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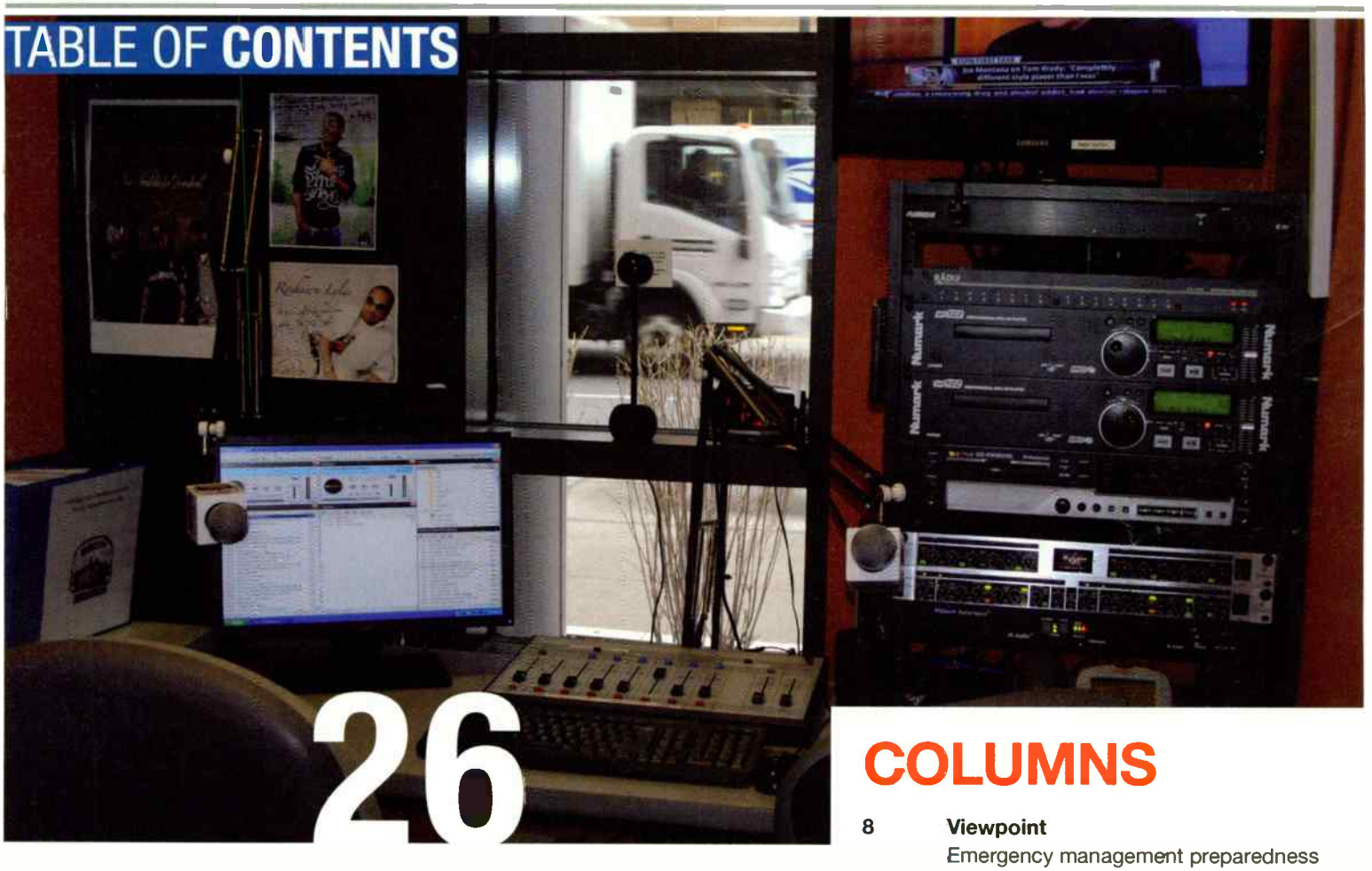

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SBE Re-elects Hogan

The results are in for the 2012-13 Society of Broadcast Engineers national board of directors after the society's first online election. Ralph Hogan, CPBE DRB CBNE remains as president for a second term.

"I look forward to continuing the excellent progress the Society has made in the past year and begin exploring the recommendations of the strategic planning committee with the board of directors at our October National Meeting," said Hogan.

Officers are elected to serve one-year terms on the Society of Broadcast Engineers board of directors. Returning to the board as officers are Hogan, director of engineering for KJZZ-FM/KBAQ-FM, Tempe, AZ, as president; Joe Snelson, CPBE 8-VSB, vice president of engineering at Meredith Corporation in Las Vegas, NV, as vice president; James Leifer, CPBE, director of engineering and IT at Clear Channel South Florida in Miami as secretary; and Jerry Massey, CPBE 8-VSB AMD DRB CBNT, corporate regional engineer and DoE at Entercom Communications in Greenville, SC, as treasurer.

The election of six directors, for two-year terms, includes the return of Tim Anderson, CPBE DRB CBNT, manager, strategic radio market and product development, Harris Corporation Broadcast Communications Division in Mason, OH; Gary Kline, CBT CBNT, senior vice president of engineering, Cumulus Media in Atlanta; and Scott Mason, CPBE CBNT, west coast director of engineering, CBS Radio in Los Angeles.

New to the board as directors are Andrea Cummis, CBT CTO, senior director of engineering and operations, WNET in New York; John Heimerl, CPBE, vice president of strategic technologies, WHRO-TV, WHRO-FM, WHRV-FM in Norfolk, VA; and Wayne M. Pecena, CPBE 8-VSB AMD DRB CBNE, director of engineering, Texas A&M University-Educational Broadcast Services in College Station, TX.

2012 was the first year the society offered online voting, which saw a 64 percent increase in ballots cast from the previous year. The total number of ballots cast was 1,313, which is 511 more ballots than in 2011.

The SBE has awarded the first CBNE certifications. The orgnization is now able to recognize a more advanced netowrking skill set of broadcast engineering.

The AES and EBU are cooperating in creating an audio over IP standard. The pair previously collaborated on the AES3 standard.

The NABEF will host the 2012 Radio Show Career Fair on Sept. 18, one day before the start of the show in Dallas.

The 133rd AES Convention will introduce a networked audio track examining the technological and operational advantages and workflow issues.

Radio Mercury Award Finalists

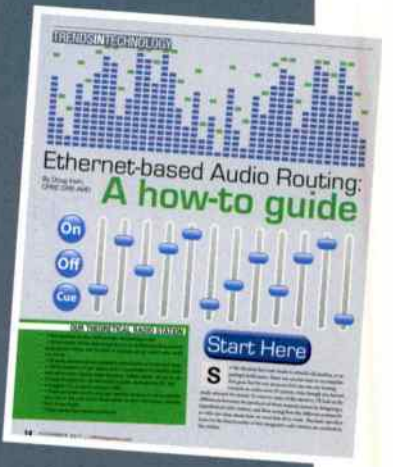
Ninety-nine diverse radio spots and campaigns have made it to the finals of the 2012 Radio Mercury Awards, which honors outstanding radio created by advertising agencies, production companies, radio stations and students. Entries were judged on their creativity, originality and effective communication of a brand's message. The 2012 finalists encompass a wide range of small to large advertising agencies and radio stations alike, as well as national and regional advertisers from the automotive, consumer packaged goods, beer, entertainment, fast food, financial services, insurance, telecommunications and retail categories.

For the complete list of finalists and judges, visit RadioMagOnline.com

SBE Honors Boswell, Pecena, Orban and *Radio* Magazine

Recipients of the 2012 Society of Broadcast Engineers were announced. The Robert W. Flanders SBE Engineer of the Year Award goes to Wiely Boswell and the James C. Wulliman SBE Educator of the Year Award goes to Wayne Pecena. The SBE also honored *Radio* magazine with the Best Technical Article Award by recognizing an article by Doug Irwin, CPBE AMD DRB, from the December 2011 issue titled "Ethernet-based Audio Routing: A How-to Guide."

This marks the 10th time an article from *Radio* magazine has received the honor, and the ninth time in a row. Radio magazine received the honor in 2011, 2010, 2008-2009, 2007, 2006, 2005, 2004, 2003 and 1999.



AES Expands Broadcast/ Streaming Media Sessions

The AES Convention Broadcast/Streaming Sessions have been set for the upcoming convention. The topics range from studio design, to processing, to audio routing. David Bialik, as he has for the past 26 years, is chairing the sessions. The 133rd AES Convention is scheduled for Oct. 26-29 at the Moscone Center in San Francisco.

FIND THE MIC AND WIN!

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

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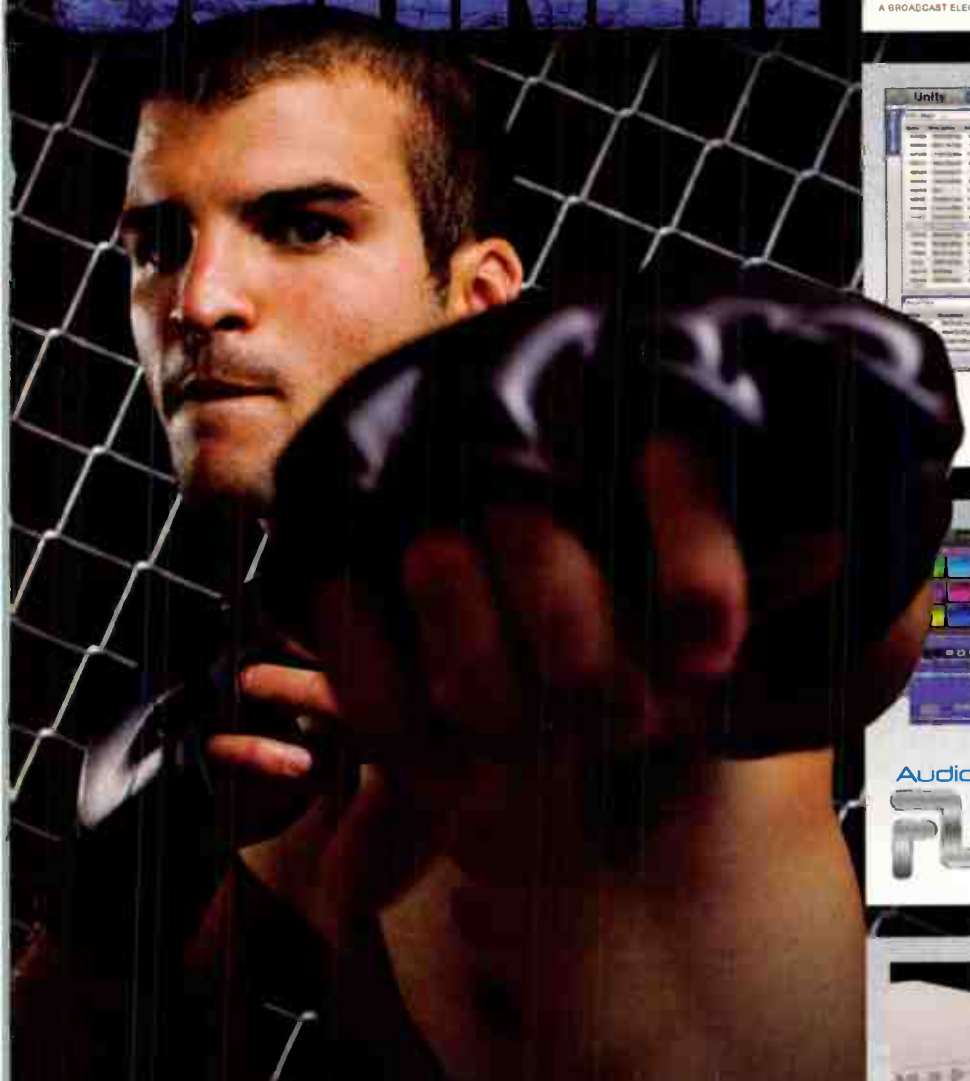

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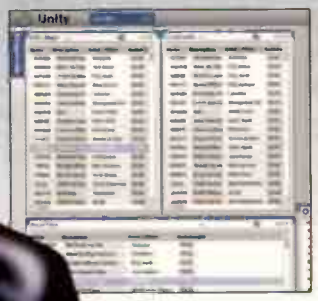

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Be Prepared on a Local Level

Part of our nature as technology managers is to prepare our stations for unforeseen emergency situations—OK, that's a formal way of saying disaster preparedness. I know some stations have elaborate plans in place to cover nearly any possibility. While the primary intent of these preparations may be designed to keep the business operation and revenue stream functioning, the plans also ensure our listeners will still have a radio signal during an emergency.

Regardless of the disaster—natural or man-made—when a crisis occurs, the public turns to the broadcast media for information. But while the station may have a plan in place to remain on the air, the plan can only be implemented if people can get to the studio or transmitter to carry it out. It may be that roads are blocked or some kind of perimeter is established around a crisis area.

When I was the president of the SBE a few years ago, an idea was proposed to create some kind of national credential that would allow certain broadcast personnel access to their sites during emergencies. Think of a station engineer being able to present a Department of Homeland Security or FEMA badge to show he has a reason to cross the boundary. The idea has merit, but as it was explored it became clear that to issue such credentials on a federal level would be a bureaucratic quagmire. While a federal ID may have some clout, the engineer would likely be showing it to a local policeman or national guardsman. It seemed approaching this idea on a local or regional level made more sense, even if it meant the same effort would be repeated in many locations.

