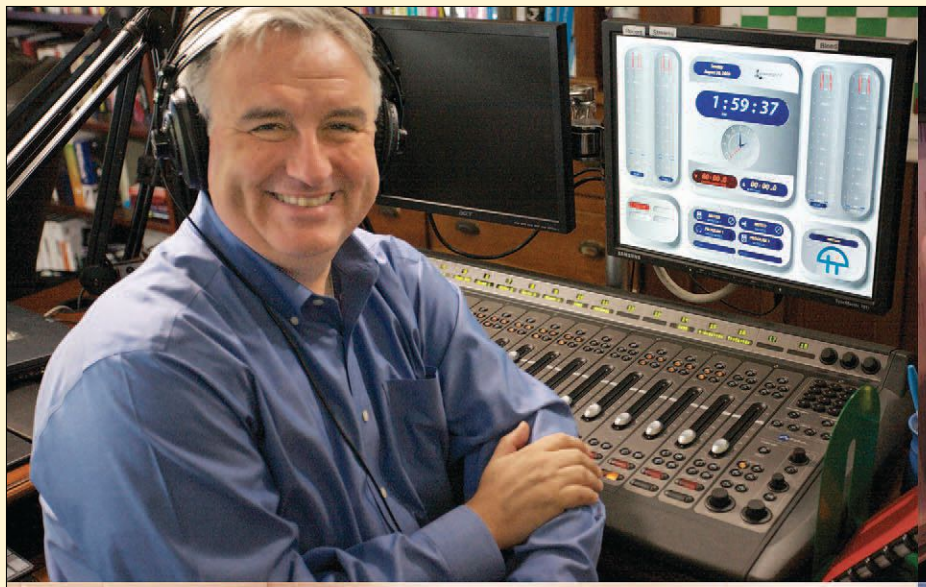
Radio Guide

www.radio-guide.com

Digital Issue Now On-Line

July-August 2012 – Vol. 20, No. 4

Axia Audio: A Decade of Making Connections



www.RadioGearGuide.com

New Product Information, Updates, and Radio Services

The latest new product releases, product updates, and special discounts. New, and on-line now! ***www.RadioGearGuide.com***

RADIO GUIDE www.radio-guide.com

View this issue of *Radio Guide* on-line, or choose from our archive of back issues. Read, search, or print - easy! ***www.Radio-Guide.com***

Inovonics RDS/RBDS Encoders:

Next generation branding and messaging.

Models starting at **$590**

INOVONICS BROADCAST

WHEN YOU NEED SOLUTIONS FOR BROADCAST AND PRO AUDIO, HENRY ENGINEERING MAKES ALL THE DIFFERENCE...

POWER, LOGIC CONTROL

POWERSWITCH
A "failsafe" AC power controller, switches to "Back-up" equipment if "Main" equipment fails. Ideal for use with Arbitron PPM™ encoders, will switch to backup PPM™ encoder if main encoder fails.

SUPERELAY
An interface for control of "On The Air" warning lights and utility switching from tally circuit of a broadcast console or switcher.

LOGICONVERTER
A utility control interface provides isolation and compatibility between logic and control circuits. 4 opto-isolated inputs control 4 isolated SPDT relay outputs. Great for TV camera tally lights.

MIXING

SIXMIX
The SixMix USB Broadcast Console is a full-featured professional radio station audio mixer. Its 10 inputs accommodate 2 mics, plus 7 stereo Line sources, and include an integral A/D + D/A digital audio codec with a USB computer interface.

STEREOMIXER
An 8-input, 2-output stereo mixer for line level signals. Operates in Stereo, mixing 4 stereo sources to stereo output, or in Mono, mixing all 8 inputs to mono output.

MICROMIXER
A 4-input, 2-output stereo mixer for line level signals. Micro-Assign switches permit routing any input to either Left, Right, or both outputs. Adjustable mix level for each input.

DISTRIBUTION, ANALOG & DIGITAL

DIGIMATCH 2X6
2-input, 6-output digital audio interface converts between AES/EBU and SPDIF signals. Also functions as a digital audio distribution amplifier, providing 3 AES/EBU and 3 SPDIF outputs from an AES/EBU and/or SPDIF input(s).

USDA 2X4
Utility Summing and Distribution Amplifier for line level signals has 2 inputs, 4 outputs (2 stereo pairs). Independent outputs can operate in stereo and/or mono. Adjustable output levels.

PATCHBOX II
Stereo Output Multiplier distributes the output of a stereo mixer to 6 balanced and 6 unbalanced loads. Feed DAT, cassette decks, processing gear, PA system, etc. without a distribution amp or patchbay.

AUDIO INTERFACE, ANALOG & DIGITAL

THE MATCHBOX HD
The industry's most used level and impedance converter. Converts unbalanced -10 dBv "consumer" audio to professional +4 dBm balanced lines. 4 channels for bi-directional conversion of inputs and outputs.

USB MATCHBOX II
An ultra high performance USB-to-XLR digital interface for analog and digital audio systems.

TWINMATCH
Dual-stereo (4 channel) level and impedance converter for 2 stereo "play only" sources. Converts -10 dBv outputs to professional +4 dBm balanced lines.

MULTIPORT
MultiPort is a multi-format digital and analog interface panel that provides convenient access to studio inputs and outputs.

HEADPHONE SYSTEMS

NEW!

TALENT POD
Gives talent control of their mic and headphones. Mic On/Off, Cough buttons, plus mixing for Local and Return headphone audio. Perfect for remotes and studios.

MULTIPHONES II
The MultiPhones Distributed Headphones System provides headphone listening facilities for multiple users.

MULTIPHONES MINI POD
A compact stereo headphone amplifier that can be used with MultiPhones II Master unit, or by itself as a "stand alone" headphone listening station.

SWITCHING

AUTOSWITCH
AutoSwitch is a silence sensor and automatic stereo switcher. It switches to Backup audio if Main audio fails or loses a channel.

STEREOSWITCH II
3-input, 1-output stereo audio switcher/router. Ideal as studio switcher or line selector. Can operate "in reverse" as a router, sending a source to 1 of 3 destinations. Relay switching adds no noise or distortion.

METERING

NEW!

STEREO AUDIO MONITOR (SAM)
SAM uses two Single Stereo Displays to show the levels, balance, and phase of stereo audio. Left and Right levels are displayed on a large arc of tri-color LEDs, with Sum and Difference components shown on a second tri-color display.

WE BUILD SOLUTIONS. DIGITAL SOLUTIONS. ANALOG SOLUTIONS. FUNCTIONAL. RELIABLE. AFFORDABLE.

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

HENRY ENGINEERING

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

AUDIOARTS

FLEXIBLE. AFFORDABLE. BUILT TO LAST.

modular design + ease of use + value = enlightenment

The IP-12's modern, modular design moves all audio, logic and control outside the control surface and into a single rackspace audio interface/mix engine (called a BLADE). This gives you much greater mixing/processing capabilities as well as the ability to cost-effectively add on incredible functionality (more audio sources, automation feeds, STL capabilities, multi-channel processing, more consoles, etc). And, if you've already got the WheatNet-IP Intelligent Network, it fits right in.

Speaking of modular design, the IP-12's construction is exactly that. Need to replace a channel? Two screws and a connector is all it takes. Got automation? IP-12 is hardware-ready. We offer a software driver that works seamlessly with the most popular automation platforms to give you control right from the console!

And here's how easy it is to set up the new IP-12 console: Unbox it. Plug it in. You're ready to go. But don't let its simple setup fool you. It's one very powerful little console...

Ready for enlightenment? Contact your Audioarts dealer, give us a call or visit us on the web today to learn more about the power, flexibility and affordability of the IP-12.

IP-12
PLUG & PLAY POWER

MODULAR WHEATNET-IP NETWORKABLE CONSOLE

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

Made in the USA

Radio Guide

Contents

July-August 2012

Cover Story – *Axia Audio* 6
A Decade of Making Connections

Studio Site 8
Playing the "Field" With Your iPhone or Android

Transmitter Site 10
Transmitter Site Tips for Techies - Part 3

Xtreme Engineering 12
One Smokin' Radio Station

FCC Focus 14
Don't Forget About EEO – The FCC Hasn't!

Disaster Preparedness 16
Is Your Staff Really Ready?

Safety and Security 18
EAS CAP for Dummies

Operations Guide 22
Audit Your Phone Lines

Chief Engineer 26
FM Antenna Patch

Practical Engineering 30
Good Studio Grounds Are a Good Investment

Tips From the Field 34
Software Upgrades - Soldering Iron - Tower Light Outage

Tips From the Field 36
Rice Saves the Day - FCC Inspection "Insurance"

LPFM Guide 38
Spinning the FM Broadcast Signal

Small Market Guide 42
Aliens in Small Marketville

Service Guide . . . . . 44 & 45
Radio Equipment, Products, and Services

Gear Guide - *New Equipment* 46
DM Engineering - ENCO Systems - Omnia Audio

Final Stage 47
Convention, and Event Register – Advertiser Information

Radio Guide

Volume 20 – Issue 4

Radio Guide Website: **www.radio-guide.com**

PO Box 20975, Sedona, AZ 86341
Phone: 928-284-3700 • Fax: 866-728-5764
Ray Topp *(publisher)* – radio@rconnect.com
Ernie Belanger *(editor)* – editorial@radio-guide.com

Radio Guide, ISSN 1061-7027, is published bi-monthly, six times a year, by Media Magazines Inc., PO Box 20975, Sedona, AZ 86341. Radio Guide is copyright 2012, Media Magazines Inc., and may not be copied, reproduced, or stored in any format, without the written permission of the publisher.

Radio Waves

by Ray Topp – Publisher

In This Issue

• Using the ubiquitous iPhone, there's no reason why you can't deliver high quality field reports. George Zahn shows us how, in *Studio Site.*

• In *Transmitter Site,* Tom Bosscher continues to deliver helpful hints. Learn how to use inexpensive instrument amplifiers to solve difficult transmitter metering problems.

• There are alternatives to a traditional tower-mounted FM antennas. Steve Callahan describes a unique smoke stack install in *Xtreme Engineering.*

• The FCC will be examining station EEO procedures more than ever. A few pointers from Peter Gutmann, in *FCC Focus,* will help keep your EEO program current.

• EAS, IPAWS, CAP ... oh my! Jeff Johnson sorts it all out for us in *Safety and Security.*

• Unused phone lines cost money. Most stations can benefit from an audit of all telco lines and services. In *Operations Guide,* Chris Tarr shows us how.

• In *Chief Engineer,* Scott Schmeling shows us that ugly can be beautiful – especially when saving $1,700. Occasionaly, FM bay lightning damage can be repaired yourself.

• Good studio grounding is always a priority. Steve Callahan shows us it can be a good investment as well, in *Practical Engineering.*

Remember to send in your tech tips. We pay $25 for each one we publish.

– Ray Topp, Publisher

AM Ground Systems Co.
www.amgroundsystems.com
1-877-766-2999
eng@amgroundsystems.com

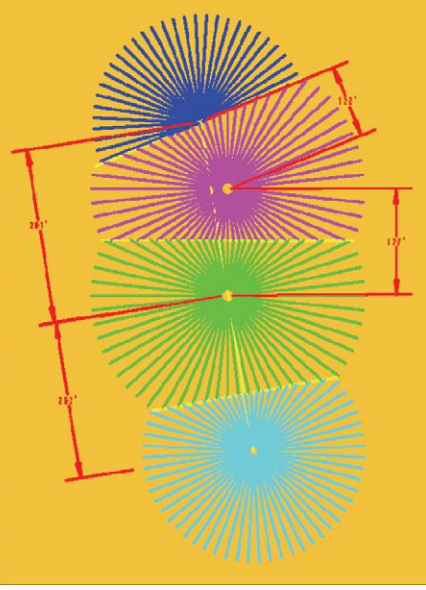
PHYSICAL
AM SITE SERVICES
CONSTRUCTION
EVALUATION
REPAIR
SAMPLE, FEED & CONTROL LINE LOCATION, REPLACEMENT & REPAIR
MOM MODELING PREPARATION WORK

SERVING THE TECHNICAL AND CONSTRUCTION NEEDS OF AM BROADCASTERS FOR OVER 25 YEARS

- Has your AM station lost coverage?
- Is your AM ground system over 30 years old?
- Has your ground system been damaged or vandalized?
- Base impedance or DA pattern unstable?
- Dramatic system or range changes in wet-to-dry conditions?

All of the above are indicators of hidden ground system problems that may be reducing your coverage.

SAMPLE TOROID RETROFIT SOLUTIONS
AND
SAMPLE LINE REPLACEMENT
FOR
METHOD-OF-MOMENTS DA PROOFING



Contact us today for a no obligation quote on any of our services.
877-766-2999
eng@amgroundsystems.com

WE EASILY ACCOMMODATE
COMPRESSED
TIME-LINE PROJECTS.

Reliable, On-time Installation
Firm Quotes
Quality Workmanship

THIS CODEC HAS BEEN THROUGH TWO WARS, MULTIPLE ELECTIONS, FLOODS, FAMINE, EARTHQUAKES, HURRICANES, MARATHONS, CHAMPIONSHIP GAMES, REGATTAS, LOTS OF CONCERTS AND WAY TOO MANY CLUB EVENTS TO ADMIT.

IP • 3G • Wi Fi • 4G • BGAN / VSAT • PSTN • DSL

ACCESS 2USB

NOW, WITH 4G COMPATIBILITY, WHERE WILL *YOU* TAKE IT?

TELL US HOW YOU USE YOUR ACCESS AND WE'LL POST IT AT OUR ROAD WARRIOR BLOG:
remotes.comrex.com

comrex.com

COMREX

19 Pine Road, Devens, MA 01434 USA Tel: 978-784-1776 • Fax: 978-784-1717 • Toll Free: 800-237-1776 • e-mail: info@comrex.com

Upgrade your ACCESS Classic to support 4G – FREE! Visit www.comrex.com/support/products/access.html

Cover Story

Axia Audio

A Decade of Making Connections

by Ernie Belanger with Clark Novak

This year represents a big milestone in the history of Axia Audio, the networked-audio division of Telos. 2012 is Axia's 10th anniversary.

Today, IP-Audio networking technology is so universally accepted that it seems like broadcasters have been building studios with it forever. But really, it was just a few short years ago that the thought of broadcast gear communicating via Ethernet was a radical idea to most engineers.

The Networking Revolution

By the late 1990's, personal computers were fairly well established as business tools, and data networking was an everyday activity. The computer and networking industry had been pouring R&D money into stable, reliable data networking technology, and a large selection of hubs, routers, cables and interface cards was available. The technology had matured – networking a group of office computers was so easy that anyone with a little tech savvy could do it.

Radio stations were using networks too – in the office. But in the studios, it was still the same old tangle of wire, mish-mosh of XLR, RCA, TRS and other assorted connectors, and expensive bundled audio cables snaking through the ceilings.

"Computers and routing switchers were becoming an essential part of the broadcast studio," recalls Axia President Michael "Catfish" Dosch, "and I'd been thinking about how useful it would be to combine the console, router, and computer network. What if the playout system could actually 'talk' to the console and share information about what song was playing? Why couldn't the phone system and the mixer connect intelligently, so that when talent took phone calls to air, the proper mix-minus was automatically generated and fed to the caller? Computerization made it possible, so why not?"

Church Also Intrigued by the Idea.

Steve Church, the founder of Telos and the innovator who'd introduced digital phone hybrids and ISDN codecs to radio, shared the same thoughts about using computers in radio studios. He saw the potential for devices that could interact, sharing data, control and audio as digital information, and using the same networking infrastructure as business computer systems.

In October, 2000, Church wrote a technical document that outlined a completely new approach to building audio infrastructure for a modern radio broadcast facility, based on standard Ethernet/IP-based protocols and off-the-shelf data network equipment. This outline contained what would become "Livewire," the immensely successful standards-based audio-over-Ethernet system for broadcast. Dosch immediately began assembling a team to turn the theory into reality.

Making It Work

In October of 2000, Dosch's Livewire team, comprised of a number of highly skilled software and data networking experts at the Real-Time Systems laboratory located at the University of Latvia in Riga. As a former Soviet communications center, Riga, was blessed with a large number of DSP and audio experts – the perfect combination for such an exercise.

The team began by examining various performance aspects of the Linux operating system and switched Ethernet, followed by hours of experiments. These resulted in CPU's Operating System and Ethernet throughput estimates, multicast and QoS behavior test reports, network packet latency distribution graphs at different conditions, and more. Gints Linis, now a project manager for Axia but, at the time, a Research Associate with the University of Latvia's Institute of Mathematics and Computer Science's Department of Real-Time Systems, was the man picked to head the Livewire development effort.

"The results were very promising," says Linis. "What had been research, began quickly transforming into software design outlines and pieces of working code. A lab demo of a fully working Livewire link was set up in June of 2001, and we began two years of intensive work devoted to bringing Livewire to broadcasters. We built prototypes of a networked mixing console, a mixing engine, and several types of audio I/O devices, as well as designed and implemented intelligent and user-friendly software."

Team Axia in 2003

Dosch and his team spent the next months perfecting the new system, writing software, designing hardware, and getting ready to debut their brainchild to the broadcasting world. Livewire made its "stealth" proof-of-concept debut in 2002, as the backbone that connected all the equipment in the Telos - Omnia display at NAB ... but it wouldn't come into public view until 12 months later.

Introducing IP-Audio

In April, 2003, the years of dedicated teamwork and engineering resulted in the public introduction of Axia Livewire IP-Audio at the NAB convention in Las Vegas. "What a show that was," remembers Axia marketing manager Clark Novak. "We expected engineers to tell us that Livewire would never work, but almost to a man, they all agreed that this was a great idea. Thing was, they all wanted someone else to try it out first!"

"We spent the next year eating airline food and sleeping in hotel beds," says Dosch. "We showed people how broadcast equipment could network, sharing audio and information, via a tremendously reduced wiring infrastructure. Savvy broadcasters saw the light, and we began to gain momentum. Suddenly, the routing system was a part of the console. Computer playout systems plugged right into the network. Talent could easily share audio and logic between distant studios, or even other buildings. It was a sea change from the old, hard-wired way things had been done before, and it cost less, too!" he concluded.

The first U.S. Axia installation, a digital snake, went on-air in late 2003; Auburn University's WEGL built the first complete studios shortly after.

The gigantic Axia installation at New York's WOR in 2005 sent measurable ripples through the broadcast engineering world. This wasn't some science experiment; it was big-time radio. Minnesota Public Radio's large-scale St. Paul Headquarters make-over in 2006 served notice that Axia networking was the way of the future. During the next years a number of other highly reputable broadcasters chose Axia Livewire too – Clear Channel, RTL, Univision, Southern California Public Radio, and more. At the same time, many smaller private and public stations in the USA, Canada, South America, Europe, India, China, Australia, and other countries around the world, adopted the new system.

Steady Growth

The steady growth of Axia AoIP didn't go unnoticed by other equipment manufacturers, who quickly realized the value of making their products connect directly with the growing AoIP community. ENCO Systems was the first, followed by many other software and hardware manufacturers, covering a wide product range that grew to include consoles, sound cards, codecs, various processing devices and playout systems. In 2010, Nautel Ltd. announced the Axia Livewire AoIP interface would be included into one of their transmitter product lines – the "missing link" that finally made possible an all-AoIP broadcast chain.

In 2009, Radio Free Europe/Radio Liberty – one of the world's biggest and most reputable broadcasters – went on air with 50 networked Axia Livewire studios from its new facility in Prague, in the Czech Republic. As of this writing, Livewire broadcast consoles and technology power over 3,000 studios around the world, making Axia the pre–eminent name in IP-Audio networking,

What's Next?

From a single networked control surface and a handful of IP-Audio interfaces in 2003, the Axia product line has grown to include a half-dozen console designs in sizes from 4 to 40 faders, a series of advanced, integrated console engines with zero-configuration Ethernet switches built in, sophisticated routing automation hardware and software suites, a custom-built Telos phone system with a single-cable console connection via IP, and the world's only IP-Audio broadcast intercom system.

From the beginning, Axia's vision of the future has been that all broadcast equipment, from any manufacturer, will one day connect to any other equipment. And, with the recent announcement of the partnership between Axia Livewire and ALC NetworX' RAVENNA protocol, that vision's reality has come a whole lot closer.

