Investing in AM | Building Visual Radio | All-Digital AM | All-in-One Portable PAs >

Radio

THE RADIO TECHNOLOGY LEADER

Beasley Places a Safe Bet

Company builds anew in Las Vegas

MAY 2014 | RADIOMAGONLINE.COM
NewBay Media

Bright idea.
All of our consoles have LED button lamps. They'll stay lit for — well, practically forever. Let's just say, your kids won't have to change bulbs, either.

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.

Built to last... and last, and last.
Element modules are machined aluminum with wear-resistant Lexan inserts for long life. We've even designed custom-molded guides to prevent tears around the fader slot. No "ouchies" here.

Unlimited vision.
Some console makers give you "switched meters" to save costs. iQ does away with that annoyance: high-rez OLED displays meter all 4 buses at once.

A low price shouldn't mean "cheap".
Other companies cut corners on their low-cost consoles. Axia packs in as much as possible. Real conductive-plastic faders, machined-aluminum work surfaces, anodized rub-proof markings, aircraft-grade switches. At a price less than some analog "bargain" consoles.

Rack 'em up.
Turn your Radius 8-fader console into a rack-mount powerhouse. Great for OB vans, performance studios, concert remotes and more.

Good timing.
Unlike those other guys' small consoles, DESQ has an event timer and an NTP-capable clock — built-in, not extra-cost. Because time is money (pardon our pun!).

Small but mighty.
DESQ packs big console power into just 18" square. 6 faders, 2 buses, automatic mix-minus, Show Profiles and more. Perfect for standalone or networked studios.

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.

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.

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.

Available in small, large, and OMG.
Whatever size console you need, Element can handle it, from 4 to 40 faders in single or split frames Huge selection of standard and motorized modules, too.

CHOOSING AXIA FOR YOUR NEXT CONSOLE IS EASY.
SELECTING ONE MIGHT TAKE AWHILE.

When we introduced AoIP to radio in 2003, some folks thought we were off our nut. Today though, broadcasters agree: picking Axia is the right choice. With over 5,000 on air daily, broadcasters have voted Axia the world's most popular networked console.

Who can blame them? Axia fans say that Livewire™ networking is the most intelligent, flexible IP-Audio system in the industry. And that our huge number of partners, with over 75 broadcast products from phones to transmitters that connect to Axia networks, makes life much simpler. They also appreciate our 5-year warranty and 24/7 technical support (not that they need it).

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?

AxiaAudio.com

Available in the U.S. from BGS: (352) 622-7700

TABLE OF CONTENTS

Photo by Scott Fybush

FEATURES

COLUMNS

DEPARTMENTS

NEW

AARON 650

Premium FM Rebroadcast-Receiver

UPDATE

DAVID IV

FM/HD Radio™ Broadcast Audio Processor

Version 3 update adds more features, new controls, and greater sonic power.

NEW

INOmini 402

RDS Sign-Driver/Receiver

Display your station's live RDS messaging for all to see.

New at NAB 2014

This year at NAB, we introduced **AARON 650**: a totally-new FM rebroadcast/translator receiver built to handle the most challenging reception scenarios. **Version 3 firmware** added adjustable crossovers, attack and release times, "Windowed AGC and more to our **DAVID IV FM audio processor.** And our new **INOmini 402 RDS Sign-Driver** was on hand displaying live RDS for your control rooms, studios and outdoor billboards.

Learn more at
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3 year WARRANTY

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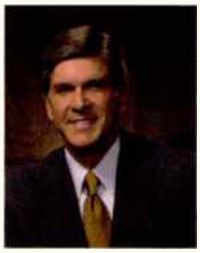
INOVONICS BROADCAST

Gordon Smith Calls for National Broadcast Plan



NAB President and CEO Gordon Smith called on federal regulators to develop a National Broadcast Plan during his keynote address at the opening session of NAB Show 2014. Smith called on policymakers to develop a holistic regulatory approach that ensures radio and television broadcasting are not disadvantaged in the marketplace due to government bias towards other forms of media.

"Our content, our connection to local communities and our spectral efficiency make us the envy of others," said Smith regarding broadcast radio and television. "We are a competitive threat. I am not sure Washington views us this way, however.

"On one hand, government can treat us as if we are dinosaurs and does what it can to encourage TV stations to go out of business," continued Smith. "On the other hand, the FCC says we are so important and powerful that two TV stations can't share advertising in the same market..."

Read the full speech at RadioMagOnline.com.

Eight Appointed to NAB Radio Board

NAB announced that Radio Board Chairman Don Benson named eight appointees to the NAB Radio Board, with the approval of the Radio Executive Committee and Joint Board Chairman Charles Warfield. It was also announced that the Radio Board unanimously elected NRG Media President and CEO Mary Quass to NAB's Executive Committee's First Vice Chair Seat.

Appointed immediately to fill a currently vacant Board seat is Eagle Communications General Manager Gary Exline. Appointed to serve until June 2015 is John Wharff, owner, Jawco Inc.

Appointed to two-year Board seats effective June 2014 are:

Don Benson, president/CEO, Lincoln Financial
Alfred Liggins, CEO, Radio One
Dan Mason, president and CEO, CBS Radio
Ginny Morris, chair, Hubbard Radio
Bob Pittman, chairman and CEO, Clear Channel
Tony Richards, vice president, Federated Media

FCC Will Soon Propose New Net Neutrality Rules

The proposed rules will not assuage the concerns of net neutrality advocates. The Commission's plan is to allow ISPs such as Comcast and AT&T to strike deals with Internet content providers (such as Netflix) facilitating more effective connections (i.e., faster) over the "last mile" specifically for the paying content provider. At the same time, the large ISPs "would be required to offer a baseline level of service to their subscribers," according to an FCC spokesperson, and the ISPs would also be prohibited from blocking or discriminating against online content.

The new proposal would establish a "baseline" rule prohibiting ISPs from engaging in "commercially unreasonable" practices in sending Internet traffic to consumers. The proposal would also establish a process for resolving disputes between Internet service providers and content companies on a case-by-case basis.

98,015

Total registered attendance for the 2014 NAB Show was 98,015, an uptick of more than 4 percent from 2013.

$158.6B

BIA/Kelsey forecasts local media advertising revenues to climb from $133.2 billion in 2013 to $158.6 billion in 2018, representing a CAGR of 3.6 percent.

$225k

Peavey has agreed to "voluntarily" pay $225,000 in settlement to the U.S. Treasury. The case involved marketing and labeling of products considered unintentional radiators.

Clear Channel Media and Entertainment introduced iHeartRadio Networks, calling it a unified platform to better maximize the company's assets and provide targeted impact for advertisers.

Paul Simon will receive the 2014 Service to America Leadership Award from the NAB Education Foundation for his long-time commitment to providing healthcare to underserved children across the country.

Radio magazine announced its Best of Show Award winners at the 2014 NAB Show. For the full list of winners, visit RadioMagOnline.com.

FIND THE MIC WINNER
MARCH ISSUE

Maynard Meyer
KLQP-FM
Madison, MN

He won a 3-pack of Hosa HMIC-025 mic cables from Hosa Technology
www.hosatech.com

The mic was hidden on the left side of the right hand monitor.

The winner is drawn from the correct entries for the issue two months prior. No purchase necessary. For complete rules, go to 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 Hosa UXA-110 mic-to-USB interface. Send your entry to radio@RadioMagOnline.com by June 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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Digital/Analog FM

2014 Best of Show Radio

2014 Best of Show RadioWorld

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drm

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Meet the new GV Series, the culmination of years of Nautel digital/analog transmission innovation. Nautel's field-proven high-power FM architecture is mated with the industry's most advanced RF technologies and Nautel's award winning control system to set a new standard for digital performance, efficiency, serviceability and unmatched functionality. Learn more at www.nautel.com/GV

Making Digital Broadcasting Work. nautel.com/GV

nautel

VIEWPOINT

These Products Were "Best of Show"

By Paul McLane

Congratulations to the companies whose products earned "Best of Show" Awards from *Radio* magazine, as we announced at the 2014 NAB Show.

