

# Radio

THE RADIO TECHNOLOGY LEADER

wicc 600

## Reconstructing WEBE 108 & WICC

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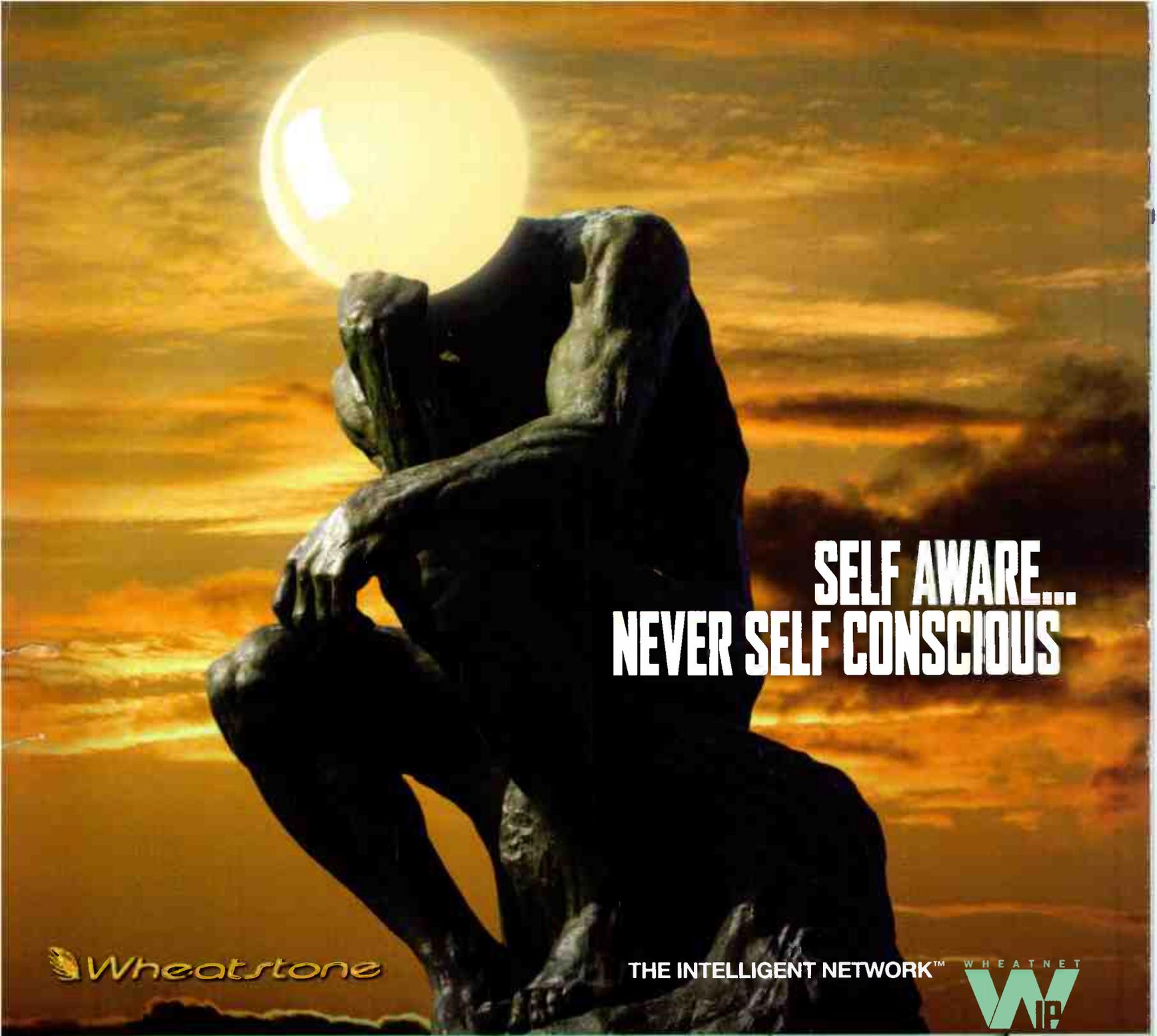
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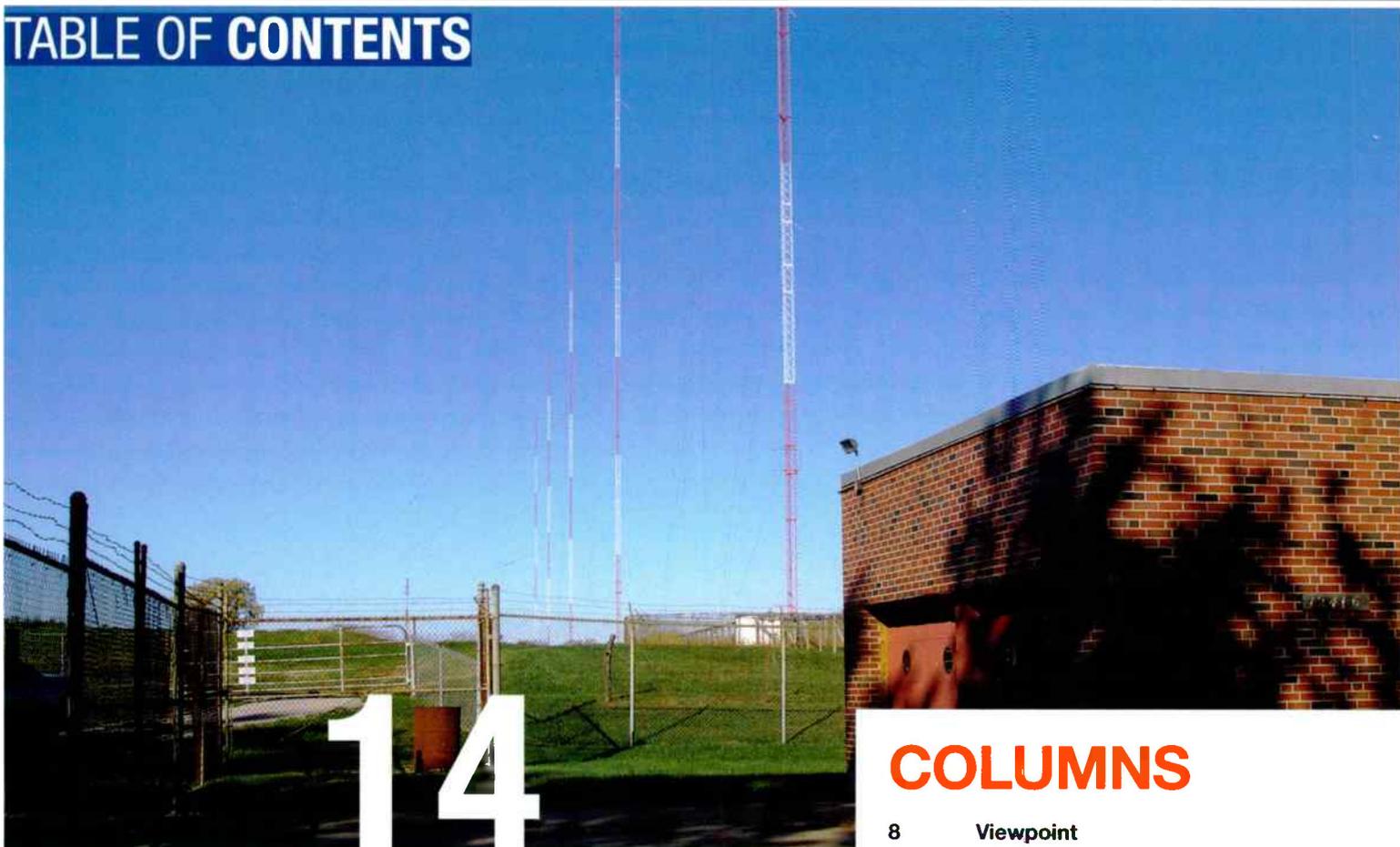
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# Introducing the Mic Adapter



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The Mic Adapter lets you connect a professional XLR Dynamic Microphone to your iPhone 4\* for HD audio quality. Simply plug your iPhone into the Mic Adapter for high quality remotes or record beautiful rich bass tones, crisp midrange and crystal clear high frequencies.

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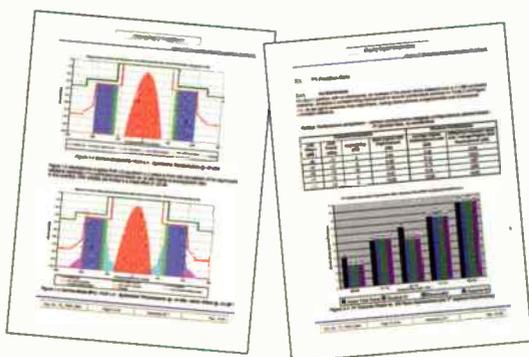
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World Radio History



## iBiquity, NAB Fastroad Release Asymmetrical IBOC Sideband Lab Tests Results

NAB Fastroad released the report "HD Radio Asymmetric Sideband Laboratory Test Report," which describes the results of laboratory testing of HD Radio asymmetric sideband technology for FM-band digital radio. This work was undertaken by iBiquity Digital, and was funded by NAB Fastroad and iBiquity.



The report characterizes improvements in digital signal-to-noise ratio (SNR) that can be realized with the use of asymmetric (unequal) IBOC transmission power. This new transmission method affords broadcasters the ability to mitigate potential first-adjacent digital-to-analog interference by allowing independent adjustment of upper and lower IBOC digital sideband levels, maximizing the digital signal coverage area as a result.

## Navteq Delivers Traffic Info to Garmin Devices via HD Radio

Navteq introduced Navteq Traffic over HD Radio, a means by which real-time traffic information is made available to Garmin digital traffic devices. Navteq can now deliver traffic updates approximately every 30 seconds across the United States (wherever HD Radio transmissions are available). According to Navteq "the ultra-rich transmission is 4 to 10 times faster than other traffic services."

## FCC

The Federal Communications Commission has released a notice of proposed rulemaking to permit common ownership of newspapers and broadcast stations in the top 20 markets under certain conditions. The notice also suggests dropping restrictions on the common ownership for TV and radio stations in all markets.

FCC Chairman Julius Genachowski appointed Henning Schulzrinne as chief technology officer. As CTO, Schulzrinne will guide the FCC's work on technology and engineering issues, together with the FCC's Office of Engineering and Technology.

## FEMA Launches IPAWS Course for Public Warning Officials

FEMA has launched an online course to provide basic information on the Integrated Public Alert and Warning System (IPAWS) to authorized public safety officials. Course attendees will learn the benefits of using IPAWS for effective public warnings; learn the skills to draft more appropriate, effective, and accessible warning messages; and best practices in the effective use of the Common Alerting Protocol (CAP) to reach all members of their communities.

The course, titled IS-247, has three lessons and is designed for emergency managers, law enforcement officials, fire department personnel, dispatch personnel (911), National Weather Service (NWS) personnel, and other authorized centers (according to a State's EAS plan, State emergency plan, Amber Plan/Amber Alert). Broadcasters could attend the course to learn what emergency managers would be expected to know.

## FCC Issues First White Space Approvals

The Federal Communications Commission has issued a public notice on the approval of Spectrum Bridge's television white spaces database system, which may provide service to devices beginning Jan. 26, 2012.

The FCC has also approved a device by Koos Technical Services (KTS) as the first product allowed to operate on an unlicensed basis on unused frequencies (white spaces) in the TV bands. The KTS device will operate in conjunction with the Spectrum Bridge TV-band database.

Commission rules require that unlicensed TV band devices contact an authorized database system to obtain a list of channels that are available for their operation (i.e., channels not occupied by authorized radio services) at their individual locations and must operate only on those channels. Initial operation under this approval will be limited to Wilmington, NC, and the surrounding area.



