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ROC YOUR WORLD

The new ROC console from Logitek

When Logitek introduced its first ROC console back in the 1990s, it marked a revolution in audio console design. One of the industry's first router-based digital consoles, the original ROC boasted simple wiring and access to multiple sources at each fader.

Over the years, the router-plus-console Networked Audio concept has become the standard in console architecture. Although the original ROC was retired years ago, Logitek has continued to develop systems for both TDM and AoIP audio networking. The new ROC takes the best of the original design and pairs it with the latest technology and styling.

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SBE 50-Year Celebration Begins

The Society of Broadcast Engineers begins celebrating its 50th anniversary in December 2013. The Society will launch a special 50th anniversary design for its member newsletter, the SBE Signal, which will include an anniversary special logo. The organization is also planning a reception to be held at the 2014 NAB Show and other special events.

Observances are being planned that will touch all members. Chapters are encouraged to use the special 50th anniversary logo on their websites, newsletters and others materials.

CEA Honors NPR Labs for Emergency Alert System Receiver

NPR Labs has been selected by the Consumer Electronics Association (CEA) as an International CES Innovations 2014 Design and Engineering Awards Honoree for the development of an FM receiver to be used as part of an emergency alerting system for the deaf. The award will be presented to NPR Labs, at the CES annual conference, which runs from Jan. 7-10 in Las Vegas.

Products entered in this program are judged by a preeminent panel of independent industrial designers, independent engineers and members of the trade media to honor outstanding design and engineering in cutting edge consumer electronics products across 29 product categories.

The NPR Labs receiver will help ensure that hearing-impaired individuals can stay informed during emergencies when electricity, Internet and other communications channels are unavailable.

NATE

The National Association of Tower Erectors posted the Tower Site Hazard Recognition Guide. The free guide provides safety information and requirements for a broad range of broadcast and communications tower-site hazards.

BW Broadcast has taken on five new staff in departments including sales, support staff and engineers, and the warehouse production line, to meet the demands of the sales department.

Harris Broadcast has rounded out its leadership team, naming Steve Reynolds chief technology officer and Skip Sorenson chief financial officer.

NABSHOW

Logitek is planning a user group meeting for the 2014 NAB Show. The event will be held April 6 at the Flamingo Hotel.

BTC Expands Number of Broadcasters, Markets Covered

Additional broadcasters and markets have joined the effort to distribute local traffic and other map-related data via FM and HD Radio with the Broadcaster Traffic Consortium (BTC).

"Watching the BTC data broadcast network grow has been truly astounding," said Paul Brenner, president of the BTC and CTO of Emmis Communications. "Broadcasters large and small are contributing to the most successful industry consortium in history. This shows that FM and HD Radio can win lucrative telematics business normally won by satellite or mobile broadband when we perform uniformly. I want to thank all of the broadcasters who contribute to this industry effort."

Read more at RadioMagOnline.com.

FCC Clarifies Broadcast Foreign Ownership Policy

The Federal Communications Commission clarified its policies and procedures for reviewing transactions in the broadcasting industry that would result in foreign ownership stakes exceeding a 25 percent benchmark set by statute. Sought by a broad and diverse range of parties -- including broadcasters, the public interest sector, and investors -- the ruling potentially removes obstacles to new capital investment, which will support small business, minority, and female broadcast ownership, and spur innovation. The clarification does not alter the FCC's obligation to protect the public interest, including national security, localism and media diversity, in case-by-case reviews of each transaction.

BIA/Kelsey Forecast: U.S. Local Media Ad Revenues to Reach $151.5B in 2017

In the midyear update to its Annual U.S. Local Media Forecast (2012-2017), BIA/Kelsey projects total U.S. local media ad revenues to grow from $132.9 billion in 2013 to $151.5 billion in 2017, representing a 2.8percent compound annual growth rate, growing faster than the firm originally forecast earlier this year.

For more, visit RadioMagOnline.com.

FIND THE MIC AND WIN!

Tell us where you think the mic icon is placed on this issue's cover and you could win a three-pack of Hosa HMIC-025 mic cables. Send your entry to radio@RadioMagOnline.com by January 10, 2014. Be sure to include your guess, name, job title, company name, mailing address and phone number. No purchase necessary. For complete rules, go to RadioMagOnline.com

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VIEWPOINT

Looking Good for 50

If you don't like how things are, you have two choices: Live with it or change it. Back in 1961, John Battison, my long-time friend and former associate at *Radio* magazine, saw there were changes coming to the two leading broadcast technical societies, the Institute of Radio Engineers and the American Institute of Electrical Engineers. The two groups were planning to merge, and Battison was concerned that the new organization would not have much to offer the station-level broadcast engineer.

John had a choice to make: Do nothing and accept whatever might happen, or speak up an initiate a change. He fortunately did the latter. At the time, John was the editor of *Broadcast Engineering* magazine, so he used the loudest platform he had at the time, the editor's page, to voice his concern and solicit action. John had hoped some broadcast engineers would step up and act on the idea.

The way the situation played out, there was interest in what John proposed, but like any project, someone needed to be the champion of the effort. After more than 18 months, John became that champion.

He continued to push the idea of a new organization. He originally proposed calling it the Institute of Broadcast Engineers. Over the months, he sent more then 5,000 letters to radio and TV engineers in the United States and Canada. In April 1963 he ran a membership application in *Broadcast Engineering*. The idea slowly continued to build interest.

On April 5, 1964, an organizational meeting was held during the National Association of Broadcasters convention at the Conrad Hilton Hotel in Chicago. About 100 broadcast engineers attended that meeting. Everyone agreed that a society targeted at broadcast engineers was needed, so they made it official. The first order of business was to change the name to the Society of Broadcast Engineers. (It was felt that the Institute of Broadcast Engineers (IBE) was too similar to IBEW, the International Brotherhood of Electrical Workers.) The other item of business was to appoint John Battison to be the society's first president.

And that's how it all began. One person spoke up and made a change. Since that first meeting in 1964, the SBE has grown to more than 5,500 members and more than 114 chapters. There are SBE members in all 50 states, four U.S. territories and 25 other countries.

To mark this milestone, the SBE is planning a series of special events, activities and projects to be held throughout 2014. A special 50th anniversary logo was unveiled last month. The Society already has plans for a special event at the 2014 NAB Show as well.

As a past president of the organization, I'm proud of what the society has become and what it accomplishes. And I'm glad my friend spoke up so many years ago.

Chriss Scherer | Editor

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New Tower Construction Update Mainly for the Birds

by Kevin McNamara

Over the past two years there have been some significant changes to the federal regulations governing the construction of new towers. Most of these changes have come in the form of additional environmental review as required by Section 7 of the Endangered Species Act (ESA) of 1973 and by the National Environmental Policy Act (NEPA) of 1969.

More on how birds are affected by towers: fws.gov

The main problem, according to the avian community, is that certain species of birds are attracted to the red lights, mainly the old style that flash at a very low rate, which apparently disorient their natural guidance system. Particularly in the case of guyed towers, the probability of hitting the guy wires and tower are very high.

The FCC is also in the process of streamlining the application process for building wireless infrastructure. While most of this streamlining typically will affect only wireless/broadband carriers, there is a proposal to eliminate many of the barriers that prevented the deployment of temporary towers, particularly during declared public emergencies.

Before you apply for Antenna Structure Registration (ASR), members of the public must have the opportunity to comment on the potential environmental impact of your proposal. Rather than submitting a fully completed tower registration form (Form 854), you will need to submit a partially completed application *and* give local notice of the proposed structure through a local newspaper. Notification through the zoning public notice process may also suffice. Once the notice has been published, the FCC will post the partial application to its website. The public will have 30 days to post comments. Based on these public comments the FCC will make a determination of whether an Environmental Assessment (EA) will be required. This notification is required for any tower that requires an ASR.

Environmental notice is also required if you propose a change of lighting to an existing tower. If an EA is required for a proposed structure the EA will be considered in context of the entire structure, rather than a service specific, there is also an interim procedure that requires an EA for changes to any tower over 450'.

The U.S. Fish and Wildlife Service (FWS) has also published guidelines and created a Tower Site Evaluation Form that will aid in the identification of potential flags in the EA process. The US FWS guidelines can be found in full online. In short:

1. Construction is strongly encouraged on existing communication towers or other structures.

2. New construct towers are strongly encouraged to be no more than 199' above ground level, using construction techniques that do not require guy wires, and unlighted (if Federal Aviation Administration regulations permit).

3. When constructing multiple towers, providers should consider the impact of each tower and collective towers to threatened and endangered species.

4. If at all possible, new towers should be sited within existing clusters of towers. Towers should not be sited in or near known bird concentration areas, in known migratory or daily movement flyways, or in habitat of threatened or endangered species. Towers should not be sited in areas with a high incidence of fog, mist, and low ceilings.

5. Towers above 199' AGL requiring lights for aviation safety must be constructed with the minimum amount required of pilot warning and obstruction avoidance lighting. Unless otherwise required by the FAA, only white (preferable) or red strobe lights should be used

ONLINE RESOURCES

> **Tower Site Evaluation Form**
fws.gov/habitatconservation/tower_site_evaluation_form.pdf

> **US FWS guidelines**
fws.gov/habitatconservation/communicationtowers.html

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at night, and these should be the minimum number, minimum intensity, and minimum number of flashes per minute allowable.

6. Tower designs using guy wires for support should have daytime visual markers on the wires to prevent collisions.

7. Towers and appended facilities should be sited, designed and constructed so as to avoid or minimize habitat loss within and adjacent to the tower footprint. However, a larger tower footprint is preferable to the use of guy wires in construction.

8. Relocation may be recommended if significant numbers of breeding, feeding, or roosting birds are known to habitually use the proposed tower construction area. If this is not an option, seasonal restrictions on construction may be advisable in order to avoid disturbance during periods of high bird activity.

9. New towers are encouraged to structurally and electrically accommodate the applicant/licensee's antennas and comparable antennas for at least two additional users, unless this design would require the addition of lights or guy wires to an otherwise unlighted and/or unguyed tower.

10. Security lighting for on-ground facilities and equipment should be down-shielded to keep light within the boundaries of the site.

11. Service personnel or researchers from the Communication Tower Working Group should be allowed access to the site.

12. Towers no longer in use or determined to be obsolete should be removed within 12 months of cessation of use.

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

STREAMLINED APPLICATION PROCESS

On Sept. 26, 2013, the FCC released a notice of proposed rule-making to address and update its rules and policies relating to wireless infrastructure builds streamlining environmental and historic preservation review procedures. This proposed rule change(s) are intended to speed up the deployment of new and emerging wireless technologies, they include:

> An expansion of the current exclusions to EA review. Under the current rules it is permissible to mount new antennas on a building (providing public exposure to RF is below prescribed limits) or existing tower structures. Under the new proposal, there would be no requirement for an EA on new antennas mounted to any type structure, providing the public exposure to RF is below the limit.