This is a new award program for both *Radio* and its parent company NewBay, replacing several including our Pick Hits of years past. Separate lists of Best of Show winners were chosen by five NewBay magazines — *Radio, Radio World, TV Technology, Digital Video* and *Video Edge* — from among more than 200 nominations. Exhibitors nominated their products for consideration by the various titles, and paid an entry fee. All nominated and winning products will be recognized in a post-show, digital *Best of Show Program Guide* delivered to readers.

So how does it work?

Any NAB Show exhibitor may submit a product for consideration by one or more of the publications, and may submit multiple products. The program seeks to recognize outstanding products exhibited at the show and new since the prior NAB Show. Winners are selected by panels of professional users and editors (for each magazine) based on descriptions provided by the manufacturers via an online nomination form as well as on judges' inspection at the convention, using the criteria of innovation, feature set, cost efficiency and performance in serving the industry. The 2014 winners are:

Broadcast Bionics PhoneBOX v4 & OASIS
BW Broadcast Ltd. RBRX Encore
BW Broadcast Ltd. Vertus AM / FM translator
Crown Broadcast IREC FME-250
DEVA Broadcast DB7007 Receiver
DEVA Broadcast Radio Explorer II Analyzer
Inovonics AARON FM Rebroadcast Receiver
Nautel GV Series Digital/Analog High Power FM Transmitters
Rohde & Schwarz R&STHR9 Liquid-cooled FM Transmitter
Wheatstone Corp. SG-192 Stereo Generator
Yellowtec iXm Recorder

We hope to improve and expand the award program in future, and I welcome your input. Email pmclane@nbmedia.com.

Radio technology management is in a time of change, and so is *Radio* magazine.

As you read last issue, Chriss Scherer has left the publication as full-time editor, but he remains a part of the *Radio* family as a contributor and colleague. I thank him for his years of leadership both to the magazine and the engineering industry, and for his friendship. We wish him well in his next ventures.

I hope to be able to share with you soon news of his successor. And I thank Senior Associate Editor Erin Shipps, Associate Publisher Steven Bell, our colleagues Chris Wygal and Doug Irwin, and the circle of *Radio* contributors for their support during this time of editorial transition.

Radio magazine is an important part of NewBay Media. As longtime readers know, our roots go back to 1959 when Broadcast Engineering began publication; the first issue of Radio magazine grew out of BE in 1993. Twenty-one years later, this magazine continues to play an important role in the careers of thousands of engineers and other technically minded managers. Stay tuned, and never hesitate to let us know how Radio magazine can serve you better.

McLane is editorial director of NewBay Media's Broadcast/Video Group.

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We Ponder an All-Digital AM Future

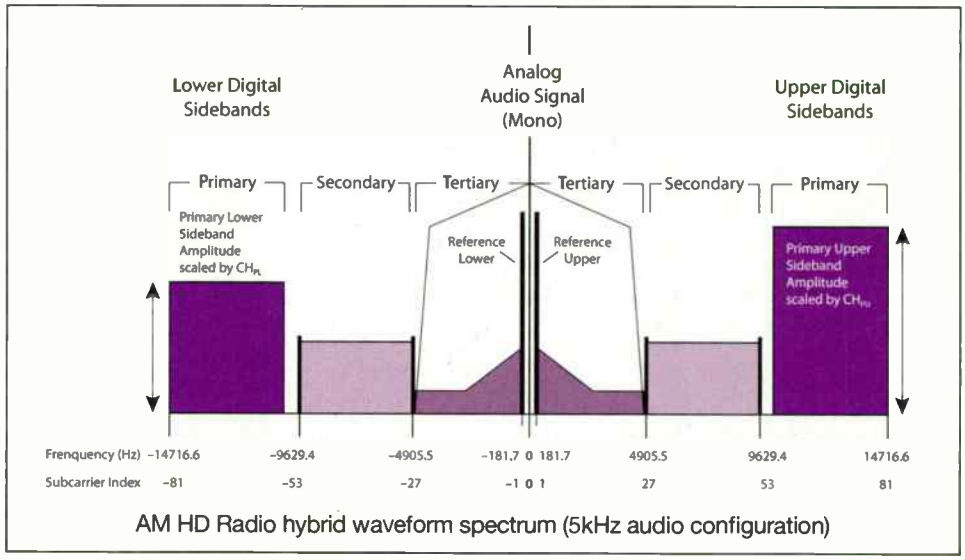
by Jeremy Ruck, PE

At the 2014 NAB Show's Broadcast Engineering Conference, there were many papers presented discussing digital AM and IBOC.

No doubt as an engineer you have experienced the "buzz saw" on the AM band from adjacent facilities, particularly at night, or been charged with running your station in digital. The current situation, in many instances, has resulted in a sharp metallic distaste in the mouths of engineers and management. Indeed numerous stations, some even in my own backyard, originally quite keen on IBOC, have subsequently turned off the digital component, and returned to analog-only operations. Although I am definitely a free-market kind of guy, the reality is human nature sometimes requires interventional prodding to get us to travel the path of a little greater resistance to a better endpoint.

Our friends on the television side of the industry underwent a similar transition. While many stations came to the table kicking and screaming for a myriad of reasons, the result has been beneficial. Program material looks and sounds better, there have been subjective gains in coverage, and multiple program streams can be shoved down the pipe. The same can be said, minus the better-looking video of course, for a transition to all digital AM. That is where we should be heading.

It is important to remember that the current situation, a hybrid mode of analog and digital, was intended only to be a stopgap between the good old days, and a bright future. The MA1 mode under which we are currently operating is akin to erecting a gigantic brick wall on the dial. Not only is there the conventional analog signal occupying its theoretical bandwidth of 10kHz, but also the three additional OFDM subcarriers. The primary and secondary subcarriers respectively lie roughly from 10-15kHz and 5-10kHz either side of the carrier. The tertiary subcarrier roughly occupies the real estate from the carrier frequency out to 5kHz either side. Usually the secondary and tertiary subcarriers are suppressed in MA1. This reduces the bandwidth used, but since the primary subcarriers are distantly located from the main carrier, the "IBUZ" problem remains.

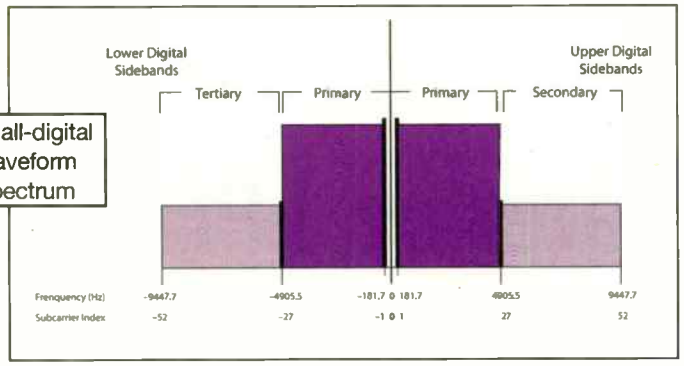


AM HD Radio hybrid waveform spectrum (5kHz audio configuration)

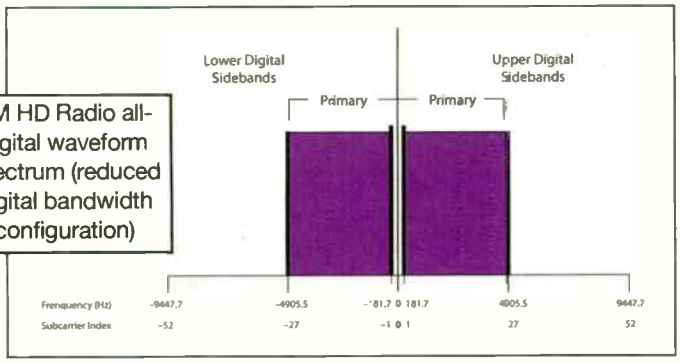
Contrast that with the endgame, which in full bandwidth mode places the primary subcarriers within the 10kHz block centered on the carrier frequency, and the secondary and tertiary subcarriers 5-10kHz above and 5-10kHz below the carrier frequency respectively. In the reduced bandwidth configuration, the secondary and tertiary subcarriers are once again suppressed, and the digital signal occupies the usual 10kHz AM channel. The end result is that in either digital condition, the overall bandwidth is reduced, and the waveform is less susceptible to adjacent-channel interference.