### 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](mailto:radio@RadioMagOnline.com) by Feb. 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](http://RadioMagOnline.com)



# SMART:



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# CHOICES:



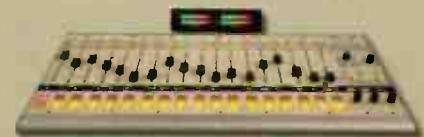
Artisan



Mosaic



Remora



Pilot



vScreen

# Ghosts of Studios Past



**T**his month's Facility Showcase brought back lots of memories. I interviewed Dave Suplee to prepare the article, but it's not the first time Dave and I spoke about WEBE. He and I talked about the station when Cumulus was in the process of buying it. I was the chief engineer of WEBE 108 from 1988 to 1990.

When Dave told me about the plans to rebuild the stations in the existing space, we talked about what he was replacing and I realized the underlying foundation of the studios was what Ed Butler, Kevin Plumb and I installed at the end of 1989.

I have always enjoyed building studios. If you have built them, you know the sense of pride and accomplishment you feel once the project is finished.

While looking at photos of the renovated WEBE/WICC, I thought about some of the other studios I built or rebuilt during my career.

My first station build was at WVCG-AM, Coral Gables, FL, in 1987. I was hired there as a board op, but I had asked to be a part of the studio build. I learned a great deal during this studio project. As the work was about to begin and equipment was being delivered, the chief engineer resigned. Station management came to me and asked if I could keep the project rolling while the search for a new chief began.

Being fresh out of college I considered the opportunity and decided I had nothing to lose. If the project fails, how can I be blamed? I was just a kid. If it succeeds, I'm a hero! As the project progressed, other engineers from the licensee's (Evergreen Media) other stations were brought in to assist. It was something of an ego to have people with 30+ years of radio engineering experience asking me what to do next. That studio build wound up being a success.

A few months later, while working as an announcer at WTMI-FM, Miami, I got involved with that station build. Contract engineer Dave Camp was in charge, but he relied on me to be on-site during much of the project, and again, I had the general contractor coming to me to make decisions.

Working with Dave Camp led to additional contract work in South Florida, and I got to know lots of great engineers, including Howard Quinton (who taught me a great deal), Roy Pressman, Mitch Wein and Jim Leifer.

The next studio project for me was WEBE/WICC. Later on, I finished building the studios for WZJM-AM and WJMO-AM in Cleveland, and rebuilt the WHK-AM air studio and the WMMS-FM/WHK-AM production studios in Cleveland. By then, studio builds were like riding a bike. But it was still an exciting experience.

I joined *Radio* magazine full-time in 1997, and I thought my studio-building days were behind me. I was given a little taste in 2007 when Entercom built new studios in Kansas City. I provided some contract services, mostly punching cables and making wire assemblies. The excitement of building studios was still there, although crawling around, banging my head and scraping my knuckles has lost its luster.

I think that WEBE and WICC were the last existing studios that I had a leadership role in building. I guess their 20-year run is a good sign.

When I'm asked what I like about being a broadcast engineer, I note the variety of the daily routine. It's rare that a single day is just like any other. Everyone has his favorite part of the job, but there's usually one aspect that stands out as a personal favorite. Revisiting WEBE brought back lot of memories of studios past. **0**

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World Radio History



# Understanding Tee Networks

by Jeremy Ruck, PE

**T**his month we take a more in depth look at the tee network. This impedance matching network, aptly named, has the appearance of a T. The vast majority of AM transmission facilities will have at least one of these networks somewhere in the facility. The substantial versatility of the network is the primary factor in its ubiquity.

The tee network seems almost magical as it has the ability to transform between almost any two complex impedances using only reactive elements. Remember that reactive elements are capacitors and inductors, and have essentially zero resistance. The absence of resistance in the elements comprising the network is critical as it eliminates power dissipation and associated heating. Even though ideally there is zero resistance in the components, the reality is we live in an imperfect world. Thus, some small quantities of resistance are unavoidable. The presence of these miniscule resistances is one of the reasons power is normally measured through the use of current meters at the antenna. In directional antennas, this is accounted for by a fudge factor in the mathematics.

In addition to transforming two impedances, the tee network also creates controlled phase shifts. The sign and magnitude of any shift in phase across the network is a function of the arrangement and value of components in the various legs. For instance, networks where the shunt leg is capacitive tend to induce a negative, or lagging, phase shift. Conversely, networks in which the shunt is inductive, or has a positive reactance value, tend to result in a leading phase shift.

Use of particular phase shifts, in combination with power division is how directional patterns are created. Although the phase shift across the matching network for a non-directional antenna is irrelevant with regard to the radiation characteristics, it cannot be totally



ignored. In cases where the antenna impedance varies wildly from the transmission line impedance, changes briskly from one sideband to the other, or other out of the ordinary cases, judicious selection of the phase shift can improve bandwidth.

### ATTENTION TO DETAILS

In addition to bandwidth considerations, care should be paid to the current in the shunt leg of the network. Changing the network phase shift will affect the current in the shunt leg for a given set of impedances. For a non-directional station, networks with a phase shift of 90 degrees are fairly common. The reasoning here is the mathematics work out quite nicely. Sometimes, however, the impedances may vary enough on the sidebands that a phase shift in this range results in a shunt leg current high enough to warrant larger components. Swinging the phase shift closer to zero degrees can result in a lower shunt leg current translating into greater savings in the component price.

The commonality of the 90-degree tee

network is in some part due to the simplicity of its mathematics. The three equations that quantify the reactances in the three legs of the network are as follows:

$$X_1 = -j \frac{R_1 \cos(\theta) - \sqrt{R_1 R_2}}{\sin(\theta)}$$

$$X_2 = -j \frac{R_2 \cos(\theta) - \sqrt{R_1 R_2}}{\sin(\theta)}$$

$$X_3 = -j \frac{\sqrt{R_1 R_2}}{\sin(\theta)}$$

In these equations, the subscripts 1, 2, and 3 correspond respectively to the input, output, and shunt legs. The Greek letter theta represents the phase shift across the network, and  $j$  is the imaginary operator.

In the 90-degree cases the equations collapse as a result of the trigonometric terms. The magnitude of the sine of 90 degrees is 1 and is positive if the phase angle is leading, negative if it is lagging. The cosine of 90 degrees is zero. So after substituting these values back in, we find that the reactance in each leg is nothing more than the square root of the product of the input and output resistance. If there is no reactance

on either side of the network, then we are finished as long as we get the signs correct. In the leading case, as previously mentioned, the input and output legs are negative or capacitive, and the shunt is positive or inductive. For the lagging case, the situations are reversed.

We do not, however, live in a perfect world, and have to deal with load reactance. While the reactance on the input side can be eliminated if it is fed by transmission line, we find no such luxury with the load on the far side of the network. As a result, we have to correct for the reactance of the load impedance. This correction is made through the addition of an equal but opposite reactance to the value determined in the third equation above.

**PUT INTO PRACTICE**

For an example, make the assumption that we have an antenna with an impedance of  $72\Omega + j50$ . This antenna will be matched to  $50\Omega$  transmission line through the use of a 90-degree tee network. It is desired to derive the

most cost effective design for the network and for this example will ignore potential concerns with the shunt leg current.

Thinking about the topology of the network, we realize that the leading phase shift will require at a minimum two capacitors and three inductors if we limit our choices to micas. The lagging phase shift will also require three inductors, but will likely only need one capacitor in the shunt leg. The lagging case looks to be more cost effective.

The magnitude of each of the leg reactances will wind up being the square root of the product of the input and output resistance values. Numerically this is  $60\Omega$ . Since we have chosen the lagging network, the shunt leg will be a negative  $60\Omega$ , and the input leg will be a positive  $60\Omega$ . The output leg is also a positive  $60\Omega$ , but we need to subtract off the  $50\Omega$  of reactance inherent with the antenna. The result is the output leg has a positive reactance of  $10\Omega$ .

Once you have designed the tee network, it may require some adjustment to ensure that

it is properly set up. A good technique is to go through and initially setup each of the legs based on the design, then move back to the input to the network, and bridge it when connected to the load. The impedance measured at the input should be very close to the design. If it needs to be trimmed, minor adjustments of the shunt and input legs should do the trick. Adjust the shunt leg to bring the resistance back to the desired value. This will skew the input reactance somewhat, which can then be trimmed out by adjustment of the input leg.

The tee network appears daunting at first, but with a little study is actually fairly simple to master and understand. Its wide versatility combined with ease of design and implementation, has made it a most ubiquitous choice for use in not only AM antennas but a myriad of other applications as well. **Q**

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

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by Lee Petro

# Political Ad Season Reminders

**A**s the calendar flips to 2012, the attention of broadcasters switches to the beginning of the political season. With the presidential election, 33 seats in the Senate, all the House seats, and 11 governor's offices up for election, it will be a robust year for political advertising.

While that is good news for the broadcasters' bottom line, the increased activity comes with the responsibility to ensure compliance with the rules and policies regarding political broadcasting. Here are several of the main topics every broadcaster should know.

The *Lowest Unit Charge* (LUC) obligation attaches 45 days before the state primary, and 60 days before the general election. During these periods, a legally qualified candidate is only obligated to pay the lowest unit rate charged for the same class and amount of time during the same period. For periods before the LUC windows, political candidates can only be charged comparable rates, i.e., not excessively higher than other commercial advertisers. The right to the LUC applies to federal, state and local candidates

A *legally qualified candidate* is a person that has publicly announced that he or she is running for elective office, and has met all of the qualifications that office. With the possibility of a third-party candidate in the presidential election

this year, broadcasters should remember that if a presidential candidate is qualified in 10 states, than he or she is a legally qualified candidate in all states.

When a candidate uses a broadcast station, its opponents are entitled to *equal opportunity* at the same cost in a comparable time period. The right attaches to all legally qualified candidates, and is applicable at any time.

In this context, a use is any positive broadcast of a candidate's voice or image, which is not aired during a bona fide newscast, bona fide news interview, bona fide news documentary where candidate's appearance is incidental, and on-the-spot coverage of bona fide news events.

One thing to remember is that even an appearance of a candidate on an entertainment program (D) running for mayor, an actor running for governor) will result in a use. Also, while a station is not obligated to notify the opposing candidates of a use, the station must place this information in the station's political file on a timely basis, and opposing candidates have seven days to make the demand for equal opportunity.

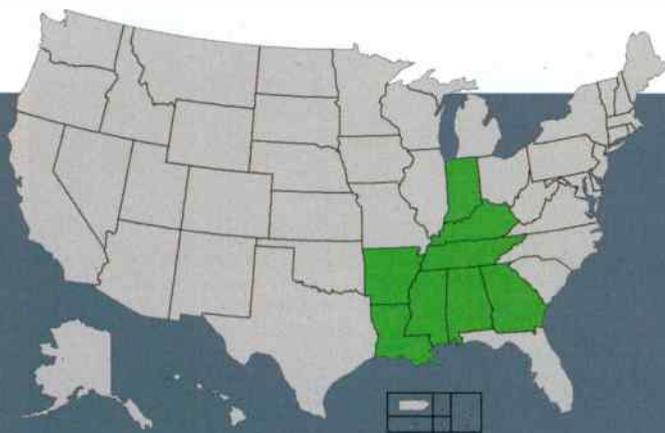
*Reasonable access* is a special right afforded only to federal candidates, and applies to all classes and dayparts of commercial time. In general, this means that a federal candidate has the right to demand access to the station to purchase advertisements. A station must make a reasonable amount of

time (both spot and program-length) available to federal candidates, but it does not have to make all its inventory available. If a station does make time available for a state or local candidate, then it must make available similar time for its opposing candidate(s), but it can decline to offer access to other state or local elections (i.e., make time available for mayoral candidates, but not treasurer).

Federal candidates have an additional requirement. The *Bipartisan Campaign Reform Act* (BRCA) requires candidates to supply a certificate to broadcast station in order to be eligible for the station's lowest unit charge. The candidate must certify he/she will not directly reference opposing candidates, unless he/she also states that the spot was approved by the candidate, and that it was paid for by his/her campaign or authorized committee.