At a recent SBE Meeting in Kansas City, the chapter chairman, Mike Rogers, raised the topic. He reported that the Mid-America Regional Council (MARC) established the Metropolitan Emergency Managers Committee (MEMC) to bring the various police, fire and EMS teams together to establish common communication and operational plans. Rogers realized that even though plans may be in place for these agencies to communicate with each other, their work did not yet include a plan for the agencies or the MEMC to communicate with the public. Simply tying in to EAS was only one part of the effort.

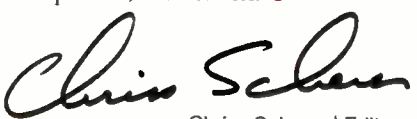
Rogers began attending MEMC meetings as a representative of Kansas City SBE Chapter 59 to include broadcast stations in the preparedness plans. One of his primary messages was to highlight the importance of not just getting information to the public, but allowing broadcasters to ensure their signals are on the air to be an active conduit.

What may result is some kind of identification for the broadcast engineering community to allow them uninhibited access to their sites during emergency situations. To me, this type of local or regional credential is better than a federally issued credential. The local patrolman may know nothing about a FEMA or DHS ID, or even believe it's legitimate. Verifying the federal ID would be nearly impossible. The local or regional ID, however, would be easier to validate. The local approach also helps prevent abuse. An ID issued in Kansas City is useless in Cincinnati.

I applaud Rogers' efforts and the support of SBE Chapter 59 to take on this project. Similar efforts may be taking place in other areas as well (and if you know of them, please let me know). While each community or region may end up inventing the same wheel, the result will be more effective communication between the emergency managers and the public.

FAREWELL TO A FRIEND

On Aug. 28, 2012, *Radio* magazine lost a member of our family when John Battison passed away. He had a long history with *Radio* magazine as our technical editor, and an even longer history of service to broadcast engineering. I'll always smile remembering John saying that "Audio is something that messes up a nice, clean carrier."



Chriss Scherer | Editor

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Dan Jackson, engineer for 92.9 FM in Perth, Australia was faced with a unique challenge. Breakfast hosts Paul Hogan and Lisa Fernandez would be cycling for hours in strong winds and pouring rain as part of the 92.9 Kids Appeal for Telethon.

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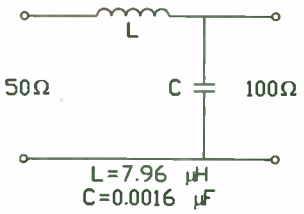
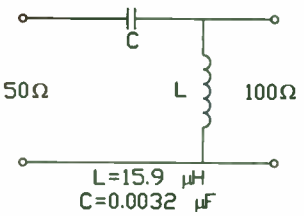
AM Tuning Networks

by Jeremy Ruck, PE

In January 2012 I looked at the venerable T network for impedance matching in AM antenna systems. Now I'll discuss the L and Pi networks, and look at their use in antenna systems.

The L network is the simplest of the impedance transformation networks, and can be constructed with two reactive elements. Since it is the simplest of the transformation networks it essentially is the building block for the more complex T, Pi, and other types of networks. The simplicity in construction, however, also limits the usefulness of this network, and its ability to make transformations.





Two variations of an L network

Because capacitors and inductors are the flavors of reactive elements available, and it takes two elements to create the L network, there are two different general topologies available. One has the shunt leg on the load side of the network, while the other is the mirror image with the shunt on the generator side. Four different arrangements are possible within these two topologies depending on the combination of components utilized. Thus, eight different combinations would be possible for matching various impedances, although the four cases utilizing both a capacitor and an inductor are used are much more common. The shunt leg of the network will be located on the side with the greater impedance.

NOT A SIMPLE TRANSFORMATION

It should be noted that an L network cannot be used to transform between two impedances where the resistance values are identical. Intuitively this should make sense as such a transformation can easily be accomplished through the use of a series inductor or capacitor depending on the direction you need to move the reactance. Inductors in series will add positive reactance, while a capacitor will take things the other direction adding negative reactance. If control of phase over such a transformation is required, then a T, Pi, or some other flavor of network must be utilized.

The Q of the network, which relates to the bandwidth, is determined by the ratio of the impedances to be transformed. This quantity, which cannot be independently selected by the network designer, is low for small transformations, and grows with the range of the desired transformation. So shifting high impedances down to standard transmission line values may result in higher than desired reflected power, and by extension VSWR, within the spectrum of a particular signal.

Because the math can get a little hairy in complex impedance situations, we will take a quick look at an example matching two pure resistances. Let us assume our desired transformation is from a 50Ω transmission line to a 100Ω resistive load at 1000kHz. We know right off the bat that the shunt leg of the network will be on the load side, and since we will limit ourselves to networks with both a capacitor and inductor, there are two possible solutions. The first step is to determine the Q:

$$Q = \sqrt{\frac{R_L}{R_G} - 1} = 1$$

The first case has the capacitor in the shunt leg and the inductor in series. The values for the components are as follows:

$$C = \frac{Q}{2\pi f R_L} = \frac{1}{(6.28)(100)} = 0.0016\mu F$$

$$L = \frac{QR_G}{2\pi f} = \frac{50}{6.28} = 7.96\mu H$$

Moving the inductor to the shunt leg and the capacitor to the series leg results in the following:

$$L = \frac{R_L}{2\pi f Q} = \frac{100}{6.28} = 15.9\mu H$$

$$C = \frac{1}{2\pi f Q R_G} = \frac{100}{(6.28)(50)} = 0.0032\mu F$$

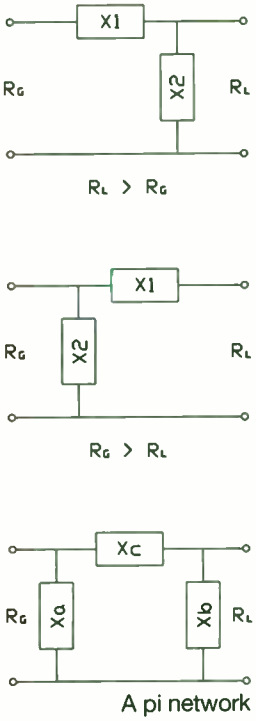
When using these equations, it is important to keep track of the decimal places. The frequency denoted by "f" is in terms of hertz, and the derived capacitance will be in farads, and inductance in henries. Because 1000kHz is 1MHz, and our desired component values are microhenries or microfarads, we can simplify the terms somewhat.

In this case the solution with the smaller inductor is probably the more cost effective solution; however, in a pinch you can use what is on the shelf. Note also that if you add an element in series on the load side of the network, you have created a T network. This additional element should be used to reduce the complex impedance to a pure resistance, then employ the above equations to make a match. Thus, with some components on the shelf, you could easily construct a matching network to return a non-directional AM station to air in a crisis.

EASY AS PI

The other network I will discuss is the Pi network. Now that the basic L network is easily visualized, it can be seen that a Pi network is really nothing more than two L networks stacked together. While the T network is two L networks stacked where the shunt legs are next to each other, the Pi network can be thought of the combination where the shunt networks are opposite each other.

As a consequence of these arrangements, an "intermediate" impedance at the center of the network is mathematically created. This value



is a virtual quantity; however, it is usually adjusted in order to meet a desired Q value, and by extension, bandwidth across the network. Note that in the Pi network this virtual impedance will be lower than either the generator or load impedance because the shunt legs of the two L networks are opposite each other. The reverse is true for the T network.

The math for the Pi network becomes a little messier as trigonometric functions are introduced. The existence of the trigonometric functions gives rise to the control of the phase shift across the network. Equations for the various legs of a Pi network for a purely resistive transformation become the following where "A" is the shunt leg at the generator side, "B" the shunt leg at the load side, and "C" the series element between the two:

The beta term introduced in these equations is the phase shift desired across the network, and is in terms of radians, not degrees. Converting from degrees to radians is accomplished by multiplying by the value of Pi, and then dividing by 180. Note also that these equations will break down if the sine of beta is zero. This occurs in cases where the phase shift would be zero degrees or plus or minus 180 degrees.

$$A = j\frac{R_G R_L \sin(\beta)}{R_L \cos(\beta) - \sqrt{R_G - R_L}}$$

$$B = j\frac{R_G R_L \sin(\beta)}{R_G \cos(\beta) - \sqrt{R_G - R_L}}$$

$$C = j\sqrt{R_G R_L \sin(\beta)}$$

The choice of matching networks varies as much as the ranges of impedances over which transformations can be made. Not only can the basic L network be expanded into the T or Pi, but other exotic combinations as well through various methods of cascading. Each of the designs has their advantages and drawbacks including bandwidth considerations, cost, currents and voltages, and dc continuity, to name a few. In the end, though, even the greenest of broadcast engineers can become proficient enough with simple L, and by extension T networks, to restore an AM station to operation until additional help arrives. That is something that management will definitely appreciate.

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

Forfeitures, Fines and Decrees

by Lee Petro

August in Washington usually means very little rulemaking action at the FCC. With the lawmakers gearing up for a fall busy with FM translator/LPFM matters and spectrum auctions, the enforcement arm of the FCC was in full swing, issuing forfeiture orders and reaching consent decrees on a number of different issues. The big-ticket knuckle-rapping targeted the musical instrument company Fender, relating to equipment authorization problems.

Contest Rules: The FCC takes a jaundice eye toward broadcasters running contests where they fail to properly broadcast and then follow their own contest rules. A recent decision though puts a different spin on the problem. In this case, the station in North Carolina developed rules for a baby photo contest and properly broadcasted the rules over the air to the public.

The station failed by posting the incorrect versions of the rules on its website and confusing the end date and award date in emails to the contestants. Since the incorrect dates were also made available to the public, the FCC determined the station failed to substantially follow its own rules, and issued a forfeiture.

Interestingly, the FCC increased the forfeiture by $10k because the licensee (CBS Radio) had previously violated the FCC's contest rules, and the prior forfeiture proceedings apparently did not convey the seriousness of the problem. Given the size the licensee, the FCC thought doubling the forfeiture might catch its attention.

Broadcasting Phone Calls: The FCC also dinged a broadcaster who twice aired telephone calls without first getting the approval from the recipient of the call. The interesting facts in the case were that the actual recipient was not the person submitting the complaint, and the complainant did not provide detailed information regarding what was aired on the stations. The Commission did not place much stock in these arguments, and, since the program was simulcast on two commonly owned stations, the FCC doubled the base forfeiture to $20k, and then tacked on an additional $5k since the violator was a repeat offender.

In the second case, the recipient of the phone call from the broadcast station did provide her consent, but not until after the call was broadcast on the station. The broadcaster argued that it had not made the call, but rather a vendor had packaged the program to be aired on the station. Not surprisingly, the FCC rejected that argument. Noting that employees of stations can cause liability for the broadcaster, the FCC concluded there was no general exception for third-party vendors. Further, the FCC concluded the station could not avoid liability because it ultimately received consent from the recipient, since the station was responsible for obtaining consent prior to pushing the "On Air" button.

Broadcast Auxiliary SNAFU: Even the oft-overlooked world of Broadcast Auxiliary licenses recently fell into the Commission's gaze. In Wyoming, a four-station radio group had been using broadcast auxiliary spectrum to link the studio with the stations' transmitters. While the broadcaster had a license to cover one of the links, the other links were not licensed, and the station owner could not provide record of prior approval. Making matters worse, the station owner had previously been ordered to pay a $10k forfeiture for the same problem for a different group of stations. In the end, the FCC ordered the licensee to pay $68k for operating the transmitters without current license authorizations, and for operating them from unauthorized locations.

Equipment Authorization Problems: While not directly a radio-related forfeiture, an interesting enforcement proceeding was initiated against Fender Musical Instruments for failing to comply with the FCC's equipment authorization rules. While not all the facts are available, it appears certain Fender products, including amplifiers, tuners and wireless microphones, did not comply with the Commission's importation and marketing rules with respect to the newer digital products, and were not properly labeled. The case was resolved by a Consent Decree, whereby Fender agreed to make a "voluntary" contribution in the amount of $265,000 to the U.S. Treasury, and agreed to adopt a Compliance Plan that involves changes to its operating procedures, the creation of a Compliance Manual for its employees, scheduling training programs for its employees, and submitting Compliance reports to the FCC.

What should be clear from these proceedings is that the enforcement staff will be diligent in enforcing the FCC's rules, even when some of us are enjoying the summer, and that broadcasters must remain vigilant in their efforts to remain in compliance. This is especially true where a broadcaster previously has found himself in the FCC's enforcement cross-hairs.

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

DATELINE

Sept. 1, 16: Stations in Illinois and Wisconsin continue running License Renewal Post-Filing Announcements. Stations in Iowa and Missouri continue running License Renewal Pre-Filing Announcements.
Oct. 1: Stations in Iowa and Missouri file License Renewal Application and EEO Program Report. Commence running License Renewal Post-Filing Announcements, and file their Biennial Ownership Report (FCC 323-E).
Oct. 1, 16 and Nov. 1, 16: Stations in Colorado, Minnesota, Montana, and North Dakota begin running License Renewal Pre-Filing Announcements.

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SNMP

Around the Station

By Doug Irwin, CPBE DRB AMD

In the series of Trends in Technology articles I've written about SNMP (simple network management protocol) several times, but this time we'll look at specific examples of what can be done with commonly available equipment. We'll also look at a common (and free) MIB browser that you can download and experiment with.

SNMP is an IP protocol that provides network elements a means by which they can communicate with and/or control one another. There are various parts that make up the entire picture: the SNMP agent, the SNMP manager and the MIB. The SNMP agent is the network element to manage; the SNMP Manager does the management; and the MIB (Management Information Base) is essentially a set of instructions that tells the Manager what information is actually available from the agent, and where to find it.

