Radio Guide

www.radio-guide.com

Digital Issue Now On-Line

May-June 2014 – Vol. 22, No. 3

Working With Intelligent Transmitters

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

POWER & LOGIC CONTROL

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.

TALENT & HEADPHONE SYSTEMS

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.

SPORTS POD
Like Talent Pod, but with dedicated Talkback output and remotely controllable Mic On/Off switching with Tally. Ideal for sports remotes and studio installations.

MULTIPHONES II
The MultiPhones Distributed Headphones System provides headphone listening facilities for multiple users. Use with Guest Pod and MiniPod listening stations or with Talent Pods/ Sports Pods.

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.

HENRY ENGINEERING:
AUDIO PROBLEM-SOLVING MADE EASY

HENRY ENGINEERING

WE BUILD SOLUTIONS.

NEW PHONE: 562.493.3589 • EMAIL: INFO@HENRYENG.COM • VISIT WWW.HENRYENG.COM FOR ALL OF HENRY'S SOLUTIONS!

FM/HD AUDIO PROCESSING
wheatstone-processing.com

HEAR IT?

YOU WILL...

FM-531HD
AIRAURA X3

http://bit.ly/HEARIT2-RG

1.252.638-7000 | sales@wheatstone.com

Wheatstone
real as real gets

Radio Guide

Contents

May-June 2014

Radio Guide

Volume 22 – Issue 3

Cover: Nautel FM Project Lead, Scott Marchand, adjusts transmitter settings via Nautel's Advanced User Interface.

Radio Guide Website: **www.radio-guide.com**
New Products: **www.radiogearguide.com**
Classified Ads: **www.radio-classifieds.com**

PO Box 20975, Sedona, AZ 86341
Phone: 928-284-3700 • Fax: 866-728-5764

Ray Topp *(publisher & editor)* – radio@rconnect.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 2014, Media Magazines Inc., and may not be copied, reproduced, or stored in any format, without the written permission of the publisher.

In This Issue

Critical Content for Radio

Cover Story – *by Jeff Welton, Nautel (page 6)*

Working with Intelligent Transmitters: *"New interfaces can make it easier and faster to check on the status of a transmitter and diagnose issues, regardless of your location. Even with advanced user interfaces, things can still pop up that will leave you scratching your head. Here are a few tips for making sure all of the elements in your transmission system work more smoothly ..."*

In the Field – *by Chris Tarr (page 20)*

Back on the Air – Minutes or Days: *"I walked in the building and immediately smelled burned components – this was a significant strike. By nature, our inclination is to dive right in and start tearing things apart. This can actually hurt later on – the best plan is to take a few minutes to assess the situation ..."*

State of the Station – *by Tommy Gray (page 30)*

We've Come a Long Way Baby: *"One of the things that I always enjoyed there was the old Bauer. It was an 'almost clone' of the RCA BTA1-R transmitter that I had become very familiar with by that time ... and boy did that Bauer sound good! I always loved to look through the glass in front of the PA tubes and see the healthy cherry-red glow of the PAs and the Modulators on those old transmitters ... "*

Audio Guide – *by Mike Phillips (page 38)*

Microphone Shootout: *"So how do you pick the best mic? Should you just go with a PR40 or an RE20 and be done with it? Do you want to go through the hassle of trying a variety of mics in your studio to see which one you like best? Can you rely on the written recommendations of others?..."*

Audio Switching & Routing

ATB-300
GPM-300
DAB-300
19" 1RU Chassis

Multi-Channel audio switchers with silence sensing and auto revert features perfect for: ***STL Switching, EAS Sharing, IBOC Routing, Video Descriptive Services switching, Studio Program Switching, FM Stereo Composite To AES Conversion, General Purpose Routing and Switching, and much more.***

Available in Multi-Channel Analog, Baseband Composite, and AES I/O Configurations