This discussion is certainly not intended to address all of the issues that broadcasters will face in the upcoming season. In the February 2012 FCC Update, I will address some of the pitfalls and other special concerns facing broadcasters. In the meantime, if you have questions, you should contact your communications counsel for further discussion before the election season starts. ☺

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



## DATELINE

January: Stations in Georgia and Alabama continue running License Renewal Post-Filing Announcements on Jan. 16, Feb. 1 and 16, 2012. Stations located in Arkansas, Louisiana, and Mississippi continue running their pre-filing announcements on Jan. 16, 2012.

Feb. 1: Stations in Arkansas, Louisiana, and Mississippi file License Renewal Application and EEO Program Report. Noncommercial stations also file their Biennial Ownership Report (FCC 323-E). Stations in Indiana, Kentucky and Tennessee commence running License Renewal Pre-Filing Announcements, continuing on Feb. 16, March 1 and 16.



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# Implementing MDCL

By Doug Irwin, CPBE DRB AMD

Lower your station's overhead by reducing power bills

**W**ith the current state of the economy (in general) and the state of the broadcast economy (in particular) it makes sense to help any radio station cut down on their operating expenses. Thanks to a recent action by the Federal Communications Commission, there is now a way to help reduce the power bills for large AM stations (20kW and greater). It's called Modulation Dependent Carrier Level (MDCL).

MDCL is really a generic acronym that covers the three methodologies: dynamic amplitude modulation (DAM), dynamic carrier control (DCC), and amplitude modulation companding (AMC). The purpose of each of these technologies is to improve the overall efficiency of large AM transmitters, thus reducing the expense associated with power. A 30 percent reduction in power use expense is a realistic expectation.

These technologies were developed in Europe and have effectively made their way stateside because the FCC is now willing to grant waivers to section 73.1560 for stations that wish to implement MDCL. I'll cover a little about each of the three methods, what the expected results are, and how to implement MDCL at your station.

Let's first review amplitude modulation. Remember that at 100 percent modulation, the total amount of power in the upper and lower sidebands is 50 percent of the carrier power. So, for example, with a 50kW carrier, 25kW of power is radiated (along with the 50kW carrier) at the 100 percent modulation level. We're

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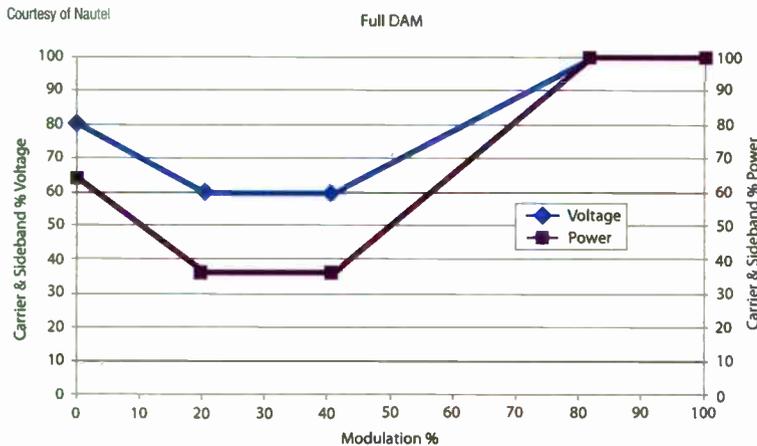


Figure 1. DAM showing power and voltage compared to modulation.

accustomed to a linear function that describes the relationship between the audio level and the percentage of modulation.

Out in the field, at each receiver, again we're accustomed to a linear function that describes the audio level obtained based on the modulation percentage of the received carrier. Additionally, the amount of quieting that a receiver will produce is dependent upon the carrier level that is encountered.

Back to the transmitter now: again, with a 50kW carrier, the transmitter can develop 25kW of sideband power. But what if the transmitter itself could analyze the incoming audio, so that it could determine just how much carrier power is really needed to generate the appropriate amount of sideband power? If the program audio was speech, for example, and there were gaps in the audio, wouldn't it make sense to be able to reduce the carrier power during those gaps in speech when there isn't going to be any need for modulation? The answer to that question is yes, and that basically describes what DCC does. DCC was developed during the early 1980s by Asea Brown Boveri, a Swiss company that manufactured large MW transmitters at the time.

DAM is an implementation of DCC and works as described, but during moderate modulation levels. (See Figure 1.) An audio peak detector's output is followed by appropriate filters that set the attack and delay;

subsequent output is then used for the input of a lookup table, the output of which sets the carrier level. From the description on how this system works, it's not hard to see that it would be most effective with speech programs, since there are always gaps in speech. It's also interesting to note that when the carrier power is reduced, the modulation depth is effectively increased; so in the field, a receiver's audio output will make the audio sound somewhat louder during the brief instances that the carrier power is reduced.

With a heavily processed music program, one can see that DAM likely wouldn't be effective in saving power since there would be few opportunities to reduce the carrier power. If the AM station in question has a highly processed program, then the MDCL method that would save power would be AMC (amplitude modulation companding). Unlike DAM (or DCC) which just reduces the carrier power, AMC reduces the carrier power *and* the power generated by

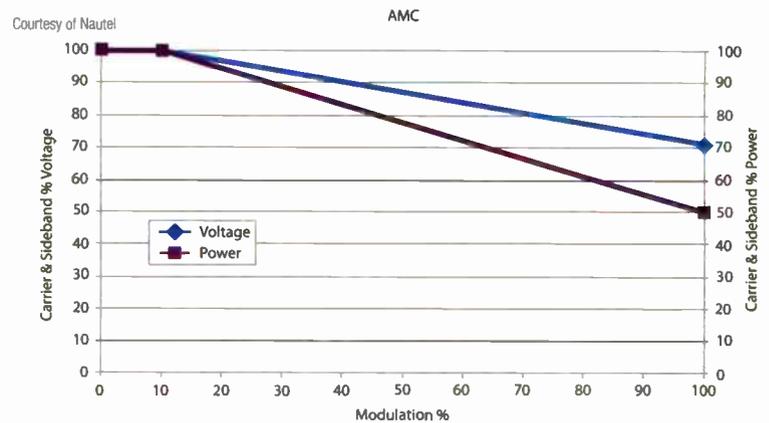


Figure 2. Typical AMC response

the modulation, so the modulation percentage stays constant, even with varying carrier power. (See Figure 2.)

You may at first ask, *Why would I want to reduce my carrier power during peak modulation? Won't that make the station sound weaker on receivers?* According to research on this topic, the answer is, *Yes, but it's barely*

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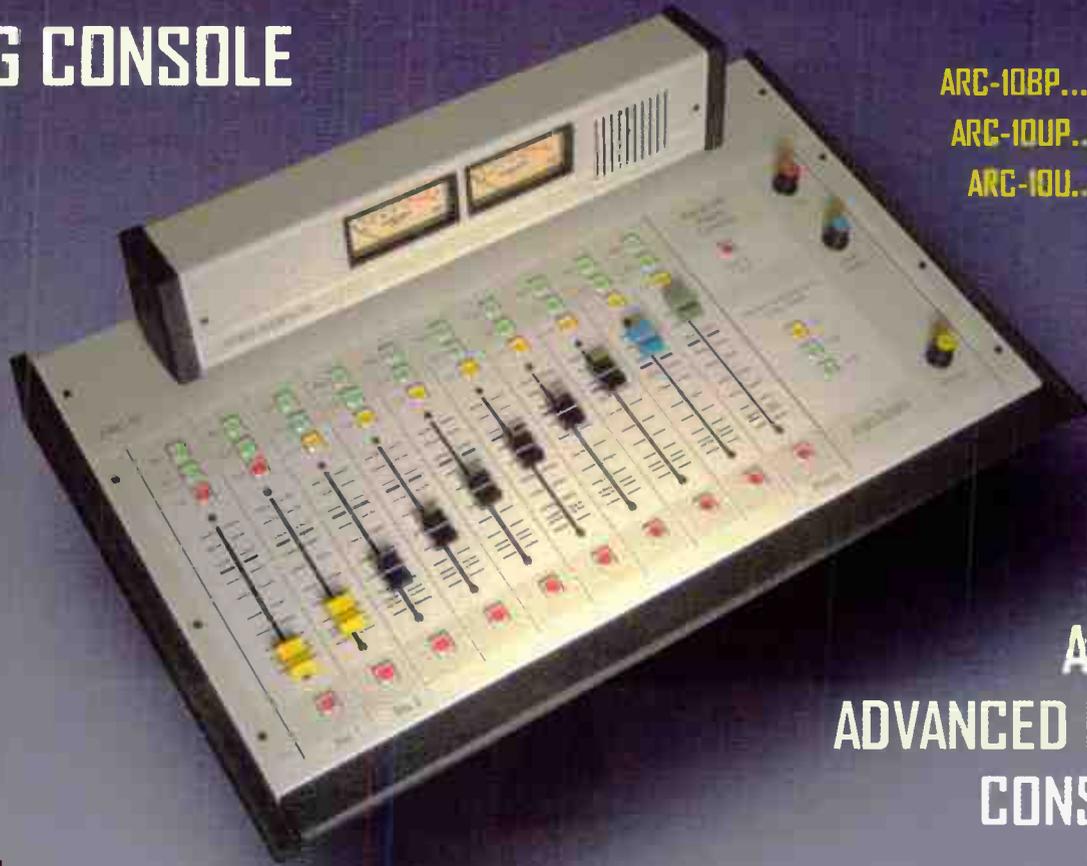
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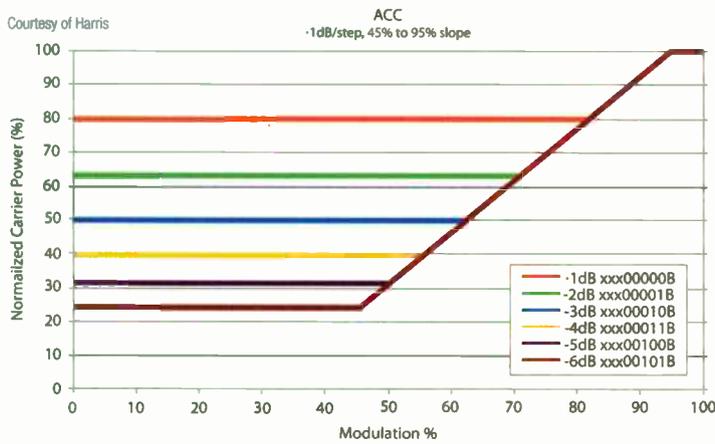


Figure 3. Typical ACC characteristic curve

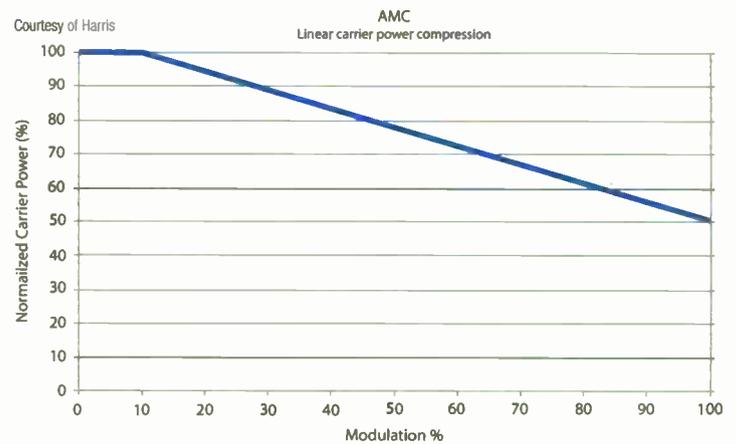


Figure 4. A typical AM response curve

audible. Think about it: The time that noise in the output of an AM receiver will be most noticeable is during no modulation. AMC does not reduce the carrier level at this point at all. The time that noise is least noticeable in the output of an AM receiver is at the highest modulation levels. This is an effect of the way human hearing works; noise is masked in the presence of other loud sounds. AMC takes advantage of this; at the time that you can most afford it (highest modulation levels) the overall carrier and

modulation power are reduced. The noise floor would increase, but in practice that isn't perceptible by the listener.

