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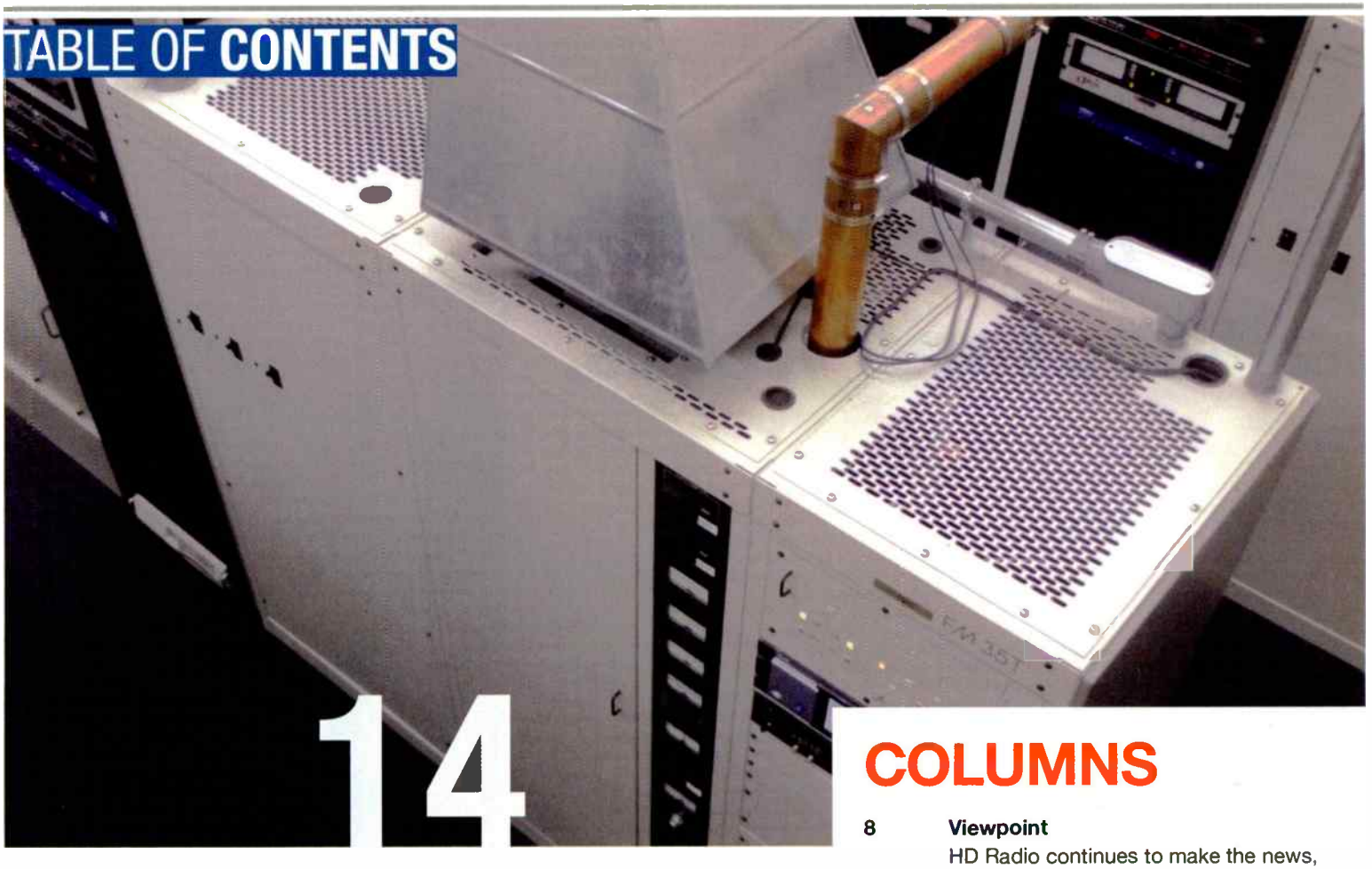

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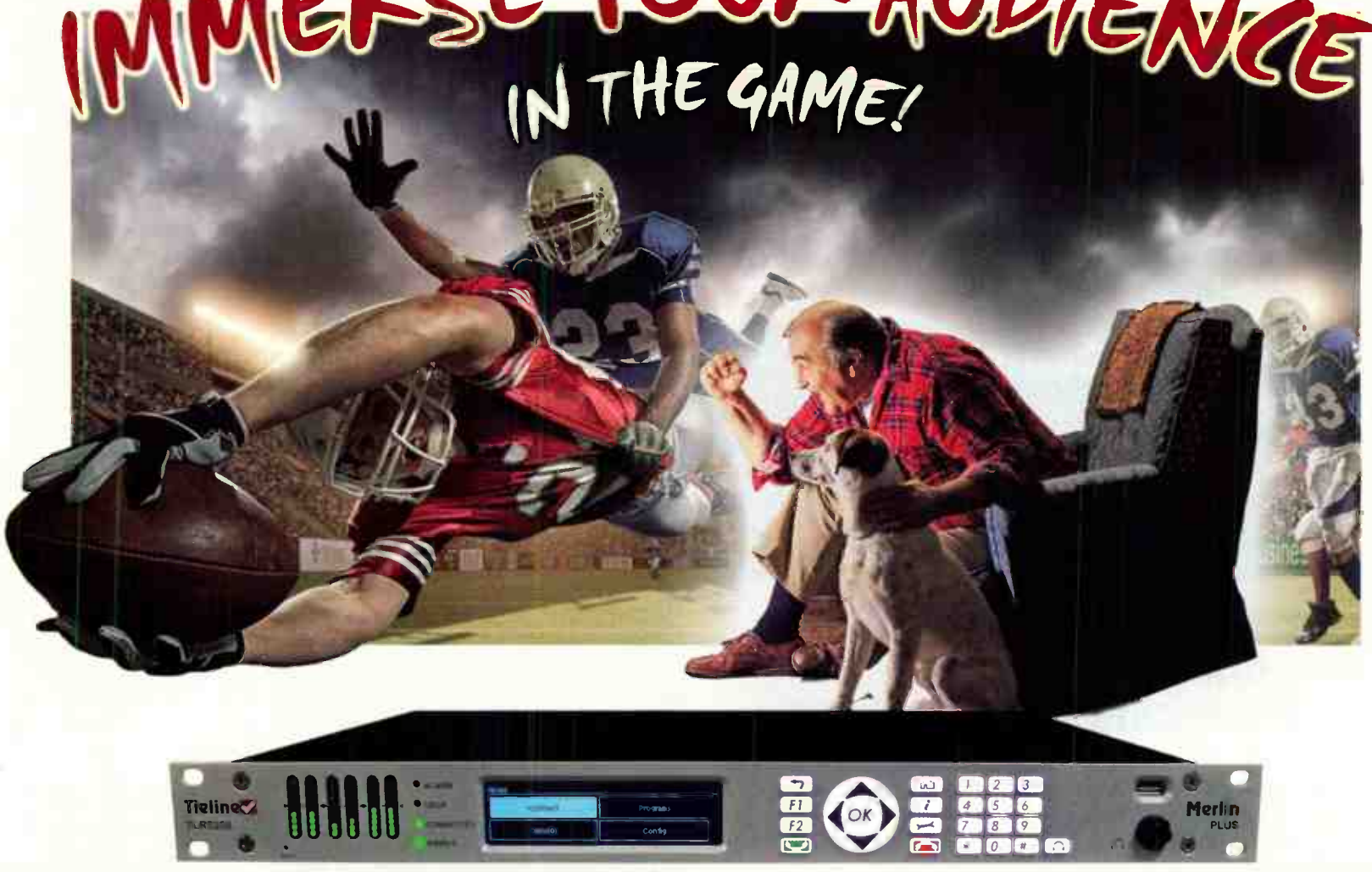

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Smith, Farber Deliver Remarks at 2013 Radio Show

The 2013 Radio Show featured a session with NAB President and CEO Gordon Smith and RAB President and CEO Erica Farber delivering their views and insight for the convention and radio. The two talked about advertising trends, NextRadio, HD Radio, the Streaming Initiative Committee, long-term goals and vision, royalty proceedings, investments, radio receivers in mobile devices, and performance tax legislation. Read their full remarks at RadioMagOnline.com.

Nielsen Completes Acquisition of Arbitron

Nielsen Holdings has completed its acquisition of Arbitron. The latter is being rebranded Nielsen Audio and will be integrated into Nielsen's U.S. Watch business segment, which provides information and insights primarily to the media and advertising industries across television, online, mobile and radio.

Beasley Broadcast Group Announces 2013 Annual Operating Award Winners

Beasley Broadcast Group bestowed its Company Operating Awards during its annual management meetings held in Naples, FL. Beasley Broadcast, with corporate offices in Naples since 1988, gathered corporate management and station leadership from the 11 markets in which it operates to celebrate achievements and contributions from individual employees and radio stations over the preceding twelve months. The 2013 honorees include:

> WXTU-FM - Radio Station of the Year, Philadelphia, PA
> Tom Humm - General Manager of the Year, Las Vegas, NV
> Charlie McCoy - Engineer of the Year, Augusta, GA
> Robin Wood - Business Manager of the Year, Fayetteville, NC
> Matt Smith - Sales Manager of the Year, WXTU-FM and WRDW-FM, Philadelphia, PA
> Shelly Easton - Program Director of the Year, WXTU-FM Philadelphia, PA
> Sam Floyd - CEO Award of Excellence, Executive Vice President

2013 NAB Marconi Radio Award Winners

Winners of the 2013 National Association of Broadcasters Marconi Radio Awards were announced night at the annual NAB Marconi Radio Awards Dinner and Show held at the Radio Show in Orlando, FL.

Established in 1989 and named after inventor and Nobel Prize winner Guglielmo Marconi, the NAB Marconi Radio Awards are given to radio stations and outstanding on-air personalities to recognize excellence in radio. The 2013 NAB Marconi Radio Award recipients are:

> Legendary Station: WBBM-AM Chicago, IL
> Network/Syndicated Personality of the Year: Steve Harvey, Premiere Radio Networks
> Major Market Station of the Year: WBEB-FM Philadelphia, PA
> Large Market Station of the Year: KSTP-FM St. Paul, MN
> Medium Market Station of the Year: KRMG-FM Tulsa, OK
> Small Market Station of the Year: WKDZ-FM Cadiz, KY

For the entire list of winners, visit RadioMagOnline.com.

Tech Tours Announced for 135th AES Convention

The 135th Audio Engineering Society Convention, which will be held Oct. 17 - 20, 2013, at the Javits Center in New York City, will include a four-day set of technical tours, itineraries that will take visitors into a wide range of interesting and significant facilities. The tour program was developed by recording and mix engineer David Merrill. Tickets for the tours will be available onsite at the Javits Center at the convention's Tech Tours desk. Tour space is limited. Find the complete tour slate at RadioMagOnline.com.

HD Radio

iBiquity says HD Radio is growing. According to the latest Spring 2013 Arbitron Radio Nationwide audience estimates, more than 4 million people listen to an HD Radio multicast in an average week.

