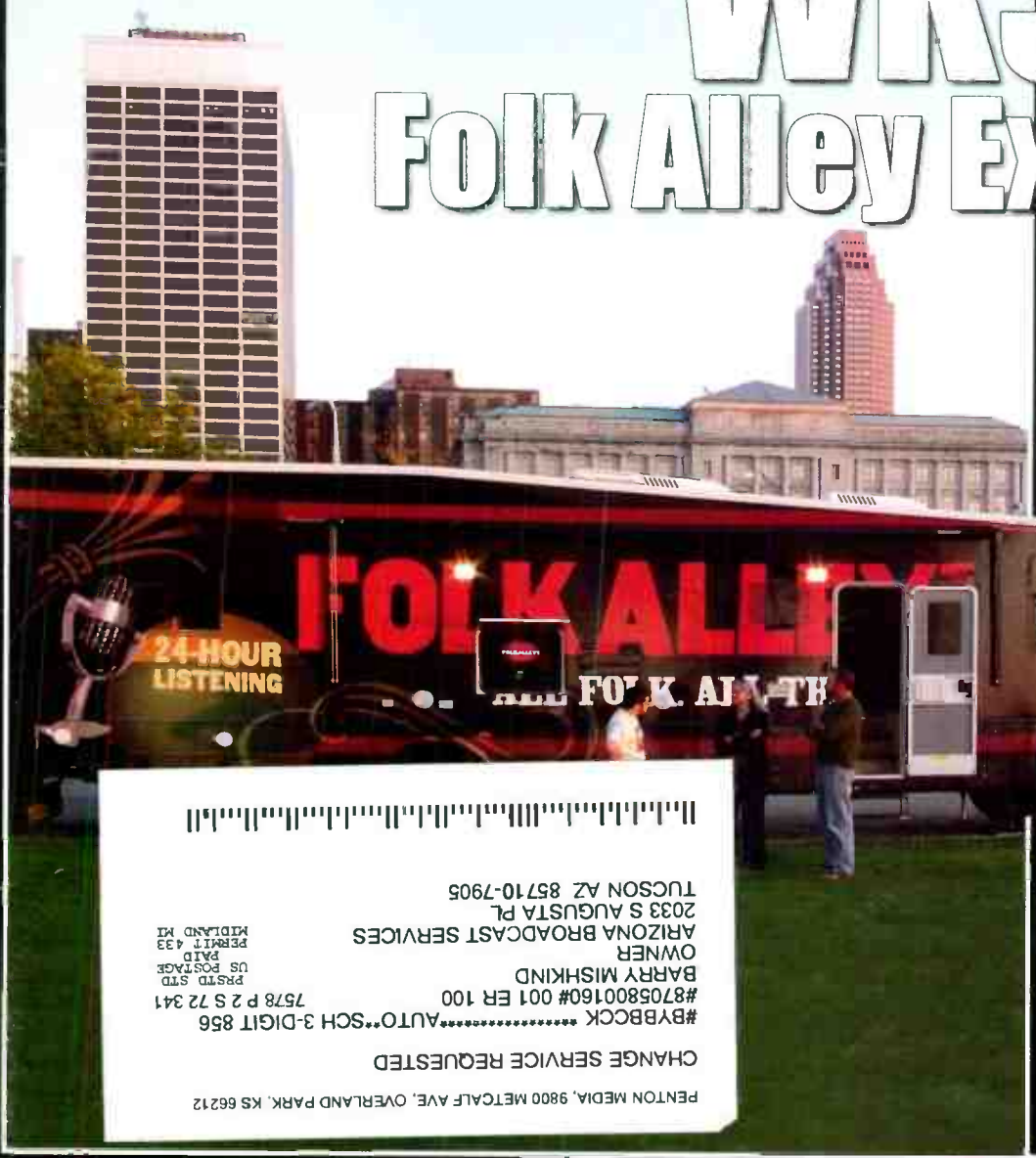
Radio®
THE RADIO TECHNOLOGY LEADER
September 2010
RadioMagOnline.com

WKSU's Folk Alley Express

Folk music on the beaten path



RADIO SHOW PREVIEW

Products, sessions & more

A Penton Media Publication

IP AUDIO MASTER'S DEGREE BUILT IN.

WHEATNET-IP KNOWS WHAT TO DO...SO YOU DON'T HAVE TO

Whether you're networking two studios in the same building or two buildings across town, award-winning WheatNet-IP has you wired. It's as simple as plug and play – drop a BLADE and a control surface wherever you need a networked console or drop a BLADE wherever you need to route audio or automation data. WheatNet-IP configures itself and you're up and running. Since the core of every BLADE contains the DNA of the entire system, you have the ultimate redundancy right out of the box. Simple. Ultra reliable. AND – this may surprise you – WheatNet-IP is the most economical professional system you can get. Each WheatNet-IP system is made in the USA and is backed by the years of experience that have made Wheatstone the number one name in networked audio. If you're thinking IP, think WheatNet-IP. Only from Wheatstone.

COOL STUFF AWARD WORLD 2010

2010 PICK HIT Radio

Wheatstone

AUDIO NETWORKING-SIMPLY EVOLVED

phone 1.252.638-7000 | www.wheatstone.com | sales@wheatstone.com

When was the last time you touched something that looks this good?

The new iMediaTouch Version 4.0 is here.

Radio Automation ▸▸ Digital Logging ▸▸ Internet Solutions

Please come see us at the 2010 Radio Show in Washington, DC–Booth #47

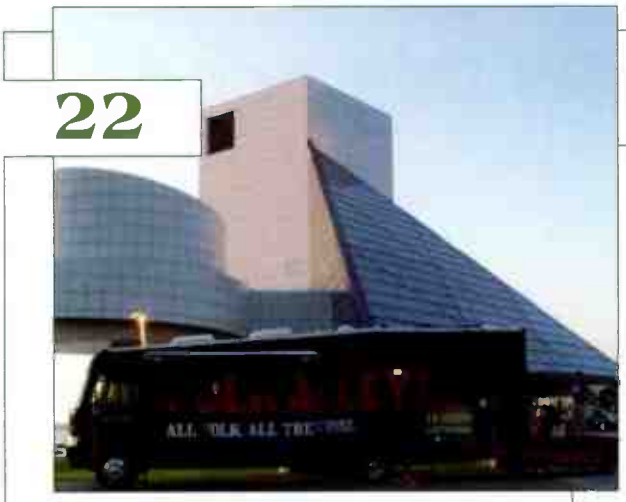
iMediaTouch

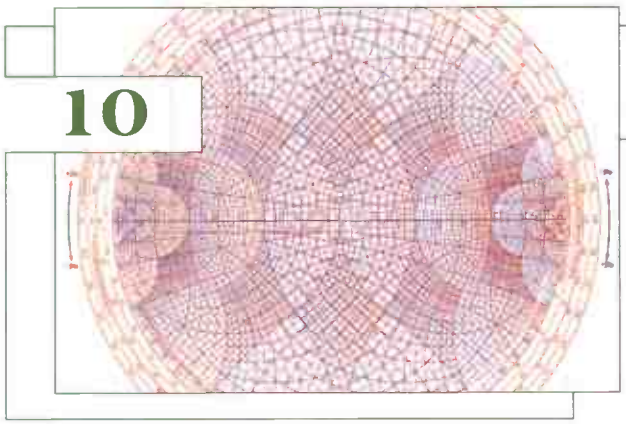
Contact our sales department today at 888-665-0501
or via email at sales@imediatouch.com

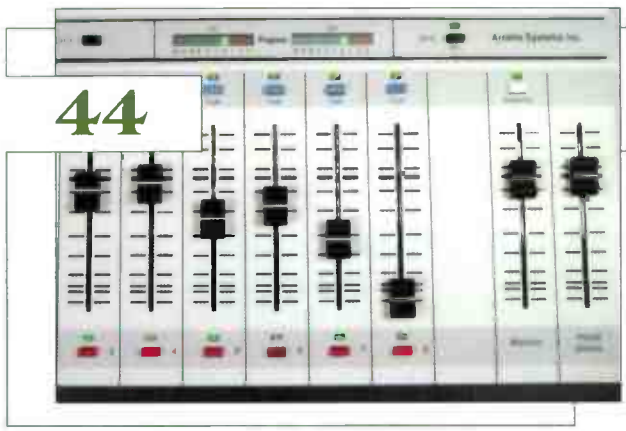
▸▸ Watch a video demo of
iMediaTouch 4.0 in action!
www.imediatouch.com

omt technologies

CONTENTS







Features

Columns

Departments

ON THE COVER

WKSU's Folk Alley Express parked in Cleveland on one of its many adventures. The overhauled RV offers recording and live audio (for streaming sites) services on the road.

OUR BRIDGE-IT IS TURNING HEADS

The ultimate low cost, point-to-point and multipoint stereo IP audio codec

- Perfect for STLs, backup audio links, IP audio distribution, STL confidence monitoring, temporary remotes, multicasting and multiple unicasting links
- The 'only' low-cost IP codec with a front panel LCD screen, dialing keypad and navigation buttons.
- Broadcast quality analog and digital audio connectors you expect to find on more expensive codecs.
- Automatic address book option. Connect Bridge-IT to the internet and watch other codecs in your network appear on your screen just like Skype™. Perfect for non-technical people.
- Tieline's famous IP QoS performance engine for low delay, rock solid, CD quality audio connections over LANs, WANs, the internet, satellite IP, WiMAX and WiFi links

Contact Tieline or your favorite Dealer today and try it now

2009 PICK HIT Radio

COOL STUFF AWARD Radio World 2009

Tieline®
www.tieline.com

www.tieline.com/bridge-it

317-845-8000

Currents Online

Selected headlines from the past month.

WSTW-FM to Receive 2010 NAB HD Radio Multicast Award

The station's Graffiti Radio features a variety of styles, including indie rock, funk, synth pop and hip-hop.

BIA/Kelsey Again Updates 2010 Radio Revenue Projections

The update is a small increase over previous projections.

FCC Encourages Broadcasters to Enroll in Disaster Information Reporting System

The DIRS program provides the FCC with situational awareness about which licensed broadcast stations are operating during, and immediately following, a disaster or large-scale emergency.

Radio Revenues Increase for First Half of 2010

The significant increases across all radio sectors were led by digital and national spots.

Texas Broadcasters Honor George Marti

The RPU and STL developer has many broadcast achievements to his credit.

Media Monitors: PPM Use Alters Spot Set Timings

Stations are adapting to the new rating measurement system.

NAB Proposes Performance Fee Terms

The NAB Radio Board reiterated its strong opposition to the pending bill in Congress, while agreeing that it is appropriate for NAB representatives to continue discussions with Musicfirst.

ABI Research: Digital Radio Installed Base Will Approach 200 Million by 2015

ABI Research says about four million HD Radio receivers will have shipped in the United States by the end of 2010.

SBE Ennes Educational Foundation Trust Announces 2010 Scholarship Recipients

Winners were chosen from applications received by July 1, 2010, from the previous 12 months.

Site Features

Newsletters Keep You Informed

The weekly Radio Currents, the twice-monthly Digital Radio Update and twice-monthy New Products Extra put the latest in radio technology in your e-mail inbox. Subscribe today.

Podcasts for On-the-go

The Radio Currents Weekly Podcast brings the headlines to your media player.

Today in Radio History

Radio broadcasting has a long history of landmark events. We're updating it all the time, too.

Industry Events

The *Radio* magazine Industry Events section lists upcoming conventions and conferences.

"

WideOrbit's technology makes sense.

WideOrbit is extremely efficient, user-friendly and allows us to easily customize and manipulate data. We're exceedingly satisfied with the product and when I asked all of our key players if we should renew with WideOrbit, 100% said 'yes.'"

– GLENN KRIEG
Chief Financial Officer, Morgan Murphy Media

END-TO-END SOLUTION FOR SALES, TRAFFIC, AUTOMATION AND BILLING

WideOrbit's comprehensive solution offers extraordinary efficiencies and visibility with live log editing between traffic and automation, real-time reconciliation and reporting, automatic updates and remote access—for ultimate control, from anywhere!

WIDEORBIT

WIDEORBIT

VISIT WIDEORBIT AT THE RADIO SHOW 2010 | BOOTH 88

SIGN UP FOR A DEMO AT: www.wideorbit.com/radiodemo

For more information, please contact:
Mike Zinsmeister, Vice President, Sales
(O) +1.828.252.8891 | (M) +1.828.712.2843
mikez@wideorbit.com

Back-door mandates

In early August, the NAB published its ideas on proposed terms for the ongoing debate about performance royalties for terrestrial radio stations. The organization has been fighting the performance royalty issue for some time. The NAB had been fighting by opposing any performance royalty; however, that stance has been softened to include some compromise in the station payment terms.

But there was one item in the list that stuck out. In the list of terms was a stipulation that Congress should mandate the inclusion of FM radio receiver chips in all cell phones. This is another issue the NAB has been pushing for some time, but now it is being attached to the performance royalty debate. It didn't take long for this to be noticed in other industries.

The FM receiver inclusion is OK with the RIAA, who is part of the royalty discussions with the NAB. With the NAB conceding on paying something to the record labels, the trade-off of having a radio in every cell phone sounds like a fair trade. Stations pay more for the music they play, but stations

also get a significant boost in the number of radio receivers being carried everywhere.

Up until now opposition to the inclusion of FM receivers in cell phones has been mild. But now that it's tied to the royalty issue, the Consumer Electronics Association and CTIA are furious.

One of the selling points for adding the receiver is that it has an inherent public safety benefit. Most people carry their phones all the time, and when an emergency hits, they can use the radio feature to get information. In times of crisis, the cell phone networks tend to be overloaded and are not reliable. The public safety aspect seems to fit with the Commercial Mobile Alert System mandate already in place.

The tech industry cry is that the FM chip mandate is not about public safety but is instead about "propping up a business [that] consumers are abandoning as they avail themselves of new, more consumer-friendly options." The opponents go on to say that "It is simply wrong for two entrenched industries to resolve their differences by agreeing to burden a third industry – which has no relationship to or other interest in the performance royalty dispute – with a costly, ill-considered and unnecessary new mandate."

The NAB issued a reply noting that other countries have added radios to cell phones, 239 million Americans tune to terrestrial radio every week, and seven million new radio listeners were added last year.

Is a radio a wanted feature in a cell phone? I could not track down a statistic, but if it was strongly desired I think it would have been added already. Would an analog FM receiver be a huge drain on power and add weight and cost? It would add to the power demand, but not very much. FM receivers are much more common in GSM phones outside the Unites States, so it's not a significant design issue. Now if the receiver has to include HD Radio, there are other issues.

The biggest advantage would be to provide instant-on emergency alerting, which is something that has been lacking in every consumer device except a weather radio.

The overall idea of adding a radio receiver to cell phones has merit. Unfortunately, the back-door deal from the NAB and RIAA has not made it a popular idea for those who would be forced to implement it.

Chris Scherer

What's your opinion? Send it to radio@RadioMagOnline.com

Smith chart basics

By Jeremy Ruck, PE

Upon initial look, the Smith chart appears to be quite complicated. Although the basis for the chart is deeply rooted in complex variable theory, you do not have to be a graduate-level mathematician to appreciate and have a solid working knowledge of the chart. While calculation methods can be performed via computer or calculator with a greater degree of accuracy, the Smith chart still remains a venerable and useful tool for the RF engineer.

One good working definition of the Smith chart is that it is simply a graphical calculator for normalized impedance and associated RF parameters. When impedance is normalized, it is related to a reference value as a multiple. For obvious reasons values of 50 and 75Ω are the most common bases utilized. In the simplest form, if 50Ω is our reference value, then 50, 100 and 25Ω normalized would become 1Ω, 2Ω and 0.5Ω respectively.

Impedance is a measure of the opposition of the flow of current in an alternating current circuit. It is the complex sum of the resistance and reactance components, and thus, in ac circuits describes not only the ratio of voltage and current, but also the relative phase angles.

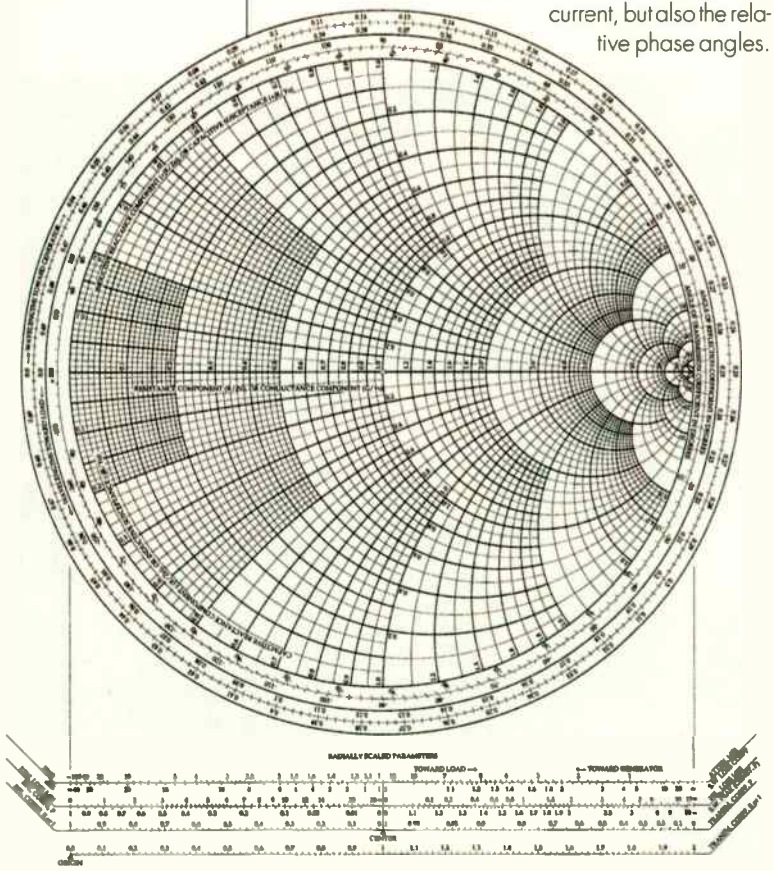


Figure 1. The Smith chart

Impedance can be written a number of different ways; however, you probably will see the Cartesian forms below more often than not.

$$Z = R + jXZ = R + jX \text{ or } Z = R - jX$$

The difference in these two equations results from the flavor of reactance. Inductive reactance is defined as positive, while capacitive reactance is negative. The reason for the sign change is how voltage and current are related in inductors and capacitors. Recall "ELI the ICE man" and that voltage leads current by 90 degrees in an inductor and vice-versa in a capacitor. Finally, note we are only considering positive resistance values. Negative resistance values do occur with some regularity in directional antenna systems; however, they are not manifested in passive circuits and not represented on the basic Smith chart as we will infer shortly.