**IMPLEMENTING MDCL**

Harris offers two MDCL methodologies. The first is what it calls ACC (adaptive carrier control) and also AMC. ACC reduces the carrier level in -1dB steps (from -1 to -6dB) when the necessary modulation level is low. (See



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Figure 3.) AMC works as described earlier, reducing the overall output power by -3dB at 100 percent modulation (see Figure 4). According to their website, MDCL can be retrofitted in to the DX, DAX, and 3DX transmitters already in the field by the installation of a modification kit. New transmitters can be delivered with MDCL capability ready to go from the outset.

Nautel offers DCC, DAM or AMC in its AM transmitter line. The NX Series have DCC and AMC capability as standard; the user must turn it on. Additionally, according to information on the website, older Nautel transmitters can be retrofitted with MDCL with the addition of an NX-series DSB board that lives in a 1RU chassis. Carrier and audio levels are then sent from this chassis in to the older transmitter in order to make MDCL work.

### FCC CONSIDERATIONS

If you read the FCC's public notice DA 11-1535, dated Sept. 13, 2011, you will note that it reads "Use of MDCL technologies requires a waiver of Section 73.1560(a) of the Commission's Rules, which sets upper and lower limits for an AM station's operating power." So get ready to ask for that waiver. Fortunately, the FCC is trying to make it as easy as it can. "AM licensees who wish to implement MDCL technology shall file with the Audio Division a letter requesting waiver of Section 73.1560(a) of the Rules ..." Once the FCC has allowed the waiver, it will modify your license accordingly.

### OTHER CONSIDERATIONS

Both Nautel and Harris have had success in combining MDCL with IBOC transmissions. For example, Nautel user KCBC has implemented MDCL (AMC) and has noted a substantial power savings year over year. As another example, Harris user WOR has successfully started using MDCL with IBOC transmissions as well — also using the AMC algorithm.

When measuring the common point current, base currents or monitor points you'll need to be able to turn off MDCL. What about modulation monitoring, though? Fortunately at least one AM modulation monitor can be used during MDCL: the Belar AMMA-2. In addition to monitoring standard AM modulation, it monitors MDCL AM transmissions. The AMMA-2 tracks the carrier, capturing the highest/lowest values of the carrier level, as well as the decibel ratio of the carrier high/low values. Modulation readings are then referenced to the carrier level appropriate for the MDCL system in use.

MDCL can be an effective means of lowering your station's overhead by reducing power bills. It should be noted that MDCL is most effective at

power levels greater than 20kW. Consult with your transmitter manufacturer to see how it can potentially benefit your operation. 

*Irwin is transmission systems supervisor for Clear Channel NYC and chief engineer of WKTU, New York.*



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# Reconstructing WEBE 108 and WICC

Cumulus tackles the challenges of an in-place rebuild. By Chriss Scherer, editor

**W**EBE-FM (WEBE108) and WICC-AM became sister stations in 1989 and moved into a new facility at the end of that year. Most licensees try to build a facility to last a long time, and these stations managed to get 20 years of service from theirs. But after all that time, the analog infrastructure and equipment, as well as years and years of layering new systems on top, meant it was time to upgrade.

In late 2010, the lease for the stations was due to expire, and the owners were looking at alternative office spaces, but the landlord and Cumulus reached an agreement for the stations to stay.

From a construction standpoint, it's easier to build a new facility and move in rather than building in place; but a new facility has its own challenges as well. Cumulus was ready for the challenge.

Dave Supplee, regional engineer for Cumulus, was the lead for most of the project. The first part of the plan was to evaluate the current space and begin planning for the changes. The rebuild extended beyond the studios and included much of the office area. Supplee and his team worked to provide the IT infrastructure to the office areas, but most of that work was left to a contractor to finish.

On the studio side, the studios were completely rearranged and remodeled, and the technical operations center (TOC) was modified. Even the existing wiring was replaced.

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## FACILITYSHOWCASE



Above: WEBE air studio; right: WICC talk studio

### LOOK AT THE OLD

The old studios included an FM control room, AM control room, AM talk studio, newsroom and four production studios. Wiring to each studio was routed through conduits that ran under the floor, which was the plenum ceiling in the space below. In 1989, the space below was empty, so it

was easy to run the conduit. This time, the new cabling was run overhead because fishing new cable through conduits with existing and working wiring was not going to be easy.

The old wiring included layers of additions over the years: As updates were needed, new wire was added. But even with updated wiring, most of the IT network was run on CAT-5 (not even CAT-5e). The fresh, overhead start was the way to go.

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WICC air studio

The studio side began with WICC. A new control room was built and the station moved in. While a new talk studio was built, the hosts and guests all worked within the control room. The new talk studio took over part of the space where the old newsroom was located. The remainder of the old newsroom and the old AM air studio became a larger room for the FM control room. Relocating this wall was one of the major changes in the project.

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The leapfrog studio swap continued as WEBE was temporarily relocated to a new production room while the new FM studio was completed. Several weeks later, WEBE moved into its home.

While only a few walls were moved, all the studio walls needed work. In 1989, a carpet-like wall treatment was applied to control sound. After 20 years, this fabric was full of dust. It was pulled down, which meant the wall surfaces had to be prepped for new coverings. Drywall dust was everywhere.

**STARTING TO LOOK NEW**

Another wall change was made in the TOC. The old TOC had a small closet, which was removed. A door was added to access an adjacent room (formerly the smoking lounge – how times have changed), which became the engineering office. Another major change in the TOC was moving the racks. The three old racks were replaced by four new racks, which were oriented 90

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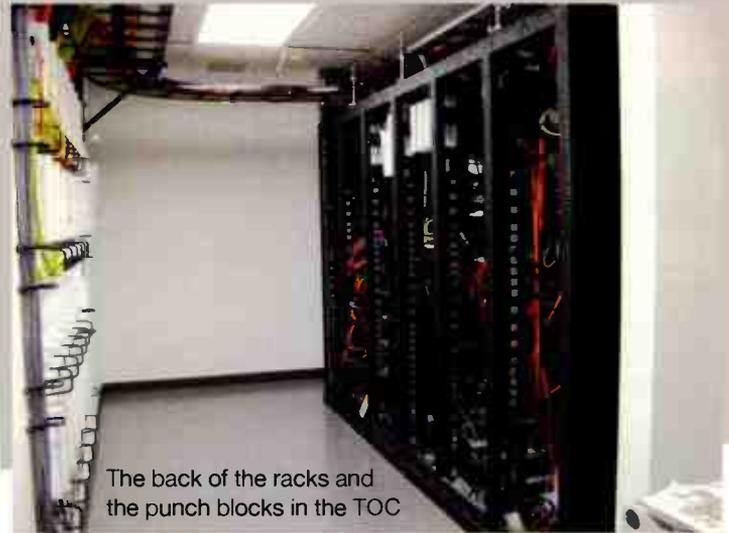
degrees from the previous location. The wall to the hallway was replaced with a large window, so station visitors could see the magical blinking lights. The TOC remodel also provided a perfect opportunity to clean out the graveyard of old equipment.

At the heart of the new studios is an Axia Livewire system. Powerstation frames are installed in the studios and the TOC, and Element consoles are connected. All new CAT-6-compliant (Belden MediaTwist) wiring was run throughout the facility. With the BSI Op-X automation computers housed in the TOC, the in-studio Powerstation chassis in each studio was sufficient for I/O. No additional Axia Nodes are installed in the studios.

There are some Nodes in the TOC for the additional sources. These Nodes are connected to punch blocks for two reasons: It allows some flexibility in connections; and Supplee was able to distribute audio sources and feeds among several Nodes to provide some additional redundancy in the system. The Axia plan typically puts a node in each rack to handle sources within that rack, i.e. one node for the satellite receiver, one node for the remote feeds, etc. Even with Supplee's distributed approach only 10 blocks were needed in the TOC.

There are no mic processors installed in the facility. All mic processing is handled within the Powerstations.

The FM control room and large production room have large, curved



atrium windows, which provide a wonderful view of the city, but they are also a large reflective surface. Looking at the studio photos, you can also see an uncarpeted floor and plain walls. The floor (an Armstrong product that Cumulus also used in the Cincinnati studios, which were profiled in the July 2009 issue of *Radio* magazine) has some give to it, but it's still reflective. Acoustics First Sonora panels (2' x 2' x 1") were placed on the walls to control reflections.

## FACILITY FOCUS

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The library was ripped using the Op-X File Manager, which simplifies title and artist labeling as well as intro and segue markers. On air talent found it a simple transition to the Op-X Studio client. It clearly shows what's playing, what's next and which audio channel is being used. The intuitive interface of Op-X Clock Builder made it easy to build clocks for satellite shows and varied programming on our news/talk station. Real Time Scaling assures our return to network shows is flawless.

"Simple" and "easy" keep popping up, which has been the way it's been since we transitioned to Op-X. I have a feeling it's going to take more than an EF1 to affect our broadcast capabilities at WEBE and WICC! – Danny Lyons, Program Director, WEBE/WICC.

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Looking through the hallway window into the TOC

**THE SURPRISES**

No studio project is completed without a few surprises. The previously noted IT wiring in the offices was just one.

The studios are on the seventh floor of the office building, so getting the studio furniture to the top floor was an effort. The building does not have a freight elevator, so several people had the task of carrying the larger pieces up the stairs to the top floor.

**PROJECT CREW**

Randy Shull, contract eningeer  
 Yancy McNair, Cumulus Pensacola  
 Radio Engineering Services  
 Dave Kerstin, BGS  
 Ken Skok, Axia  
 Dave Supplee, Cumulus

The real surprise came during the demolition of the FM air studio. A wall was removed from the old studio, and within that wall was a structural pillar that was not on the floor plan. While this could have been a disaster, the studio furniture was reoriented and still fit easily in the room.

One other surprise was presented when it came time to install the wire ladder. A misunderstanding resulted in the wire ladder not being ordered. Fortunately, Middle Atlantic was not too far away in New Jersey. One interesting installation note is that the ladder in the TOC is not suspended from the ceiling (which would have been a eight-foot length of all-thread around HVAC and plumbing), but rather mounted on the rack tops. This simplified not only the ladder installation, but also the wire installation because it could be laid on top rather than threaded through support rods.

The entire project from the first demolition of walls until everything was installed an on-air took nearly 10 months.

Much of this was because of the project being in-place, but the construction crews were also based out of town, so there was an ongoing back-and-forth of crews coming to town to work, then taking off again. In the end, it all came together. The previous studios worked well for 20 years. The new studios are poised to serve another 20. 

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by Doug Irwin  
CPBE DRB AMD

# A Jump Start on Spring Cleaning

I recently moved a couple of legacy transmitters from one floor to another on top of the Empire State Building and that of course was an opportunity to really give each one a good cleaning prior to installing them in their new functions as backups.

These are vacuum-tube transmitters and so the high-voltage wiring accumulates very fine dust over the life of the unit. Normally when you perform a routine cleaning there is only so much you can do to pick up this fine dust; but on this occasion I decided to go farther – so I cut all the tie-wraps holding the high voltage bundles, and cleaned the wires individually.

The primary items used to clean this fine dust are some sort of rags – preferably cloth-based – although tough kitchen paper towels will work. The cleaning fluid I use is isopropyl alcohol. It works well for several reasons:

- > You need something to dampen the cloths, to pick up dust.
- > It removes oils well.
- > It evaporates fast, leaves no residue.

It's a good idea to use some sort of rubber gloves when making use of isopropyl alcohol because it will dry your skin quickly.