The information available to the manager from the agent takes a couple of forms. The first of those forms are known as traps. Traps are simply pieces of information, put in place by the designer of the equipment upon which the SNMP agent is running, that can tell you something important about that piece of equipment. (Think of a trap as a red flag. Raising the red flag prompts the trap message to be generated and sent.) The transmission of traps happens in an outbound manner though; so, in a sense it's kind of a passive way of keeping track of problems in an agent. It's kind of a no-news-is-good-news methodology. As the user, you would configure the equipment to tell it what traps you were interested in (in some cases it may be all or nothing at all) and where to send them—in other words, the IP address of the SNMP manager. That manager receives the traps and either logs them or lets you know immediately.

Another way to use SNMP is to have the manager query the agent on a regular basis. In this case, you will use SNMP Get commands to retrieve various pieces of information from the agent. You can also make use of SNMP Set commands to have the manager control the agent. This is one of the most useful facets of SNMP—having the manager tell the agent to do something via set commands, based on information gathered via get commands. When combined with scripting, the manager can essentially be a proxy for you to take actions on your behalf.

Now you may be thinking, *Why bother with this when I can see all that I need via a browser?* and that's a good question. The answer is simply this: SNMP works in the background while you are busy doing something else. Opening a browser uses your time and attention, and you pretty much only concentrate on one site at a time. On the other hand, one SNMP manager can look at multiple sites, all the time, 24/7. While someone's Web interface may look pretty, that isn't much use while you are sleeping, is it?

SNMP IN ACTION

Let's look at a MIB browser. An MIB is basically a small text file (you can paste it in to notepad if you want to see what one looks like) that the manager reads to find information in the agent. Conceptually, the MIB is configured like a tree; as you go up the trunk and out the branches, the information becomes more specific, until you reach a leaf. The leaf is the end and represents a very specific piece of information that you want the manager to be able to see. The leaf is found by the manager by its reading of the OIDs (object identifiers) that are present in the MIB.

The browser I use is made by iReasoning Network. Go to ireasoning.com/mibbrowser.shtml and note in the right hand column a link to download free personal edition. Download the MIB browser from there.

For this demonstration we're going to use a Broadcast Devices DPS-100D in-line wattmeter. (I've chosen this device because the MIB is simple and illustrates the point well.) After you launched the MIB browser, download the MIB for this device. Go to broadcast-devices.com/images/BDI%20MIB%20FILES.zip, unzip the files and save them somewhere convenient. The final step in setting this up is to run the MIB browser, then select File > Load MIBs. Then, with the open window, find the Broadcast Devices MIB files you just unzipped. First click BDI DPS-100D MIBS\BDI-Enterprise-MIB-SMIv2.mib and click open, then click BDI DPS-100D MIBS\BDI-DPS100D-Product-MIB-SMIv2.mib and click open. You need both.

With all this done, you can type in an IP address in the window in the upper lefthand corner of the MIB browser. The address for our demonstration unit is 108.170.120.155. Then select Operations > Walk. You should then see the result table populated.

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This remote device has been left open for purposes of this demonstration; note however that there are basic security features with SNMP (version 1) namely the Read Community and the Write Community. (If you click on Advanced Features you'll see where to enter those.) These are basically just passwords, and typically the Read Community is the word <public> and the Write Community is the word <private>. Obviously you can change these in your own SNMP configurations.

Notice the results table has four columns: name/OID, value, type, and IP:port. As I browse this MIB I noted a couple of things I wanted to be able to read: the forward and reflected power (for example) and the internal temperature along with the external temperature. Looking in the next column, I see their values (what they were when the walk was executed); and I see the OID type. Here is where this gets useful: Notice that if you highlight any one of the lines in the results table that its OID (Object Identifier) shows up in the OID window, which is near the top of the page, above the results table. The OID (as you can see) is a series of numbers separated by decimal points: One example would be the forward power OID: <1.3.6.1.4.1.37691.2.2.1.1.1.3.7.0>. Note there is a one-to-one correspondence between this OID and the information leaf you want to read.

When you configure your SNMP manager, the OID and the type are the information the browser needs to be able to read. The value will be read every time the agent is queried by the manager (Get). You can do this manually by highlighting the OID you want (forward power in this case) and then using the operations window (upper righthand corner) and choosing Get, you'll see the MIB browser return the value again. Of course your SNMP manager will automate this function.

MORE DATA

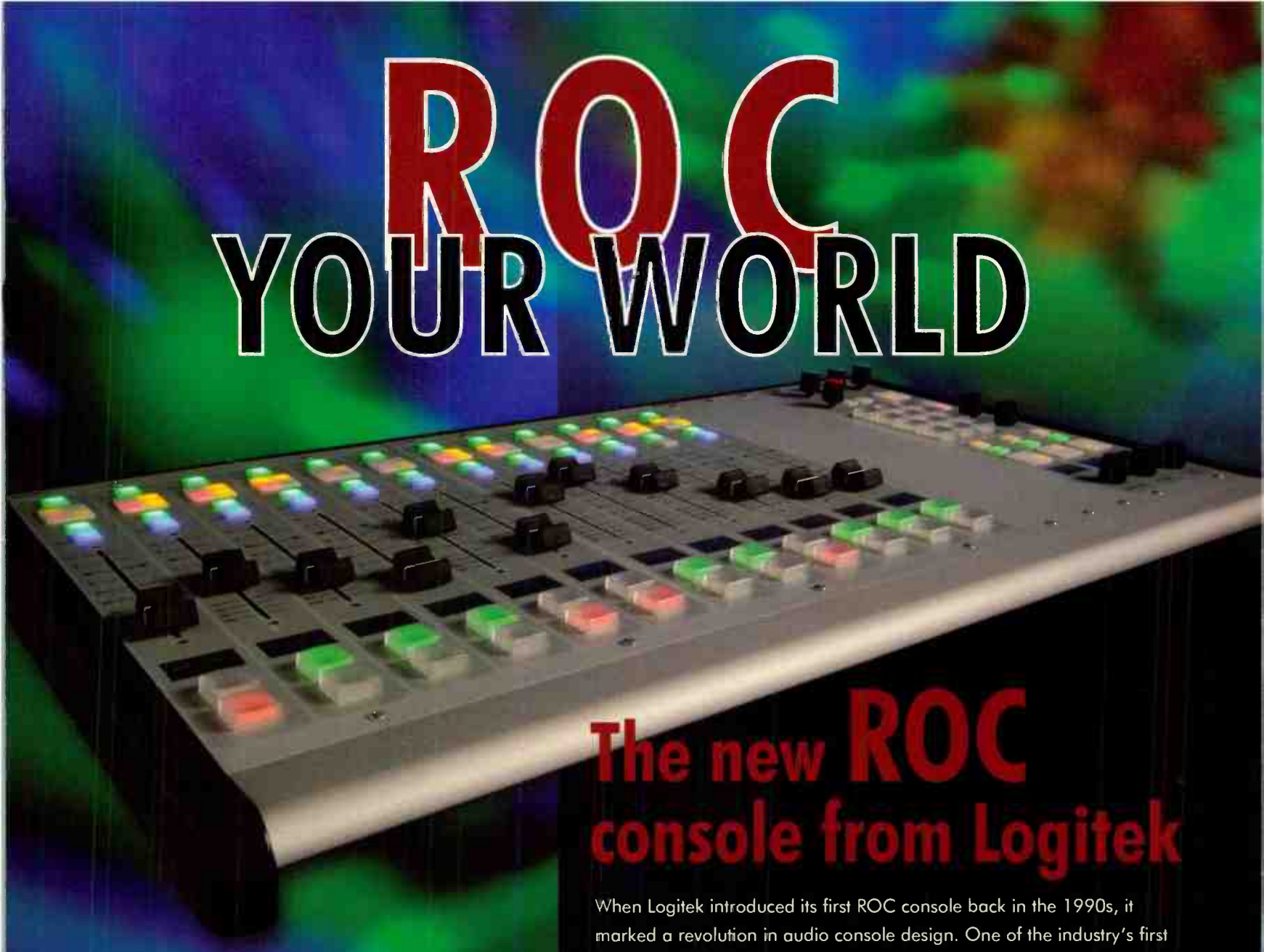
When you look at more complex MIBs you may see all kinds of things you want to read. This is a simple example, and more complex equipment (with SNMP support) will usually have all kinds of information for you.

If a new piece of equipment going in at the transmitter site has an Ethernet port for Web browsing support, it may very well have SNMP support as well. If so, your wiring is complete the moment you plug in that RJ-45 cable. You can read the information via your IP network wherever there is an SNMP manager; and conversely, if you have an SNMP manager, it can read agents all over your IP network.

Now let's take a look at some real world examples of SNMP usage.

A year ago, Clear Channel New York began a new transmitter facility build for WLTW and WWPR. For this project we acquired two Nautel NV20s (one for each station) and we decided to repurpose two BE FM10Bs (which had been WWPRs transmitters) so that one became an

ROC YOUR WORLD



The new ROC console from Logitek

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

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

Available in multiples of 6 faders (up to 24), the ROC is housed in an attractive tabletop enclosure. Durable Penny & Giles faders, OLED source indication and intuitive controls make the ROC a natural for on-air, production rooms or even in temporary studio setups. Two monitor feeds, front panel headphone connection and user-assignable softkeys will please even your fussiest operators.

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alternate for WWPR, and the other became an alternate for WLTW. The NV20s provide complete metering and control via the Advanced User Interface that is accessed via Ethernet. We also have nine Harris Z10s, which have complete metering and control available via a serial connection (which we use). However, the BE transmitters date from the

Figures 1 and 2: Before and after

early 1990s, and only had legacy GPIO connections on their internal terminal blocks.

For this project, I really wanted to try to update the BE transmitters so that they were accessible via the same network as the Nautel transmitters. We chose the Mini Control Silver from Audemat to accomplish this. To simplify the installation, I decided to install the MCS for each station inside the transmitter itself. (See Figure 1, the before shot, and Figure 2, the after shot, on the previous page).

The Mini Control Silver is kind of the baby brother of the Relio (which is built by SeaLevel, and programmed by Audemat). Our new transmitter facility uses Relio for remote control, and each of these devices acts as an SNMP manager, communicating with the MCS (inside the transmitter), which acts as an SNMP agent in this case.

The MCS has eight analog inputs, eight status inputs, and eight relays, so I was able to connect to everything I needed inside the FM10B—the standard meters, on/off controls, and overload reset. It's powered from a source inside the transmitter.

Figure 3

The next thing to do was connect the MCS up to our LAN. When I did that, the FM10B made its appearance on our network.

Control of the FM10B could be done via a direct connection between a computer and the MCS (via Audemat's program called Master View) but that isn't what we do; all the normal user controls for the FM10B are viewed on the GUI of the WWPR Relio (or WLTW Relio). In fact, one entire tab in the GUI is dedicated to the FM10B. If you look at Figure 3 you'll see a column of buttons on the lefthand side that correspond to the BE controls: In the middle column there are two grey boxes for status (they turn green when ON) and in the righthand column, the typical transmitter meters. These controls (except the bottom two) and the meters (except the bottom one) are carried out via SNMP—no extra wiring involved. The pushbutton controls are done via SNMP Set and the metering is done via SNMP Get (with continual querying).

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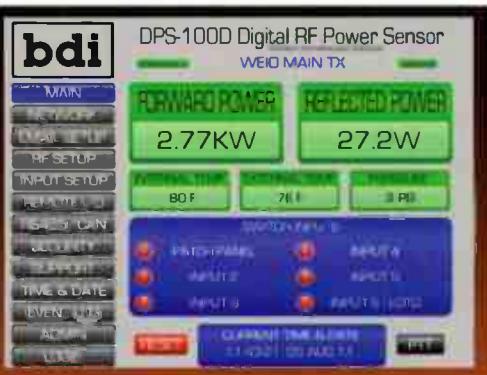

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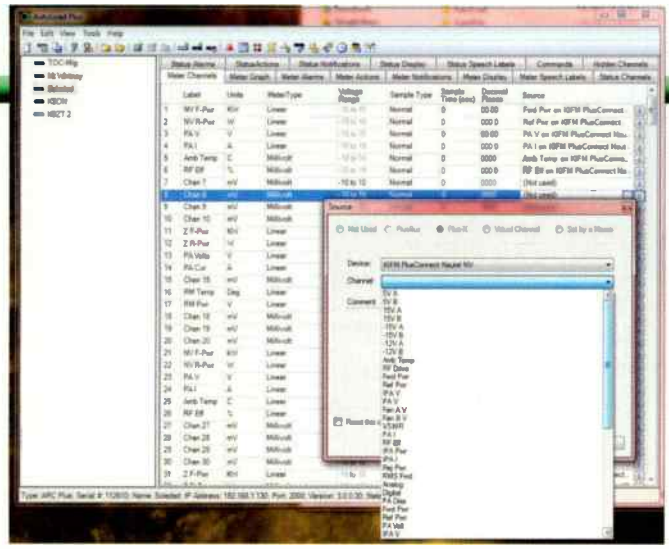

Figure 4

A script for changing transmitters exists on Relio; controls for that function are actually done via real wire. (Those are the bottom two buttons, and the bottom meter.) The scripting is done with Audemat's program called ScriptEasy. Once you decide that you are going to use SNMP, you'll load the particular MIB you need in to the mini-control-silver; afterward you can use its own MIB browser to pick out what you want it to read. SNMP-accessible objects are then available to use in the script, in addition to the eight relays, eight status inputs, and eight meter inputs.

Figure 5

ANOTHER METHOD

Another very well known remote control that takes advantage of SNMP is the Burk Arc Plus. Burk has a custom interface for the NV series of transmitters. Bill Eisenhamer of KIFM in San Diego (Lincoln Financial Media) was kind enough to send me a description of how the system works in practice.