> Categorical exclusion of small cell and DAS (Distributed Antenna Systems) from the Historical Preservation Review process.

> Waiver of the Environmental notification process for temporary structures that meet the following criteria: Will be in use for 60 days or less; requires notice of construction to the FAA; does not require marking or lighting pursuant to FAA regulations; will be less than 200' in height; and will involve minimal or no excavation. ■

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Update on LPFM Window and Foreign Investment in Licenses

by Lee Petro

As discussed in last month's column, the FCC was closed for most of October as a result of the federal government shut down. Since it re-opened its doors, the FCC has been a whirlwind of activity. Two of the most notable activities on the broadcasting front has been the LPFM window and the release of a declaratory ruling relating to foreign investment in broadcast licenses.

In light of the government shutdown, the FCC pushed back the close of the LPFM filing window until Nov. 14. This delay provided applicants additional time to finalize and file their applications. By initial calculations, there were more than 2,800 new LPFM applications, along with approximately 20 applications by existing LPFM licensees to make major changes in their facilities. On Nov. 29, the FCC released a public notice accepting for filing nearly half of the applications, determining that they were not mutually exclusive with any other applications submitted during the filing window.

On Dec. 3, the FCC released a public notice to provide further guidance on the processing of the remaining applications. The public notice indicated that the initial wave of applications had been accepted for filing, and that petitions to deny would be due by the end of December. Unopposed singleton applications will begin to be processed and granted in January 2014.

Next, the FCC stated that a subsequent public notice would be released by the end of December listing the mutually exclusive applications. The release of this public notice will trigger a period of time during which applicants may elect to submit minor amendments to eliminate their mutual exclusivity with the other applications in the group. The FCC made clear, however, that any amendments submitted cannot enhance the comparative standing of the application (i.e., adoption a pledge to provide local programming), nor can the amendment correct site coordinates to correct spacing concerns.

Applicants will also have an opportunity to reach settlement agreements with the other applicants in their group, but the FCC requires that at least one singleton applicant will be created. The applicants that agree to dismiss their applications will be permitted to receive reimbursement of their legitimate and prudent expenses associated with the preparation and prosecution of their applications.

The other option for parties wishing to avoid the comparative process is to reach a time-sharing agreement, again where at least one facility will become a singleton. The time-sharing agreement must detail the specific hours of operation for each party to the agreement; must prohibit simultaneous operation of the station by two or more of the parties; and, each party to the agreement must propose to operate for at least 10 hours per week.

Finally, the public notice discussed the standards by which parties may seek reconsideration and reinstatement of their dismissed applications. As noted above, the FCC will not permit parties to cure spacing concerns, nor will the FCC permit parties to amend applications to exchange an individual name for a non-profit organization. It has been reported that several applicants erroneously listed an individual from their organization as the applicant, and the FCC said these errors cannot be corrected through a petition for reconsideration and reinstatement. On the other hand, if there are other reasons for reconsideration and reinstatement, the applicant may submit the filing within 30 days of the dismissal.

The other item of note for broadcasters is the release of the declaratory ruling for foreign investment in broadcasting licensees. In the past, there have been very few attempts for foreign investors to seek a waiver under the Communications Act to invest in a broadcaster with an interest exceeding more than the 25 percent cap. While the Act indicated the FCC had the discretion to grant such requests, the FCC had only granted one request in the past 30 years.

In response to a request by a group of licensees seeking clarification of the FCC's policy, the declaratory ruling was released, in which the FCC reasserted that it would, in fact, review each request on a case-by-case basis. The ruling is not expected to result in a land-rush of foreign investment, however, given the need for applicants to file waiver request or petition for declaratory ruling before the investment has taken place. At the very least, however, the current FCC leadership has expressed its interest in permitting such investment to occur.

Petro is of counsel at Drinker Biddle & Reath, LLP. Email: lee.petro@dbr.com.

FCC DATELINE

Stations in Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont continue running License Renewal Post-filing Announcements and stations in New Jersey and New York run License Renewal Pre-Filing Announcements Dec. 16, Jan. 1 and 16.

Commercial radio and television stations file Biennial Ownership Reports (delayed deadline): Dec. 20, 2013.

Deadline for comments in AM Revitalization Rulemaking proceeding: Jan. 21, 2014.

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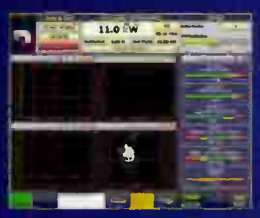

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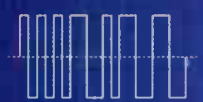

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IP Audio Begins Interoperability Journey

With various IP audio systems in existence, there was no common communication between them — until now, thanks to AES67.

By Doug Irwin, CPBE DRB AMD

The Audio Engineering Society has developed a new standard regarding the interoperability of audio over IP (AoIP) systems now known as AES67. The new standard is the result of the work of the AES-X192 task group, which finished its work in April. After being ratified by the AES Standards due process, it was published on Sept. 11, 2013.

You'll hear more about this standard as time goes by. But what is AES67, and how can it benefit a radio station? To start, let's use the AES67-2013 standard itself for the definition of its scope:

> *"This standard defines an interoperability mode for transport of high-performance audio over networks based on the Internet Protocol. For the purposes of the standard, high-performance audio refers to audio with full bandwidth and low noise. These requirements imply linear PCM coding with a sampling frequency of 44.1kHz and higher and resolution of 16 bits and higher. High performance also implies a low-latency capability compatible with live sound applications. The standard considers latency performance of 10 milliseconds or less."*

The AES67-2013 standard also points out that the current AoIP systems are not interoperable, despite the fact that they all have a common basis in IP. AES67 is simply a means to give them a way to talk to one another, using existing protocols; no new protocols have been developed in this process. The AES expects this standard to be useful in fixed and touring live-sound applications, as well as music production and post-production, and, of course, broadcasting.

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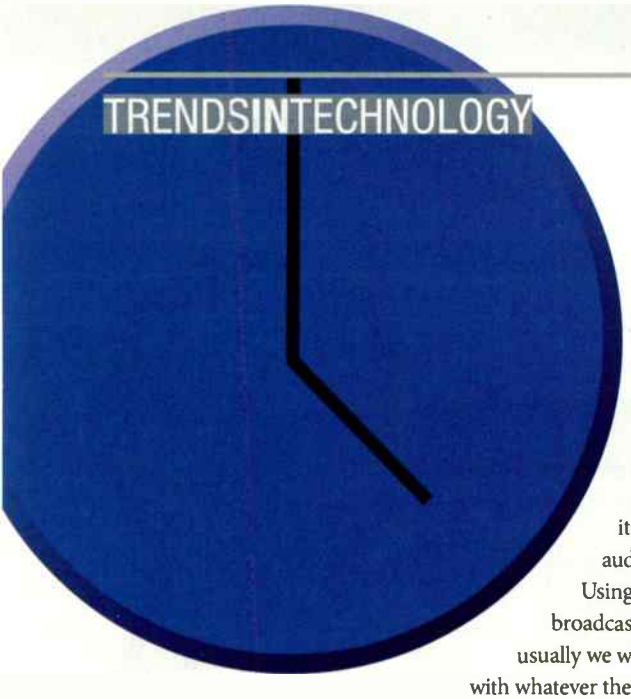


SYNCHRONIZATION

Many of us have used AoIP systems in which timing was irrelevant; Streaming is the most obvious one. When using UDP/IP (the best effort transport) it doesn't matter to us when audio is heard on the far end. Using audio over IP for remote broadcasts is yet another example; usually we would just accept and work with whatever the delay was between points A and B. It's out of our control, generally speaking, and not a problem unless it gets exceptionally long anyway.

However, it's not hard to imagine if you work in live sound how important timing would be. One could not allow timing to change for front-of-house or stage applications. Using AoIP in that application would demand fixed time delays. This seems to me, after reading AES67, to be one of the most important aspects of the new standard. From the AES67-2013 standard:

> *"The ability for network participants to share an accurate common clock distinguishes high-performance media streaming from its lower-performance brethren such as Internet radio and IP telephony. Using a common clock, receivers anywhere on the network can synchronize their playback with one another. A common clock allows for a fixed and determinable latency between sender and receiver. A common clock assures that all streams are sampled and presented at exactly the same rate. Streams running at the same rate may be readily combined in receivers. This property is critical for efficient implementation of networked audio devices such as digital mixing consoles."*

Let me give you a hypothetical application in broadcasting though. Let's say you use AoIP for your main STL for an FM station; and let's also say you want to build an on-channel booster for that same FM station. In this application you'll want to maintain a fixed (but configurable) delay between the two; but you're also using IP for your connection to the booster site. How would you ensure the time delay remains constant? AES67 might provide the answer: It uses IEEE 1588-2008, otherwise known as Precision Time Protocol. PTP basically works like this:

- A grand-master clock lives on the network, and it receives its time data via GPS
- Time-stamped synchronization messages are sent out on the network, and received at each end point (slave), where the time is read.
- The slave can (optionally) send a delay request message back to the grand master
- The grand master in turn sends the delay-request message back to the slave that requested it, with an updated time stamp
- The slave receives the message, takes the time difference between when it sent the message, and when it received it, and divides it in two. The calculated propagation delay is then added to the clock at the end point.

So what's particularly neat about this is that not only do you synchronize the clocks at the end points, but you also continually measure the propagation delay, and corrections are made as necessary.

MEDIA CLOCK

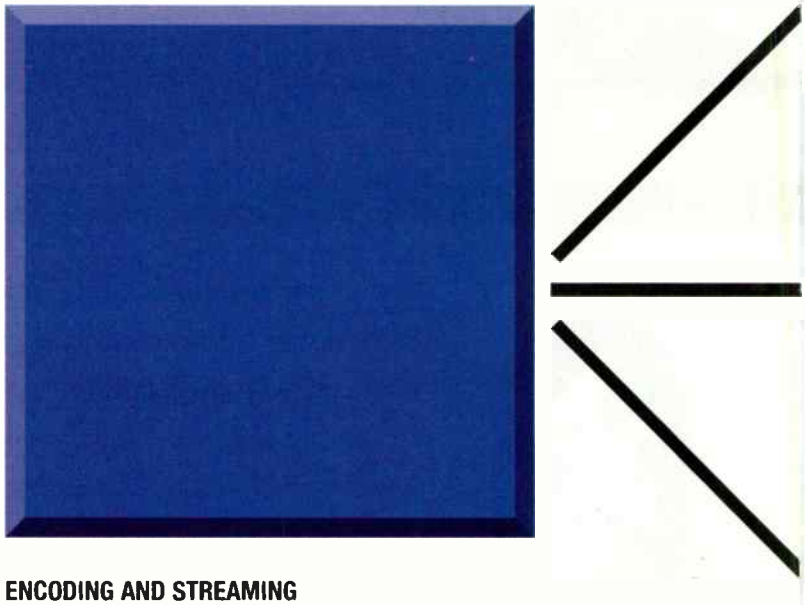
Closely related to the network time that is continually adjusted by way of PTP, is the function of the media clock. On the input side of the AoIP system, the media clock sets the sampling rate for the ADC at one of the standard's supported frequencies, 44.1-, 48- or 96kHz. Likewise, on the output side, the media clock is used by the DAC. The media clock has a fixed relationship to the network (grand-master) clock; for example, the media clock used for an ADC at a 48kHz sampling rate will advance 48,000 samples for each elapsed second on the network clock.

