collection of blues; disc three highlights modern grooves with Indian flavor; disc four features the best of American urban hip hop; and disc five is an extensive sampling of funk.

801-531-0060; www.nonstopmusic.com
info@nonstopmusic.com

Broadcast Software

1-888-274-2721
www.bsiusa.com

Radio Automation

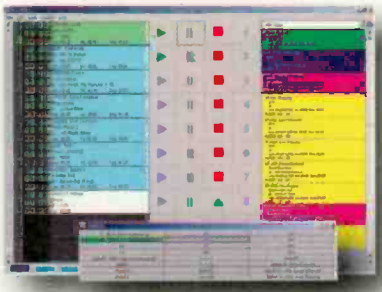


Simian - radio automation and digital play out system

Instant Audio

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

Digital Cart Player



WaveCart - the original on-screen cart machine

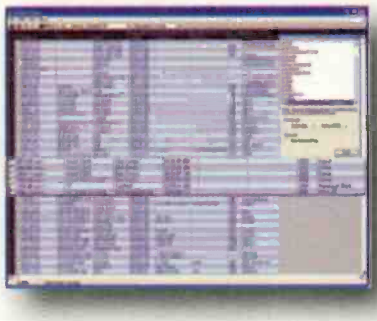
Audio Logging

SkimmerPlus - professional audio logging and skimming

Full PC Systems

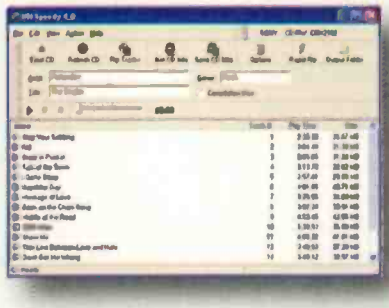
Complete PC systems - with hardware and music

Music Library



MusicStore - over 55,000 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

Cable connector
Neutrik

Crimp XLR: As the crimp termination version of its "XX" and "DLX" series, the Crimp-XLR is an ideal solution for large cable assemblies and solderless RoHS applications. It is available in several models for greater versatility and faster assembly. The three-pole FXX (NC3FXX-A-D) and MXX (NC3MXX-A-D) cable connectors are terminated on semi-automated machines and include boot assembly and cable testing, while the three-pole FXX and MXX connectors (NC3FXX-HA/NC3MXX-HA) and the three-pole NC3FD-LX-HA and NC3MD-LX-HA chassis connectors are terminated with hand crimp tools.

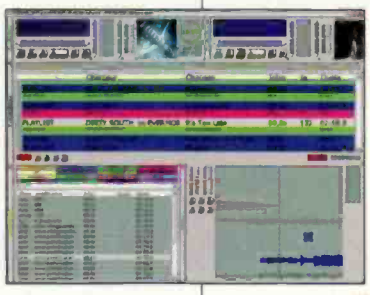
732-901-9488; www.neutrik.com
info@neutrikusa.com

CAP-to-EAS converter
TFT

Model 2008: This CAP-to-EAS was designed by Hormann-America. The Model 2008 connects to a CAP feed via the Internet and optionally by other means, processes incoming messages and sends them as audio to an FCC type-approved EAS encoder/decoder. The converter connects to an EAS unit just like a radio tuner. The unit polls a CAP source every 15 seconds for new emergency messages and generates an EAS protocol output. The unit, a 1RU PC, includes a 40GB hard drive to store data.

800-347-3383; www.tftinc.com
dparker@tftinc.com

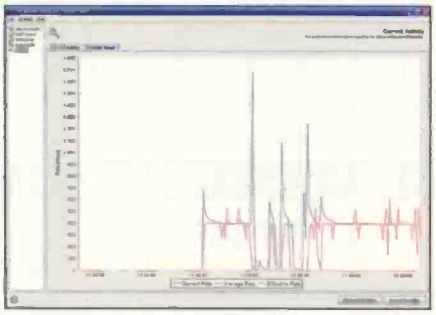
Automation suite
Winmedia Software



Winradio 2.7: WinRadio 2.7 is an integration of web services enabling remote voice tracking, flow control and sales by using handled devices. The ergonomy of the software has also been polished with a new version of the mixer window, new version for the on air system, and new graphical presentation.

514-984-4912; winmedia.ca
jerome@winmedia.fr

File transfer
Unlimi-tech Software



File Catalyst Web: Combining file transfer ease and e-mail notification with acceleration, File Catalyst Web from Unlimi-Tech Software Inc. removes complexity for ordinary end users. A File Catalyst Web user can send files of any size to anywhere using a web browser, make scheduled and automatic transfers via desktop client, transfer data at maximum bandwidth, is immune to latency and packet loss, has the industry standard SSL for control channel and AES for data encryption, can automatically detect line speed with adaptive rate control and has cross-platform support (Windows, Linux, Solaris, Mac OSX).

877-EASY-FTP
www.filecatalyst.com
info@utechsoft.com

Automatic voltage regulation
Stormin Protection Products

AVR+Spike Block: This automatic voltage regulator prevents feedback loop and case/ac ground notch filtering for ground transit surges caused by lightning, pumps, motors and drives. The system prevents noise generated by heavy-duty equipment that emit impulse frequencies below 50Hz, and lightning impulse frequency above 2.2GHz. Using this product along with an existing UPS and other surge suppression devices will create alternative pathways for lightning to travel.