- Simple front panel menu programming of silence sense delay, priority channel, revert timeout etc.
- Fully Remote Control Ready
- Frame Rate Conversion with Synchronous switching on all digital inputs
- Proprietary "Silent Switch" feature for seamless switching between sources
- In Studio or Transmitter Site Program Audio Switching
- DB-25 or Optional DB-25 to XLR/BNC I/O Panels available

bdi
Broadcast Devices Inc.
Tel. (914) 737-5032 Fax. (914) 736-6916
www.broadcast-devices.com

© 2014 Comrex Corporation

Broadcaster:
Florida News Network

ACCESS 2USB

We know that live remotes can boost ratings and generate reveue. The more remotes the better. The ACCESS 2USB BRIC IP Audio Codec makes it easy to broadcast from just about anywhere on the planet - *even from a speeding train.*

With the touch of one button, your remote jounalists and guests will be connected to the studio via available 3G, 4G, WiFi, BGAN or POTS/PSTN networks. They'll sound as if they're in the booth with you due to high quality AAC and Opus audio alogrithms while you enjoy the connection reliability only Comrex technology can provide.

Contact your Comrex dealer or visit comrex.com for more.

USA DESIGNED + BUILT

19 Pine Road Devens, MA 01434 www.comrex.com

COMREX BROADCAST RELIABLE

info@comrex.com 1 800 237 1776 1 978 784 1776

Working With Intelligent Transmitters

by Jeff Welton – Nautel Limited – info@nautel.com

The features offered by today's intelligent transmitters can be very useful to engineers who don't have the time or resources to spend hours at a transmitter site, and are frequently overworked at the studio. A far cry from old transmitters, today's units offer amazing functionality: advanced instrumentation, diagnostics and control that can be accessed via the Internet; on-board audio content capabilities; built in audio processing; and direct digital links to studio equipment. For a quick update on some of the latest capabilities of intelligent transmitters take a look at the sidebar.

New interfaces can make it easier and faster to check on the status of a transmitter and diagnose issues, regardless of your location. Even with advanced user interfaces, things can still pop up that will leave you scratching your head. Here are a few tips for making sure all of the elements in your transmission system work more smoothly.

It's an IP Enabled World

I get a lot of calls from folks setting up network access to their equipment – some on closed networks, and some in the Wild West environment that is the public Internet. There are a few things to remember when configuring your transmitter for operation on a network.

First, YOU NEED A FIREWALL! In the majority of cases, the most cost-effective way to do this is through hardware, with a decent quality router. You've got the ability on most routers out there to control access in and out, to perform port forwarding if you've got multiple transmitters in your site, and to restrict access to any non-necessary ports in your equipment.

As an example, I have a low end D-Link router on my home network – it sells at Walmart for about $40.00. It provides the ability to do port forwarding, QoS (useful if you're carrying HD Radio™ data over your network path; more on QoS below) and many other features that I don't even pretend to know about. One of the things I was able to figure out was its ability to enable or restrict access to various ports on different machines on my network.

There are usually a couple of ports to keep in mind. For example, if you are working with Nautel equipment, port 22 is used in-house for SSH access to our GV, NV, NVLT, NX and VS Series transmitters – this port should absolutely be locked down from any outside access. Other ports are used for http access (port 80), email alerts (port 843) and AUI access (port 3501).

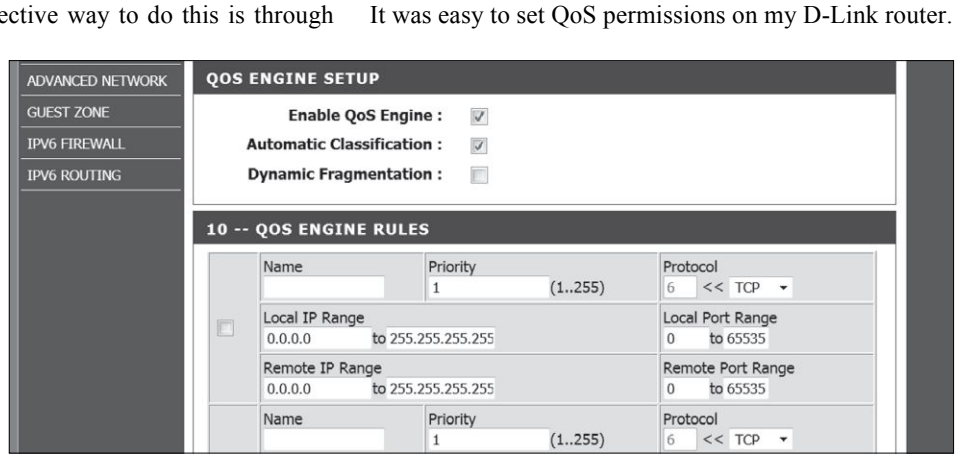
Definitely, if it were up to me, I'd pick something a bit more industrial than a consumer grade $40.00 D-Link router for my broadcast plant, but it does serve to prove that decent security is available even at the lowest end of the price/quality spectrum.