MORE CURRENTS

The Audio Engineering Society has published AES67-2013, a standard for networked/streamed audio-over-IP interoperability. While in development, this standard was referred to as AES-X192.

Audinate and AEQ have signed a licensing agreement. Audinate's Dante technology is a plug-and-play audio networking system.

Bird Technologies has acquired DeltaNode, who supplies RF-over-fiber distributed antenna systems and repeaters designed for commercial wireless and public safety communication systems.

Barix has hired Ronni Guggenheim as CEO. Guggenheim recently held leadership roles at Minicom Digital Signage and ComQi.

GeoBroadcast Solutions has named Jampro Antennas as a technology partner on GBS MaxxCasting and ZoneCasting.

FIND THE MIC AND WIN!

Tell us where you think the mic icon is placed on this issue's cover and you could win Hosa HDC-800 headphones. Send your entry to radio@RadioMagOnline.com by Nov. 10. 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

Tell Me About HD Radio

Just prior to the opening of the 2013 Radio Show in Orlando, iBiquity announced that it had redesigned and relaunched the HDRadio.com website and released an HD Radio app. Redesigning a website? That happens all the time, but it was still worth a look. And I looked into the new app as well.

What I found was a fresher view of HD Radio. HDRadio.com was always full of consumer information about the technology, but now that information is shown in a sleeker format that brought visions of other tech sites to mind. I haven't explored every corner of the site, but what I have seen should appeal to consumer interest quite well.

And the app? Everyone has an app, but it's another positive stroke for HD Radio. Every effort to increase consumer awareness can only benefit the ongoing rollout.

Meanwhile, the news from iBiquity continues to roll in noting that more and more auto manufacturers are including HD Radio in the factory radio offerings. It had been a premium offering for many years, but we're now seeing HD Radio becoming almost standard on factory radios.

Again, another positive stroke for HD Radio.

So at the same time all this news was released, I received a 16-page brochure from online electronics dealer Crutchfield. I opened the mailer to see what was inside. It was a targeted piece that touted some specific consumer technologies, including OLED TVs, TV soundbars, home theater speakers, and personal listening devices from ear buds to bookshelf speakers. But there were two sections that caught my eye because they featured car audio. One showed two in-dash navigation systems for radios. The other touted voice control for a car radio. I read these pieces in detail.

What did I find? Neither mentioned HD Radio. The voice control section touted the iPhone integration with the radio so Siri could launch Pandora.

This was only one mailer, so the lack of HD Radio isn't a huge red flag, but it made me wonder how HD Radio was doing in the stores. It's been several years since I visited an electronics store to see how HD Radio is being shown to the masses.

My first stop was in a local auto sound dealer. I started by simply asking the salesman what he knew about HD Radio. Yes, I primed the conversation from the start, but I didn't want to spend hours trying to get him to tell me about it when I wasn't there to actually buy anything. The local store person knew a great deal about it. He said his wife's car has an HD Radio receiver. He told me about the local stations. This was all good news.

I asked him if other customers ask about HD Radio. He said that very few do. When I asked what feature customers ask for, he said that USB connectivity and access to Pandora were the prime features. I asked if satellite radio was requested, and he said not like it had been several years ago.

I repeated this exercise at a Best Buy. I received many of the same answers. Best Buy had a sheet on the wall noting which stations transmitted an HD Radio signal, which was refreshing.

I asked both stores if awareness of HD Radio was up or down from a year or two ago. They both replied that they felt it was about the same. But when their customers find a radio they like and then learn it has HD Radio, it's like icing on the cake. So far, few if any consumers are asking for it.

So what does this mean for HD Radio? It seems the word is getting out, albeit slowly. One salesman thought that having HD Radio in the factory car radio is raising awareness. Word of mouth is helping promote the technology. But for all the positive efforts being made to advance HD Radio, it still struggles with consumer awareness and desire.

Chriss Scherer | Editor

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Frequency Coordination for Wireless Mics

by Kevin McNamara

Over the past few years, technology has embraced "cutting the cord." Virtually every type of device can communicate wirelessly, either using Wi-Fi or Bluetooth. While this technology is pretty impressive, consider that wireless microphones have been around since the 1940s. By 1959, people could purchase handheld or lavalier mics.

As technology improved, most high-end wireless microphones were allowed to operate on "unused" and "white space" (or within the guard band) portions of the 698MHz to 806MHz spectrum. The frequencies were primarily used by television stations licensed to channels 52 through 69, prior to the FCC DTV conversion mandate, which required stations licensed to cease operating on these channels after Dec. 31, 2011. The FCC also banned the sale and use of wireless microphones or similar devices (wireless intercoms, ear monitors, audio instrument links and cueing equipment) intended for use in the United States in the 700MHz band in January 2010 and June 12, 2010, respectively. This allowed the FCC to repurpose the spectrum and create new blocks, some of which were auctioned and purchased by wireless carriers to operate 4th generation services such as LTE. The remaining portion was allocated for interoperable digital public safety radio systems, including the upcoming implementation of public safety LTE systems.

Wireless microphones can legally operate on a number of other frequency bands including 902MHz - 928MHz, 944MHz - 952MHz (yes, where STLs commonly operate), 2.4GHz, or even using a spread-spectrum scheme called UWB that operates in the 3GHz - 10GHz range. The problem is that these bands are commonly shared with a multitude of other devices and are subject to interference or limited in range.

To permit a more desirable spectrum for devices displaced from the 700MHz space, the Federal Communications Commission adopted rules and procedures that would authorize unlicensed television band devices (TVBDs), of which wireless microphones are included, to make use of unoccupied parts of current television channels, or white spaces. The Commission's rules (47 C.F.R. § 15.701) currently permit unlicensed radio devices to transmit on white space in the spectrum bands used by the broadcast television service, i.e., 54-72MHz, 76-88MHz, 174-216MHz, 470-608MHz and 614-698MHz.

TVBDs would have to protect all television stations, and related operations, from any interference. To do so, TVBDs would have to regularly check TV band databases, and based on information contained there, not operate in a way that could affect television. The problem was that there was no official database available until recently.

The Spectrum Bridge site provides channel availability in a tabular report and several other formats.

In the implementation of a database that could manage TVBDs nationally, the FCC's rules require that TV white space database systems protect the following radio services and receive-only operations (authorized services):

> Broadcast television stations (including full power, TV translator, low power TV, and Class A stations);

> Fixed broadcast auxiliary service (BAS) links (regular licensed and temporary);

> Receive sites (and received channels) of TV translator, low-power and Class A TV stations, and multichannel video programming distributors (MVPDs);

> Public safety and private land mobile operations;

> Offshore radio telephone service operations;

> Radio astronomy service operations at specific sites.

> Low-power auxiliary service operations (licensed and certain approved unlicensed wireless microphone venue sites). Except for MVPD receive sites, sites where licensed.

According the FCC, the database must be designed "In order to protect TV broadcast and other licensed services operating in these bands, the rules require these TV white space devices to obtain a list of channels available for their operation (i.e., in general, channels not occupied by authorized radio services) at their individual locations from a database system authorized by the Commission and to operate only on those channels. The database systems protect authorized services by preventing TV

World Radio History

The Iconnectiv white space database provides a map-based method to determine channel availability.

white space devices from operating on channels in which they could cause interference to the authorized services and unlicensed wireless microphones used by eligible venues."

The FCC created a framework for the database and opened it to private sector companies who specialize in the administration of databases. The intent is to give users a variety of choice in which company to register. To initially test the system, on Sept. 19, 2012, the Office of Engineering Technology opened the registration of TVBDs operating in a limited area through certain private companies. Subsequently on Dec. 6, 2012, the OET and WTB approved two of the companies, Spectrum Bridge (spectrumbridge.com) and Iconnectiv (iconnectiv.com) to provide registration and coordination services nationwide. It is interesting to note that Iconnectiv was the once esteemed research and development arm of Bell Labs. Also known as Bellcore, it was responsible for many of the telecom standards still in use today. The company was recently purchased by Ericsson.

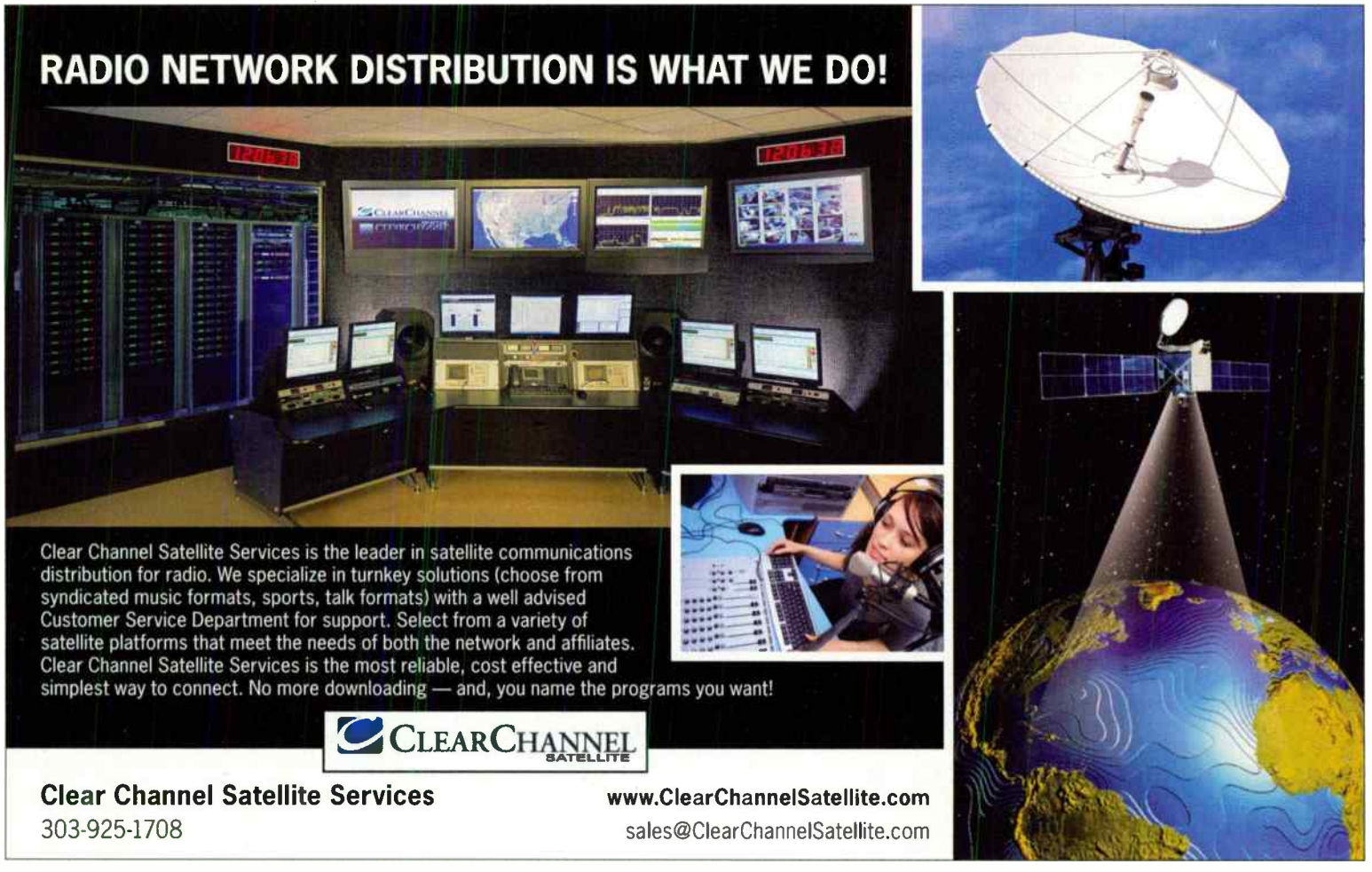
The Spectrum Bridge Web portal (whitespaces.spectrumbridge.com/whitespaces/Home.aspx) is straightforward. You can view available white space by entering one of the following location criteria or use an interactive map: Complete address (street, city, state; Zip Code) or latitude, longitude.