The details

The Smith chart (Figure 1) is constructed from three families of circles. The first family of circles are tangent to a point on the right side of the outer circle along the center horizontal line. Each of these circles has a constant normalized resistance value. As one moves along any particular circle, the resistance value of the impedance will remain constant, but the reactance will vary.

The second family of circles is that of constant reactance, which are tangent to the same point as the constant resistance circles but are rotated clockwise or counter-clockwise by 90 degrees. These circles form what appear to be arcs on the basic chart with positive or inductive reactance lying abave the center line and the converse for capacitive or negative reactance. Reactance is a frequency dependent quantity and can be calculated by the following:

$$jX = 2\Pi fLjX = 2\Pi fL \text{ or } -jx = -\frac{1}{2\Pi fC}$$

The third set of circles is not normally visible on typical versions of the chart save for one element. These circles form the constant reflection coefficient circles and are concentric radiating out from the center of the chart. Although not strictly correct, these circles can also be thought of as constant VSWR circles because of the relationship between the reflection coefficient and VSWR.

The reflection coefficient varies from a maximum of -1 through 0 to 1. A perfect short is realized by

a reflection coefficient of -1, while 1 represents a perfect open, and zero a perfect match. Since a perfect open or short is not usually realized, it is usually more accurate to represent the reflection coefficient, denoted by Γ, with a phase angle.

The reflection coefficient is then related to the load impedance (Z_L), characteristic impedance (Z_O) and VSWR (S) through the next two equations. The absolute value bars in the second equations are necessary to force the VSWR value to a positive number.

$$\Gamma = \frac{Z_L - Z_O}{Z_L + Z_O} \text{ and } S = \frac{1 + |\Gamma|}{1 - |\Gamma|}$$

A perfect short is nothing more than an impedance of 0Ω, while a perfect open would be an impedance of infinite Ω. As we move from the right side of the chart to the left side, the normalized resistance values decrease from infinity to zero. Thus a perfect open is represented by the point along the horizontal axis on the right side of the chart while a short is the corresponding point on the left side of the impedance chart.

Both of these locations represent a reflection coefficient with a magnitude of 1, so the outer circle of the Smith chart corresponds to a reflection coefficient magnitude of 1. A wave encountering an open circuit is reflected back in phase, while a short is 180 degrees out of phase. So we can see that rotating around the outer ring of the chart relates to the resulting phase shift, and we are able to plot points and directly read the phase shift.

The locations on the outer ring of the chart up and down from the center location, which has an impedance of 1+j0Ω, the reference value, are a 90-degree phase shift. These locations intersect the 0Ω resistance circle at +j1 and -j1Ω, resulting in normalized impedances of 0+j1 and 0-j1Ω. These are an inductor and capacitor respectively and correspond to the known phase relationship between voltage and current in these components.

There is also a scale for the transmission coefficient, which is the complex sum of 1 plus the reflection coefficient. It is not as widely used as the reflection coefficient. Outward from these two scales are the wavelength scales, used in transmission line calculations. They show that one full rotation around the chart corresponds to one-half wavelength.

Below the chart in Figure 1 there are several radial scales. These scales function as rulers, and can be utilized to make measurements based on items already illustrated on the chart. Typically included are scales for SWR, attenuation, return loss, and transmission and reflection coefficients.

A calculator

Calculations may be simplified using a ZY chart (Figure 2). On the ZY chart, the impedance Smith chart is overlaid by its admittance Smith chart, which is created by rotating the impedance chart

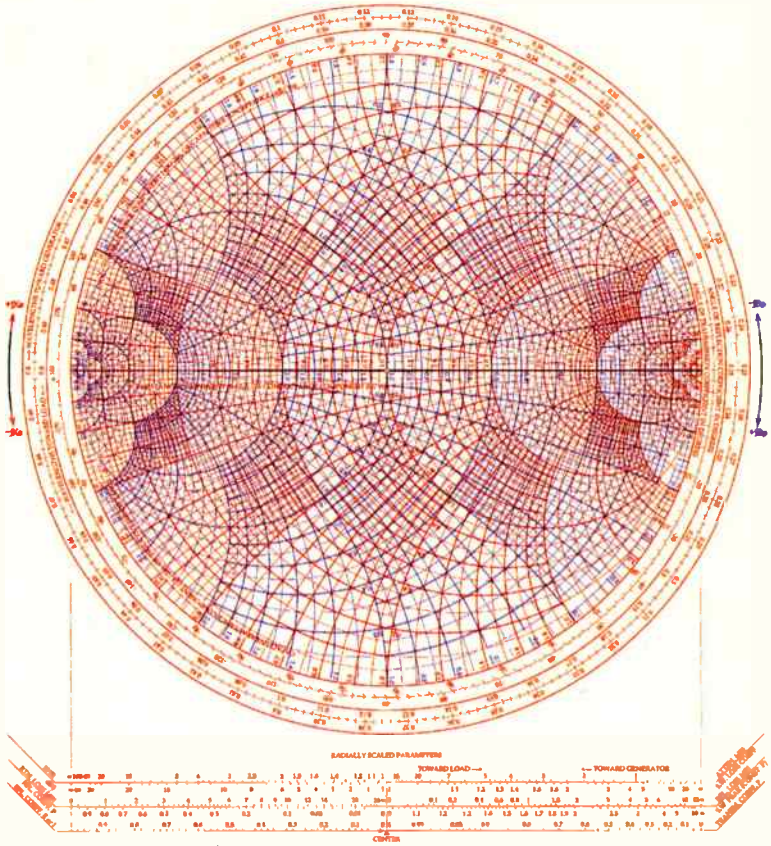


Figure 2. The ZY chart

by 180 degrees. Addition of components in series moves the impedance along a constant resistance circle, while shunt or parallel addition moves the impedance along a constant conductance circle, which is the analog to the resistance circle. With a T or pi configuration, nearly any impedance can be matched to another.

Even when not performing design calculations, the Smith chart provides an excellent method to visualize issues with antenna systems. A simple sweep may illustrate a greatly elevated VSWR. This measured quantity, flat across a range of frequencies, certainly demonstrates the presence of an issue with the system; but where is it located? From a Smith chart plot a relative location may be discerned. If the plot shows large diameter circles centered on the midpoint, then the impedance mismatch is distant from the generator. If the trace results in a compact circle slid off center, then the reflection is closer to the transmitter. In an ideal world, antenna systems would closely approximate a dot in the center of the chart.

For almost 75 years the Smith chart has been a mainstay of RF engineers. Its construct really is quite remarkable, and its ease of use is one reason for its continued relevance in today's world of calculators and computers.

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

Political broadcasting – election year update

By Harry Martin

Mid-term elections are just around the corner. Now is the time for broadcasters to review their procedures to assure compliance with the FCC's political advertising rules.

The FCC's political broadcast rules generally cover: (1) who is entitled to access to broadcast advertising time and under what circumstances, (2) how much candidates can be charged for that time, and (3) disclosure and recordkeeping requirements.

Uses. A concept that affects several areas of the FCC's rules is the idea of a candidate's "use" of a broadcast station. A use is any positive appearance of a candidate whose voice or likeness is either identified or is readily identifiable. Friendly third-party ads may trigger a use, as can appearances in entertainment programming (*e.g.*, Governor Schwarzenegger's performance in *Kindergarten Cop*). The candidate's appearance on a station, however, must be "positive," so a third-party attack ad against a candidate would not be considered a use. Likewise, an appearance by a candidate on a bona fide news or news interview program is not considered a use.

Dateline

For *noncommercial* radio stations in Iowa and Missouri, biennial ownership report deadline is Oct. 1.

Oct. 1 is the deadline for radio stations licensed in the following locations to place their Annual EEO Reports in their public files: Alaska, Florida, Hawaii, Oregon, Puerto Rico, Virgin Islands, Washington and the Pacific islands.

The radio station license renewal cycle begins again in 2011, with the first batch of renewals due on June 1, 2011, for stations in D.C., Maryland, Virginia and West Virginia.

Access. The FCC's rules provide that "legally qualified" candidates for federal offices (*i.e.* for president, U.S senator or House member) can demand "reasonable access" on commercial broadcast stations. This means that commercial broadcasters are generally obligated to sell time to candidates for federal office. Third-party advertisers and "issue advertisers" do *not* have reasonable access rights and, as discussed below, neither do candidates for state and local offices.

If a station decides to cover a local or state election and time is sold to candidates in such elections, their opponents are entitled to "equal opportunities." Once a legally qualified candidate for a given office makes a "use" of a station, all other legally qualified candidates for the same office are entitled to the opportunity to make equal use of the station. A candidate claiming equal time must make a request for it within seven days of the opposing candidate's triggering use of the station. Stations are not obligated to notify opposing candidates when a use is made.

Lowest Unit Charge. All legally qualified candidates for state or federal political office are entitled to the "lowest unit charge" (LUC) during the 45 days before a primary election and the 60 days prior to a general election. For the 2010 federal general election, the LUC window opened on Sept. 3, 2010. The LUC is the lowest rate changed to any commercial advertiser for the same class and amount of time for the same time period, including all discounts and bonus spots. Only candidate ads are entitled to the lowest unit charge.

Disclosure Statements. In addition to ascertaining their lowest unit rates, stations should ensure that they have an up-to-date disclosure statement to provide to political advertisers. Although the FCC's rules do not technically require written disclosures, every station should have one to ensure compliance and also to head off disputes. A written disclosure statement should cover the classes of time available to advertisers, the lowest unit charge for each class, any make-good policies, policies on the preemption of ads, and any other sales practices or information that would be relevant to advertisers. Stations should provide the disclosure statement to any candidate, agency or group requesting political time (inside or outside of the LUC window).

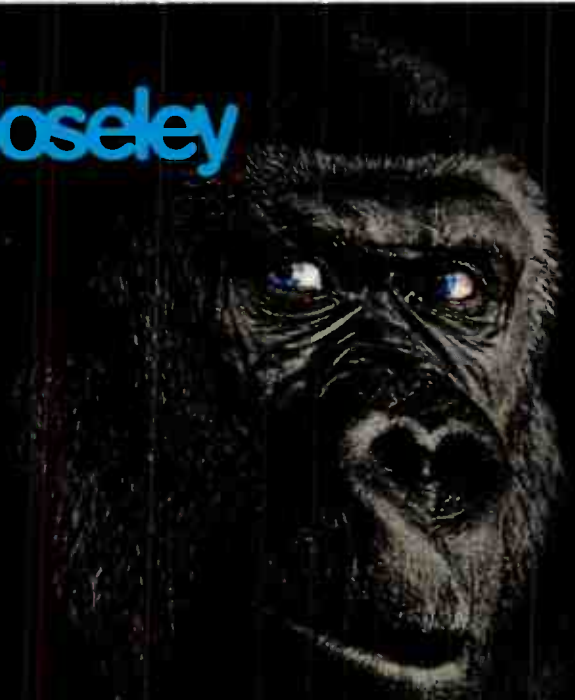
Sponsorship Identifications. All political advertising must include sponsorship identification, *i.e.*, a statement that the ad was "paid for" or "sponsored by" the group or person purchasing the ad time. If the advertiser does not include such a statement, the station must add this language on its own.

Recordkeeping. The FCC's political file rule requires stations to maintain, and allow public inspection of, records of all requests for political time. These records must include details of the nature and disposition of the requests, the schedule of time provided or purchased, the classes of time involved, the rates charged and contact information of the purchaser.

Martin is a member of Fletcher, Heald & Hildreth, PLC, Arlington, Virginia. E-mail: martin@fhhlaw.com

Moseley

WE WANT YOU TO GO APE OVER OUR DIGITAL STL CHOICES.



EVENT 5800
High Capacity Bidirectional STL
Up to Nine Uncompressed Stereo Feeds

STARLINK T1
Digital Linear Uncompressed STL/TSL
for T1/E1 Circuits and Microwave Links

LANLINK
LAN Extender — Data Link for Ethernet
Networking at the Transmitter Site

STARLINK
Digital Linear Uncompressed STL
for 950 MHz and all Worldwide STL Bands

DESIGNED AND MANUFACTURED IN THE USA

Moseley has tamed the primitive STL jungle and become the world leader in the technology, design and manufacturing of digital studio transmitter links. Moseley, the first to bring a totally transparent digital uncompressed STL to the broadcast industry, continues that same innovative thinking today. Now, 50 years later, Moseley has more than 15,000 microwave systems in service in the hostile RF jungles of cities around the world.

Don't monkey around with your on-air sound. Call the digital STL experts today.

Bill Gould (978) 373-6303 | Dave Chancey (805) 968-9621 ext.213

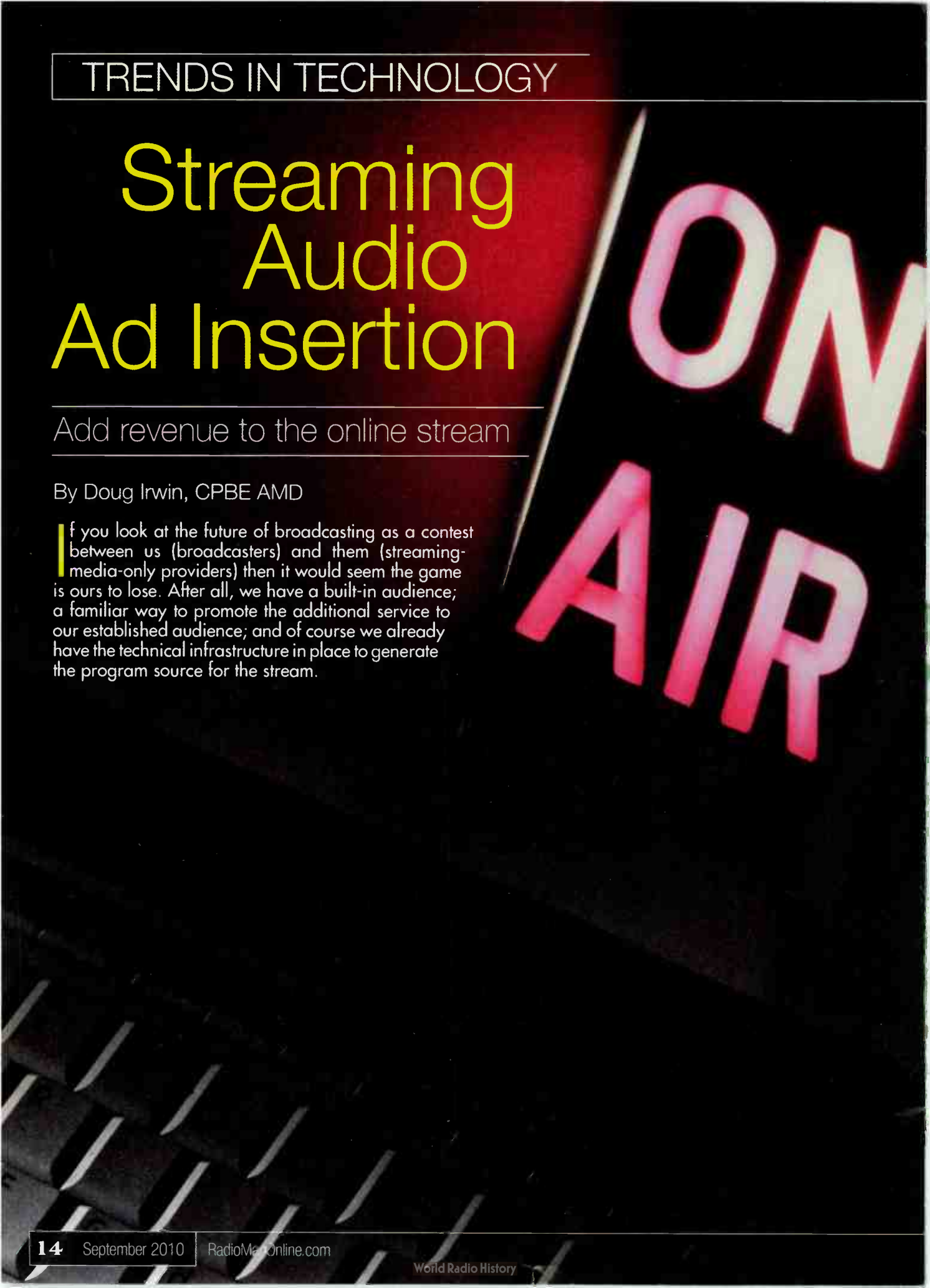
www.moseleysb.com

Streaming Audio Ad Insertion

Add revenue to the online stream

By Doug Irwin, CPBE AMD

If you look at the future of broadcasting as a contest between us (broadcasters) and them (streaming-media-only providers) then it would seem the game is ours to lose. After all, we have a built-in audience; a familiar way to promote the additional service to our established audience; and of course we already have the technical infrastructure in place to generate the program source for the stream.