As mentioned above, many routers – even inexpensive routers like the D-Link – can also handle QoS. QoS (Quality of Service) allows you to assign a higher priority to network traffic addressed to a specific IP address in your network that originates from another specific IP address. This way you can assign higher QoS, for example, to traffic between your HD Radio Exporter at the studio and the transmitter's Exgine card at the site.

Livewire Feed Dropouts

More and more, we're moving to 100% IP-based content delivery, from the board all the way to the transmitter. In the process of moving the data from one point to another, there will be several routers, switches and various potential logjams. We once had a situation where we were battling Livewire connection issues with the transmitter. We spent a lot of time discussing the possibility that a software change had caused the situation, when it turned out that the data was getting dropped on the way from the studio to the transmitter site. This was resolved by assigning higher QoS to that feed.

If you're unfamiliar with setting QoS and prioritizing network traffic, this is something that you should definitely learn. Most routers will support this – it's just a matter of learning the "how to" in order to make it happen. It was easy to set QoS permissions on my D-Link router.



D-Link Router QoS Permissions Setup Screen

Importance of Firmware Updates

Folks, a gentle reminder here – if Nautel (or anyone else) sends out a software update, it's usually because we found something that needed to be fixed, frequently because somebody pointed out a glitch to us, or we've added some new features. Please take the time to install them!

For Nautel, you can find the *Latest Software* releases and information under the *Support* tab in the *Technical Resources* section – other manufacturers make their updates readily accessible as well. Take a moment to browse around the support section while you're on the www.nautel.com website – you should find some interesting new stuff there. If you're a Nautel customer, take a moment to let us know what you think, or how we could improve the site even more.

While we're on the topic – many of you have indicated that you'd like to be notified of software upgrade availability. Not to toot the Nautel horn too loudly, but we have a tool on our website that allows you to have that ability. Simply go to www.nautel.com, hover over the *Support* tab near the top of your screen, then click on *Latest Software* on the menu that appears to the left. On this page, you'll see a section regarding our *Software Manager.*

If you click on the *Software Manager* section, you'll be directed to the page where you've got the ability to download the *Nautel Updater and Manager,* which, when installed, will activate a pop-up window on your computer whenever a new software revision specific to your transmitter is released. Other manufacturers may offer a similar service.

Christy White of Nautel, doing a live software update on the VS Series, during the NAB User Group meeting.

Hopefully, some of these tips will help you take full advantage of today's increasingly intelligent transmitters. How about dropping me a note with your favorite IT-related transmitter/remote control tips and I'll incorporate the thoughts into a future article or e-newsletter story! Until then, be safe and happy engineering! *– Radio Guide –*

What the Future Holds for Intelligent Transmitters

Scott Marchand, a Design Engineer at Nautel, shares some of the latest developments:

Automatic HD Efficiency Tuning

If you invest a little time, you can tune an HD mode transmitter to gain some attractive increases in efficiency. Historically, everything had to be done manually, potentially involving a 19 page procedure with numerous steps, calculations, a flow diagram and the use of an external spectrum analyzer. With a bit of patience, a fixed optimization could be achieved, saving some power, but the optimization was vulnerable to changes in environmental conditions such as Load VSWR.