The Web portal can also be used to register certain protected devices and services entitled to protection authorized by the FCC rules. These devices and services include: low-power auxiliary stations, including wireless microphones, Multi-Channel Video Programming Distributor (MVPD) receive sites and broadcast auxiliary links (cable headend receive sites).

It also provides apps for both Apple and Android devices, which allow you to identify local white space availability.

Iconnectiv also provides a Web portal (prism.telcordia.com/tvws/main/home/index.shtml) with the ability to view available white space locally and register protected devices. It doesn't appear it has apps for smartphones.

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



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Key Theme at Radio Show: AM Revitalization

by Lee Petro

Recent statements by FCC Chairwoman Clyburn and Commissioner Pai have shed light on potential changes to the AM band. They both attended the 2013 Radio Show in Orlando and discussed the need for the FCC to consider changes to the AM Broadcast service with the intention of reducing regulatory burdens and encouraging AM stations to improve service.

Three proposals outlined by Clyburn in her speech indicate that the FCC will consider rules to expand the use of FM translators by AM stations; modify the service coverage requirements to AM stations' community of license; and "ratch down" the "ratchet rule" that was intended to reduce nighttime interference, but instead stymied attempts by AM stations to improve their service. These proposals are said to be part of a notice of proposed rulemaking that had been circulated, but not released, prior to the federal government shutdown.

First, the FCC is said to be eyeing a limited opportunity for AM stations to participate in a filing window for FM translators where such spectrum is available. Presumably, this window would be scheduled after the low-power FM filing window applications have been reviewed, and existing FM translator stations and pending applications have had an opportunity to submit minor change applications to eliminate mutual-exclusivity situations remaining in existence from the 2003 filing window.

In his speech to the Radio Show attendees, Commissioner Pai also referenced his support for requests by AM broadcasters to make larger-scale modifications to FM translators. The so-called Tell City waiver request was filed in November 2012, and sought FCC permission to modify the transmitter site of an FM translator beyond what is specified in the FCC's rules, so long as the FM translator would not preclude LPFM licensing in spectrum limited markets, and the FM translator was used to fill in the service area of an AM station.

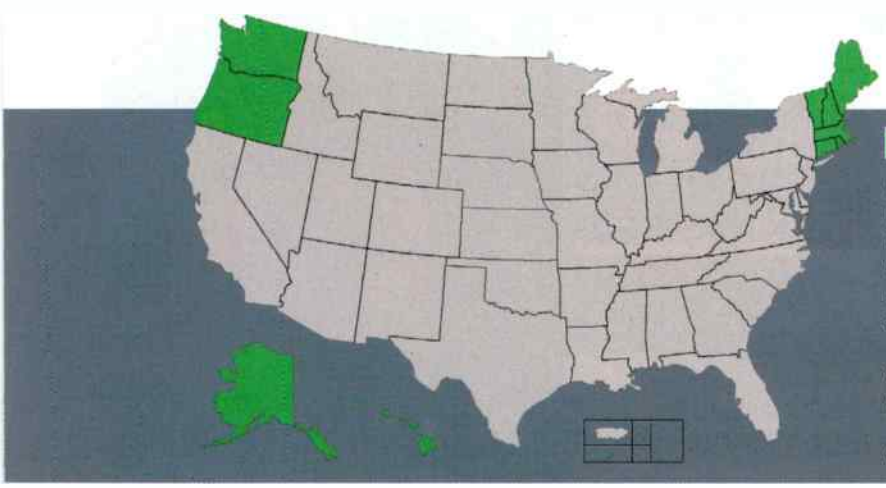
Next, the notice will consider changes to the AM rules community of license coverage rules. In addition to interference issues (discussed below), more recent changes to local zoning regulations and environmental processing rules have prevented AM stations from changing their transmitter sites. The FCC is considering the possibility of reducing the required level of service by an AM station to its community of license to permit such moves. Other possible changes would be to permit nighttime stations to utilize directional arrays to eliminate interference when making such changes.

Third, perhaps the most significant proposed change is the ratcheting down of the ratchet rule. The ratchet rule was adopted in 1991 as a means to reduce interference in the AM band. As specified in the rules, when an AM licensee voluntarily proposed to modify its facilities, it was also required to reduce its contribution to nighttime interference levels. However, as pointed out in a 2009 Petition for Rulemaking, the ratchet rule actively discouraged AM licensees from proposing to make service improvements. As a result, the rule incentivized AM licensees to maintain their current facilities, and not take advantage of opportunities to improve their coverage areas, lest they be forced to lose nighttime service.

Finally, the FCC will also consider two other changes, streamlining authorization to use MDCL control technologies, and reducing the required minimum effective field strength values for AM stations by approximately 25 percent, which would permit the use of shorter AM antennas.

As noted above, the proposed rules were slated to be released immediately after the Radio Show. However, with the federal government shutdown as of Oct. 1, it is unknown when the actual text of the rules will be released. Upon release, interested parties can file comments.

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



DATELINE

License Renewal Pre/Post-Filing: Stations in Alaska, American Samoa, Guam, Hawaii, Mariana Islands, Oregon, and Washington continue running License Renewal Post-Filing Announcements, on Oct. 16, and Nov.1 and 16. Stations in Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont continue running License Renewal Pre-Filing Announcements on Oct. 16, and Nov. 1 and 16.

Quarterly Issues/Programs List: Stations place in their public file by Oct. 10, 2013, covering the period from July 1, 2013, through Sept. 30, 2013.

Commercial radio and television stations file Biennial Ownership Reports Dec. 2.

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Is It Time for a New Transmitter?

It's a major capital purchase that must operate for many years.

By Doug Irwin, CPBE
DRB AMD

October is the time of the year we need to think about capital purchases for the following year. Transmitters are one of the most expensive of capital items, so I'll outline the new and updated products available now.

Harris Broadcast is offering its Flexiva Compact Class line of FM transmitters, which come in 50W, 150W, 300W, 500W, 1kW, 2kW, 3kW and 3.5kW (analog) versions, and they are very compact — the largest requires four rack units. They're frequency-agile, with broadband amplification, so there's no need for tuning of course. The unit has an integral direct-to-carrier digital exciter, stereo generator, and RDS generator as well. Flexiva can operate at full rated power with up to a 1.5:1 VSWR and will reduce power proportionally up to 3:1 VSWR before shutting down. Fast analog VSWR protection circuits mute the transmitter instantly in the event of a shorted or open antenna or line to protect the transmitter. The lower power versions of this transmitter (up to 550W) operate on line voltages from 100 to 250Vac; the higher power versions, 208 to 250Vac (single phase, and between 47 and 63Hz).

It looks to me like Harris designed this transmitter line to handle less-than-ideal transmitter sites. What if you wanted to build an N+1 site to backup an entire cluster? This transmitter could be the way to go for such a plan. Some of its features could make that idea fairly easy to implement and manage; for example, it has a Web-based HTML GUI and SNMP support, so (assuming you have IP access to the transmitter site) it would be easy to bring it up on the air from just about anywhere. It has five different program source inputs: two AES, two composite and one analog. Each input is monitored for valid

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Harris Flexiva

program content and can be programmed to switch to a valid backup source should the main source drop below a predetermined threshold and time interval. Upon restoration, the program can automatically switch back to the main source.

You can buy this transmitter for analog FM now and be able to upgrade it to a combined amplifier for analog and digital after December 2013 when the new Flexiva G4 Exgine is released. New features will then include hybrid crest factor reduction, real-time adaptive correction, a built-in spectrum analyzer, and host audio extraction. (If that becomes your plan, make sure you size the amplifier correctly; for example, the largest version of this transmitter (FAX 3.5K) will provide 1.7kW of analog FM at the -10dBc IBOC level.)

A few final optional features to mention: Add an Orban 5500 to it for built-in audio processing; or add a GPS receiver for Single Frequency Network synchronization.

GOING ONE MORE

Let's take this N+1 idea a little farther and see what is available in terms of broadband antennas. Shively makes the model 6832, which is broadbanded (VSWR 1.35:1 or less across the entire FM band) and will handle up to 2.5kW per bay. Another possibility for a low power N+1 application could be the Jampro JCPB. Its VSWR spec is 1.25:1 or better across the entire FM band, and it's also rated at 2.5kW per bay.

On the opposite end of the power scale for Harris Broadcast is the HPX, which is its high-power, vacuum-tube PA line of transmitters. According to Harris, the HPX system "provides the highest operating efficiency of any transmitter in its class" thanks to its ¼-wave cavity and grounded cathode design. Its basic on-board controller provides critical life support, control, automatic exciter switching and fault diagnostic functions without reliance on a microprocessor. The enhanced transmitter control unit option combines the basic controller functionality with a microprocessor and ¼ VGA touch-screen GUI for increased control and diagnostics, including TCP/IP connectivity, Web remote control/monitoring and SNMP support.

The HPX can also be used as a combined amplifier for HD Radio purposes. As an example, in conjunction with the Flexstar exciter, and using the real-time adaptive correction feature, the HPX-40 can make 31.5kW FM and digital at the -20dBc level, or 17kW at the -10dBc level.

For nearly my entire career I've been connecting a stereo generator output to

Harris HPX

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an exciter input via a piece of coax, although there was that time, in the 1990s, where I experimented with running AES straight in to an exciter. The results were mixed — I was soon back to the coax runs. The Nautel Omnia Direct interface makes an AES connection from an Omnia 11 directly to the input of a Nautel NV series exciter. Wheatstone has also unveiled its application of this technology, which is called Baseband192. Nautel and Wheatstone have both produced videos on this topic.

The operational specifics are pretty simple in concept. Think for a moment about the workings inside a typical audio processor/stereo generator combo: After all the audio processing is finished, the stereo generator, still in the digital domain, converts this audio to the familiar composite MPX format, and a final digital to analog conversion takes place. If that signal is routed via coax to the composite input of (for example) the integrated digital exciter in an transmitter, a subsequent analog to digital conversion takes place at the input of the modulator. Wouldn't it be great to eliminate that D/A and A/D conversion set? Well, by scaling the AES sample rate up to 192kHz (giving 96kHz of audio bandwidth) the intermediate steps along the way can be eliminated. The coax is replaced by an XLR cable to transport the AES data stream.