PROVEN, CONSISTENT, RELIABLE

For over 58 years broadcasters have relied on proven MYAT RF solutions. From rigid transmission line systems to filters to switches and combiners, we deliver performance on time, every time. Whether it is basic hardware or full-line integrated engineering solutions, MYAT designs and builds reliability into every product we make. And with our unmatched stock and inventory, we can assist with your immediate requirements and last minute needs.

FM Splitter/ Patch Panel | *Coaxial Transfer Switch* | *LPFM/IBOC Filter 3kW* | *LPFM/IBOC Filter 8kW* | *FM Constant Impedance Combiner* | *FM Switchless Combiner*

Learn why so many broadcasters rely on MYAT.

Call us at 1-201-767-5380 or log onto www.myat.com

MYAT, INC.

Streaming Audio Ad Insertion

If you already work with streaming media you know the online audience, while not as large as the over-the-air audience, is growing rapidly. Unlike our over-the-air audience (which costs the same to service whether one person listens or 1 million people listen) the online audience costs more and more as its size grows. (It may cost less on a per-stream basis, but it does cost more, nonetheless.) Naturally, then, we need to seek a means by which we can not only cover the extra costs associated with streaming, but perhaps (in time) even make a profit.

At least one way to do that is to use the familiar model we've been using: Sell spots on the stream that are different than what goes over the air. There are several different ways to accomplish this. First, I'll detail how we do it here at Clear Channel NYC where everything is done in-house. Then I'll discuss a hybrid approach – selling the ads in-house but using Ando Media software to integrate the ad-blocks smoothly. Finally, I'll look at how Liquid Compass and Ando Media work in conjunction to provide streaming audio ad insertion.

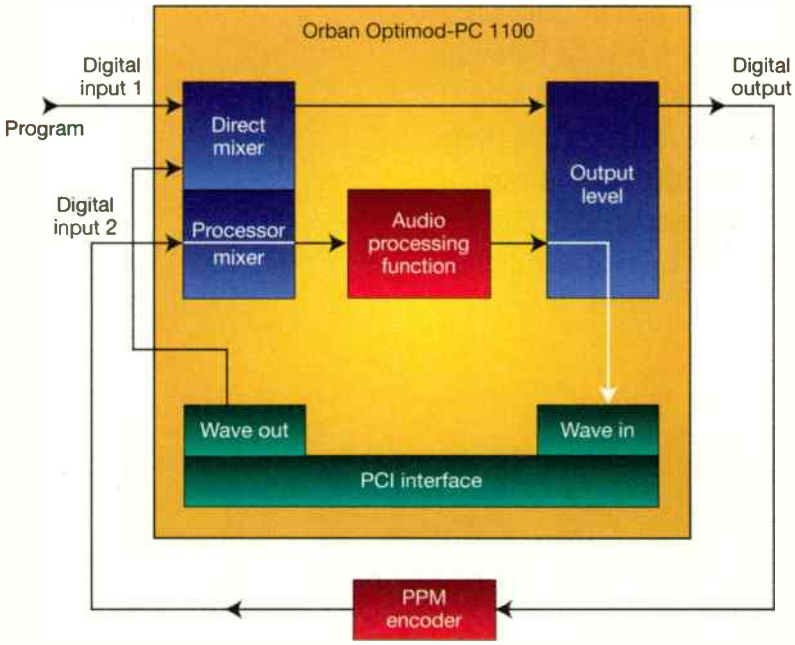


Figure 1. Handle all streaming ad insertion using a sound card such as the Orban Optimod-PC 1100 (or 1101).

Doing it all yourself

One way of handling ad insertion over streaming media is to do it all yourself – and this is the way it is done inside the Clear Channel system.

We have five FM stations here in New York, and each has about a half-dozen streams associated with it. Some of those streams are for desktop users and some are for mobile platforms (see "Streaming to Mobile Devices" in the April 2010 edition of *Radio* magazine). One computer is used for multiple purposes; it runs a log (using Nexgen from RCS) made solely of spot blocks to play over the streams. That same computer also houses an important sound card – the Orban Optimod-PC

Online audience measurement

Anyone familiar with streaming audio knows that Ando Media plays a huge role in audience measurement. I spoke with Robert Favre, the senior vice president of technology for Ando, to gain some insight into how these measurements occur.

Ando uses two different methodologies in collecting audience data. First is the log file method, which is simply the collection of log file data from the CDNs streaming the audio for a particular client station. This log file data includes (on a per-station basis) the start time for each individual user's stream; the duration of the session; a listener identifier (source IP address); and a geo-location for each source IP. Streaming clients give permission to their CDNs to share all of this data with Ando. The log files are collected daily.

Favre told me the log file method usually gives a somewhat smaller cume number than the listener-tracking method (discussed below). This is because sometimes there are multiple users behind a router providing network address translation to users on a LAN. When this happens, each user will have an identical source IP address – so multiple users are only counted as one (in that case).

The second method Ando uses is listener-tracking. The listener-tracking method utilizes client or server-based code implemented directly on the station player or at the streaming server itself. This code serves as a beacon that sends a message, updated every 60 seconds, about the status of each individual user. The messages are sent to Ando's cloud-based servers (Amazon's Elastic Compute Cloud, also known as Amazon EC2). The listener-tracking method also provides more granular detail for every user: device type, stream source, and player type data are available. As I mentioned previously, the listener-tracking method also shows a higher cume per stream, since it counts individual users, as opposed to source IP addresses.

Once all the data is collected and processed, Webcast Metrics (an online service) is updated, and client stations can view reports related to their streams. Updates occur in Webcast Metrics once every 5 minutes.

And finally it is interesting to note that Ando is currently undergoing accreditation by the Media Ratings Council of its collection methods, transformation (which is the conversion of data in metrics) and presentation. Ando expects the MRC to complete accreditation process in October of this year. ■

SANITIZED FOR YOUR PROTECTION

SOME WORDS SHOULD BE OBSCENE AND NOT HEARD

Eventide Broadcast Delays are designed to keep profanity off your air, and angry listeners, embarrassed advertisers, and the FCC off your back. We invented the obscenity delay and have a solution for stations large and small that provides up to 80 seconds of the highest quality revenue and license-protecting delay.

Our new HD compatible BD600, 24-bit delay, comes standard with AES/EBU, and provides up to 80 seconds of memory — twice as much as other delays. There are fully adjustable Delay and Dump functions, and a Sneeze function which "edits" audio entering the delay, allowing the host to sneeze, cough, or make a short comment without being heard on air.

The BD600 offers two different methods of delay buildup and reduction: Eventide's catch-up and catch-down system, and an exclusive fast-entry-and-exit feature which allows starting a broadcast with the delay already built up to a safe amount and ending it with a rapid reduction of delay.

For HD, the BD600 offers MicroPrecision Delay™ mode which allows up to 10 seconds of delay to be adjusted in real time in 100 nanosecond increments. This is useful for synchronizing analog and digital signals while on-air, without audible artifacts, to maintain a seamless user experience.

Whatever your size, whatever your format, you can't expect to protect the integrity of your air and the foundation of your business without an Eventide Broadcast Delay in your rack.

Eventide®

HD COMPATIBLE

1100 (or PC1101). This sound card is really the heart of the system, because it allows for the playback of the streaming-media spot blocks, and it processes the audio as well (ahead of all the various encoders). Figure 1 (on page 16) shows how this is done.

The streaming server CPU (that houses the Orban sound card) operates as a slave to the Nexgen server used for playback over the associated radio station. When a spot block starts, that slave machine is signaled (via our LAN) to play the spot block sent as streaming media, as opposed to over-the-air. A small routine called SB_Play is used on the slave machine to tell the Orban card to switch its direct mixer output from the source coming in on digital input 1 (which comes from our router, and is basically a copy of the on-air program) to the WAV out input, which is the actual source of the spot audio for stream use only.

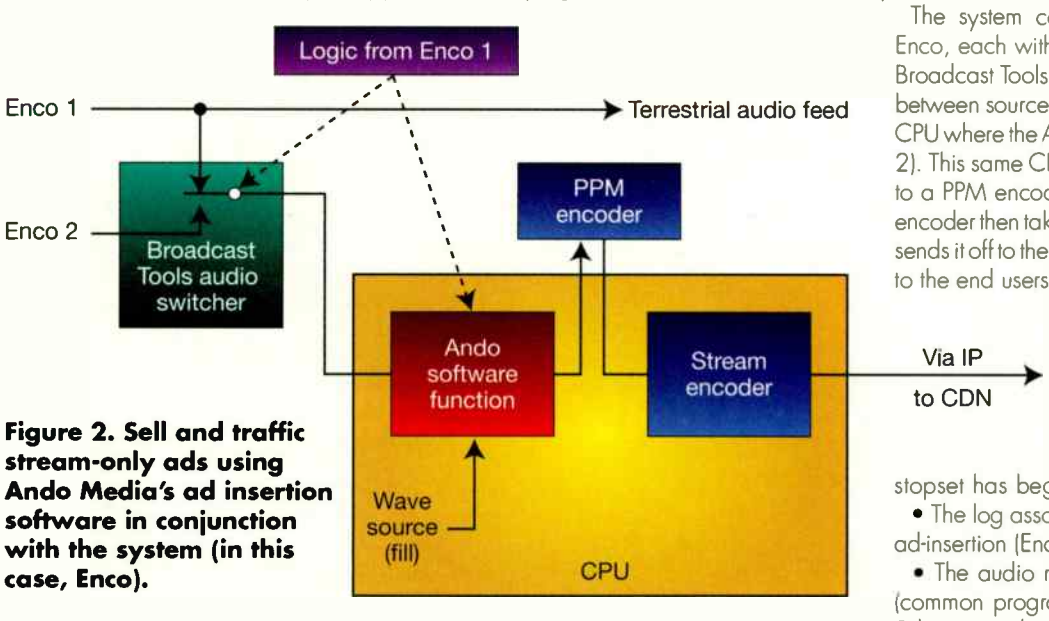


Figure 2. Sell and traffic stream-only ads using Ando Media's ad insertion software in conjunction with the system (in this case, Enco).

The output of the direct mixer is then routed (internally on the Orban card) to the digital out, and thereafter an AES version of the direct mixer is available for use. From there, the signal is routed to a PPM encoder, and then back to digital input 2 of the Orban card. The digital 2 input goes through the process mixer and then to the audio processing section of the Orban card. The output of the processing section is routed back to the WAV in input, and back to the PCI bus where it becomes available for use on all the streaming encoders operating in that same machine. All the various streaming encoders make use of the same program feed.

When the spot block ends, the Orban card is signaled to resume using the program source coming from digital input 1 and thereafter it feeds the common program (heard by over-the-air users as well as stream-only users) to the inputs of all the encoders.

Our traffic department schedules the spot blocks for streaming media, just as it does for the spot blocks that run over the air on the associated radio station.

Some of the over-the-stream spots have visual elements associated with them. Metadata from the stream-only spots is forwarded (via our WAN) to our corporate streaming headquarters in Cincinnati, signaling servers there to add the visual elements by way of the Flash player used by the desktop-only streaming clients. Mass redistribution of the streams is handled by Akamai's CDN.

A hybrid approach

I spoke with my friend Bryan Hubert, the chief engineer of Crista Ministry's radio stations in Washington state about its hybrid approach to streaming audio ad-insertion.

Crista wanted to sell and traffic all the stream-only ads itself, and it recognized the capabilities of Ando Media's ad-insertion software, so the group decided to use Ando in conjunction with its Enco system.

The system consists of two logs running in Enco, each with an associated audio output. A Broadcast Tools audio switcher is used to switch between sources, and that output is routed to the CPU where the Ando software resides (see Figure 2). This same CPU has an output that gets routed to a PPM encoder and then back. A streaming encoder then takes that PPM encoded source and sends it off to the Streamguys CDN for distribution to the end users.

When the log playing the common program gets to a spot block, several things happen:

- The Ando software is signaled by Enco 1 that a stopset has begun on the over-the-air station
- The log associated with the streaming audio ad-insertion (Enco 2) begins playing
- The audio router switches from Enco out 1 (common program) to Enco out 2 so that Enco 2 becomes the source of audio for the stream. Enco 1 is still playing audio for the over-the-air station's program.

The buffering feature of the Ando software makes this process sound very smooth for the end-users of stream audio.

Hubert told me that one important consideration in this process is that the spot block playing on the stream *must* be shorter than that playing over-the-air. For example, a spot block over-the-air is 4 minutes and 10 seconds in length, and the spot block for the stream is just 4 minutes. As the ad-insert audio is playing through the CPU that generates the stream, the Ando software (running on the same CPU) is waiting to receive a logic signal from Enco 1 (in this example) telling it that the over-the-air spot block is over. Because the spot block for the stream is, of necessity, shorter than that for the over-the-air signal, the Ando software does the following:

- Fill material (stored on the CPU running the Ando software) will start to play at the end of the spot block for the stream.
- While the fill is playing, Ando is waiting to be signaled from Enco 1 that the over-the-air spotblock is over.
- Once that signal is received, Ando starts recording or buffering the output of the audio switch (which is now feeding the output of Enco 1)

Resource Guide

Providers of streaming ad-insertion technology

Abacast
866-872-0781
www.abacast.com

Akamai Technologies
877-325-2624
www.akamai.com

Audio Compass
888-62-AUDIO
www.audiocompass.com

Backbone Networks
508-753-5665
www.backbone.com

Barnabas Road Media
317-965-8505
www.barnabasroad.com

Jetcast
917-338-3289
www.jetcast.com

Liquid Compass
303-839-9400
www.liquidcompass.net

Live365.com
323-230-6000
www.live365.com

NewTek
800-847-6111
www.newtek.com

Orban
480-403-8300
www.orban.com

Real Networks
206-674-2700
www.realnetworks.com

Stream Audio
253-238-2187
www.streamaudio.com

Stream Guys
707-667-9479
www.streamguys.com

Stream On
951-801-2309
www.streamon.fm

Stream the World
866-448-4037
www.streamtheworld.com

SurferNetwork.com
973-691-7420
www.surfernetwork.com

Viewcast.com
800-540-4119
www.viewcast.com

Warp Radio
303-799-9118
www.warpradio.com

• Once the fill material is played, Ando immediately switches over to its buffer, and so the normal common program is once again heard by end users of the stream.

So in this example, the over-the-air spot block was 4 minutes and 10 seconds. The stream-only spot block was 4 minutes. If Ando started a 30-second fill piece at the end of the stream-only spot block, then when all is said and done for this block, the stream audio is 20 seconds behind the over-the-air audio (ignoring any other types of delays used for the over-the-air signal). So if you were to listen to the stream source in one speaker and the over-the-air source in another speaker (again neglecting additional delays used for the over-the-air signal) you would note that the stream source is always behind that of the over-the-air source. The amount of time depends on the net difference in length of the spot blocks.

Streaming Audio Ad Insertion

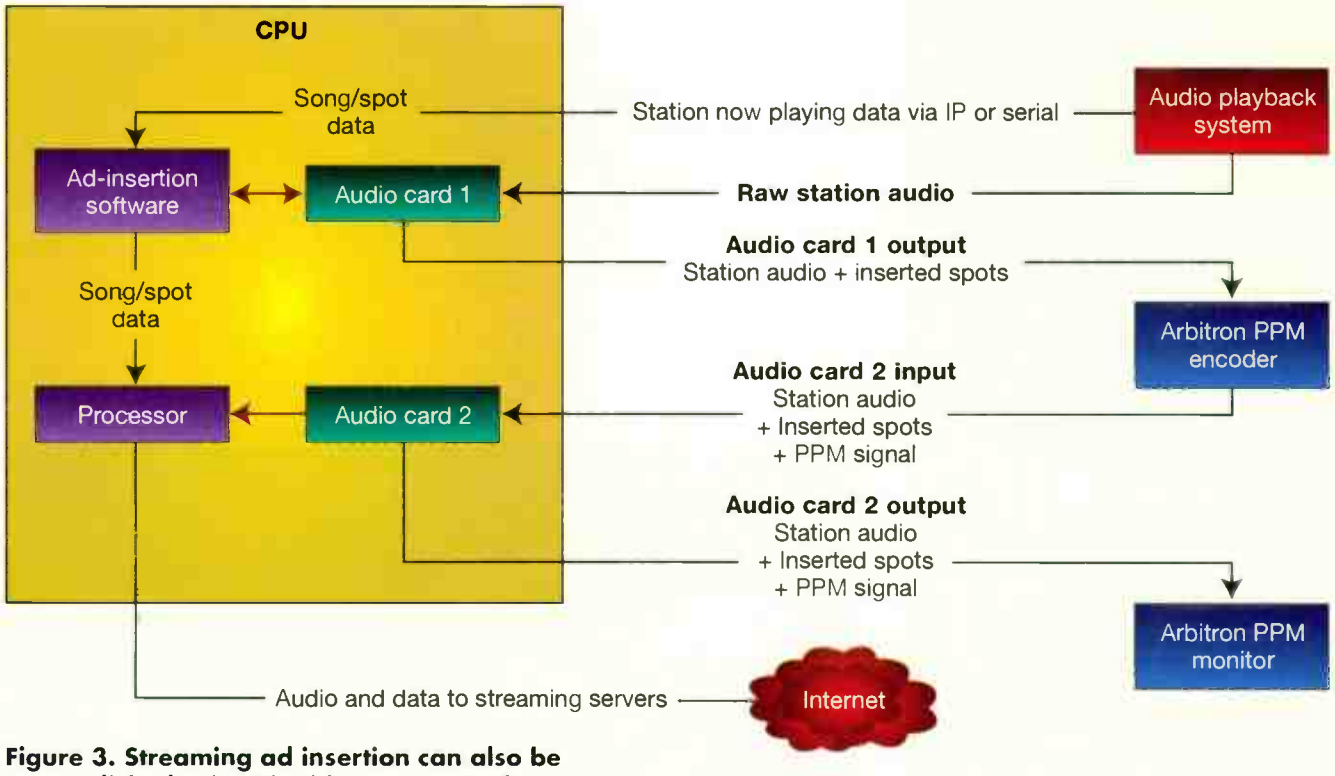


Figure 3. Streaming ad insertion can also be accomplished using Liquid Compass Radius Live with Ando Media, as seen here.