In the most recent transmitters, advanced instrumentation and an automatic optimizer continually monitor the transmitter's output spectrum and power consumption. As environmental conditions, injection level or TPO parameters change, the system automatically adapts, always maintaining compliance with the spectrum limits and keeping more money in the customers pocket – not to mention reducing their carbon footprint.

Site Control

The latest transmitters now provide the capability to monitor and control site related equipment, door contacts, HVAC status, generator status, etc. The transmitter can notify the engineer via email if any of those monitored parameters transition to a fault state. Users can even customize Boolean expressions that consist of pre-existing, configurable remote inputs, and drive pre-existing remote outputs to control the operational state of other site equipment (e.g. open a building vent if the air conditioner fails).

The Expanded

NV^LT Series

EXCEPTIONAL VALUE

NOW UP TO **40** kW

Proven NV Series Architecture
Outstanding Efficiency
Exceptional Value
Intelligent Features

Meet the expanded NV^LT Series for analog FM broadcasting. They're built tough with integrated exciters, parallel power amplifiers, power modules and switching power supplies. Unmatched Nautel control helps save time, trips and money. Add class leading efficiency and the result is unprecedented value.

AUI Control System

PUSHRADIO™

1110100

Integrated Digital Exciter

Backup Audio

Livewire

IP Audio

orban

Nautel **PhoneHome**

icecast

NULLSOFT SHOUTcast

Streaming Input

And **MORE**

RDS generator
Audio spectrum analyzer
Powerful presets

Scheduler
Instrumentation
Play lists

Videos, webinar and more at **Nautel.com/NVLT**

nautel

Studio Site

Make Your XP Your X-tra PC

What to do when your old XP isn't ready to die!

by George Zahn

Since my last article, the Windows XP operating system has gone the way of the T-Rex, the Edsel, and Milli Vanilli's singing career. Despite those of us who came to love and depend on the old system, in lieu of Vista, Windows 7 and Windows 8, the inevitable time came for the venerable old system to be phased out. If you're still running an XP operating system computer on any interconnected computer, you are definitely at risk, since Windows is no longer supporting or updating XP.

I don't care how much of a "traditionalist" you may consider yourself, it's a dangerous game if you're still on the Internet, or any kind of LAN or WAN with an XP machine. Even with the best "for pay" virus protection, Windows is no longer sending patches and updates, which makes XP computers more vulnerable than ever to hacks, malware, and virus infestation.

If all the doomsday articles and reports haven't scared you enough, allow me to suggest the "humane" alternative to simply labeling your old XP computer a "boat anchor," then wiping the drive and exiling it to the engineering closet.

XP or Not XP?

If you have an XP computer and you're like me, you've come to depend on much of the great software that is still on that computer. If you're suddenly changing to Windows 7 or 8, many of those same applications may not work on the new hardware, especially in the transition from a 32-bit system to a 64-bit system. For me, that would mean giving up some of the software that has made me more efficient at my job, for example, an admittedly old Adobe Audition version 2.0, among other graphics and even video software I use for the station and our website.

Sure, the newest versions of these software options have more "bells and whistles," but I've been ringing and whistling just fine with what I had. In today's overbooked society, in which we're all trying to do more work with less staff, I don't really want a steep learning curve to see what features have been added (and/or taken away) in a new version of my old dependable software. And if you haven't priced the new versions of your "old" software, be prepared for vertigo in some cases, as some will have your head spinning.

Many software packages are moving toward monthly "rentals" of software. In the case of one audio editing software I've tried, the buyout version allows you to rip separate tracks individually but there's no option to rip multiple tracks as one large audio file. No, that feature is *only* on the monthly plan of the software.

Also the new version of the software has dropped some rudimentary and simple features such as scrolling through the visualization of the audio file on the screen. "Someone" in software development or a focus group must have deemed that tool (which I use every time I edit) as unnecessary. Last article, I urged trying new software and keeping an open mind, but Bill Gates just did us a huge favor. There is a way to have your cake and eat it too!