"To speed the adoption of studio networking, Axia has always welcomed partners," says Dosch. "In fact, we've even opened up the specifications, schematics and protocol documents for Livewire to broadcast manufacturers. There are now more than 40 companies, like Nautel, AudioScience, Telos and RCS, who make hardware and software products that connect seamlessly to Axia networks via Ethernet."

For IP-Audio to continue to grow more valuable, there must be an increasing number of networked broadcast devices – which is where RAVENNA comes in. In 2007, ALC NetworX, launched by the well-known German console maker Lawo, announced the RAVENNA networking protocol. It, too, gained prominence and established a network of partners anchored by respected European manufacturers such as Genelec, Neumann, AEQ and AETA.

"It didn't take long for the engineers behind Livewire and RAVENNA to realize that what both of us were doing was very similar," says Dosch. "Both are standards-based open technology platforms. Both share core philosophies and a desire for broadcasters to have equipment that goes together easily, works seamlessly, and increases efficiency. Both have established clients and partner networks. Partnering with each other to increase the number of devices that broadcasters can connect to was a natural next step."

The first RAVENNA-compliant devices – Axia xNodes, the latest in the company's family of AoIP interfaces – are here now, and Axia plans to add more new RAVENNA-compliant devices over the next few years. The company will also implement RAVENNA-compatible mode in all existing Livewire devices via simple software updates; all Axia products will be compatible by the end of 2012.

"RAVENNA and Livewire are the two leading protocols in broadcasting. Together, we have more than 60 technology partners whose devices interconnect. Our collaboration paves the way for products from both groups to inter-operate, giving broadcasters more choices," says Dosch.

"After all, the value of a network increases exponentially with the number of devices that connect to it." notes Dosch. With more than 3,000 Axia consoles and 25,000 Axia-connected devices now in the field, it's clear that broadcasters agree.

For more information about Audio over IP and the entire line of Axia audio products contact Axia Audio at their Cleveland , Ohio Headquarters–just down the street from the Rock and Roll Hall of Fame. Call216-241-1125, visit their web site at www.axiaaudio.com,

Introducing the

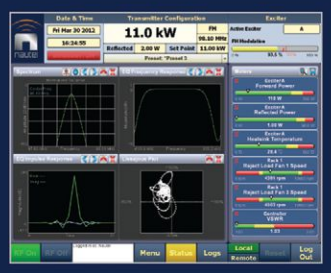
NV LT Series

3.5 – 10 kW Analog FM

Proven NV Series Architecture
Outstanding Efficiency
Exceptional Value
Intelligent Features

COOL STUFF AWARD
RADIOWORLD
2012

Integrated Digital Exciter



AUI Control System

Backup Audio

orban

PUSHRADIO™

Nautel PhoneHome

icecast

NULLSOFT SHOUTcast

Streaming Input

Livewire

IP Audio

Even MORE

RDS generator
Audio spectrum analyzer
Powerful presets
Scheduler
Instrumentation
Play lists

EXPECT MORE

Meet the new NV LT Series for analog FM broadcasting. Based on the proven NV Series architecture, they're built tough with integrated exciter(s) and parallel power amplifiers, power modules and switching power supplies. Unmatched Nautel control helps you save time, trips and money. Add the highest efficiency in their class and the result is unprecedented value.

Videos, webinar and more at

Nautel.com/NVLT

nautel

Playing the "Field" With Your iPhone or Android

Alternatives to Portable Digital Recorders

by George Zahn

In recent issues, I've discussed the possibility of recording, editing, and transmitting programs and news reports from our smart phones. On the other hand, solid state portable recorders from companies such as Tascam, Zoom, Sony, Alesis, Marantz, and others, give us the ability to record digitally in studio or in the field. Some even do basic editing, but they lack smart phone's easy connectivity for filing field reports or transferring files.

Even some of the better portable digital recorders have had the limitations of limited frequency response on the built-in microphones. It seems the greatest limiting factor for the field production of these portable recorders, and especially our Smartphones, is the manufacturer-supplied microphone. My experience with a number of the portable digital recorders is that the on-board microphones, though very convenient and often able to be arrayed in a number of stereo or even quad recording configurations, tend to be lacking in low end (bass) response.

A Bass-Less Argument

If you're equalizing a field recording in the studio, that limitation may be fixable, provided there is enough bass captured in the recording. In past issues, we covered the possibility of plugging in an external mic. Many of the lower end portable recorders have a mini stereo jack for an external microphone input. In making a proper XLR to mini TRS cable, you will need to look at the specs on the individual recorder. However, it is possible to create a viable adapter that will allow connection of a standard pro microphone to the portable recorder.

One other issue that's been highlighted on some portable recorders is that when using a dynamic external microphone, the input level is marginal at best. Keep in mind that on a $200-$300 all-in-one recorder, you're not going to get the equivalent of two to four mic elements which are close to top professional quality. Likewise, any external mic preamplifier may be limited, at best. Solid input levels a must in order to mask the noisier preamps.

For portable recorders, one away around the low input level issue is to use a self-powered condenser microphone (not all portable recorders provide phantom power). The small boost given by the condenser microphone's amplifier gives enough "umph" to push past the limitations of the recorder's preamp. It is also possible, of course, to use external stereo microphones with these portable recorders.

What's Up, Dock?

Yet when it comes to smart phones as field recorders, we haven't had many options other than the standard microphone built into the phone, which is most likely built to handle voice-only communication. There are apps that can turn Android or iPhones® into editors, but other than a studio-design balanced interface for the iPad® (the iO Dock by Alesis) there have been few, if any options to get a solid professional microphone input into a Smartphone.

At some point, we have all encountered Tieline products for codec, STL, or other transmission applications, but the company has "quietly" had a product out that allows for professional microphone connection to an iPhone. Rolling out an iPhone microphone adapter is an ideal follow up for a company that also has its own editing app and field filing service it calls "Report IT."

Tieline claims that the Tieline Mic Adapter, microphone interface, which can be used with an iPhone 4®, has the full fidelity low end that is lacking on many portable field recorders, cell phone microphones and wireless microphone options for cell and Smartphones.

The Tieline Mic Adapter

Tieline had introduced its application, which allowed reporters and field producers to gather and edit information in the field. Now they offer a finished package, with a high fidelity, bidirectional link through the iPhone, back to the studio, so that a reporter can be live on mic and insert actualities or natural sound live.

This is not to disrespect Smartphone manufacturers. Their goal is basic intelligibility, and despite the old ads that claim "you can hear a pin drop," cell phone microphones are going to pretty much ignore anything below 200 Hz and above 4 kHz – basically covering the range where the majority of our normal speaking tones reside. If you try to use that mic to capture music or booming natural sound, good luck. Imagine listening to concert over a standard phone line, or worse. Youch!

Getting Connected

The Tieline Mic Adapter has a professional XLR input and two headphone outputs for use with the bidirectional Report IT app. The iPhone adapter, Tieline claims, will be effective from 20 Hz on up, with solid performance on mid and high frequency ranges as well. An iPhone 4 clips into the adapter, which also features the option to turn Automatic Gain Control (AGC) on and off which is a nice option in recording on the fly.

The Tieline adapter offers a few other features that help to make it a field, or even an auxiliary studio, recorder. There is microphone gain control, and the entire device is self-powered by batteries. Tieline also boasts a USB power input connection that helps to keep its heart, the iPhone 4, charged during lengthy broadcast use.

The widespread availability of the predictable quality iPhone makes it a solid choice for such an adapter, but there's another reason why we likely haven't seen such a device for our Android phones. The multiplicity of Android phone licensees (each with their own design and features) creates a moving target for developers seeking to meet the needs of the marketplace. There's just one iPhone design – one set of jacks and inputs always in the same location – so it's not surprising to find this adapter for iPhone first.

Android Coming Along

There are other editing apps out there for Android, but the Tieline Report IT app can also be downloaded for Android phones. For "down and dirty" field recording and editing, a reporter can record, edit with some limited apps, and even e-mail the final report, evading the dropout pitfalls of the digital cell phone domain.

The Tieline service allows for use of an Internet Protocol (IP) codec that is designed for 15 kHz live two-way interviews. It also allows for filing reports via an FTP without a codec. For freelancers, they offer an iPhone or Android Report IT "Lite" package that's free, but with limited capacity of an hour or two of live interface time and FTP filing of up to two reports. Hours of live interface after the minimum are charged on an hourly basis.

For larger producers, stations, and newsrooms, there are packages that include Report IT Live and Report IT Live Pro which include much larger time and filing limits, or no limits in some cases. Any of these services can be used with or without the Tieline mic adapter.

The digital recording landscape has been changing quickly and will likely continue to grow at an almost logarithmic rate. Many of the new Smartphones hitting the market now have built-in HDMI output for excellent audio and video output. Adapters are readily available at electronics outlets to take that HDMI output and convert it to a basic stereo RCA output, to interface in a studio setting. It seems only a matter of time before we have pro audio inputs as a standard feature on higher quality phones.

Do you have a success story or question concerning portable recording or the use of devices such as these new technologies in the studio or in the field? Let us know! What are the new technology areas that you're most interested in from a studio perspective?

George Zahn is a Peabody Award winning radio producer and Station Manager for WMKV-FM at maple Knoll Communities in Springdale, Ohio. He is a regular contributor to ***Radio Guide*** *and welcomes your feedback. Share your stories with others by sending ideas and comments to gzahn@mkcommunities.org*

If you're trying to make it all add up, we suggest the new Optimod math.

5 Band + 2 Band + 5 Band Ultra Low Latency Processing + Stand Alone Stereo Encoder = 1 Affordable Price

OPTIMOD 5500

Competitive Optimod sound in a compact package at the most affordable price ever.

orban
www.orban.com

CONTACT SCMS for ORBAN products

N.C. Corp Office: Mike, Matt, Ernie, Chuck or Bob... **800-438-6040** www.scmsinc.com

Bob Mayben	**877-391-2650**	Mid-South	Bernie O'Brien	**731-695-1714**	Central
Art White	**770-632-1295**	South-Atlantic	Pam Leffler	**513-376-8600**	North Central
Jim Peck	**315-623-7655**	North-East	Mary Schnelle	**513-899-3036**	Mid-West
Doug Tharp	**818-398-7314**	West Coast	Lily Massari	**760-650-1427**	Latin America
Ric Goldstein	**877-640-8205**	Pro Audio	Art Reed / Bob Eburg	**800-732-7665**	Bradley Div.
Andy Cole	**866-205-6905**	Southern Gulf			

SCMS INC.
YOU KNOW WE KNOW RADIO

36 years of BROADCAST EQUIPMENT SOLUTIONS

Transmitter Site Tips for Techies - *Part 3*

by Tom Bosscher

These new solid state transmitters are great – built in web browsers, Ethernet connectivity. Yet, when you have a new 20 kW FM transmitter, one would like to have a confidence monitor of what is going on. A staple of a solid FM plant is an external RF wattmeter. Again, there are nice new ones that have Ethernet outputs and isolated analog outputs, but many of us have the older analog power meters that have been in the plant for a while – still in-line to the antenna. These are great for when you are at the transmitter site, but it would be nice to have an output to feed the remote control.

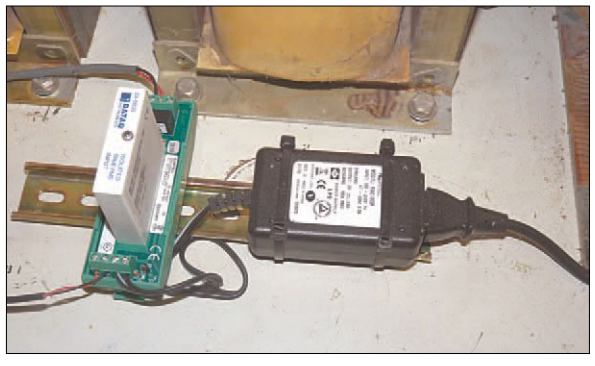
The problem is Ohms Law. Most of the higher power meters are 100 microamp movements, with an internal resistance of around 2500 ohms. That means full scale is only around 250 mV. Connected to most remote controls, that is too low to have enough resolution. We need to bump that level up – cleanly, and accurately.

Enter the Dataq DI-5B series of industrial amplifiers. Take a look at www.dataq.com/.

For our purposes, the DI-5B30-03 will take a 100 mV input and give you 5 VDC out. This module has an input resistance of 50 Meg-ohms, so this will never load down a circuit driving a 2500 Ohm meter. You will need to use some high quality, 1 and 3 Meg-ohm resistors to knock the 250 mV down to less than 100 mV. Then you can feed the 5 VDC amplifier output to your typical remote control.

You can buy a DI-5B04 (two module holder), then add a DI-BEFE unit, and two DI-XSE units. Add a DI-5B-PS 5VDC power supply, and you are good to go. The accesory modules are all less than $65 each, and the amplifier module is $150.

Dataq also supplies modules that have true RMS inputs for precise AC voltage measurement. I use the 300 VAC full scale unit (DI-5B33-05) to monitor the primary of filament transformers. I then calibrate the remote control reading to a temporary, handheld true RMS DVM hanging across the actual filament connections – right on the tube socket (the transmitter is *NOT* on the air during this!)

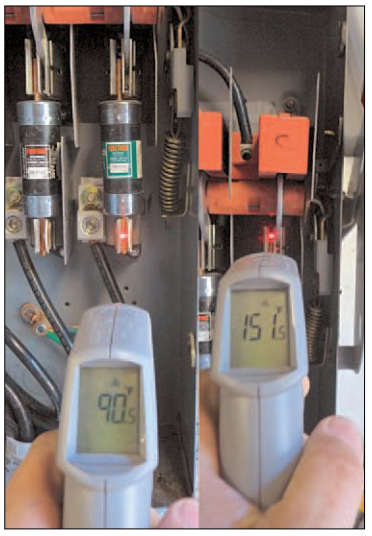


A Dataq module installed in a Harris 3.5K, used to monitor the filament voltage.

Your remote control will now give you a much more accurate reading and tracking than any transmitter front panel meter. The AC modules run about $ 240. I also use these to monitor incoming utility and generator AC voltage to the remote control.

If you have a Continental 816, you are aware that the plate current sample is across two terminal points. Since most remote controls are single ended, we all end up just tapping one of those pins. With this transmitter, we now are monitoring both the plate with screen current, and true tracking of the plate current is not possible. If you put in a Dataq Model DI-5B31-02, it can connect to these two pins. The input pins are completely isolated and floating from the output, so this module will give you a true reading to your remote control as to what is across the two driving pins.

You may have heard about having an infrared thermometer as a piece of test gear. Take a look at this picture of the fused disconnect switch at one of my transmitter sites. The bottom blade of the fuse was 60 degrees less than the top one. In this case, the switch was simply defective, and needed to be replaced. When you are using one of these probes, slowly check all the hardware, lug nuts, the wire itself – and all parts of the switch and the fuse holder. The test unit shown is the Raytek RAYMT4U, and the cost is low enough that I carry one in my tool bag in the car.



Brush Off the Lightning

Wish to protect your smaller towers at the studio and your satellite dishes from lightning? You can buy many static drain products from many very good companies, but take a trip to Grainger and pick up a pair of their part #3EDN1 brushes.

Add a few parts from the hardware store, and you can have a dual bleeder as shown.

While these were designed to clean out the inside of pipes, this stainless steel brush has several hundred sharp points to bleed off the charged air around your tower. These devices do wear out, due to the constant discharging and dulling of the sharp points. You'll need to replace them every few years or so.

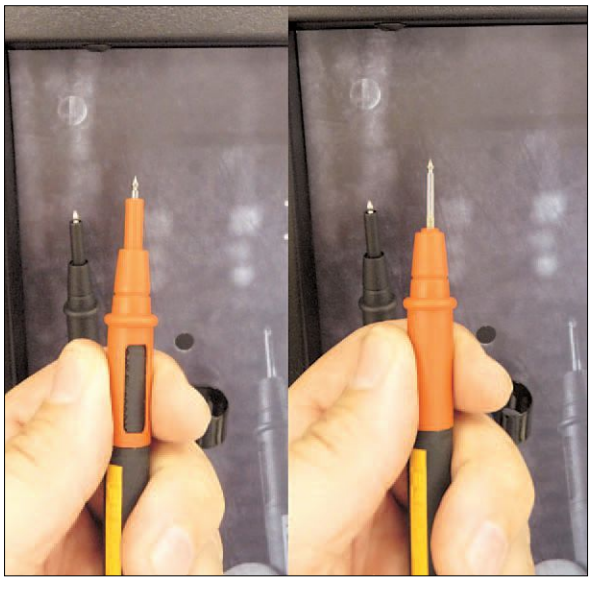
Do you have a security light at your transmitter site? Put an AC relay across the photocell relay contacts, and wire the contacts of this relay in series with the contacts of an additional relay that is in parallel with the lamp. Now, if the lamp is smashed by vandals, you will get an alarm. Many times, thieves will darken a facility to see if anyone notices, and then come back in a few days. This gives you a leg up on them.

Speaking of alarms, what does yours do when it is triggered at the transmitter site? Most alarms properly dial a central monitoring station, the studio – or you. But with a little thinking, you just might scare the thieves away. When the alarm is triggered, have that drive a 30 to 60 second delay.

"Your Time is Up"

That would then trip a fifty dollar voice announce card. No siren sounds, just a calm voice sating: *"Your presence was detected 30 seconds ago, and confirmation has been received from the sheriff's department. Please stay in the building for proper accounting."* I also had a friend that hard wired into the building interior and exterior lights, and flashed them on and off when the alarm was tripped – the wall switch had no affect

Fluke has introduced a clever set of probes, that have a shroud that you can adjust up and down to expose more and less of the probe. This has to help with the slippery finger syndrome at 3:00 AM, when you are trying to measure voltages on adjacent sets of terminals carrying 240 VAC.



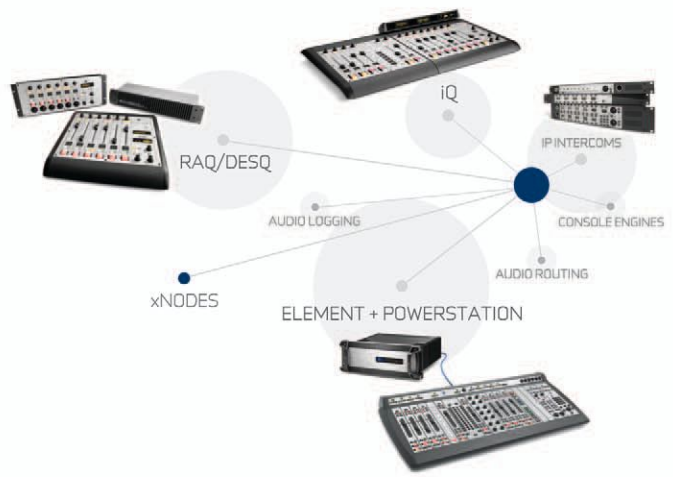
Fluke TL175 TwistGuard™ test leads, with adjustable length test tips.

And finally, if you share a transmitter building with anyone, install a simple wired doorbell, with an appropriately loud buzzer. You might wish to embellish this with a passive infrared detector (PIR) that is always active. This way, if someone walks up to your building at night, or your buddy is stopping by, they can ring the doorbell, or be announced by the PIR detector. This is really nice, compared to having someone walk into the building and scaring you while you are measuring voltages on adjacent sets of pins carrying ... 240 VAC!

Tom Bosscher is the Chief Engineer at Cornerstone University Radio. Email him at: tom@bosscher.org

MEET THE NEW AXIA xNODES!

IP-AUDIO JUST GOT AN UPGRADE.



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

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

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

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

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

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

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

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

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

RJ45 OR DB-25? xNodes give you I/O both ways, so you can choose whichever industry-standard breakout cable you prefer.

XNODES ARE SMALL. Mount them on your wall, under the counter — mount 'em on the ceiling if you like. Optional rack- and wall-mount kits provide plenty of options.

CONFIDENCE METERS on every xNode mean you'll never have to wonder where the audio's at. Audio presence and levels are both displayed at a glance.

INFORMATION OVERLOAD? Not here. Sharp, high-rez OLED displays put all the information you need right on the front panel, without the need for a distracting multi-colored lightshow.

xNODES WORK WITH BOTH LIVEWIRE AND RAVENNA AoIP networks — making them compatible with IP-Audio gear from over 40 major broadcast companies.