The end-users hear a smooth transition when the stream source returns to the common program feed.

Yet another way to accomplish streaming ad insertion is to use Liquid Compass Radius Live in conjunction with Ando Media. See Figure 3.

The actual configuration is very much like the first system. Although two audio cards are shown, it can be done with a single card, again the Orban PC1101. In this case, the station sells spots for the stream ad insertion, but uploads them via the Internet to Ando, which in turn does all the trafficking, and then turns around and pushes the spots back out (again via the Internet) to the CPU that runs the software and physically resides at your radio station. The command to switch between the common program and the stream-only spot block can be delivered via your LAN or a serial connection.

As you might imagine, when you rely on outside services (such as Ando) there are network connectivity and security issues that need to be addressed. In the example I just gave, both Ando and Liquid Compass need remote access to each CPU running the software. It would be prudent to establish a separate Internet connection that would host the server(s), along with a hardware-based firewall that provides the appropriate security. Certain ports need to be open for each IP address on the secure side of the firewall. Remember that this same Internet connection will be used to get the stream out to the ISP or CDN that will in turn service each end-user, so it has to have enough bandwidth to handle all the connections at the same time, plus a safe amount of overhead. That is just one more expense involved in servicing the listeners of your audio stream.

If you are part of a large organization with its own WAN, then a VPN that allows companies like Liquid Compass access to the WAN might be a viable solution as opposed to an additional Internet connection per station location.

Some radio groups are large enough they can maintain staff that focuses on the streaming audio aspects of the operation; obviously some others are not. If your group is smaller, likely it makes financial sense to farm the entire process to companies providing hardware, software and CDN services to many of the smaller groups already.

There are three different ways to accomplish the same end. While selling Internet-only spots may have its own challenge for the sales team, I can tell you that, from the technical standpoint, all the trails are already blazed and there are vendors out there hoping to hear from you. Setting up streaming ad insertion isn't difficult, and hopefully you can make it a viable part of your business.

Irwin is transmission systems supervisor for Clear Channel NYC and chief engineer of WKTU, New York. Contact him at doug@dougirwin.net. *Thanks to Barry Thomas for his help in writing this article.*

On the Road Again

WKSU's Folk Alley Express provides Web and broadcast audio production support to folk music on the beaten path.

By Ron Bartlebaugh, CBNT

My first exposure to PPM was in the mid-1960s. No, not the Arbitron Portable People Meter (PPM) technology currently used to measure radio audience participation, but the now-well-known folk music group Peter, Paul and Mary. Little did I know then that I would eventually be working with FolkAlley.com, the world's most listened to folk music site with more than 102,000 registered listeners who collectively represent nearly every country around the globe.

The creator of FolkAlley.com, soon to enter its seventh year of operation, is WKSU-FM's Executive Director and General Manager Allen Bartholet. As I write this, Bartholet, his crew and the Folk Alley Express (motor coach) just returned from the Newport (Rhode Island) Folk Festival. They spent the weekend there providing Web and broadcast audio production support to NPR Music, WFUV and local outlets. The Folk Alley Express experienced its maiden voyage in August 2009 when it first attended the Newport Folk Festival. Its most recent journey prior to this year's Newport event was to the Austin and Dallas, TX, areas to attend folk music festivals.

The Folk Alley Express idea came about when a fan, who felt that Folk Alley needed to be more visible in the community, provided a generous $150,000 gift to obtain a motor coach and subsequently install a recording and production studio in the vehicle. The purpose of the Folk Alley Express is to provide a promotional tool for Folk Alley and to record the best folk music performances throughout the country for webcast at www.folkalley.com and for broadcast over Folk Alley affiliate stations.

The project begins

Early in the project we realized a standard motor coach floor plan was not practical for our application: The motors for the slide outs were at floor level – at least in every model we researched. That eliminated the possibility of stripping a bedroom for conversion into a studio. An alert motor coach salesman realized our dilemma and suggested we consider a toy hauler-type motor coach – the type with a garage in the back for hauling a motorcycle, ATV or golf cart. That was the answer! The brand new unit we acquired is a 37' long by nearly 13' high Damon Outlaw Model 3611. The interior includes an 8' wide by 10' deep by 6.5' tall garage, a queen-size loft bedroom located above the garage, a rear full-size drop down tailgate, plus all the other appointed comforts of home.

With the help of Malcolm Lanning at Custom Mobile Products in Cleveland the garage was converted to a two-position studio that includes an audio operations position on one side and a video operations position on the other side. The studio has equipment racks and storage cabinetry for audio and video production electronics, microphones, cameras, cable reels, stands

and lots of other peripheral equipment that will all eventually be carried on board as future funding permits. One entire cabinet houses the vehicle's sophisticated mobile communications system. Cable pass-through access holes were created in each side of the body and through the roof for easy routing of cabling from the studio to one or more on-site performance venues as well as to the roof for a future rooftop video shoot platform and Internet uplink dish. Because the rear wall tailgate drops down, a typically rear-mounted ladder for roof access was not an option. Therefore, a 24" x 24" hole was cut into the ceiling of the studio, which is also the floor deck for the queen size bedroom above. An equally sized hatch was cut into the roof and perfectly aligned with the studio ceiling hole for easy pass through of materials to the roof deck from either the studio or the bedroom deck. Two removable panels were manufactured for placement in the studio ceiling pass-through hole – one an open grate to allow for additional air conditioning flow into the studio and the other a solid panel for support of additional bedroom deck weight when required. Standing on the bedroom deck allows for easy and safe access to the roof through the hatch.

To see the project budget and equipment used in the Folk Alley Express, visit RadioMagOnline.com.

The Folk Alley Express ready to head to Newport, RI, for the Newport Folk Festival.

An adjustable hand-cranked four-jack stand arrangement with two metal edge-to-edge connecting horizontal members serves as support for the tailgate in a flat and level position for use as a performance stage. A custom fabricated set of metal steps attaches to the tailgate to allow for easy on/off stage access. When not in use, the tailgate remains in its up position to form the rear wall of the studio.

Top: Supports for the vehicle's rear drop-down tailgate allow it to serve as a stage for three- to four-person folk music groups. Above: WKSU staff inspect the garage area on delivery day. The garage, intended to haul motorcycles, ATVs, golf carts, etc., was made into the studio.

An on-board 5.5kW generator provides electrical power when the vehicle is not connected to commercial (shore) power. To provide uninterrupted power, a 2.5kW inverter was added to the studio along with two additional deep cycle batteries for extended run time. The studio's electrical power distribution system is configured so that it can be fed from an independent generator or other power source in the future if and when required.

Getting equipped

For audio equipment, a Digidesign Model 003 using Pro Tools LE provides the audio mixing tool when connected to Presonus DigiMAX LT eight-channel preamps tied to a Roland S1608 16x8 digital snake system for stage-to-studio audio transport. Being locally based, Audio-Technica has always been a generous supporter of WKSU and Folk Alley. A full complement of Audio-Technica microphones ride onboard, including AE-5400 stage mics, AE-5100 and PRO-35 instrument mics, and AT-875R shotguns. All of this is complemented by WKSU's locker of Neumann and AKG vintage microphones, along with cable reels and many other odds and ends. A NewTek TriCaster/Camplex cable video system is expected to be added to the Express when budget permits. In the meantime, Internet quality video is shot and edited using a variety of video recording devices. All equipment is portable so as to perform double duty when relocated to any of WKSU's nine studios that can support the Folk Alley operations. It also sometimes is put into use

On the Road Again

at smaller venues that do not permit placement of the Folk Alley Express because of its physical size and weight.

Because of the nature of a mobile studio combined with our FolkAlley.com Internet-based programming, reliable connectivity is a high priority. A moving vehicle presents significant obstacles for maintaining the reliable cellular access and data services required on long trips. While designing the Folk Alley Express' connectivity and network

Photo by Chris Wallis

The studio allows for flexible setups such as this one that was used at the Newport Folk Festival to record the festival acts as well as provide audio for various live streaming destinations.

Photo courtesy Audio-Technica

An audio setup for many events includes a Digidesign 003, a laptop and Audio-Technica mics.

infrastructure, WKSU LAN Administrators Chuck Poulton and Dan Kuznicki made the decision to use both Verizon and AT&T for data services. Both carriers have advantages and disadvantages, but generally speaking one or both will have coverage in any given area. In addition, each carrier utilizes a different base technology. That ensures each carrier will never be a roaming partner with the other and therefore the Express will not be reliant on a single carrier for service at any given time.

The pfSense on the embedded m1n1wall Netgate routing hardware enables the system to intelligently load balance and fail-over both cellular data connections. A Level One WBR-3800 and a Cradlepoint CTR350 gateway are used to maintain the 3G/PPP cellular connections so the router

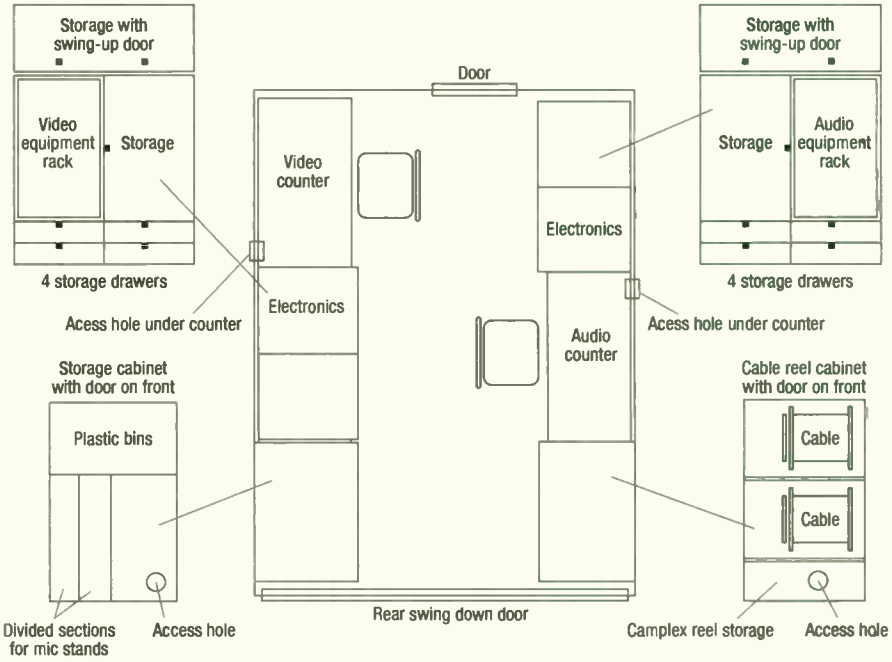
Hear music gathered aboard the Folk Alley Express at www.folkalley.com, a service of Kent State University.

can manage the IP connections natively. In addition to the onboard cellular data services, interfaces have been added to the load-balancer allowing utilization of local high-speed Internet connectivity when available.

All load-balancing, routing decisions and connections are managed automatically. The Express' road team need only connect to venue Internet access when available. Otherwise, no operator intervention is required. The entire system is totally remote accessible so the WKSU/Folk Alley IT team has the ability to manage the configurations while not actually being on site for an event.

POTS telephone service is trunked to the Express via a VPN tunnel, in combination with a Linksys PAP2T VOIP analog telephone adapter and an Asterisk server located at WKSU. The SIP telephone trunks are delivered via Bandwidth.com. The design provides direct telephone service, both via an inbound local number and unlimited outbound calling. In areas where cellular coverage is limited, data service reliability is enhanced by a pair of elevated outdoor cell antennas mounted just below roof level.

The Folk Alley Express will be attending many more folk music events yet this year and in the years to come.



A drawing of the Folk Alley Express studio gives an idea of the scope of design and how much was built into the space.

Bartlebaugh is director of broadcast engineering, WKSU-FM/Kent State University. WKSU LAN Administrator Dan Kuznicki contributed to this article

A Monumental Event

The Radio Show heads to our nation's capital

A new location, a new show. The 2010 Radio Show has changed from previous years. Now a partnered effort between the Radio Advertising Bureau and the National Association of Broadcasters, the updated conference also makes a debut in our nation's capital.

Our convention preview highlights some of the products being discussed in the Marketplace – the new exhibit floor. This smaller area features table-top displays arranged mostly in squares. Without booths, it should make the space easier to find everything.

The engineering track for presentations has been modified as well. All the engineering sessions are set up as ask the expert panels. There will be no formal presentations, only open discussions. This allows you to directly ask questions on the topic rather than sit through a presentation first. See the rundown of engineering sessions The main conference sessions are a mix of panel discussions and presentations with a business and management focus, but there are some sessions with a technical theme.

Program shrinker/stretcher
25-Seven Systems

Program Length Manager: The 25-Seven Program Length Manager (PLM) shrinks or stretches your programs and program segments by 5 percent (three minutes per hour) or even 10 percent -- without pitch change, artifacts or glitches. Time-manipulated audio is clean enough to use on stereo music programs and live events. PLM is operator friendly and requires little training whether controlled from the front-panel or via Web browser. PLM is the next best thing to being able to stop the clock or add more minutes to the hour.

888-257-2578; www.25-seven.com; info@25-seven.com

Longwave transmitters
Nautel

NX Series: With power outputs ranging from 25kW to 2000kW, this transmitter series offers AM adaptive pre-correction, ac to RF efficiency of 90 percent, linearity utilizing a nine-phase Direct Digital Modulation scheme encoded at 2:7 mega-samples per second, and a footprint requiring 1/3 to 1/2 less space than other transmitters. A touch-screen controller plus remote Web access are standard.

207-947-8200; www.nautel.com; info@nautel.com

CONNECTING STUFF IS ALL ABOUT THE GOZINTAS AND COMEZOUTAS

MULTIPORT IS ALL ABOUT CONNECTING STUFF TO YOUR STUDIO

Getting all your external gear into and out of your studio is never easy. You're always looking for an adapter or cable of some kind and, even when you find it, you're then on the hunt for level or impedance matching gizmos.

MultiPort™, from Henry Enginrering, takes care of all that by facilitating interface between a studio and external audio equipment. Providing convenient access to a studio's analog and digital audio inputs and outputs, it allows connection to both professional and consumer gear. MultiPort's active circuitry performs all level, impedance, and topology conversion necessary for correct interface.

You can put MultiPort wherever it's convenient. Mount it in your cabinetry, or use the included rack adaptors to mount it in your rack. Once you've got MultiPort, you'll wonder how you ever limped along without it!

WE BUILD SOLUTIONS.

DIGITAL SOLUTIONS. ANALOG SOLUTIONS. FUNCTIONAL. RELIABLE. AFFORDABLE.

Visit www.henryeng.com for all of Henry's solutions!

Henry Engineering • 503 Key Vista Drive, • Sierra Madre, CA 91024 USA
T: 626.355.3656 • F: 626.355.0077 • email: Info@henryeng.com

A Monumental Event

Processing/mix engine
Wheatstone

Gibraltar: Loaded with features, Gibraltar provides up to 1024 DSP processing signal paths (any combination of 5.1, stereo and mono channels) and can apply all processing functions to 768 input paths and 256 mix output paths simultaneously. Its flexible mixing architecture allows more than 500 mix bus capability. Additionally it offers four-band fully parametric EQ with HF/LF peaking or shelving, three parametric filters (high pass, low pass and notch), parametric compression, limiting and gating, 16 control channels for keying/ducking/side-chain applications, panning and surround imaging control, individual input and output delay capability, up to 650ms per path. Its modular design utilizes hot-swappable cards and provides fiber or CAT-5 connectivity.

252-638-7000; www.wheatstone.com; sales@wheatstone.com

Broadband dipole
Shively Labs

6020: The 6020 broadband dipole is now also incorporated into a low-windload broadband FM panel, model 6018V or 6018H. It is rated at 10kW input and can be used either for vertically or horizontally polarized applications. The 6020 has already been used successfully in Turkey and Haiti, and has proven its capabilities as a rapidly deployable, robust 5kW antenna. Features include vertical polarization and 5kW power rating per bay. Radomes and de-icers are not required.