An "Initial" Reaction

Let's revisit a concept from a few articles ago. We addressed the KVM switch which is a convenient device that allows two computers to share a keyboard, video monitor, and Mouse – hence KVM. I originally was citing this device as a way of reducing computer fan noise in studios, and saving cluttered space by minimizing the number of needed monitors in your studio. Let's look at another use that's closer to what many home computer folks have.

Let's face it. At some point, we do need to move forward to a newer operating system on our current computer, or a new computer altogether, to keep up with the technologic world. For that reason, I simply bought a new i5 computer with Windows 7 (just my personal preference over Windows 8). I wanted something that would be safe to use for the Internet and also something that would not be totally outmoded in six months, but was still was a compromise of quality and price. That 64-bit computer is not always compatible with my old software, but it is safe to use for network and Internet connections, and that's its main use, for now.

On the other side of the KVM switch is my old XP computer, still happily running all my "old" audio editing software and some other applications that I choose not to replace with new software at this time. The old XP computer is no longer connected in any way to the Internet or other networks. It is strictly a standalone unit, very capable of doing what it has done so well until the Microsoft XP support plug was pulled.

A "Boat" of Confidence

It's the ultimate in recycling, and it does something even better. It buys me time! I don't have the need to dump a ton of money into 64-bit compatible software after just spending more than I really wanted (especially if not for Microsoft dumping XP support) for a new computer. Think of the old XP computer as kind of a life boat. It's not meant to last forever, but it will eventually get you safely where you need to go.

I refuse to be a "stick in the mud" and I do plan to eventually migrate to new software over time, but now I can choose *what* and *when,* to a greater extent than if I had chucked the old XP. I can triage and better control what costs I want to incur and when I tackle them. I can also take my time to do A-B comparisons, and learn the newer software on smaller or less critical projects, while having my dependable XP with fully familiar software for tight deadlines.

For example, I recently worked on a 20-minute video project that would have been terribly taxing for the XP (a dual core with fairly limited RAM). I was lucky that my video editing software was compatible with Windows 7, and I immediately installed it on the new computer to take advantage of the much heartier i5 processor and today's "daily recommended allowance" of RAM.

There's no doubt that my old XP would have choked on such a large project. It was never designed or updated for heavy video editing, but the Windows 7 computer handled it quite well. I had a choice, and was able to prioritize the software I'm adding to the Windows 7 machine. By computer actuarial tables, my XP doesn't have long to live, but it will let me ease my way into newer versions of software. It's not ready for the computer graveyard – or the engineering closet yet!

Not a Perfect Plan

The two biggest obstacles to this set up are file transfer and audio output. The KVM switch shares the keyboard, monitor, and mouse, but it is not made to share audio. There are two easy was around the audio issue. The "On the Cheap" way is to simply disconnect and reconnect the speaker input cable from computer to computer, depending on which you are using at the time. If you have a nice amplified speaker system, it might be advisable to turn your volume down when switching the input cable.

Even cooler, (and remember, we're talking to engineers and radio managers here) how about re-use of an old small mixer or simple audio switcher – or make a basic mixer from parts in the engineering closet. It's quick and simple. With a mixer, you can just leave both pots open so each computer can simultaneously feed your speakers. Pre-made switchers can be found at basic electronics stores if you're not feeling adventuresome.

File transfer is no longer really a significant issue, especially if both computers are side by side. If, for instance, you have just downloaded a file from the cloud, a VPN, dropbox, etc., onto your Windows 7 computer, thumb drives and USB ports make the transfer easy. A quick transfer, especially if your PC and drive has USB 2.0 or 3.0, is a snap. I still suggest you keep some form of security software on the XP computer and *always* have it on the computer with which you visit the web.

With Caution, XP Computers Are Still Usable

And here are the last three tips, especially as your XP computer ages: Backup, Backup, and Backup. We may wish to keep that old XP forever, but it almost definitely has seen more days in its life so far than it will see in the future. Remember to keep the XP computer isolated from networking and the Internet, but dedicate a portable drive or other connectable device to backup files on a regular basis. It also makes accessing those files easier when you may be on today's new computer in the future!