Cloth rags are best for cleaning typically because they don't leave anything behind. I was surprised that they are not as easy to find as they used to be. If needed, order some online ahead of time. ERC Wiping Products is one



resource. ([www.ercwipe.com/lint-free-towels.html](http://www.ercwipe.com/lint-free-towels.html)) You might get lucky at a grocery store or dollar store for something inexpensive that works just as well.

Another tool to pick up plain old dust are the duster cloths like Swiffer. Run those over all the horizontal surfaces inside what you are cleaning. They pick up dirt and dust remarkably well.

A different item that is handy while cleaning the old rig is a small paintbrush (never used for painting though). Dislodge dust and dirt around the inside, through tight spaces, vertical spaces and everywhere. Then use a vacuum cleaner to pick up the dislodged dirt then.

## OTHER TOOLS

There are two items you should have on hand when cleaning and repairing a transmitter cleaning or other work. One is an inspection mirror. It seems there is always some spot inside you need to see, but it's obscured by lots of other parts. These mirrors are indispensable. Hardware and tool stores, including Grainger, carry the Proto mirror. ([www.grainger.com/Grainger/PTORO-Round-Telescoping-Mirror-3R561](http://www.grainger.com/Grainger/PTORO-Round-Telescoping-Mirror-3R561))

The second item you should have is a telescoping-magnetic-picker-upper (for lack of a better name). When you drop a screw deep down inside, you can likely still pick it up. I picked mine up

at Sears. ([http://www.sears.com/shc/s/p\\_10153\\_12605\\_00946948000P?mv=rr](http://www.sears.com/shc/s/p_10153_12605_00946948000P?mv=rr)). There is also a magnet/mirror combo ([http://www.sears.com/shc/s/p\\_10153\\_12605\\_00947095000P?prdNo=22&blockNo=22&blockType=G22](http://www.sears.com/shc/s/p_10153_12605_00947095000P?prdNo=22&blockNo=22&blockType=G22))

It's not that hard to make that old transmitter rig look (almost) as good as new. It's funny too how they always seem to work better afterward.

## KEEP IT CLEAN

With tablet computers gaining in popularity, perhaps you keep your manuals on one. Transmitters are not always the cleanest, nor are your hands while you're working. Here's a neat item you may want to make use of while you work: Chefsleeve ([chefsleeve.com](http://chefsleeve.com)). This is a disposable (and recyclable) plastic sleeve that goes over the tablet, and allows you to keep using it, even while you are doing a messy job. 

*Irwin is transmission systems supervisor for Clear Channel NYC and chief engineer of WKTU, New York. Contact him at [doug@dougirwin.net](mailto:doug@dougirwin.net).*

## RESOURCES

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# Deva Broadcast Model DB44

by Barry Thomas, CPBE CBNT

**D**eva Broadcast's newest entry into the FM monitoring arena is the DB44 compact FM radio monitoring receiver. It's an IP-accessible, DSP-based analog FM monitoring (no HD Radio) receiver that packs a lot of capability into a small package. The physical unit is an almost pocket-sized device with connections on the rear for 12Vdc power, an FM antenna, an RJ-45 for the network connection, and a high-density DB-15 for an external cellular (GSM) modem. On the front panel there are three LEDs for power, LAN connection and for the GSM modem, and a  $\frac{1}{8}$ " headphone jack for local audio monitoring. A 1RU mount is also available.

An obvious application for this device is to provide remote monitoring at FM transmitting sites. It also might be a good fit for remote broadcast or vehicle applications. The device can be set to monitor up to six FM preset frequencies and send email or SNMP alerts on up to six parameters on each preset: RF level, MPX deviation, left and right audio level, pilot and RDS deviation.

The DB44 is an embedded device; there is no hard drive or display. Boot time is in seconds and it's ready to monitor immediately. It is operated entirely through an IP connection using either a dedicated or DHCP address, and has a well designed embedded website for monitoring and control functions. Web

pages are arranged as an intuitive tabbed display. The main page shows meters for RF

level, measured multipath level baseband modulation (positive and negative peaks), audio levels, pilot and RDS levels. The lower 15 percent of the DB44 page is the "dashboard" of the device. This mimics a radio display showing the frequency, status of the stereo and RDS lock, amount of internal attenuation selected, and a summary display of alarm status of all six presets. Buttons for the presets are in this dashboard as well as a blank to manually enter a frequency. The remaining items in this screen allow the selection of RDS mode (European or U.S.-standard), the local time and a listen button. The listen button engages a selectable-bit rate MP3 audio stream.

One of the device's most compelling features is that all readings, meters, settings, etc., can be accessed using a standard Web browser – even using an iPad or Android device, although. I noticed that the graphs and spectrum displays would not resolve on certain Android devices, however, but that might have more to do with the specific mobile browser I was using.

## OBVIOUS STRENGTH

It's apparent that one of the core competencies of Deva is in RDS. The RDS page is comprehensive with a display of the scrolling RadioText (RTA and RTB), basic RDS fields and a chart of all decoded RDS groups with a percentage measurement based on the overall RBDS data stream or group count. A very useful graph on this display is a rolling RDS bit error rate (BER) display.

The remaining pages are essentially live

graphs. The overall FM graph is a multi-colored plot of MPX, pilot, left and right audio levels. It's a good way to capture an average of the significant parameters of the analog signal. The MPX tab shows both baseband MPX deviation as a function of deviation in kilohertz over a percentage of time. The graph quickly shows modulation density. There's also a rolling 30-minute-average graph of baseband power measured in dB.

The spectrum analyzer tab is a unique feature: It is a baseband and audio spectrum display. Initially it shows the baseband from 0-65kHz so you can clearly see the mono signal, stereo pilot and L-R and RBDS carriers. Perhaps it's a curiosity but I like being able to quickly see the baseband in a glance. It was particularly interesting using this tool while some alternate stereo modulation techniques were being tested in town. The spectrum analyzer display can be selected for the discrete left and right audio and plotted using one of a number of waveform sampling and display models.

The scope display is essentially what it would seem: an oscilloscope display of the baseband, left right and a composite graph of the left/right audio. It is similarly intuitive with the bandscan tab. The start button on this page initiates a measurement across the FM band plotting the signal strength in dBu. There's a moveable frequency marker to read the individual levels to 0.01dBu resolution.

## OTHER FEATURES

The status tab shows the alarm results of

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**MORE ONLINE** Find screenshots from the DB44 online at RadioMagOnline.com.

each parameter of the preset frequencies, along with the basic device and network status (IP address, MAC, etc.)

Alarms can be customized on a per-preset basis under the settings tab. Each preset has its own page where the preset is programmed, named and a monitoring time frame is set. Measurement windows can be set for each of six parameters: RF level, left and right audio level, MPX (baseband) deviation, pilot and RDS deviation. Each alarm parameter can be set with minimum trigger and alarm release times. The IP port settings for the embedded Web pages is set at 80 but can be changed. It is the same with the streaming audio port.

The email settings provide for two send-to email addresses and even allow the use of an alternate SMTP port and an authenticated SMTP server login. All relevant SNMP parameters can be set on this page, as well (although the MIB file is downloaded elsewhere). Other global settings like RF attenuator setting, de-emphasis,

date/time (automatic Internet time sync is default) and device timeouts are set on a separate management page.

Although being far removed from U.S. time zones, the company has been exceptionally responsive to the email questions I had. Needless to say the unit firmware is field upgradable over the IP connection.

While this is an incredible tool, especially for the price, I mentioned some possible improvements to Deva. I am told many of these ideas will be implemented in the next firmware update, which I noted below.

- RDS/RBDS was a global setting. The RDS mode setting will be on the same [settings] [management] screen as de-emphasis, and the screen real estate on the dashboard will be indicators for de-emphasis and RDS modes.

- The unit now supports RadioText+, which my unit did not.

- A Lissajous option for the scope page will be added.

- The bandscan and device log results can be now be exported.

- The streaming function is excellent but I would love to see the listen function work on mobile devices as well.

Of course, we have to consider HD Radio monitoring. As we are reaching critical mass for HD Radio deployment, the need for inexpensive remote monitoring of HD Radio parameters such as RF mask compliance is needed. Adding HD Radio is undoubtedly a challenge, but eventually we will all need it.

For FM monitoring situations where the expensive, full-fledged system is not needed or where cost is a limiting concern, the Deva Broadcast DB44 is a good monitoring solution. It is remarkably simple to drive and understand and it can be accessible using any Web browser over an Internet connection. 0

*Thomas is vice president of engineering, Lincoln Financial Media, Atlanta.*

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## Nagra SD

by Ben Weiss, CPBE

**T**here are a plethora of handheld digital audio recorders available now, so when a new one is introduced, I want to know what sets it apart from other models. Each model seems to have its own unique feature set, so when I received a Nagra SD as a demo unit I had to check it over.

My first impression of this compact unit was its sturdy feel. The case is aluminum and some plastic, but it has some heft to it, unlike some other portable recorders I have looked at. All the buttons are laid out for one-hand operation, and it's easy to access all the controls this way.

### GETTING CONNECTED

The unit has four connectors: 3.5mm stereo mic in, 3.5mm stereo line in, 3.5mm stereo headphone/line out and USB. The unit can be powered via the USB port. The audio input connectors are on the top of the unit, which is where most handheld recorders have their built-in microphones. The SD also has a mic, but what is unique about it are the four mic capsules available for the recorder. The mics all clip securely in place to provide on-board pickup, and they are color-coded by function as outlined in Table 1.

The red capsule is included with the unit. Nagra also offers mono and stereo mic cables that clip to the same audio input connector. These cables provide a secure mic connection. A mono mic cable is included. The mic capsules and cables are the same style used in

|       |                                   |
|-------|-----------------------------------|
| Red   | Stereo cardioid                   |
| Green | High-quality stereo cardioid      |
| Blue  | High-quality mono omnidirectional |
| White | High-quality mono cardioid        |

Table 1. The various mic capsules available for the Nagra SD

the preceding model, the ARES-M, and are compatible with both models.

The SD memory card accepts any storage capacity CD card. A 2GB card was included with my unit. The unit can be set to record mono or stereo files saved as WAV, MP2 or MP3. The sampling rate can be set from 24 to 96kHz and the bit rate can be set from 32 to 384kb/s for MP2 and MP3 files. The unit is powered by two AA batteries, which during my field recordings lasted for several hours.

On either side of the bright display are the input recording level set and output playback level set buttons. The software keys make it easy to set and repeat a level, which when the function hold switch is set to on will stay

where they will not be inadvertently changed.

Other front-panel switches include view (which toggles between the timer and file format settings), cue (which sets cue points during recording), files/menu, A-B (to loop playback of a section), delete and power, as well as a five-button ring to control the transport and navigate the setup menu.

When held, the files/menu button shows the various system and recorder settings. The menu tree is accessed with round function buttons that act like a cursor. When the files/menu button is tapped, a list of recorded files is shown.

There are seven switches on the back panel to quickly access several functions rather than having to toggle through menus. These switches include mic gain (high/low), filter (on/off), AGC (on/off), file type (mono/stereo), mic power (on/off, for the Nagra electret mic capsules), quality (low/high) and hold (on/off). The quality setting allows two standard setups to be set. The low/high labeling is really for convenience. I have both quality settings on 16/44.1 WAV just in



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case the switch is accidentally changed. The speaker is also on the back.

### IN OPERATION

The recorder has a pre-record buffer that can be deactivated in the menu, although I like having it on. When record is pushed, the ring around the record button flashes red a little faster than once per second. This indicates the recorder is in record ready, and levels can be set. Push the record button again, and the ring flashes red about four times per second. A circle on the display also fills solid to indicate the unit is recording.

I like having visual confirmation that I am recording, although I would prefer the ring to stay steady red while recording, like a camera tally light. The red ring can be turned off completely while recording.

The unit includes a leatherette case, which protects the recorder while in use. A clear plastic front allows easy viewing of the controls and display. There are also cutouts for the audio

levels and the hold button on the back. The case also provides the method to attach the recorder to a camera tripod mount.