888-SHIVELY; www.shively.com
sales@shively.com

Fixed directional couplers
ERI-Electronics Research

Precision Directional Couplers: Precision directional couplers are available for $1^5/_8$", $3^1/_8$", $4^1/_{16}$", and $6^1/_8$" (50Ω) transmission lines and can be purchased with one to four coupling probes; they include the required external terminating loads. These couplers are balanced high precision test instruments. They may be used with ERI's PWR-100D power monitor and its companion VPS-100 VSWR monitoring and protection system, produced in partnership with Broadcast Devices, or they can be used as standalone test port or even in simple applications such as providing a modulation monitor sample.

812-925-6000; www.ERIinc.com; sales@ERIinc.com

Web management system
Triton Digital Media

Flex: This content management system allows stations to build and maintain websites with local and contributed content. Sites can be built with configurable custom content positions created through a drag-and-drop process. Flex includes text-messaging tools, the ability to place music news content, music-discovery widgets and podcast tools. In addition, stations can create music side channels and use Flex as a video content platform.

818-528-8860; www.tritondigitalmedia.com
solutions@tritondigitalmedia.com

Remote over IP codec
Telos Systems

Z/IP One: This 1RU codec is designed to maximize audio quality from public IP networks and mobile phone data services, including connections behind NATs and firewalls. Agile Connection Technology (ACT) is the foundation for the Z/IP's performance on real-world networks. When the network is functioning well, Z/IP provides the lowest possible delay and the highest possible fidelity. Should network conditions become challenging, it automatically lowers the bit rate and increases buffer length. Z/IP One is wireless capable and can connect to IP networks via Wi-fi, EVDO and UMTS.

216-241-7225; www.telos-systems.com
telos-info@telos-systems.com

STL IP audio codec
Digigram

IQOYA *LINK/LE: With its decode-only approach, simplified ergonomics and features targeted at unattended transmitter sites, the *LINK/LE is for broadcasters looking for a mix of 24/7 reliability, wide choice of audio formats and affordability. An AAC codec package is included and enhanced apt-X decoding is also available. Its hardware is combined with FluidIP, Digigram's IP audio codec engine that can send and receive IP streams simultaneously on two seporate RJ-45 ports. Should anything happen to the main IP audio stream, a secondary IP stream, or the analog or AES audio input, or even playlists stored on an SD card will guarantee 100 percent on-air time. Its power consumption is below 15W.

703-875-9100; www.digigram.com; input@digigram.com

Service for advertisers
vCreative

vCreative Consulting: This flexible, full marketing consulting service helps advertisers navigate the new brand, media and consumer world. It helps connect with their customers through marketing strategies for radio, social media, viral marketing, Internet/digital and guerrilla marketing. vCreative Consulting is led by a small, hand-picked group of individuals who have been successful in both radio and marketing. They have created opportunities that connect advertisers and content with consumers and audiences. They also understand the unique needs of radio advertisers and how they can enhance their presence and brand.

800-605-9889; www.vcreativeinc.com; info@vcreativeinc.com

Read what our users say...

KJDL, Lubbock, TX

" I like (Xtreme) a lot! Once we got things together we never have any problems. (Xtreme) is a 9 out of 10 for usability. It didn't take me long to figure out, I picked up most of the major (features) in the first day. (The Xtreme) is user-friendly for all involved."

Jessie Walker, Program Director

DMS Broadcasting, San Francisco, CA

" When we started, we were jumping into something we knew nothing about! We called your tech support & within a day they had a solution. It was miraculous. They helped us get wired up & set up. (Tech Support) had a positive & upbeat attitude. They went above & beyond!"

David Trudrung, General Manager & Co-owner

WDHC, Berkley Springs, WV

" We are absolutely pleased. I especially like the game scheduling feature, it works great for Mountaineer West Virgnia University games. I rate it a 9 ½ because we can schedule 2 games simultaneously & flip flop when there are rain delays. It works great for sports talk!'

Mike Hurst, Engineer

KSVL, Yerington, NV

" I love (Xtreme)! We've been running (Xtreme) for a year & a half every single day & we give it a 10! It's easy to learn & use. Good support & it's dependable!"

George Lemait, Station Manager

KSMZ, Alexander, AR

" Xtreme has more flexibility, sounds better & has fewer problems then our stations running (other automation systems). It's easier to program & a 9 compared to other programs out there."

Scott Gray

and MANY more...

Join the hundreds...

... of others on air with Digilink-Xtreme, the best automation system in Radio. Full featured, it is easy to install, use, and maintain. Best of all, it is easy to buy. Choose from either the no contract $100 per month 'Solutions Program' from Arrakis Systems or buy 'Xtreme-Complete' outright for only $6,500 from Broadcast Supply Worldwide (BSW)

A Monumental Event

Automation mobile application
Enco Systems

iDAD: This companion mobile application for the Enco DAD and Presenter audio automation studio systems is targeted at the iPhone and the iPad. It will feature the ability for news reporters and announcers to record, trim and tail, label and then send audio from the mobile device directly to their DAD or Presenter automation systems for timely playback. iDAD will also feature a remote control function which will allow control of the DAD or Presenter system from the mobile device using a simple array of buttons representing various user definable functions.

800-362-6797; www.enco.com; sales@enco.com

Radio automation system
Wide Orbit

WO Automation for Radio 2.0: WO Automation for Radio 2.0 features Leader and Follower functionality, which allows two or more radio stations to share common programming like music but break apart for independent commercial breaks or longer segments. All stations can be run from one computer, separate computers or computers in different time zones delivering flexibility and scalability for broadcasters running multiple stations from a single location. Leader and Follower also simplifies and automates the programming of different commercials on terrestrial and Web streams so there is no need for additional costly software or services. WO Automation for Radio 2.0 also brings seamless integration with WO Traffic.

415-675-6700; www.wideorbit.com; mzinsmeister@wideorbit.com

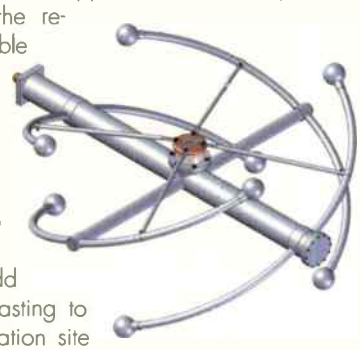
Modulation monitor
WorldCast Systems

Audemat Goldeneagle HD v2.0: The Goldeneagle HD v2.0 adds significant additional functionality in both hardware and software. On the software side, it offers advanced RDS monitoring capabilities with analysis of RDS groups distribution, AID monitoring and remote streaming of raw RBDS data; advanced monitoring of HD Radio data with the ability to monitor many new HD Radio data signals such as UFID, IBOC BER and PAD; and support for Scripteasy v2, allowing for easy graphical scripting to fully automate the process of event triggering on out-of-tolerance conditions. This new version also supports SNMP communication for control and monitoring of other devices on the network. On the hardware side, the Goldeneagle HD v2.0 offers a new HD Radio tuner enabling detailed HD Radio data monitoring such as presence of services and MIME types as well as enabling the streaming of raw HD Radio data.

305-249-3110; www.audemat.com
contact@audemat.com

Sidemount FM antenna
Dielectric

DCR-S: The DCR-S provides a low-wind load alternative for broadcasting multiple FM stations from a common antenna. When paired with Dielectric's patent-pending, ultra-compact manifold combiner, the DCR-S creates a package for broadcast applications where space is limited. Without the requirement for flexible jumpers, the new antenna is simple to install and maintain. The DCR-S can be used by broadcasters to establish multistation broadcasting, to add HD Radio broadcasting to an existing multi-station site or to provide a reliable auxiliary antenna. The DCR-S is a circularly polarized antenna with a power rating of 28kW for a single bay, and is available in stacked arrays of up to 16 bays for a power rating of 120kW. The antenna system is engineered to support high-input power as needed for multiplexing. Designed specifically to reduce downward RF radiation to the ground, the DCR-S features a custom feed design with shorter spacings and a series-fed configuration.



800-341-9678; www.dielectric.com
dcsales@dielectric.com

Software-defined audio transport
Moseley Associates

Rincon: Rincon is a software-defined audio transport product optimized to deliver multichannel digital audio over IP, T1/E1 and radio links, and networks simultaneously. Rincon carries up to eight stereo audio channels over the multiple network choices. Backup solutions such as failover inputs, redundant outputs and automatic switchover in case of audio loss are included, and it inserts a backup audio file to keep audio on the air in case of total link failures. Choose from linear uncompressed audio or any advanced audio compression algorithms. Management and configuration is handled via Web and SNMP interface and can even be accessed via smartphone.

805-968-9621; www.moseleysb.com; info@moseleysb.com

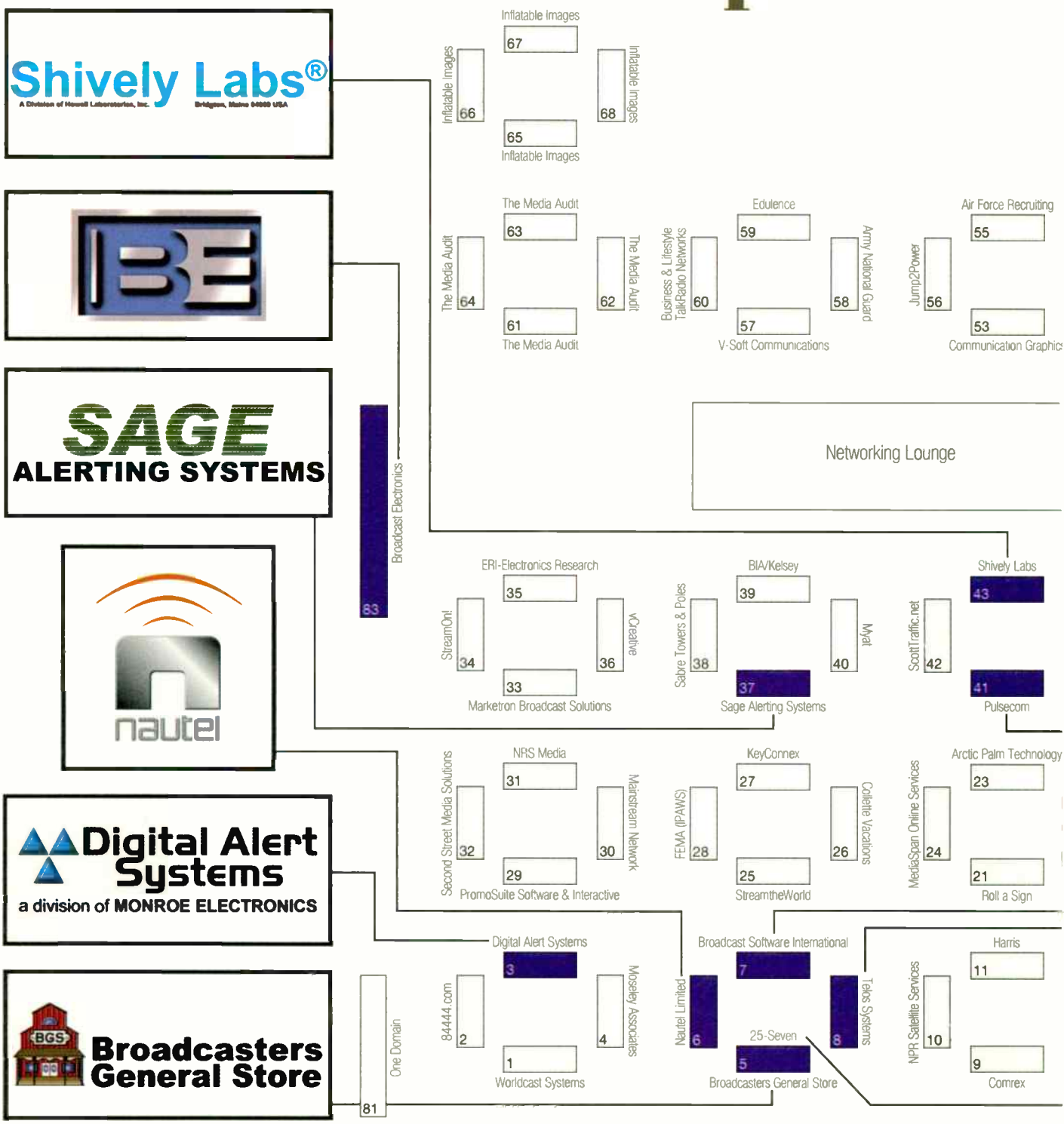
Digital media system
Broadcast Electronics

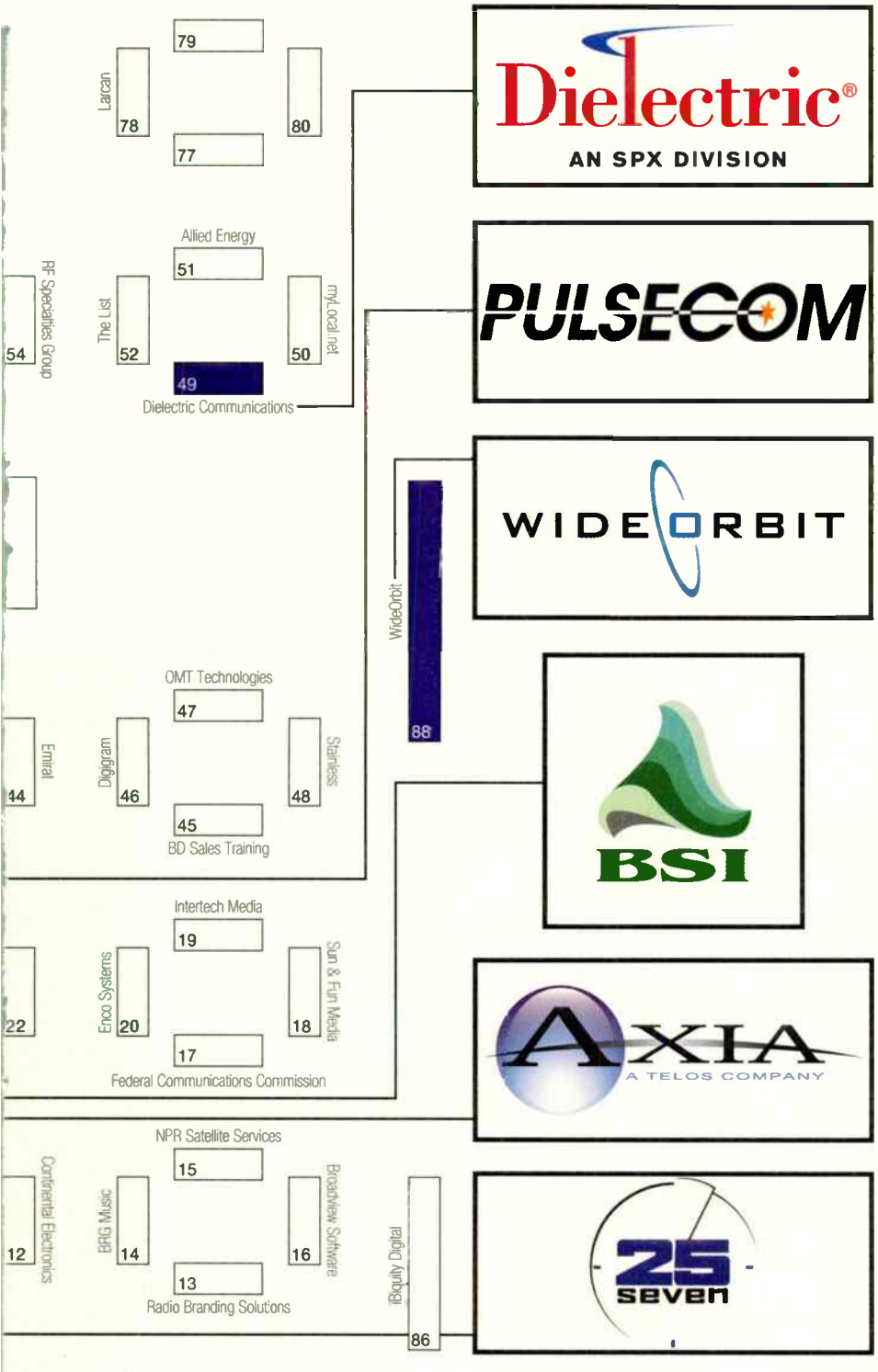
AudioVault Flex Enhancements: The latest version, AudioVault Flex adds a simple segue editor for doing quick song-to-song transitions and an enhanced voice tracker with gain envelope control for seamlessly crossfading voice tracks with music. The new voice tracker makes it possible for talent to add commentary during a song by adjusting audio gain, and to fade music or voice tracks during transitions. In addition, another new feature lets talent quickly mark sections of an upcoming song and play it on-air. AudioVault Flex can also be configured to suit individual workflow, and its new tabbed gadget dock feature enables users to organize and stack gadgets into tabs and quickly switch between them.