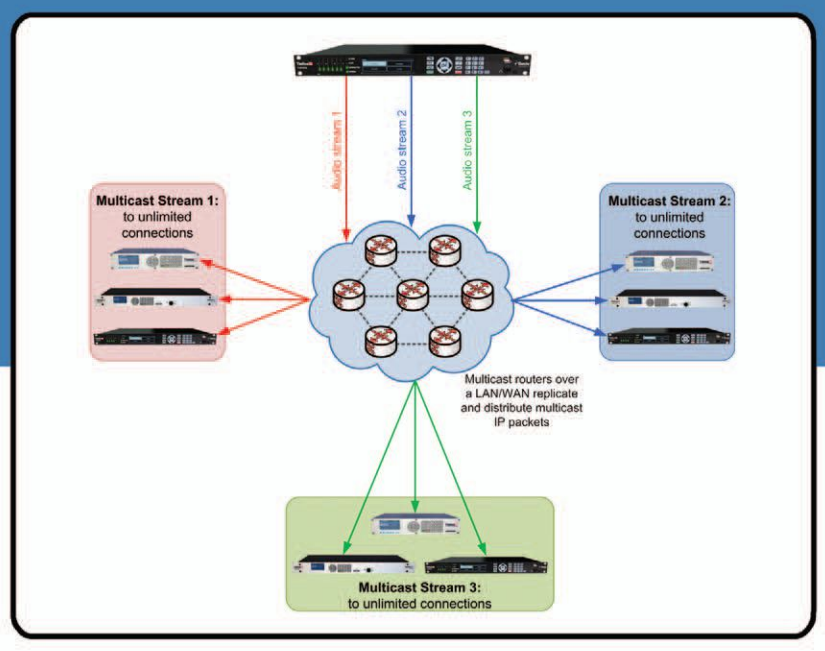
George Zahn is a Peabody Award winning radio producer and Station Manager for WMKV-FM at Maple Knoll Communities in Springdale, Ohio. He is a regular contributor to ***Radio Guide*** *and welcomes your feedback. Share your stories with others by sending ideas and comments to gzahn@mkcommunities.org*

Expand your Network with...

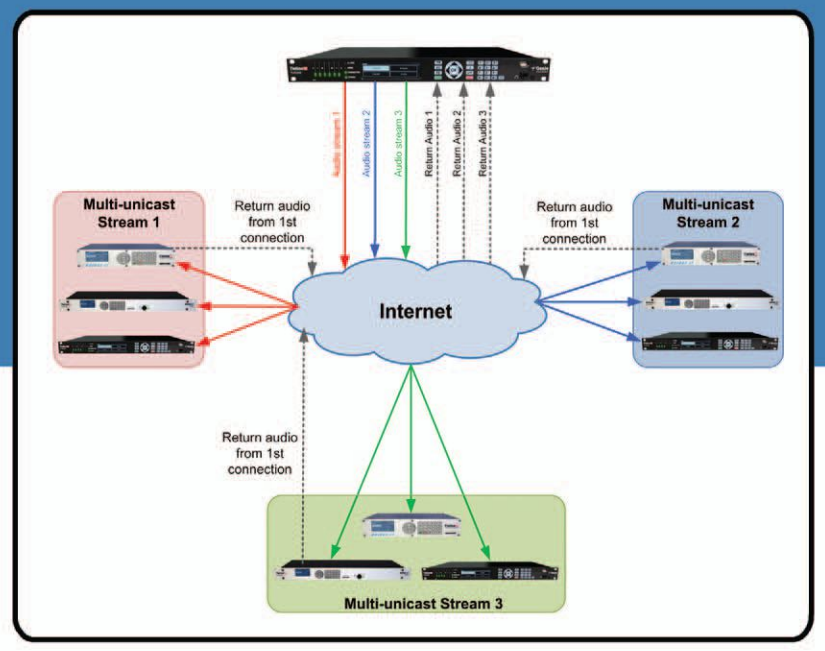
Genie
DISTRIBUTION

Latest FREE firmware update includes new program sharing options

3 Simultaneous Multicast Audio Streams



3 Simultaneous Multi-unicast Audio Streams
(up to 50 endpoints in total)



COOL STUFF AWARD
RADIOWORLD
2013

SMART STREAM+

Tieline®
The Codec Company

Call: 1-317-845-8000

www.tieline.com

Station Stories

Gone With the Wind

The Disappearing Transmitter Plant

by Mike Callaghan (KIIS Radio - Retired)