Orban's version follows the system developed by Nautel and Omnia, but samples at 384kHz and uses both left and right channels in the AES3 stream

NOT JUST HD RADIO

If HD Radio isn't part of your station plans, there are many manufacturers able to provide hardware.

Bext offers two compact transmitters: the XL1000 and XL2000. All inside a 2RU package (23" depth and 33lbs in weight) you get the integrated exciter, power amplifier, output filter and power supply. Output standard is a 7/16 DIN. Specify a 7/8 EIA flange if that's your preferred connection

The integrated exciter uses direct-to-channel modulation and has a single composite input and two other inputs that can be used for SCA and RDS. Additionally, it has its own built-in stereo generator, supporting left/right analog inputs. (An AES input is optional.)

Access to all settings and readings is available at the front panel via a menu-based display, but the unit supports Ethernet as well, so if you have connectivity at your site, you can use that for remote access.

Other GPIO access is done via DB9 connectors on the rear panel. RS-232 and RS-485 access are available. If you are looking for a transmitter that can make a good translator, keep in mind that one option for the XL1000/XL2000 is an FSK keyer for ID purposes.

BW Broadcast offers the V2 line, which covers a power range from 5W to 1.5kW. They have a built-in DSP-X processor, 14 factory presets and a built-in FSK and Morse identifier. Gold-clamp transistor technology allows quick in-the-field transistor changes. Ethernet control SNMP and other connections simplify control and monitoring. Power supplies slide in and out.

Ecreso, a division of Worldcast Systems, has the Helios 2000W, a 2kW unit (the entire line covers the 350W to 2kW level), which needs 3RU and weighs about 45lbs. Its integrated exciter uses a direct-to-channel modulator with a built-in stereo generator, accepting analog or AES up to 192kHz sample rate at 16-, 24- or 32-bit word length. Additionally it has two BNC inputs that will accommodate external composite or SCA/RDS signals.

Aside from local GPIO connections for control, Helios supports HTTP using an internal Web browser and Ecreso's AMI (Advanced Measurement Interface) via Ethernet. It also supports SNMP, and has an interesting feature known as Expert Maintenance Reporting. EMR is an optional service, which pushes regular reports on the status of key parameters such as temperatures, currents and voltages, plus information on the performance and lifespan of components such as the fan and power supply, via an IP connection, to Worldcast Systems where the data is monitored. With trend analysis, EMR can identify problems and issue warnings in advance to allow for corrective action to be taken. A map-based display

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of current statuses and detailed reports and graphs are available at any time on the EMP user page. Clearly this is a potentially useful feature if you have a widespread network of transmitters.

Ptek has a line of transmitters that includes the Gamma HE series. It comes in six different versions, at power levels of 2, 2.5, 3, 3.5, 4 and 5kW with a 7/8" flange output connector. All but the 4 and 5kW versions use 4RU; the two largest need 6RU. The integrated exciter makes of use Direct Digital Synthesis; the amplifiers are made of up LDMOS, resulting in higher efficiency (and reduced cooling requirements). Aside from front panel metering and control, the transmitters have complete remote control: GPIC and an RS-232 interface that allows access to all major transmitter parameters. An embedded web-server is optional. The power supply accepts voltages between 208 and 264Vac.

Armstrong has a line of transmitters (that includes the FM Series B) which are completely solid-state and come in power levels of 5, 7.5, 10, and 12.5kW. The amplifiers are self-contained and include three power supplies per amplifier. The IPA for the lower power levels is the IFX-150B, and for the larger levels, the FM650B. The output connector is a 1⅝" flange. AC power input can be single or three-phase, 208-240Vac. The exciter is optional with the purchase, and obviously Armstrong offers those as well; you could certainly consider the FMX-30B.

OMB has a line of products that includes the FMA 2000 HE. This is a 2kW transmitter (3RU) with two 1kW amps with individual switch-mode power supplies; the output connector can be EIA 7/16" or 7/8". Local control is via the front-panel TFT screen and touch keyboard. VSWR protection against line mismatches is included along with an integral low-pass filter. Remote control is provided by GPIO and RS-232. You would need an exciter as well; for example the EM 25 DIG PLUS. This is a frequency-agile exciter, with analong, composite, and SCA inputs. Maximum power out is 25W.

Finally, let's look at the Elenos line. The Medium Power ETG series includes models in the 2.5, 3.5 and 5kW power levels. You can get this transmitter as an amplifier with integrated exciter (in 4RU) or as a 2RU exciter and 4RU amplifier. The Indium series in 10 different versions, from 100 up to 2kW, and the Elenos Eco-Saving line has models from 5 to 30kW. ■

World Radio History

to multiplex the samples in an even-odd sequence between the left and right channels of a 192kHz AES3 link. Using only the left channel it is compatible with the Omnia method. The hardware can be retrofitted into an Optimod-FM 8600 on a rear-panel chassis cut-out.

Broadcast Electronics and Harris Broadcast offer a similar feature on at least one exciter in each of their respective lines. The feature is generically known as MPX over AES in these cases.

Many are familiar with the Nautel NV and VS series of transmitters. A fairly recent addition is the NVLT series (NV light), which, while based on the NV design, is missing one major feature: It will not operate as a combined amplifier for HD Radio. It's strictly an analog FM transmitter. Still, it has many (if not all) of the features of the NV. Nominal power levels range from 3.5 to 40kW.

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Broadcast Electronics has a line of (relatively) lower power transmitters called STX LP. It's available in four different versions: 1, 2, 3 or 5kW, with an integral exciter and low-pass filter. (One of the options available is an external exciter kit, which you would use should you want to broadcast with HD Radio). The exciter has a composite input, and three additional inputs — two for SCAs and one for RDS. Optionally you can add a stereo generator module with AES and analog inputs. Local control is done via the front panel LCD interface, but the unit has Ethernet support, so if your site has IP connectivity, then you can gain access to the transmitter remotely by that means. BE's RGUI (Remote Graphical User Interface) allows for the control and monitoring of up to eight different STX LP transmitters. RGUI also provides for complete diagnostics of the transmitter, as well as event logging.

Another new BE product is the STXe exciter, which is basically a stand-alone version of the integral exciter for the STX LP series. This exciter has a built-in controller with an updated GUI. Ethernet support allows for http access from anywhere assuming your site has IP connectivity (using a PC, laptop, tablet or smartphone). Additionally, the STXe supports SNMP. With the addition of BE's VPe (Vector Power Enhancement, which is their peak-to-average power reduction technology)

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the STXe can also operate in the IBOC mode, allowing for the transmission of HD Radio. (DRM+ is an option for stations outside of the U.S. where it is used for DAB in the VHF spectrum.)

Continental Electronics has been maintaining its familiar line of high-power FM transmitters: the 816R series. Power levels range from 11kW to 21.5kW (using the 816R-2C) up to 40kW (the 816R-7C). A single tube is deployed as the final amplifier (4CX15000A, 4CX20000E, or 4CX25000C depending on the power level). All of the series are self-contained, except the 816R-7C, which uses a separate power supply cabinet and external harmonic filter.

The 816R-HDR (HD Radio-ready) is a high-power combined amplifier for IBOC applications. You can buy it up front as an FM-only transmitter, while planning to add the IBOC components (the Exgine-enabled 802Ex digital FM exciter, along with an exporter) later on. Continental's D816HD series transmitters range in combined TPO from 18kW to 56kW at digital power levels of -20dBc to -10dBc. These combined transmitters use only one tube each, the final power amplifier tube. The D816HD series transmitters are also completely self-contained, including the harmonic filter. (The 70 kW has two high voltage rectifiers and plate transformers located in two separate chassis.) D816HD transmitter systems work with Continental's 802Ex digital FM/HD exciter to provide forward looking fully adaptive pre-correction, system and HD Radio performance monitoring and on-channel spectral analysis.

These combined transmitters may be set up in several configurations: single exciter to drive both transmitters; dual exciters; or, dual exciters and automatic coaxial switcher/combiner. The D816HD-20 will go up to 25.2kW of analog with an IBOC level of -10dBc; the D816HD-25 tops out at 34kW of analog with at -10dBc; and the D816HD-28L will reach 38kW of analog FM with an IBOC level of -10dBc.

It will soon be 2014 and I hope that you will take some time to look in to new features that are available from many of the transmitter manufacturers. Remote access and control, and IBOC capability, are the prominent features that have appeared in the last 10 years. It's not 1980 anymore and many of the features found today are put there to make your life easier.

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

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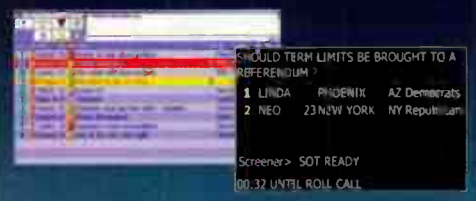

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By Ben Blevins

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In 2007, Chris Ferris, VP of audio, built and opened an incredible new facility serving as a great base for our operations. When I started in 2010 they were still working from a very analog environment, which at the time served the company — then known as ISP Sports — well. Shortly hereafter, amid a merger with IMG Worldwide, we were in need of growth and more flexibility. A lot had to change, and quickly.

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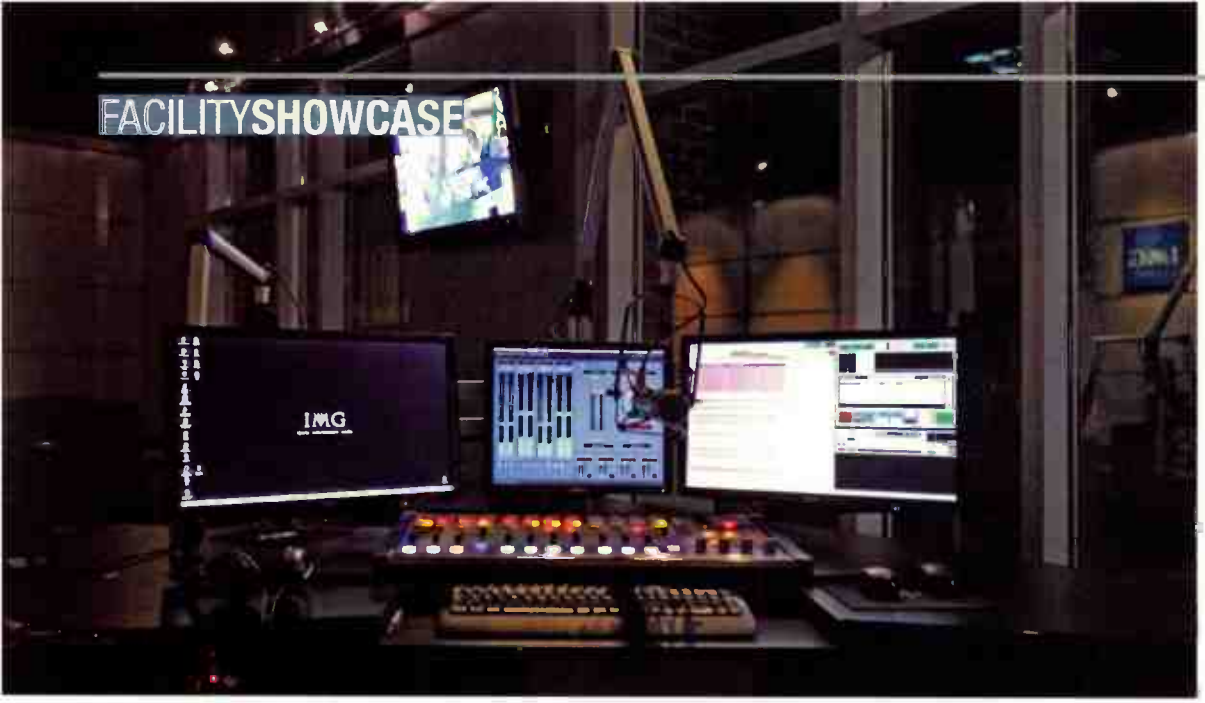

The centerpiece studio of IMG, which hosts anything from Oregon's Ducks Insiders daily show to the nationwide Notre Dame IMG Sports Network.