TRANSPORT

In the AES67 standard, media packets are transported using IP version 4, though care has been taken in its design so that the standard can facilitate IPv6 at a later date.

All participating devices must support IGMPv2 and optionally IGMPv3. IGMP (Internet Group Management Protocol) will be used for devices requesting multicasts, such as the PTP messages, media streams, and discovery (more on that a little later).

Propagation time through a network must necessarily be low for media packets that comply with AES67. For this reason, quality of service (QoS) becomes a necessary feature in the network. All devices will use the DiffServ method, meaning that the DSCP (Differentiated Services Code Point) field in the header of each media packet will be marked according to their traffic class, allowing the network to recognize the need of said packets for preferential treatment. All devices will tag outgoing packets with their appropriate DSCP values.



ENCODING AND STREAMING

Several audio payload formats are supported in AES67: L16 (16-bit linear) and L24 (24-bit linear). All devices must support a 48kHz sample rate, and should support 44.1- and 96kHz sample rates.

Multicasting of streaming data is an efficient means by which audio information can be distributed on a one-to-many basis. Multicasting is also an important component in connection management (described later). All receivers must be able to receive multicast and unicast streams.

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In AES67 only one device will send to a multicast destination. The destination address for a particular stream is configured in the management interface of the sending device.

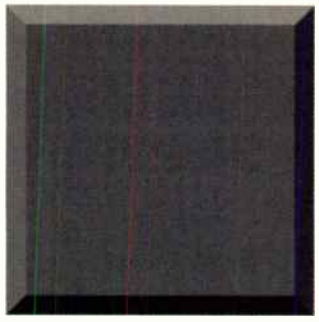
DISCOVERY

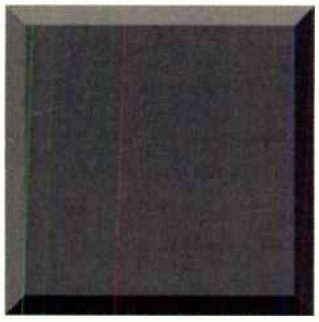
Discovery is used by participants on the network to build a list of other participants or sessions available on the network. The list is then available to end-users to facilitate connection management. Connection management requires a *Session Initiation Protocol* URI (uniform resource identifier) or a *Session Description Protocol* description. Although no discovery service is mandated by this standard, these can be delivered via one of a number of means, including: Bonjour (for Apple); SAP version 2; Axia Discovery Protocol; or Wheatstone's Wheatnet IP discovery protocol.

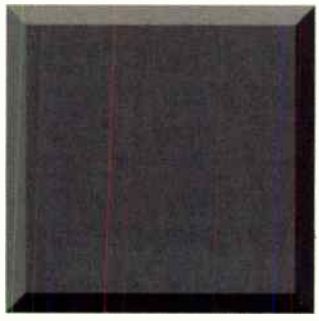
SESSION DESCRIPTION

Sessions descriptions are used by discovery, and in connection management (described a little later in this article). Session descriptions specify critical information about each stream including network addressing, encoding format and origination information. Interoperability imposes additional SDP requirements and recommendations for the following aspects:

- Packet time
- Clock source
- RTP clock and media clock offset
- Payload type







CONNECTION MANAGEMENT

Connection management is the means by which media streams are established between a sender and one or more receivers.

Connection management for all unicast streams shall be done via Session Initiation Protocol (SIP). All receivers must support unicast streams, and all receivers must support SIP. All devices are SIP user agents with an associated SIP URI (Uniform Resource Identifier). URIs are learned through discovery or by other means such as static configuration.

Typically, SIP is used with the assistance and participation of SIP servers, and different types of servers perform different tasks on an SIP network. They can be located anywhere on the network that is reachable by other participants. However, there is also a *server-less* mode that can be used to perform connection

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> "AES67 is a great start toward a unified standard, but when the first AES67 devices hit the marketplace, they will also need to support additional functionality, no matter whose system they use."
> — Marty Sacks, VP of Axia Audio

management between user-agents in a direct peer-to-peer fashion. This mode is used in smaller systems where the SIP servers would provide minimal benefits. In order for this to work, there must be a means by which the caller can learn of the network information (i.e., IP address) of the callee. This can be done through discovery, manual configuration, or higher-layer protocols. In the server-less mode all SIP messages must be sent directly to the targeted agent as opposed to a SIP server, and an agent operating in this mode must respond to such requests.

Multicast connections may be established without the use of a connection management protocol. A receiver is not required to make a direction connection with the sender. Instead, a receiver obtains a session description of the desired connection using discovery, and then uses IGMP to inform the network of its desire to receive the stream in question.

GOING FORWARD

After reaching this point in the article, you may have one of two questions: either you want to know if AES67 will affect your current system in some fashion; or alternatively, if it will affect future purchase decisions.

According to its website, Axia and the other companies in the Telos Alliance have been involved with AES-X192 since its inception. I communicated directly to get their thoughts on AES67. "We finally have a standard for AoIP audio transport in AES67 – and that's great!" said Marty Sacks, VP of Axia Audio. "Ultimately, the goal is for every studio audio device to click together with CAT-5 and share audio. But along with that shared audio, there's a whole world of other functionality that broadcasters expect, like device start/stop functions, monitor mutes, on-air tallies, the ability to control peripherals from the console, the ability to know when an audio source is live and ready for air, the ability for playout systems to control fader on/off functions and more. Those are functions that AES67 alone doesn't provide for. AES67 is a great start toward a unified standard, but when the first AES67 devices hit the marketplace, they will also need to support this additional functionality, no matter whose

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> "AES67 is the first step in what we hope will lead to a totally interoperable environment that includes not only transport, but the means to control and discover all devices and functions within the network." — Andrew Calvanese, VP of engineering, Wheatstone

system they use, in order to provide an integrated control experience for the user – otherwise they're going to be no better than AES3 streams, with serial GPI cables running alongside."

I also communicated directly with Wheatstone for its thoughts regarding AES67. "Wheatstone was very involved in the AES-X192 group that developed the new AES67 standard, which gives us that very important first step of transport interoperability," said Andrew Calvanese, Wheatstone VP of engineering. "We are evaluating our WheatNet-IP system so that our customers can take advantage of AES67 but with an eye on a much wider goal of total interoperability that includes discovery and control. AES67 is the first step in what we hope will lead to a totally interoperable environment that includes not only transport, but the means to control and discover all devices and functions within the network. We are working with other engineering teams to standardize on the control and discovery protocols that can make that happen at an overall, interoperable level."

Logitek intends to be compliant with the AES67 standard by spring of 2014; It will make the necessary development work this winter and plan to have that project completed by April.

To reiterate, AES67 is simply a means to give (formerly) disparate AoIP systems a way to talk to one another, using existing protocols; no new protocols have been developed in this process. It's too early to tell what impact AES67 will have in broadcasting, but the adoption of standards in technology usually provides benefits down the road. 0

Irwin is RF engineer/project manager for Clear Channel Los Angeles. Contact him at doug@dougirwin.net.

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Seacrest Studios Comes to Cincinnati Children's Hospital

A cutting-edge radio and TV broadcast media center brings hope and entertainment to a sixth pediatric hospital.

By Brian Clark and Michael Rose

The Ryan Seacrest Foundation inspires youth through entertainment- and education-focused initiatives. This includes building broadcast media centers, named Seacrest Studios, in pediatric hospitals for patients to explore the creative realms of radio, television and new media.

The Foundation opened its sixth Seacrest Studios pediatric location on November 18 at The Cincinnati Children's Hospital Medical Center following openings in Atlanta, Philadelphia, Dallas, Charlotte, and Orange County, CA. As with previous locations, the Cincinnati project utilized labor and equipment donations from broadcasters and industry vendors to design and build the studio. Clear Channel Communications played an integral role in training hospital staff, interns and in-house tech support, including equipment operation and on-air programming. A Clear Channel integration team led by Dan Mettler also came to the site to help wire, connect and test all radio equipment.

Seacrest Studios creates a fully professional broadcast and production space with a comfortable learning curve and wiring environment. This is ideal for encouraging patients to contribute, and accommodating local

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The facility produces more than just radio programming. Video cameras and a backdrop screen make this a multimedia space.

broadcasters who wish to do remote broadcasts from the studio. The Cincinnati location retains this concept as in previous deployments, and adds some unique design and operational characteristics.

Most studios to date are built using existing empty space. This is also the case in Cincinnati, where the hospital engineering staff carved out a 970 square-foot space in the atrium, testing and measuring all electrical loads in advance of integration. The team was able to use existing electrical runs, with minimal new wiring required to support the on-air and production workflow. Most of the components in that workflow – including some cameras, a green screen and other video equipment – are located within the cozy space.

Perhaps most interesting is the absence of a central rack room – at least in the traditional sense. Instead, all live radio and TV signals produced in-house are multiplexed and routed across several destinations before being modulated within the hospital TV headend. The radio broadcast and accompanying video signals are broadcast to 700 TVs on Channel 33, and the overall architecture is a seamless marriage of cutting-edge broadcast technologies and legacy hospital RF systems.

STUDIO DESIGN

Studio comfort is a top priority for the young patients who are here for treatment yet able to come down and participate in the broadcasts. Furniture design is therefore a significant factor. Harris Broadcast designed and built all studio furniture and cabinetry, with comfort and visual appeal achieved in equal measure.

The designs originated from Harris Broadcast's Pacific Design Center in California, where a team led by design engineer Nick VanHaaster developed a one-host, five-guest concept with built-in headphone controls at each position, as well as EV mics on adjustable Yellowtec Mika arms. The guest wing is raised to an elevation that accommodates wheelchairs and gurneys in addition to adjustable chair heights.