I was innocently walking down the studio hallway one January morning in 1999, and I noticed our controller, Jim Murphy, walking up the same hall.

"Oh, Hi, Mike – I've been looking for you." He said.

It's very, very rare for the controller to be looking for me instead of the other way around, so I was immediately suspicious.

"Good morning, Jim – what's up," I asked.

"Well, your station in Barstow is off the air!" Jim reported.

"But Jim, I don't *have* a station in Barstow," I explained.

"Guess what, Mike, you *do now*, and I can even tell you why it's off the air," Jim smiled.

"OK, Jim, tell me *why* my station in Barstow is off the air." (Barstow is a desert community about 120 miles from Los Angeles, on the way to Las Vegas.)

"Because there was a huge windstorm last night, and *your* transmitter building got blown off the mountaintop. It's supposed to be down a hillside lying in a canyon somewhere! You'd better go out there see about getting it back on the air!"

I didn't even know we had a station in Barstow. I called a friend who worked for a group of stations out there, and he was just about to leave and try to get his stations back on the air. He told me Clear Channel had a station on the same hilltop, and it was also off the air. I surmised that was the one Jim Murphy had told me about. I decided I'd better leave for the mountaintop as soon as I could, although I had no idea where it was. My friend reported it was "Calico Peak," about 12 miles North of Barstow, in a community called Yermo. I told him I'd call when I got close. He told me I'd need a four-wheel drive truck to get up the mountain.

I called Kirk Phillips, a local friend of mine that had such a truck, explained the situation, and we left the Los Angeles basin with a basic set of tools. Two hours later we reached the junction where the road to Calico Peak left the main highway. I called my Barstow buddy and he gave us directions off the highway. The road was really narrow with lots of switchbacks. So much so, that there were places where you had to stop and back up to change the approach angle or else you'd slide off and careen down the hillside. It took a good 90 minutes to scale the mountain.

When we finally reached the top, there were about a half dozen trucks already there. You could see where our transmitter "building" had been. It turned out to be a Sears sheet metal tool shed, held down by a canvas strap stretched over the roof and secured at the front and the back. No cement pad, no foundation, just a smooth spot on the dirt. When the building blew away it pulled some lines loose from the buildings for the other stations on the mountaintop. That's why they were off the air. Their failure was obviously our fault.

If you stood at the edge of the hilltop, you could look down the ravine and see the crumpled, flattened mass of metal that was the remains of our transmitter building *(see photo)*. It was about 200 feet over the side, with the power cables twisted around it. Our station had been buying power from one of the other stations on the hilltop for $400 a month. There was no commercial power available, so they had twin generators, alternating 24/7, to support their operation. They had been kind enough to sell us a few hundred Watts so we could avoid generating our own AC.

We took some rope and started sliding and skidding down the hillside. When we reached the debris and tangled metal, we found a short equipment rack imbedded in the wreckage. In the rack were a Harris Digit exciter, a 500 Watt Ptek FM amplifier, a Burk ARC-16 remote control, and a Moseley PCL-606 STL receiver.

These pieces of broadcast gear were all there was to our transmitter plant. A 6-foot Andrew STL dish and the two bay broadcast antenna were both still on the tower.

We tied the rope to the top of the rack, and started sliding it up the hillside, working our way around the debris and boulders. It took both of us the better part of an hour to reach the top again.