With the full-bandwidth mode, the secondary and tertiary subcarriers become available for additional program streams. Nyquist, however, pops up again, and since these subcarriers are narrower, they will pass less information. Therefore their use is really only suited for highly compressed material such as weather or traffic reports, information services, and the like. Still, this provides additional outlets for programming, and opportunities for alternate revenue streams.

While all of this is encouraging, the nagging issue of receiver penetration remains. At the 2013 Engineering Conference, it was stated that estimates have the number of extant conventional AM receivers pegged at one billion. The conversion to all digital will most likely relegate these to the E-waste heap, or to non-functioning museum pieces. Oh, I suppose a converter could be made; however, it does not seem likely that the economics would be there for such a device. Furthermore, unless the desire is to keep one of Mr. Kent's masterpieces functional for nostalgic purposes, the addition of a converter box would seem to destroy the portability that radio offers. Finally, how would such a device interface with a conventional



AM all-digital waveform spectrum



AM HD Radio all-digital waveform spectrum (reduced digital bandwidth configuration)

radio? Devices are of course available that take an audio signal, and convert it to a very low-level FM signal for reception by a receiver in close proximity. But the scheme of taking a digital AM signal and converting it to FM to be receivable by a conventional FM radio seems to fall somewhere between a light chuckle and absurdity. This is where the Commission should eventually establish a sunset date for analog operations.

Before reaching that sunset date, however, there would be a fair amount of work to be done. First would be upgrades to transmitter plants. Some of these upgrades would necessarily take the form of replacement transmitters. A transmitter is definitely one of the biggest single-ticket items a station has. No doubt in some instances this may cause some financial hardship. Also in the upgrade column would be necessary changes to antenna systems. In general, the non-directional guys have it fairly easy. For many of them, a change in the phase shift of the ATU may be all that is required. However, in the case of directional antennas, there may be some significant work necessary.

Back in the day when the tube transmitter would load into a wet noodle, impedance bandwidth of the common point was less of a concern. Sure, the tubes may glow a little red on occasion, but RF was being made, and the information loss inherent in the modulation scheme combined with speaker quality meant you sounded no worse than your neighbor, despite the grimness of your load. But with exotic things like MER and SNR to consider, the load needs to approach the terrain of Eastern Illinois ... flat. Many arrays may require appropriate modifications, which could cause the cost of a retrofit to spiral up further.

However, items that are still being investigated include power levels and coverage. The field tests conducted so far, including those reported in 2013 and 2014, are encouraging to say the least. Not only are there significant increases in the recorded off-air audio quality, but also the coverage seems to be well matched, or better than the corresponding analog coverage. Since only one facility was tested at a time, there may be some variation in observed behavior when everybody on the dial goes fully digital. Indeed one of the papers this year raised this very issue and notes that power levels need to be potentially revisited in concert with the ongoing propagation tests.

While the transition to full digital remains elusive at best, there is no doubt that things look to be moving that direction. Momentum seems to be building for an eventual transition to all-digital. While FM translators for AM stations have no doubt been a boon and most helpful, a transition to all-digital AM will highlight why AM spectrum is valuable, and worth preserving and utilizing. Perhaps this transition will usher in a new Golden Age for radio. If it does, I for one hope it is accompanied by a restoration of some of the cultural refinement of that era. That of course, is a topic of discussion for another day.

Ruck is the principal engineer of Jeremy Ruck and Associates, Canton, IL.

Regulating E-Cigarettes, LPFMs, and Digital-Only Political Ads

by Lee Petro

In the absence of any significant rulemaking proceedings initiated or completed in the past month, below are several of the subjects that were discussed during the NAB Show in Las Vegas in April. Of special note is the FDA's recent rulemaking on e-cigarettes, and the FCC's future resolution of Low Power FM (LPFM) stations filed during the November 2013 window.

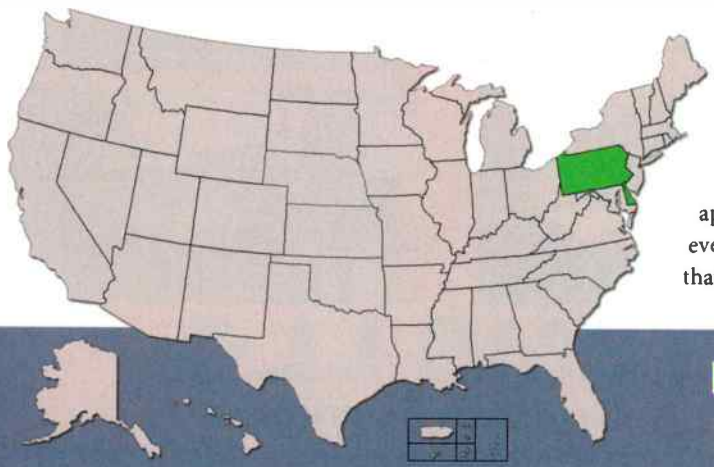
First, as noted in the February 2014 column, the growing popularity of e-cigarettes has raised issues regarding the appropriate policies for broadcasters to adopt for advertising such products. While no action was expected to occur until the third quarter of 2014, the Federal Drug Administration took the first step to adopt rules regulating e-cigarettes in April. Specifically, the FDA proposed two alternative options for regulating e-cigarettes, with each option taking the critical step of finding that e-cigarettes are tobacco products. Absent in the notice of proposed rulemaking was a detailed discussion of the advertising restrictions. However, should the classification of e-cigarettes as tobacco products make it into the final rules, then the FDA and the FCC would likely apply its current prohibitions on advertising certain tobacco products to e-cigarettes as well.

Another topic of discussion was the growing use of digital-only political ads that are placed on broadcast station websites. During the panel discussions, a question was raised whether digital-only time/exposure from a licensee would trigger the FCC's political broadcasting rules. While such advertisements do not trigger the FCC's rules, the broadcast licensee must remember that it is no longer entitled to the strict immunity from prosecution for false or defamatory statements that may be present in the ads, which is currently provided by the Communications Act. While the Communications Decency Act and Digital Millennium Copyright Act may protect against defamation, state law and copyright claims for online political ads, broadcast licensees should establish policies to make sure they preserve their right to these protections. For instance, producing or editing the ad could mean that the licensee is considered to have created or developed it, and may erode some of these protections. Therefore, broadcast licensees should ensure that they obtain indemnification from the candidates or PACs when taking the advertisements.

Another topic discussed in Las Vegas was the processing of mutually exclusive Low Power FM applications submitted during the November 2013 filing window. While the FCC has processed more than 1,000 singleton applications, there remain even more applications that are mutually exclusive with each other. In such cases, the FCC must use the point system factors articulated in the FCC Form 318 to determine a tentative selectee among the group of conflicting applicants. It is expected that the FCC will be releasing a public notice listing the tentative selectees in the near future. Upon release of the public notice, the tentative selectees will be "accepted for filing," and parties may submit petitions to deny the applications. One aspect that may resolve many of the MX situations is the concurrent opening of a window for MX applicants to submit amendments to their applications. While "minor" amendments can be filed at this time, during the upcoming window, the FCC is expected to permit "major" amendments that propose non-adjacent channel changes and/or community of license changes that will render applications acceptable for grant as a singleton. Of course, it may be possible that two parties submit proposed changes that result in new conflicts, but it is likely that many of the proposals will result in new LPFM stations.

Finally, the Copyright Office is considering significant changes to the copyright royalty payment structure. The office released a Notice of Inquiry that teed up more than 20 different topics for parties to address in their comments, including an overhaul of the royalty structure for over-the-air and Web-based radio stations. Comments are due in the proceeding on May 16, and the suggestions contained therein will likely lead to further inquiry from the Copyright Office before final rules are adopted.

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



DATELINE

Stations in Delaware and Pennsylvania continue running License Renewal Post-Filing Announcements on May 16, June 1 and 16.