The PlusConnect-NV talks to the transmitters via the local LAN, and continually queries the AUI of the transmitters. The information gathered feeds to the ARCPlus for display, command and status. (AutoPilot gets information that it needs from the ArcPlus.) The user configuration is done using drop-down menus to map pre-defined channels to ArcPlus using AutoPilot Plus (Figure 4).

The PlusConnect-NV is configured via telnet; this includes its IP address, port numbers and polling rate (Figure 5).

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A piece of software that goes along with ArcPlus is called AutoLoad Plus, and the most recent version allows you to instruct ArcPlus to automatically issue a command or to run a macro in the event that a predefined limit or status changes. Macros are created in the AutoLoad Plus software, using predefined statements selected via drop-down lists, on a per-channel basis. You can also use a visual format for creating scripts, known as Jet Flowcharts. These run on the computer that runs AutoPilot.

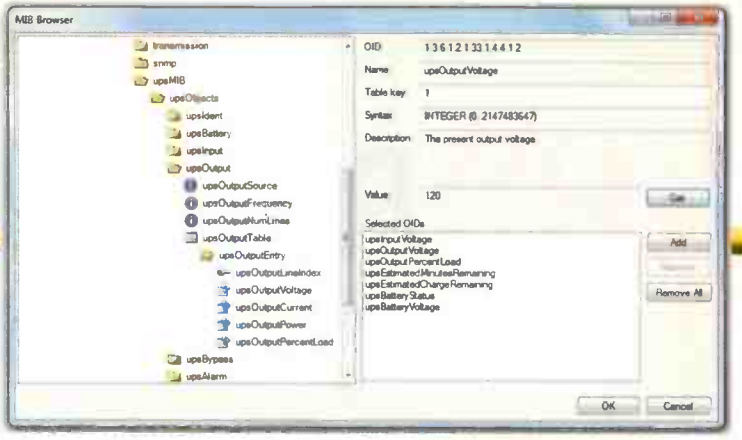

Figure 6

Like the Mini Control Silver, the Burk system can also speak via SNMP with other agents. For example, Eisenhamer uses AutoPilot to communicate over the LAN with multiple PowerWare UPS units and the Broadcast Tools TempSentinel. After retrieving and loading the appropriate MIB in to AutoPilot, you can use its MIB browser to pick the OIDs that correspond to parameters you wish to monitor (Figure 6). After that, you configure the channel type (meter or status) and label, units and limits (Figure 7).

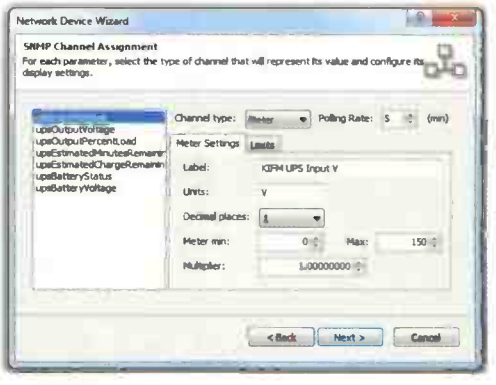

Figure 7

The SNMP protocol has been around for many years and is now really finding its way into the broadcast engineering vernacular. (Better late than never!) I'm seeing more and more equipment that supports SNMP: transmitters, remote controls, audio codecs, microwave receivers and transmitters, and ancillary equipment such as air conditioners, UPSs and of course networking equipment like switches and routers. The SBE now offers an online course about SNMP as well.

Irwin is transmission systems supervisor for Clear Channel NYC and chief engineer of WKTU, New York. Contact him at doug@dougirwin.net.

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EDUCATION INSTALLATION

The Illinois Center for Broadcasting provides a real-world learning environment

By Chriss Scherer, editor

The Ohio and Illinois Centers for Broadcasting (beonair.com) operate six campuses. Three are in Ohio (Cincinnati, Columbus and Cleveland), two are in Illinois (Chicago and Lombard, IL), and one is in Colorado (Lakewood). The school was founded in 1986, and the curriculum covers all aspects of broadcasting through a hands-on program instructed by professionals. The Centers for Broadcasting have educated scores of broadcast professionals on the air and behind the scenes. The centers strive to provide practical experience in a broadcast facility. To do this, the facilities are updated regularly to ensure the equipment is representative of modern broadcast operations.

The Lombard campus occupies 15,000 square feet and has 15 audio studios. Three Internet radio stations broadcast from this facility, which was completed in 2009, although the school has had other campus facilities in Lombard for more than 25 years.

While the Lombard campus filled a need, the school decided it

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The main studio looks out onto State Street.

needed a facility in Chicago. In 2010, the Illinois Center for Broadcasting opened its facility on State Street in Chicago.

LOCATION, LOCATION

The site chosen on State Street is a highly visible location, and some 65,000 college students live in the area and see the street-front studios every day. The showcase studios not only promote the school, but allow passersby to see the school and the various broadcast programs in action. Two Internet radio stations operate from here: chicagolandsportsradio.com and windycity underground.com. The sports channel features former football player Jarrett Payton, who is also the son of Walter Payton, and Chicago broadcaster Chet Coppock. The underground station is completely student run.

The State Street location has two radio studios: one on-air studio and one production studio. They both have windows looking out to

There's still a view to the street in the second State studio, which is a smaller studio.

the street, and it's common for people on the street to peek in and watch radio being made.

But not long after the State Street facility was built, it was realized more space and additional studios were needed. A second Chicago facility was built a few blocks at LaSalle and Harrison. This facility features 12 radio studios. With this expansion, the LaSalle and Harrison location became the primary audio production and training facility, and video production was set up on State Street while leaving the showcase studios in place.

A REAL FACILITY

To provide a real-world operational experience, the school built the State Street studios around Arrakis consoles. The Marc-15 and Arc-8 consoles were chosen because they are typical of a radio console and don't have too many unneeded features and buttons. The school also had experience with Arrakis

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One of the editing suites at the LaSalle Street facility.

products and likes the reliability. The automation system connects to the console via the console's USB connection.

The LaSalle facility has 15 studios, and all are equipped with Arrakis Arc-8 consoles. Other equipment includes Sam Broadcaster for automation, Shure SM27 mics, PreSonus DigiMax D8 preamps, Alesis 3630 compressors, a Symetrix 6100 broadcast delay, Comrex Access codec, Tascam CD-RW900SL CD players and Adobe Audition 3.0. Belden 9451 was used to wire the facility.

All the studios also have webcams so the students can learn about video production and web streaming. Telestream Wirecast is used for switching the video from the multiple webcams.

Each campus operates on its own. A computer network connects all the facilities to transfer data.

When the State Street studios, all the equipment was specified with exact needs in mind, but with flexibility for whatever may be needed in the future. The studios are a bit small, so there's little room for unneeded equipment. This saves space of course, but there was also a desire to preserve the acoustics. With large windows already in place, stacks of racks were avoided to reduce unwanted audio reflections.

The original studio plan had T-shaped furniture. While this looked good on paper, it took up too much floor space. It was also realized that with a sports format coming in—and the above-average-sized football players—more talent space was needed. The T design was eliminated.

The show producer was also originally in the studio. As the studios saw more use and added additional hosts, the producer had to moved outside the studio.

The Chicago school graduates about 125 students each year through its one-year, nationally accredited program. Alumni now working in broadcasting often return as guest speakers as well, giving back some of their practical experience to the next broadcasters. Through its efforts, the Illinois and Ohio Centers for Broadcasting are educating the next generation of broadcasters.

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- PreSonus DigiMax D8
- Alesis 3630
- Sam Broadcaster v4.7
- Stream the World
- Belden 9451
- Symetrix 6100
- Comrex Access
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Layer 2 Switch Troubleshooting and Setup

by Doug Irwin
CPBE DRB AMD

Nearly every radio station uses Layer 2 Ethernet switches as part of their systems. Usually, they're just plug and play; but what about that occasion when there appears to be something wrong with an Ethernet connection? How do you go from having a hunch to really figuring out what the problem is?

In these examples I'll refer to Cisco switches, but clearly the same issues can manifest themselves no matter what brand of managed switch you are using.

To see what we want to see with a managed switch, we're going to refer to the console input, which is a serial connection for Cisco, made via an RJ-45 on the unit itself labeled "console." The easiest way to accomplish this is via the serial-to-RJ45 cable that came with the unit. On your computer, configure hyper-terminal (or Putty with Windows 7) for 9600 baud, 8-n-1. (Alternatively if this switch already has an IP address, you can telnet in to it.) If you use the console, when first connecting you'll see something like this:

```
Dougs_3550 con0 is now available
Press RETURN to get started
```

I have to assume for purposes of this narrative that either your console requires no password or else you know it. When you get the prompt : *switchname*> you'll be able to look at the statistics that I'll refer to below. As an example:

```
Dougs_3550>
```

If you now type in: <show interfaces fastethernet 0/3 counters errors> you will get an output that looks like this:

```
Dougs_3550>sh interfaces da0/3 counters errors
Port      Align-Err    FCS-Err    Xmit-Err    Rcv-Err    UnderSize
Fa0/3             0          0           0          0            0
Port    Single-Col   Multi-Col   Late-Col   Excess-Col   Carri-Sen   Runts   Giant
Fa0/3             0          0           0            0           0       0       0
Dougs_3550>
```

I used port three because I happened to plug my computer in there. Let's look at a few of these error counters and see what causes them.

Align-Err: These are usually the result of a duplex mismatch or a physical problem (such as cabling, a bad port, or a bad NIC).

FCS-Err: This is typically a physical issue (such as cabling, a bad port, or a bad Network Interface Card (NIC)) but can also indicate a duplex mismatch.

Now if you type in <show interfaces fastethernet 0/3>

With Cisco you are presented with a large amount of information. You'll have to visually sort through it. One of the common issues between a switch port, and a connected device, is duplex mismatch. A symptom I have seen of this condition was the connected device simply 'freezing' up and needing a reboot. Excessively slow communication is another. When you operate in a half-duplex mode some data link errors are normal—for example, errors noted in FCS (Frame Check Sequence), alignment, runts, and collisions. According to Cisco, a ratio of one percent errors to total traffic is acceptable. A degradation in performance can be noted if the error ratio exceeds 2 or 3 percent. However, if you are operating in the full-duplex mode, FCS, CRC (Cyclic Redundancy Checks), alignment, and runt counters must be minimal. If those counters are incrementing then check to make sure the connected device expects to communicate in the full-duplex mode (or change it).

A few other counters of interest:

Lost carrier/No carrier: the number of times the carrier (the signal coming in on the receive pair) was lost in transmission. If that count increments, check for a bad cable, and check the physical connection on both sides.

Output buffer failures: this can be a sign that the ports are run at an inferior speed and/or duplex, or there is too much traffic for the port.

```
Dougs_3550>sh interfaces fastethernet 0/3
FastEthernet0/3 is up, line protocol is up (connected)
  Hardware is Fast Ethernet, address is 000a.b7eb.9c03 (bia 000a.b7eb.9c03)
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 10/100BaseTX
  input flow-control is off, output flow-control is unsupported
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output 00:00:01, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 1000 bits/sec, 1 packets/sec
     58813 packets input, 16632115 bytes, 0 no buffer
     Received 3450 broadcasts (0 multicasts)
     0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
     0 watchdog, 2020 multicast, 0 pause input
     0 input packets with dribble condition detected
     130916 packets output, 77340817 bytes, 0 underruns
     0 output errors, 0 collisions, 1 interface resets
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier, 0 PAUSE output
     0 output buffer failures, 0 output buffers swapped out
Dougs_3550>
```

Irwin is transmission systems supervisor for Clear Channel NYC and chief engineer of WKTU, New York. Contact him at doug@dougirwin.net.