Our goals were simple: IMG Audio had to consolidate its resources and develop a more efficient and flexible environment, while improving to the highest quality of audio. With 30 studios already in place, we approached the project in two phases. First, was to update our current TDM routing system, which we were close to outgrowing. We needed to move to a plug-and-play environment. The second phase was to add a second set of studios to accommodate our new networks.

Studio console and network equipment requirements were simple: ease of use and reliability. Should the unexpected happen, we needed to be able to move audio across the network or change things on the fly. Our previous routing system had a huge point of failure in being solely dependent on a PC to run the system. We needed something that could continually function, despite an occasional failure. As part of this undertaking, I met with Jay Tyler of Wheatstone along with Shannon Nichols at BSW. After only a few meetings, it was clear Wheatnet-IP and an AoIP network was our future.

THE LAYOUT

Before getting started, Kelly Parker from Wheatstone came in to offer advice on network and studio flow. With his help and support from the fantastic staff at Wheatstone, we determined that the best approach was to

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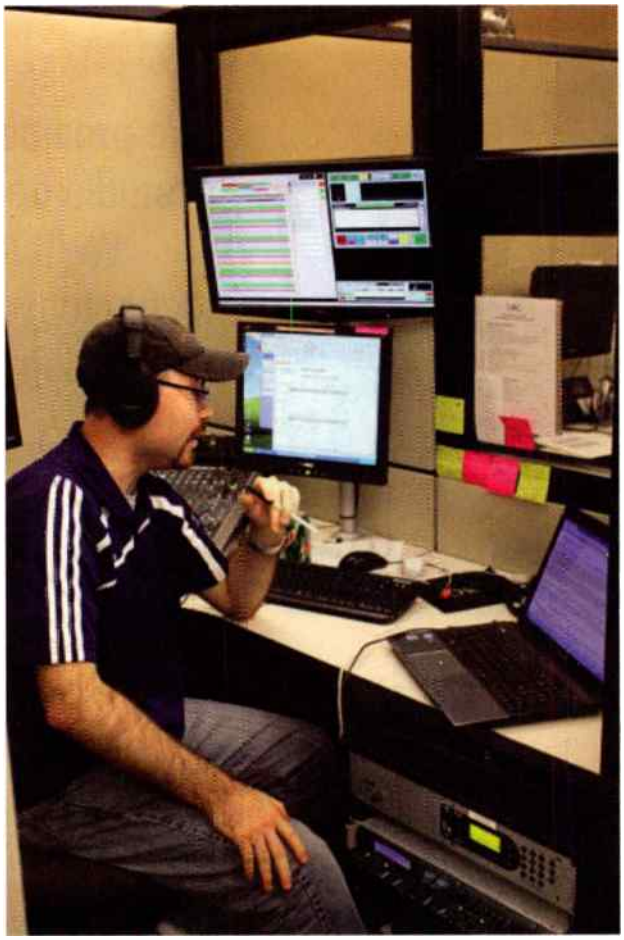
divide our TOC into two halves — one side for inbound and the other for outbound, with essentially a hallway dividing the two halves into two distinct engineering rooms. Each side contains the appropriate equipment, whether it be Telos Zephyrs, Comrex STACs or PCs for encoding audio to partners' websites, auto-answer couplers for backups to affiliates, or satellite receivers to monitor our broadcasts.

Also included in that is our primary backhaul, which is provided by Clear Channel Satellite. We have a 6MB MPLS circuit point-to-point from Winston-Salem, NC, to Denver. We're using Worldcast Systems APT Equinox codecs to handle our audio and GPIO, with ISDN redundancy built-in — in case of a network failure or maintenance. We have 34 channels of audio from our headquarter studios to Denver. Also traveling down that line are UDP commands as redundancy to our contact closures and regional copy insertion to run our networks with the XDS platform.



An IMG studio host in one of the 41 workstation studios.

There are two Core Hewlett-Packard 4800-48G switches that support each side. We also have backups racked, which are programmed and ready to go. It's just a matter of literally moving patch cables from the main to the backup switches, and we're live. Smaller HP ProCurve 2810-24G switchers then support two studios per switch, dividing the workload of each.

Our decision to go with Hewlett-Packard switchers has to do with our corporate leanings. All our desktops and laptops are HP, and the corporate network is run from HP switches. We had the built-in support for HP already, so it was logical to go that route instead of going with Cisco switchers, which most AoIP networks have been built around. Wheatstone support helped with our initial setup and made setting up our network very simple.

THE OPERATION

Most of our remote crews are using Telos Zephyr Xstreams as their primary method of connection. A lot of our networks are also using audio over IP with Comrex Access. We employ a Traversal Server account from Comrex to make it easier for any of the 40 rack or portable units we own to find one another whether in the field or our studios. Adding to that, we've pushed to have hardwired data added to the broadcasters reciprocal agreement in the Southeastern Conference as a trial. This gives our broadcast crews access to the big campus networks and a reliable connection back to the studio. Chris Crump and Comrex have been great in helping us set guidelines for what is needed. Our hope is to create a

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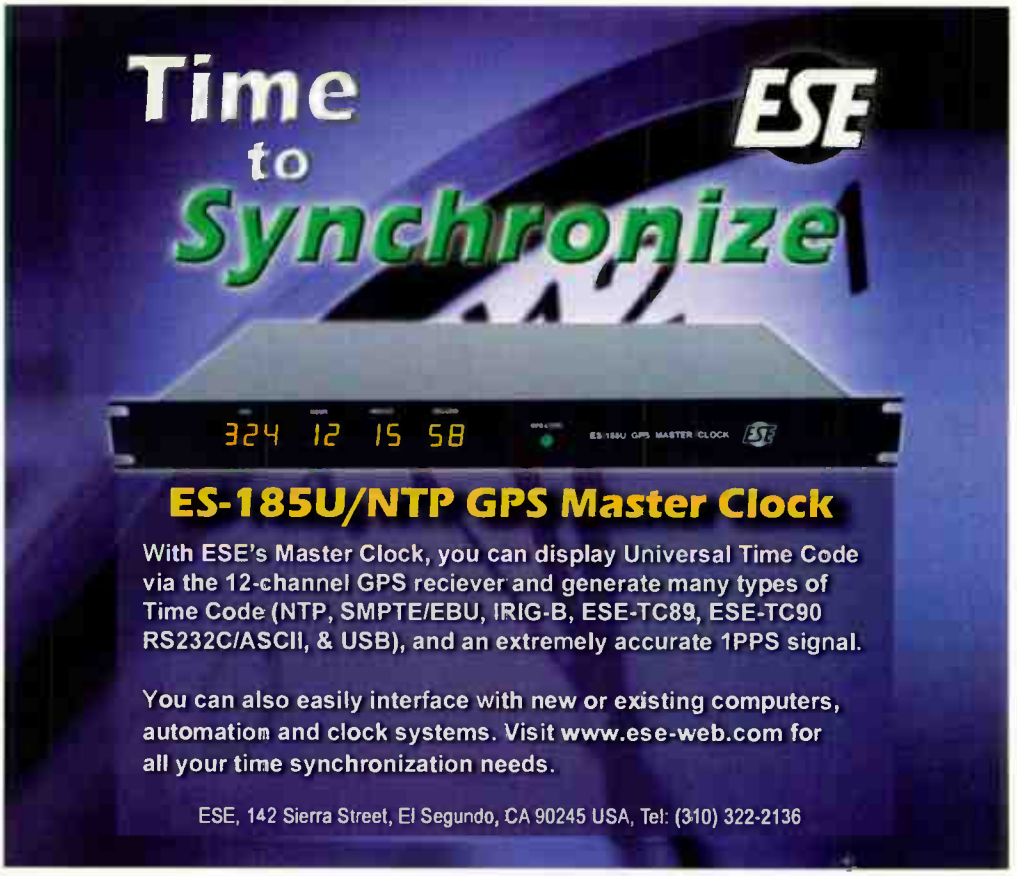
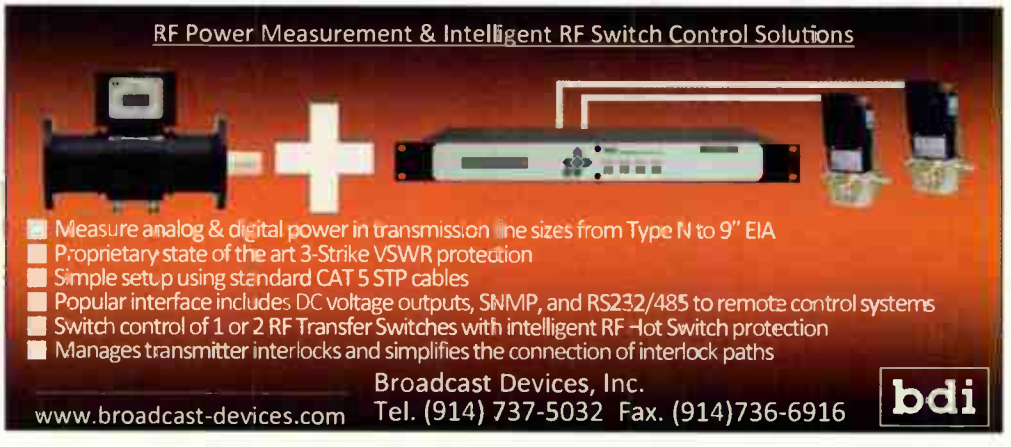
standard that the rest of the conferences can adopt in the coming years.

We started with 30 existing studio workstations before the merger. We have since added 13. We have two sets of identical studios. Our studio workstations are built in a cubical type environment, each able to produce feeds to any number of our networks. We use the Mackie Oynx 1640i, Telos Zephyr Xstream, Comrex Access or Matrix, DBX 1066 compressor/limiter, Airtools 6100 broadcast delay, Sennheiser HMD-25 for on-air and communication, and two PCs for automation and general use.

We converted six of our enclosed studios to Wheatstone E6 consoles, including our two studios in the front of our building visible from Trade Street. In those street-side studios, we installed E-6 control surfaces with a 12-fader layout. This layout gives onlookers an interactive experience by being able to listen to high-profile games broadcast on outside speakers, while displaying our impressive-looking consoles. In addition, we dropped the E-6s into furniture made by our local woodworker.