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With 'Xtreme-Complete' for $6,500, you purchase a complete system ready for air: DELL business PC, Arrakis 'Bridge', and Xtreme software for on air, production, scheduling, voice tracking and more. The system comes with a full year of the 'Solutions Program' with training, support, upgrades, and next business day 'Bridge' replacement if it should fail. The DELL PC comes with 3 years of next business day, on site service from DELL.

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AM RADIO

Industry talk is on improving AM, but is it worth the investment?

By Doug Irwin, CPBE DRB AMD

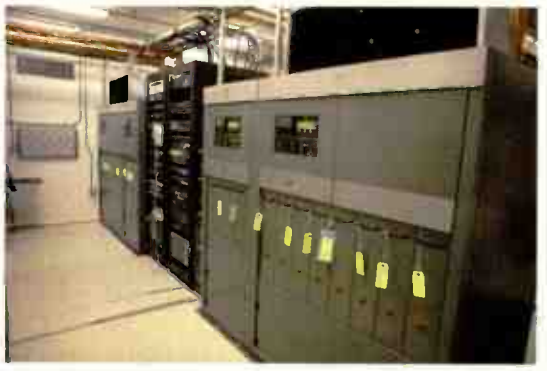
As I read through the trades it seems that most of the talk about AM radio has to do with its diminishing stature. Young people don't listen to AM at all; or, the venerable AM powerhouse stations are simply shadows of their former selves; or there's no point in playing music on an AM station. On the other hand, as I look at the latest BIA/Kelsey revenue report for 2013, I see that five of the top 10 billing stations in the country are AM radio stations. The Commission is soliciting ideas on how to improve the AM band. Clearly the AM band retains much of its viability.

Ninety years after the first AM broadcasters made their debuts, is it still worth investing in an AM radio station transmitter plant? For many broadcasters, the answer is yes, and we're going to look at a couple of examples in this article. Communications technology continues to evolve, and it's bringing AM radio along with it.

WASHINGTON STATE—KRKO AND KKXA

Anyone who has visited AM transmitter sites knows that they use up a substantial amount of land. Often transmitter sites that were built "outside of town" 40 or 50 years ago are now surrounded by houses or otherwise very valuable property. Selling the land under the transmitter site is not an uncommon occurrence, especially if the transmitter site can be moved into a diplexing arrangement with another AM station in the immediate area. The building of a new AM transmitter site can often be facilitated this way, because it saves on land expense and it means no new towers need be erected.

Craig and Andy Skotdal, of Everett, WA, have been the owners of KRKO (1380 KHz) since 1995. The original transmitter site dated from



Above: KBRT AM740's tower array in California. Photo by Scott Fybush.

Right: Main and backup transmitters for both KRKO and KKXA.

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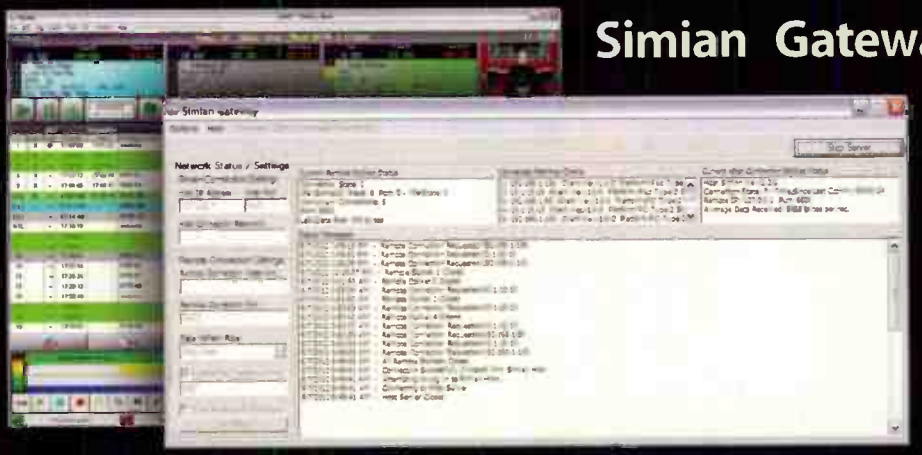

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The KRKO/KKXA transmitter building was raised 16' above ground to mitigate the potential damage from flooding.

An extensive amount of time and effort was put in to protecting the KRKO/KKXA transmitter site from potential flooding.

1958, and came complete with a 1987 version Continental Power Rock and a 1958 Gates 5kW as a "backup." Both the studio and sales departments were located on-site. "It was farmland and in tough shape," said Andy Skotdal, now president and GM of S-R Broadcasting.

In 1997 the Skotdals discovered an opportunity to increase KRKO's power to 50kW full-time, and they made the decision to invest in a new transmitter site. Not long after that process began, they entered AM auction 84, and successfully gained the right to build a station

on 1520kHz as well (now KKXA). An appropriate piece of land was secured, but a land-use battle ensued — one that took 16 years to resolve. The Skotdals were confident in the ultimate outcome, though, and engaged the engineering firm of Hatfield and Dawson (H&D) of Seattle for the overall system design, which would be, from day one, a diplexed array that would accommodate the 50kW non-D daytime and 50kW nighttime pattern for KRKO and the 50kW non-D (daytime) and 50kW DA nighttime array for KKXA.

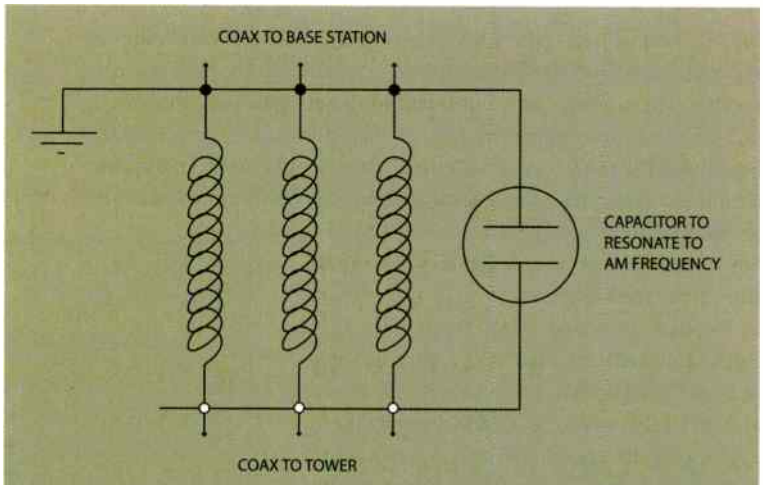
Stephen Lockwood of H&D recommended Bobby Cox and James Banks of Kintronic Labs of Bluff City, TN, to design and build the Phasors and ATUs that would be used to generate the appropriate directional patterns, as well as the diplexer and filters that would allow the two stations to share towers at the new transmitter site.

The new location presented some challenges to Andy and the engineering team, since it is located in a river flood plain, frequently visited by salty marine fog and high winds. All outdoor components (ATUs and filter/diplexers) built by Kintronic use unistrut framing, thick aluminum walls, weatherproofing, and grounded doors. If the river floods, the water can be up to 16' deep, not counting wave action. "We designed the entire plant to operate in a worst-case flood condition," said Andy. "Everything had to be elevated, and we put all our power, control, and RF lines in underground conduit in case we ever had to replace it or add something else in the future."

The KRKO and KKXA engineering team didn't just give consideration to the environmental aspects though; other parts of the facility were also hardened so that the stations would be able to continue operating through other emergency situations. They use a Burk ARC Plus with both telephone and IP interfaces so the site can be easily and immediately reached remotely. "We have alarmed nearly everything humanly possible from fuel level to activation of our main surge clamp to generator telemetry to tower light telemetry to building temperature," said Andy. STL switching is automated, with three different sources. A licensed 11GHz microwave system provides the main STL audio source, along with Internet connectivity, telephone extensions, and other TV, FM and AM audio sources to the transmitter site, where a basic on-air and production facility is also ready for use. The duplex nature of such a link allows for security devices and video cameras to be monitored remotely as well. Four HVAC units are onsite, though only two are

needed to provide the necessary cooling (except during summer heat waves that do happen, even in the great northwest). Onsite generator power is tested weekly; the site can run 14 days, with both transmitters at full-power, should there be a long-term power outage.