Livewire RAVENNA

NO NOISY FANS HERE. Front-mounted heat sink keeps xNodes calm, cool and collected using air-conditioned studio air (instead of that hot air in the back of the rack).

FAST, ONE-BUTTON SETUP. Hit the switch and plug 'em in — your xNodes will be streaming audio in under 30 seconds.

DUAL ETHERNET PORTS for redundant network links. The overnight jock kicks out a connection? No problem; the other one takes over so your programming never skips a beat.

xNODES HAVE AUTORANGING INTERNAL POWER SUPPLIES, but can use PoE (Power over Ethernet) too. Perfect for those out-of-the-way places where a power cable is inconvenient. Hook 'em both up for redundant, auto-switching backup power.

VERY VERSATILE. 5 different xNodes handle nearly any signal type. AES/EBU, Analog, Microphone and GPIO xNodes are perfect when you've got a lot of one audio type to work with. But what if you need a little of everything? This is the Mixed Signal xNode. Think of it as your utility MVP, with a switchable Mic/line input, 2 dedicated analog ins, 3 analog outs, a digital AES/EBU input and output, and 2 GPIO logic ports.

MONO OR STEREO ROUTING. Choose from 8-in, 8-out mono operation or 4-in, 4-out stereo. Both signals intermix seamlessly on your Axia network.

TWO xNODES MOUNT SIDE-BY-SIDE, so you can create your own custom mix of I/O types within a single rack space. Pair up an AES/EBU xNode with a microphone xNode, or match a GPIO xNode with an analog unit. Or combine a couple of Mixed Signal xNodes for the ultimate mix of mic, analog, AES3, Analog and logic I/O.

NOT AT THE OFFICE? No problem; built-in webserver lets you manage an xNode from anywhere. Or, use Axia iProbe software to manage your entire facility – back-up and restore settings, automatically update software and more.

AxiaAudio.com/xNodes

Axia Audio, a member of The Telos Alliance™. ©TLS Corp. 2012.
RAVENNA™ ALC NetworX GmbH

Xtreme Engineering

By Steve Callahan

One Smokin' Radio Station

"Stacking" an LPFM Antenna

We all automatically assume that a radio station always needs a tower to broadcast from. Well, that isn't absolutely true because an "antenna support" structure could be several things. In my area, one licensee has recently been successful getting FM stations licensed with antennas mounted in trees instead of towers. Sometimes, you just have to get creative.

I personally like to travel by train from Boston to New York City and you get to see a lot more that way than if you're flying over or fighting the traffic on the interstate. In Bridgeport, Connecticut I have always been fascinated by the multi-bay FM antenna which is located on a large smokestack. It always seemed to me to be an excellent solution for a potential FM antenna location which had no available tower or chance of building a tower. However, it also looked harder to get the antenna up there, mount it properly, and then maintain it on a smokestack, than on a regular lattice tower.

In Rhode Island, I knew of an LPFM that was struggling to get a good signal and better serve it's listeners.

WSUB-LP, Ashaway, RI started off with a single bay antenna on the roof of a house, but coverage from there was limited by a lack of height. When a co-channel station in New York improved it's facility, that forced WSUB-LP to try to find a new frequency to operate on. Fortunately, they found a new and better frequency but, as it is with most LPFM's in heavily-populated radio markets, the acceptable area-to-locate for their antenna was a thin sliver of real estate.

Previous WSUB-LP location on a two-way radio tower.

With the frequency change came a move to a short, two-way style tower behind a nearby gas station. The site move was a step in the right direction, but I always thought they could have done better. When the gas station went out of business, it was time to look for a third tower site for WSUB-LP. I took a very close look at the area-to-locate study that Skywaves Consulting did for them and I remembered that there was a smokestack inside the acceptable area. If a smokestack had worked as an FM antenna support structure in Bridgeport, why wouldn't it work in Rhode Island?

Recently, I had some experience with smokestacks and radio stations. I worked at a directional AM that was right across the street from a smokestack that was going to be home to several cell antennas.

You have to remember that most smokestacks were built many decades ago, and they were built to convey smoke upward, not to support thousands of pounds of antennas. The stress of torque presented by a side-mounted antenna in high winds was never considered when the smokestack was originally constructed. However, cell companies have looked to smokestacks for years as a way to fill in their urban coverage without having to permit and build a new tower. A careful structural analysis of a potential smokestack is critical and mandatory for a successful installation.

Back at WSUB-LP, I looked at the smokestack and saw that there was a "porch" structure located about half-way up. It looked to me like the owners of the factory with the smokestack had, at one time, been amenable to locating a cell site half-way up the stack. There wasn't a cell antenna there now, but a non-commercial FM had just located on the porch.

WSUB-LP's antenna at top of smokestack.

One negative about locating an FM antenna on a smokestack is that you have a large mass directly behind the antenna. You also have to keep an eye out for metal ladders, lightning rods and vertical grounding wires. Since an LPFM is by name and nature low power, we needed to mount the antenna where the stack structure would least affect the signal, but would yield the best altitude and non-directionality possible.

It was decided to mount the single bay antenna on a short pipe just above the top rim of the stack. The next problem was how to mount the support pipe to the stack. Drilling into the red brick of a stack, especially an older stack, wouldn't be the best solution.

The tower crew visited the site and found that there was a side mounted ladder that ran the entire height of the stack. They also found that there were metal bands around the stack and they could mount the vertical support pipe at the two metal bands that circled the stack at the top. Problem solved!

The tower crew was well experienced in working on towers of all sizes and on cell monopoles. However, they related to me that working on a smokestack had its unique challenges. They found that some of the ladder mountings to the stack were loose and needed repairs – which they did first. With a stack, it's impossible to "belt off" around it like you would a lattice-type tower. When on the top of the stack, they said it was a very strange to be standing on the narrow lip of a working smokestack while looking backward toward the ground and forward into the black abyss of the stack.

However, despite the challenges, the tower crew did a great job of drilling and mounting the vertical pipe to the bands, mounting the antenna, and then running the transmission line down the ladder to the roof of the factory. A horizontal run across the roof of the factory was needed to get to a small room that the factory had allocated to house the transmission equipment for the stack-mounted antennas. Street-level access and an outside door to the equipment room made it easy to deliver the transmitter and rack that WSUB-LP would need at it's new home.

WSUB-LP Station Manager Chris DiPaolo (left) and Chief Operator Steve Conti (right).

WSUB-LP's Chief Operator Steve Conti and Station Manager Chris Dipaolo moved the equipment from the old two way radio tower location to the new equipment room at the factory and hooked everything up. It's always a good feeling when you move a transmitter to a new location and it powers right up as it should. It wasn't long before the calls from listeners started coming in congratulating them on the new, and much larger, coverage area.

This arrangement is truly a win-win for both the factory, which is realizing some revenue from their smokestack, and WSUB-LP, whose listeners are enjoying some much improved coverage. The next time you have to move an FM, take a look around and see what else is available that would make a good antenna support structure. You just might find a smokestack in need of an antenna.

To reach Skywaves Consulting, call them at 201-248-5620 or dave@skywaves.com

Steve Callahan is the owner of WVBF, 1530 AM, Middleboro, Mass. and may be reached at wvbf1530@yahoo.com

MT-MR Platinum STL System

Why the MT-MR Platinum?

-For its **excellent quality-price** value.

-For its **adjustable transmission power** output from 0 to 20W for any selected operational frequency.

-For its **double conversion receiver** that makes it apt for **digital codification** (Up to 4 audio channels).

-For being **digitally synthesized** in 20 MHz operational band for frequencies from 150 MHz to 960 MHz.

-For the fact that **both the transmitter and receiver can measure the modulation percentage and pilot signal level** (19 KHz stereo without disconnecting the audio from the transmitter).

-For its **remote control**.

-For its **analog telemetry**.

-For being made for **mono or stereo (MPX) signal**.

-For its **capability to work with AC power voltage from 90 to 250 V, 50/60 Hz**, and also with external battery if needed.

OMB, the Future of Communication

OMB AMERICA
phone. (305) 477-0973
(305) 477-0974
fax. (305) 477-0611

3100 NW 72nd. Ave. Unit 112
MIAMI, Florida 33122 USA
http://www.omb.com
usa@omb.com

Don't Forget About EEO The FCC Hasn't!

by Peter Gutmann

Now that the FCC's current Equal Employment Opportunity rules have been in effect for a decade, FCC staff has indicated that they plan to scrutinize broadcasters' EEO performance more severely than in the past.

All broadcasters are required to avoid discrimination on the basis of race, color, national origin and gender. A station is exempt from the FCC's formal EEO requirements only if its "employment unit" (comprising all commonly-owned stations in a market with at least one shared employee) has a staff of less than five full-time personnel. Even in the absence of complaints, all others face at least two opportunities for FCC analysis of their EEO programs – at license renewal and during random audits.

Note that while religious broadcasters are permitted to establish religious belief or affiliation as a qualification for all station jobs, they are still required to comply with the other formal elements of the FCC's EEO program.

One of the most important recent developments concerns the extent of reliance upon internal and Internet referral sources.

Procedures Must be Publicized

Current EEO procedures require that all full-time positions be widely publicized so as to notify and attract applicants from throughout a station's service area. Rather than specifically targeting minorities and women as in the past, the theory behind the present regulatory scheme is that if all interested job-seekers are able to learn of openings then they will have an equal opportunity for employment.

In order to advise potential applicants of job availability, many stations tend to rely primarily on their own on-air announcements, employee word-of-mouth referrals, bulletin board postings and websites. That certainly seems logical – surely folks interested in broadcasting would tend to listen to local stations, and job-seekers would leave few proverbial stones unturned, including the Internet, the medium by which most personal communications are now sent.

Indeed, stations tend to prize walk-ins quite highly for similar reasons – anyone taking the initiative to find a job that may not even exist would seem to be highly motivated and worth keeping in mind when a position were to open at some point in the future. Tangible expressions of such enthusiasm signal an attitude that employers cherish.

Yet, the Commission regards these sources as non-public, in the sense that they are not necessarily targeted to the entire community. The Commission specifically cites the continuing "digital divide" that excludes those without ready access to the web.

Additional Means Must be Used

So while these internal and electronic resources may be used as part of a recruitment program, the Commission requires that they be supplemented with other means calculated to reach all segments of the general public, such as newspaper advertisements, partnering with local service organizations, speaking engagements at schools and presence at job fairs and community events.

Admittedly, some of the logic behind this distinction seems increasingly weak. For example, far more people of all economic strata rely upon the Internet and social media nowadays than read classified ads in newspapers. Indeed, most libraries have more computer stations than copies of local newspapers. Broadcasters understandably resent the need to buy ads in newspapers, which they regard as forced support of competitors. Nonetheless, it is important to recognize and abide by the FCC's current perspective.

Substantial Fines Imposed

Earlier this year the FCC gave notice of its future treatment of such situations when it imposed substantial fines and EEO reporting conditions upon the renewals of eleven stations. Notably, the penalized stations had not placed exclusive reliance upon websites and private sources to recruit for most of their positions. Rather, they did so only for a few of their full-time openings.

In that regard, it is worth emphasizing that the FCC expects stations to follow formal recruitment procedures for nearly every full-time opening. The primary exception – and this should be very rare – is when immediate replacement is needed for an essential employee whose duties cannot be filled, even briefly, by other staff. Internal promotions can also be made without formal recruitment, so long as the full procedures had been followed at the time of the initial hire.

An important part of an FCC EEO audit as well as the EEO portion of a license renewal application is a narrative statement discussing how an employment unit achieved broad outreach and explaining any difficulties. Implicit in this requirement is a commitment to remedy any shortfalls. Ongoing efforts to interest local recruitment sources are apt to help deflect Commission concern over lapses.

At the outset of the current regime of EEO requirements, stations were encouraged to seek out local referral sources by placing ads to solicit interest and making direct contact with agencies and organizations that might be able to refer qualified candidates that would be interested in receiving notifications of job openings. Indeed, the annual public file EEO report requires identification of sources that requested notification, and a complete absence of such sources could suggest inadequate efforts to locate and alert them.

Lack of Positive Response

In response to initial efforts to stimulate interest among local organizations many broadcasters were dismayed at the dearth – and in some cases complete absence – of positive responses. Some stations have engaged in periodic efforts to update potentially productive recruitment sources. For others, in light of the profound social changes the last decade has brought in most communities, it may be opportune to undertake a further effort to find new sources among currently-active local organizations.

A related area of potential concern that stations often overlook is the need to conduct on-going or periodic analysis of the effectiveness of their EEO programs. Former EEO rules assessed success on the basis of minorities and women present in a station's workforce, both overall and in the "upper four" job categories of officials and managers, professionals, sales workers and technicians. Under the current scheme, achievement is far more abstract and requires evaluation of whether a sufficiently broad segment of potential applicants has been attracted on a consistent basis for all full-time openings. In the past, relatively simple statements of overall satisfaction seemed to pass muster, but it is unclear whether they will suffice in the future. Rather, the FCC may look for credible indications of efforts to expand local recruitment sources, both in terms of meaningful evaluation of the reach of current efforts and actions to address shortcomings or problems.

Another area of likely scrutiny of EEO performance involves required outreach activities. Depending upon market size and location, every employment unit is required to engage in two or four activities every two years. The FCC affords substantial flexibility in fashioning activities that a specific unit finds most effective in light of the demographics of its listenership, so long as they are reasonably calculated to promote and disseminate information concerning broadcast employment opportunities. A common oversight involves job fairs, conventions, career days, workshops and comparable events – hosting or sponsoring such activities counts as a full initiative, but merely participating counts as only 1/4 of an activity.

It is also essential to document all efforts undertaken to expand recruitment efforts and to broaden the reach of a station's publicity of job openings. This would include copies of ads or insertion orders, as well as emails, faxes and other written communication with recruitment sources. Indeed, EEO audits (and staff inquiries in the context of renewal analyses) routinely ask for such material.

While minimal amounts of documentation have passed muster up to now, the FCC EEO staff has strongly suggested that greater future emphasis is likely to be placed on thorough record-keeping. It is equally important to track the results of contacts with recruitment sources, as the statistics required for the annual public file EEO report includes the number of persons interviewed who were referred by each source. Those statistics, in turn, may indicate sources that may need to be replaced or supplemented with more productive ones.

So keep your EEO program fresh – and document it well.

Peter Gutmann is a partner in the Washington, DC office of the law firm of Womble Carlyle Sandridge & Rice, LLP. He specializes in broadcast regulation and transactions. His email is: pgutmann@wcsr.com

CUT COSTS.
NOT CORNERS.

SAS
SIERRA AUTOMATED SYSTEMS

The M-Class Audio Console System is engineered for streamlined operation with an elegant ergonomic layout at a very attractive price. **Available in sizes from 8 to 24 input fader channels** the M-Class is suitable **for single and multi studio applications.** Networked or stand alone, the M-Class console is in operation in many markets, small and large.

Proudly designed and manufactured in the USA, the M-Class delivers the features and robustness you expect from SAS' experience of almost 25 years. You'll be pleasantly surprised; cutting costs doesn't mean you have to cut corners.

Give us a call to find out how!

SAS
SIERRA AUTOMATED SYSTEMS

20 years of listening. 20 years of innovation.

See more at sasaudio.com

818.840.6749 • www.sasaudio.com

Disaster Preparedness

Is Your Staff *Really* Ready?

by Ernie Belanger – editorial@radio-guide.com

I was watching TV the other night when a PSA came on promoting an "Emergency Kit." The scenario was a boy in an emergency shelter with his mother. He was having an asthma attack, needed his inhaler, and mom very quickly retrieved it from the kit.

This got me thinking about all of the *Disaster Preparedness* columns I've written to help you make sure your station is ready to deal with a disaster. In a couple of columns I even went so far as to suggest you develop a plan to help your staff evacuate their families so they could focus on passing vital information to listener's during and after a disaster – without having to worry if their family was OK sitting at home while they were at work.

Help Your Staff Plan For Their Family

One thing that I didn't cover – this is as important as an evacuation plan or having the station ready for a disaster – was helping your staff make sure they and their families are prepared to weather the storm – no pun intended. Now just in case you think I'm crazy to suggest a staff plan, let me assure you that there are corporations both small and large that have well designed plans. In many cases, when they have had to execute their disaster preparedness plans, they have not only saved the lives of their staff members but they have also helped save their businesses.

In fact, one large brokerage firm that was in Buildings Two and Five of the World Trade Center (WTC) ordered it's 3,800 employees to evacuate immediately after the plane rammed One WTC on 9/11. After the 1993 WTC bombing, it had taken *four hours* to get everyone out. This time, because of the planning and evacuation drills held between the two disasters, it only took 45 minutes to get everyone out safely.

Let's discuss preparing your staff for the disasters that potentially will occur in your area. Regardless of what the disaster is, there are some commonalities that most probably will have to be dealt with – loss of utilities, power, water and communications. Your ability to move about may also be restricted due to road closures. And if the stores run out of goods, because of last minute panic shopping by people who didn't have a disaster plan, your ability to purchase even basic necessities may also be at risk.

All Hazard Approach

The planning process should take an "all hazards" approach. The probability that a specific hazard will impact is hard to determine. That's why it is important to consider many different threats and hazards, and the likelihood they will occur.

Depending on circumstances and the nature of the emergency, the first important decision is whether to stay home or evacuate. Staffers should understand and plan for both possibilities. Regardless if they plan to evacuate or shelter in place, family members should put together an emergency kit. Taking time to do this before a disaster strikes, or is imminent, will ensure that necessities are in hand when they are needed

The last thing you want your staff and their families to do is haphazardly throw a bunch of stuff in a car to leave the area, or to try to run out at the last minute to attempt to purchase necessities when everyone else is doing the same thing. That's why we call it preparedness.

While you may question some items in the recommended kit, keep in mind your staff may need to be prepared to be "living in the dark ages" – with no cell phones, no power, no safe water, etc. – potentially for a few days.

The Emergency Kit – The Basics

After a disaster, local officials and relief workers will be on the scene, but they cannot reach everyone immediately. Help could come in hours, or it may take days. With this in mind, a disaster kit should contain the following:

- Water –one gallon of water per person per day, for at least three days, for drinking and sanitation.
- Food – at least a three-day supply of non-perishable.
- Battery-powered or hand-crank radio and a NOAA Weather Radio with tone alert, and extra batteries for both.
- Flashlight and extra batteries.
- First aid kit.
- Whistle to signal for help.
- Dust mask to help filter contaminated air and plastic sheeting and duct tape to shelter-in-place.
- Moist towelettes, garbage bags and plastic ties for personal sanitation.
- Wrench or pliers to turn off utilities.
- Manual can opener for food.
- Local maps.

Additional Important Items

Once they have gathered the basics, they may want to consider adding the following items:

- Prescription medications and extra glasses.
- Infant formula and diapers (if appropriate).
- Pet food and extra water for your pet.
- Cash and change.
- Important family documents such as copies of insurance policies, identification and bank account records in a waterproof, portable container.
- Emergency reference info such as a first aid book.
- Sleeping bag or warm blanket for each person.
- Complete change of clothing including a long sleeved shirt, long pants and sturdy shoes.
- Household chlorine bleach and medicine dropper to be used as a disinfectant. Or in an emergency, you can use it to treat water for drinking.
- Fire extinguisher.
- Matches in a waterproof container.
- Feminine supplies and personal hygiene items.
- Mess kits, paper cups, plates, paper towels and plastic utensils.
- Paper and pencils.
- Books, games, puzzles for children – if electronic games be sure to have back-up batteries.

Remember the unique needs of family members, including growing children, when making the emergency supply kit and family emergency plan.

If you are in a colder climate your staff should consider adding extra clothing and bedding to the emergency kit – no power means no heat.

For A Baby:

- Formula
- Diapers
- Bottles
- Powdered milk
- Medications
- Moist towelettes
- Diaper rash ointment
- Medicine and Toys

For Adults:

- Denture needs
- Contact lenses and supplies
- Extra eye glasses

Ask your doctor about storing prescription medications such as heart and high blood pressure medication, insulin and other prescription drugs.