Jacob Potter, an IMG Audio producer, hosting the Arkansas Razorbacks football broadcast.





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EQUIPMENT LIST

- Yellowtec Mika
- Worldcast Systems APT Equinox
- Wheatstone E-6, Event Scheduler, four-channel IP driver, Navigator, PC-XY-IP, WheatNet-IP88a, WheatNet-IP88ad, XYE-R-IP controllers
- Tieline Commander G3
- Telos Zephyr Xstream, Zephyr
- Symetrix 528E
- Sennheiser HMD-25
- Mackie Oynx 1640i
- ESE ES-289E, ES-185U
- E-V RE-20
- DEX 1066
- Comrex Vector, STAC, Matrix, Hotline, BRIC-Link, Access
- Clear Channel Satellite Services
- Broadcast Electronics AudioVault 9.20
- Barix instreamer 100
- Airtoo's 6100

Also in the studios are the IP 88AD Blades, Telos Zephyr Xstream and Comrex Access IP audio codec. We're using the Symetrix 528E mic processors and Yellowtec Mika arms for microphone and monitor support.

We use Audio Vault 9.20 for our automation much like many of our affiliates. With that, our producers are cutting game highlights using AVRPS, so we are able to share high quality audio across all of our networks, improving the information we can offer listeners — not just the score, but how it actually happened. Audio Vault is also sending GPIO commands to our backhaul for local automation contact closures and UDP or RS-232 commands for regional copy insertion. In our E-6 studios, we use Wheatnet's IP Driver to send and receive audio to Audio Vault, while avoiding the hefty costs involved with sound cards. This feature has worked great and will continue to become a staple in our facility.

Our biggest emphasis is being able to run any network from any studio at any given time. For Florida Gators broadcasts, for example, we'll dial in sources for the stadium talent, the producer, the tailgate show and the host (who is located in a different city). All of that (mix-minuses too) are programmed as an event to any of our E-6 consoles. At a moment's notice, we could pick up and move the entire broadcast almost seamlessly. Without the flexibility of Wheatnet, this would take significantly longer and potentially be noticeable to our listeners should it happen while we are on the air.

The flexibility of our design has also allowed us to handle impromptu special requests. During the BCS National Championship game, for example, actor Vince Vaughn happened to be there watching from the sideline. As a Notre Dame fan, Vaughn wasn't going to be available at halftime for an interview. Not a problem; our great Notre Dame remote engineer and producer, Bill Karambelas, fed the sideline mic back to us on another ISDN channel and Wheatnet's ability to route that audio into another studio allowed us to record the interview off-air for playback as if live later on.

Thanks to Wheatstone's Wheatnet IP, we've built an environment where IMG Audio can accomplish what was once thought impossible — bringing every listener a real-time, exciting college athletics experience each and every week.

Blevins is technical operations manager at IMG College.

FACILITY FOCUS

THE TECHNOLOGY BEHIND IMG COLLEGE

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BSI
RADIO AUTOMATION SOFTWARE

A Better Backup Method

by Doug Irwin
CPBE DRB AMD

In the September 2013 Tech Tips I discussed subtle single points of failure and how they should be found and eliminated from on-air systems to provide the best long-term reliability. This month I want to spend a little more time looking at air chains, and specifically, backup air chains.

I've seen several stations' air-chains put together such that if you wanted to use any backup component, you were forced to use all the backup components. In other words, the backup system was a single thread, isolated from the main: the backup STL (whether radio or wireline) fed the backup on-air processor (and stereo generator for FM), which fed the backup exciter/transmitter, which in turn fed the backup antenna. They were all hard-wired together with no way of switching them by remote control.

Back in the day when there were more live jocks, and reaching an engineer (after hours) meant paging him or her, it made a lot of sense for the on-air personnel, after noticing a problem over the air, to just hit one button to turn on the backup transmitter. There's no need for that person to analyze what the problem is, right? "Suddenly we had dead air and I just put the backup transmitter on." Problem solved (hopefully). I, however, have issues with this methodology. Almost every time there is something inherently inferior about the backup system: the transmitter is old, the audio processor is ancient, the antenna is low on the tower, etc. If the station experiences a failure in its main air-chain audio processor (as an example) why would I want to settle for even lower performance just for the sake of simplicity? I wouldn't. There is a better way.

Figure 1 shows what I usually refer to as the matrix solution to the main/backup air chain systems. With this arrangement, you can select any one of the four (potential) links from the studio via the first input switcher, which is passive and based on magnetic-latching relays. The output of that switcher feeds one of two on-air processors. Now each transmitter has its own input switcher (also passive and based on magnetic-latching relays) so that it can take an audio source from either audio processor. This allows us to make use of any one of the four (potential) audio sources for either transmitter, and allows us to use either audio processor for either transmitter. And yes—one chain is on a UPS, and one isn't.

However, we still make use of the one-pushbutton idea, even with the matrix arrangement because the normal connections for the backup thread all make use of the backup components. Notice the backup thread is made up of the secondary STL (a 15kHz phone line) and the second audio processor, which feeds the DX10, our backup transmitter. So, in the spur of the moment, no analysis would be needed; You could just put the backup on in case of dead air. Later we can go back and switch over, by remote control, to the better elements (the better STL for example) to keep the system optimized until such time as the bad element of the thread is fixed.

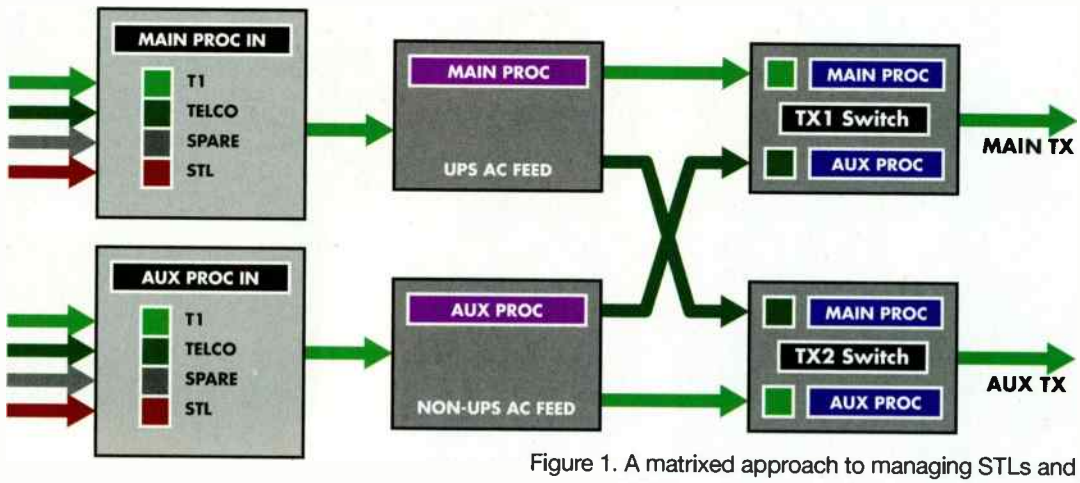

Figure 1. A matrixed approach to managing STLs and processors to feed a main and aux transmitter.

TECH TIP FOLLOW-UP

In the June 2013 Tech Tips installment I wrote about dealing with coaxial cables and running them out to telephone poles and the like. I commented on the advantages of a creosoted-treated wooden pole. Dave Day from Epping, NH, wrote and told me the EPA warns that contact with creosote should be strictly limited, gloves should be used, and wood with creosote should not be burned. Please keep that in mind if you come in contact with poles that are treated this way.

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

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NRC rating from .85 to 1.15
Contains primarily post-consumer recycled content

Acoustical Solutions AlphaSorb

By Chris Wygal, CBRE

In May 2013, Liberty University's Victory Radio Network moved its facilities from a historic house on the school's campus to a storefront space in a nearby shopping center. The project was a welcomed change. Leaving a house-turned-radio station and relocating in a building that was specifically designed for broadcast fostered an environment for implementing much needed improvements. The most noticeable feature in the new studios is the acoustical treatment. Victory FM worked with Acoustical Solutions on the installation of AlphaSorb acoustical wall panels. This product improves the acoustical properties of each studio by leaps and bounds and it provides a visual component that is fun to look at.

The Victory Radio Network facility houses four studios used on-air and for production. The master control studio is visible from the street. Behind it is the production studio, followed by production control, and the programming/engineering office, which is used for production as well. The long, narrow layout of the building lends itself to the studios not being perfectly square, but square enough to create standing waves and resonance. Consequently, the studios have skewed walls offset by about 8" each. This design allowed us to forego the installation of corner traps. The walls however, are drywall, making reflections an obvious problem. Acoustic treatment of some sort was in order, but we didn't want to take away from the fresh clean look of the new studios. Plus, we wanted the entire facility to have a uniform look that displayed the station's burgundy color. AlphaSorb was the perfect solution. Plus, when we learned how easy it is to install ourselves, AlphaSorb was even more attractive.

ACOUSTICAL SOLUTIONS
800-782-5742
acousticalsolutions.com
info@acousticalsolutions.com

THE PRODUCT

Michael Binns from Acoustical Solutions in Richmond, VA, visited our studios and took meticulous measurements of each wall, painstakingly noting the placement of windows and doors. We wanted to cover each wall from floor to ceiling and make the panels fit perfectly. Acoustical Solutions custom-cuts the AlphaSorb panels and assigns numbers to notate where each is to be placed on the walls. Each panel can range in size up to 4' × 10.' We specified 1" thick panels because it worked well with the trim package on our studio windows. Panels are available in 1" and 2" thicknesses with beveled, mitered or radius edges. The edges come either natural or chemically hardened. They are made of rigid, highly compressed fiberglass insulation covered by Guilford of Maine 100 percent Terratex Polyester fabric. It is Class 1 fire rated.

Because AlphaSorb is primarily used to reduce or eliminate audible reflections

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on wall surfaces, the NRC (Noise Reduction Coefficient) is important. Simply put, the NRC rating indicates how much a frequency is not reflected back into the room once it comes into contact with the acoustic material. The NRC rating for the 1" thick AlphaSorb is .85, which means on average, the wall panels will absorb 85 percent of frequencies between 125Hz and 4kHz. The NRC rating for the 2" thick AlphaSorb is 1.15. As would be expected, the reflection dampening ability is excellent. When guests walk into a room surrounded by the panels, they immediately comment on the attenuated reflections. Conversely, the rooms aren't "dead." Frequency absorption is just right for a broadcast facility without making the room stuffy.

A full-sized panel is very lightweight and easy to move. One cubic foot only weighs 6-7 pounds.

THE INSTALLATION

The AlphaSorb wall panels ship with either impaling clips or Z-clips for fixing the panels to the walls. The impaling clips look exactly like the gusset plates used to hold trusses together. They are small and are simply hot glued or screwed to the wall. Then, a glob of construction adhesive is applied next to the impaling clip. When the panels are pressed into place, the impaling clips and adhesive hold everything together. If Z-clips are desired, a 4' × 6' panel, for example, would ship with six evenly spaced metal clips attached to the back of the panel. The installer simply installs the matching metal clip to the wall, and the panel essentially hangs on the Z-clips. This installation is excellent for panels that are temporarily moved or hang from ceilings. Layout and leveling of the Z-clips is important, but not terribly time consuming.