One problem that can occur in a potential diplexing situation is that the partners are close in frequency. Just how close can they be? Phasetek of Quakertown, PA, completed a diplex recently in which the stations were separated by just 80kHz (WSKY (1230kHz) and WISE (1310kHz) of Asheville, NC). What are the special design considerations in a case such as this? "With close frequencies, careful choice of filtering circuits must be made to provide adequate attenuation and reasonable bandwidth," said Kurt Gorman, president of Phasetek. "I have developed a 'pi' filter circuit that does a good job for this. Typically on close frequencies, it is better not to 'brute force' the filtering. Placing filtering, where possible, at 50Ω points is better."



Conceptual diagram of the LBA CoLoCoil (typically three coax cables)

HAWAI'I — KNUI

As we saw from the KRKO/KKXA transmitter example, it's often times easier to arrange a diplex so that two AM stations can share towers, rather than building two separate transmitter sites.

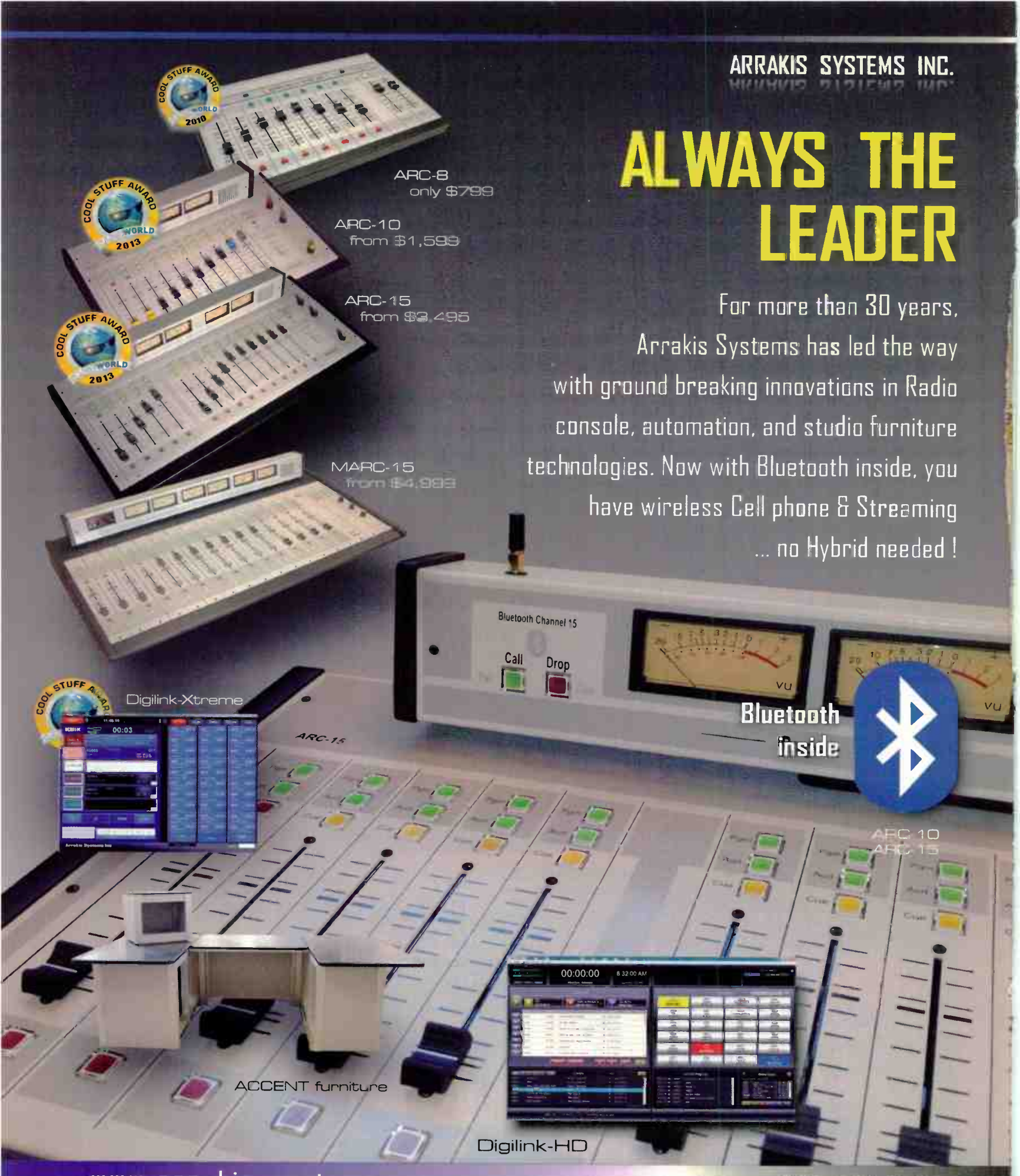
Are there other ways that AM towers can be used for shared purposes, thus generating some income for the tower owner (presumably the AM radio station)? The answer to that question is yes and it's been done for years, by one of three different means. Perhaps the most

familiar way is by grounding the tower base and shunt feeding the tower; or, alternatively by making use of the folded unipole type arrangement. In either case the tower base is grounded and coaxes can be run up the tower without further isolation. In the case of series-fed radiators, another means is by using iso-couplers that allow the RF signal in the coax to jump across the tower base, while appearing invisible to the RF flowing on the tower itself. Finally, the third method is to run the coax up the tower, arranging the length of the coax outer conductor so that it appears as a $^1/_4$-wave stub to the RF frequency on the tower.

With the proliferation of cellular telephone sites, one would think that more cellular carriers would look to existing AM towers as a way to get around problems with local zoning. If we look at the case of KNUI in Wailuku, HI, we find an example of this very thing happening. Verizon Wireless needed to expand its footprint in the area, but ran into zoning difficulties with the local authorities; so, they asked around, and found KNUI (then KMVI) as a partner station. KNUI had a 450' tower, but it couldn't support the antennas that Verizon needed. A compromise had to be made between Verizon and the station owners, though — the new tower could only go up 180' (with top-loading, it appears to be about 46 degrees). Both parties decided it was mutually beneficial to go ahead with the project. KNUI selected LBA Technology of Greenville, NC, to provide the new ATU, and another LBA product known as CoLoCoil, to allow the installation of the Verizon antennas on the new tower. The CoLoCoil system is a variation on the iso-coupler idea, but it uses parallel-resonant filters, composed of the outer conductor of the coax, and a parallel capacitor, to reject any RF energy from the tower itself. (See figure 1.) According to LBA, the tuned circuits present a "lower capacitive footprint to the tower's lump base capacitance," while allowing the RF path for the cellular company, and a DC path for any control systems, or tower-mounted amplifier systems.

AM radio remains a viable means of communications. Certainly we all know that it is not as important as it once was during the 1930s and 1940s, for example, when there was no competing electronic media. But even with its gradually diminishing stature, there are station owners out there putting their hearts and souls into it. During the composition of this article, Andy Skotdal of KRKO/KKXA was busy planning, and later executing a remote broadcast designed to benefit the families of victims of the tragic mudslide at Oso, WA, but still found time to answer my questions. I know there are others who are working just as hard to make their AM stations successful. I hope if you are involved in AM radio that you will give every effort toward the same end. Q

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



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Beasley Broadcast Builds Anew in Las Vegas

By Chriss Scherer, CPBE/CBNT

When a licensee obtains new stations in a market, it can sometimes take months or years to integrate the various operations from multiple facilities into a single, combined operation. This was the case with the Beasley Broadcast stations in Las Vegas. After several acquisitions, Beasley had five stations operating from three different facilities around the area.

Two of the facilities were on East Tropicana, and the third was on East Desert Inn Drive. The plan to consolidate all under one roof was established several years ago, and the search began for a suitable location. There were two main criteria: Find a building that was in a safe part of town, and was also higher in elevation to facilitate radio paths.