888-471-1038; www.storminprotection.com
storminprotection@earthlink.net

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Contributor Profile

Meet the professionals who write for *Radio* magazine.
This month:
Field Report, page 44.

Gary Wachter
Director of Engineering
KKDA-AM/FM
Dallas

Wachter has been actively involved in radio (and some TV) for 35 years. In the 1980s, he worked alongside Leonard Kahn to FCC type accept AM stereo and was the first to start broadcasting full time at KTSA San Antonio.

He has authored numerous software packages for use by broadcast equipment manufacturers and his own company. He enjoys designing and building studio and transmitter facilities.

Radio
THE RADIO TECHNOLOGY LEADER

Written by radio professionals
Written for radio professionals

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ADVERTISER INDEX

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

by Chriss Scherer, editor

Do you remember?

In 1982, Henry Engineering began manufacturing and delivering its first product: the Matchbox. This utility device proved to be a popular interface for balanced and unbalanced audio signals. In its original form, the unit delivered an audio response of dc to 20kHz ±0.25dB at 0.008 percent distortion with a S/N ratio of about 80dB.

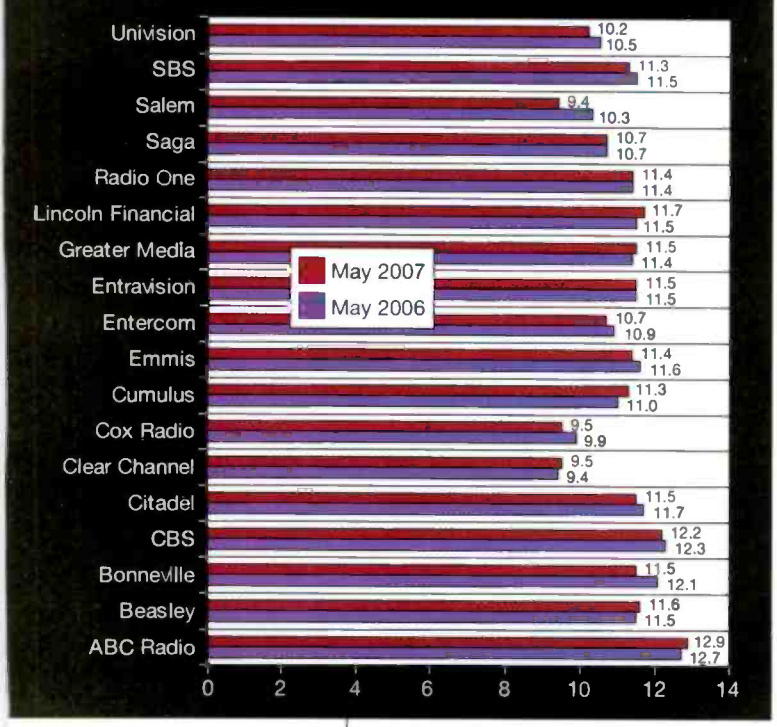
After 25 years, Henry Engineering offers an updated version that fits in a 1/3-width, 1RU package. The current unit places the audio connections on the rear panel, unlike the original that provided all the connections on the front of the project box.

Henry Engineering reports that the Matchbox will be available in the original configuration in the coming weeks—just in time for its silver anniversary.

Sample and Hold

Commercial airtime loads ranked by owner

A comparison of average minutes per hour of commercials for various owners.



Source: Media Monitors

That was then

During the early days of radio broadcasting, it was common for stations to be owned by companies that could use the medium to supplement its other business. Department stores would own stations so they could promote the store and sell receivers. Newspapers would own stations to sell more newspapers. Even receiver manufacturers took up the practice. Powell Crosley is probably the most well-known for this with Crosley Radio and WLW in Cincinnati.

There was another manufacturer and station owner in Cincinnati that gave it a go. This 1925 ad from *Popular Mechanics* shows various Logodyne Big Five receivers available from the Kodel Radio Company, which also owned WKRC-AM. All of these units were based on a five-tube design and boasted fine hardwood cabinets, a built-in speaker and compartments for A and B batteries. Other models, including the Gold Star Series, were available with one, two or three tubes.

More online
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This Little Unit

Can Do BIG Things!

Our new AP-3 is the perfect HD Processor.

SETTING UP FOR HD RADIO?

The Vorsis AP-3 digital processor is the ideal tool to shape your sound exactly the way you want it —cleanly and efficiently.

Built around a multi-band compressor with complementary AGC, the AP-3 replaces a whole *rack* of dedicated units. VORSIS pre-conditions your signal (HPF, LPF, notch filter, de-esser, expander), then let's you apply 3-band AGC/compression *and* 4-band parametric EQ (signal chain reversible) before going through a final stage zero-overshoot peak limiter.

With real-time spectrum density readouts and full metering, our included PC graphic interface software makes operation of the AP-3 direct and easy, offering complete control of all audio parameters, presets, monitor functions, system settings and security—all through a single RJ-45 ethernet connection that lets you control one or many AP-3 units.

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THE TOOLS HAVE CHANGED...

BUT THE *MISSION* REMAINS THE SAME

Today's audio control surface has evolved to a very high degree. Yesterday's wish list is today's feature set: total router integration, routable audio and logic, total show recall, and a complete set of DSP audio processing are under the hood of this G7...

All in a package of stainless steel and aluminum designed for years of 24/7 service, with a familiar look and feel that will ***help your talent make years of great radio.***

Networked audio requires a higher level of expertise, experience and resources. Benefit from all three with *WHEATSTONE!*

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