Nick and his team jazzed up the trim with appealing, out-of-the-ordinary colors that pop when viewed from the central atrium area. The oval-shaped cabinetry atop the surface to the right of the host position adds more visual appeal while providing plenty of storage for CD players and other source equipment. Meanwhile, the sturdy and spacious desktop surface accommodates a wide array of on-air and production equipment for the 24/7 operation.

Interestingly, Clear Channel Communications also uses the studio as a training location for station engineers. Harris Broadcast designed a custom removable desk surface that conceals wiring to the on-air console, mics and other source equipment so trainees can quickly dive in and work. Similarly, the furniture design included a cabling and wiring package that simplified equipment and electrical connections across the space.

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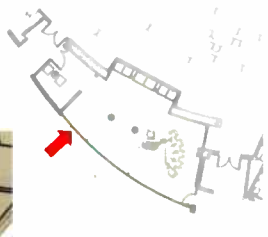

This artist's rendering of the completed facility shows the large window opening to an atrium.

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Multiple guests and an in-studio audience can be accommodated within the studio.

MAKING RADIO – AND MORE

The on-air and production environment brings all the tools of a modern digital radio studio together, including two automation systems, a multi-channel console, processing gear, telephone codecs, production accessories and source equipment. This enables patients and staff to produce a variety of music, entertainment and educational programming.

The radio programming typically comprises DJ-hosted music shows, sports and entertainment talk shows, storytelling and community interaction.

The Ryan Seacrest Foundation also brings artists and celebrities through the studios as they pass through town, with live performances broadcast to patient rooms. Harris Broadcast supplied its World Feed Panel to accommodate these live performances, a 3RU audio signal connection system with an interface panel for cabinet side-wall mounting. It supports all common connector types – RCA, XLR, 3.5 mm, ¼" TRS balanced and unbalanced – and an active USB interface to support temporary connection of instruments, laptops, DJ coffins and other live performance equipment to the house system.

The "house system" in this case is a 12-channel Harris Broadcast Flexiva NetWave console, with removable faders to accommodate future audio signal networking as needed. The NetWave provides on-air personnel with a direct view meter display for clear comprehension of audio levels, which is helpful to patients and staff learning radio for the first time. The console supports multiple on-air sources, including the mics, a Comrex STAC six-line talkshow system, a 360 Instant Replay effects system and a Tascam CD and MP3 player. A Telos Zephyr Xstream rackmount codec is in place for local stations broadcasting live

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from the studio, providing ISDN and Ethernet options for distribution to host studios.

The two automation systems – a BSI Op-X and an RCS Selector – provide the studio with plenty of redundancy for overnight programming, since the station is typically manned only for 8 to 10 hours a day. The BSI Logger feature is useful for pulling air checks done throughout the day. These are interspersed with music to create a complete air shift.

Most radio streams are delivered to the room with an accompanying HD or digital video feed. Patients and staff often use the video equipment to create music videos or other shows and segments using the in-studio green screen. Live on-air shows can also be conducted while another is recorded. Onlookers in the atrium might see an interview being recorded in the studio while a previously produced program plays on the external studio monitor, as well as Channel 33 in the rooms.

The signal flow gets interesting from this point, as the radio and video elements are multiplexed and routed long distance to the main headend. Audio leaving the NetWave (including audio from a video playback computer) is first moved through an TransLanTech Sound Ariane Sequel. This device provides an AES output that is sent to the AES input of a Blackmagic ATEM production switcher. Here, the radio audio combines with four active video inputs (two ceiling-mounted cameras and an in-studio tripod, plus the playback computer video). All video is captured as HD 720p60 at a 16×9 aspect ratio.

EQUIPMENT LIST

360 Systems Instant Replay 2
Ashly SRA2075
Audion Labs VoxPro, control panel
BSI Op-X, Logger
Comrex STAC
EV RE-320
Genelec 6010B
Harris Broadcast Flexiva NetWave, Phone Strobeflasher, WorldFeed Panel
JBL CBT 50LA
Middle Atlantic EGR4428, UPS2200R
Mika mic arm with LED
Neutrik connectors
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RCS Nexgen Digital
Sennheiser HD280 Pro
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Tascam CD-500, SS-CDR200
Telos Zephyr Xstream
Translantech Ariane Sequel
Vaddio Productionview HD

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Left: Computer screens were kept as low as possible to maintain the best possible sight lines.

Below: There are three backdrop screens available for video shots.

The program-out signal is passed to a Blackmagic Hyperdeck HD recorder, and this unit and a second Hyperdeck connect to a two-input Extron HD video switcher. This represents the start of the final phase of the studio workflow, which is able to pass live (Input 1) and recorded (Input 2) content.

Both Hyperdecks also connect to a Crestron touchscreen for playback control at the DJ deck. This proved to be a challenging component of the integration, as discrete commands required for the RS-422 control were forced through an Ethernet control port. Overall, it required adding 20 static IP addresses on the studio network switch to accommodate all radio and TV devices – a demanding task in a real-estate-challenged space.

AT THE HEADEND

The multiplexed audio and video signal moves onto to a simple Extron HD distribution amplifier: One feed goes to the in-studio monitor, a second is pushed the exterior studio monitor and a third feed is sent to a Blackmagic mini-converter. This is where the HDMI to HD/SDI conversion takes place, and from here the signal is transported to a general control room space and switching closet before being passed to the hospital TV headend – two buildings over and six stories up from Seacrest Studios.

To solve the problem of carrying the 720p60 signal over such a long distance, it is sent into an Extron HD/SDI to fiber converter and optically transported to the TV headend. There, it is de-fibered and converted back to HD/SDI before passing to a separate HD to composite converter, which conforms the studio signal for the hospital TV system.

The conforming is necessary as the TV system is currently analog SD 4:3 (though there are upgrade plans for digital and HD in the works). However, turning off the "letterbox" feature in the composite converter allows for a clean 16:9 display on in-room flatscreen TVs. This means that while HD content in the studio is downconverted to SD, signals are displayed in the correct aspect ratio for the TV sets even as SD analog instead of being automatically copped.

At the composite conversion stage, the HD signal also splits left and right analog audio. All three analog signals are then passed to a 25-year old Drake RF stereo encoder and a Drake modulator of the same age. The signal then passes through an RF combiner before being delivered to sets on Channel 33.

The overall effort represents the spirit of everyone involved in the project, from suppliers like Harris Broadcast, Comrex and BSI to the staff of Clear Channel Communications. These companies donated time and equipment to the cause, which is about stimulating the minds of patients in for treatment and encouraging optimistic thoughts through creativity and interactive experiences.

Clark is the chief engineer of the Ryan Seacrest Foundation. Rose works in Interactive Services at Cincinnati Children's Hospital Medical Center.

Clark is the engineer for the Ryan Seacrest Foundation. Rose works in Interactive Services at Cincinnati Children's Hospital.

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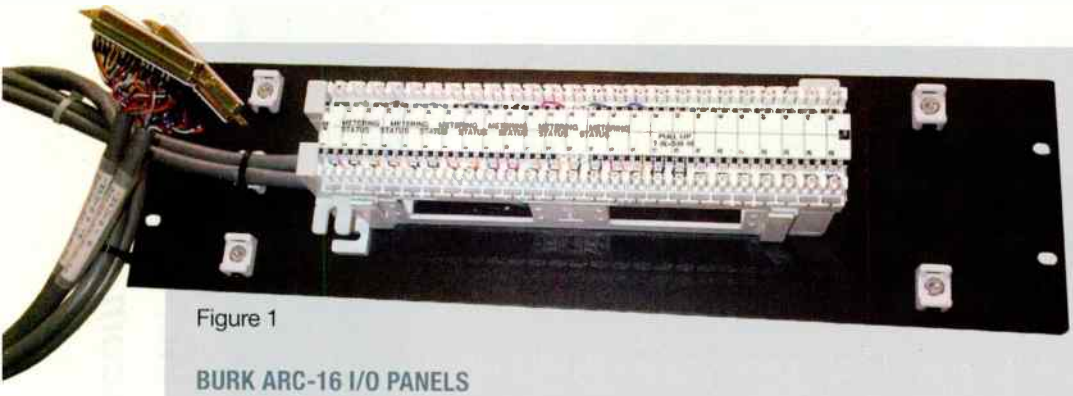

Figure 1

BURK ARC-16 I/O PANELS

As you likely know, the IP-8s were populated by single-pole, double throw relays with a common, a normally open, and a normally closed contact per relay (also known as a form-C relay). So, if you wanted to use the open-collector outputs from the Burk, along with its internal power supply, to make your own output panel you could do one of several things:

> Build your own array of form-C relays, or

> Take the opportunity to build an array of multiple-contact relays (such as a DPDT, 3PDT, 4PDT or more)

> Expand the number of open-collector outputs by using the Burk to drive further logic that has multiple, isolated outputs per relay. In other words, pressing channel 1 and raise (for example) actually provides multiple closures instead of just one.

> A combination of the above: an isolated relay contact (or more) that operates simultaneously with multiple logic outputs done via open-collector.

What about the analog inputs and status inputs, though? Well, these are easier to deal with. You'll need to make up a cable to go from the DB37 on the ARC-16 to an external block of some type — whatever you prefer of course (see Figure 1.) I'm partial to the 25-pair Krone blocks. (Another favorite of mine is the ADC I-24, because you can mult on the front and back of it.) This might be the time to add two features as well: First, you know that the Burk analog input is limited to +5Vdc. Many of us have hung voltage dividers on the inputs to allow higher voltages to be read by the ARC-16. When setting up this block, to take the place of an IP-8, you could provision it to make the voltage dividers easier to install. Second, many of us have connected up parallel remote controls — sometimes diode isolation is necessary between the two units for the status inputs. Set up your new block to make diode isolation easy to do.

Basically I'm saying if you plan on making an ersatz IP-8, you should provision all the bells-and-whistles ahead of time.

REPURPOSE AND REUSE

A few months back I talked some about parting-out old equipment that you were keeping around the engineering shop. The idea was to compromise between hoarding too much junk and not throwing out something valuable, simply by gutting out the parts that actually had value. That at least will save space, right? So let's take a look at a simple use of one of the items I picked — the RF relay.

Figure 2

If you have two transmitters then likely you'll want to listen to the local modulation monitor while it's connected to the aux transmitter during testing. With an FM mod monitor you'll likely need something that passes 100MHz easily enough. That is where your salvaged RF relay comes in to play. Most of those I've seen are SPDT, and you'll need a power supply to energize the relay coil. One feed (likely your normally closed contact) will come from the main transmitter, and the other will come from your aux transmitter. Mount the relay on a rack panel, with buttons to energize the relay, and there you go. See Figures 2 and 3. Both construction projects by Jerry Burnham.