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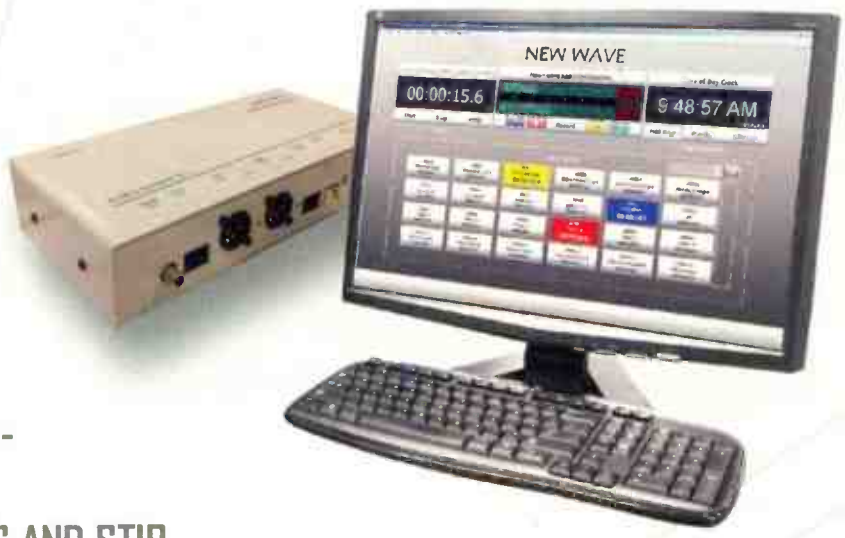

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The studio for Coyote 102.7 is a mirror image of the other air studios.

The Bob 107.9 studio has a slightly different configuration because of the room dimensions. The guest area is to the side instead of to the front of the console.

While Las Vegas appears to be completely flat, there are variations in average terrain in the valley. The area to the west is slightly higher. This area also provided suitable options for being safe after hours.

While the search for a new place was underway, the existing studios were kept running as best as possible, knowing a new facility was in the works. Upgrades were needed, but they were put off. But while the upgrades weren't implemented to the old studios, they became the basis of plans for the new studios.

The talk studio for AM720 KDWN.

The performance studio is an intimate space that can seat about 20 guests.

In April 2012, a building that met Beasley's requirements was found. The two-story building was purchased and remodeling began in June 2013.

The building was previously occupied by a real estate agency. The entire second floor was completely remodeled to house the studios and technical operations center. About one-third of the first floor was remodeled to house the sales and administration offices. A 70' tower was built next to the building to hold STL and other antennas.

Studio A – production (one of several)

Studio C – smaller production

Traffic for all the stations originates from this studio.

BRING IN SOME HELP

The lead architect on the project was V Three Studios of St. Louis. To facilitate the project, and to adhere to state laws, SCA Design of Las Vegas was the architect of record. SCA was the firm that designed the building when it was built in 2007, and had access to all the plans of the building. Strata Building Group was hired to build the actual studios. With the plans developed and a contractor in place, construction on the studios began in June 2013.

There are 12 studios in the facility. One design plan was to have studios maintain a certain consistency between rooms. All the FM control rooms are essentially the same. The same is true for all the production studios, except one. Because some staff members work across several stations, it made sense to keep layouts and operations similar between rooms. There are subtle differences that were dictated by a particular station's format or operation.

The production room that stands apart also serves as the back-up air studio, which is why it was designed differently. The AM studios were set up for the particular needs of an AM talk station.

The second floor of the building is made of wood. There was concern that it did not have sufficient mass to prevent transmission noise from entering the studios. For this, a raised, floating floor was installed. When you exit the second-floor elevator,

EQUIPMENT LIST

APC 2200
Audion Labs Voxpro 5
Barix Exstreamer 500
Belar FM HD Monitor
Burk ARC Plus, ARC-16
Burk Assurance Controller
Comrex Access, Hotline, Matrix
DaySequerra M4
Denon DN-630, DN-C635
DM Engineering Multistation Relay Adapter
Dorrough Model 40-A, Stereo Signal Tester
Fostex RM-2
GatesAir Intraplex Cross Connect Server, Intraplex HD Link, Intraplex
STL Plus
Gorman-Redlich CRW-S
Inovonics 630, Inomini 632, Inomini 634
KRK Rockit 8
Microwave Networks 11GHz STL
Middle Atlantic racks
Moseley 5010, DSP6000E, Lan Link 900
Omnirax furniture
Rolls RS-80
Sage Digital Endec
Spectracom GPS Ageless Oscillator
Symetrix 528E
Telos 2x12, Delta 100, One, NX-12, Zephyr, Zephyr Xstream
Tieline Express
Titus Technologies on-air lights
Wheatstone Blades, E-1, E- 6, Sideboard, Vorsis M1
Wideorbit Radio Automation
Worldcast Systems APT Horizon Nextgen

there is a slight grade that steps up about 2". The small incline is often not noticed by visitors.

While the construction and installation progressed smoothly for the most part, there were some bumps along the way. The previous facilities did not have suitable performance spaces, so one was planned in the new building. As the performance studio/conference room was being built, it was quickly realized it was too small. The plans were changed to provide more room and make it a more functional space.

Another obstacle was based on geometry. While the plans said the building was square, it turns out it was not perfectly square. The studio

Left: The rack room *Below:* The news studio has room to add additional workstations. There are six TV monitors on the walls.

furniture, designed and supplied by Omnirax, needed some small, last-minute updates to fit the spaces properly. The furniture was built to the exact specs provided, it just turned out the specs had an error.

TO THE EQUIPMENT

The previous studios were built around analog consoles and discrete wiring, which was the common practice when they were built. This was another planned upgrade for the new facility: An integrated audio routing network. An IP audio network and control surfaces from Wheatstone was chosen to handle the audio needs. A new WideOrbit automation system rounded out the foundation of the new studios.

When it came time to switch the new studios online, there was no fuss. As the new facility neared completion, the audio feeds from the old buildings were sent to the building and then fed to the various studio-to-transmitter links via the


Tower behind the studio


Beasley's fleet

audio network. This made the old studios simple audio network sources. And a new automation system at the new studios provided all the necessary audio files. When it was time to switch, a new source fed the STL and the new facility was on the air.

So after an extended period of waiting before work on the new studios could begin, Beasley in Las Vegas finally has a new home. And from when the work was begun in June 2013, the stations were all on the air from the facility by the middle of December 2013. And even better, the project was completed one month ahead of schedule. That's a lucky roll of the dice.

Scherer is a contract engineer and recording engineer in Kansas City, and former editor of Radio magazine.

All-in-one PAs

by Chriss Scherer, CPBE CBNT

While radio remotes have evolved and embraced IP audio and other newer technologies, there are still certain basic needs for a live appearance. One of those needs is delivering audio to the live audience. The days of setting up a boombox to play the station feed are behind us, mainly because there is some audio delay in the chain somewhere.

Having a portable PA on site provides a better way to deliver the audio to cover an area, and the PA offers greater flexibility at the remote site. If an over-the-air feed is used, it can easily be fed into the PA. Otherwise, take a feed from the backhaul from the remote connection (without the IFB of course). Better yet, feed the mix-minus into the PA as well as the local audio sources and avoid any chance of odd effects from audio delay. With a mic feeding the PA directly, the local talent can also talk to the listeners attending the event.

While good-sounding audio at the remote site is important, the portable PA becomes yet another piece of equipment to load/unload and set up. With this, there's a compromise between quality sound and sufficient volume without requiring a heavy hauler to get the PA in place. For the lineup this month, we looked at systems that use a single-box

Alesis Transactive Wireless | alesis.com

With a built-in telescoping handle, this portable PA can easily be wheeled in place. It features a ¼"/XLR mic/line input, a ¼" instrument input, a 3.5mm stereo TS input, and audio can be streamed to the amp via Bluetooth. It has a recessed dock to hold a tablet, and a USB port to charge or power a device. It has an 8" woofer and 1" compression tweeter. It can operate on ac or internal batteries (up to 50 hours). It has a 35mm socket on the bottom to support the unit on a speaker stand.