RESOURCE

Cisco | cisco.com/en/US/products/hw/switches/ps708/products_tech_note09186a008015bfd6.shtml#portan

WE NEED YOUR TIPS

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

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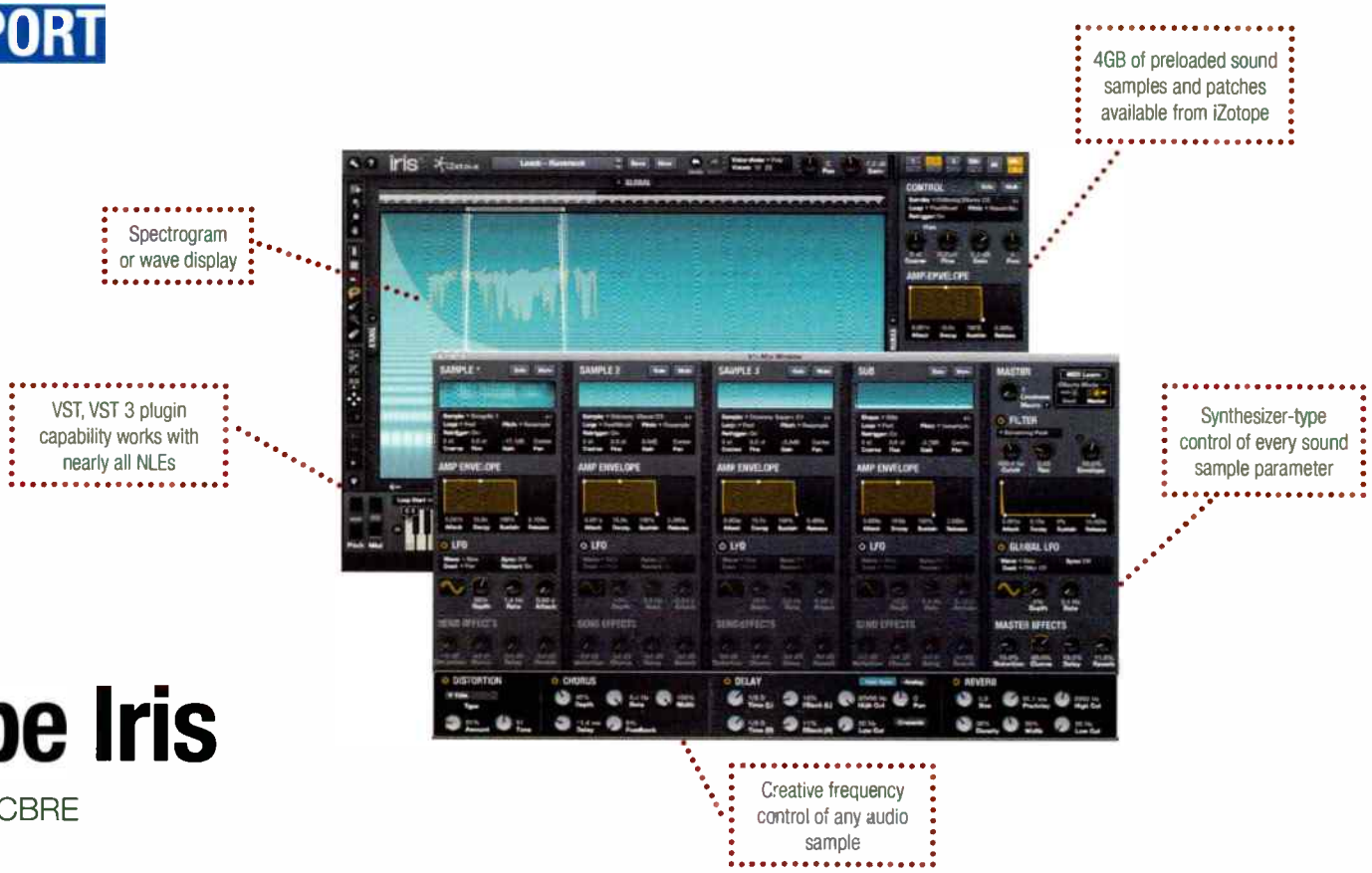


iZotope Iris

By Chris Wygal, CBRE

Radio production suites are environments that foster creativity. They are the places where the audible image of the station or network is born, and where advertisements come to life. The production engineer is faced with the daily task of keeping creative material current and relevant to listeners and advertisers. Often however, the daily doldrums of production are relegated to using beds and effects from the trusty elements library. What happens when the flash and flare of the elements library dries up? What happens when a client or general manager wants original, cutting-edge audio? Developers at iZotope have the solution. Iris is a groundbreaking plug-in or standalone program for PC and Mac. It is built on iZotope's spectral selection technology. Users can effectively "draw" frequency-specific nuances on an audio sample, and it is essentially amazing.

DRAW YOUR SOUND?

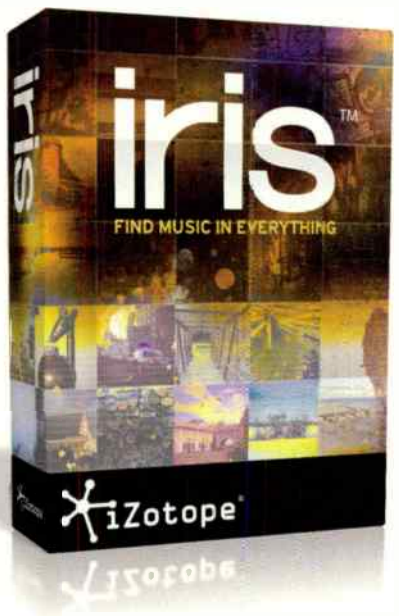
Using a visual drawing engine, Iris is a sampler and resynthesizer that allows the user to import audio samples and patches from a 4GB iZotope library, or import his or her own WAV or AIFF files. In doing so, the sample is displayed in waveform view, spectrogram view, or both. Most NLE software provides a spectral view, so Iris' spectrogram is not terribly foreign as it behaves much the same way. Familiar tools such as lassos, magic wands, erasers, paint brushes and select boxes facilitate free-hand manipulation of frequency, amplitude and time within the workspace. The sound created by a paint brush visually highlighting frequencies anywhere from 20Hz to 20kHz is fascinating. Then, imagine using the brush to additionally paint over and highlight more frequencies at any point on the sample. Or, add to the fun by using the frequency selection box to select a horizontal group of frequencies. The possibilities are endless at this point for augmenting the sound of an audio sample or sound effect, and we haven't even discussed the mix view.

MIX IT ALL UP

As previously mentioned, Iris provides radical control of frequency-specific sound design using the spectrogram and iZotope's spectral selection technology. In the event that a sound designer needed to recreate a drone or pad, add a new twist to a transition effect or apply an amazing sweep to a voiceover sample, the visual drawing engine makes it happen. However, Iris is designed to stack three samples and a sub waveform into one patch. The control of the four mixed samples playing simultaneously is in mix view. Three different samples can be played at once with endless differing effects. The sub waveform is a sample that stays relatively constant by way of pulling the entire patch together. A low-frequency saw tooth waveform, as an example, may be put in the sub sample to keep things flowing. With that idea in mind, any sample can be fine-tuned to match the pitch and tempo of other samples. If your sub waveform plays out in the key of B-flat, the other samples can be tuned to match, as it were. iZotope's Radius RT is a real-time pitch shifter that transparently preserves timing while accurately changing pitches.

Samples 1, 2, 3 and sub each have their own mixer-like layout in mix view. An entire manual would be needed to detail this view. However, each sample contains features such as pitch control, gain, pan and an amp envelope. This is where Iris lends itself to synthesizer-type control of each sample within the patch. Parameters including attack, decay, sustain and release are controls in amp envelope. Send effects route each sample to the distortion, chorus, delay and reverb

IZOTOPE
izotope.com
izotope@izotope.com



channels. These effects each have multiple parameters for critical crafting and artistic design of the sound of each sample.

Additionally, each sample has a low frequency oscillator used to control amplitude, pitch and pan. LFO utilization involves intense knowledge of waveform manipulation and requires considerable practice and know-how. Iris can be interfaced into a MIDI environment, which opens up a musician's world involving keyboard control of samples and patches. While MIDI keyboards are rare in radio production, an adept musician/production engineer can make great use of Iris' synthesizer-type controls. MIDI Learn assigns MIDI controllers to Iris' parameters.

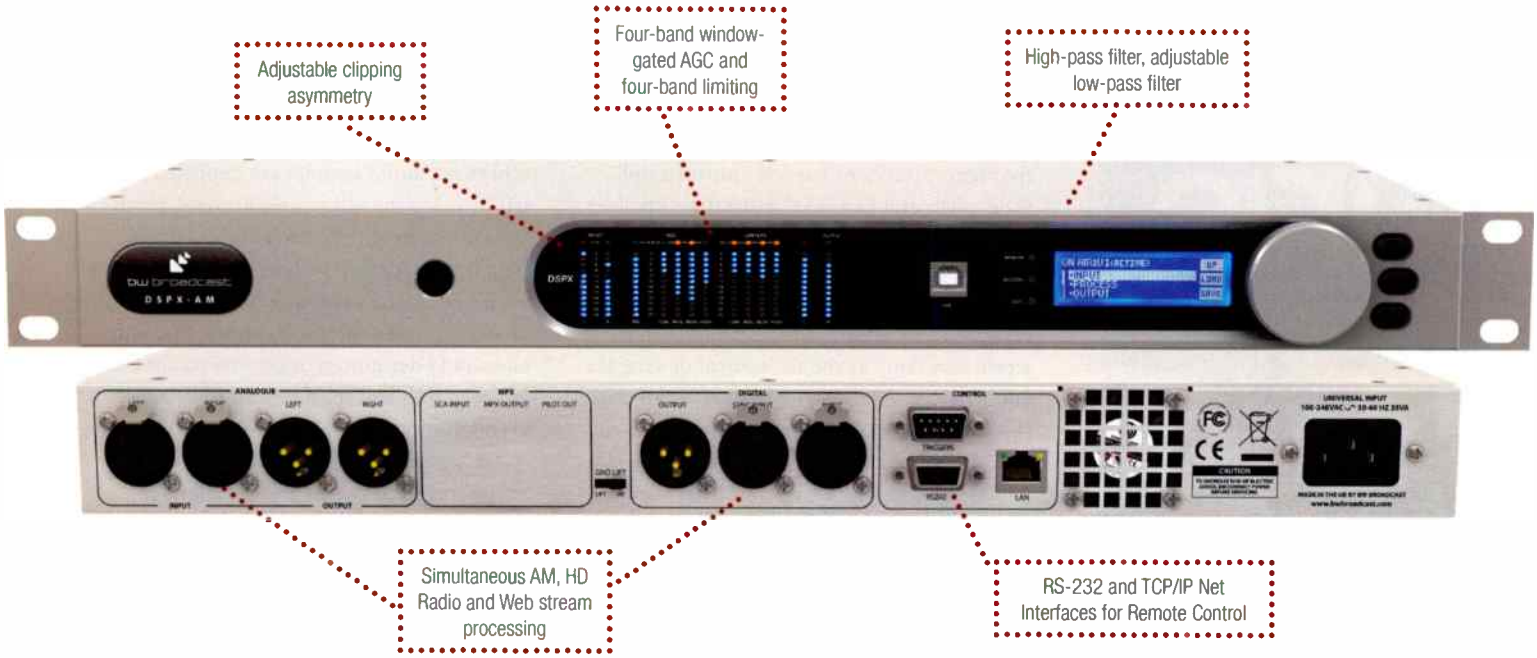
As is usual with most mixing consoles, Mix View contains a master section for sample mixes, LFO and effects. Filters allow the user to shape the sound of the overall mix envelopes influenced by the sound of analog predecessors. Retro and warm synth, among others, add characteristics that give more flexibility to the overall sound of the patch.

WHERE TO START

Whether from the iZotope library or otherwise, audio samples are imported into Iris by using the full sample browser, patch browser, or by simply dragging and dropping from folders. Iris sound libraries such as wood, glass, and food offer hundreds of pre-produced sound samples with which crafting and sound design can begin. Iris patches such as vocal, bass and retro combine effects for even more creativity.

Iris windows and views are dockable anywhere in the workspace. Workflow is seamless, and Iris can be used as a standalone application or as a plugin with many NLEs. The frequency-specific augmentation of any audio sample is endless when using Iris. New life will be breathed into any production environment when Iris is put to work.

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



BW Broadcast DSPX-AM

by Paul Jewusiak

The KSRM radio group delivers programming on five radio stations serving the Kenai Peninsula in Alaska since 1967. Located 140 road miles south of Anchorage, KSRM sits between Kenai and Soldotna Alaska and covers an audience of around 40,000 people. The flagship station, KSRM 920AM, has broadcast a news/talk format for more than 40 years. It is particularly popular during the morning drive when it pulls in its largest listening figures.

A great sounding radio station will keep listeners coming back. If audio is fatiguing people won't like what they hear. This often is due to the loudness war. You try to be as loud as the competitor, but quality suffers when you push the processor past its limits in the quest for loudness. You could have superior content, but if the audio quality is poor, people will turn off.

In Alaska, we have the disadvantage of being a sparsely populated state. So, KSRM did not want to spend $7,000 on an AM audio processor. As I searched for a lower-cost solution, Doug Tharp with SCMS recommended I try the BW Broadcast DSPX-AM. The price was right, but I wasn't sure about the quality. SCMS provided a 30-day try-before-buy unit. I decided to try it.

BW BROADCAST
866-376-1612
bwbroadcast.com
info@bwbroadcast.com

INSTALLATION

I found the DSPX-AM easy to set up. It was clear that BW Broadcast had spent lots of time building the factory presets. In fact, I ended up choosing a rock preset to get the desired high-energy sound. With the built-in sine and square wave generator, setup was fast. I tweaked the sound a little and was impressed with the difference. I then decided to go to the car and listen. With the remote control software I could make changes from the parking lot. It didn't take long for staff to take notice. The GM was pleased with the sound. The DSPX-AM produces a clean, crisp and punchy sound that stands out.

FEATURES

The unit has analog and digital inputs and outputs. All the audio connections are via XLR connectors. The digital inputs accept 32-96kHz inputs. The digital output is selectable for 32, 44.1 or 48kHz. The XLR digital sync input provides for an external clock source.

The unit can be remotely controlled via the front-panel USB connection or the rear-panel connections, which include a DB-9 for RS-232, a DB-9 for external triggers, and the RJ-45 for a LAN or network connection.

The front-panel display has an array of LEDs to show stereo input level, gate level, the four-band AGC, the four-band limiter and the stereo output.

There are four main menus to adjust the processor. They are input, process, output and schedule. In addition, there is a system menu to access the unit's non-processing functions and security.

The input menu contains all the controls that affect input selection, level control and signal conditioning. The process menu contains all the controls that affect the processing.

The output menu has all the controls that affect output selection, level control and signal conditioning. The schedule menu contains all the real time clock controls for switching presets (dayparting).

Once a setting has been made, it can be saved as a preset; the unit can store up to eight. Presets are loaded via the front-panel control. While presets can be loaded as needed, it's also easy to compare between two presets. When a setting is loaded, one of the softkeys allows you to toggle between the current settings and the previous settings. In this way, small changes can be quickly compared.

Settings can also be accessed via the remote control software, which runs on a PC and connects to the processor via the RS-232 port, the USB port or the LAN port. The eight user presets can also be recalled with the trigger contacts on the rear panel.