The included mic sounds very good. I used it to record a concert band and a handbell choir, and there is good separation between channels. The frequency response sounds good as well. Most of the time I use an external stereo mic that has a 3.5mm output for these ensembles, and the recorder worked very well in this setup too.

I also tried the recorder like it would be used to get a news actuality or in a handheld interview. The high-quality capsule has lower handling noise than the standard capsule.

The mic preamps in this little recorder sound very good. The published distortion spec is listed as being 0.025 percent at 1kHz, which is really good. There is no published signal to noise ratio, although a 90dB dynamic range is specified in the manual. Using my external mic on the SD and the same mic on

another handheld recorder, the SD appears to be quieter on silence.

The recorder has a voice on record (VOR) function to automatically record when the audio surpasses defined threshold, which is adjustable to be -30dBfs, -20dBfs, -10dBfs or off. VOR can also be set to pause on silence or create a new file each time recording starts. A delay can also be specified to continue recording from 5 seconds to 3 minutes once silence is detected.

While recording, the stop button must be held a few seconds to actually stop. I like this because it prevents accidental stopping if the button is brushed by mistake.

Overall, the Nagra SD is very good recorder. With recording capability up to 24-bit/96kHz resolution and the variety of mic capsules, it can easily be used in a wide range of recording applications. 

*Weiss is a contract engineer in Kansas City.*

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# Compact Mixers

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For our comparison, we looked at models that

had two microphone inputs, although we found units that only had one. (One manufacturer's smallest model started at four mic inputs.) The mixers below also have larger brothers in their series.

All the mixers have stereo outputs. Some have effects or monitor sends. The models with sends could be set up to provide a main feed on one

channel and a mix-minus on the other. All models offer some EQ. The two-band choices have sweeps at 80Hz and 12kHz. When a third midrange band is offered it is centered at 2.5kHz.

All these models have external power supplies. In another installment of Side by Side we'll look at battery-powered options for total mobility. **0**



| Model              | Alesis MultiMix 4 USB                        | Behringer Xenyx 802                                       | Mackie 402-VLZ3   | Samson MDR624                                      | Peavey PV 6 USB   |
|--------------------|--|---|---|--|---|
| Inputs             | 1 mic/line/guitar, 1 mic/line, 1 stereo line | 2 mic/line, 2 stereo line, stereo tape                    | 2 mic/line, stereo line in, stereo tape in  | 2 mic/line, 2 stereo line, stereo tape in          | 2 mic/line, 2 stereo line   |
| Phantom power?     | yes  | yes   | yes   | yes  | yes   |
| Input pan control? | yes  | yes   | hard switch for input 1 left & 2 right  | yes  | yes   |
| Outputs            | stereo line TRS                              | stereo main TRS, stereo control room TRS, stereo tape RCA | stereo line out, stereo tape out  | stereo control room out, stereo main out, tape out | stereo control room out, stereo main out                                |
| Headphone out      | 1/4" TRS                                     | 1/4" TRS  | 1/4" TRS  | 1/4" TRS   | 1/4" TRS  |
| EQ                 | 2-band on inputs 1&2                         | 3-band on all channels                                    | 2-band on inputs 1&2, low-cut switch on inputs 1&2  | 3-band on all channels                             | 3-band inputs 1&2, 2-band inputs 3/4 & 5/6, 80Hz low-cut on main output |
| Sends              | none   | 1 post-fader per channel, TRS output                      | none  | 1 pre-fader per channel, TRS output                | 1 post-fader per channel, TRS output                                    |
| Returns            | none   | stereo TRS inputs   | none  | stereo TRS inputs                                  | stereo TRS inputs   |
| Special Features   | USB audio I/O                                | -   | Mounting holes for Atlas AD-11B mic stand adapter, instrument input setting on inputs 1&2 | -  | USB audio I/O   |
| Power              | 10Vac, 500mA                                 | ±18.5Vac, 300mA   | ±18.5Vac, 410mA   | ±18Vac, 600mA                                      | 15Vdc, 500mA  |
| Weight (lbs)       | 1.5  | 2.2   | 2.5   | 3.7  | 3.9   |
| Size (w x l x h)   | 6" x 7.75" x 2"                              | 7.4" x 8.7" x 1.9"  | 5.8" x 7.3" x 1.6"  | 7.36" x 10" x 2"                                   | 7.55" x 9.717" x 2.7"   |
| Other models       | MultiMix 6 USB, MultiMix 8 USB               | Xenyx 502, Xenyx 1002, Xenyx 1202                         | 802-VLZ3, 1202-VLZ3   | MDR1064  | PV 6, PV 8, PV 8 USB, PV 10, PV 10 USB                                  |
| List price         | \$129  | \$130   | \$130   | \$110  | \$170   |
| URL                | alesis.com                                   | behringer.com   | mackie.com  | samsontech.com                                     | peavey.com  |

**COMING UP** Next in our February issue, get your voices heard with microphone preamps.

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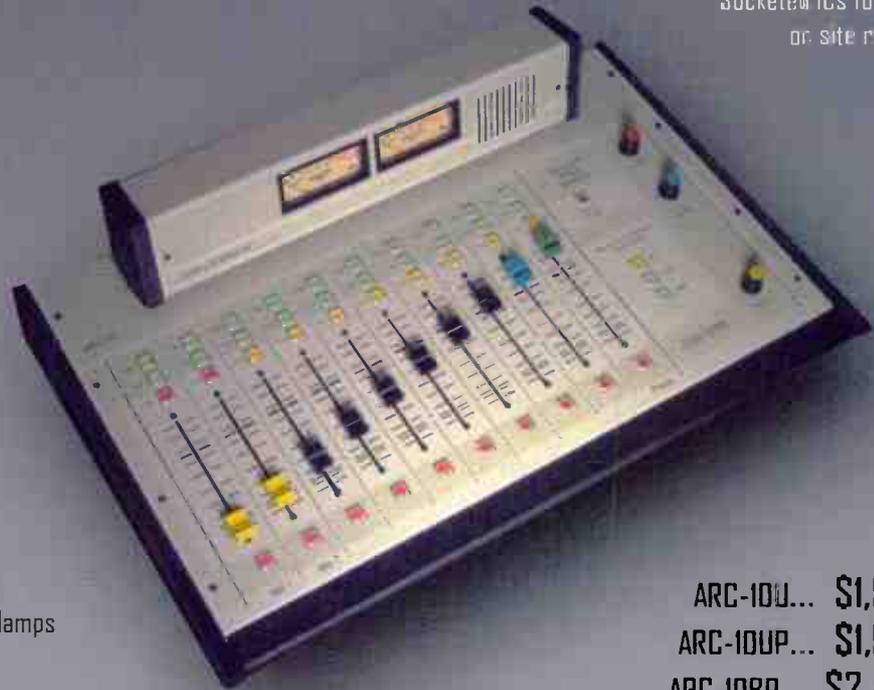
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[www.krksys.com](http://www.krksys.com)



### Sine Systems | Intelligent rack adapter

**Model RAK-2:** The RAK-2 takes the foundation of an RFC-1 and extends it into the connected world. It features a wired Ethernet connection with a built-in network interface and Web server. The remote control system gains network connectivity while maintaining the traditional RFC-1 voice mode interface. Both voice and data interfaces are included as part of the standard device. Also included are telephone line surge suppression and front panel status indicators.

[www.sinesystems.com](http://www.sinesystems.com)

### Davicom/Comlab Telecommunications | MAC expansion module

**MEXM-1:** The MEXM-1 adds extra I/O capability to any Davicom MAC product. Each MEXM-1 adds 24 metering inputs, 24 status inputs and 24 relay outputs that are automatically integrated into the MAC's control structure. They therefore take full advantage of the MAC's powerful control, monitoring and automation functions. A Davicom MicroMAC with a single MEXM-1 yields a total of 32 metering inputs, 32 status inputs and 32 relay outputs. Up to eight MEXM-1 units can be used together and, if connected to a MAC216, will give a total of up to 144 metering inputs, 224 status inputs and 104 relay outputs. Metering input ranges cover  $\pm 2.5$ ,  $\pm 5$ ,  $\pm 10$ ,  $\pm 25$  and  $\pm 50V$ .

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### ARX Systems | Audio interface

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[www.arxamerica.com](http://www.arxamerica.com)

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[www.iis.fhg.de](http://www.iis.fhg.de)



## NEW PRODUCTS



### MXL Microphones | USB-powered condenser mic

**Tempo:** This USB-powered condenser microphone allows users to record vocals and other sounds on-the-go when connected via an optional iPad Camera Connection Kit adapter. This light-weight microphone makes it easy to record professional-sounding music and podcasts virtually anywhere without expensive studio equipment. It is also compatible with PC and Mac computers and works with a wide variety of music and chat programs. The MXL Tempo also features an integrated headphone

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[www.mxlmicro.com](http://www.mxlmicro.com)

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[www.digigram.com](http://www.digigram.com)



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Thanks to the car radio, it's almost fun being hopelessly lost!

### Barix | STL application

**Reflector App:** This free iOS app for use on the iPhone, iPod Touch and iPad is a mobile receiver for the Barix Reflector Service, allowing customers to monitor their audio streams on the go. The Barix Reflector Service is typically used by radio broadcasters and service providers to stream audio between two or more points. The service essentially offers IP streaming without the complexity of IP, simplifying the setup process for audio transport connections. The Reflector app taps into the main Reflector Service audio feed to allow real-time listening and monitoring of contact closure status and network statistics. This gives broadcasters and service providers access to a wealth of information about their streams and channels from any location.

[www.barix.com](http://www.barix.com)

### Phasetek | Voltage sampling unit

**P600-206-WP:** These units are designed to provide an RF sample voltage proportional to the RF voltage connected to the input bowl feed-thru assembly on the unit. These units will allow AM broadcast stations to conduct Method of Moments proofs of performance on arrays with tower heights and geometries in which base toroidal current transformer samples are not permitted. The units are designed as an inductive voltage divider. This provides static (dc) path to ground, eliminating a separate static drain choke. The input impedance of the unit is high within its specified frequency range. This high input impedance minimizes any tower impedance "shunting" and current phase shift. Units are designed for indoor mounting or can be mounted outdoors with an optional weatherproof cabinet assembly.