If you live in a cold climate, you must think about warmth. It is possible that you will not have heat. Think about your clothing and bedding supplies. Be sure to include one complete change of clothing and shoes per person, including:

- Jacket or coat
- Long pants
- Long sleeve shirt

Maintaining The Kit

Just as important as putting supplies together, is maintaining them so they are safe to use when needed. Here are some tips to keep supplies ready and in good condition:

- Keep canned food in a cool, dry place.
- Store boxed food in tightly closed plastic or metal containers to protect from pests and to extend its shelf life.
- Throw out any canned good that becomes swollen, dented or corroded.
- Use foods before they go bad, replace them with fresh supplies.
- Place new items at the back of the storage area and older ones in the front.
- Change stored food and water supplies every six months. Be sure to write the date you store it on all containers.
- Re-think your needs every year and update your kit, as your family's needs change.

Keep items in airtight plastic bags and put your entire disaster supplies kit in one or two easy-to-carry containers, such as a new trash can, covered storage container, camping backpack or duffel bag.

Kit Storage Locations

Since you do not know where you will be when an emergency occurs, prepare supplies for home, work and vehicles.

Home – Keep this kit in a designated place and have it ready in case you have to leave your home quickly. Make sure all family members know where the kit is kept. Additionally, you may want to consider having supplies for sheltering for up to two weeks.

Work – Be prepared to shelter at work for at least 24 hours. Make sure to have food and water and other necessities like medicines in the kit. Also, be sure to have comfortable walking shoes at your workplace in case an evacuation requires walking long distances. The kit should also be in one container and ready to "grab and go" in case you are evacuated from your workplace.

Your staff and their families will cope best by preparing for disaster before it strikes. One way to have them prepare is by assembling a Disaster Supplies Kit. Once disaster hits, they won't be stressed trying to throw together a kit – they'll have the energy to deal with the daunting task of making it through the disaster. More information is available on disaster prep and kits is at www.fema.gov

Proven

Consistent

Reliable

MYAT, INC.

For over 59 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.

YES—
BUT THEY'RE MUCH MORE:
* INNOVATIVE
* DEDICATED
* RESPONSIVE
CONTACT MYAT WITH
YOUR PASSIVE RF
REQUIREMENTS.

FM Splitter/ Patch Panel

Coaxial Transfer Switch

LPFM/IBOC Filter 3kW

LPFM/IBOC Filter 8kW

FM Constant Impedance Combiner

FM Switchless Combiner

MYAT, INC.

Learn why so many broadcasters rely on MYAT. • 1-201-767-5380 • www.myat.com

Safety and Security

A regular column on protecting property and persons – with a technical slant.

EAS CAP for Dummies

by Jeff Johnson,CPBE

We've heard that we *finally* get to retire when we've learned all of the acronyms ... but just then, there are more thrown at us! Think of EAS: now there are "CAP" and "IPAWS."

EAS* (Emergency Alert System), has been in force since January 1997. It is the successor of EBS* and CONELRAD*. EAS has been a "daisy-chain" scheme since its inception – one station broadcasting codes and information and then being monitored by another. Each state has had its own plan of these daisy-chain links, which have worked well in some instances and poorly in others. It has been akin to turning radio stations into 500-baud modems. A number of the more successful states have implemented alternate links to the daisy chains.

The EAS codes and information, in the form of alerts, have been introduced via analog technology from the Federal level by the PEP* (Primary Entry Point) system. The national test in November, 2011 demonstrated the weakness of the PEP system – the audio message was garbled or missing.

Now there has been introduced a Federally mandated addition to the daisy chains – IPAWS (Integrated Public Alert and Warning System). According to FEMA*, "IPAWS will build and maintain an effective, reliable, integrated, flexible, and comprehensive alert and warning system. IPAWS will diversify and modernize the Emergency Alert System (EAS)."

IPAWS is the system. CAP is the technology.

The primary technology of IPAWS is "CAP" (Common Alerting Protocol). It is in XML*, a format sent commonly via the Internet. According to FEMA: "CAP alerts are transmitted in digital format; therefore, there is no degradation of quality of the content that may be experienced with analog methods such as radio."

CAP requires a broadband Internet connection at the location of each EAS CAP compliant device. This is available at studio locations with broadband Internet, but requires Internet service even at unattended remote locations if that location embodies an EAS codec. There are also CAP/IPAWS-focused satellite Internet services available for these remote locations.

Now that we have the basics, and know that the new system is intended as an improvement, how does it work?

CAP is simply another input to – another monitored source for – the EAS codec. It contains the same information as the familiar analog alerts plus additional information. CAP was developed by, and is a trademark of, a company named OASIS.

http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2-os.html

The following is a quote from the OASIS website:

The Common Alerting Protocol (CAP) provides an open, non-proprietary digital message format for all types of alerts and notifications. It does not address any particular application or telecommunications method. The CAP format is compatible with emerging techniques, such as Web services, as well as existing formats including the Specific Area Message Encoding (SAME) used for the United States' National Oceanic and Atmospheric Administration (NOAA) Weather Radio and the Emergency Alert System (EAS), while offering enhanced capabilities that include:

- *Flexible geographic targeting using latitude/longitude shapes and other geospatial representations in three dimensions.*
- *Multilingual and multi-audience messaging.*
- *Phased and delayed effective times and expirations.*
- *Enhanced message update and cancellation features.*
- *Template support for framing complete and effective warning messages.*
- *Compatible with digital signature capability; and,*
- *Facility for digital images and audio.*

CAP, as seen, is compatible with the familiar NOAA* SAME* and EAS alerting formats. It is "pulled" into a CAP compliant EAS device by "polling" (querying or – plainly – asking) IPAWS CAP Internet servers for alerts. This polling, or pulling, eliminates firewall troubles as a computer inside a firewall can go "out" for information and the firewall will recognize that incoming data was "asked" for.

(Continued on Page 20)

Moseley
BROADCAST

INTRODUCING RINCON

Moseley STL for under $3000*

THE INDUSTRY'S FIRST MULTI-CHANNEL, MULTI-ALGORITHM, MULTI-NETWORK, MULTI-STL

Rincon is the broadcast industry's first Digital Audio Transport Product optimized to deliver multichannel digital audio over IP, TDM or Radio Links simultaneously. Rincon's ability to leverage these network choices and low purchase price gives excellent return on investment.

*Per terminal end

Catch the wave. Call your broadcast experts today.

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

www.moseleysb.com

MANUFACTURED IN THE USA

Safety and Security

EAS CAP for Dummies

– Continued from Page 18 –

At present, July 2012, only the FCC-mandated FEMA server, called IPAWS OPEN* must be polled:

https://apps.fema.gov

What does the FEMA server do? It "aggregates" (collects) messages and makes them available when polled. The following is from the FEMA website:

http://www.fema.gov/emergency/ipaws/about.shtm

Message Aggregation

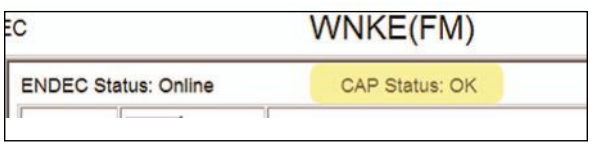
The IPAWS Open Platform for Emergency Networks (OPEN) is a set of securely hosted Web services that enable the routing of standards-compliant emergency messages between disparate third-party applications, systems, networks and devices. Since the initial version of OPEN (DM-OPEN 1.0) had an established capability to route Common Alerting Protocol (CAP) alerts between organizations and to the public via the National Weather Service's (NWS) All-Hazards Emergency Message Collection System (HazCollect), OPEN was selected by FEMA to perform message aggregation for IPAWS.

Yes, "OPEN" is yet another acronym!

In addition to providing IPAWS Aggregator Services for the purpose of public alerting, IPAWS OPEN will continue to support the NWS HazCollect system, which relays Non-weather Emergency Messages (NWEMs) from authorized alert originators to the public through the NWS family of dissemination services, including NOAA Weather Radio (NWR) and rebroadcast by Emergency Alert System participants.

In the future, mandated polling of designated state IPAWS CAP servers will be required as states implement and register them. This is similar to the histories of the individual states' EAS plans.

When a CAP compliant EAS device successfully connects to the IPAWS OPEN server, that success is reported to the user. The SAGE web interface displays success on its home page.



SAGE IPAWS CAP Status: OK

What does the CAP compliant EAS device do with the XML formatted data file it receives? It parses (reads) the file and converts it into a conventional EAS alert. The EAS device treats it the same as an alert received via the familiar monitored analog sources such as NOAA, LP1s and LP2s. That may be "Log Only," "Timed Relay," etc. Also, there may be a broader range of information such as digital images for television and alternate languages as seen in the OASIS paragraphs above.

Here is an actual CAP RWT.

Matched filter RWT, Received from CAP. Log Only.

The Civil Authorities have issued a Required Weekly Test for all of Connecticut, all of District Of Columbia, all of Delaware, all of Florida, all of Georgia, all of Indiana, all of Kentucky, all of Massachusetts, all of Maryland, all of Maine, all of Michigan, all of North Carolina, all of New Hampshire, all of New Jersey, all of New York, all of Ohio, all of Pennsylvania, all of Rhode Island, all of South Carolina, all of Virginia, all of Vermont, and all of West Virginia beginning at 11:05 am Fri Jun 15 and ending at 12:05 PM Fri Jun 15 (fromcap).

CAP Server: IPAWS CAP Reference ID: IPAWS@dhs.gov,RWT_EDT_20125151152,2012-06-15T11:05:02-04:00

CAP Text: Test Message IPAWS OPEN CAP EAS Feed Configuration Test Message

The failure of the analog PEP system in November of 2011 will be ameliorated by expansion within IPAWS. The FEMA IPAWS PEP Station Expansion project expects to include and maintain over 80 PEP stations operational throughout the United States and its territories (U.S. Virgin Islands, Puerto Rico, Guam, American Samoa, U.S. Mariana Islands) by the end of the project. Direct coverage of the nation's population will expand from approximately 67 percent in 2009 to over 90 percent when these additional stations become operational.

Acronym Summary:

- CAP - Common Alerting Protocol
- CONELRAD - CONtrol of ELectromagnetic RADiation
- EAS - Emergency Alert System
- EBS - Emergency Broadcast System
- FEMA - Federal Emergency Management Agency
- IPAWS - Integrated Public Alert and Warning System
- OPEN - Open Platform for Emergency Networks
- NOAA - National Oceanic and Atmospheric Admin.
- PEP - Primary Entry Point
- SAME - Specific Area Message Encoding
- XML - Extensible Markup Language

SAME Codes may be researched at: www.nws.noaa.gov/nwr/indexnw.htm

URL Summary:

www.fema.gov/emergency/ipaws/about.shtm

http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2-os.html

www.eas-cap.org/ECIG-CAP-to-EAS_implementation_Guide-V1-0.pdf

Jeff Johnson can be reached at: jeff@rfproof.com

Sale

ARC console family

Whether stand-alone or networked, the Arrakis ARC and MARC series consoles are feature laden, high performance, and professionally reliable. Ideal for On Air, production, or Internet Radio !!!

Stand-alone ..or.. Networked !

NEW

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 ?

Innovative & cost effective Radio products from Arrakis Systems

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

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

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)

WHY PAY A FORTUNE
FOR AUTOMATION ?

Digilink-Xtreme

only $100 per month
support, training, upgrades
the best automation in Radio, period !

www.arrakis-systems.com

970-461-0730

Operations Guide

Audit Your Phone Lines

by Chris Tarr

A couple of months ago, my General Manager came to me and said that over the past year, our phone bills have increased substantially. I knew what needed to be done!

Radio stations are often like a "roach motel" for telephone company (telco) lines. They check in, but never check out – even when they're no longer needed. It often doesn't help that most telephone companies won't put all of your services itemized on a single bill, instead sending you different bills, at different times, for different things. It's easy to miss things buried deep in the piles of papers. Telephone bills often remind me of the frog in the boiling water parable – the amount you pay increases ever so slowly every month until you look back a year or so later, to find that you're paying a whole lot more per month than you used to.

Every few years it's a good idea to sit down and do a forensic audit of your telco services. In my case, my last audit ended up saving us $1,500 a month!

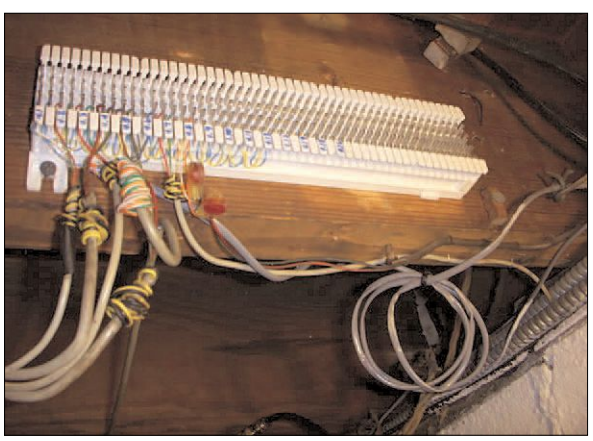
A forensic audit consists of a few tasks: Gathering up bills, matching them to the services that you have, and making sure what you have is what you need.

The first step of gathering up the bills can be a daunting task! The business office is your friend here. I suggest starting with a single month – for example the month prior to the current month. Ask the business office to provide you with that month's bills for the past two years. This will help you identify any trends and see a usage pattern. Using the same month will give you the best apples-to-apples comparison, because there won't be any seasonal changes to throw you off. For example, there may be a lot higher phone usage around the holidays due to increased sales and remotes compared to, say, March.

When going though the bill, be sure to go through line-by-line and check for increases in fees, taxes, or services. There may not be a lot you can do to reduce those line items, but at least you'll have a handle on what they are. In my case, they accounted for about a $20 month increase from the prior year.

Next, look at the services on each line. I had a few cases where we were paying for things like call waiting and caller ID on a transmitter dial-up line. These services often get "bundled-in" for free when a line is ordered, then you start to get billed after a promotional period. Well we don't need those on our lines, so get rid of them! In one review, I noticed that a prior technician ordered a no answer/busy transfer service on what was supposed to be the first line of a hunt group, instead of simply adding the line to the group. While it functions the same, it certainly isn't billed them same! In this scenario, every time a second call came in, it forwarded to the next line and we got billed twice. Once for the call to the originating line, then again to the line if forwarded to. That's not how hunt groups work!

In a review of our data circuits, I noticed that we went out of contract on a T1 line. That caused our monthly rate to go up by almost $1,000! Often data circuits are charged at the tariffed rates when they're on a month-to-month basis. Since I knew we'd be using that line for some time to come, a call to our provider got us a new contract and much better pricing.



Physically Identify Each Line

Next up, let's look at matching the services to the bills. This is where you look at each bill and physically identify the lines that are assigned to the account. This is often where you can find some significant savings!

(Continued on Page 24)

Sicon-8 Internet & Voice Remote Control

The CircuitWerkes Sicon-8 Voice Remote Control

- Uses Dial-up, Internet Web server or free Sicontroller Software!
- 8 channels of metering, status and control (expandable to 32) and up to 5 alarms per channel.
- No accessories necessary to control your site right out of the box.
- Auto-ranging, auto-calibrating meters make setup a snap.
- Includes: Function scheduler, auto-logging & alarm reporting.

Internal Web Server

Free Sicontroller Software

The Sicon-8 lets you control your site via Internet with its internal Web server, via telephone, auto-answering cell phone or with our free software. Setup is a breeze using the Sicontroller software that also includes scripting, e-mail alerts, multi-site management, virtual metering & much more!

NEW!! Web-Based Silence Sensor

Introducing the Silence Sentinal

Discover more online at www.circuitwerkes.com

- Detects Stereo or Dual Mono Silence (independantly adjustable channels).
- User-programmed relays (DPDT) close automatically or via Web control
- Balanced or unbalanced audio inputs.
- External trigger inputs activate user-defined actions.
- Optional Multi-Site monitoring software coming soon!

Remote Broadcasting Solutions

MicTel Mic/Line to Telephone Interface

- Outputs & Inputs for telephone handset, cellular phone or balanced line level at up to +10dBm.
- Operates up to 36+ hours on two 9V alkaline batteries.
- High quality, user-switchable, internal limiter prevents clipping.
- External power input with silent, auto-switching battery backup.
- Individual gain controls for send, receive & headphones levels.

Unattended Dial-Up Broadcasts with the DR-10

- The DR-10 is a Dial-Up remote control with balanced, telephone audio input & output that can control many automation systems or your audio console for unattended remote broadcasts.
- Our Silencer™ option removes control tones from the audio path.
- Use the DPDT relays to insert the phone audio directly into the program path when necessary, especially for emergencies.

TelTap Pocket-Sized Manual Telephone Coupler

- Can be used as a phone tap or a passive manual telephone coupler.
- Send or receive telephone audio.
- Compact size & low cost makes the TelTap a great addition to your remote kit for main or backup capabilities.

Lots More CircuitWerkes Problem Solvers

- Transcon-16 - Move up to 16 contact closures from room to room over an audio cable
- DT-232 - Turns DTMF sequences into user-programmed serial outputs & action steps.
- FSK Encoders, decoders, tranceivers and contact-to-FSK encoders/decoders.
- SUB-03 Subaudible tone decoder and SEN-6 Subaudible encoder.
- HC-3 telephone autocoupler and AC-12 rack of autocouplers
- DTMF-16 and DS-8 DTMF tone decoders.

Find Full product info & downloadable manuals online at www.circuitwerkes.com. 352-335-6555

Operations Guide

by Chris Tarr

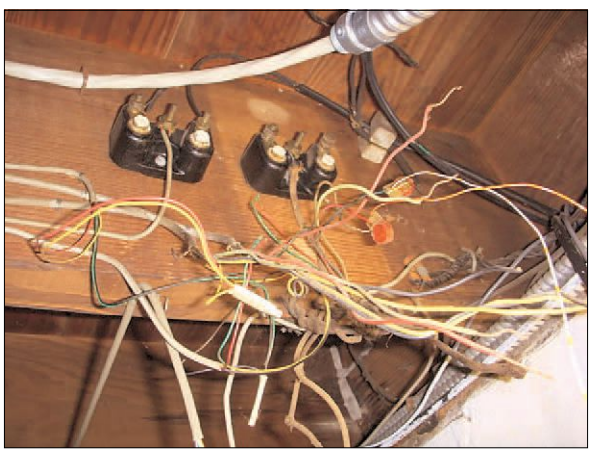
Audit Your Phone Lines

– Continued from Page 22 –

In many cases, especially with an older station, you tend to get "service creep." People add lines or services either meaning for them to be temporary, or for projects that later go by the wayside or moved to a different technology. When this happens the infrastructure associated with it is left behind. Because the business office isn't in the "loop" on it, they dutifully continue to pay the bill, especially since in some situations a couple hundred dollars is just "noise" in a total telco budget. It's not hard to imagine having a POTS line put in for a remote broadcast, only to forget to have it disconnected after the event.

In my review, I came across a $120 monthly charge for an alarm circuit buried in one of our bills. The circuit? It hadn't been used in years, and when I went to the police station where it was supposedly terminated, the telcom staff had no idea where the line came in! From what we can tell, it was part of an alarm system that was removed many, many years ago. I still hear stories all the time about "orphaned" equalized lines and dry pairs. Generally these go unnoticed for years.

Let's take a look at the final step. Make sure what you have is what you need! In looking through our bills, I noticed that the ISDN lines that I had installed at our transmitter site for emergency program delivery had gotten really expensive to maintain – to the tune of about $175 month! I had two of those lines at transmitter sites that really had very little use. They're for emergencies only.



A good time to remove older, unused lines.

The reality is that audio-over-IP has gotten very mature, and it's become a viable way to deliver audio to a site – especially if it's for temporary use. So I canceled our ISDN lines and put in DSL. The cost dropped from $175 for the ISDN (plus $40 for our POTS dial-up line) to a flat $60 for POTS *and* DSL. Multiply that by two sites, and you have some serious savings!

Using these techniques, I was able to add about $18,000 back to our bottom line. How many Engineers are able to do that for the company? Now, obviously your mileage will vary – some shops are very diligent about keeping track of the services coming in and out of the building. Some are very small or new stations, and have 100% track of everything they have. Still, there may be savings to be had in those situations, however small the savings may be. Do you have a line that you know you're going to keep for a while? Maybe you can enter into a contract for better rates. Perhaps there's a newer, cheaper technology you can use to replace some of the older services you have. Maybe there are services on your line that you don't need. All those little numbers can add up quickly!

Nobody really likes going through the mountain of paperwork generated by telecom companies. It can take long hours making sense of it all. However, if you take the time to diligently go through the audit steps, there's a good chance that you can give your General Manager some good news. After all, it's great when Engineering can add to a station's bottom line in a very tangible way.