I chose the rock preset as a starting point to get good loudness. With some very minor tweaking, I achieved a sound we are very happy with. The DSPX allows the envelope to be pushed, but still presents very clean and crisp audio that is pleasant to listen to. The compressors and limiters do their job very well and keep the average level high without the perceptible negative effects often heard when trying to drive the audio hard. Overall, the performance exceeds expectations for the price point.

The manual has a complete overview of the processor's functions, including how to access all the parameters within the menus. One helpful section provides tips on achieving certain processing goals with the unit. With section titles such as "Need more bass?" and "Need more clarity?" it should be easy to find the station's signature sound.

I found the DSPX-AM has a feature set formidable to any processor, at any price. The unit offers four-band limiting and a four-band window-gated AGC processor. The tri-band look-ahead path allows the simultaneous full 20kHz digital radio processing. Of course, we use the asymmetrical clipping to optimize the sound for voice. Add this to the tilt equalization and we have a bright and energized sound unmatched in this market. It has a real-time clock for preset scheduling. The DSPX-AM offers dual processing paths if we ever decide to transmit HD Radio.

We liked the processor so much we bought it. We are very pleased with the sound we've achieved and the minimal work required to do so. I'd highly recommend the DSPX-AM to anyone looking in any size market. I've used processors that cost much more and have not been able to get these results. I can't wait to try the BW Broadcast DSPX-FM on my next project.

Jewusiak is chief engineer of KSRM, Kenai Peninsula, AK.

Portable Recorders

Portable recorders abound, and their features range from bare basics to multitrack editing giants. We narrowed our choices to mono/stereo recorders with XLR mic inputs. Then you can use your favorite field mic, because a recording is only as good as the mic.

One choice is based on a mic design with several mic capsules. All the models operate on batteries or another power source. As always, we included suggested price, although street prices are typically much lower.

Model	Marantz PMD661	Roland R-26	Tascam DR-40	Yellowtec iXm	Zoom H4n
Inputs	2× xLR mic/line, 3.5mm TRS line, RCS S/PDIF	2× xLR/TRS mic, 1× 3.5mm stereo mic	2× xLR/TRS mic/line	3.5mm balanced TRS line	2× VLR/TRS mic/line 3.5mm stereo mic
On-board mics	2	1 omni, 1 stereo XY pair	2 (XY or AB)	Multiple mic capsules available	2 (XY or AB)
Phantom Power	✓	✓	✓	bult-in	✓
Outputs	2× RCA, ⅛" TRS headphone	3.5mm TRS headphone	3.5mm stereo line/ headphone	3.5mm stereo line/ headphone	3.5mm stereo line/ headphone
USB	yes	yes	yes	yes	yes
Speakers	2	1	1	none	1
Card Storage	SD, SDHC	SD, SDHC	SD, SDHC	SD, SDHC	SD, SDHC
On-board Editing	✓	✓	✓	-	✓
Markers	✓	✓	✓	✓	✓
ALC	✓	✓	✓	✓	✓
Varispeed	✓	✓	✓	-	✓
Prerecord Buffer	2 sec.	2 sec.	2 sec.	30 sec.	-
Recording Modes	mono, stereo	mono, stereo, 4-channel, 6-channel	mono, stereo, 4-channel	mono, stereo	stereo, 4-channel, MTR
Recording Formats	MP3 (64, 128, 192, 256, 320kb/s), linear PCM	MP3 (128, 160, 320kb/s), WAV, BWF	MP3 (32, 64, 96, 128, 192, 256, 320kb/s), WAV, BWF	MP2 (128, 160, 192kb/s), WAV, BWF	MP3 (48, 56, 64, 80, 96, 112, 128, 160, 192, 224, 256, 320, VBR), WAV
Sampling Rates	44.1, 48, 96kHz	44.1, 48, 88.2, 96kHz	44.1, 48, 96kHz	32, 44.1, 48kHz	44.1, 48, 96kHz
Bit-rates	16/24-bit	16-bit	16/24-bit	16-bit	16/24-bit
Remote	✓	-	✓	-	✓
Tripod Mount	✓	✓	✓	mic clip	✓
Included Accessories	audio cable, USB cable, ac adapter, carry strap	SD card, Cakewalk Sonar, ac adapter, carry strap windscreen	SD card, USB cable, tilt foot	SD card, USB cable, charger. Six mic capsules are available.	SD card, USB cable, windscreen, Cubase LE, ac adapter, case, mic stand adapter
Power	5Vdc	9-16Vdc	USB	built-in Li-ion, USB speed charger	5Vdc
Batteries	4× AA	4× AA	3× AA	3× AA	2× AA
Size (in.)	1.4 × 3.7 × 6.5	1.625 × 3.25 × 7.125	1.378 × 2.756 × 6.1	10 × 1.96	1.4 × 2.87 × 6.15
Weight (oz.)	14	14	7.51	13.23	9.8
MSRP	$700	$600	$270	$1,450	$550
URL	usa.d-mpro.com	rolandus.com	tascam.com	yellowtec.com	samsontech.com

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ARC-8X COMPACT RADIO CONSOLE

$799

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2 mic, 4 stereo line, PC, & Phone in
USB interface for play and record from a PC
Mix minus in-out for an external Telephone hybrid
BOTH balanced and unbalanced inputs and output for flexibility

All ARC consoles have conductive plastic faders and long life switches for reliability & Socketed ICs for fast on site repair.

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Ten mixing channels
Two Stereo Program outputs
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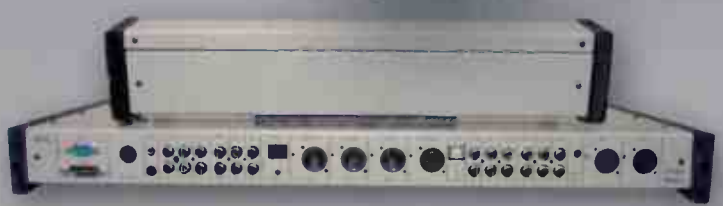
USB PC sound card on ARC-10UP & ARC-10BP
Mix minus in-out for an external Telephone hybrid
Multimillion operation switches with long life LED lamps

The ARC 10UP with unbalanced inputs and PC sound card is displayed. The ARC-10U has unbalanced inputs without a sound card. The ARC-10BP has balanced inputs with the PC USB sound card



ARC-10U... $1,599
ARC-10UP... $1,999
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Offer ends September 28 or may be withdrawn earlier if Frank Foti returns from his vacation and gets wind of this.

iPhone/Android app | Comrex

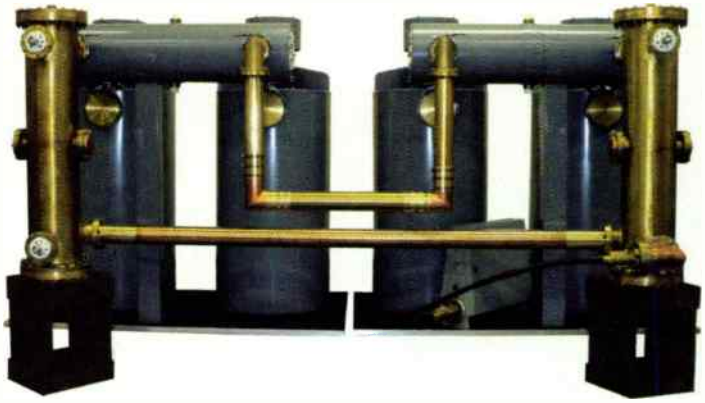
VIP QC: VIP QC (which stands for Quick Connect) is an app that can be easily downloaded and installed on an iPhone and Android Smart Phone and used to call a Comrex STAC VIP VoIP Call Management System, using the phone's available data connection. Then, it's as simple as select and connect. A list of stations available for connection is presented to the user after the app starts. Once the station is selected, the app becomes locked to that station, displaying logo information whenever the app is restarted. The app can even be configured behind the scenes to call Comrex Access and BRIC-Link codecs.

comrex.com

Remote voicetracking | Enco Systems

RemoteVT: RemoteVT is designed to allow any facility to have operators voicetrack into their logs from anywhere in the world. Share resources with other sites, have employees voicetrack from home or hire independent contractors. Anyone with Internet access and a Windows workstation can now voicetrack into daily playlists.

enco.com



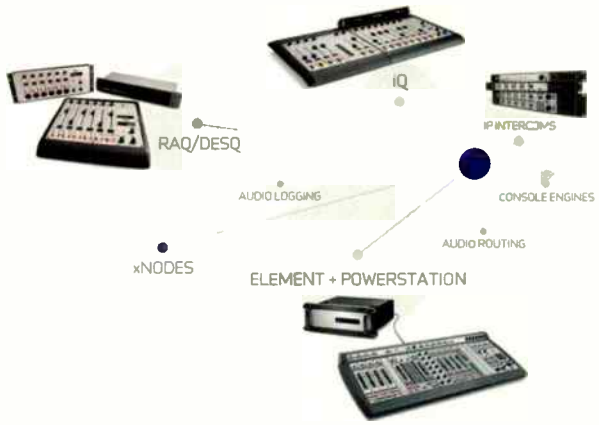
All pass FM analog/HD Radio diplexer | ERI-Electronics Research

788 Series: This high-level diplexer efficiently combines analog and digital. The system's analog insertion loss is -0.35dB or less and the digital loss is -1.4dB or less. In addition, the group delay performance is readily correctable by currently available FM transmitters. Group delay of the analog signal is less than 350 nanoseconds and the digital delay is less than 600 nanoseconds. The 788 is rated for up to 30kW analog and up to 5kW digital input power. The digiplexer gives FM radio stations currently operating a -20dBc IBOC power level with a 10dB hybrid injector the opportunity to increase digital power without having to invest in a new transmitter.

ERIinc.com

MEET THE NEW AXIA xNODES!

IP-AUDIO JUST GOT AN UPGRADE.



Everybody knows that Axia introduced broadcasters to IP-Audio in 2003. 3,000 studios and 30,000 connected devices later, the competitors who said "it'll never work" are now eating their words. How do you follow up that sort of success? If you're us, you open up a case of Monster and go back to work. So we did.

The result: Axia xNodes, smart new AoIP interfaces that transform your audio devices into an intelligent network. Use them to turn analog, digital or mic-level signals into routable IP-Audio, with associated GPIO logic. They're so advanced, they won two major awards at their NAB debut.

WHAT CAN YOU DO WITH THEM? HERE ARE A FEW IDEAS.

» **BUILD A ROUTING SWITCHER.** One stand-alone xNode is an 8x8 (4x4 stereo) routing switcher. Connect 8 xNodes to a switch and make a 64x64 routing switcher. Need more I/O? Connect more xNodes. Like all Ethernet-based networks, Axia systems are naturally scalable, up to 10,000 stereo signals (plus logic).

» **STL OVER IP.** Today's cluttered RF spectrum makes IP a great alternative. Put an xNode at either end of a fiber run, OC-3 circuit or a pair of inexpensive Ethernet radios to send eight channels of uncompressed audio to your TX – and get eight channels of audio backhaul too.

» **SAY SO LONG TO SOUND CARDS.** PCI, PCIe, USB3, FireWire. . who needs 'em? Load the Axia IP-Audio Driver onto your PC workstation and connect it to an xNode to get eight professional, balanced outputs and eight inputs. Use an industry-standard DB-25 breakout cable for pro XLR connections. You'll get studio-quality audio and save some green, too.

» **ADD MICS TO THE MIX.** xNodes make awesome multiple Mic preamps. They have ultra-low-noise, ultra-high-headroom, studio-grade preamps with selectable Phantom power. Put your Mics in, bring your analog line level out. And that IP-Audio network jack? Ready to be used whenever you upgrade to a full IP-Audio network.

» **MAKE AN A/D/A.** Take one analog and one AES/EBU xNode and rack-mount them side by side. Voila! Eight precision A/D converters and eight precision D/A converters, in just 1RU. Studio-grade, 48 kHz, 24-bit Delta-Sigma A/D and D/A convertors, with 256x oversampling, make difference you can hear.

» **SLIM DOWN YOUR SNAKE.** Connect two analog or AES xNodes with a single Ethernet cable for an instant 8x8 bi-directional snake and bid the multi-pair bundle goodbye. Add a few more xNodes on each end for a 16x16, 32x32 or 64x64 snake. Use off-the-shelf media converters for long-haul fiber connections.