[www.phasetekinc.com](http://www.phasetekinc.com)

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SSCDR1 List \$1,399.99

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FM300ES 300W List \$5,000.00 **\$2,500<sup>00</sup>**

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## NEWPRODUCTS



### Hosa Technology | Audio cables

**Pro Speaker Cables:** These Hosa cables feature 14 AWG oxygen-free copper (OFC) conductors and a black PVC jacket. The cables are available with Rean Loudspeaker connectors by Neutrik. Loudspeaker and 1/4" TS connectors are available in this product line. Rean loudspeaker connectors incorporate silver-plated contacts, a glass-reinforced housing, a robust, twist-lock mating system, and chuck-type strain relief. The 1/4" TS connectors include nickel-plated contacts, a zinc die-cast housing, crimp-type strain relief, and rubber boot kink protection. Cables are available in 3', 5', 10', 25', 50', and 100' lengths  
[www.hosatech.com](http://www.hosatech.com)

### Tieline Technology | Wireless interface

**USB Module, 4G Modem:** Tieline now has a 4G USB module capable of interfacing with both the Pantech UML290 and the Verizon Wireless 551L 4G LTE USB Modems. This will allow Tieline G3 codecs to connect and broadcast over the Verizon 4G LTE network. The module fits into existing Commander G3 Field and i-Mix G3 remote broadcast codecs. Both the Pantech UML290 4G LTE and the Verizon Wireless 551L 4G LTE USB Modems support 4G LTE (700MHz), as per modem specifications.  
[www.tieline.com](http://www.tieline.com)

### Harris | Processing device

**VMReact:** A 1RU logic processing device that enables automated responses to changes in audio routes, logical conditions and other events, VM-React further enhances control and monitoring in VistaMax networked audio systems. Broadcasters can quickly and easily set up parameters and conditions in advance to trigger desired responses, supporting a variety of applications throughout the network. This includes switching audio sources, changing audio routes and triggering logic events to control external equipment — without the need for manual intervention.  
[www.broadcast.harris.com](http://www.broadcast.harris.com)

### Broadcast Electronics | Interactive social message tool

**DJ Wall:** Providing DJs with a central Web location to receive and respond to listener feedback, DJ Wall is aggregated from various social networking and communication channels. Users can aggregate messages from listeners on SMS, Twitter, Facebook, MySpace, AIM, Google Talk, MSN, Yahoo and phone/voice; integrate local SMS and voice-enabled phone numbers into the social networking experience; poll listeners live and receive immediate results from all the social network channels. Poll results are "automagically" updated in real-time right in a station's wall. Users can also publish recorded and "star" messages to a central public feed for easy access by listeners, and centralize status updates for all listeners on all the social networks and devices of their choice.  
[www.bdcast.com](http://www.bdcast.com)

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[www.BroadcastConnection.com](http://www.BroadcastConnection.com)

# There's only one question on this iQ test: Where'd they hide the switch?

You've heard the buzz about IP consoles, and you love all the things they can do. Only one thing held you back: you figured you'd have to call Mr. IP Genius just to plug it in. Then you saw iQ, and everything changed. Axia deep-sixed your switch configuration worries by putting an Ethernet switch right into the console. Mixing engine, power supply, I/O, and a built-for-broadcast switch all in one neat, fan-free rack unit. There's zero switch configuration, zero finger-pointing from tech support, zero "kinda-maybe" compatibility issues. And only Axia does it.

iQ really passes the test. You'll be able to send audio instantly to any studio. Eliminate distribution amps, punch blocks, patch bays, sound cards — and that rat's nest of wire in the ceiling. Control everything with a browser, even over the Internet. Connect to scads of Livewire-ready broadcast gear with just an Ethernet cable. Solder? What's that? Yeah, building this studio will be more fun than a bucket of ping-pong balls on top of the News booth door. You pull the trigger and smile as you imagine the first of many weekends without a 3AM phone call. Smart guy.

>> Rugged, super-duty power supply with optional fully-redundant backup. No wall-warts on Axia gear.

>> Plenty of professional, balanced mic, analog, AES and Livewire I/O in a fanless 3RU chassis.

>> Beefy heat-sinks look cool and keep cool - no noisy fans here.

>> Built-in Ethernet switch lets you network devices and studios easily.

>> Two Telos DSP Hybrids with DDEQ, wideband AGC and Advanced Echo Cancellation. Phones never sounded so good.

>> Nobody does broadcast phones better than Telos. And Telos builds the iQ6 exclusively for Axia. This'll get 'em talking.

>> High-resolution OLED meters with VU & PPM ballistics and peak hold. Switchable displays let talent meter 2, 3 or 4 buses at once.

>> 12-key dialing pad lets talent place calls without ever taking their eyes off the board.

>> Time-of-day clock can slave to your NTP server. Event timer has manual or auto-reset option.

>> Push and rotate Options control to select source, adjust pan, trim gain and more.

>> Avionics-grade switches with LED lighting.

>> Rugged machined aluminum surface has anodized finish and markings that can't rub off. Backed with our 5-year warranty.

>> OLED source / options display with audio confidence meter on every fader. They're sharp as a tack.

>> Silky-smooth, side-loading 100mm conductive-plastic faders feel great.

>> Join multiple iQ frames with included hardware. It's desk-mount, so no need to cut the counter.

>> Keep your eyes on the prize. Telco section OLEDs integrate hybrid control right into the board.

>> Separate selection and volume controls for guest studio and control room monitors.

[www.AxiaAudio.com/iQ](http://www.AxiaAudio.com/iQ)



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

## Burk Technology | ARC Plus adapter



**Plus-X Dual IP-8 Adapter:** Recognizing that rewiring is one of the largest costs and hassles of upgrading a legacy remote control system, Burk Technology developed the Plus-X Dual IP-8 Adapter. The IP-8 Adapter connects directly to existing ARC-16 IP-8 panels, linking them to a new or existing ARC Plus remote control over the LAN, WAN or Internet. The Plus-X Dual IP-8 adapter also eliminates the need to purchase additional I/O. Furthermore, a single ARC Plus can replace multiple ARC-16 systems, making larger upgrade projects substantially more cost effective.

[www.burk.com](http://www.burk.com)

## WorldCast Systems | FM rebroadcast receiver

**Audemat FM Receiver Silver:** The FM Receiver Silver is capable of receiving a signal in difficult circumstances and outputting an MPX baseband or audio signal, which can be used for high quality retransmission by any make of transmitter. This enables a broadcaster to provide complete coverage in shadow areas, tunnels and other hard to reach areas. To provide broadcast engineers with complete peace of mind, the FM Receiver Silver will monitor RF levels and MPX deviation to establish the presence of a suitable signal and display the current status via the LED front panel.

[www.audemat.com](http://www.audemat.com)

## Sony Creative Software | Video editor

**Vegas Pro 10.0d:** Vegas Pro 10.0.d now includes improved closed captioning options, comprehensive 3D solutions, support for AMD's ATI graphics chipsets using OpenCL, as well as an improved track group workflow. Vegas Pro 10.0d's enhanced closed captioning support now provides broadcast editors with the ability to read and write closed captioning embedded in MPEG-2, enabling a unified workflow for EIA-608, EIA-708 and MXF delivery options. It also now incorporates timeline burning to full-frame 3D Blu-ray Discs. An expanded GPU accelerated AVC encoding support to video editing professionals using AMD ATI graphics chipsets, which support OpenCL, the open standard for parallel programming of heterogeneous systems. Additional updates include MVC and MPO 3D file format compatibility from Sony cameras including TD10, NX3D1, TD300 and the Alpha and NEX series, providing users with added support for advanced camera and media technologies.

[www.sonymediasoftware.com](http://www.sonymediasoftware.com)

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# The future is calling. (It's for you.)



These days, nearly everything is networked. And now, so are your broadcast phones. Meet Telos VX, the multi-line, multi-studio, networked talkshow system.

VX uses standard Ethernet to connect all the phones, hybrids and consoles around your facility, transporting caller audio, mix-minus, POH and control logic on one skinny cable. Connect to POTS, ISDN-PRI, or even BRI telco lines via standard gateways, and *voila*,

they're available for use anywhere in your facility. And if you decide you want to use VoIP services, VX can do that too.

VX is so scalable, it can manage multiple simultaneous talkshows in the largest facilities. Yet it's cost-effective even for a few studios. Audio is clean and consistent, because dedicated, third-generation Telos hybrids manage each individual call. Even conferences are crystal-clear. You can deploy VX "virtual

phones" in production rooms, news workstations, or anywhere there's a PC with a USB mic and headset. Got a hot talkshow that suddenly demands more lines in a certain studio? Just a few keystrokes at a computer and you're set.

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## AUDIO LOGGING



PC Software for archiving and logging all of your stations audio.

## NEWPRODUCTS

### AETA Audio Systems | Audio recorder/mixer

**4Minx:** An ultra-portable DSP-based combined audio recorder and four-channel mixer, 4Minx is rugged and robust, with a user-friendly interface featuring rotary encoders, programmable function keys, and a TFT display panel. The 4Minx provides a breakthrough combination of functionalities for music recording and satellite mixing, or radio journalism. 4Minx features four mic/line inputs, two stereo line inputs, and two AES3/AES42 inputs, along with industry-leading output flexibility provided by two stereo line outputs, two auxiliary outputs, and three AES3 outputs. The DSP-based mixer supports four channels and a stereo mixdown, and the unit provides flexible routing for outstanding versatility through any mix of analog, digital and 100Base-T outputs. 4Minx's high-quality mic pre-amp guarantees quality sound with flexible integrated monitoring for SoundField microphone systems.

[www.aeta-audio.com](http://www.aeta-audio.com)



### Mogreet | Business automation

**Mocast Broadcast Platform:** This platform is designed to grow radio listening audiences and take advantage of the hyper-growth in local and national mobile advertising. Automatically deliver breaking news and multimedia content via API, RSS and MRSS. Send full track songs and podcasts to any mobile device in the United States. Support multiple mobile advertising formats, including pre- and post-roll video, images, text and audio ads. Mocast Broadcast Platform also includes SaaS contesting and sweepstakes features, daily deals and rich media mobile coupons, and real-time analytics and ROI reporting for advertisers and station executives. Integrated handset detection enables custom programming and app downloads by handset type. Mobile and social sharing features drive audience growth and amplify advertiser messaging.

[www.mogreet.com](http://www.mogreet.com)

## UPGRADES AND UPDATES

Prism Sound has released the latest version of its Sadie 6 software, which adds a dongle-based security feature to allow the software to be used on any computer. ([www.sadie.com](http://www.sadie.com))...**Navteq** Traffic via HD Radio for real-time traffic information is now available on the Garmin Nuvi 3490LMT can be added to other selected Nuvi devices via the Garmin GTM 60 adapter. ([www.navteq.com](http://www.navteq.com), [www.garmin.com](http://www.garmin.com)) ■

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**Omnia Audio | File-based audio processor and encoder**



**F/XE:** F/XE is a file-based audio processor and encoder application specifically engineered for podcasting or file-based streaming. It combines Omnia audio processing with Fraunhofer MP3 and AAC codecs. F/XE is software only; no special cards are required. It is able to read PCM WAV files, MPEG Layer-2 and MPEG Layer-3 source files. It can automatically send the output file to an FTP server and will notify the user at once by email if problems are detected. Logs are kept during processing so that the source of a problem can be traced. F/XE can also read metadata from external files and embed the information as ID3 tags in the output files. It can encode the output audio using MP3 or AAC (including HE AAC and HE AAC v2), or save linear PCM WAV audio files.  
[www.omniaaudio.com](http://www.omniaaudio.com)

**Harlan Hagan's Voiceover Essentials | Portable sound booth**

**Porta-Booth Pro:** Porta-Booth Pro is a professional quality sound studio featuring sonic stage "auditorium" design. It assembles in seconds by closing two zippers, and the 600 denier fabric features reflective piping. A zip-open rear slot accommodates shotgun mics, boom arm mic stands and cables. A zip-open bottom slot opens for both floor and desktop stands. And included LED light clip illuminates and holds sheet music. A built-in hood helps reduce extra noisy environments and an exterior travel bag pocket holds cables, lights, etc. Two adjustable web straps compress the booth providing additional packing space. Porta-Booth Pro is built to airline standards and qualifies as a carry-on or checked baggage. It weighs seven pounds and is 21" x 21" x 7" in its carrying case.  
[www.voiceoveressentials.com](http://www.voiceoveressentials.com)

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## NEWPRODUCTS

### Primera Technology | Disc publisher

**Bravo Archive-SeriesT:** The Bravo Archive-SeriesT Disc Publishers, now feature recordable drives and media from JVC Advanced Media. JVC Archival Grade DVD-R complies to the Optical Disc Archive Test ISO/IEC10995, which states that recorded data can be retained safely for more than 30 years under a temperature of 25 degrees Celsius and with 50 percent relative humidity. JVC's archival grade DVD-R delivers long-term data retention by the use of the company's own specially-developed dye, which controls the initial writing error at low levels. The reflective layer was also specially developed for archival use and is designed to last the lifetime of the media. The media has a hard-coat surface similar to that of the latest



BD-R media. Compared to JVC's standard DVD-R surface, the archival media is 200 times more scratch resistant, seven times more fingerprint resistant and 1,000 times more dust free.