Chris Tarr CSRE, CBNT, DRB is the Director of Engineering and IT for Entercom's radio stations in Milwaukee and Madison, WI he can be reached via email chris@geekjedi.com

TOWER SIGNS
antennaID@msn.com
E-MAIL FOR FREE PDF CATALOG
FCC TOWER SIGNS
FCC ASR - CAUTION - DANGER - RESTRICTED SIGNS
ADD YOUR CONTACT NUMBER & WORDING TO ANY SIGN
NO ADDITIONAL COST
ANTENNA TAG SETS 4 EACH & NUMBERED
RED GUY WIRE MARKER BALLS YELLOW GUY WIRE GUARDS
ANTENNA ID PRODUCTS
610-458-8418 610-458-5575 www.antennaID.com

When you want more than just an antenna
Providing broadcast antennas and RF systems with more than 25,000 TV and Radio systems delivered worldwide. Products include antennas, combiners, filters, patch panels, towers, rigid line & accessories.
JAMPRO ANTENNAS, INC.
Est. 1954 Made in the USA
Dual Input HD Sidemount Antenna
High Power FM HD Antenna
Constant Impedance Bandpass Combiner
JAMPRO Antennas, Inc. | T: 916.383.1177 | F: 916.383.1182 | JAMPRO.com

Available from

SCMS INC.
YOU KNOW WE KNOW RADIO

bw broadcast
Smart Gear. Priced Right.

www.scmsinc.com
1-800-438-6040
sales@scmsinc.com

MidSouth:	1-877-391-2650
SouthAtlantic:	1-770-632-1295
NorthEast:	1-315-623-7655
Central:	1-731-695-1714
NorthCentral:	1-513-376-8600
SouthWest:	1-210-775-2725
MidWest:	1-513-899-3036
WestCoast:	1-866-673-9267
ProAudio:	1-877-640-8205
LatinAmerica:	1-760-650-1427
BradleyDiv.:	1-800-732-7665

Award winning broadcasting equipment, that will keep your station ahead of the competition!

TX5

The perfect low power transmitter for broadcasting commentary, drive-in movie theatres, houses of worship and cable modulators. Now with 4-band DSPX processing and digital AES/EBU input.

Proudly supplying equipment for the 2012 Games

Chief Engineer

FM Antenna Patch

Or, How Ugly Can Be Beautiful

by Scott Schmeling

In a perfect broadcasting world, we put things up on a tower, connect the transmitter, pressurize the line and never have to think about them again. But we don't live in a perfect world. There are multiple external forces continually testing the integrity of everything on that tower. Among other things, we have to regularly check pressure on transmission lines to be sure there are no leaks. But leaks do happen – probably more often than not. The severity of the leak, as indicated by how long a tank of nitrogen lasts, determines what we do about it. If it's a slow leak you may decide to leave it alone and simply change nitrogen tanks as needed. Or you could forget about the nitrogen tanks and install a dehydrator and keep an eye on it. Of course, a more severe leak requires more immediate attention.

I have a site that had been really good for a long time. Then after a recent storm came through, we noticed tank pressure dropping rather quickly – a replacement nitrogen tank would only last a few days. We were going through nitrogen like a teenager goes through ketchup! A tower crew inspection found a hole in the top bay, obviously caused by a direct lightening hit. I should mention here that we also have static dissipaters at the top of the tower, but this was just more static than they could dissipate! As a temporary fix, the tower crew applied several layers of electrical tape over the hole – more to keep moisture out than to maintain line pressure – but we were able to keep pressure at about a pound. We had other projects scheduled for this tower, so a more permanent repair job was added to the list.

Basically, we had two options. We could either replace the radiator or we could do a field repair. Checking with the antenna manufacturer, a replacement radiator arm would cost something more than $1,700. We decided to repair! At least we would try that first. If it didn't work, the manufacturer could ship out a new one in a day or so.

When the tower crew returned we shut the station down and they unbolted the top bay and brought it to the ground for me to work on. After unwrapping the tape, I could see the crater created by the lighting hit. At the outer surface it was about a quarter inch in diameter with some burrs around the perimeter. At the center there was a hole roughly 1/32 of an inch – very small, but certainly enough to empty a nitrogen tank in a few days.

Lightning leaves it's mark.

Burrs removed and prepared for patch.

The plan was to solder a patch over the hole ... not unlike patching the innertube of a bicycle tire. The first thing I did was file down the burrs around the perimeter of the crater using a flat file. *(Continued on Page 28)*

Tieline®
The Codec Company

Audio without compromise
for the discerning engineer.

Genie STL

IPV6 Ready · Dual Power · Dual Ethernet · Silence Detection

Get yours today at
proaudio.com/genie
or call (800) 433-2105

YOUR SMART SOUCE FOR TIELINE:
PROAUDIO.com
smart sound solutions

Chief Engineer

by Scott Schmeling

FM Antenna Patch

– Continued from Page 26 –

Once the burrs were removed I took the area down to shiny copper using a metal brush and some emery cloth. I needed the brush to clean the inside of the crater itself. The surfaces had to be clean to assure a proper solder bonding.

Let me pause here to admit that I came to this project sorely unprepared! It would have been best, I'm sure, to silver solder the patch in place. But I did not have enough silver solder experience to have confidence that I wouldn't melt a hole in my antenna. So I chose to use regular soft solder and a propane torch like you would use in a home plumbing project. Since the line pressure here was relatively low, it certainly should hold.

I was *sure* I had some solder and a torch at the site ... but I didn't! I had no soft solder, no flux, and no torch – what a *rookie!* So I used what we had on hand. I used plain old solder from my electronics toolbox. Luckily, the tower crew had a torch on one of their trucks. The lesson here is *never assume* that what you need is at the site. Be sure and take it with you – at worst, you'll have two, but that's better than none.

With the antenna surface shiny and clean, I first melted solder directly into the crater. In theory that probably would have plugged the hole well enough, but this bay is about 600 feet up so I wanted to be a bit more certain – I preferred to do this job once.

So I cut and cleaned a small patch from a piece of copper strap to solder over the area. I melted solder all around the crater area and on the bottom side of the copper patch. Then I heated the area with the torch, pressed the patch in place and held it in place with a piece of wood while sweating some solder around the edges to prevent moisture from getting under it.

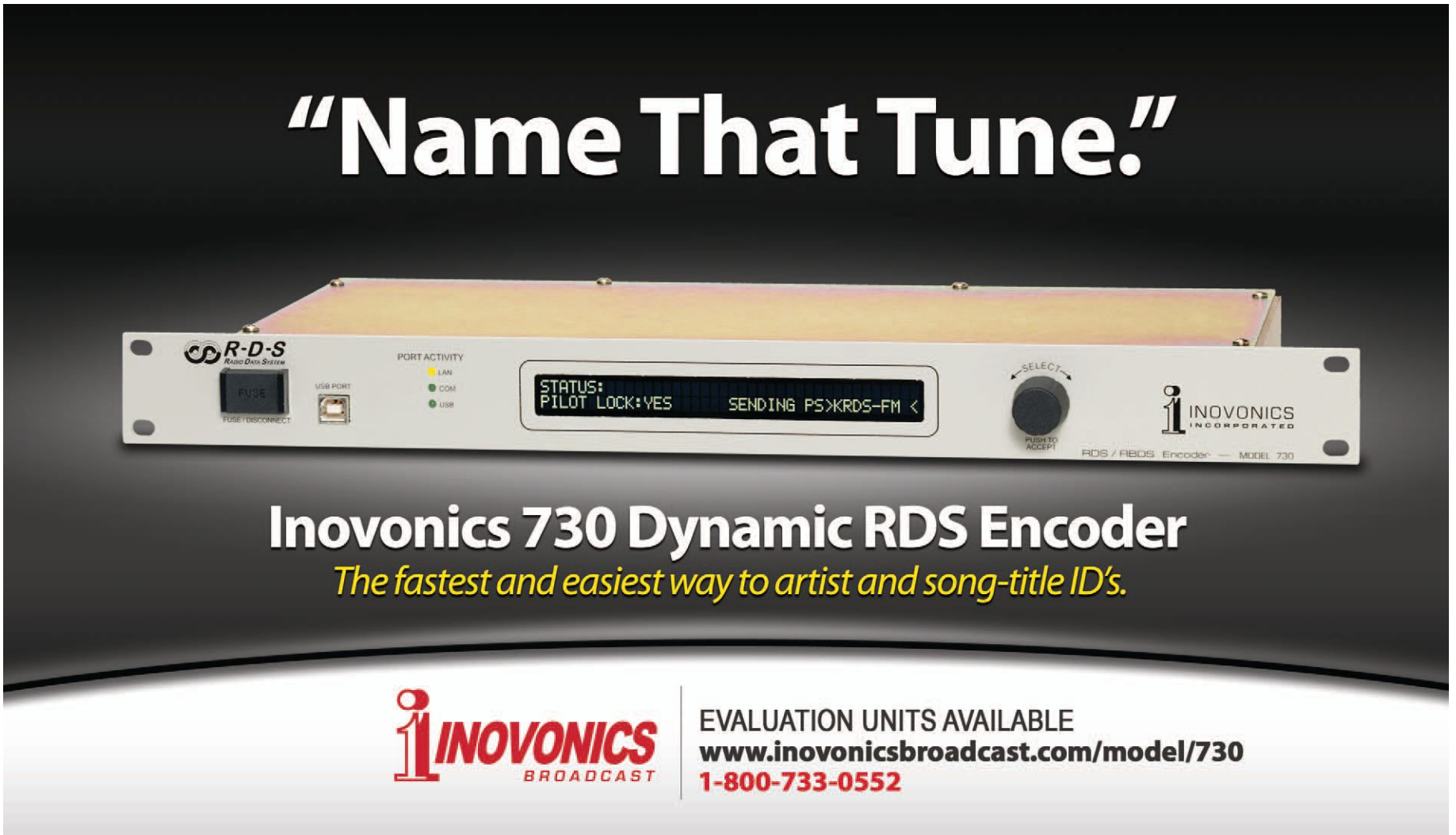
Solder fills the hole.

To say the least, it wasn't pretty. In fact, it's kind of ugly. But as an old friend of mine used to say, "It looks fine from the road!" After the bay was back in place we pumped the line up to four pounds and shut the regulator off. The next day we checked and it was holding beautifully. In fact four months after the patch job the line is still holding very close to that four pounds.

A final patch, just to be sure.

Seeing how well this worked, I have another site with a leak I hope to patch this summer. And considering the $1,700 savings versus replacing the antenna element, it's certainly worth the time to do the patch. Hopefully, some of you will find this information useful. The patch itself may not be pretty, but seeing that pressure gauge holding steady is a beautiful thing!

Scott Schmeling is the Chief Engineer for Minnesota Valley Broadcasting. Email him scottschmeling@radiomankato.com



TRADE-UP DEAL

Compete. Defeat. Repeat.

Omnia Summer Trade-Up Deal

Trade up your current Omnia
*and get $4000 toward a new Omnia.11 FM HD

Contact your Omnia Dealer today

Omnia

*Qualified Omnia models for trade-in: Omnia Classic, Omnia Hot, Omnia 4.5, Omnia 05, Omnia 06.
Offer ends September 28 or may be withdrawn earlier if Frank Foti returns from his vacation and gets wind of this.

Practical Engineering

Good Studio Grounds are a Good Investment

by Mike Callaghan

Station Grounding. Ah, yes. A subject near and dear to anyone doing broadcast engineering. There are a number of different approaches to the subject, and despite much of it seeming like "Black Magic," a few basic rules cover a lot of situations. It is *not* following the rules that can cause a lot of problems.

Studios can be grounded a number of ways, and many of them have proven to be not entirely adequate. In the early days of computerized consoles, poor grounding could cause channels to mysteriously start and stop on their own, or even turn on from someone firing an input in a different studio.

Early automation systems were overly sensitive to static discharges produced by studio carpeting, and a show could be either stopped entirely or "double rolled" by a simple footstep or two followed by touching the automation rack.

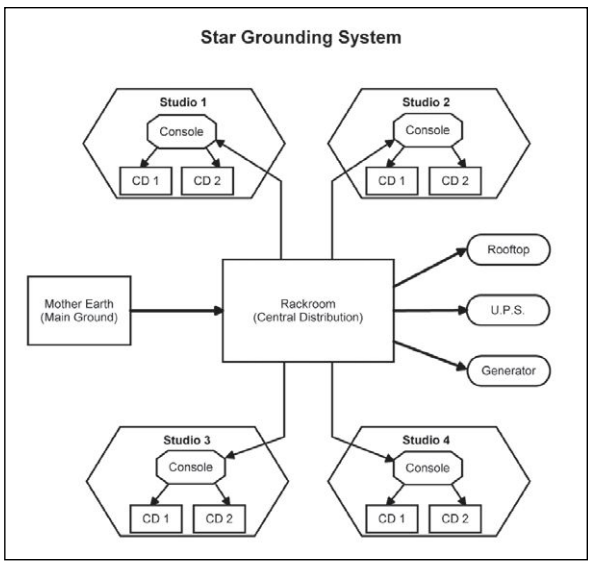
I once earned sweat equity in a tiny station adjacent to a lawyer's office. He had a tabletop Xerox 660 copier, which dumped huge amounts of garbage into the building ground system, and would "false-start" all sorts of events on our Schafer 800 automation system. Not only that, but it would also set fire to and torch the originals, but that's another story. Mercifully, the Xerox 660's are all gone now.

Problems such as this are best avoided before studios are built; designing a robust ground system isn't that hard, and it provides peace of mind long after the build is finished.

One scheme, especially prevalent in long and narrow buildings, is to "daisy-chain" the ground from studio to studio, with the main ground tied in at one end. This means some ground returns have a short distance to travel, and others need to go much farther. Fortunately, it's not very common, or very wise.

The time proven and simplest ground system is called a "Star Ground." Designing this is like laying out an organization chart, with the most important single entry at the "top." This is what I call "Mother Earth." It's the single ground point for the entire installation, and can be anything from a good chemical ground to a run of heavy cable secured or welded to the steel frame of a building. This single ground has the highest integrity and lowest resistance of any ground in the system. This is brought in through a heavy single conductor cable to the central ground point.

From this single point, ground cables are run to each of the studios. There, it is secured to the equipment rack with a good metal-to-metal connection. This point becomes the



central ground for the equipment in the studio. If the studio doesn't have a rack, the console power supply ground can serve as the central tie point. Other power supplies, monitor amps, tape decks and anything else that may be affected by not having a secure ground should be tied to this point. Audio source cable shields are grounded only at the console end. The shield end closest to the actual equipment should float. The same rule applies for devices the console feeds, like recorders. This avoids audio ground loops when the studio goes into use. Microphones, which have no power connection, get grounds at both ends of the cable shields.

If you still use turntables, the phono cartridge ground(s) are tied to the tone arm, the tone arm is grounded to the turntable frame, the frame is tied to the preamp ground, and the preamp is tied to the console or studio ground.

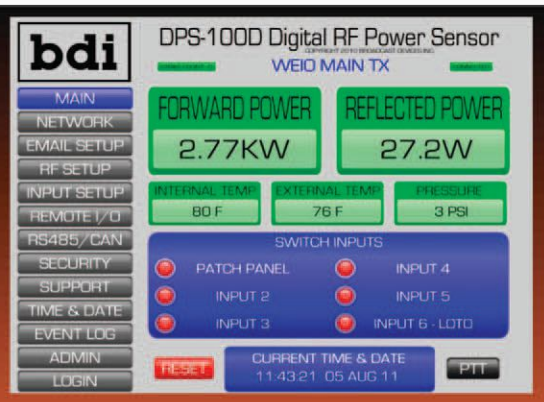
(Continued on Page 32)

RF Switch Controller With Smarts

SWP-200

SCALABLE RF SOLUTIONS FOR PROJECTS OF ANY MAGNITUDE

DPS-100D
True RMS
RF Power Meter



The DPS-100D and SWP-200 are part of a growing number of RF site management products offered by BDI. The DPS-100D true RMS RF power meter offers industry leading features and performance. The built in web server provides remote access and control of all vital parameters. Supports SNMP for remote control along with other popular network protocols. The DPS-100D RF Power Meters can also be daisy chained as part of a simple or complex RF transmission monitoring system using standard CAT 5E STP cables. Put one anywhere you want to monitor RF FWD/REF power. **Need RF switch control?**

SWP-200
Intelligent
RF Switch Controller

3-Strike™
BDI RF Monitor & Protection

RF Transfer Switch

The SWP-200 is a stand alone 1RU RF switch controller which can control any brand of motorized RF switch. In addition the SWP-200 manages transmitter interlocks and simplifies the connection of interlock paths. When installed as a system together with a DPS-100D, the SWP-200 provides complete Hot Switch protection by preventing the movement of a switch if RF is present. The SWP-200 also doubles as a rack mounted RF power display for up to 2 DPS-100D Sensors.

For complete information on these or any of our RF and audio products please contact us

www.broadcast-devices.com

Broadcast Devices, Inc.
Tel. (914) 737-5032 Fax. (914)736-6916

bdi

Practical Engineering

– Continued from Page 30 –

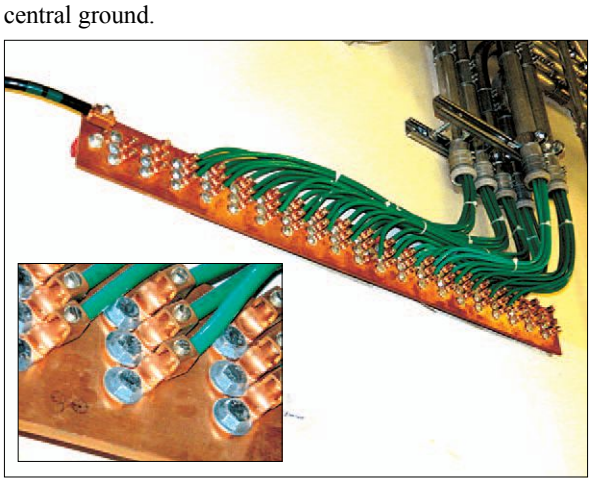
Current wiring standards insure that most equipment will find a ground through the ubiquitous "U" ground on the power cable. Most of the time, this will be adequate to avoid surprises from static and other surges. But the electrical "U" ground is not the same as the real "Mother Earth" we're talking about. It's often just a simple ground rod sunk into the earth for the building's circuit breakers or power distribution system.

Inside the studio, it's wise to give the air personalities a "static pad" to stand or sit on. This is an area of conductive tile or linoleum. It drains off any charges building up on bodies as they do their show, and prevents static spikes when they touch and use equipment. This surface is grounded using a copper strap run under the carpet to the studio ground tie point.

At one point in the studio, the studio ground is attached to the "U" ground. This is done in a wall outlet so it will be permanent, even if the cabinetry and internal studio wiring is removed.

The Rack Room

Rack rooms also have a central ground point, with each rack or group of racks tying to it with a good metal to metal connection. This room is a convenient place to locate the central ground distribution bus. This can be a copper bar with threaded studs, a ground landing similar to the one in an electrical distribution box, or even large Euro-blocks for smaller facilities. It should be centrally located to be convenient to all the connections it will have. Overhead wiring trays, the telco demarc and the metal conduits going up to the antennas on the roof should all be tied to the central ground. Remember to run a green ground wire up through the roof conduit so that the masts and mounting hardware for the rooftop antennas can also be tied to the central ground.



The idea behind the one central ground is to avoid current flow between different grounds if there's a lightning strike or power fault and the fault currents don't know where to go. If the facility has a UPS, it should have a stout connection back to the central ground.

True AC-DC-AC UPS systems can produce huge amounts of electrical noise, so this connection should be robust and not shared with any other equipment. The same thinking should apply for motor-generator systems employed for emergency power.

Wiring Between Studios

Analog audio wiring between studios is as old as radio. As long as the circuits are balanced, crosstalk and ground problems should be very rare. Nonetheless, when a circuit becomes unbalanced, current can start flowing through the grounds and be difficult to find. Classic symptoms include crosstalk, and most notoriously, not being able to silence a monitor speaker all the way, even if the pot's all the way down. This is because current is being pumped into the ground, and even though the pot is at minimum, there's still a signal going from what "should be" ground into the monitor amplifier. This usually happens because someone has changed something.