AxiaAudio.com/xNodes

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

Paging station | Barix

Annuncicom PS1: The Annuncicom PS1 doubles as an IP paging and intercom device, with a simple and compact design. A push-to-talk button allows technical directors to facilitate camera movements and communicate with production personnel while remaining mobile. Camera operators can mount a simple belt clip to the back of the device for on-cable attachments. Power over Ethernet (PoE) capability allows studio and production personnel to move around the studio with freedom, using a single-wire, high-bandwidth IP connection. The Annuncicom PS1 design features well-illuminated, highly responsive front panel buttons for easy push-to-talk functionality.

barix.com

Low-power exciter | Harris

Flexiva Exciter: The new Flexiva Low-Power family of transmitters includes a 50 and 150W exciter/transmitter. It is designed to integrate with the Flexiva HP family as either an internal or external exciter. The heart of the LP line is the direct-to-channel, digital modulator with all of the popular features and performance of the Flexstar exciter in a more cost-effective package. Initially, the Flexiva will be offered as an FM-only exciter with upgrade-options for HD Radio, DRM, Audio over IP and USB audio playback, as well as other options for internal GPS, single frequency networking and Orban Inside audio processing.

broadcast.harris.com

Multi-platform scheduler | RCS

Selector2Go: Selector2Go is an Internet-based multi-platform scheduler. This puts the Selector and GSelector scheduling engine in the hands of radio programmers no matter where they want to schedule. It delivers a powerful, easy-to-use interface. Now programmers can check back from anywhere on those extended schedules they started before they left the office.

rcsworks.com

Transmitter | Ecreso

Helios FM 350W: The first FM transmittersbased on 6th generation MOSFETs, the new medium-power FM range is robust and delivers efficiency of up to 74 percent. Top signal quality and performance are achieved thanks to the FM band direct-to-frequency digital modulator, which is at the heart of this product line. The manufacturing quality and the simplicity of use make this a powerful transmitter to broadcast analog FM programs from 100W up to 2kW. Helios FM 350W is fully protected against overheating, VSWR and lightning. Features include full RDS encoding and automated audio backup. Fully featured for local maintenance and configuration, it also allows extensive remote control by Web server, SNMP, RS232 or GPIOs. The 350W FM Transmitter is available either as a separate exciter and amplifier or as a single integrated 3RU unit.

ecreso.com

VX VoIP system | Telos Systems

VSet 1, VSet 6: The family of VX products has expanded, with the introduction of VSet6 and VSet1. Like their big brother the VSet12, the six-line VSet6 and single-line VSet1 phone sets have a big, bright LCD color display with exclusive Telos Status Symbols to keep talent informed of line and caller status. When used with VX Producer call screening software, the VSet display also delivers detailed information such as Caller ID, time ringing-in or on-hold, and even screener comments from the VX Producer software application. All VSet phones are powered by PoE (Power over Ethernet) from a Telos-approved switch, a PoE port on an Axia console engine, or from the power injector included with each unit.

telos-systems.com

Power Supply | Digital Alert Systems

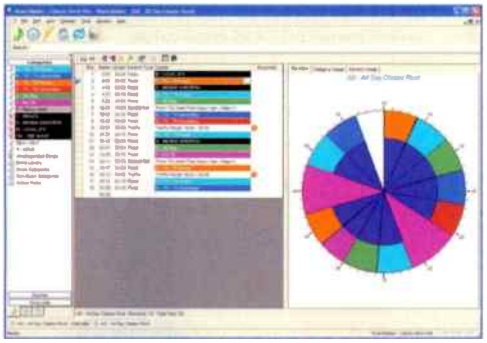
NoNOISE-PS: This professional-grade no-noise power supply option for the Dasdec-I and Dasdec-II emergency alert systems (EAS) is ideal for Dasdec units housed and accessed in quiet environments, such as radio studios. The power supply offers new and existing Dasdec users a simple, cost-effective way to ensure noiseless operation. The power supply is an external brick supply that replaces the Dasdec systems' currently installed power supply with a connector panel. Unlike external power supplies, the NoNOISE-PS is engineered for use in mission-critical applications. It can be added to any new Dasdec system at time of order, and current Dasdec users can have their existing units retrofitted at the Digital Alert Systems' Lyndonville, NY, factory.

digitalalertsystems.com

Digital RF power meter | Broadcast Devices

DPS-100D: This power meter provides accurate and reliable measurement of RF power and other transmission line parameters. Forward and reflected power, transmission line temperature and readings from optional external temperature and line pressure sensors are provided simultaneously on an internal backlit LCD display and remotely via an internal Web server and SNMP agent. Proprietary 3-strike VSWR protection and interlock management protects equipment and provides e-mail alerts when user configurable thresholds are exceeded. The DPS-100D incorporates a precision directional coupler available in all standard EIA line sizes and also includes Type N models.

broadcast-devices.com



Scheduling software | MusicMaster

Version 5: Version 5 is 100 percent Windows-user friendly. Data can be shared between MusicMaster and other applications such as Microsoft Word, Excel, PowerPoint and Outlook, using intuitive copy and paste. You can even import all kinds of data from e-mails, websites and more. Mac users also schedule withMusicMaster, utilizing programs such as Parallels or VMWare Fusion. Multitask with as many different windows within the program as required. Edit music schedules, open the library editor, open a few clocks, open up the Rule Tree, run a history analysis, and leave all these things open going from one to the other. Open them in individual windows to drag-and-drop elements. Create a special program just by dragging songs from the library into the schedule. Share a database on a network and several people can work in the system at the same time.

mmwin.com

Solid-state transmitters | Elenos

Indium Series: The Indium Series combines high system efficiency with planar technology, which views a circuit in its two-dimensional state, and uses photographic processing concepts to achieve a series of exposures on a substrate. As used in the entire RF section, this process reduces the parts count, weight, cost, and greatly improves reliability. Additional features of the Indium Series include design suggestions from engineers in the field. The conservative rating of all components extends the life of the transmitter, meaning the transmitter will operate in a much hotter environment. Design steps have also been taken to reduce the impact of high humidity conditions. The ETG2000.20 is a 2kW transmitter with integral built-in exciter. RF Power can be adjusted from 200 to 2kW. The transmitter occupies 2RU. The ETG5000.50 is a 5kW transmitter with built-in integral exciter. RF Power can be adjusted from 300 to 5kW. This model occupies 4RU and does not externally couple two amplifiers to achieve the total output.

elenos.com

Sales management software | WideOrbit

WO Sales v3.0: The latest release of WO Sales introduces an entirely new and streamlined user interface with simple and easy-to-use workflow, navigation and menu options. It is comprised of two modules: WO CRM and WO Proposal. New features include the ability to submit new accounts and account assignments to WO Traffic, improving on the existing integration. WO Proposal features include new simplified wizard setup and export options, and redesigned export output for avails and proposals, which improves the overall efficiency of the sales submission process. The post-buy analysis feature has been expanded to support spot level modifications and improves upon the real-time posting capabilities provided by seamless integration with WO Traffic. WO CRM features include enhancements to forecasting for simpler pending update, providing visibility into the sales pipeline across stations and revenue streams. Sales reports have been enhanced to include a simple wizard setup and enhanced filter options that enable fast and flexible revenue analysis across the organization.

wideorbit.com

OP-XAUTOMATION

SIMPLE • POWERFUL • REDUNDANT

"OP-X is very functional and easy to use. Log merge on our old system took minutes and OP-X it takes seconds."
-John O'Dea, Ops Mgr
WNNK-FM, Harrisburg, PA

Ask us about our iPad app!

- Modular Operation in Op-X allows for a tiered system at a fraction of the cost of its competitors.
- Each studio client is capable of accessing all Audio Server modules on the network.
- Remote voice-tracking allows for creation of content for remote studios also running Op-X.
- The revolutionary design of Op-X's clock builder turns the previous task of scheduling satellite programming into a few simple clicks.
- Share serial devices from any machine using the Op-X Serial Server.
- Importing logs now gets its own module that takes confusion out of the process.
- Engineers will enjoy Op-X because it's easy to install, maintain, and has automatic backup features.

BSI

RADIO AUTOMATION SOFTWARE

iPad app Features

- Live show real-time control from almost anywhere
- A powerful tool for remotes or voice tracking
- Take a show on the road
- Start, stop, copy and paste functions from the log
- Insert audio items into the log
- Initiate audio playback from hot buttons
- Run macro command from hot buttons
- Secure access to your system

Broadcasters General Store
352-622-7700
www.bgs.cc

Audio delay processor | 25-Seven Systems

Precision Delay: Precision Delay addresses a range of radio applications, such as drift between analog and HD Radio transmission signals; broadcast repeater synchronization; and delaying programs across time zones. It uses delay status readings from compatible Belar and Audemat modulation monitors to automatically adjust delay of the analog broadcast signal for synchronization with the HD Radio signal. In addition to the blend issue, some stations choose not to delay their analog signals during local sports events, so listeners can hear the analog signal in real-time with the game. Not only does Precision Delay provide both the inaudible exit from delay and precise post-game resynchronization with the HD Radio signal required by "ballgame mode," it does so while leaving PPM watermarking intact, so stations don't have to sacrifice ratings during the delay transition. Serial data over IP or RS-232, as well as contact closures, can also be delayed insync with audio.

25-seven.com

Compact AoIP mixer | Axia Audio

DESQ: DESQ is a compact mixer that occupies 18 square inches of desktop real estate. Like its rack-mountable cousin RAQ, the mixer is powered by the fanless Axia QOR.16 integrated console engine, which provides analog, AES/EBU and Livewire I/O,along with GPIO ports, console power supply and CPU, and an exclusive zero-configuration network switch with Gigabit. Setup is easy: DESQ connects to the QOR.16 with a single cable. A single QOR.16 engine can be used with twoDESQ consoles (or with the new RAQ rackmount mixer), making a cost-effective solution for multi-console installations.

axiaaudio.com

Control Freaks

SITE *Sentinel*® 16
Robust, full-featured, web-enabled sixteen channel remote control system.

WVRC-8
A one rack-unit solution for web based and/or recordable voice response dial-up transmitter site control.

AC Power *Sentinel*® 2
An ideal solution for remote reboot and many other remote power control applications.

AC Power *Sentinel*® 2 Plus
Same as AC Power Sentinel® 2 with additional features.

WVRC-4
Provides a half-rack solution for web based and/or recordable voice response dial-up transmitter site control.

NTP Server *Sentinel*
A standalone "ready-to-run" GPS referenced NTP time server offering a complete solution for synchronizing time across TCP/IP LANs using NTP.

AES Switcher *Sentinel*® 4 »Web
Perfect for AES digital audio switching via the web and/or local control.

Switcher *Sentinel*® 3 »Web
Web enabled transparent three input, single output stereo switcher/router.

SITE *Sentinel*® 4
Provides a cost-effective, one third-rack solution for web based site remote control.

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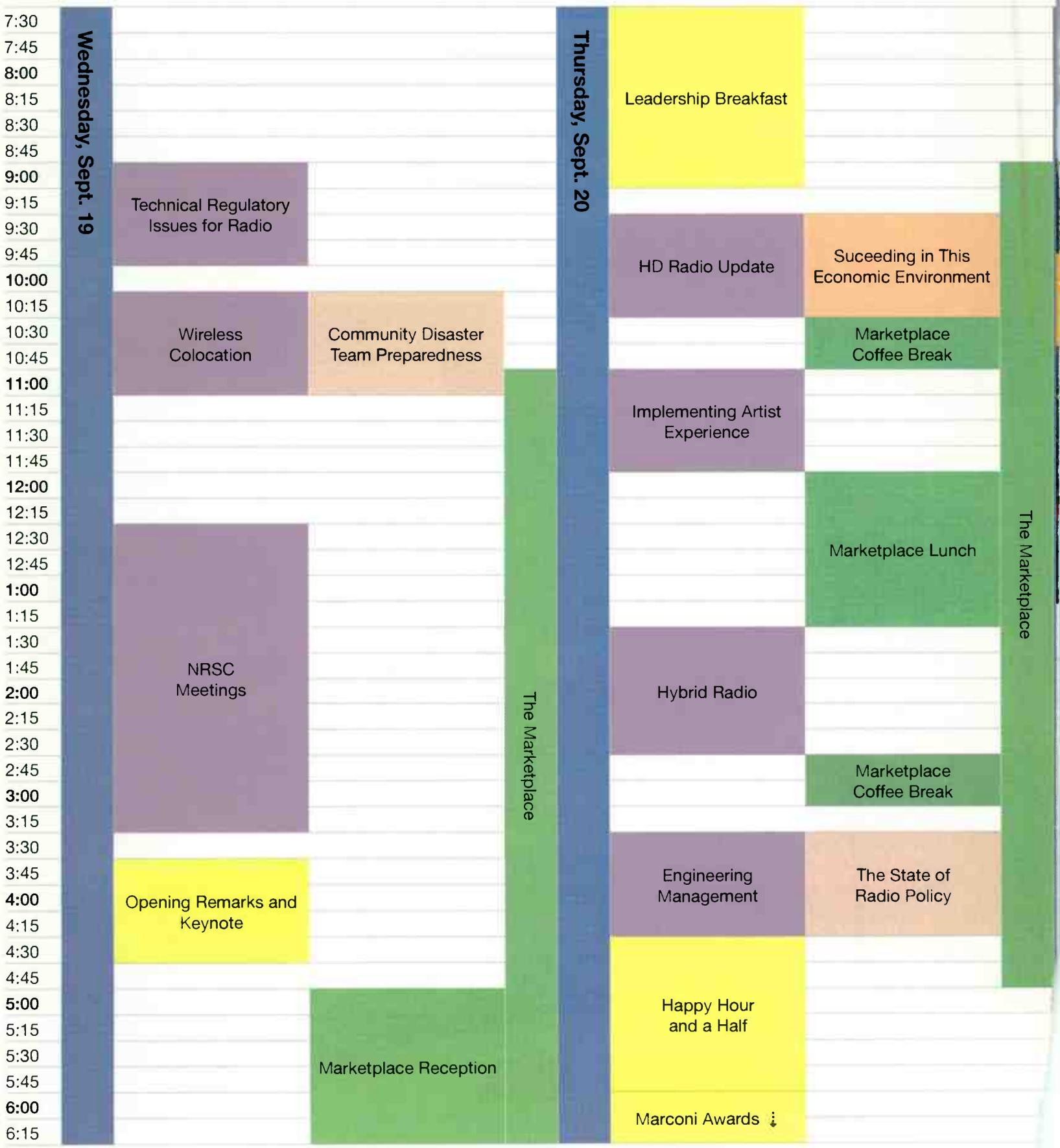
RADIOSHOW Session Timetable