[www.primera.com](http://www.primera.com)

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"ONBOARD DSP"

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

**ASI 5211 features:**

- +24dBu balanced analog and AES/EBU I/O
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- Up to 4 cards in one system
- Mic input with 48V phantom power
- Parametric Eq and Compressor/Limiter
- 2 in, 2 out GPIO
- Windows XP, 7 and Linux drivers

### Enco Systems | Audio file transfer system

**ENconveyor:** ENconveyor automatically downloads audio files from the Web or FTP sites and delivers them to a station's automation or audio delivery system. It can convert from multiple audio formats, sample rates and stereo/mono files. It works with Enco's DAD and Presenter systems or any automation system that can access a local or LAN-based directory. Set up user-defined schedules for downloads. PCM16 WAV files can be trimmed automatically to the first and last instance of audio at a user specified dB level. ENconveyor can even download and extract audio from unprotected video files. ENconveyor will automatically create and send an email if a site is down, if audio files are missing or files are an unexpected length, so there are no surprises. There is a built-in help system and helpful popup windows that guide users through setup and operation.



[www.enco.com](http://www.enco.com)

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**3Crowd | Content delivery application**

**CrowdCache:** An intelligent content delivery application that gives organizations greater control over how they deliver online content, CrowdCache transfers bandwidth access to the content owner. Unlike traditional CDNs and other cloud-based services, CrowdCache is an elastic caching system that functions on top of virtually any type of hardware and operating system and is piloted through a simple Web interface and API. The CrowdCache application removes the engineering complexity and operational overhead created by content delivery networks and allows users to quickly build and run an infrastructure to their exact specifications and needs. Built on the founding principles of utility computing, CrowdCache allows users to scale the delivery infrastructure, as necessary, without the steep learning curve of running a large scale, complex infrastructure. CrowdCache is controlled and operated by CrowdDirector, the management console that also acts as a globally distributed content load balancer for all 3Crowd products. [www.3crowd.com](http://www.3crowd.com)

**FIND THE MIC WINNER  
NOVEMBER ISSUE**

Congratulations to

**Gil Martinez**

Ultra Concepts, Sherman Oaks, CA



He won a Hosa USX-100 mic-to-USB converter from Hosa Technology.

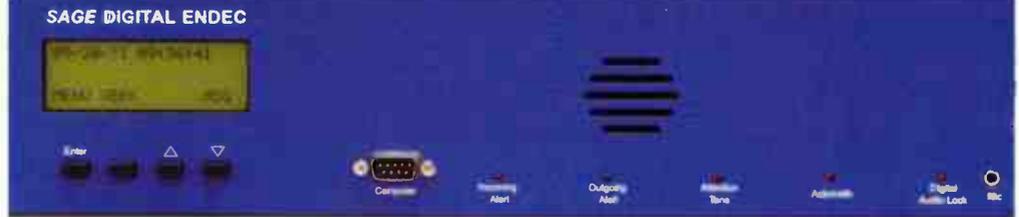
[www.hosatech.com](http://www.hosatech.com)

The mic was hiding in the tower cross members just below the O in the Radio logo.

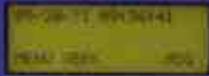


*The winner is drawn from the correct entries for the issue two months prior. No purchase necessary. For complete rules, go to [RadioMagOnline.com](http://RadioMagOnline.com).*

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[www.sagealertingsystems.com](http://www.sagealertingsystems.com)



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## NEWPRODUCTS

### MacinMind Software | Automation

**Radiologik:** Radiologik DJ is a music and playout system offering real radio transitions by employing Track Prep through the accompanying scheduler program.

It makes great use of an iTunes library, marking songs as played so smart playlists can be used for very complex radio rotation. It includes three main players, a palette of players for short sound effects, and its own library for searching, previewing and programming tracks while on the air. Radiologik DJ is useful as a live DJ and a 24/7 automated station for many formats where DJs can walk in and out at any time. Exchange ideas in the user-led radiologikusers.com forum, and watch two hours of video tutorials.

[www.macinmind.com/Radiologik](http://www.macinmind.com/Radiologik)



### Eaton Corporation | UPS

**5PX:** The Eaton 5PX UPS is an integrated power management system that supports virtualization strategies through seamless integration with Eaton's Intelligent Power Software Suite, which combines power monitoring with shutdown of devices or live migration of virtual machines. It meters energy consumption of individual devices down to the outlet segment level. An intuitive, graphical LCD display is built into the front of the UPS. Through this display and the power management software, users have a full view of the power draw of individual devices connected to the UPS, enabling better management of electrical loads, consumption and energy footprint.

[www.eaton.com](http://www.eaton.com)

### RDL (Radio Design Labs) | Stereo bi-directional audio format converter

**RU-AFC2:** The RU-AFC2 is a stereo bidirectional audio format converter to convert the stereo input and output of a consumer audio product to professional balanced standards. The audio fidelity, low noise, low distortion and crosstalk performance are ideally suited to the most critical applications. Unbalanced audio connections are available on front-panel RCA jacks. Balanced audio connections are available on front-panel XLR jacks and on rear-panel detachable terminal blocks. The shield connections of the XLR output jacks are connected to the case through a rear-panel ground-lift switch. The unbalanced to balanced section includes an additional mono-summed output on a rear-panel detachable terminal block which may be wired balanced or unbalanced. The mono output may be used to drive patch-bay jacks, powered monitors or subwoofer amplifiers.

[www.rdl.net](http://www.rdl.net)

## DB44 - Compact FM Radio Monitoring Receiver

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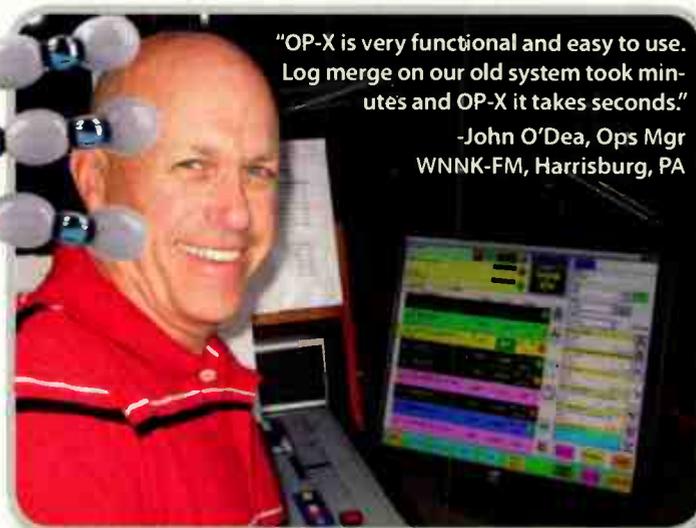
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by Erin Shipp

## MILE STONES



### 22 RØDE Microphones

The first RØDE microphone was produced and marketed 22 years ago this year. Now the company is launching The RØDE Difference, a website and online campaign that goes behind the scenes of the Australian microphone manufacturer, publicly sharing for the very first time the secrets and techniques behind how they produce their microphones. RØDE Founder and President Peter Freedman guides visitors on a personal tour at [www.therodedifference.com](http://www.therodedifference.com).

### 50 Audio-Technica

Audio-Technica celebrates 50 years this year. In 1962 Audio-Technica launched the AT-1 moving magnet phono-graph cartridge, used in radio stations for broadcasts. Some other important accomplishments from A-T's timeline:

- >1964: Development of an elliptical diamond stylus and the AT-3X and AT-5X
- >1965: AT-1001 tone arm package recognized by the Agency of Industrial Science and Technology
- >1967: Vibration-testing equipment shipped to measuring-device manufacturers and dual-magnet VM phono cartridges launched
- >1968: Technology for joint phono cartridge research with the NHK Technology Research Center provided
- >1969: Phono cartridges exported to audio equipment manufacturers worldwide; first microcassette recorders launched
- >1971: Patents obtained for the VM phono cartridge format in the UK and U.S.
- >1972: U.S. office established in Akron, OH
- >1973: Phono cartridges shipped to European audio equipment manufacturers
- >1974: AT-700 stereo headphones launched; AT-15E VM phono cartridge awarded top prize in the phono cartridge category at the Stereo Components Grand Prix competition; product goes on to win numerous other awards.
- >1978: ATH-8 and ATH-7 condenser headphones win MITI Good Design Award; AT-800 series of microphones launched; office opens in Leeds, England.
- >1986: Commercialized a Pure Copper by Ohno Continuous Casting AV cable; AT33ML/

OCC phono cartridge, the world's first phono cartridge made with PCOCC materials, launched; wireless microphone systems unveiled; boundary microphone unveiled

- >1988: Office established in Taiwan
- >1991: AT4033 cardioid condenser microphone introduced
- >1994: AT4050/CM5 multipattern condenser microphone launched
- >1998: AT4060 vacuum tube studio-use condenser microphone introduced
- >1999: AT895 adaptive array microphone introduced with DeltaBeam technology.
- >2002: 5000 Series advanced wireless systems introduced
- >2003: AT3060 cardioid phantom-powered tube microphone introduced
- >2004: New price/performance standard set with the AT2020 side-address studio cardioid condenser microphone
- >2005: Developed UniGuard, 13 individual patents, and a total system for RFI protection
- >2007: AT2010 cardioid condenser vocal microphone introduced; QuietPoint noise-cancelling headphones introduced; SpectraPulse, a patented Ultra Wideband (UWB) technology, introduced; SpectraPulse UWB Wireless Microphone System bypassed the increasingly congested RF bottleneck to deliver clear, intelligible audio without the performance and set-up issues associated with conventional wireless systems
- >2009: First ribbon microphones, the AT4080 and AT4081, introduced

*Audio-Technica also has a large involvement with the Olympic Games. For a complete company history, visit [www.audio-technica.com](http://www.audio-technica.com).*

## 2012's Hot CE Tech Forecast

Readers of the Consumer Electronic's Association's SmartBrief recently weighed in on the must-have technology in 2012. Top on their list? Tablets took a decided lead followed in the distance by connected TVs. Fry's Electronics co-founder and President

### WHAT WILL BE THE MUST-HAVE CE TECHNOLOGY IN 2012?

Randy Fry, who also serves as the CEA' executive board chairman, commented on the subject saying, "Innovative connected personal devices will continue to drive consumer demand. Consumers react with fervor whenever the 'next cool smartphone' is released. Tablets as well as the new ultra books will be hot items this new year as all three platforms converge seamlessly supported by some type of cloud experience."

|     |                                       |
|-----|---------------------------------------|
| 41% | Tablets                               |
| 18% | Connected TVs                         |
| 10% | Cloud computing                       |
| 10% | In-car technologies                   |
| 9%  | That is up to the individual consumer |
| 7%  | Technology to improve health/fitness  |
| 5%  | 3DTVs                                 |
| 4%  | Applications                          |

CEA SmartBrief Dec. 14, 2011.

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# CLEANUP

YOUR ON-AIR SOUND & IN THE RATINGS

**AirAura's 31-Band Limiter Delivers FAR More Clean Sound Detail than ANY Other Limiter on the Market. Here's Why This Is Important...**



In a traditional processor with 5-band limiting, selecting 3 bands results in 60% of the audio being affected. It's clear to see how such a coarse adjustment can adversely affect the overall audio.



In the AirAura, with 31-band limiting, only the narrow bands that need limiting are affected (just 9.5% of the audio spectrum). This allows MUCH more natural sound and the ability to tune-in your audio with near surgical precision.

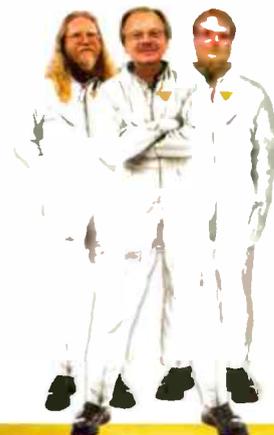
In a side-by-side listening comparison, you'll hear that this difference is HUGE. 31-Band Limiting is also relevant because it's a natural division – each band represents one third-octave of the audio spectrum. This makes processing more natural and more musical.

AirAura has a lot of other tricks up its sleeve, all of which reduce or refine the amount of processing to reduce distortion, artifacts and overblown sound. All we ask is that you listen...we know you'll be blown away.

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