A new piece of equipment might have an unbalanced input. A mono headphone plug could have been plugged into a stereo phone jack. Or an unbalanced pad has been used in a balanced circuit. This rarely happens without some form of human intervention in the recent past. It's at times such as this that the integrity of the ground system can be of major importance in quickly isolating the problem. With a flimsy ground system, incorrectly fixing a problem in one location can simply shift it to another. Knowing the logic and rules behind grounding and using them for new builds and modifications will simplify issues after the work is complete.

Mike Callaghan is the Chief Engineer at KIIS-FM in Los Angeles, CA. His email is: mc@amandfm.com

FREE

NOW THAT WE HAVE YOUR ATTENTION.

READY FOR A NEW CONSOLE?
MEET THE NEW AXIA RADIUS. NOW WITH DIAL TONE.
A LIMITED-TIME OFFER YOU'LL WANT TO "RING IN" ON (PARDON THE PUN).

PURCHASE A NEW AXIA RADIUS AOIP CONSOLE (LIST $2995) WITH QOR.16 INTEGRATED CONSOLE ENGINE (LIST $2995), AND WE'LL INCLUDE A NEW TELOS HX1 ANALOG POTS HYBRID. THAT'S $795 IN HIGH-TECH PHONE GEAR, FREE.

It's a great deal any way you look at it. You'll get the benefits of a high-performance Radius console, with eight faders, four stereo mixing buses, separate control room and studio monitor controls, built-in multi-segment LED metering, side-loading dirt-resistant faders, OLED channel displays, automatic mix-minus and more.

You also get Telos' most advanced, best-ever POTS hybrid, the Hx1. It's crammed with cutting-edge tech to make callers on even the diciest POTS connections sound great: Telos' famous Dynamic Digital EQ, pitch-shifting and studio-adaptation routines that let talent take calls over open speakers while minimizing feedback, caller-audio sweetening by the processing gurus at Omnia, front-panel send/receive meters and lots more.

"I WANT IT! HOW DO I GET IT?"

- Buy a new Radius and QOR.16 console engine from Broadcasters General Store.
- Make your purchase before September 28, 2012.
- Your Radius console arrives. Along with it comes a Telos Hx1 (with analog I/O).
- Hook up your sources with CAT-5 cable and start making great radio!

BGS

Broadcasters General Store

352-622-7700 • www.bgs.cc

Family owned and operated since 1979

Tips From the Field

– More Tips on Page 36

Tech-Tips from Radio Guide Readers

#1 Software Upgrades & A Cool Soldering Iron

from Steve Callahan

• You do keep up with the software upgrades from the manufacturers of equipment you maintain – don't you?

If the upgrades are piling up, don't do them all at once. If you do several upgrades or modifications at once and that particular piece of equipment, such as your transmitter, doesn't start, then you will not know which upgrade was bad – you'll have to undo all of your good intentions. It's better to schedule regular maintenance sessions and keep up with the upgrades one at a time. If you must absolutely do multiple modifications at one time, then take the time to check for normal operation *between* the individual upgrades.

• How many times has this happened to you? You finish a job which required your soldering iron and you have packed up and are ready to head home. Unfortunately, your soldering iron has not cooled off yet. An easy and time saving solution is to have a piece of half-inch copper water pipe in your tool box that is long enough to cover the entire heating element of your soldering iron. With the copper pipe in place, the plastic parts in your tool box will be safe from your cooling iron.

Contact Steve at: wvbf1530@yahoo.com

#2 Steps to Take for a Blown Tower Light

from Leo Ashcraft

A blown tower light is not only dangerous to aircraft it can result in a serious fine for the tower owner. Therefore it is imperative to make it a regular task to check your tower lights and make a log entry. If a tower light is out, the tower owner is required to notify the FAA. This will create a Notice to Airmen (NOTAM). This notice is available to all pilots and the FAA's NOTAM phone service, 800-WX-BRIEF.

Previously you would call the local FAA center to report the outage. Times are a changing and now, while some centers still accept calls, many are finding the phone numbers they have no longer work. The new procedure is to contact the NOTAM hotline at 877-487-6867 which will in turn route you to the proper flight center.

You will need some key information when you call NOTAM, such as the tower registration number. If you are not sure of the tower number, generally it is on the tower fence or building, and you should also be able to find it on your license – it is *required* to be posted at the tower location. Be sure to write down the reference number the operator gives you. It is best to describe the outage in your log.

Once you have notified NOTAM, the report will be good for 15 days. If you are unable to make the repairs during this time, you need to submit a new NOTAM report.

If you would like to verify your NOTAM or check a NOTAM for a specific tower you can do this on-line at https://pilotweb.nas.faa.gov/distribution/home.html. Enter the airport code preceded by a k. Ie; Dallas/ Fort Worth Airport would be kdfw. Where do you find the airport code? It is also available on-line at http://www.airnav.com/airports/search.html

A few minutes each week checking the tower lights and keeping a detailed log will keep aircraft out of harms way and keep your tower in compliance. Another good addition is an alarm system for your lights.

Contact Leo at: techtips@nexusbroadcast.com

Do You Have Tech Tips?

Email them to:
editorial@radio-guide.com

You've got more than callers on the line.

HX SINGLE AND DUAL LINE HYBRIDS

Telos is the world leader in broadcast telephone technology. We invented the first adaptive digital hybrid, and we've been reinventing it ever since. Take the new Hx1 and Hx2. With the most advanced signal processing ever, these POTS hybrids deliver consistently superior performance, regardless of telephone line characteristics. Your callers will sound amazing, even those on mobile phones.

VX MULTI-STUDIO VoIP SYSTEM

VX is the world's first VoIP broadcast phone system. With its powerful Ethernet backbone, VX is scalable from a few studios to dozens and connects to everything: POTS, T1, or VoIP. Lines are easily shared between studios. VX also features our most advanced audio processing ever. Each incoming line has its own individual hybrid, allowing multiple calls to be conferenced and aired simultaneously with superior clarity and fidelity.

NX MULTI-LINE SYSTEM

The Nx6 uses our latest digital hybrid technology for great sound, even with cell-phone callers. It handles up to six POTS or ISDN phone lines, and connects to your console via analog, AES/EBU or Livewire IP-Audio. Nx provides Caller ID, of course, and a range of hardware and software phone controllers your operators will love. Need more lines? Check out the Nx12. Handles twice the number of phone lines, and can serve two independent studios simultaneously.

Telos

AUDIO | NETWORKS

www.telos-systems.com

© 2010 - 2011 Telos, Zephyr, Livewire, VX, Nx6, Nx12, Hx1 and Hx2 are trademarks of TLS Corp.

Tips From the Field

– More Tips on Page 34

Tech-Tips from Radio Guide Readers

#3 Spilled Soda? Rice May Save the Day

from Leo Ashcraft

As much as we protect our precious portable devices such as our smart phones, ipods, etc. Sometimes the worst happens – a spill, a drop into a liquid. While this certainly can destroy electronics, as water and electricity don't play well together, the problem is more one of residue left behind by the liquid. When the worst happens, don't panic! Follow these steps and you just may save the device from the landfill.

First, quickly remove the battery. The longer current is flowing through the new liquid connections, the more possibility for damage. Next, if there is a SIM card or memory card take that out as well. If you are sure the liquid penetrated the device, gently pour a small of rubbing alcohol into the device. Otherwise wipe off the device with a cloth dipped in the alcohol. The higher the alcohol content the better. This will help to remove any residue and evaporate the liquid quickly. Be sure to shake out the excess as much as possible – you might use a bit of compressed air here to help. Be sure to wipe all the moisture off of the outside of the device. Now here is the big surprise, place the device (and battery) in a small container of uncooked rice. Use a sealed container and snap the lid in place. Wait till the next day and try out the device. You might be surprised when it functions perfectly.

I have used this method on cell phones and many keyboard spills, so far with 100% success. Of course your results and mileage may vary, but what do you have to lose at this point – it's likely bricked from your sugary soda or coffee otherwise. Some devices can take more time to dry, so the longer you can leave the device in the container the better. Next time be more careful, but when it happens you now have a bit of knowledge that just may save your device from the trash.

Contact Leo at: techtips@nexusbroadcast.com

#4 A Little FCC Inspection "Insurance"

from Leo Ashcraft

The FCC inspector is in the lobby and wants to inspect your station! This can be an extremely stressful situation if you aren't prepared. Suddenly you envision all the things that you might have neglected by accident or procrastination. But he is here and he is not coming back later. Of course the best course of action is not to procrastinate and make sure your Public File is in order and neatly organized. Make sure your logs are meticulous, but eventually we are all going to miss something.

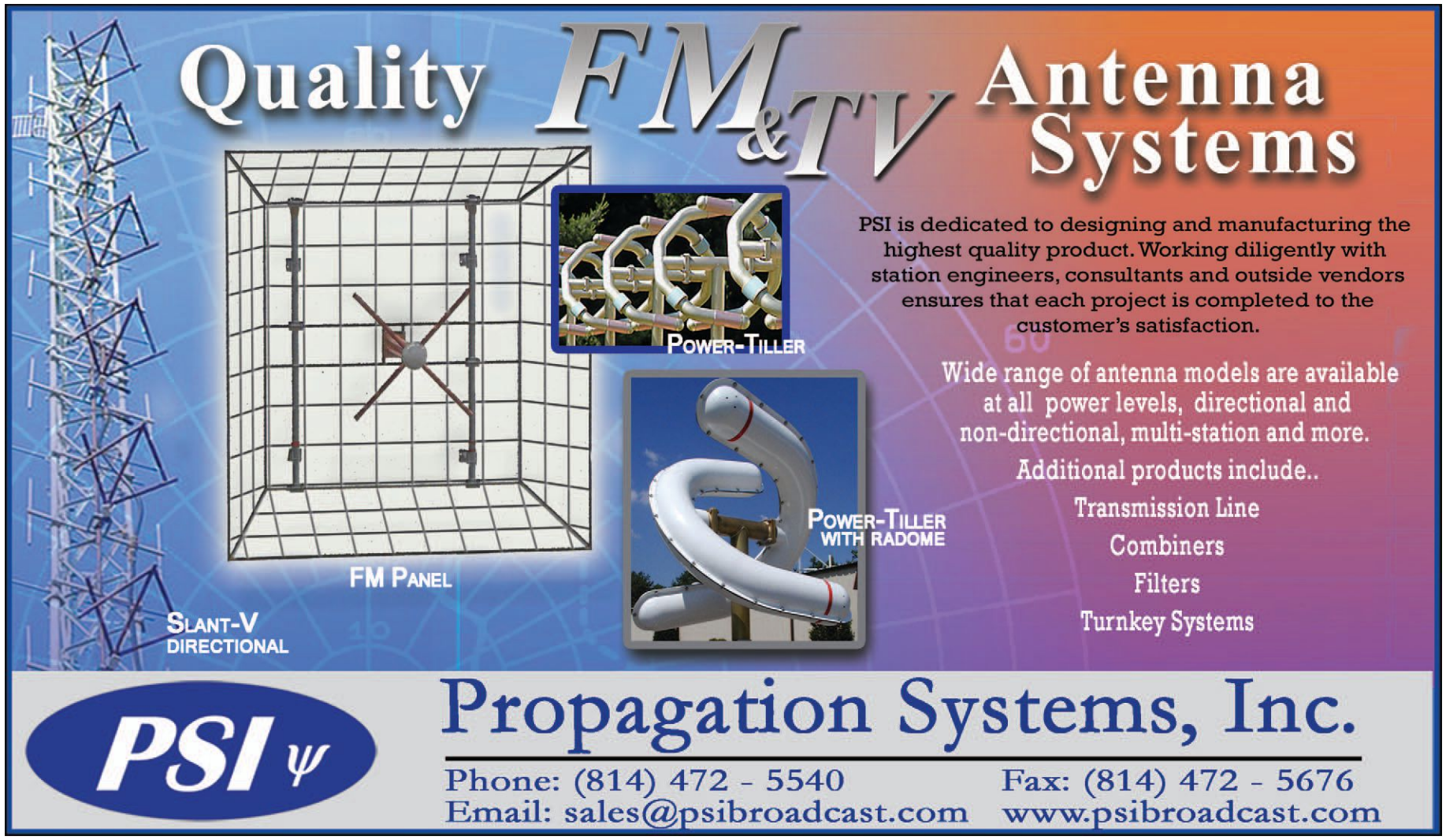
Beyond planning, there is a bit of insurance broadcasters can put in place to avoid costly fines and embarrassing FCC inspections. Interestingly many stations don't take advantage of this valuable insurance – a way to make the FCC inspector happily go away or never show up at all.

What is this valuable service that could make such a nightmare simply go away? A sort of rehearsal inspection where you cannot be fined for violations found during the inspection. Many state broadcasters associations have made arrangements with the FCC to *not* perform random inspections of stations that pass the ABIP inspection for three years. You simply pay your state broadcasters association to inspect your station instead, post the certification, and sleep better.

This is just like an FCC inspection, without the FCC inspector. You will still of course be required to correct any infractions, but they will not be reported to the FCC. Once the infractions are corrected, a certificate of compliance will be issued. In addition to a technical inspection, the association inspector is well trained on matters of the Public File. They will work with you going through the self-inspection checklist, and help you answer the questions properly.

However, if you are operating with blatant violations, with variations from your license – ie, a six bay antenna when you are authorized for four, you can expect a visit from the real FCC inspector. If your transmitter is improperly maintained and wiping out the local EMS, you can also expect a visit from the FCC.

Contact Leo at: techtips@nexusbroadcast.com



SCALABLE

AUDIO PLAYOUT

USER FRIENDLY

AUTOMATION

ENCO DOES FLEXIBILITY.

RELIABILITY

INTEGRATION

IP AUDIO

SMALL MARKET

NON-COMM

PUBLIC

MAJOR MARKET

LIVE ASSIST

NETWORK HEADEND

REDUNDANCY

PROCESS CONTROL

MIGRATION

REMOTE VOICE TRACKING

METADATA

DISTRIBUTION

CONTENT MANAGEMENT

COMMERCIAL

COMMUNITY

Small Market or Large.

One Studio or Two Hundred.

Live Assist, Automated,

or Anything In Between.

ENCO Has the Solution

That Fits Your Size

And Your Budget.

ENCO Does Flexibility.

What Can ENCO Do For You?

enco.com/radio

(800) ENCO-SYS

LPFM Guide

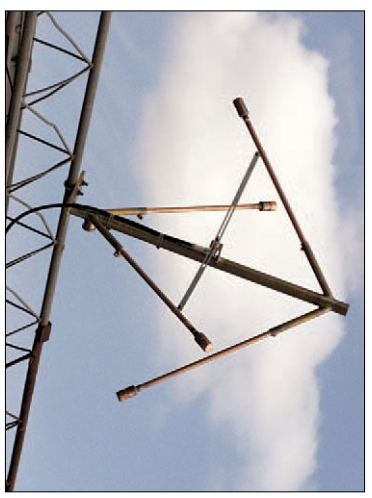
Spinning the FM Broadcast Signal

by Leo Ashcraft

In a previous ***Radio-Guide*** article we touched on various types of FM Broadcast antenna systems. There is a big misconception that all antennas are the same. Many think that they all will work – which they will to some extent. The problem is an LPFM station is Low Power, 100 Watts ERP with fairly low antenna height – 100 feet HAAT. With a system like that, the antenna system, including the coax, is key to coupling your hard work into the ether. While all antennas do just that, they all do it with varying levels of efficiency. One of the most significant factors determining the success or failure of any FM broadcast station is the quality and coverage of its signal. A station that does not provide a clean, interference free signal in its coverage area cannot expect high audience cumes, regardless of programming, equipment, etc.

While I have established my clear preference for an antenna based on the "Penetrator" design, I promise to go into further detail in a future article.

There is one caveat to this improved propagation. Since we are no longer transmitting in a single plane, the gain of the system is greatly reduced. Just as receiving a transmission which was originally transmitter horizontally, receiving it with a vertical antenna would result in a much lower received signal. Since most receivers in vehicles are vertically polarized (unless they are embedded into the windshield) the obvious answer would be to transmit your signal vertically. However, this also has its own set of signal issues. In low power operations with low HAAT, this can create a unique multipath problem. The multipath is created as the angle of radiation drops quickly at low HAAT installations. Within a few miles, the signal is already running into power poles, buildings, etc. This can cause what is described as a picket fence sound when the multipath cancels the main signal briefly. If there is interference on the frequency, this problem can be greatly aggravated. The slower you drive, the longer the interference periods. Sometimes stopping within a wavelength from the pole will completely cancel your signal. Moving ten feet or so will clear it up. These are problems inherent in vertical transmission.



Model JLLP from Jampro

Additionally, reception by vehicles with antennas embedded into the windshield and home receivers is greatly reduced by using vertical transmission. (Embedded antennas and home receivers generally use a horizontal type antenna.)

Have My Cake and Eat it Too?

Obviously horizontal transmission is not the answer as this would harm vehicle reception. Can we have it both ways? The answer is yes, and the solution is a truly circularly polarized antenna.

Circularly polarized antennas were originally developed for use in satellite communications. They have a very long way to travel with fairly low power. Since the ionosphere is difficult to penetrate reliably, circular polarization was the answer. By literally spinning the signal from the transmission side, the signal more easily penetrates the ionosphere and also finds its way through holes in weather and the atmosphere. This same penetration feature can be harnessed for FM Broadcast. In fact most commercial FM stations in the United States utilize this polarization method.

What About Us Earthlings?

Down on earth, when a circularly polarized FM broadcast meets obstacles, there is still an absorption problem – we haven't invented something that just ignores these objects yet. But instead, since the signal is spinning, it simply goes around the object. It gets its name because it seemingly penetrates objects. But what it really does is throw your transmission into all possible planes. This allows it to sneak through non-obstructing "holes," such as windows, between the trees and leaves, between the clouds, etc. *(Continued on Page 40)*

BROADCAST CONNECTION
equipment solutions

from the studio to the antenna

full line broadcast equipment supplier

Contact our experienced team of specialists for all your radio needs.

Max Brown	Terry Becht	John George	Ken Perkins	John Shideler	Eric Wandel
Mukilteo, WA	Canyon Lake, TX	Lexington, SC	Evergreen, CO	Mesa, AZ	Newburgh, IN
719-650-6330	830-899-7012	803-951-7443	303-674-6566	970-227-1405	812-490-7947
Max@broadcastconnection.com	terry@broadcastconnection.com	john.george@broadcastconnection.com	ken.perkins@broadcastconnection.com	john@broadcastconnection.com	eric@broadcastconnection.com

www.BroadcastConnection.com

Array Solutions Your Source for Outstanding Radio Products

Top-ranked Measurement Equipment from Array Solutions

Announcing the NEW: PowerAIM 120
Vector Impedance Analyzer for Broadcast Engineers

- Patented, unique technology offers the broadcast engineer the full capabilities of a single port network analyzer
- Small, lightweight, software-driven instrument
- Easy to carry on airlines and in the field.
- Very simple to set up and use.
- Safe measurements in RF-dense broadcast environments.
- Time Domain Reflectometer (TDR) Functions.

PowerMaster II

- New Larger, Sharp & Fast LCD Display
- Reduced Energy consumption
- USB and RS-232 interface built-in
- New - Both 3kW and 10kW couplers on one display - switched
- Hi / Lo Power Level Monitoring
- Supports 2 like couplers simultaneously (3kW & 3kW, 3kW & V/UHF, 10kW & 10kW)
- SWR Threshold Protection (with amp PTT bypass)

Single and Dual Rack Mount available
New "Power Master Basic" Software FREE!

Vector Network Analyzer Model VNA 2180

Measures impedance magnitude, phase and transmission parameters for antennas, filters, and discrete components - using one or two ports.

- Frequency range is 5KHz to 180MHz.
- Data plots include: impedance, SWR, return loss, S11 and S21.
- Plots can be saved for before and after comparisons.
- Dual Smith charts with zoom and rotation.
- Time Domain Reflectometer (TDR) Functions.
- New – 6 port VNA multiplexer for measuring directive arrays including Phase/Magnitude vector scope software.

AIM *uhf* Analyzer

- Frequency range from 5 kHz to 1 GHz.
- Data plots include SWR, RL, R + X, series and parallel, magnitude, phase, and more.
- Dual Smith charts with rotation and 20 markers.
- Plots and calibration files can be saved and used anytime in CVS and dynamic formats.
- AIM 4170C is still in production covering 5kHz to 180 MHz.
- Time Domain Reflectometer (TDR) Functions.