217-224-9600; www.bdcast.com; bdcast@bdcast.com

A Monumental Event

The Radio Show
The Marketplace





A Monumental Event

The Radio Show

Sessions and Events

Wednesday, Sept. 29	
10 a.m. - Noon	**Ask the Experts: Building a Radio Station** Proper planning and an eye to the future will save time and money on your office, studio and transmitter projects. Moderator: Gary Kline, Cumulus Media. Panelists: Antonio Argibay, Meridian Design Associates Architects; John Bisset, consultant; David Gilson, Lerman Senter; Andy Laird, Journal Broadcast Group; Mike Starling, National Public Radio Labs
1 p.m. - 3:30 p.m.	**NRSC Meetings**
3:45 p.m. - 4:15 p.m.	**Opening Remarks by Jeff Haley and Gordon Smith**
5:30 p.m. - 7 p.m.	**Reception in the Marketplace**
Thursday, Sept. 30	
7:30 a.m. - 8:45 a.m.	**Breakfast in the Marketplace**
9 a.m. - 10 a.m.	**Super Session - Goin' Mobile** In a world where mobile devices are with us all the time and always on, this session takes a deep dive into the world of iPhones, Androids and Blackberries and explores how they're changing our lives. Presenter: Fred Jacobs, Jacobs Media
10:30 a.m. - Noon	**Ask the Experts: Technical/Regulatory/Legal/FCC** FCC staff, communications attorneys, engineers and broadcast consultants answer questions on regulatory topics and federal compliance matters. Moderator: Paul McLane, New Bay Media. Panelists: Ann Bobeck, NAB; Jim Bradshaw, FCC; Peter Doyle, FCC; Lisa Fowlkes, FCC; Richard Mertz, Cavell & Mertz; Gregg Skall, Womble Carlyle Sandridge & Rice; Milford Smith, Greater Media; Glynn Walden, CBS Radio
Noon - 1:30 p.m.	**Advertiser Keynote and Luncheon** Keynote speaker TBA
1:30 p.m. - 3 p.m.	**Ask the Experts: AM/FM/Digital Transmitter Manufacturers** New RF technology, digital radio power levels and maintenance, capital budgeting, facilities upgrades, power bills, multi-transmitter sites, and more will be discussed. Moderator: Steve Davis, Clear Channel Radio. Panelists: Tim Bealor, Broadcast Electronics; David Hultsman, Continental Electronics; Gary Liebisch, Nautel; Geoffrey Mendenhall, Harris

3:30 p.m. - 5 p.m.	**Ask the Experts: The iBiquity HD Radio Team** This is your chance to ask about the future HD Radio, what new implementations are in the works and what receiver manufacturers are doing. Moderator: Chriss Scherer, *Radio* magazine. Panelists: Steve Baldacci Sr., Joe D'Angelo Sr., Ashruf El-Dinary, Jeff Jury and Albert Shuldiner from iBiquity Digital
6 p.m. - 9 p.m.	**NAB Marconi Radio Awards Reception, Dinner and Show** Hosted by Ron Chapman, featuring a live performance by Jack Ingram
Friday, Oct. 1	
8 a.m. - 9 a.m.	**Breakfast in the Marketplace**
9 a.m. - 10:15 a.m.	**Ask the Experts: Creative Audio Processing** Talk with the experts about audio processing experiences and learn what they recommend. Moderator: Dom Bordonaro, Cox Radio. Panelists: Glen Clark, Gaintenna; Frank Foti, Omnia Audio; Jeff Keith, Vorsis/Wheatstone; James Loupas, James Loupas Associates; Greg Ogonowski, Orban/CRL Systems
10:30 a.m. - 11:45 a.m.	**Ask the Experts: The AM Antenna Modeling Gurus** Get advice and guidance on what software is best, the potential pitfalls of do-it-yourself modeling and what you need to know to comply with FCC requirements. Moderator: Cris Alexander, Crawford Broadcasting. Panelists: Benjamin Dawson, Hatfield and Dawson; Tom Jones, Carl T. Jones; Ronald Rackley, du Treil, Lundin and Rackley; John Warner, Clear Channel Radio
Noon- 1:30 p.m.	**Radio Luncheon** Charles Warfield is the 2010 National Radio Award recipient, WSTW-FM's Graffiti Radio is the HD Multicast Award winner, and Christiane Amanpour leads a newsmaker interview.

Tips, tricks, hints and more

By Chriss Scherer, editor

Keep cool

Most engineers will be involved in at least one facility build at some point in their careers. This project will likely involve a rack room. It's always a challenge to maintain a balance between creature comforts (the people) and proper equipment cooling. A rack of equipment can create a great deal of heat, and it's no secret that heat is the enemy of electronics.

Most equipment rack installations I see are designed with passive thermal management techniques, but active thermal management is an option. Regardless of the technique, there are several common mistakes often made. These mistakes result in air flow hot spots, which can lead to premature equipment failure.

While investigating some information about proper thermal management I came across some information from Middle Atlantic. The company publishes a white paper that discusses thermal management in great detail. If you are designing a rack room, this is a good read. But there are some basic rules to keep in mind that can be applied in any situation.

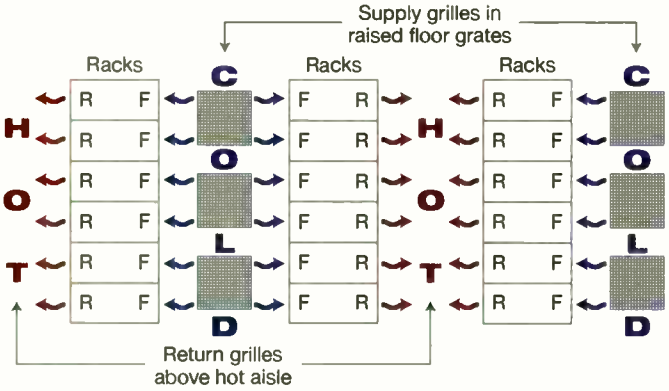


Figure 1. Ideal placement of cold air supply and hot returns in a rack room.

Ideally, a rack room will be designed for proper air handling from the start. Middle Atlantic describes this as establish hot and cold aisles around equipment. This plan provides an air flow from cold to hot through and around the rack-mounted equipment.

Ideally, the cold air supply is delivered from the floor, which can be a raised floor or floor-mounted vents. The air return is in the ceiling. This establishes the basic of the air flow from cold below to heat above. The next step is to orient the racks so they alternate front and back. In Figure 1, there are three rack rows. Notice how the equipment is placed with the fronts facing in two rows and the back facing in the next row. The air intake for the rack is placed at the bottom of the rack front. Some equipment also has air intake vents on the front. The cold air will flow into the rack at the bottom and rise as it is heated by the equipment. The hot air returns are placed in the opposite aisles at the rear of the equipment.

This is only the first step in thermal management, however. Ensuring proper air flow within the rack creates the second step in the process. Too often, vented rack panels are placed in incorrect positions, resulting in localized convection loops that do not properly vent the heated air within the rack.

Figures 2 and 3 indicate the proper placement of vented panels to ensure optimal air flow. For passive cooling (Figure 2), a vented rear door is recommended. With active cooling, a solid rear door should be used. Both systems note that the air intake vent should be at the bottom of the rack.

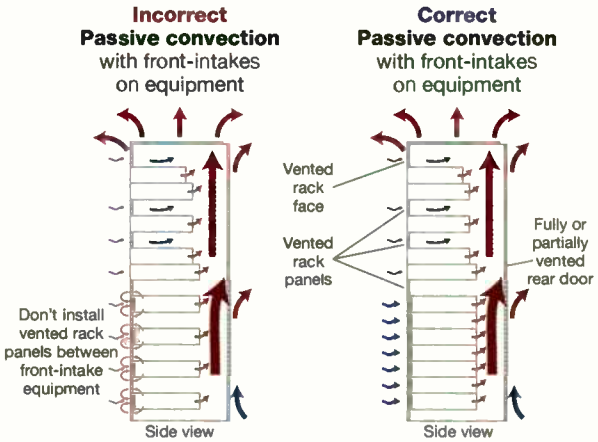


Figure 2. Passive thermal management

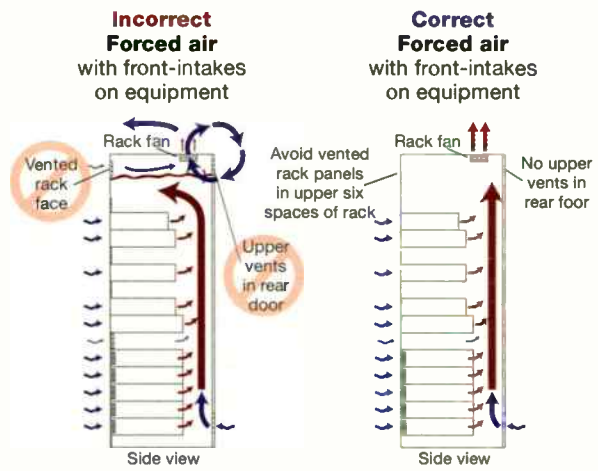


Figure 3. Active thermal management

Both methods rely on providing the most natural airflow to ensure the heated air is evacuated and not recirculated into the rack and equipment.

Diagrams courtesy of Middle Atlantic

We need your tips!
Ideas submitted to Tech Tips may be suitable to earn SBE recertification credits.

Do you have a tech tip? Send it to us at radio@RadioMagOnline.com

expect MORE

more engineers. more innovation. more award winning products

nautel

+1.902.823.5131

MOREFM

VS SERIES FM 300W – 2.5kW

NV SERIES FM 3.5 – 88kW

MOREAM

NX SERIES AM 25kW – 2MW

HD Radio
Pure Digital. Clear Radio.

MORECONTROL

NAUTEL AUI
(ADVANCED USER INTERFACE)

Nautel offers the industry's broadest portfolio of digital/analog solid-state transmitters including 1kW to 2000kW MW and 300W to 88kW FM models. Outstanding reliability, global presence, efficiency and exceptional support have resulted in more than 8000 Nautel transmitter deployments in 176 countries. Expect more from Nautel.

Making Digital Radio **Work.**

See what more looks like at nautel.com/expectmore/

2010 PICK HIT

The XB-14 received a *Radio* magazine Pick Hit at the 2010 NAB Show.

Allen & Heath XB-14

By Chris Wygal, CBRE

On more than one occasion, I have built small production studios using small-format mixing consoles. These rooms are rarely used on the air, but inevitably someone in production or management says, "I wish this little console would trigger our CD decks and mute the speakers when we open the mic." It's a legitimate concern, and engineers are forced to use their creative devices to install start closure buttons to trigger playback devices and relays to mute studio speakers. Because of this, I was pleasantly surprised when Allen & Heath unveiled the XB-14, a small-format audio console with cool features galore.

Features for radio

The XB-14 boasts features that complement on-air environments where triggering and remote interfacing are essential. Inputs one through four are mono with three-band EQ (sweepable mids), 100Hz rolloff, input gain (69dB range), pan, aux send, and an on/off button. The on/off button is programmable via dipswitches on the rear of the mixer and can be disabled or permanently on. The mono input channel faders will also mute the control room speakers by simply pulling up the fader.

External remote control on the XB-14 is connected through two DB-15 jacks. All channels have a Mix B that routes the channel to an unbalanced stereo output via RCA jacks, where mix-minus or an additional recording output can be established. The mono channels will accept mic level inputs via XLR jacks and line level inputs via 1/4" jacks along with insert points for outboard processing.

Adding Ma Bell

Two telco channels make the XB-14 unique. Both channels have male and female XLR jacks above the channel strips. Each telco channel features two-band EQ, and a talk button and clean-feed source selector. With the talk button, the user can talk back to the caller off air. The clean feed source allows the user to toggle between routing program audio or AUX send output to the caller. If program audio is selected, the XB-14 automatically mix-minuses the telco channel out of program on the clean feed so the caller doesn't hear echo on the return. The built-in mix-minus feature is truly a unique breakthrough for a small-format mixer. The telco channels also have start switching remote interface logic.

The XB-14 has seven stereo inputs: One, three, five and seven are fully balanced on 1/4" TRS jacks. Inputs two and four are unbalanced RCA inputs and input six is a USB interface. The USB interface is 1.1 and 2.0 compliant and facilitates bi-directional audio to and from a computer. The USB source input is routable to stereo input three. Program, Mix B or aux + mono can be routed to the USB mixer output. The USB interface uses Windows and Mac Core Audio drivers, so no extra software or drivers are necessary. The USB connector is housed above the stereo 4-channel strip. Depending on which input is selected, the corresponding source audio equipment can be remotely started by depressing the on/off button.

Get outta here

As far as outputs go, the XB-14 allows for flexibly interconnecting with all audio equipment. The master section is home to record output, control room speaker output, Mix B output and an external monitor input, all of which are on stereo unbalanced RCA jacks. Main program output is via electronically balanced XLR jacks and includes 1/4" insert points. Mono out is via an unbalanced RCA jack, and aux out is via a 1/4" balanced jack. Two guest

Performance at a glance

- Remote start/stop logic on stereo input channels
- Mic channels mute control room speakers
- USB I/O
- External monitor input
- Guest and host headphone jacks
- Talkback and mix-minus features
- Rack mountable

headphone jacks and one control room headphone jack are available with separate volume and source controls. Aux, Mix B, USB in and external monitor can be separately routed to the control room speakers and/or headphones. Pre-fader listen can be made available to the guests, selectable on the front panel. A momentary talk-to-guest button allows the user to talk off air to the guests on their headphones. The level adjustment for Mix B is made on a rotary knob just above the main program mix fader, which like the input faders has a 100mm throw. It is interesting to note that unity gain on the input and outputs faders is 0dB and is situated at the very top of the fader. The XB-14 uses a 12-segment LED meter indicating levels from -30VU to +16VU. The meter can also indicate pre-fader listen input levels.

Two DB-15 connectors allow for remote control of other audio gear. The Remote B connector holds the start and stop pulses for stereo inputs one through seven. The Remote A connector is home to speaker muting relays and external remote mic and telco channel muting. The external meter socket feeds line (0VU at 0dBu) program left and right levels to an audio meter via a DB-9 connector. The 12 configuration dipswitches on the back of the mixer allow for setting up different on/off button options.

Using unbalanced RCA jacks for connection to control room speakers and an external monitor source can be viewed in two ways: Cost effectiveness on the part of the manufacturer, and/or end-user usability. In the case of the XB-14, providing options for users to interconnect with prosumer grade audio equipment is paramount. Additionally, for example, small powered speakers almost always have unbalanced inputs, and nearly every FM or AM receiver has RCA jacks. In that regard, the XB-14 is a friendly and forward-thinking product. In providing USB in/out, remote interfacing, telephone hybrid ins and outs, and a beautiful mix of unbalanced and balanced ins and outs, the XB-14 will easily find a home where multiple applications and close attention to the budget are necessary.

Wygal is the programmer, engineer and Web designer for Liberty University in Lynchburg, VA.

Editor's note: Field Reports are an exclusive *Radio* magazine feature for radio broadcasters. Each report is prepared by well-qualified staff at a radio station, production facility or consulting company.

These reports are performed by the industry, for the industry. Manufacturer support is limited to providing loan equipment and to aiding the author if requested.

It is the responsibility of *Radio* magazine to publish the results of any device tested, positive or negative. No report should be considered an endorsement or disapproval by *Radio* magazine.

Allen & Heath

P 800-431-2609

W www.allen-heath.com

E info@allen-heath-usa.com

Arrakis ARC-8

by Gil T. Wilson

I think I may have found an actual "radio station in a box." The Arrakis ARC-8 console seems to have it all and is versatile enough to be used from the top engineering professional to the amateur podcaster at home.

This little console has a great look and feel and is easy to use right out of the box. It also comes with a USB connection to hook into any computer for playing or recording. I hooked this up to my laptop with Windows 7 and the device was recognized immediately and all drivers installed without a hitch. Soon I was off and running with limits only bound by my imagination.

The Arrakis ARC-8, a computer, music library and transmitter would be all one would need to run a radio station. The console comes with free Digilink-Xtreme software, which contains a working app for just about any radio station need, automation (with some limits on the free version), production and phone recording. The only bug I ran into when installing the software was that I was using Windows 7, and in Windows 7 the font folder is protected, so you have to manually copy and paste the four fonts used in the Xtreme software into the Windows font folder. That is a Windows issue and not one that could be found as a fault in the Xtreme software.

If a person had limited space or startup capital this handy console would be perfect. It would also be nice to have on-hand for emergencies. The quick power up would get a radio station back on the air with very little time involved in setup.

Performance at a glance

- Single stereo mixing bus
- Mix-minus bus
- Two mic inputs
- USB audio connection I/O
- Includes Digilink-Xtreme software

Flexibility

The versatility of this console is what I found to be most admired. Some potential uses that are perfectly suited for this console are: Remote broadcasts, podcasting, recording studio, mobile DJ service, emergency backup board, or even as the main board for a radio station.

The inputs to the eight channels are simple to use. There are 10 inputs that can be channeled into the eight slide pots. These include a single stereo mixing bus with both balanced and unbalanced inputs; PC USB output of the program bus for recording to a PC; monitor/headphone/cue system with external input for off-air monitoring; cue system autocues with program dimming into the monitor and headphone systems; and balanced mix-minus telco output. The board can also be hooked into a system to turn the on-air light on and off when the microphones are turned on or off. The system also provides talkback for the mix-minus.

Most of the inputs are both RCA and balanced RJ-45 inputs, with the exception of the two XLR inputs for the two mic channels (with optional 48Vdc phantom power), the RJ-45 for telco, and the PC USB with channel eight being used as the PC out. The button to switch channel eight between PC and whatever you have plugged into the RCA jack input is conveniently located on top of the console so you, in actuality could have that extra channel at the push of a button. Another convenient feature is that the headphone jack is 1/8" and not the 1/4" that used to be standard. I call this convenient because anymore headphones are standard with 1/8" jacks and an adapter can be used. Plus, earbuds can be used in a pinch.