I chose to install the panels myself with some help from the radio station staff. Except for a few longer panels that required more hands, the process was simple. I started with the panels that touched the ceiling, assuming that if there was any drift or something got out of square, it would be best to have it show up near the less-visible cove base on the floor. The biggest challenge was measuring and cutting around receptacles and light switches. A utility knife easily cuts the panels and a pair of scissors cuts the Guilford of Maine fabric. I spaced the impaling clips evenly over the area of the panels and used the construction adhesive somewhat liberally. After aligning the panel, I used the palm of my hand to pop panels into place. The impaling clips take hold, the adhesive sets up, and the panels look incredible.

It is important to consider the installation of receptacle and switch boxes. Since we were adding an extra 1" of material to our walls, the electricians installed electrical boxes that stuck out an extra inch until the AlphaSorb was installed. This allowed us to easily cut around the boxes and put regular cover plates back on. By way of a hint, if your cutout in the panel is slightly too big, used an oversized cover plate and the problem is solved!

Using AlphaSorb panels equally provide an aesthetic showpiece and acoustic treatment for our studios. The 1" option fits neatly on the walls and cleans up reflections that would otherwise render the room useless for live on-air work and recording. Don Strahle and Michael Binns from Acoustical Solutions were great to work with, and they took our needs into serious consideration. AlphaSorb is a well-designed product that will serve our needs for many years to come.

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

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On-air Telephone Systems

by Chriss Scherer, editor

Radio listeners like to interact on-air with their favorite stations, and the telephone is still the easiest way for them to do it. Since the first on-air phone systems were introduced, the technology has advanced to provide exceptional quality from analog phone services. More recently, ISDN, VoIP and other services have been added as available communication channels, and the same attention to quality is being applied.

The basic building block to improve the quality of a POTS phone call is the telephone hybrid. We looked at systems that provide all the call handling functions needed to manage listener calls and put them on the. Some systems are available in various sizes, and some manufacturers offer more than one system to accommodate various needs.

"Go ahead caller, you're on the air..."

AEQ Systel IP 12

This third-generation Systel talk-show and multi-conference system is built around a digital router and accept lines from IP telephony systems. The processing and connectivity is handled in the 2RU engine. It includes connections for eight analog inputs and eight outputs, four digital inputs and four outputs, four handset ports, 12 GPI and 12 GPO. Configuration software, Web server and Web client will handle an unlimited number of terminals. The SYSTEL IP control terminals feature a handset and a Web browser that can be operated from any PC. The software can also be run on tablet computers. It can handle up to 12 calls at once.

Also available: Systel IP 4

aeqbroadcast.com

Comrex STAC VIP

STAC VIP takes advantage of advances in VoIP and SIP-based technologies that allow for high-quality voice calls to be made from IP-based PBX systems, smartphones, PCs and VoIP providers. It can also manage VoIP, SIP and HD Voice calls from smartphone apps, soft codecs and Skype. Big Time provides an on-screen clock that will sync with an NTP time server. There is also a Cisco Unified Communications Manager compatibility mode. It includes the STAC IP Call Screening and Control Interface. The STAC VIP Caller Management system integrates with a VoIP PBX system. *Also available: STAC 6, STAC 12*

comrex.com

Broadcast Bionics PhoneBox4

A software-based system that runs on a PC, PhoneBox4 accepts POTS, ISDN and SIP lines and calls. Hybrids are dynamically assigned to calls to the quantity desired. The system goes further to become a total communications center and accepts SMS, email and integrates with social media. Additional features can be added including Prize Manager for prizes, Data Manager for database information, Stats to analyze caller info, and Oasis to integrate with social media services and messaging services. The system can be stand-alone in a single studio or networked across a wide area. PhoneBox is also compatible with the Telos VX engine.

Also available: PhoneBox Solo

phonebox.com

JK Audio Concierge

JK Audio has a modular family of talk show system components. The heart of the system is the Concierge switch core, allowing connection of two hybrids across six phone lines. The switch matrix routes six incoming analog phone lines to JK Audio Innkeeper 1rx or Innkeeper 2 digital hybrids. Concierge adds a music-on-hold input, auxiliary phone integration, and intuitive call control. Two Concierge switch cores can be bridged to provide six additional phones lines for a two-hybrid, 12-line system. Up to eight Guest Module control surfaces can provide remote control of the switch matrix over CAT5 cable.

jkaudio.com

Telos VX

Telos VX shares phone lines across a number of studios using standard IP technology. It is a scalable system that is compatible with a variety of VoIP gateways and PBXs. Gateways are available for POTS, T1/E1, and both BRI and PRI ISDN. Units can be installed as rack-mount units for large numbers of connections or desktop boxes that interface a few POTS lines. The SIP interface transfers calls between the office and studio systems. The VX Engine is a 2RU device providing call control and audio processing. There is one hybrid per line, allowing multiple calls to be conferenced and aired simultaneously with excellent quality. Several VSet phones are available. *Also available: Hx6*

telos-systems.com

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Bright idea.
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Big Shot.
Your station super-sizes everything? No problem; iQ can scale from 8 to 24 faders. Handles even the most zany morning crew, talk show - or anything else you think up.

Control at your fingertips.
See these buttons? You can program them (or the button modules available for Element consoles) to perform routing salvos, system-wide scene changes and more. Because great power requires control.

Smarter phones.
Not only are hybrid controls built into iQ for direct-from-the-board control, the IQ6 phone system connects with just one Ethernet cable.

Network everywhere.
No need for cheesy A/V mixers - RAQ lets you put a networked, professional console anywhere, at a price that'll make the even stingiest GM smile.

Double your pleasure.
Did you know that one QOR.16 console engine will power 2 RAQ or DESQ mixing consoles? Makes your money go further on news bullpens production pods, ingest stations, etc.

Step to the side.
Dirt and liquids: a console's most hated enemy. Element foils 'em with premium, side-loading conductive-plastic faders: dirt drops past, not in.

Who's da boss?
Clients rave about them, talent loves them: over 5,000 on the air makes Axia radio's favorite IP console.

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A low price shouldn't mean "cheap".
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Small but mighty.
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Axia makes the switch.
No "plug-n-pray" unmanaged switches here; Axia builds our own custom zero-config, built-for-broadcast network switch right into our PowerStation and QOR console engines.

Show-off.
Element lets you store up to 99 Show Profiles - "snapshots" that recall channel sources, bus assignments, EQ settings, even fader positions. So every jock can have their own customized console.

Speak your mind.
Element consoles have comprehensive talkback features. You can talk directly to remote codecs, phone callers, adjacent studios... even individual talent's headphone feeds. Even our most cost-effective boards let you talkback to callers and codecs.

Available in small, large, and OMG.
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Handsome devil.
Our meters aren't just good-looking; they're designed specifically to convey the most information possible at just a glance. And Axia consoles support VU and PPM metering styles - something you might not find on consoles that cost a lot more.

Big power, small price.
Radius loads you up with 8 faders, 4 mix buses, automatic mix-minus, onboard EQ and voice dynamics and more — for just $5990 USD. Shh... don't tell the accountants.

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In fact, we calculate that thanks to our huge selection of frame, module and mixing engines, there are at least 32,209,982 different ways to order an Axia console. With that many options, you'd better get started now! Mmm... don't you just love that new-console smell?

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TV STL

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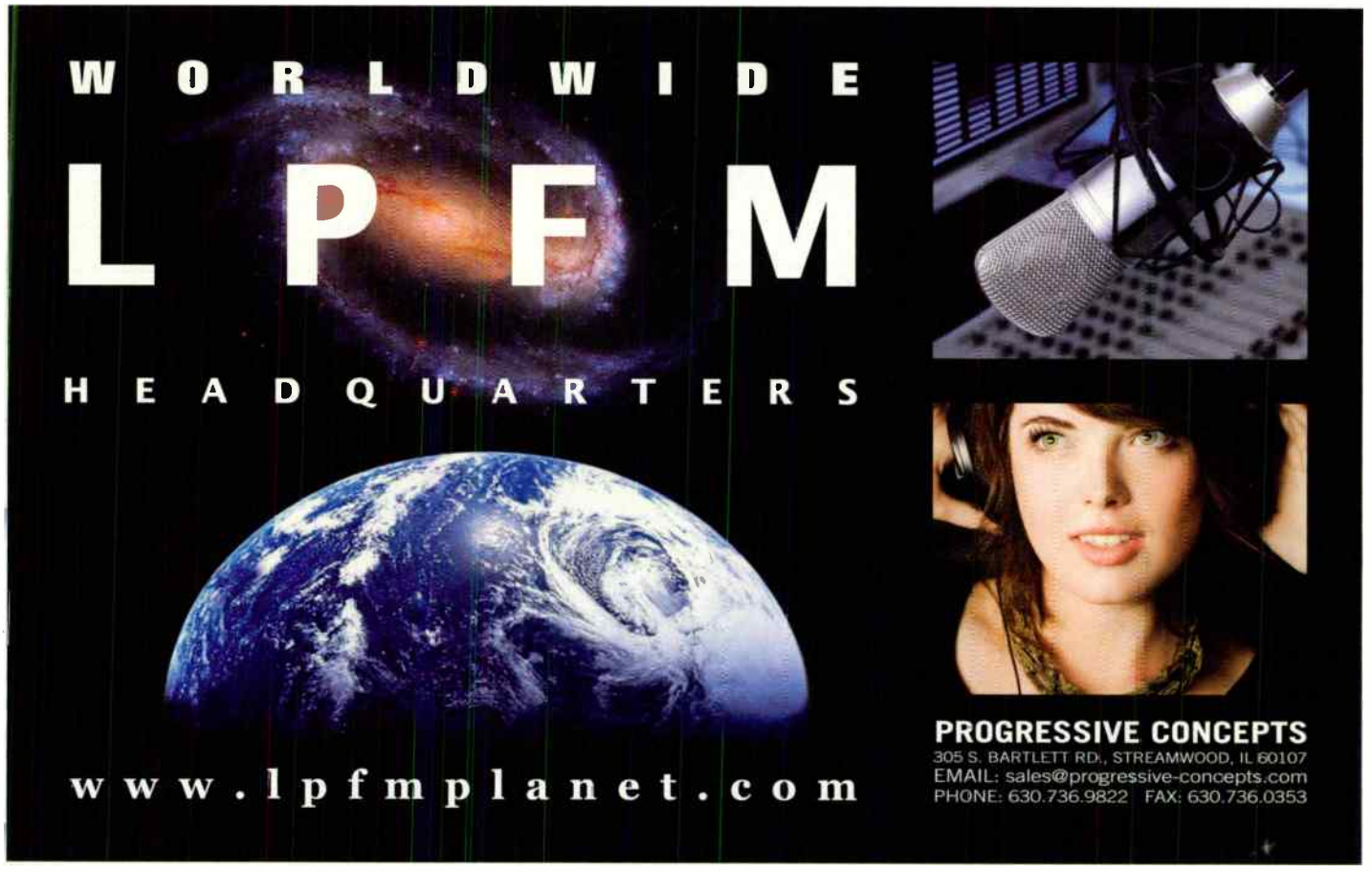