Figure 3

WE NEED YOUR TIPS

Tech tips may be suitable to earn SBE recertification credits. Send your tips to radio@RadioMagOnline.com.

Irwin is RF engineer/project manager for Clear Channel Los Angeles. Contact him at doug@dougirwin.net.

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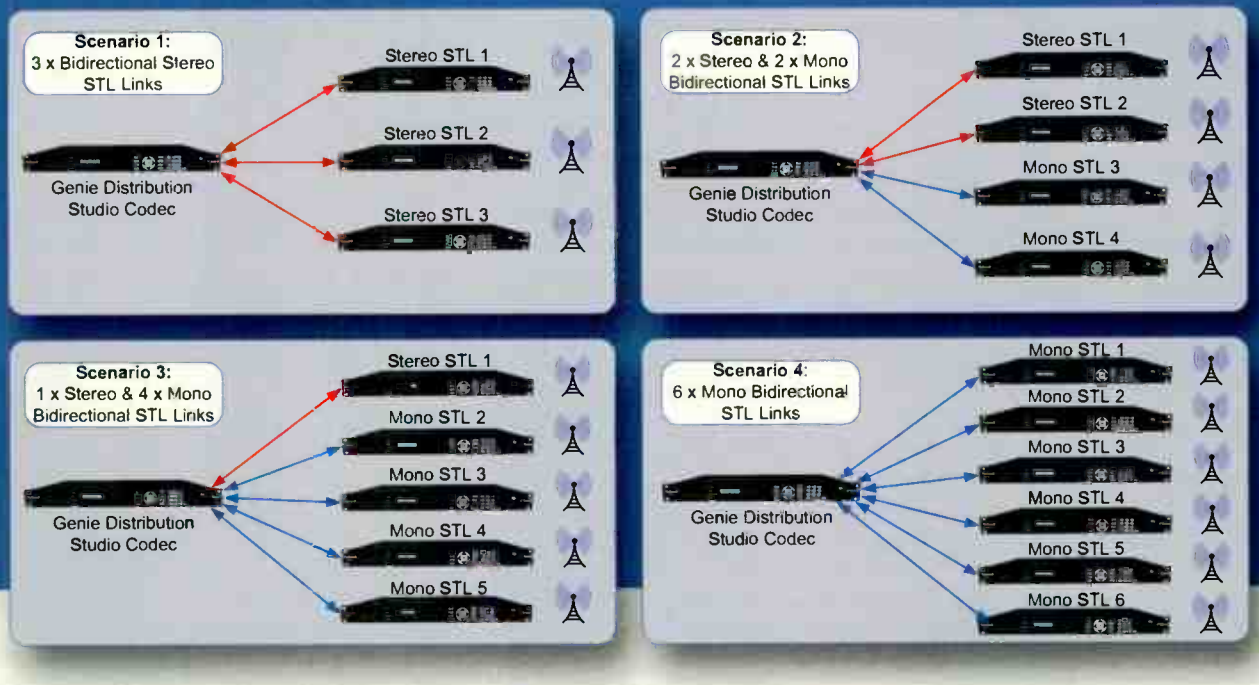

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SIDEBYSIDE

Portable Recorders

by Chriss Scherer, editor

Since digital portable recorders have been introduced, there's been an explosion in the number of product offerings. The most basic devices offer multiple file formats and quality settings. The most common design has some type of stereo mic. Once the basics are covered, look at the various features. Battery life is an important concern so you're not constantly swapping cells as you work. One recorder offers dual power options to ensure long recording times.

Internal and removable storage, or a combo of both, depends on the usage. If the user won't be able to offload recordings regularly, removable is an advantage. The attached mics are certainly convenient, but they vary greatly in quality and sound. In some cases, a little equalization can be applied to improve the sound.

Other common options include on-board editing and effects and music tools such as a tuner or metronome. Again, depending on the user, these may be valuable tools. What really matters is how the unit operates in the hand of the user. Some users can dive deep into menus, while others need a few basic settings to be made for them. Every recorder we looked at provides a USB connection to transfer audio files.

Some recorders have special designs that work well for specific applications such as interviews or multi-track recordings. And if you plan to use an external mic with the recorder, look at the connector options. While a 3.5mm connector is reliable, an XLR offers a much more stable option.

ATS Nagra Mezzo

This handheld recorder brings the Nagra quality to a compact and affordable package. It has 8GB of internal flash memory, built-in cardioid microphones for X-Y recording, an external microphone connection and line in and out connections. Recording quality is possible up to 24-bit, 96kHz in linear PCM or MP3 formats. An automatic gain control, voice-operated record function and low-cut filter assist in capturing the best recording. On-board editing allows for field editing. A built-in speaker and tripod thread mount round out the device.

nagraaudio.com

Olympus LS-12, LS-14

The Olympus LS-12 and LS-14 capture audio with on-board directional stereo microphones. The 1.75" LCD menu screen provides intuitive and easy-to-follow settings, recording is made easier by the Mode Select Dial and Smart Mode features. The Mode Select Dial, located on the bottom right-hand corner of both recorders, can be set to the following modes: Tuner, Manual, Quick and Smart. Smart mode sets the recoding levels for less-experienced users. Both operate on two AA batteries. The LS-12 has 2GB internal memory, the LS-14 has 4GB internal memory. Both accept an SDHC memory card. Both include external mic and line inputs and a headphone jack, and will record up to 24-bit/96kHz signals.

olympusamerica.com

Yamaha Pocketrak PR7

The Pocketrak PR7 provides high-quality recordings whenever and wherever you need. Equipped with a newly developed crossed XY stereo microphone, the PR7 captures high-resolution stereo recordings, achieving consistent quality and natural sound. Additional tools for music recording include an onboard tuner and metronome, while overdubbing and marker editing, which are easily accessed via a simple, intuitive interface, can be used for field recording. It also features five optimized presets tailored to a variety of applications.

yamaha.com/proaudio

Yellowtec iXM

With a simple two-button, three-LED control panel, operation of this recorder is simple. The buttons are silent and waterproof as well. Levels are automatically set with Yellowtec's LEA engine. Twist-off twist-on (TOTO) exchangeable mic heads offer a variety of pickup options. The adjustable pre-roll recording buffer captures audio even before the record button is pushed. Power is supplied by a dual source: a built-in, rechargeable lithium-ion battery and three standard AA cells. It also sports a built-in headphone jack, line-in jack and USB 2.0 port to download recordings and charge the internal battery. It records to SD/SDHC memory cards.

yellowtec.com

Zoom H6

The H6 offers six tracks of simultaneous recording and employs a system of interchangeable input capsules. Four capsules are available: stereo X/Y and MS (mid-side), both included with the H6, and shotgun and combo dual XLR/TRS capsules, available as options. It records directly to SD, SDHC and SDXC cards up to 128GB in a variety of MP3 and BWF-compliant WAV file formats. Four XLR/TRS combo jacks enable the connection of external microphones or line-level devices. Each input has its own dedicated gain control and pad switch, as well as phantom power in three different voltages.

zoom-na.com

World Radio History

Compact Radio Console...

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ARC-8

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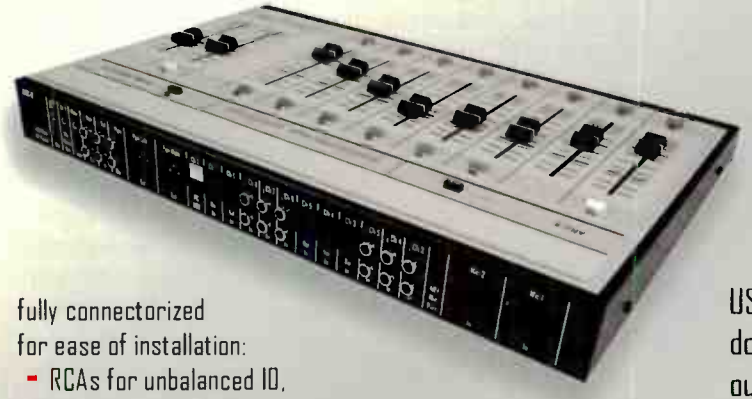
- Cat5 cabling for today's infrastructure
- Analog & digital with USB sound card built in
- Ideal for professional Radio broadcast applications

conductive plastic faders and long life switches for reliability. Socketed ICs for fast on site repair.

the next generation of Analog-digital Radio console

speed ... power... and control



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for ease of installation:
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- Cat5s for balanced inputs,
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- Stereo Program output
- 2 mic, 4 stereo line, PC, & Phone in
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The BEST of both analog and digital, the ARC-8 features a built in USB sound card to play and record in digital directly from both Windows & Apple *PCs. With BOTH balanced and unbalanced inputs and outputs, the ARC-8 works out of the box in any Radio application.

list price **$795**

*USB sound card supports USB HID compatible PCs

www.arrakis-systems.com

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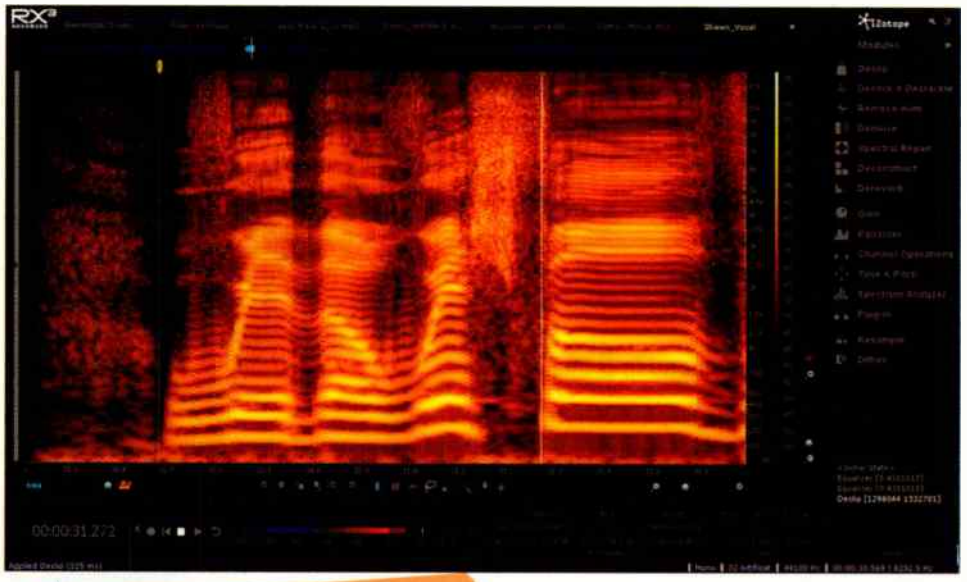
World Radio History

iZotope RX 3 Advanced

by Chris Wygal, CBRE



Each summer growing up I worked with my dad on every type of construction job, where I learned an invaluable lesson: A man is only as good as his tools. This is also true in audio production. With the advent of pocket-sized broadcast-quality recording devices, radio staff can go anywhere and gather actualities and natural sound. This, however, lends itself to capturing noises of all sorts. Additionally, the archived analog recordings of yesteryear sometimes make their way back onto the air. These old reels and cassettes, or vinyl discs by today's standards usually need some cleaning up. With all of that in mind, what tool do you pull out of your box to prepare your audio for broadcast? RX 3 Advanced from iZotope is a great gadget to have on the job.