USB, too

The ARC-8 contains a built-in, Windows- and Mac-compatible, USB sound card on channel 8B with

USB connection to a PC. Most Windows-compatible audio software can play and record from the console. The Digilink-Xtreme software will recognize the ARC-8 console and operate in the free ARC mode to provide live on-air features ideal for broadcast, Internet or podcast-style radio applications.

One of the tasks I ran this board through was to produce a multitrack recording of a local band. Using the USB connection I ran the board through my laptop using Adobe Audition 3.0. The quality was perfect and the convenience of running the various instruments and microphones through the board made switching between tracks easy. At the beginning of the recording all levels were set, which made multi-track recording easy just by turning on or off each channel – thus turning a laptop into a portable recording studio.

> This console packs a lot into a relatively small package.

This console packs a lot into a relatively small package, weighing in around 10 pounds. Its dimensions are 11.5" (depth), 2" (height) and 18" (width). This could easily fit into a small suitcase/road case.

No matter what use you have with an audio console, the ARC-8 could fill that need and not take up too much space, require an engineer to install every time you use it and be carried anywhere. All this is done without losing any audio quality.

Arrakis Systems

P 970-461-0730

W www.arrakis-systems.com

E arrakis@arrakis-systems.com

Wilson is an announcer, producer, webmaster and promotions guy at WAKO-AM/FM, Lawrenceville, IL.

Editor's note: Field Reports are an exclusive *Radio* magazine feature for radio broadcasters. Each report is prepared by well-qualified staff at a radio station, production facility or consulting company.

These reports are performed by the industry, for the industry. Manufacturer support is limited to providing loan equipment and to aiding the author if requested.

It is the responsibility of *Radio* magazine to publish the results of any device tested, positive or negative. No report should be considered an endorsement or disapproval by *Radio* magazine.

by Erin Shipps, associate editor

Multitrack audio recorder
Sonoma Wire Works

FourTrack: This multitrack audio recorder captures musical ideas and record songs with the iPhone headset mic, or an iPod Touch 2nd Gen (OS 3.0) with a third-party mic and headphones. Everything is recorded at 16-bit, 44.1 kHz quality. Everything from the multi-touch fader, to the spinnable pan wheel was designed with the iPhone in mind. Use FourTrack's Wi-Fi sync to downloaded recordings to any computer with a browser. Load tracks into any recording software to continue working on songs. Or launch RiffWorks to import FourTrack songs complete with pan and gain settings.

www.sonomawireworks.com
info@sonomawireworks.com

Mic pre and DI
True Systems

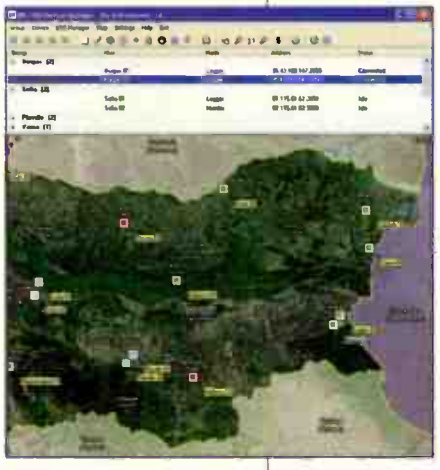
PT2-500: The PT2-500 conforms to the modular 500 Series format. Like all the other preamps in the True Systems family, the PT2-500 delivers detailed analog depth and a robust, reliable design. But the PT2-500 is 500-module sized, so it can work with an existing installation, saving additional power supplies and multiple racks. It features up to 70dB of high-headroom, low-noise microphone gain. Switchable phantom power, 80Hz high-pass filter and polarity reverse give the unit flexibility in a tiny space.

520-721-2735; www.true-systems.com

FM measurement system
Axel Technology

Wolf: Wolf measures and certifies signal alteration and decay through the broadcast path, and reports real-time information and alerts whenever any detected parameters should be under the selected threshold, eventually switching between main and emergency sources. In typical installations a master Wolf unit is placed at the end of the on-air studio audio path, and constantly compares all the signals to the Wolf slave units, situated on each local antenna tower; each local unit performs accurate audio monitoring, and manages complex changeover features both for local and studio audio signals. Wolf also features complete RDS filter/splitting management, built-in RBDS and MPX decoders and a wide range of I/O connections, both analog and digital.

+39 51 736555; www.axeltechnology.com; info@axeltechnology.com



FM radio monitoring receiver
Deva Broadcast

DB4000: DB4000 permanently monitors the quality and continuity of up to 50 FM stations with features such as TCP/IP connectivity, audio streaming and automatic alerts on out-of-predefined ranges in regards with the ITU-R. In case of any faults in the transmission the maintenance staff will be alerted via e-mail or SMS. It allows the monitoring of RDS/RBDS and some other signal parameters from anywhere. With the external Audio Stream Server option you can listen to, skim and record the audio from any station.

+359 56 820027
www.devabroadcast.com
sales@devabroadcast.com

Communication and equipment shelters
Precision Quincy

XP Series: Precision Quincy's line of XP Series Shelters are designed to meet the changing needs of broadcasters. The company offers full service design and engineering along with its line of custom manufactured equipment shelters and cabinets. It guarantees compliance with all codes, programs, specifications and zones. XP shelters are strong but lightweight, and attractive yet low maintenance. They feature many industry-first innovations including "passive ventilation" roof design and a patent-pending super lightweight fire-rated construction. These extra design features allow the XP series to be used virtually anywhere equipment protection is needed.

815-338-2675; www.precisionquincy.com
pqsales@precisionquincy.com

NEW PRODUCTS

Audio converter
NTP Technology

DAD AX24 192 PHD: The DAD AX24 192 PHD is an eight-channel AD/DA audio converter. Available with eight analog inputs or eight analog outputs channels, or both, it is operated via the DADman control application, which runs on Mac OS X and Windows. The application is capable of handling 128 channels and can be automated from Avid Pro Tools, emulating the Avid Pro Tools PRE, or via EuCon for operation from the Euphonix MC-Pro and 5-MC hardware controllers. Sampling rate is 384kHz with DSD at 64 frame/s or 128 frame/s and 352.8kHz DXD.

+45 4453 1188; www.ntp.dk; ntp@ntp.dk

Rack equipment
Argosy Console

Spire: Ancillary rack equipment and monitors are no longer relegated to "less-than-impressive" boxes and stands. Spire solutions protect and display some of your most valued equipment, keeping it well organized and accessible at all times.

800-315-0878; www.argosyconsole.com; nancy@argosyconsole.com

Handheld vector network analyzer
Anritsu

VNA Master: The VNA Master MS2026B is a handheld solution for two-port measurements. It specifically addresses complex cable and antenna measurement needs in the field with accurate, vector corrected two-port magnitude, phase, and distance-to-fault measurements. MS2026B covers a frequency band from 5kHz to 6GHz, which contains a wide variety of radio frequency communications systems. This measurement tool offers the industry's first 12-term error correction algorithm in a handheld VNA. Using a three-receiver architecture, the MS2026B can measure all four S-parameters at once with a single connection to the DUT.

800-ANRITSU; www.us.anritsu.com; us-sales@anritsu.com

GPS controllers
International Tower Lighting (ITL)

RLC-201-GUI, RLC-203-GUI: The RLC-201-GUI Controller provides wireless flash synchronization of AM tower arrays. It features wireless GPS-based flash synchronization, and controls one L-864 LED or incandescent beacon and up to five L-810 LED or incandescent markers. The GPS antenna can be mounted remotely or on the enclosure. Its flash rate is adjustable for 20 or 30FPM, and it features a manual mode control switch, indicator lights for operating mode and flash command, and a built-in fusing for beacon, markers and photoelectric cell (PEC). Alarm relays indicate failure of lamp, flasher, marker, PEC and Power Fail. Mode relay indicates day or night mode operation. 120Vac and 230Vac International versions are available.

615-256-6030; www.itl-llc.com; info@itl-llc.com

NEW PRODUCTS

Nearfield studio monitor
Blue Sky International

SAT 6.5 EXR: The SAT 6.5 EXR is a two-way, bi-amplified, 200W, nearfield, ported studio monitor, featuring two 100W amplifiers, a single 6.5" high-excursion hemispherical woofer, and a 1" dual concentric diaphragm tweeter with integral wave guide for superior off-axis response. It can be used with or without a subwoofer. The rear panel incorporates two completely independent balanced input stages with XLR connectors. The main input is for standard 80Hz bass-managed operation, and makes the SAT 6.5 EXR fully compatible with Blue Sky's SUB 12, SUB 212 and SUB 15 Universal. This input features an 80Hz high-pass network, with phase correction alter. The second Extended Range input is for applications where a sub is impractical, or as a second confidence input.

516-249-1399; www.abluesky.com
info@abluesky.com

Foam acoustic panels
Acoustical Solutions

Sonex Audio Tiles: Sonex Audio Tiles come in a 1' x 1' x 1" size, which allows for the highest level of design and acoustical performance as studios can be treated in the exact points of reflection. They are designed for high frequency noise control in broadcast and recording studios. These low-profile, sound-absorbent foam tiles are available with beveled edges and come in both gray and white. They are also available in a sculpted pattern or flat face finish.

800-782-5742
www.acousticalsolutions.com
info@acousticalsolutions.com

Alert monitor
Enberg Electronics

PC12: The PC12 includes a BA12CTL controller, FN2 ring detect module (which will detect conventional 90Vac ring on two separate lines), licensed software CD and one RS-485/232 adapter to interface with a PC's serial port. The PC12 outputs RS-485 serial data which can be run a very long distance in any environment. Designed to be used with a PC, minimum hardware requirements are a Pentium 3 CPU, 400MHz minimum with 512MB RAM. The software will run on Windows XP sp1, 2000, or later with Dotnet 2.0 framework installed. There is no need to have the PC connect to the Internet. The PC12 has complete user configurable settings for text, font (4 choices), background color, label color, font color and screen size (full or widescreen).

317-683-8792; www.enbergelec.com
info@enbergelec.com

UPGRADES and UPDATES

Studer recently sold several On Air 3000 digital consoles and in the process surpassed the 1,000 mark. (www.studer.ch)... **Steinberg** has released Nuendo 5, which includes several new features, including an ADR toolset, the Clip Packages system, new plug-ins and a range of mixing, routing and automation enhancements. (www.steinberg.net)...**Omnia Audio** has shipped the 5,000th Omnia.One audio processor. (www.omniaaudio.com)... **RCS** has released GSelector 3.15.1, Updating the program architecture, third-party tools and reporting. (www.rcsworks.com) ■

NEW PRODUCTS

Telephone hybrid
Glensound Electronics

Copper 29: The Copper 29 digital hybrid, part of the Atomic Range of products, uses a two-pass, twin DSP process, giving a dedicated device-to-echo cancellation, with mix-minus generation. The second DSP takes care of the further processes of the compressor/limiter, automatic gain control (AGC), band pass filters and auto ducking. The result is an audio signal with better than -80dB of separation. A CPLD device is utilized to manage sample rate conversion to remove any unwanted delay, and a voice optimized DAA ensures compatibility with worldwide impedance matching. Auto answer is included as a selectable option, and the inputs and outputs are available as balanced analog or AES3. Due to modern facility control systems, the maximum control level was implemented with 8Vdc loops for control of multiple functions, and full control via RS-232.

+44 1622 753662; www.glensound.co.uk; sales@glensound.co.uk

DVB satellite receivers
viaRadio

DSR Series: Manufactured in Germany, the DSR series decodes DVB-S and S2 with the latest high-efficiency codecs including MPEG 1 and MPEG 2 (Layer 1, 2, 3) MPEG2/4 AAC LC, HE v1 and v2, and AC3, making it possible to deliver broadcast quality audio over a 128Ksym channel. The 1RU box has no moving parts and features two sets of AES/EBU and balanced stereo audio outputs. It can decode both channels at once in digital or analog with a very short, stable and programmable delay. Control signals or data such as RDS or PAD can be output via serial ports or using the Ethernet port to control up to eight different IP devices. There are seven relay outputs on the box. The DSR also supports up to 8GB of professional-grade flash storage for store and forward of satellite or IP delivered audio, conditional access decryption and audio input and output via IP.

321-242-0001; www.viaradio.com; sales@viaradio.com

Direct play remote
Tascam

RC-SS20: The Tascam RC-SS20 is a direct play remote for its lineup of solid-state recorders. Compatible with the new SS-R1, SS-CDR1 and HD-R1, the RC-SS20 provides 20 buttons to begin instant playback. The self-illuminating keys and load button are ideal for use with the Flash Start feature on the SS-R1 and SS-CDR1, whether triggering sound effects, music cues, announcements or other sounds.

323-726-0303; www.tascam.com; tascamlit@tascam.com

- Modular Operation in Op-X allows for a tiered system at a fraction of the cost of it's 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.

Op-X
RADIO AUTOMATION

AUTOMATION

SIMPLE • POWERFUL • REDUNDANT

Not since Axia audio-over-IP *was introduced to the broadcast industry have we at BGS been so excited! It is with great enthusiasm we'd like to invite you to take a look at the new Op-X Radio Automation delivery system for any single or multi-station cluster. Op-X's versatility allows it to operate seamlessly with either Axia IP-Audio networks or legacy audio consoles.*

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

Workstation
Custom Consoles

EditOne: A key feature of EditOne is its compact shipping size. It has a 2.3 x 1.03m footprint including a profiled horizontal work surface with an optional dual 2RU desktop pod. A 13RU-high equipment bay supports the left half of the desk which is set forward at a 15 degree angle for easy access. The equipment bay includes space for a tower PC. Fully integrated cable management allows wiring to be routed easily throughout the desk structure as well as enabling easy connection to external equipment and breakout boxes. The equipment bay is well ventilated and provides easy equipment access from front or rear.

44 1525 379909; www.customconsoles.co.uk

Two-channel Cobranet interface
AudioScience

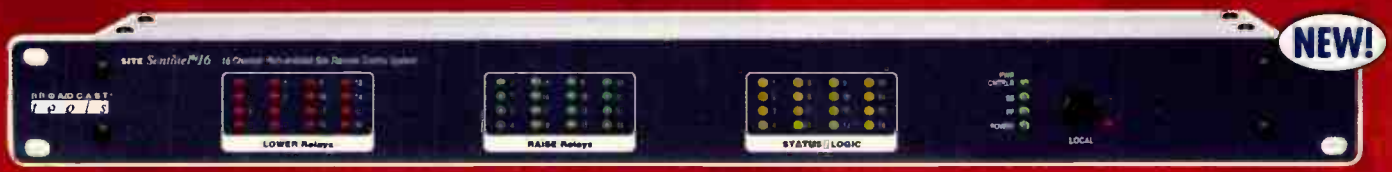
ASI2202: The ASI2202 is a professional CobraNet card using the Cirrus Logic technology for streaming audio over Ethernet. The ASI2202 provides two channels of CobraNet receive and transmit and can be connected to any CobraNet-compliant device. AudioScience provides ASIControl, an application that allows CobraNet routing connections to be set up between the ASI2202 and any other compliant CobraNet device on the network. CobraNet Discovery can also be used for routing connections.

302-324-5333; www.audioscience.com; soles@audioscience.com

Site Control

WVRC-8 Web-enabled and Voice Dial-up Eight Channel Remote Control

The WVRC-8 provides a cost-effective, one rack-unit solution for web based and/or recordable voice response dial-up transmitter site control. Each analog, status, silence sensor, temperature sensor and power failure input can be configured to dial-out and/or email up to four individual email addresses.



Site *Sentinel®* *16* Web-enabled Sixteen Channel Site Remote Control System

WVRC-4 Web-enabled and Voice Dial-up Four Channel Remote Control

The WVRC-4 provides a cost-effective, half-rack solution for web based and/or recordable voice response dial-up transmitter site control.

Site *Sentinel®* *4* Web-enabled Four Channel Site Remote Control System

I/O *Sentinel®* *4*
Web-enabled Four logic/status input, four relay output module

Relay *Sentinel®*
Web-enabled three relay module

Schedule *Sentinel®*
Web-enabled Event Scheduler

Status *Sentinel®*
Web-enabled three status/logic module

Status *Sentinel®* *16*
Web-enabled Sixteen-input status/logic module

Relay *Sentinel®* *16*
Web-enabled Sixteen open collector/SS relay module

WebSwitch
Remote Power Switch

VAD-2 Plus
Dual channel Voice alarm Dialer

The tinyTOOLS VAD-2 Plus is a user programmable dual status input multi-number voice/pager auto diaer with integrated stereo silence sensor, temperature sensor and power failure port designed fordial out paging and/or voice message notification.

AUDIO *Sentinel™*
Web-enabled dual channel stereo silence monitor

The Audio Sentinel™ is a web based dual channel stereo silence monitor combined with a transparent, integrated audio switcher. Designed to monitor two balanced or unbalanced independent stereo analog audio sources.

USA Proud

BROADCAST tools

www.broadcasttools.com

PROBLEM SOLVED

Audio disc authoring
Minnetonka Audio Software

discWelder Bronze 1000m: DiscWelder Bronze 1000m produces DVD-audio, DVD-video and compact discs from high-resolution stereo audio files. It duplicates any DVD-audio content into a disc's video zone, creating universal titles that play on any DVD system. In creating the mirrored video layer, it will preserve the original sample rates of stereo files up to 96kHz. This provides much better fidelity and offers extended playing time. 192kHz source files are sample rate converted to 96kHz. DiscWelder Bronze 1000m also allows users to burn DVD-Audio discs with gapless playback of up to 192kHz/24-bit stereo mixes. It can also down-sample high resolution files and create compact discs within the same authoring project.