Other Quality Products from Array Solutions...

ACOM	Phillystran, Inc.	RigExpert	Prosistel Rotators	OptiBeam Antennas	Hofi®
Sales and Service for Amplifiers and Accessories	Official Worldwide Phillystran Distributor	Analyzers and Interfaces	Strongest Rotators on the Market	German Engineering means High Performance	Surge Arrestors & Antenna Switches

ARRAY SOLUTIONS

www.arraysolutions.com

Sunnyvale, Texas USA
Phone 214-954-7140
sales@arraysolutions.com
Fax 214-954-7142

Array Solutions analyzers are used by amateur, commercial, and professional broadcast engineers. See our web site for other products and additional details on these analyzers.

LPFM Guide

Spinning the FM Broadcast Antenna

– Continued from Page 38 –

The resulting reception also enjoys a much cleaner broadcast for stereo reception due to a greatly reduced multi-path effect.

This is a very unique looking design and the signal coming from the antenna has a true spinning motion. This spinning signal is in *all* planes and is able to penetrate through spaces – thus the name "Penetrator." There are various manufacturers of these type of antennas. They have very recognizable appearance of two arrows at a 45 degree angle inside one another. They are also highly effective at improving situations where interference is causing problems with your coverage.

Interference Reduction

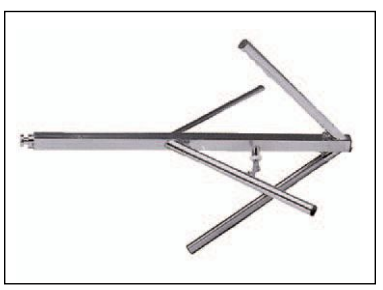
Since many Low Power FM stations are in the non-reserved band (92.1 - 107.9 MHz) they are susceptible to interference from commercial FM stations. Going up against one of these, even from a distance, can be troubling for a low power station. This situation is aggravated if you are using a vertically polarized or elliptically polarized antenna.

Where your signal is weakened by multi-path and blocked by vertical obstacles, the circularly polarized commercial broadcast will fill in the gaps. Since this can be an annoying situation for the listener, a truly circularly polarized antenna system will greatly reduce this type of interference.

OK, you understand CP antennas are the way to go – but you still must be careful selecting these as well. If you think all CP antennas are the same, again, you may be working with assumptions, with no real world evidence. Many manufacturers sell a circularly polarized antenna system, which is not in fact circularly polarized! These are generally reputable manufactures who are making an antenna which actually is sending out an elliptical signal, basically at a single 45 degree angle. While many times this may actually work better than a simple vertical or horizontal antenna, it is not a true CP antenna. You will see better results, but you are still throwing away much of your signal!

What to Buy?

There are several manufactures of circularly polarized antennas, such as Jampro, Bext, PSI Broadcast and SWR. I personally like the BKG77 model as it is stainless steel and much lighter than the other models, which are built from either brass or copper, or a combo of both. The BKG 77 also comes pre-assembled in a folding fashion which greatly eases installation and reduces mistakes from putting the antenna together. Most antennas are sent semi-built to reduce shipping costs. If you are using a light gauge tower, the lighter BKG77 is the best way to go. Your tower will thank you.



BKG-77 from Nicom

Many years of real world testing on many FM radio stations around the U.S. have always confirmed my testing results of CP antenna systems. While I no longer sell or install equipment myself, my recommendation of this type of antenna continues to be relevant. The primary function of vertical broadcast antennas through recent years has been generally related to protection of the TV 6 AM television carrier when the FM station is located in the lower end of the reserved non-commercial band. In many cases due to FCC regulations, vertical transmission was the only option available. Today with the digital transition, most TV 6 stations have migrated to higher frequencies and these regulations may no longer effect your installation.

Model FML from PSI Broadcast

Leo Ashcraft is CEO of Nexus Broadcast "Broadcast Outside The Box!" He is a broadcast consultant with over 28 years engineering experience and an avid LPFM advocate for over 15 years. More information at NexusBroadcast.com or 888-732-3599

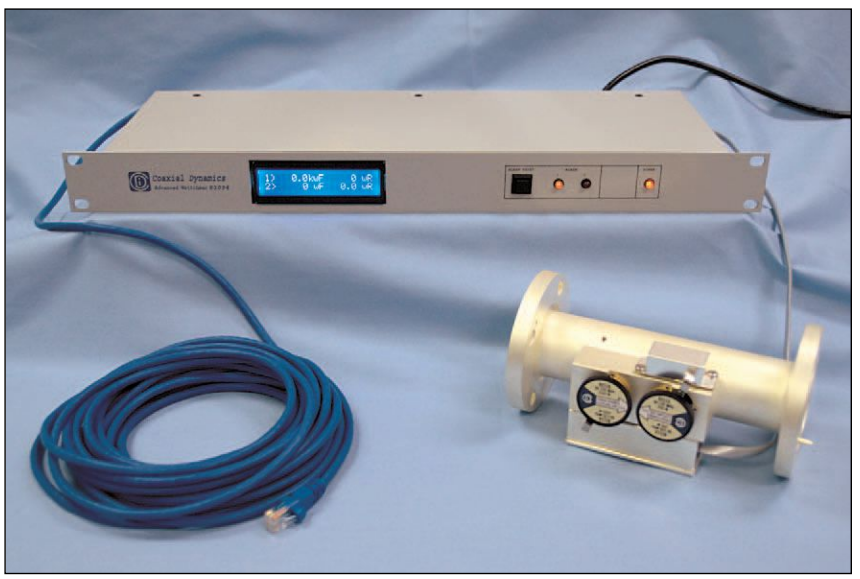
Coaxial Dynamics

Model 81094

Advanced Wattchman® Monitor/Alarm For Analog and Digital Broadcasting

The Model 81094 is the first in a series of Internet/Intranet accessible Advanced Wattchman® Wattmeter/Alarm systems that will monitor both forward and reflected power in two transmission lines with only one controller. Unlike previously available systems that needed one controller for each transmission line, the Advanced Wattchman® will monitor two lines (4 ports). The front panel display shows power on both systems simultaneously. Operating conditions may also be displayed on a PC from any location on the Internet/Intranet.

- Protects Your Transmitter System
- Bright Fluorescent Display
- Continuous Display for Two Systems
- Remote Display and Control
- Audio and Visual Display of Faults
- Power Range: 1 Watt to 100 kW
- Frequency Range: 2 MHz to 2.3 GHz
- Modulation Type: Analog Elements (FM, CW)
- Accuracy: +/- 5% of full scale
- Master alarm plus one alarm for each system.
- Nominal Size: 1-3/4" H x 19" W x 7" D - 1RU
- Two Year Limited Warranty



Coaxial Dynamics

1-800-COAXIAL • 440-243-1100

www.coaxial.com

ECONCO

Rebuilt Power Tubes

Approximately One Half the Cost of New

3,000 Hour Unconditional Guarantee

Call for Your Quotation

ECONCO

Phone: 530-662-7553 • Fax: 530-666-7760
Toll Free: 800-532-6626
www.econco.com
1318 Commerce Ave, Woodland, CA 95776

MAKE WAVES

MADE IN USA

EXPECT MORE FROM YOUR AM TRANSMITTER

Presenting the Armstrong Transmitter X-1000B

Bring major market sound to your radio station with the dual, hot-swappable 600 Watt RF modules capable of 150% modulation in Armstrong Transmitter's X-1000B, (1KW HD & DRM ready AM transmitter).

Engineered with the latest technology advances, X-1000B offers high reliability and built-in redundancy. Get ready to save money while improving your sound and reliability. Call us today!

ARMSTRONG
TRANSMITTER CORPORATION

Tel 315-673-1269 ▲ sales@armstrongtx.com ▲ www.armstrongtx.com

---

AARLON

AS YOU UPGRADE YOUR STATION, UPGRADE YOUR REMOTE CONTROL

THE MOST ADVANCED IP & POTS REMOTE CONTROL SYSTEM ON THE MARKET

AN IP AND POTS DELIVERED GUI BASED REMOTE CONTROL SYSTEM THAT INCLUDES A WEATHER STATION, STREAMING STEREO AUDIO RETURN, VIDEO CAMERA FEED AND MUCH MORE.

www.AARLON.com | Email: aarlon@aarlon.com

Bay Country Broadcast Equipment

Buy • Sell • Trade

Your #1 Source for Quality Used Radio Broadcast Equipment

View our latest list of equipment on-line at:
www.baycountry.com
Or call and we will fax it to you.

All equipment sold with a 15 day return guarantee.

Turn Your Excess Gear Into Cash

Fax or email your list to us and we will respond with our offer promptly.
We only buy good working equipment with traceable serial numbers.

Fax Your List Today – 443-596-0212

Welcome to Bay Country BROADCAST EQUIPMENT

http://www.baycountry.com
(Website Updated Daily)

E-mail: sales@baycountry.com
877-722-1031 (Toll Free) 443-596-0212 (Fax)
7117 Olivia Rd, Baltimore, MD 21220

Small Market Guide

Aliens in Small Marketville

by Roger Paskvan

We had just signed on a new AM radio station several days ago, I was looking forward to a breather after months of construction. Then the phone rang.

It was our neighbor, the guy next door to the radio station. He had called to inform me that some kids were having a party at our AM tower site and we should do something about it. "They got their loud stereo up and it's keeping me awake," he said. I thanked him and said I would check it out.

Driving to the tower, I found no one at our AM array. They must have been tipped off and vacated the place or saw my car lights off the highway.

The following night, my neighbor called again and told me in so many words that just about every night there are kids having a party and playing loud music. He went on to say that this is really causing him some sleep issues. I again drove to our tower site and looked around. No evidence of any parties, kids, car tracks or anything out of the usual – an empty field.

The next day I went over to the neighbor to discuss this problem. I explained that I had been at our tower site each night that he called and found no one. He said, "Look, I'm not crazy, there are kids out there at night trespassing on private property and they have some kind of boom box playing. I can hear them talking plain as day!"

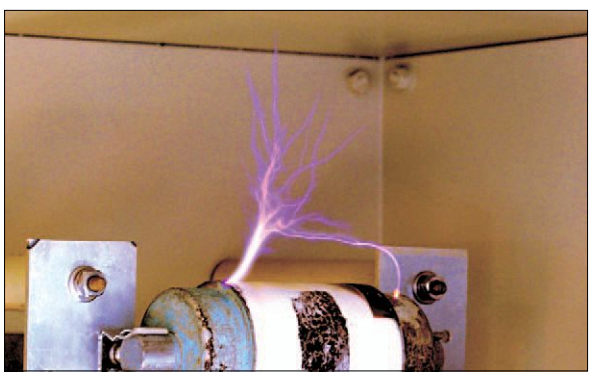
In the morning, I posted No Trespassing signs on our AM tower property. I was told that if the property was clearly posted, the police could arrest the people.

Two more days went by, and at 2:00 AM my phone rang. It was the police telling me that they had received a complaint of loud music around our towers. Meeting the officer at the tower site, there was no one to be found. The officer said, "Either these guys are real good, or they must be aliens that vanish on command. Kids, now-a-days, no respect for private property."

As we got into our cars, a sudden burst of music emanated out of the fenced tower, 100 feet in front of us. Making our way to the tower, the officer yelled, "Okay turn off your boom box and come out of there." No one responded and the music continued. It then quit. The officer yelled again, "Come out, we know you're in there." The music started again, and I recognized the culprit was at least was listening to our AM station. The music ceased! "Put the radio down and come out with your hands in the air," the officer yelled. "You're trespassing on private property." No answer. The music started again, even louder this time.

The officer made his way to the tower gate. The music stopped. He drew his stun gun and kicked the gate open, shining a flashlight at the tower. I watched from behind, waiting for some high school kids to run out. There was no one. We both searched the fenced area around the tower. "Must be aliens or this guy knows how to vaporize with the boom box," the officer commented. We closed the gate, looked at each other and started for our vehicles. Like magic, the music came back loud and clear, like they were just teasing us! We both ran for the tower gate and yanked it open. No one there, but the music was still blearing out of the new 4 x 4 tower matching network box.

I unlocked the metal cabinet and *wow!* There was an eerie yellow arc about six inches long, dancing around the components. It lit up the whole cabinet and the voices were actually coming from the arc flame just like a speaker. The sound quality was amazingly clear and it danced around various components then suddenly vanished!



We both laughed, but this was one incredible sight. The sound came and went at will, as the arc would find enough power to sustain itself. Never in all my years of engineering, had I seen anything that even comes close to this singing, six-inch arc. It would make a great science project, but the reality is we cannot have this continue.

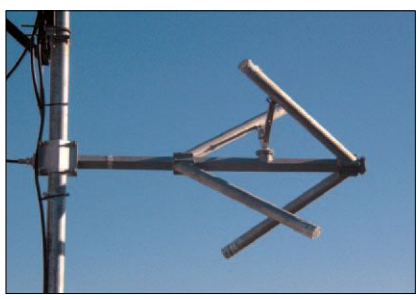
Currently we are working with the phasor designer to figure out how to cure this broadcast science project so my neighbor can get some sleep.

Just another exotic chapter in small town radio.

Roger Paskvan is an Associate Professor of Mass Communications at Bemidji State University, Bemidji, MN. You may contact him at: rpaskvan@bemidjistate.edu

Micro Communications, Inc.

Full Line of FM Products



FM Antennas

Horizontal Polarization
Vertical Polarization
Circular Polarization
Top Mount
Side Mount
Leg Mount
Custom Patterns

Coaxial Components

Coax Switches
Filters
Power Combiners
Channel Combiners
Transmission Line Components

Micro Communications, Inc.

PO Box 4365, Manchester, NH 03108
Phone: 800-545-0608 • Fax: 603-624-4822
www.mcibroadcast.com • sales@mcibroadcast.com

Gorman Redlich Mfg. Co. is CAP-able

The CAP-DEC1, Gorman-Redlich is a standalone CAP-to-EAS converter for use with your existing emergency alerting equipment.

This cost-effective device allows broadcasters to easily meet Common Alerting Protocol (CAP) compliance requirements mandated by the FCC without requiring the purchase of an additional encoder/decoder system or other costly equipment.

The CAP-DEC1 is CAP 1.2 compliant and requires only one unit of rack space. Trust the experts with over 35+ years experience in the emergency alerting industry to help you meet your broadcasting needs.

Visit our website or contact us today for more information about the Gorman-Redlich CAP-DEC1. We continue to support equipment we made 35 years ago.

- Compatible with any existing EAS encoder/decoder made by any manufacturer
- FEMA Independent lab affirms CAP 1.2 compliance
- Powerful 1.6 GHz dual core processor and 1 GB of memory
- Built-in text-to-speech conversion functionality
- FAST Gigabit network capability with built in firewall for security
- Options to print, store or email logs via built-in email server
- Five (5) USB ports for peripherals
- Nearly limitless storage capacity for logs and audio messages
- Automatic clock synchronization via NTP servers
- Software can be updated via LAN or USB
- Print alert reports to USB or network printer
- Polling 3 URL's currently with room for future expansion
- Built-in email server to send log information

Gorman-Redlich Mfg. Co.
www.gorman-redlich.com
257 W. Union Street, Athens, OH 45701
Phone: 740-593-3150

Give your MAC some ears!

AM/FM Broadcast Monitor · FMBM

Davicom's AM/FM Broadcast Monitor offers a surprising number of advanced features in a compact, low-cost package.

It integrates directly into Davicom's MAC line of remote control systems and monitors transmitter power, modulation and carrier frequency.

The FMBM can also be manually configured and operated.

Intelligent Site Monitoring

t. 1.418.682.3380 | f. 1.418.682.8996
www.davicom.com

TRANSCOM CORPORATION

Serving the Broadcast Industry Since 1978

Visit Our Website – www.fmamtv.com
Send your e-mail requests to: transcom@fmamtv.com

Fine Used AM & FM Transmitters & New Equipment

AM	2.5 kW	1991	Nautel Ampfet ND2.5 - *Solid State*
	5 kW	1991	Nautel Ampfet ND5 - *Solid State*
	10 kW	1991	Nautel Ampfet ND10 - *Solid State*
	10 kW	1999	BE AM10A
	Please see our current listings on our website.		
FM	100 W	2008	BE FM100C
	500 W	1998	BE FM 500C
	5.0 kW	1997	Harris Z5CD - *Solid State*
	10.0 kW	1993	Harris Platimun 10CD - *Solid State*
	10.0 kW	1998	Harris Z10CD - *Solid State*
	20.0 kW	2006	BE FM20S - *Solid State*
	30.0 kW	1988	Harris FM30K
	Please see our current listings on our website.		

USED MISC. EQUIPMENT:
Used Bird Wattmeter with Elements
Orban Optimods 8100XT, 8100A

EXCITERS / GENERATORS:
New – 30W Synthesized Exciters
Used BE FM30, SCA Generator
Used BE Fxi250 exciter, FM Analog Exciter

Please go to our website for updated listings.
Retuning and testing available – call for quote!

OMB STL systems for radio, complete with antenna and cable for under $5,000!

2655 Philmont Ave, Ste 200, Huntingdon Valley, PA 19006
800-441-8454 • 215-938-7304 • Fax: 215-938-7361

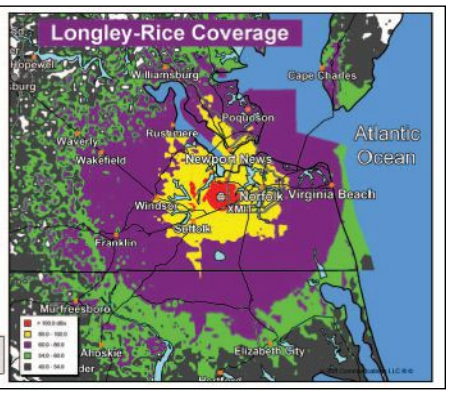
Service Guide Radio Equipment Products and Services

BAUER TRANSMITTERS, INC.
www.bauertx.com

BAUER - ELCOM BAUER - SPARTA - CETEC
Re-Manufactured
Bauer Transmitters Available
AM/FM – 2.5 kW to 25 kW
www.bauertx.com paul@bauertx.com
915-595-1048 Fax: 915-595-1840

V-Soft COMMUNICATIONS® R.F. Communications Software and Engineering Consulting
The Leader in Broadcast Engineering Consulting Software!
- Use Probe 4™ to create stunning "real-world" coverage maps using Longley-Rice and other models.
- Run Terrain-3D™ to plot STL paths and Longley-Rice coverage over 3D terrain.
- Run AM-Pro 2™ to perform AM skywave and groundwave allocation studies, interference analysis, & coverage mapping.
- Use FMCommander™ to study FM allocations using contour-to-contour protections. and minium spacings.

www.v-soft.com • info@v-soft.com • 1-800-743-3684



BROADCAST WORKS
Full Service Broadcast Engineering
Project Management - Studio Build Outs
Transmitter Sites - IBOC Installation
Automation Systems - STL & RPU Repairs
Full Service Shop - Emergency Equipment Rental
24/7/365 Tech Support
We can team up with your engineer to supply extra manpower for big projects – or we can see your project through turn-key.
Serving Broadcasters for over 12 years.
888-509-2470 • www.broadcastworks.com

Delta Meccanica
Specialists in FM equipments :
- Accessories
- Filters
- Combiners
- Switching units (Manual & Motorised)

Broadcasting Division – ITALY-, www.deltameccanica.com, info@deltameccanica.com , Phone +39 0763 316 222, Fax +39 0763 316 267

Professional Engineering Services
★FCC Applications
★Coverage modeling
★RF exposure limit reports
★STL & microwave path analysis
★Co-location and interference studies
★Expert witness testimony by P.E.s
www.rfengineers.com
RFEngineers, Inc. 352-367-1725

DANGER

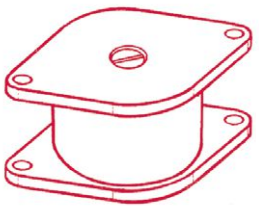
Old Safety Sign.
High Liability!
Replace Immediately!
RFSigns.com
- ANSI Z535.2 Compliant
- Easy to order

Doug Vernier
Telecommunications Consultants
- FCC Applications for AM, FM, TV, DTV, LPTV, STL
- Upgrade and Due Diligence Analysis
- Frequency Searches
- Site Relocations
- Propagation Prediction with Custom Mapping
- Demographic Analysis
- Directional Antenna Design

V-Soft COMMUNICATIONS® We use V-Soft Software!
www.v-soft.com consulting@v-soft.com 800-743-3684

Alert Monitors
BA6 self contained, 6 channels, free labels 349.00
BA12 with controller, 12 channels, free labels 549.00

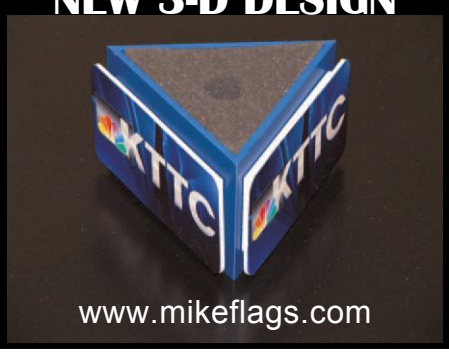
enbergelec.com

TRANSMITTING
CAPACITORS
MICA-VACUUM-CERAMIC

SURCOM ASSOCIATES, INC.
(760) 438-4420
LINK@SURCOM.COM

M. Celenza
Communications Consultant
FM • LPFM • AM • DTV • STL • Translators
Preparation of Applications, Amendments, Channel Studies, New Allocations, Relocations Interference Studies, and Coverage Maps
Call: 631-965-0816
41 Kathleen Crescent, Coram, NY 11727
msccommunications@yahoo.com

Nexus Broadcast
Broadcast Technical Consultants
☑ FCC Applications Preparation
☑ Frequency Searches
☑ Site Relocations
Over 20 years engineering and consulting experience
Try Calling Us using a QR code reader!
888-732-3599
NexusBroadcast.com

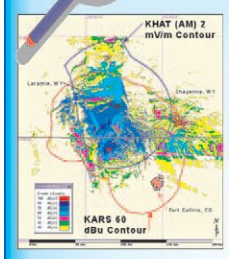
RF PARTS™ COMPANY
From Milliwatts to Kilowatts℠
Eimac • Amperex • Svetlana • M/A-Com
Motorola • Toshiba • Philips • Mitsubishi
Se Habla Español • We Export
800-737-2787
760-744-0700 Email: rfp@rfparts.com
www.rfparts.com

NEW 3-D DESIGN


www.mikeflags.com

Service Guide Radio Equipment Products and Services

rf Investigator V 3.0



FM...AM...or Both
You choose!
rfSoftware, Inc.
innovative engineering tools

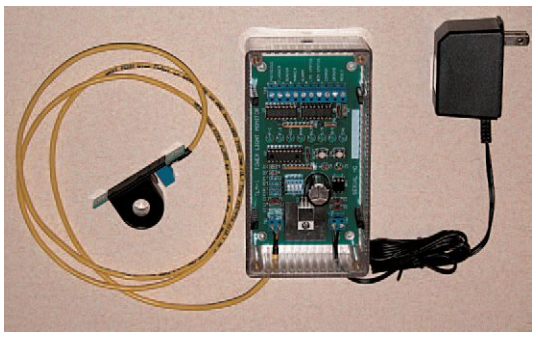
Are you tired of switching from program to program to complete a project?