TOP 5 FEATURES

- Standalone or plug-in use
- Spectral editing for frequency-specific troubleshooting
- Learn feature for adaptive correction
- Default presets for everyday problems
- Resampling and dithering for final mastering

THE OVERVIEW

The RX 3 Advanced can be used as a standalone application or a VST3 plugin for most DAWs and audio editing platforms. The primary goal of RX 3 is to restore audio and eliminate problems. Several preloaded modules tackle popular audio problems. Namely, RX 3 will declip, declick, decrackle, denoise, deconstruct, dereverb, remove hum, equalize, attenuate and amplify, change phase, change pitch, resample and dither. It also provides a high-resolution spectrum analyzer and virtual space to use extra plugins. Most impressive is the spectral view and repair features that allow the user to find noises and other anomalies on a frequency-specific basis. Spectral editing offers a more defined sonic "picture" of the audio file and a better opportunity to find and diagnose problems.

RX 3 Advanced boasts extremely accurate and precise algorithms. Most of the default presets are spot-on solutions to everyday noise problems. However, it gives the user very wide parameters for experimenting and testing. But, improper use of those parameters can cause unwanted results. Machinery cannot replace the discernment of the human ear. So use it with deft precision and apply just enough correction, but no more!

IZOTOPE
617-577-7799
izotope.com
support@izotope.com

WHAT'S COOL

Sometimes radio talent sound as if they have plastic wrap in their mouths. The Declick & Decrackle module is designed to clean the effects of scratches on grooves during vinyl disc restoration and vinyl recordings, but it also works for de-drymouthing a voiceover.

RX 3 Advanced also sports the Remove Hum module. Each module has a "learn" function that examines the fingerprint of the problem noises and attempts to covertly eliminate them. The hum remover allows the selection of up to eight harmonics, which means for example, that 60Hz and its associated colorations will be attenuated. Default setting work wonders, but several adjustments can be made to fine-tune the hum removal.

The most comprehensive RX 3 Advanced noise reduction tool is found in the Denoise module. Denoise allows for manual control or adaptive learning of the noise characteristics and attempts to suppress hums, hisses or buzzes to an acceptable level. As with any type of noise reduction, there is a fine line between reducing noise and introducing digital artifacts. Denoise gives plenty of manual control for the user to fine-tune. A color-coded real-time graph represents input levels, noise suppression and output levels for accurate frequency monitoring.

RX 3 Advanced is comprised of other modules that include Declip, which repairs clipped waveforms that were victims of analog overmodulation and sloppy analog to digital conversion. Deconstruct is one of the more interesting modules in that it can locate noisy components and tonal components of an audio file. Then by amplifying those components, the user can choose to purposefully destroy the audio file. This is a great effect for making a recording sound older. Dereverb reduces the sound of reverb and ambience in reverberant material recorded in a poor acoustic environment. This reverb profile can be augmented on a four-band processor and the tail length of the reverb can be reduced.

RX 3 comes loaded with modules for gain control, normalization and parametric equalization. The Channel Operations module is great for correcting stereo imaging, phase and other problems that crop up where stereo audio is involved. Time delay on a per channel basis, channel mixer and a center channel extractor are also available. The Time and Pitch module is where file length is adjusted or pitch correction is applied to musical selections. Musicians, especially singers, will appreciate the presets that correct flat and sharp pitches and help with tuning.

World Radio History

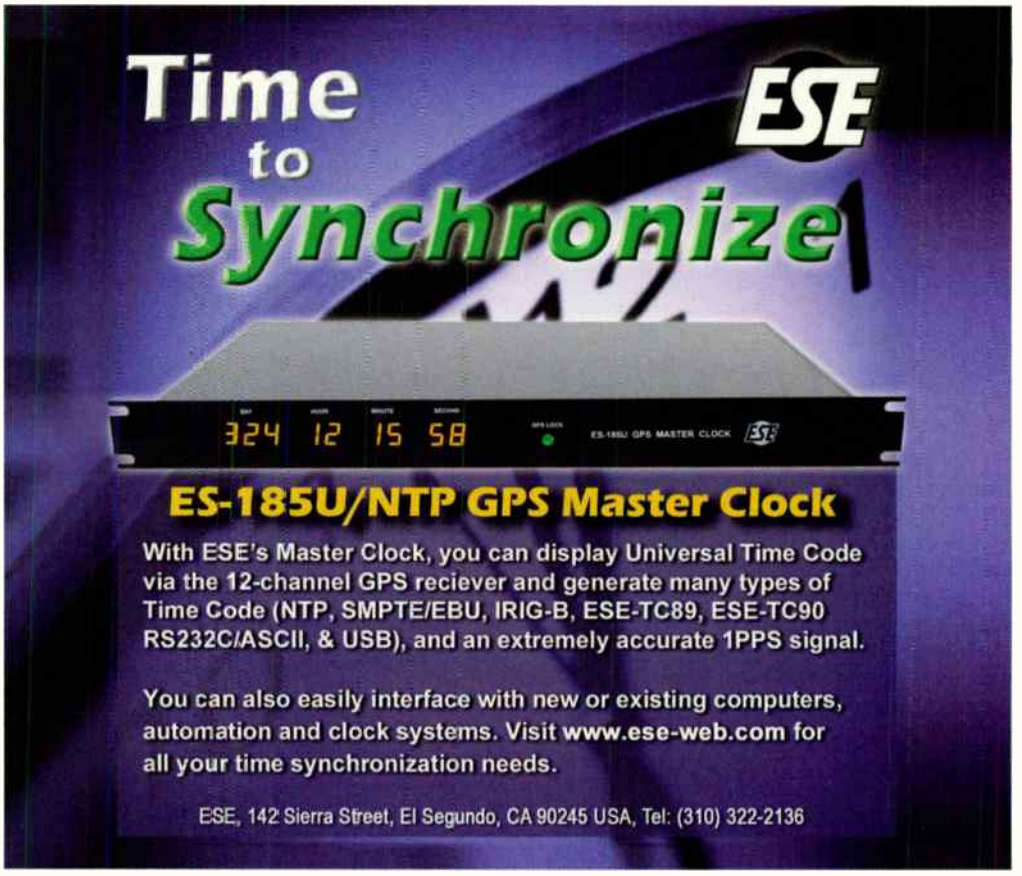
The Spectrum Analyzer module is a tried and true graphic representation of real-time frequency amplitude. For locating problem frequencies or getting a good look at equalization, the spectrum analyzer is a must. For even more fine-tuning, users can also add AU and VST plugins to RX 3 Advanced. This feature lets the user analyze and diagnose the effects of his or her favorite plugins. The Resample module displays the audio frequency bandwidth available per sampling rate. If the user chooses to resample the audio file at 44.1kHz, the graph shows the sample rate converter response curve as well as aliasing or artifacting involved. Finally, the Dither module allows for bit rate adjustment and noise shaping that effectively reduces artifacts resulting from copies of copies of digital material.

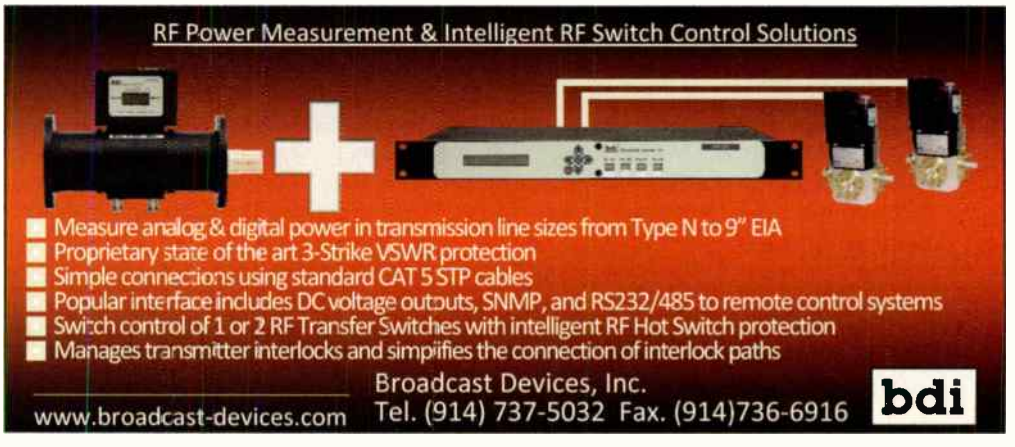
THE SPECTRAL DISPLAY

Day-to-day audio editing is primarily represented by the familiar waveform. Waveforms indicate amplitude over time, but are not able to give a frequency-specific analysis of audio files. The spectral view is a snazzy representation of the audio material that shows frequency response and amplitude over time. The brighter the color, the louder it is. The higher it is stacked in the graph, the higher the frequency. RX 3 Advanced includes tools such as paintbrushes, lassos and time and frequency selection marquees to select and remove anomalies from the audio material. As an example, a 60Hz hum and its harmonics appear as straight bars along the bottom of the display. A bird chirping during a bassoon solo would clearly appear in the upper register of the display and could be easily isolated and erased from the audio clip without destroying the frequency response of the bassoon. During a voiceover, a dropped pencil or slammed door can be isolated and removed. "Spectral Repair" is a tool that allows the user to pick a section of audio material, remove it and then intuitively replace it. This transparently allows a noise or instant of noise to be unnoticeably removed. Spectral editing is clearly a perfect tool for critical audio editing and is a crowning feature of RX 3 Advanced.

In a world where digital signal chains and improved audio systems leave little room for marginal audio quality, extra work is a must. Good producers and engineers use every means possible to provide excellent quality to their audience. Keeping RX 3 Advanced handy in the audio editing environment will ensure top-quality audio production every time.

Wygal is the programmer and engineer for Victory FM at Liberty University, Lynchburg, VA.