612-449-6481; www.minnetonkaaudio.com
info@minnetonkaaudio.com

Fanless embedded computer
Sealevel

Relio R5200: Sealevel's Relio R5200 embedded computer offers a wealth of I/O features with the benefits of solid-state operation with no fans or other moving parts. The computer is powered by a 2.2GHz Intel Core 2 Duo CPU designed to run fanless up to 45 degrees C. The compact chassis has expansion slots for one PCI Express X16 and one full-height PCI card. The system supports up to 4GB of DDR2 667MHz RAM. An optional 2.5" solid-state SATA hard drive can be integrated and preloaded with Microsoft Windows or Windows Embedded operating systems. Linux is also supported.

864-843-4343; www.sealevel.com
sales@sealevel.com

CLASSIFIEDS

FOR SALE

INVITATION TO BID SALE OF SURPLUS STUDIO & MASTER CONTROL EQUIPMENT by
FLORIDA GULF COAST UNIVERSITY
OFFICE OF PROCUREMENT SERVICES
10501 FGCU Blvd South • Fort Myers, FL 33965-6565

Competitive sealed bids will be received by the Office of Procurement Services for:
Invitation to Bid: 10M-S-2 – Sale of Surplus Studio & Master Control Equipment
Opening Date and Time: October 12, 2010 at 2:00 p.m. ET
Bid becomes available for pick-up or on web: September 9, 2010

An Invitation to Bid may be obtained by going to our website **http://www.fgcu.edu/AS/Purchasing/current-bids.html** or by calling Procurement Services at (239) 590-1130. The Office of Procurement Services reserves the right to reject any or all bids.

Americans with Disability Act of 1990 – If special accommodations are needed in order to attend the bid opening, contact the Office of Adaptive Services at (239) 590-7956 prior to the scheduled bid opening date and time.

Radio®
THE RADIO TECHNOLOGY LEADER

www.RadioMagOnline.com • radio@penton.com

Editor – Chriss Scherer, CPBE CBNT, *chriss.scherer@penton.com*
Associate Editor – Erin Shipps, *erin.shipps@penton com*
Senior Art Director – Michael J. Knust, *mike.knust@penton.com*
Senior Digital Content Specialist – Brad Erpelding, *brad.erpelding@penton.com*

Technicol Consultants
contact them via radia@penton com
Harry C. Martin, *Legal*
Kevin McNamara, *Computers and Networks*
Mark Krieger, CBT, *IBOC*
Jeremy Ruck, P.E , *RF and Transmission*
Russ Berger, *Broadcast Acoustics*

Contributors
Doug Irwin, CPBE AMD; Chris Wygal, CBRE; John Battison, P.E.

Group Publisher – Wayne Madden, *wayne madden@penton.com*
Associate Publisher – Steven Bell, *steven.bell@penton com*
Senior Marketing Manager – Kim Davidson, *kim.davidson@penton com*
Marketing Coordinator – Crystal Shires, *crystal shires@penton.com*
Chief Information Officer – Jasmine Alexander, *jasmine.alexander@penton.com*
Director of Production – Patricia Kowalczewski, *patricia.kowalczewski@penton.com*
Group Production Manager – Jocelyn Hartzog, *jocelyn.hartzog@penton.com*
Production Manager – Kathy Daniels, *kathy.daniels@penton.com*
Contracts Specialist/Order Entry – Tina Miller, *tina.miller@penton.com*
Lead Client Services Coordinator – Terra Maples, *terra.maples@penton.com*
Classified Ad Coordinator – Sarah Maxey, *sarah.maxey@penton.com*
Electronic Prepress – Becky Grady, *becky.grady@penton.com*
Audience Marketing Director – Marie Evans, *marie.evans@penton.com*
Audience Marketing Manager – Kris Cunningham, *kristi.cunningham@penton.com*

MEMBER ORGANIZATIONS
Sustaining Member of:
• Audio Engineering Society
• Society of Broadcast Engineers
Member, American Business Media, The Missouri Association of Publishers

missouri association of publications

A PENTON MEDIA PUBLICATION

Penton Media

Penton Media, Inc.
249 West 17th Street
New York, NY 10011

Chief Executive Officer – Sharon Rowlands, *sharon.rowlands@penton.com*

SUBSCRIPTIONS: Free and controlled circulation to qualified subscribers. Non-qualified readers may subscribe at the following rates (subject to change): USA and Canada one-year subscription (12 issues) $66. Outside the USA and Canada $83. To subscribe or change your address online, please visit: http://subscribe radiomagonline.com. Customer Service can be reached at: radio@pbinews com or by calling 866-505-7173 or 847-763-9504 or write us at Radio Magazine, PO Box 2100, Skokie, IL 60076-7800, USA. Back issues are available for $10 each by calling Customer Service.

POSTMASTER: Send address changes to Radio, P.O. Box 2100, Skokie, IL 60076-7800 USA.

ARCHIVES & MICROFORM: This magazine is available for research and retrieval of selected archived articles from leading electronic databases and online search services, including Factiva, LexisNexis, and Proquest. For microform availability, contact National Archive Publishing Company at 800-521-0600 or 734-761-4700, or search the Serials in Microform listings at napubco.com.

REPRINTS: Contact FosteReprints to purchase quality custom reprints or e-prints of articles appearing in this publication at 866-436-8366 (219-879-8366 outside the U.S and Canada). Instant reprints and permissions may be purchased directly from our website; look for the RSiCopyright tag appended to the end of each article.

PHOTOCOPIES: Authorization to photocopy articles for internal corporate, personal, or instructional use may be obtained from the Copyright Clearance Center (CCC) at 978-750-8400 Obtain further information at copyright.com.

PRIVACY POLICY: Your privacy is a priority to us. For a detailed policy statement about privacy and information dissemination practices related to Penton Media, Inc. products, please visit our website at penton.com.

EDITORIAL and BUSINESS OFFICE: Penton Media, Inc. 9800 Metcalf, Overland Park, KS, 66212, 913-341-1300; RadioMagOnline.com, penton.com.

List Rental Services
Marie Briganti
MeritDirect
Phone: 877-796-6947
E-mail: mbriganti@meritdirect.com

Editorial Reprints
Diane Mason – Penton Reprints
Phone: 877-763-2303
Website: www.pentonreprints.com
E-mail: diane.mason@penton.com

Sales Offices

Associate Publisher
Steven Bell
Phone: 913-967-7221; Fax: 913-514-6848
E-mail: steven.bell@penton.com

Europe/UK
Richard Woolley
Phone: +44 1295 278 407
Fax: +44 1295 278 408
E-mail: richardwoolley@btclick.com

Classified Advertising
Julie Dahlstrom
Phone: 312-840-8436; Fax: 312-595-1983
E-mail: julie.dahlstrom@penton.com

Online Sales & Marketing
Angie Gates
Phone: 913-967-7516; Fax: 913-514-7516
E-mail: angie.gates@penton.com

Contributor Pro-file

Meet the professionals who write for *Radio* magazine. This month: RF Engineering, page 10.

Jeremy Ruck
Senior Engineer
D.L. Markley and Associates
Peoria, IL

Ruck joined D.L. Markley and Associates in 1989. He graduated from Bradley University with a bachelor of science in electrical engineering degree. While at Bradley, Ruck specialized in RF and transmission lines, high voltage power systems and control theory, and served as the chairman of the student branch of the IEEE. He is a registered professional engineer in the state of Illinois.

He began writing the RF Engineering column in 2010.

Radio
THE RADIO TECHNOLOGY LEADER

Written by radio professionals
Written for radio professionals

Radio, Volume 16, Number 9, ISSN 1542-0620 is published monthly and mailed free to qualified recipients by Penton Media, Inc. 9800 Metcalf, Overland Park, KS 66212-2216 (www.penton.com). Canadian Post Publications Mail Agreement No. 40612608. Canada return address: Bleuchip International, P.O. Box 25542, London, ON N6C 6B2. Additional resources, including subscription request forms and an editorial calendar are available online at www.RadioMagOnline.com. To order single copies call 866-505-7173 or 402-505-7173.

ADVERTISER INDEX

This index is a service to readers. Every effort is made to ensure accuracy, but *Radio* magazine cannot assume responsibility for errors or omissions.

by Erin Shipps, associate editor

That was then

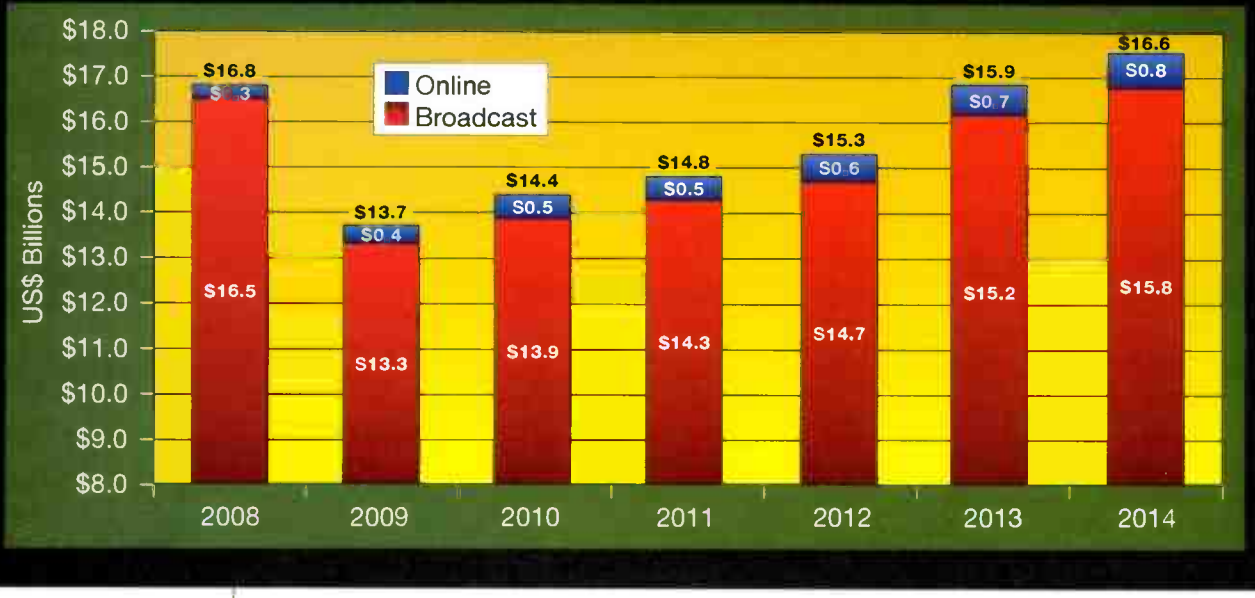
As part of the website re-launch of Stories from the Golden Age (www.goldenagestories.com), book publishing company Galaxy Press has created its own radio station that will feature unabridged, multicast audiobooks of pulp fiction short stories and books written by author L. Ron Hubbard in the 1930s and 1940s, for free. In addition to the Golden Age Radio, several eBooks and audiobooks written by the author are also being offered for free. The free eBook and audiobook downloads are part of an ongoing effort to educate general readers on pulp fiction stories written in the 1920s, 1930s and 1940s.

Visit www.goldenagestories.com and click on Golden Age Radio on the right or click any of the categories on the left-hand side to browse other audio books to play on the multicast stream.

Sample and Hold

Radio Revenue Growth

BIA/Kelsey reports, "The radio industry will see its over-the-air revenues in 2010 climb 4.4 percent over last year to $13.93 billion, with another $459.3 million in revenues coming from digital and online sources." This uptick, reported in the third edition of BIA/Kelsey's quarterly *Investing In Radio Market Report*, comes from collective increases across the country in the various radio markets. According to the report, top 10 market cities will average a 6.26 percent increase, while a number of cities in scattered markets will hit 7.5 percent or greater. Markets 11 to 25 will raise an average of 4.05 percent.



Source: BIA/Kelsey

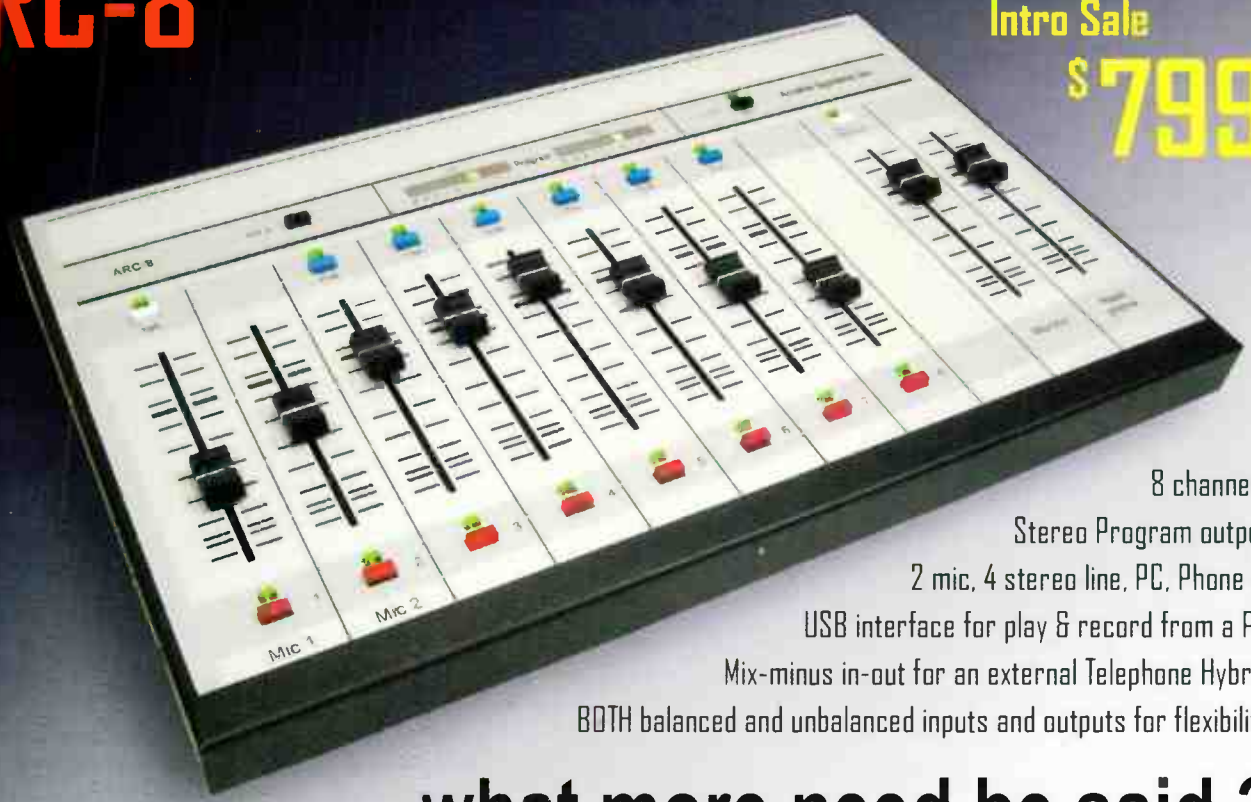
NEW

full featured, professional consoles at amazing prices from ARRAKIS

ARC-8

Intro Sale

$799



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

...what more need be said ?

other members of the ARC family...

$1,599
ARC-10U

$3,495
ARC-15BP

$5,495
MARC-15-12

www.arrakis-systems.com 970.461.0730

FIVE MARKETS OVER 40 STATIONS ONE NETWORK:

WHEATNET-BRIDGE TDM

For Entravision, with multiple stations in multiple markets, a network with flexible functionality and reliability is key to maintaining the strongest on-air presence with absolutely no downtime. Listeners depend on Entravision for content tailored to each community as well as demographically relevant programming across the grid. Wheatstone's WheatNet-Bridge TDM systems make it possible to keep such a network up and running around the clock.

Entravision currently has Wheatstone TDM systems in 5 of their markets –including Los Angeles where 27 surfaces provide programming for their eight Los Angeles area transmitter sites and seven satellite uplink networks.

Rick Hunt, Vice President and Director of Radio Engineering at Entravision Communications Corporation knows that taking chances with unproven or ad-hoc technology simply isn't feasible – that the ultimate cost of using less than the best can be detrimental not only to day-to-day operations but to their overall success.

"Entravision prides itself on delivering the highest quality content and programming to our loyal base of radio and television audiences, and we rely on the Wheatstone system as an important piece of our broadcast equipment. The system is versatile, easy to manage and one of the most advanced pieces of technology on the market. It also delivers an unmatched level of consistancy, ensuring that our systems operate the same way regardless of size or location."

You do your best to create and maintain a successful business. Wheatstone designs and builds its networking systems, whether TDM or IP based, right here in the USA. Wheatstone knows that your programming, network and content are mission-critical, and that failure is not an option. Don't leave it to chance - choosing Wheatstone can only ensure your efforts are rewarded... continuously.

Give us a call or visit us on the web to learn more - we'd love to hear from you.

Rick Hunt, Vice President and Director of Radio Engineering at Entravision Communications Corporation, with one of their Wheatstone G5 consoles.

Wheatstone

AUDIO NETWORKING-SIMPLY EVOLVED

phone 1.252.638-7000 | www.wheatstone.com | sales@wheatstone.com