Friday, Sept. 21

Preparing for a Disaster

Delivering on the Dash: Radio's Center Stack Strategy

The Marketplace

Tips From the Workbench

Radio Luncheon

Technology Sessions
Management Sessions
Super Sessions
Special Events

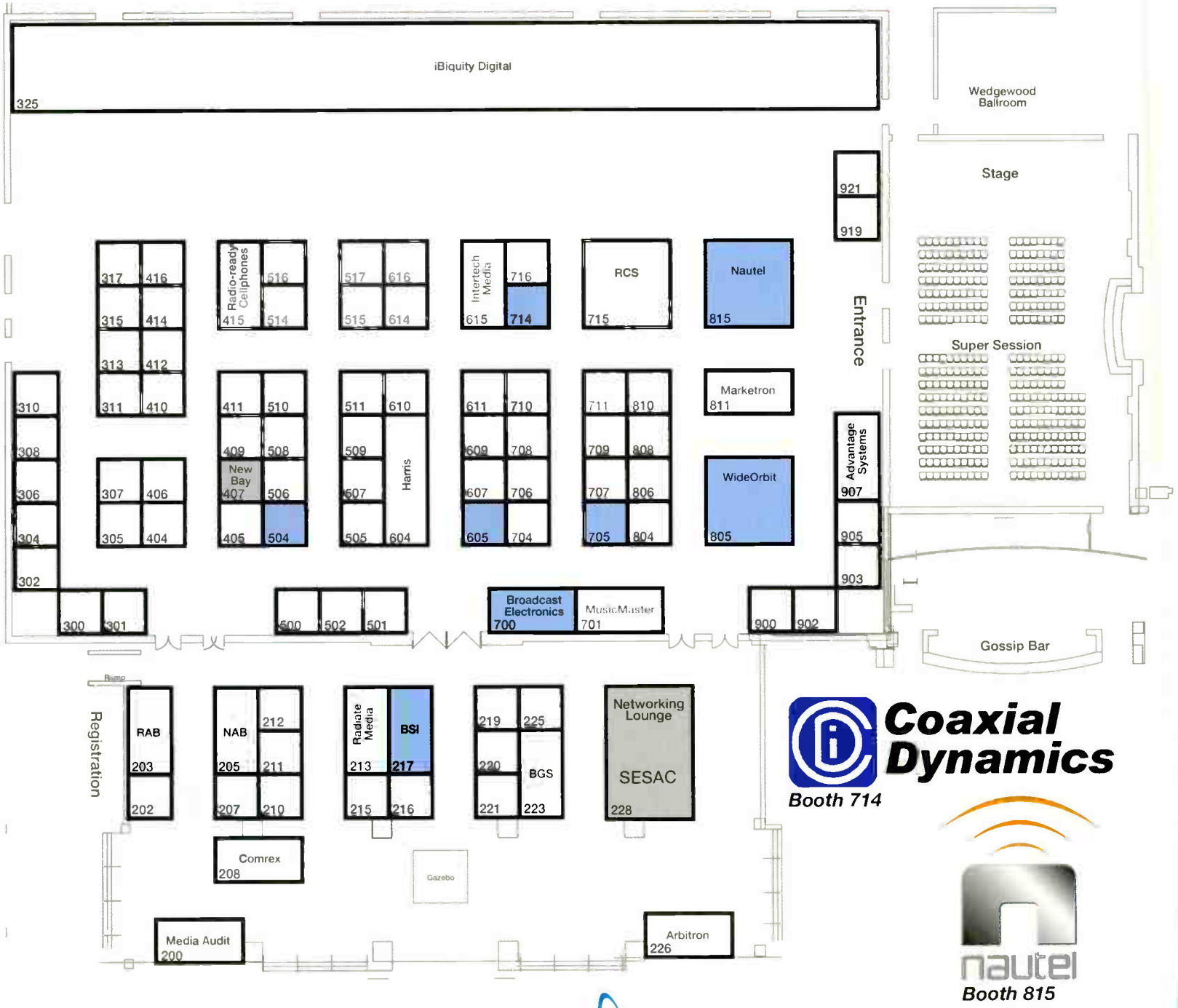
RADIOSHOW The Marketplace

Booth 217

Booth 504

Booth 605

Booth 700



Booth 714

Booth 815

Booth 705

Booth 708

Booth 902

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Moseley Associates	505
MusicMaster	701
Myat	611
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NAB Membership	207
NAB Public Service	202
Nautel Limited	815
NewBay Media	407
NPR Satellite Services	711
OMT Technologies	501
OneDomain	905
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Powergold Music Scheduling	220
Power-Link/Proof of Play	219
Precision Communications	706
ProAudio.com	510
PromoSuite Software & Interactive	900
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RAB Membership	101
Radiate Media	213
Radio magazine	407
Radio Revolution Network	500
RadioDNS	921
Radio-Ready Cell Phone Showcase	415
RadioTraffic.com	221
RCS	715
RF Specialties Group	902
Second Street Media Solutions	212
SESAC	228
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This advertiser index is a service to readers. Every effort is made to ensure accuracy, but *Radio* magazine cannot assume responsibility for errors or omissions.

The Passing of a Legend

by Chriss Scherer, editor

Battison receiving the SBE's Lifetime Achievement Award in 2006.

On the morning of Aug. 28, 2012, as we were wrapping up this issue, broadcast engineering lost one of the greats. John Battison, P.E., CPBE, passed away peacefully with his family at his side. John was born Sept. 11, 1915.

Readers of *Radio* magazine know John as a long-time editor and contributor. While *Radio* magazine was launched on its own as a spin-off from from *Broadcast Engineering* in 1994, John started writing for Broadcast Engineering in the early 1960s. He served as the editor for *Broadcast Engineering* for about a year, and in 1961, John penned an editorial suggesting that broadcast station engineers needed their own organization to serve their needs where other groups were focused on consultants and other disciplines. This editorial was the start of the effort to create what became the Society of Broadcast Engineers. John was the SBE's first president.

In 1998 he was awarded the National Association of Broadcasters Engineer of the Year Award for radio. In 2006, he was awarded the Society of Broadcast Engineers Lifetime Achievement Award, which later was renamed in his honor.

John was not only a leader in broadcast engineering, but also my very good friend, mentor and colleague. John was the technical editor, RF, for *Radio* magazine when I was hired as the editor in 1997. In 2009 (and when he was 94), John told me he was going to step back from his regular writing duties. I hated to lose him on the regular roster, and I could tell he didn't like having to give it up, either. He had so much experience and knowledge, and I know he enjoyed sharing all of it.

John was an expert on AM generation and transmission. In the many conversations I had with him, I always laughed when he would say that for radio, "Audio is something that messes up a nice, clean carrier"

And so ends another broadcast day.

THE LIFE OF JOHN BATTISON

John Henry Battison has played a significant role in the radio industry. From working in radio stations to founding the Society of Broadcast Engineers in 1963, he has been a source of creativity and experience.

From 1978 to 1985 Battison held several management and engineering positions. He was the director of engineering and general manager of CHCTTV in Calgary, AB. He became director of television, produced Burl Ives on ABD Network and produced two weeky shows on Dumont, CBS and NBC. In 1947-1949 he worked for ABC New York, where he planned and designed four network TV and FM stations. In 1968-1970 he worked in Saudi Arabia, Riyadh as chief engineer of Saudi Television. These 56 years of broadcast have provided input to dozens of stations, and these aren't all his accomplishments.

John Battison, G2AMC, in London in 1931. He built the 10W transmitter.

Battison was also a consultant. He was a consultant for Bing Crosby, owner of KCOP-TV in Los Angeles from 1961 until going to Saudi Arabia in 1968. He was also a consultant to former Governor of New Mexico John Burroughs from 1960-1962. Battison became a TV consultant, planning TV studios, for American University, Washington, DC, from 1952-1954. He has lectured on broadcasting at New York University, American University and in 1952 became the director of education for the National Radio Institute in Washington.

With all of his hard work, it's no surprise he received several awards and recognitions. Battison was nominated as a Commissioner to the FCC in 1961 and 1973 by Senator Joseph M. Montoya. He was appointed Colonel-aide-de-campe to Governor Sims of New Mexico. Battison is listed in "Who's Who in America."

Known in broadcasting circles as the authority on directional transmitting antennas, he taught at five of the six special directional antenna seminars given by the NAB. In March of 1980 he became a U.S. member of the FCC delegation attending the Region II, Medium Wave World Administrative Radio Conference in Buenos Aires. In 1979, he was selected to travel to Moscow as the U.S. delegate at the Popoff Conference.

Other international accomplishments include:

> *Belgium:* Battison was invited to be a guest lecturer on the subject of design of interactive television and CATV systems, at the University of Liege, 'nternational Conference in Nov. 1980.

> *Bahrain:* Battison planned the national TV system in this country as well as a high-power radio station.

> *England:* He was director of engineering for Associated Redifussion, which was the largest commercial TV operation in England.

> *Lebanon:* From 1976-1978 he was a consultant to the government in connection with two high-power direction FM stations and the new Nationa Television system.

> *Yugoslavia:* Battison designed 1,200kW directional antenna system.

> *Uganda:* In 1962, He was a consulting engineer helping to plan the country's national TV system.

> *China:* He lectured at Peking Institute of Broadcasting in Peking, China, in May 1981, as an official guest.

Other achievements include being the author of 15 technical books and more than 500 technical articles in technical journals. From 1964 to 1967 he was the editor of the *Journal of Society of Broadcast Engineers*. He is a former editor of *Broadcast Engineering*, a contributing editor for *Public Telecommunications Review* and former technical editor of *Radio* magazine.

ARRAKIS SYSTEMS INC.

MARC-15-15
on sale $6,499

15 channel modular console
supports two phone hybrids
USB sound card modules
control room & studio

ARC-8
only $799

2 mic, 4 stereo line,
PC USB , and Phone input
both balanced & unbalanced IO

XTREME
automation
only $100
per month

Live On Air
hard disk & Satellite
16 stereo input switcher
with logic

ARC-10
three models

ARC-15
only $3,495

1-5 mic inputs,
PC USB , and Phone inputs
both balanced & unbalanced IO

ARC-10U $1,599 unbalanced
ARC-10UP $1,999 unbal w USB
ARC-10BP $2,495 balanced w USB

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PC USB , and Phone inputs.
both balanced & unbalanced
models.

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studio furniture

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all ARC consoles
(except ARC-10U) feature built in
PC USB sound cards and come with
'Xtreme -Studios' live on air software

'Pre-End of the World Sale'
the Mayan calendar predicts the end of
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ACCENT is a contemporary blend of brushed metals, pleasing colors, and interesting textures. The metal structure is artfully integrated into the visible design decor of the cabinetry. Cabinetry and electronic equipment complement each other to create a bold visual environment for talent, guests, and clients alike.

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all prices are msrp

THE INTELLIGENT NETWORK

"gotta have it!"

"Wow, Wow!"

Rick Hunt, Vice President & Director of Radio Engineering, Entravision Communications Corporation

"Considering the LX-24's attractive good looks, modularity, traditional console layout and functionality, I can't wait to get my hands on one!"

Greg Landgraf, Senior Engineering Manager, Corus Radio Western Canada

"A high performance, reasonably priced, great looking console integrating common sense features such as overload indicators for meters and ergonomic controls. Very impressive and well thought out."

Benjamin Brinitzer, Regional VP Engineering Clear Channel Media & Entertainment

"By far the most elegant and feature rich control surface on the market. The attention to detail and functionality is remarkable. Its architecture, such as "hot swappable" modular design, is a winner. A traditional meter bridge is appreciated by users and your millwork guy will appreciate the fact that it's a table-top design."

Kris Rodts, Director of Engineering, IT & Facilities, CKUA Radio Network

"Wheatstone's innovation continues to make AoIP a viable product for professional broadcasting facilities. Just a few things that make the LX-24 stand out to me are the clear and decisive metering, individual fader modules, and "out of the box" thinking with faders for the headphone and monitor volume controls instead of rotary knobs."

Phillip Vaughan, Chief Engineer KFROG, CBS Radio

"Leave it to the exquisite design talents of Gary Snow and the Wheatstone team to really hit the nail on the head. The LX-24 is not only the most functional, feature-laden IP based console for radio, it also raises the bar for the finest ergonomic radio command center on the planet."

Tim Schwieger, President / CEO, BSW - Broadcast Supply Worldwide

"I didn't think Wheatstone could improve upon the E-Series of consoles, but they have done it with the new LX-24. This is a beautiful, well designed console and the individual faders, integrated meters with overload indicators and low profile table-top design make this a must have for our facilities."

Michael Cooney, Vice President of Engineering & CTO, Beasley Broadcast Group, Inc.

"Cool and sexy (I sound like Bruno from Dancing with the Stars). A great addition to the WheatNet-IP family."

Norman Philips, Vice President of Engineering, Townsquare Media

"I am very impressed with the sleek new design that incorporates single channel-strip architecture, integrated metering and stereo cue speakers in a thin, sloping chassis that needs no cabinetry cut out. Well done."

Erik Kuhlmann, Senior Vice President of Engineering, Clear Channel Media + Entertainment

"Wheatstone continues to hit balls out of the park and this year they did so again with the LX-24 control surface. This new product marries the best of the old (modular design architecture) with the new (Audio-over-IP). Continuing in that theme was a Wheatstone module that marries their bridge router system to the new "BLADE" audio-over-IP system. This has the potential to extend the life of bridge router facilities indefinitely."

W.C. Alexander, CPBE, AMD, DRB, Director of Engineering, Crawford Broadcasting Company

"The LX caught my attention on the NAB Show floor. The look, form and function are unlike any other IP console available today. The easy-to-read buttons and displays are just second to none, not to mention the most bang for the buck. I can't wait 'til I have the opportunity to deploy my first LX."

Anthony A. Gervasi, Jr., Sr. Vice President Engineering & Technology, Nassau Broadcasting

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