How about displaying your drive test output on top of your Longley-Rice prediction to SEE how your station is operating.

Save *time, money, and hard drive space,* with software that gives you all the tools in one program to work *smarter not harder.*

Call 352-367-1700 for Details!
Visit www.rfsoftware.com Today

TLM-1 TOWER LIGHT MONITOR
Total Monitoring for Older Lighting Systems



A microprocessor based system designed to monitor the status of FAA type A incandescent tower lights.

- Individual alarms for photocell, flasher, beacon & marker.
- Status outputs for lights on/off and beacon on/off.
- LED indicators for each alarm and status output.
- Opto-isolated fail-safe outputs for each alarm.
- Easy setup – one button calibration.
- Installs at the circuit breaker panel.
- Available through broadcast distributors.

FM Services
www.towermonitor.com • 336-667-7091

MOORETRONIX
BROADCAST & INDUSTRIAL ELECTRONICS

Our 12th Year

Our client list continues to grow. Thank you for your confidence and equipment purchases.

We Re-Condition

Pacific Recorders BMX I-II-III, AMX, ABX and RMX, Stereo-Mixer and Mixer News-Mixer products.

We Have

Replacement Wind Screens and Blast Filters for the SM-5B microphone.

We Repair & Re-Crystal

STL Transmitters, STL Receivers, and RPU equipment.

See the "News-Update" page at our website.

Tel: 800-300-0733 Fax: 231-924-7812
WWW.MOORETRONIX.COM
E-Mail us at: rrmoorejr@aol.com

Give us a call at 352-344-2983

Repairs and Maintenance • Project Management • Engineering Assistance • Studio Build Outs
Transmitter Site Builds • HD Installs and Upgrades • Due Diligence Inspections

itinerant engineers

At Itinerant Engineers, we are committed to seeing you get the most out of today's technology. We have helped many smaller market stations and know how to stay within a budget and still achieve the highest quality facilities. We work with several manufacturers to provide the best equipment at the lowest prices.

Visit our website at www.ieengineers.com • E-mail us at info@ieengineers.com

RECEIVERS

OUTSTANDING specifications and pricing on professional quality receivers for EAS, station monitoring and translator applications.
The AFC3 is a three receiver rack mount that is configured for your EAS or monitoring specific application.
Our AF210FM receivers meet today's Translator application specifications for reliability, linearity and cost.

DAYTON INDUSTRIAL CORPORATION
2237 Industrial Blvd., Sarasota, FL 34234 Tel: (941) 351 4454
Quality Receivers Designed and Manufactured in the USA
Email: sales@daytonindustrial.com Website: www.daytonindustrial.com

BESCO INTERNACIONAL
World Leader in AM-FM Transmitters
Complete Inventory at:
www.Besco-Int.com
Pre-Owned AM-FM units in stock!
R.E. Witkovski - President
Rob Malany - Vice President
Sales: (321)-960-4001 Email: Sales@Besco-Int.com

TOWER SIGNS
antennaID@msn.com
E-MAIL FOR FREE PDF CATALOG
FCC TOWER SIGNS
FCC ASR - CAUTION - DANGER - RESTRICTED SIGNS
ADD YOUR CONTACT NUMBER & WORDING TO ANY SIGN NO ADDITIONAL COST
ANTENNA TAG SETS 4 EACH & NUMBERED
RED GUY WIRE MARKER BALLS YELLOW GUY WIRE GUARDS
ANTENNA ID PRODUCTS
610-458-8418 610-458-5575 www.antennaID.com

Chris Scott & Associates
Visit our website
www.scott-inc.com
Ph: (270)781-5301
Fax: (270)781-1232
Bowling Green, Kentucky

Professional Equipment Repair
at Lightner Electronics, Inc.
- Consoles
- Exciters
- STLS
- Automation Systems
- Audio Processors
- Transmitters
- Remote Equipment

Toll Free: 866-239-3888
www.LightnerElectronics.com

Gear Guide

Visit our equipment website at: www.radiogearguide.com

DM Engineering - ENCO Systems - Omnia Audio

DM Engineering – MSRA-RM

Control up to 4 stations with your Sage-Endec, reliably and economically!

The DM Engineering MSRA-RM (rack mount) and MSRA (table top) Multi-station Relay Panel is totally compatible with both the Sage-Endec 3644 Digital (in analog audio mode) and the original SE1822. Features included: fail safe, gold clad relay contacts to assure no program audio loss during power failure conditions, individual station EAS audio gain controls, L & R balanced stereo or mono audio inputs and outputs for each station, LED indicators showing EAS relay activation for both left and right channels, and Eurostyle pluggable I/O connectors for secure and positive connections.

Installation and Endec programming is easy and straight forward, allowing control of up to a total of four stations. Detailed instructions for Endec programming and set-up are included. The MSRA-RM and MSRA are available at most major broadcast distributors without long delivery wait times, and priced significantly lower than competitive products.

For more information: **www.dmengineering.com**

ENCO Systems – ENCO1

Virtualize your radio station's automation system with ENCO1, by ENCO Systems.

ENCO1 is a drastic departure from the traditional model used by broadcasting facilities for automation system design and integration. It allows broadcasters to take advantage of all the benefits of operating their radio automation system in a virtualized environment by utilizing existing IP Audio technologies in a pair of specialized servers along with inexpensive thin clients.

This virtualized environment simplifies deployment, increases efficiency, lowers operating costs, and offers high availability as the risks of downtime are eliminated. ENCO1 is capable of replacing 5, 10, 20 or more workstations and servers in a single facility. For more information on this revolutionary product please visit www.enco.com or contact ENCO sales at 800-ENCO-SYS.

For more information: **www.enco.com**

Omnia Audio – Summer Trade Up Deal

Omnia clients are constantly telling stories about their first Omnia audio processor. They remember how it felt when they first fired up that fire-breathing Omnia-6FM, and the difference that it made to their station's sound.

Now, Omnia Audio has a way for stations to experience that thrill all over again: The Omnia Summer Trade-Up Deal.

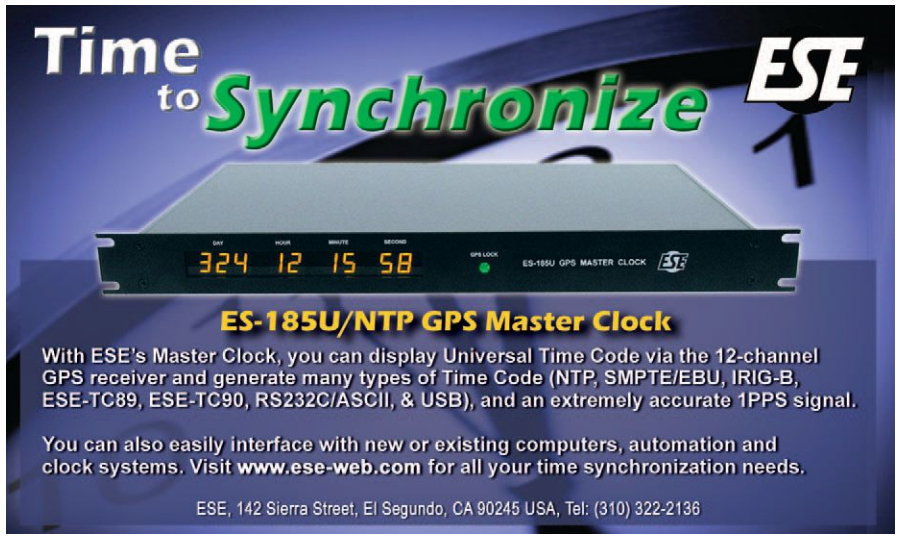
Under the terms of the newly-announced deal, broadcasters with Omnia.fm Classic, Omnia.fm Hot, Omnia-4.5, Omnia-5 or Omnia-6 processors can use those faithful friends to take their stations to an even higher level of market domination Any of the models mentioned is good for a $4,000 trade-up allowance toward a brand new Omnia.11 FMHD.

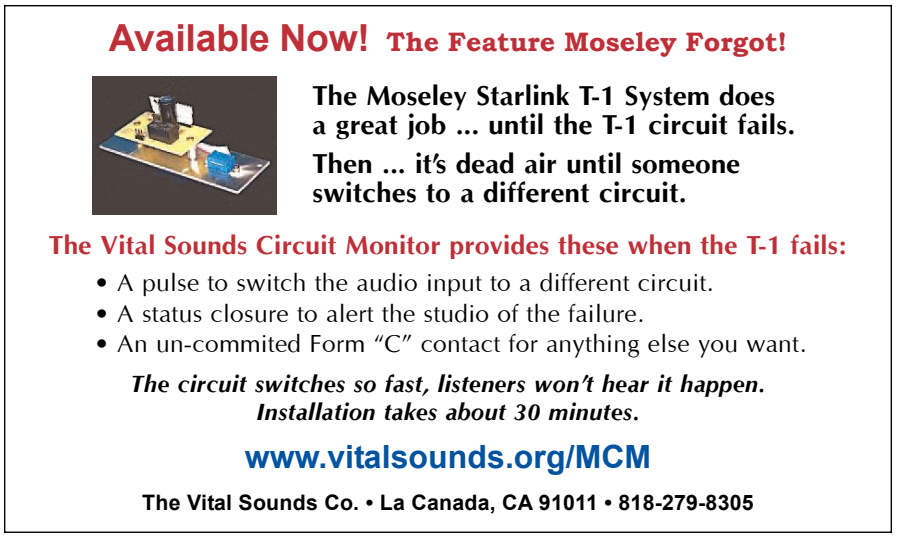
"This is our way of saying 'thank you' to the many, many broadcast professionals who care about audio processing," says Omnia Audio Director of Marketing Denny Sanders. "Thanks to them, Omnia processors are the choice of winning stations everywhere. This trade-up deal is our way of recognizing their loyalty and leadership."

For complete details on the Summer Trade-Up Deal, Omnia owners can contact their favorite Omnia dealer.

But remember: This is a summer-only opportunity. So when the leaves start changing color, your chance to take advantage of this deal will be gone like a summer breeze.

For more information: **www.omniaaudio.com**





Final Stage

RADIO ROUNDUP

The Radio Guide Event Register

Email your dates and info to: ***radio@rconnect.com***

NAB 2012 Radio Show
September 19-21, 2012
Hilton Anitole, Dallas, Texas
www.radioshowweb.com

Broadcasters Clinic & National SBE Meeting
October 9-11, 2012
Madison Marriot West, Middleton, Wisconsin
www.wi-broadcasters.org

SBE 22 Broadcast and Technology Expo
October 11, 2012
Tuning Stone Resort and Casino, Verona, New York
www.sbe22expo.org

College Broadcasters Inc, (CBI) Convention
October 25-27, 2012
Sheraton Altanta Hotel, Atlanta, Georgia
www.askcbi.org/?page_id=1500

2013 CES Conference
January 8-11, 2013
Las Vegas COnvention Center, Nevada
www.cesweb.org

NRB Convention
March 2-5, 2013
Nashville, Tennessee
www.nrbconvention.org

Radio Guide Advertiser Info – Jul/Aug 2012

Advertiser - Page	Website
Altronic - 20	www.altronic.com
AM Ground Systems - 4	www.amgroundsystems.com
Aarlon - 41	www.aarlon.com
Armstrong Transmitters - 41	www.armstrongtx.com
Arrakis - 21	www.arrakis-systems.com
Array Solutions - 39	www.arraysolutions.com
Axia - 11	www.axiaaudio.com
Bay Country - 41	www.baycountry.com
BEXT - 42	www.bext.com
Broadcast Connection - 39	www.broadcastconnection.com
Broadcast Devices - 31	www.broadcast-devices.com
Broadcasters General Store - 33	www.bgs.cc
Broadcast Software Intl. - 38	www.bsiusa.com
BSW - 30	www.bswusa.com
BW Broadcast - 25	www.bwbroadcast.com
CircuitWerkes - 23	www.circuitwerkes.com
Coaxial Dynamics - 40	www.coaxial.com
Comrex - 5	www.comrex.com
Davicom - 43	www.davicom.com
DM Engineering - 47	www.dmengineering.com
Econco Tubes - 41	www.econco.com
Enco - 37	www.enco.com
Elenos - 46	www.elenos.com
ESE - 46	www.ese-web.com
Gorman Redlich - 43	www.gorman-redlich.com
Graham Studios - 46	www.graham-studios.com
Henry Engineering - 2	www.henryeng.com
Inovonics - 1, 28	www.inovon.com
Jampro - 24	www.jampro.com
Kay Indistries - 47	www.kayind.com
Lightner Electronics - 22	www.lightnerelectronics.com
Michael Patton - 47	www.michaelpatton.com
Micro Communications - 43	www.mcibroadcast.com
Moseley - 19	www.moseleysb.com
Myat - 17	www.myat.com
Nautel - 7	www.nautel.com
OMB America - 13	www.omb.com
Omnia - 29	www.omniaaudio.com
ProAudio.com - 18, 27	www.proaudio.com
PSI (Propagation Systems) - 36	www.psibroadcast.com
Radio Systems - 34	www.radiosystems.com
RAM Systems - 26	www.ramsyscom.com
SAS (Sierra Automated Sys) - 15	www.sasaudio.com
SCMS - 9	www.scmsinc.com
Shively - 32	www.shively.com
Systems Store - 47	www.systemsstore.com
Telos - 35	www.telossystems.com
TFT - 42	www.tftinc.com
Transcom - 43	www.fmamtv.com
Vital Sounds - 46	www.vitalsounds.org/MCM
V-Soft - 44	www.v-soft.com
Wheatstone/Audioarts - 3, 48	www.wheatstone.com

DO WE HAVE A FLASHER FOR YOU!

NO, NOT THAT ONE, THIS ONE!

THE FIRST PHONE FLASHER, ALERT AND DOOR INDICATOR SYSTEMS THAT ARE DESIGNED EXCLUSIVELY FOR THE BROADCASTER, WITH THE FOLLOWING FEATURES:

* Distinctive color multiple ultra-brite wide angle LED flashers and distinctive audible alerts for both phone, alert or door
* Single line stand-alone units and multi-line systems available with up to 12 lines in and up to 5 display indicator modules
* Audible alerts muted by contact closure or logic low
* Driving voltage output provided for the DME Solid State Relay Pack for lighting incandescent lamps
* Adjustable volume for audible alerts (Off-Low-High)

And the best part is the price!
Single Line Units: $93.00
Multi-Line Units: 4 line $178.00
8 line $208.00
12 line $238.00

DM Engineering

For details on these and other innovative products for the broadcaster, call us or visit us on the web at:
www.dmengineering.com 1-800-249-0487
2174 Chandler St. Camarillo, CA 93010 805-987-7881

Baton Rouge, Louisiana 225-752-4189
ENJOY THE SOUND.
Michael Patton & Associates
www.michaelpatton.com
Expert AM/FM Transmitter Repairs
☑ Repair/retune service-in our shop or on-site
☑ Harris MW- & SX- series modules rebuilt
☑ Solid-state FM IPA module "bricks" rebuilt
☑ Exciters, STLs, audio processors, etc. repaired
Licensed--Certified--Insured

No 3-phase power? No Problem!
Operate any 3-phase broadcast transmitter from a 1-phase utility supply!

- Turn any location into a 3-phase site within hours!
- Save thousands $$ on utility line extensions
- Recommended by leading transmitter manufacturers
- True 3-phase, not open delta
- Over 1500 Radio & TV installations worldwide
- Rotary design stores energy and rides-through line transients far better than electronic devices.

If you have ANY questions about 3-phase electric power for your broadcasting application, do yourself a favor and call Kay Industries first!

Kay Industries
PHASEMASTER®
Rotary Phase Converters
South Bend, IN 800-348-5257
Fremont, CA 877-348-5257
The World Leaders in Single to Three-Phase Power Conversion

SystemsStore: Your Premium Source for the various supplies required to create and maintain technical infrastructure, including Wire & Cable, Connectors, Racks, Punch Blocks, Tools, Test Equipment, and a wide variety of "Problem Solver" devices

SYSTEMS STORE .com
KRONE
RIP-TIE Cable Management
BAR IX
MINUTEMAN Power Technologies From Para Systems, Inc.
SURGEX Professional AC Power Products
CBT SYSTEMS
PLATINUM TOOLS
TRIPLETT
EXTECH INSTRUMENTS
RDL Radio Design Labs
.... and much, much more!
www.SystemsStore.com
Tel: 407-656-3719
Sales@SystemsStore.com
Fax: 407-656-5474

PRSRT STD
U.S. POSTAGE
PAID
PERMIT NO. 410
BEAVER DAM WI

RADIO GUIDE
www.radio-guide.com

WHEATNET
THE INTELLIGENT NETWORK

"gotta have it!"

"Wow, Wow!"

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

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

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

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

Benjamin Brinitzer, Regional VP Engineering Clear Channel Media & Entertainment

"Wheatstone continues to hit balls out of the park and this year they did so again with the LX-24 control surface. This new product marries the best of the old (modular design architecture) with the new (Audio-over-IP)."

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

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

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

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

Greg Landgraf, Senior Engineering Manager, Corus Radio Western Canada

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

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

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

Norman Philips, Vice President of Engineering, Townsquare Media

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

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

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

Phillip Vaughan, Chief Engineer KFROG, CBS Radio

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

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

Wheatstone
LX-24
ADVANCED MODULAR NETWORKABLE CONSOLE

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