Anchor Audio Go Getter | anchoraudio.com

Weighing 23lbs., Go Getter can be mounted on a standard speaker stand and can operate from its internal battery for up to eight hours. It has a 6.5" woven fiber woofer and a high-output horn tweeter. The mixer on the back has two mic inputs (combo XLR/TRS jacks), a 3.5mm and ¼" stereo line input, a line output, and a speaker output. An LED indicates the battery charging and remaining power. The unit produces 75W on ac power and 50W on dc power. The mixer has a built-in limiter to prevent overloads. Options include a CD/MP3 player with USB and SD card slots, and up to two wireless mic receivers.

Powerwerks PW100T | powerwerks.com

With four 4.5" speakers and high-frequency driver, the PW100T stands 28" tall, 7.5" wide, 6.5" deep, and delivers 100W of output power. It weighs 23lbs. The built-in three-channel mixer supports two mic- or line-in channels and one stereo line-in channel. The mic inputs include phantom power. Each channel has two-band EQ. A Powerlink connection (in and out) allows multiple units to be linked for greater coverage and additional inputs. The Powerlink output can also be used to feed another sound system or used as a line output. There is also a subwoofer output. (The PW112S subwoofer is also available.) The cabinet features a built-in stand adapter. Frequency response is 20Hz to 20kHz.

Roland BA-330 | roland.com

This all-in-one system has stereo speakers and a built-in mixer/amp. It has two mic/instrument inputs (XLR and TRS), two stereo line inputs (TRS), and aux in (3.5mm TRS and RCA), line output, and a stereo link output to connect to another BA-330 or a separate amplifier. There's a two-band EQ on the output. It operates on 12Vdc (external supply) or internal battery power (8xAA). It features a built-in feedback eliminator and stereo effects for reverb and delay. A footswitch can enable or bypass the effects. A slot on top holds a media player for playback. It measures 16.375" w x 14" d x 20" h and weighs 30lbs.

approach. There are lots of combo systems that break down into a mixer/amp head and two speakers. These are good systems, but when physical size is an issue, and with less technical staff handling setup, an all-in-one has certain convenience benefits.

All these units can be mounted on a standard speaker pole to get them above the heads of a crowd. Many of them can operate on batteries as well, which is convenient if shore power is limited. Other offered features include on-board audio effects and the ability to link or expand units for greater coverage.

Scherer is a contract engineer and recording engineer in Kansas City, and former editor of Radio magazine.

Line 6 StageSource L2t | line6.com

This slender amp has an integral speaker stand receptacle at the bottom. The mixer includes two mic/instrument inputs on combo XLR/TRS jacks. The inputs have a switchable pad, three-band EQ, feedback suppression, modulation effect (doubling) and reverb. There is a control to adjust the acoustic modeling for an acoustic guitar input. There is also a line input (combo XLR/TRS) and an auxiliary input (RCA). Multiple units can be linked with the Loop Thru and Mix Out jacks, or via the L6 Link jacks (for other Line 6 products). It has a 10" woofer and 1" tweeter. The cabinet can be laid on its side and angled using the handle or the kickstand. It stands 23.75" h × 12.25" w × 12.25" d and weighs 39lbs. It operates on ac power.

Samson XP40i | samsontech.com

This PA features a 6" woofer and 1" high frequency driver powered by a 40W class D amplifier. It has a combo XLR/TRS mic/instrument input on channel 1, a 3.5mm TRS line and ¼" instrument inputs on channel 2, and a level control for the internal 30-pin iPod dock. A two-band EQ adjusts the output mix. A ¼" jack links two units together for added inputs or stereo setup. There is a speaker stand pole-mount receptacle on the bottom. The unit is powered by 18Vdc via an external power supply or via the internal gel cell batteries. The XP40iw adds a wireless mic.

The New Face of Radio

by David Holland, Omnirax

When ESPN commissioned us in 2008 to build two new on-air radio studios, the challenge was to make them video friendly. At the time, "Mike & Mike" was already a popular show being simulcast on television, but no radio studios on the campus were "TV friendly." Since completing that project, we've done more than a dozen more where "visual radio" was a key component in studio and studio furniture design. At this year's NAB Show, at least 50 percent of the people planning on new studio builds were considering some type of video in their plans.

Simulcast, streaming video, webcasting — they all need to overcome the visual clutter of radio's typical above-counter profusion of monitors and mic booms and present a clean face to the cameras. Here are a couple of the strategies you can employ to make this work in your studio.

OVER THE TOP

"America's Morning Show" with Blair Garner was conceived as a TV show that happens to be on the radio. With lots of space, computer-controlled lighting and video embedded in the furniture and the wall behind (not to mention room for a live audience), this really is a visual studio. The look and feel of the furniture drove the design; the engineering challenge was to embed monitors, mics, switches and keyboards into a structure that looked permanent, yet could be unbolted and wheeled off the stage to make way for a live performance.

Photo by Claire Tallerico

"America's Morning Show" features embeded monitors, mics, switches and keyboards.

Multi-level | *Clockwise from top left:* An overhead view in the shop showing the three layers | The view through the control room glass covers all five positions: host, co-host, screener, producer and guest. | This is what the primary camera sees. The screen image can be changed. | Ron and Don have room to spread out with a comfortable and ergonomical arrangement, and tall chairs to match the surface height.

Photos by Chris Pendi

MULTI-LEVEL

At KIRO-FM in Seattle we employed a three-level design with the control room and studio working together to produce the show. There is a work surface for the talent, technology "moat" for monitors, mic booms, switches and cable routing, and a "top hat" for the camera to feast on. Layering in this manner made it easy for the engineers to have access to gear (in racks under the top hat) and run wire, left the talent free to spread out and work normally while the camera just grabs the perfect image.

Low riders | *Left:* This four-person setup places six low monitors in front of the host, two in front of the co-host with additional spots for the producer and engineer. *Right:* A two-level design includes the top hat and work surface with sunken monitors. The shape of the top hat provides the desired reflection for the camera while shielding the papers and peripherals from view.

LOW RIDERS

This approach keeps everything low so hand-held cameras can roam and capture visuals on the fly. The key is dropping the monitors down to surface height and planning on low profile mic booms. Yellowtec just showed a new M!ka boom at the NAB Show, which is designed just for this purpose. Studio Items have a number of other suitable models.

ARE YOU READY FOR VISUAL RADIO?

While this short primer focuses on furniture, clearly there are other considerations not covered here. The studio must be large enough for pleasing camera angles, of course the cameras themselves (plus operators or remote software), and additional attention must be paid to the lighting.

As with all studio planning, thinking about these things far enough in advance is critical in helping to make your "furniture headache" go away. Remember, the first thing in the room shouldn't be the last think that you think about.

David Holland is VP Design, Omnirax Furniture Company, Sausalito, CA.

DAA modules, DIY interfaces, and directional couplers

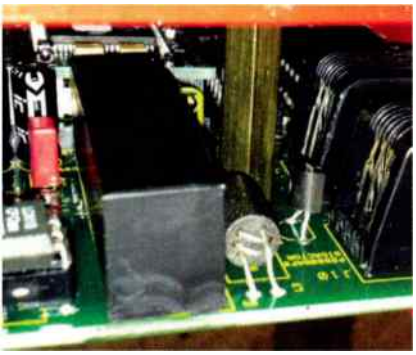
by Doug Irwin
CPBE AMD

In previous editions of Tech Tips I've mentioned the fact that we're always looking for tech tips from engineers working in the field. This month we've got two excellent submissions.

NO DIALTONE

First we'll take a look at a great idea forwarded from Randy Orbaker from WHAM in Rochester, NY.

"We use Comrex Hotlines occasionally for sports or other remote broadcasts where nothing else works. On three separate occasions, three different units suddenly failed to connect when trying to place a call. Each time the display read "NO DIALTONE." In each case, the POTS line was found to be working.



The DAA module is the black rectangular item.