World Radio History

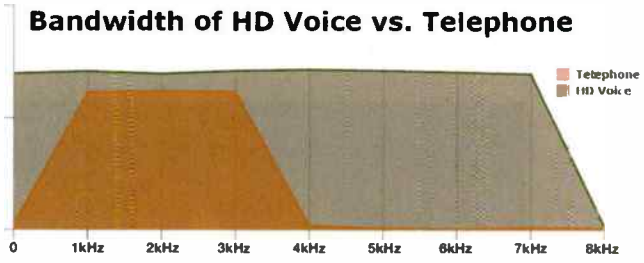
HD Voice Turbo-charges Call-in Programming

by Tom Hartnett, Comrex

It seems we live in an HD world — the prefix having been already applied to radio and TV. In most circumstances it's used to promote a better user experience, including a significant bump in quality. Why is it we're not demanding the same for on-air phone calls? Phones have sounded the same way for over 100 years. Our expectations of quality in audio and video have risen, yet phone calls still sound thin and fatiguing, especially when put on the radio. What other technologies have taken so long to evolve?

Telephones remain low-fidelity because of choices made by telco network engineers decades ago. Figure 1 shows the approximate audio bandwidth from an 8kHz sampled voice call. When listening to a call on a tiny handset, an increase in audio bandwidth doesn't sound very dramatic. This is why efforts at HD Voice — the term used for the process of delivering wideband phone calls — have lagged. But when these calls are broadcast on the radio, the lack of bandwidth becomes obvious and grating. And we finally have a tool to fix that.

Figure 1



The tool is the now-ubiquitous smartphone. Since telephony has made the progression to voice-over-IP, it's finally possible to leave the old-fashioned techniques of transmitting digital voice behind and move into the 21st century. As shown in Figure 2, once you move to an architecture where your entire phone call exists in the IP domain, it's no longer necessary to stick with traditional narrowband voice codecs (the algorithms used to digitize and compress the voice audio). As long as the hardware on each end supports it, an HD Voice codec can be negotiated and used. And with more studios moving to VoIP for their call-in lines (either by choice or necessity) it's much more likely to get these end-end VoIP calls happening.

To qualify as HD Voice, the codec used must sample the voice at a minimum of 16kHz, at least doubling the audio bandwidth available. In addition to adding in high frequencies, HD Voice restores the low end (below 300Hz) that gets filtered by most phone networks. The result is a crisper, more intelligible conversation with a lot more "punch" and presence, and one that is much more listenable to a radio audience.

In the VoIP world, a range of HD Voice codecs has emerged that delivers good quality at low network bit rates. Algorithms like SILK (used by Skype), G.722.1, and iSAC compete in this space. But the industry has adopted a lowest common denominator of G.722, the old familiar friend of radio from ISDN days. Its strengths are ease of implementation, low delay, and lack of current patent claims.

The mobile phone industry also supports HD Voice today, but the tech has moved in a different direction. Many modern smartphones have the capability of negotiating HD Voice within the phone's main voice channel, replacing the thin sounding mobile algorithms of the past. This is very good because the codec can be engineered to degrade gracefully under adverse signal conditions, much like narrowband codecs do (rather than the dropouts you might experience on data channels). But there are significant limitations.

The first is codecs. The mobile phone industry has chosen AMR-WB (also known as G.722.2) as their primary HD codec, an algorithm completely unsupported in most VoIP systems. This incompatibility hardly matters, though, because the mobile phone networks don't provide any way to bridge

COMREX
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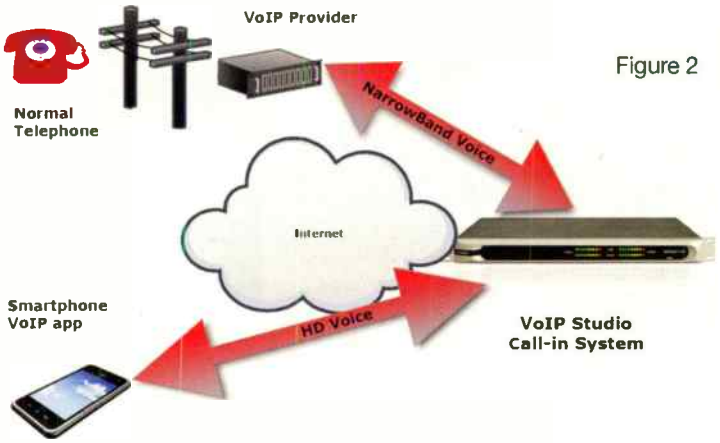


Figure 2

these calls over to wired data networks. This means HD Voice is only available to calls entirely within the provider's voice network, and all calls that leave the network (either to the PSTN or to competing wireless providers) are reduced to narrowband. So carrier-grade HD Voice has very limited application to radio broadcasting for now.

But with the advent of 3G and 4G service to smartphones, a more compatible version of HD Voice can be provided. The mobile industry refers to this at "Over the Top" (OTT) voice, where a VoIP app will utilize the data channel to deliver calls. These apps can be built to be completely compatible with wired VoIP systems, and thereby deliver HD Voice to studio-based call-in systems. Most of these apps are based on the common SIP protocol, so they are universally compatible. The list also includes the popular Skype app. When used for voice calls, Skype provides an HD experience when connected to another Skype user.

As mentioned, so far HD Voice has not generated excitement from general telephone users. But radio is uniquely suited not only to leverage the benefits of HD Voice (with higher quality programming), but to promote the adoption of the tech on-air. Shows with call-ins can start by equipping scheduled guests (pundits, politicians, athletes) with HD Voice apps to do their calls to the studio. Eventually, stations can enlist listeners to use the apps by offering preferred access to callers who use them. And it all moves toward a worthy goal, which is the eventual banishment of telephone audio from the radio dial.

Of course, proper equipment is required on the studio side to make this happen. An easy way to integrate HD Voice into a studio is via Comrex STAC-VIP, a full-featured talkshow system that works exclusively on VoIP phone lines. STAC-VIP can handle multiple calls from a variety of users, including those on "old-fashioned" phones, HD Voice apps, and Skype. All the different types of callers can be processed and conferenced together like normal phone calls. The Web-based call management system is delivered to a browser from the system's internal Web server, and gives a visual indication of which incoming calls are HD before they are answered.

While STAC-VIP can accept HD Voice calls from most VoIP softphone apps (and VoIP hardphones for that matter), there's a companion app designed especially for simplicity called VIP-QC (Quick Connect). Available on both iTunes and Google Play, the key to the app is simplicity. Setup and station choice is streamlined so the app can be given to anybody. Once configured, one button push connects to the STAC-VIP in HD voice mode.

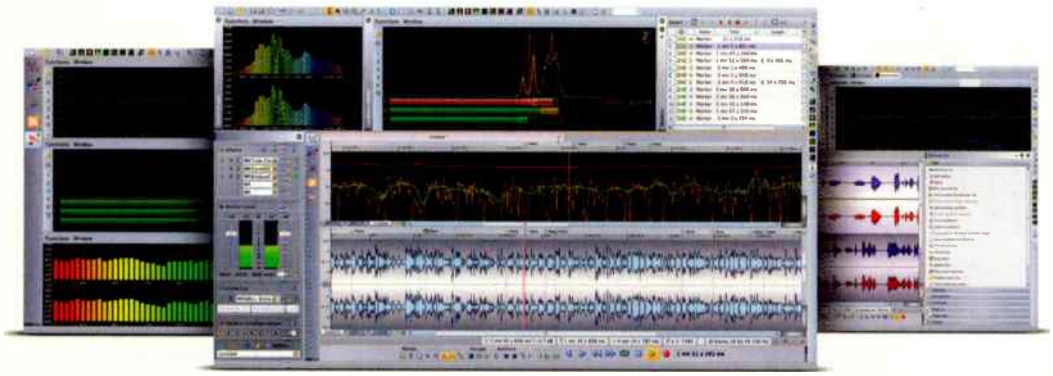
Radio continues to use the call-in show as the easiest way to connect with listeners and create compelling, locally-oriented programming. It's time to change that programming into something that's actually pleasant to listen to, and avoid listeners changing stations due to annoyance with telephone audio quality. Good stations already create great call-in content. HD Voice now gives radio the tools to make those shows sound good from a technical standpoint as well.

An audio demo comparing telephone audio to HD Voice is available at comrex.com/products/stacvip.html

Hartnett is technical director, Comrex, Devens, MA.

World Radio History

NEWPRODUCTS



DAW/audio editor | Steinberg

WaveLab 8: WaveLab 8 features a new speaker management system, loudness metering and processing, single-window plug-in management, a master control panel, iZotope's MBIT+ master dither, Voxengo's CurveEQ, brickwall limiter and tube compressor, SuperClips, metadata support and more than 150 improvements to its user interface and comprehensive tool set. Observing EBU R-128 compliance, WaveLab includes loudness metering for momentary, short-term and integrated values, true peak support and enhanced loudness and batch processing tools. With the MBIT+ master dither, WaveLab features a sophisticated set of word-length reduction algorithms for dithering and noise shaping. The second plug-in highlight is the linear-phase spline equalizer, CurveEQ, which matches and transfers a spectrum's shape from one recording to another. Workflow improvements see a polished user interface for easy operation, a new master transport panel to expedite navigating through the project, single-window plug-in management that allows users to sort plug-ins by manufacturer, category or preference. Audio Montage offers a new Master Plug-in Section for local storing of plug-in chains alongside SuperClip capability to combine multiple clips.
steinberg.net

Advanced Measurement Interface | WorldCast Systems

Ecreso AMI: The Advanced Measurement Interface available on Ecreso transmitters enables users to consult a real-time dashboard that provides an at-a-glance overview of the transmitter performance. Onboard instrumentation enables detailed analysis of the RF spectrum, MPX spectrum, audio spectrum and peak meters, displayed simultaneously in a clear and easily accessible viewing panel. With no need to connect an external unit to perform diagnostic measurements, the new AMI makes it quick and easy to identify any issues and obtain a detailed understanding of the transmitter signal.
ecreso.com

UHF single channel wireless system | Relacart

HR-30S: The HR-30S UHF single channel true diversity wireless systems features 640 selectable UHF frequencies and true diversity reception for interference-resistant operation. The on-board Ethernet interface monitors and controls system parameters with RWW 1.0 control interface software. The transmitters offer durable, magnesium bodies and soft-touch controls. Press the AFS (Auto Frequency Selection) button 3S and the receiver will auto-scan and lock on to an open, interference-free frequency. Press the IR button to automatically upload the receiver frequency to the transmitter. PLL (Phase Lock Loop) frequency control ensures transmission reliability, and Noise Lock effectively blocks stray RF. The receiver has a high-visibility LCD display and is housed in a half-width 1RU enclosure.
relacart.com