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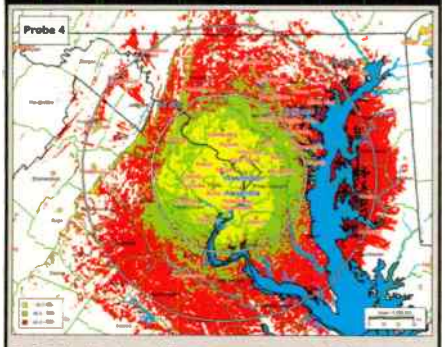

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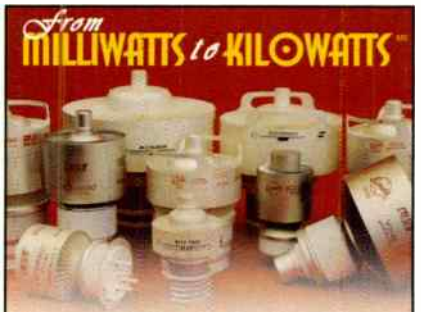

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2013 Salary Survey

by Chriss Scherer, editor

Radio magazine has conducted an annual salary survey since being launched in 1994. We provide this information as a service to the radio industry and those who work on the technical side. We gather data by soliciting information from readers like you. Thanks to those who took the time to respond and contribute. We placed links in all our email newsletters and on the *Radio* magazine website. With your input we can provide the most accurate overview of radio technical salaries.

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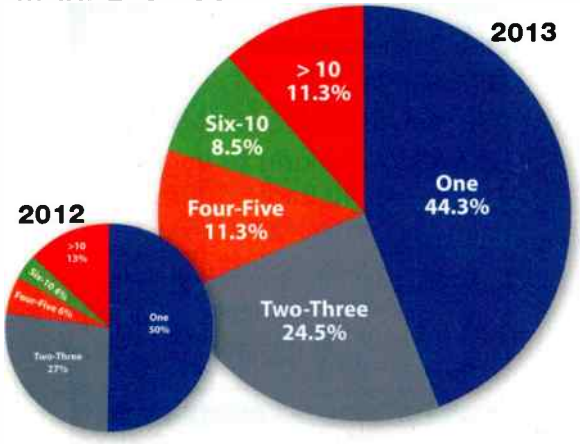

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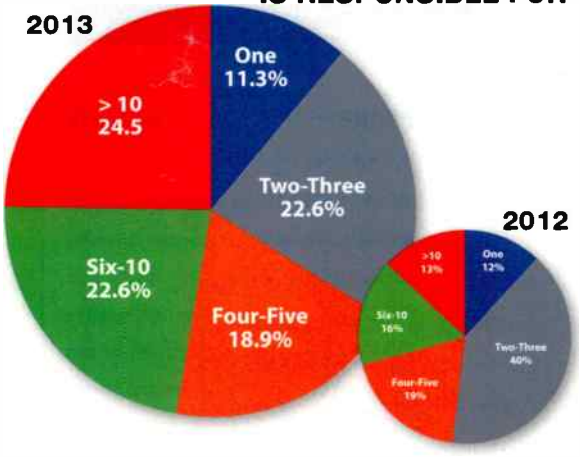

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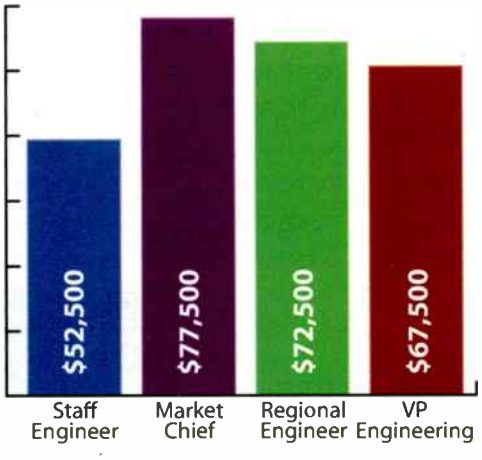

BY THE NUMBERS

11.8
Average years in current position

31
Average years in the broadcast engineering field

62.4
Percent belong to the SBE
Other memberships:
7.5% APRE
6.5% AES
9.7% IEEE
2.2% NARTE
30.1% ARRL

53.4
Percent who received a raise in the past 12 months
Median increase 3%; average 5.5%
In 2012: 54% received a raise, median raise 12.5%; average raise 4.4%

63.7
Percent age 55 and older
67% in 2012

41.9
Percent who are *not* certified
51.6% are SBE certified
3.2% are NARTE certified
7.5% are Microsoft certified
4.3% are Cisco certified

SBE Certification stats:
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6.5% AMD
4.3% DRB
2.2% CRO

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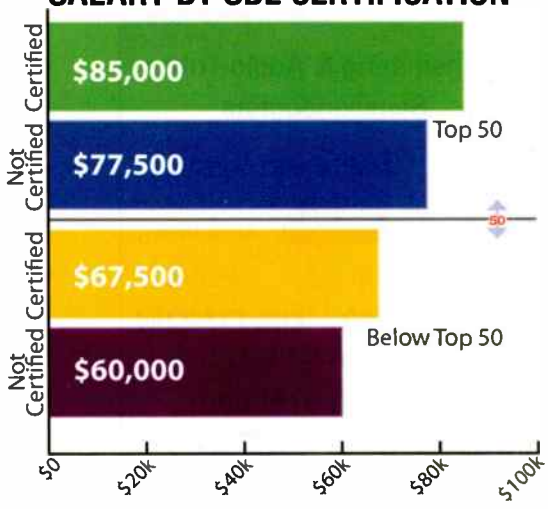
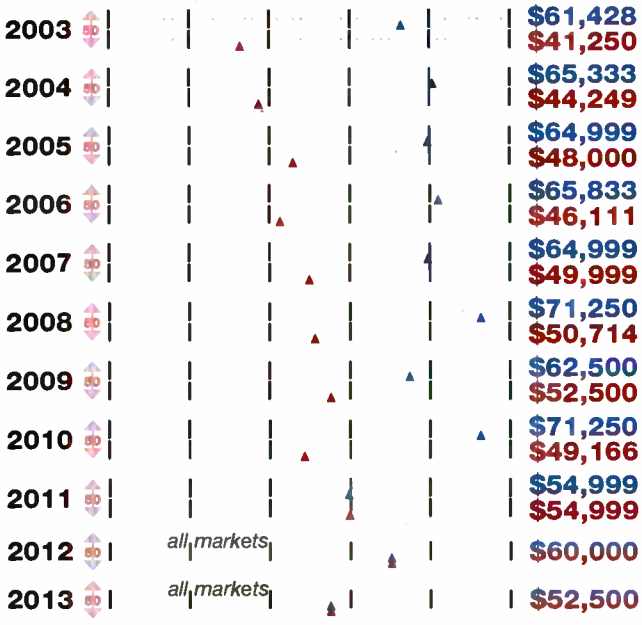


STAFF ENGINEER MEDIAN SALARIES

above and below top 50 markets



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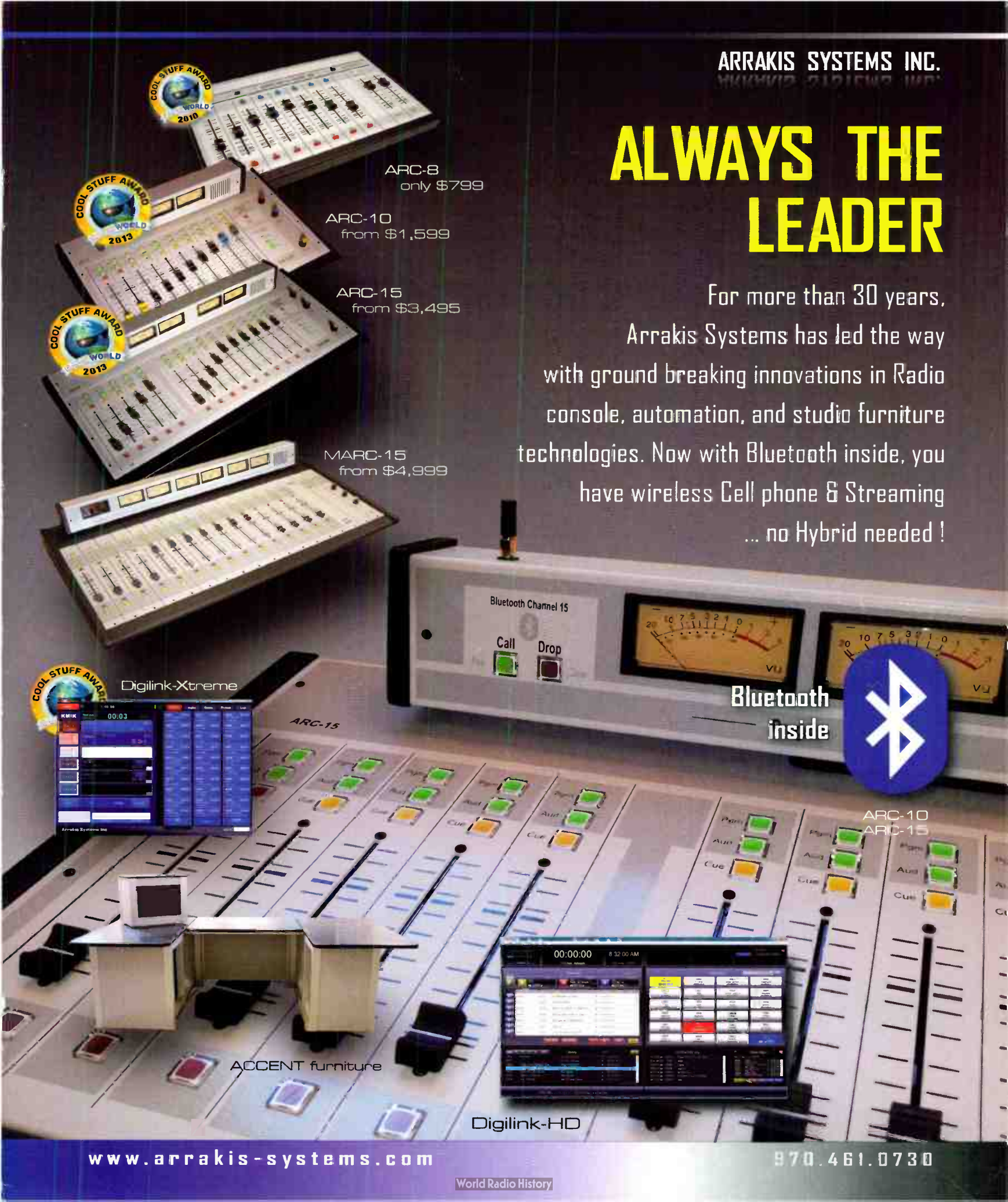
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