"The failure was traced to the DAA (data access arrangement) module, which acts as an interface between the POTS line and the rest of the Hotline circuitry. This part is a Xecom model XE1030. I have not found it at Newark, DigiKey or our other usual parts vendors, but was able to purchase replacements through Broadcasters General Store for about $40 each (the most recent price). It was a special order, taking typically 30 days for delivery.

"Replacing this module fixed this particular failure in every case.

"The module has a SIP plastic package with very small pins. Care is needed when de-soldering and soldering so as not to damage it."

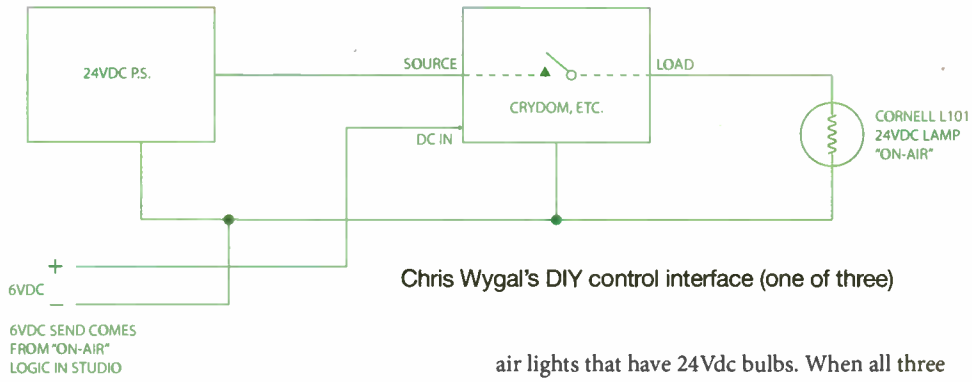
As Randy says, "You might find this repair tip useful, to avoid having to scrap an otherwise working unit." Amen to that.

DIY CONTROL INTERFACE

The second tip this month comes from our very own Chris Wygal. "The recent relocation of our network studios required typical equipment and accessories purchases. On some items, however, I chose to be crafty and thrifty. Instead of buying a control interface for on-air lights, I built one using two power supplies and three solid-state relays.

"Crydom makes a product that is perfect for this application. It's a solid state control relay that needs as little as 3.5Vdc to pull down and a load relay that can handle 3 to 60Vdc. (An example of a Crydom part for this application would be an LVD75A40. You can learn more by looking at the Crydom website: crydom.com.)

"We use small unobtrusive Cornell L101 on air lights that have 24Vdc bulbs. When all three lamps are on, the combined amperage is considerably lower than the 3.33A load the power supply can handle. The diagram above shows how an incoming "tally light on" closure from all three studio consoles will create the logic control for the corresponding on-air lights. All three light systems share the control voltage power supply and the power supply for the on-air lamps. I used Cat-5 cable for the console closures and 18 AWG wire for the lamps. The entire project was less than $150."



Chris Wygal's DIY control interface (one of three)

DIRECTIONAL COUPLERS

Let me add one more. At one of the stations I work at here in L.A., we recently decided we wanted to remotely monitor the power output from an amplifier connected to the output of our IFB transmitter on Mt. Wilson. (The unit didn't have a native provision for that.) My colleague Jerry Burnham found a vendor that makes all kinds of directional couplers, and specifically one that was ideal for our application (100W range at 455MHz). That vendor is Connecticut Microwave (connecticutmicrowave.com/prod_directional_couplers_coaxial.php) and they offer up a wide range of power levels. The units don't come with a meter, but each has a dc output (proportional to the power level flowing through it of course) that can be used to drive a remote control input.

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

WE NEED YOUR TIPS

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

50 YEARS SBE 1964-2014

This Month in SBE History

What's in a Name?

By Chriss Scherer

2014 Marks the 50th Year of the Society

Over the years, the Society of Broadcast Engineers has faced challenges with its own name because of the use of the word "engineer." The definition of the word typically refers to an individual who has technical or scientific training and designs, builds or maintains complicated products, machines, systems or structures. Those involved in the technical operation of a radio station will agree that the title "engineer" appropriately describes what we do.

But other industries and organizations have disagreed over the years.

One of the first challenges to the use of the term "engineer" came with a confrontation with the state of Minnesota. In May 1967, the attorney general for Minnesota wrote to the SBE asking for information about the SBE chapter there. Unfortunately, the intent of the letter was misunderstood to be a challenge of the use of the word engineer, but the cycle had begun.

While the Minnesota situation was handled, there have been other challenges since. Some have come from State Registered Professional Engineer organizations. There have been other challenges in some states in identifying the type of work a broadcast engineer can perform without holding a specific license or certification. To date, the SBE has been successful in defending its name and dispelling any concern that SBE members were trying to pass themselves off as registered professional engineers.

Such challenges aren't limited solely to SBE members; they apply to anyone calling him or herself a broadcast engineer. But after 50 years, the name of the society appears to be safe for now.

Historical sources: "The History of the Society of Broadcast Engineers, 1964 - 1981," by Bradley L. Dick, CPBE. Personal experience of Past President Chriss Scherer, CPBE CBNT.

BIA/Kelsey Releases Annual U.S. Local Media Forecast

Here are some of the findings from the most recent BIA/Kelsey forecast:

> Based on changes in the overall local media marketplace, the company estimate the overall local media market will grow faster than previously thought through 2018 (at a 3.6 percent compound annual growth rate). By 2018, the total will be $158.6 billion, strengthened by political and Olympic advertising.

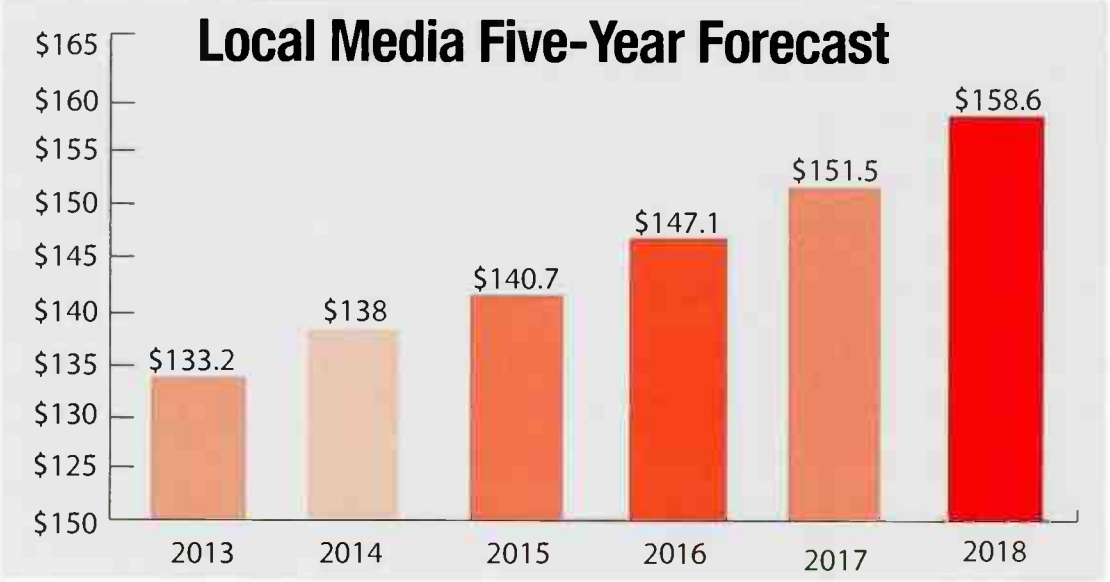
> Total local media advertising revenue growth will fail to keep pace with growth of the overall economy throughout the company's projection period. Advertising as a percentage of GDP will reach a new low of 0.75 percent.

> Growth in online/digital advertising revenues will remain strong, with a 2013-2018 CAGR of 13.6 percent.

> That compares with a 2013-2018 CAGR of 0.1 percent for traditional advertising revenues.

> By 2018, local online/interactive/digital advertising revenues will be $52.7 billion, 33.2 percent of the total local media advertising revenues.

Source: BIA/Kelsey U.S. Local Media Forecast



Full report: biakelsey.com/Research-and-Analysis/Forecasts/US-Local-Media-Forecast-Full-Edition/

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