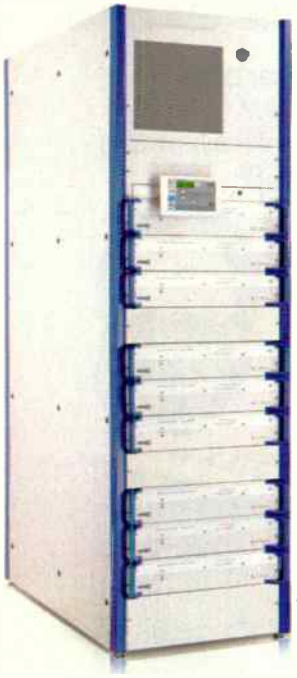
Connector for TRRS devices and smartphones | Rode

Micon: The MiCon-11 adaptor cable provides connection between the Rode HS1 headset, PinMic and Lavalier microphones, and TRRS devices such as the Apple iPhone, iPad and iPod Touch as well as a large number of Android phones and tablets. This now means that users of these microphones are able to take advantage of the Rode Rec app on Apple iOS devices. The 1.2m/4' cable adaptor also includes a MiCon male-to-male interface to allow it to be used as an extension for other MiCon cables from Rode.
rodemic.com

Studio monitors | Mackie

MRmk3: MRmk3 monitors are acoustically optimized at all stages to enhance the mixing, monitoring and multimedia experience in any studio. The MRmk3 line not only fully replaces the previous generation of monitors with the MR5mk3 and MR8mk3, but expands the range with the 6.5" MR6mk3 full-range monitor and MR10Smk3 studio subwoofer. A newly designed minimum-diffraction waveguide provides a seamless transition from highs to lows, and also creates a wider sweet spot and an open feel. The power amplifiers and transducers are also custom-matched for increased performance. All MRmk3 cabinets are rear-ported, providing added punch and bass extension and packed with acoustic absorption material for tight sound. A range of I/O options deliver the connection types needed for easy studio integration. There are even customizable acoustic controls to get the exact sound needed for the space. The low frequencies can be boosted by up to 4dB and the highs can be both cut and boosted depending on the user's needs.
mackie.com

World Radio History



High-power FM translator | Rohde & Schwarz

THR9: The liquid-cooled R&S THR9 high-power FM transmitter provides output power ranging from 5kW to 40kW. It is digital-ready, making it well equipped to meet future demands because it supports both FM and digital standards in VHF band II such as HD Radio. Network operators will benefit from the MultiTX concept, integrating multiple transmitters into a single rack. The THR9 concept makes it possible to accommodate as many as four 10kW transmitters in a single rack. The FM transmitter is highly efficient: Two RF power components – the power combiner and the RF rigid line – have minimum attenuation. This enables efficiency values of up to 75 percent in analog FM mode and cuts energy costs by as much as 50 percent.

rohde-schwarz.com

Speaker isolation | Auralex Acoustics

ProPAD XL: The ProPAD XL speaker isolation product is a larger version of the ProPAD. XL is designed to work with horizontally oriented, twin woofer monitors, and a solution for decoupling monitors and reducing structural vibration from larger format monitor speakers. Features include: increased midrange resolution deeper, more focused soundstage improved low-frequency definition angle adjustable to optimize listening axis and significant reduction of extraneous mechanical resonance.

auralex.com

Control surface for WheatNet-IP | Wheatstone

L-8: Wheatstone's L-8 control surface for WheatNet-IP is a cousin to the LX-24 on-air control surface, but scaled for news production, voiceover booths or other similar studio applications. The L-8 a precision-built, low-profile, tabletop IP control surface that offers assignable sources to any fader and with hot-swappable individual fader modules. And, the L-8 is networkable to Wheatstone's WheatNet-IP Intelligent Network, an AoIP system with logic routing and Gigabit distributed networking for true interoperability across the studio network.

wheatstone.com

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NEWPRODUCTS

Low-power transmitter | Harris

Flexiva Updates: Four new low-power Flexiva transmitter models include 50, 150, 300 and 500W, extending its range to accommodate analog and digital transmission network requirements. This is ideal for international broadcasters deploying multiple low-power FM transmitters across a region or country. The low-power models join a growing range that alsoincludes several medium- and high-power options that span to from 1 to 40kW.

harrisbroadcast.com

Digital audio workstation | Acon Digital

Acoustica 6: Among the new features in version six are multitrack editing, upgraded audio restoration tools and a phase linear equalizer. Acoustica 6 is available in three editions: the free Basic Edition, the Standard Edition and the Premium Edition. Premium Edition 6 offers a large range of high quality filters and effects, multitrack editing and support for multichannel audio such as 5.1 and 7.1 surround. The new phase linear equalizer is equipped with six bands and six filter types. Multitrack editing is also included in Acoustica Standard Edition 6. The free Acoustica Basic Edition 6 provides a basic foundation for audio editing and now supports new audio formats such as WAV64, MP4 and AAC.

acondigital.com

FIND THE MIC WINNER
OCTOBER ISSUE

Chris Barber
WIUP-FM
Indiana University of Pennsylvania
Indiana, PA

He won a pair of HDC-800 headphones from Hosa Technology.

hosatech.com

The mic icon was on the side of the headphones on the counter.

The winner is drawn from the correct entries for the issue two months prior. No purchase necessary. For complete rules, go to RadioMagOnline.com.

GALLERY

World Radio History

CircuitWerkes Web Power!

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Sicon-8 - Web & Dial-up Remote Control

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5 KW	2006	Harris Z5, solid-state, unused
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10 KW	1991	Harris HT10
10 KW	1993	Harris PT10CD
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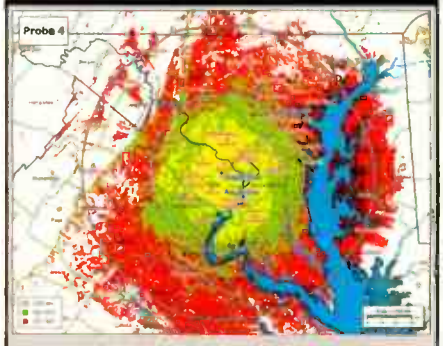

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Do You Remember?

Gifts of Holidays Past

by Chriss Scherer

We're surrounded by technology today, and the holiday wish lists are packed with tablets, games, media devices, phones and many other items that bring various media into everyone's lives. While the devices of 2013 are highly advanced, the idea of tech for the holidays is hardly a new idea.

We looked into some archives and found two magazine ads that show how radio technology had held the top tech spot for many years. The 1953 ad (above) touted the various colors available in four different models. A radio wasn't just an appliance then, it was a home accessory. And they all boasted contemporary and sleek styling. Set the alarm to wake up to news or music — from an AM station. There are no FM tuners on these models.

By 1965 (at left), the general styling changed a little, although you can see two models that are very similar to the 1953 offerings. The big change was the addition of FM to the receiver. Even the tiny portable had both bands.

I can imagine hearing Christmas carols playing from the dual speakers of the modern-styled radio now.

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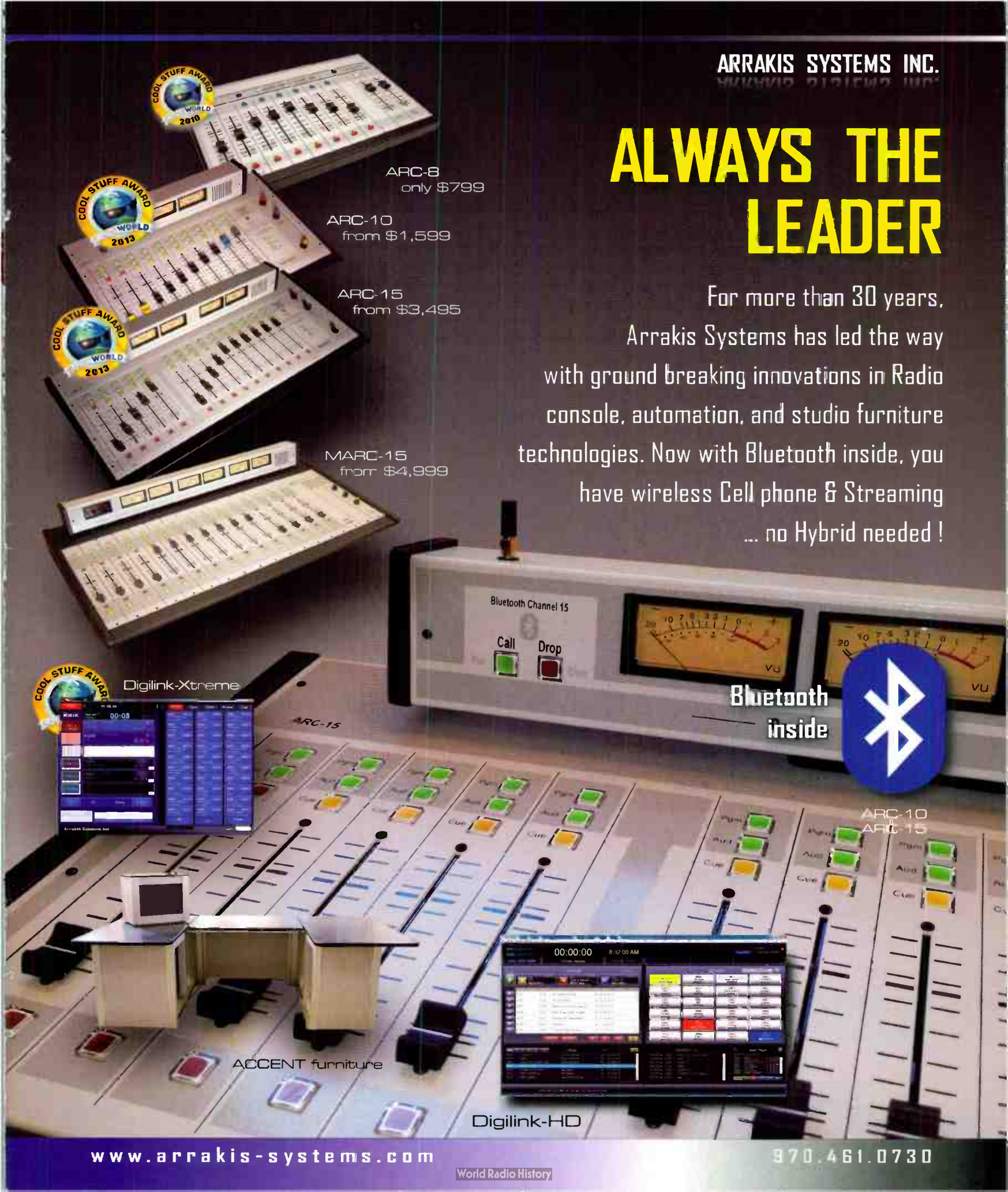

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