When we arrived, we had an opportunity to look over the rack and see what we could still use. Most of the gear was in pretty good shape. The interconnections were all trashed, but they were pretty simple. The STL's composite went to the exciter, the exciter drove the Ptek 500 Watt amplifier, and that went to the broadcast antenna on the tower.

That connection had been pulled loose and destroyed. The feed from the STL dish to the Moseley receiver was also ruined. Fortunately, the engineers from the other stations had a good parts supply and they were able to provide fittings to make repairs.

The power connection to the Digit exciter was pulled loose. I was able to get Harris tech support on a cell phone to learn the pinouts so I could get power back to the Digit.

So, we were able to restore the rack full of equipment to operation – but we had no place to put it. Our transmitter shed (and that's just what it was) was ruined and we couldn't just strap the rack down to the dirt and leave it standing there with no protection.

Fortunately, the engineers from the other stations were benevolent and agreed to allow us some space in one of their "real" structures while we replaced the building we'd lost.

So our rack went inside their space *(see photo)*. We punched a couple of holes in their outside wall for the two coaxial lines, and extended both of them to reach the extra distance. We finally got the station back on the air by mid-afternoon.

The STL shot feeding the Moseley came straight across the Mojave desert from Mt. Soledad, just North of Lancaster, from where the station was programmed. This is a distance of about 75 miles. Sometimes inversions would make the signal drop into the noise, but no one was really listening critically in Barstow, so we heard few complaints.

A few months after restoring the transmitter, our management started getting phone calls from our "new landlord." He wanted to know when we were going to get our equipment out of his building and back into one of our own. After getting no response, he started sending us invoices for $400 per month rent. Apparently, those also went unheeded. Finally, we got a certified letter with notice that we had 90 days to vacate his facility, and that he was not going to sell us power any more. We'd recently made changes in our format, and we were now competing directly with him in Barstow. Why should he sell power to help out another station trying to harvest the very same advertising dollars?

We were in a world of hurt. In 90 days we'd have no place for the transmitter and nothing to power it with. Even worse, this was just before New Years of 2000. Remember Y2K? Did you try to buy a generator just before 2000 rolled around?

Fortunately, we found a pair of new 5 kW Generac diesel gensets in time and had them trucked to Calico Peak along with a new double wall, reinforced 1,000 gallon fuel tank. The new generator building consisted of steel reinforced concrete block walls, with a poured slab and roof. All the building materials, bags of cement, concrete blocks, rebar, and the hundreds of gallons of water were transported up the nigh-impassible road aboard six-wheel-drive trucks.

A real transmitter building was ordered and installed. It had two openings for window air conditioners to keep the equipment cool. After everything was installed, we found that, after a generator outage, it was more than the generator could handle to start both air conditioners at the same time. So delays were added to the HVAC power, so the air conditioners would start at different times.

The large fuel tank meant that the site should have gone a month between servicings. After it was all installed and working, I got around to reading the genset owners manuals and found someone at corporate had decided to save some money – the generators weren't what I'd asked for. They were for standby use rather than being prime movers, and the oil was supposed to be changed every 80 hours of operation – not good.

So, we found a diesel service company that would make the drive up Calico Peak once a week, top off the diesel tank, and change the oil. Needless to say, this cost much more money than just getting the right gensets in the first place.

Clear Channel sold the station a few years ago, and after all it had involved, I wasn't exactly heartbroken to see it go. I'm sure you can understand why!

Mike Callaghan was formerly the Chief Engineer at KIIS-FM in Los Angeles, CA. His email is: rg@mike.fm

Broadcasters General Store

352-622-7700 · www.BGS.cc

Serving the Broadcast Industry since 1979

AXIA

LINEAR ACOUSTIC

Any Way You Want It

WVRC-4 Plus

Web & Voice Remote Control

The WVRC-4 Plus gives you the power to monitor and control your site any way you want it. Log in with internet access from any PC, tablet or smart phone or dial in for control using voice prompts and touch tone commands. Simple, affordable, versatile. Access any way you want it – the WVRC-4 Plus.

BROADCAST tools

PROBLEM SOLVED

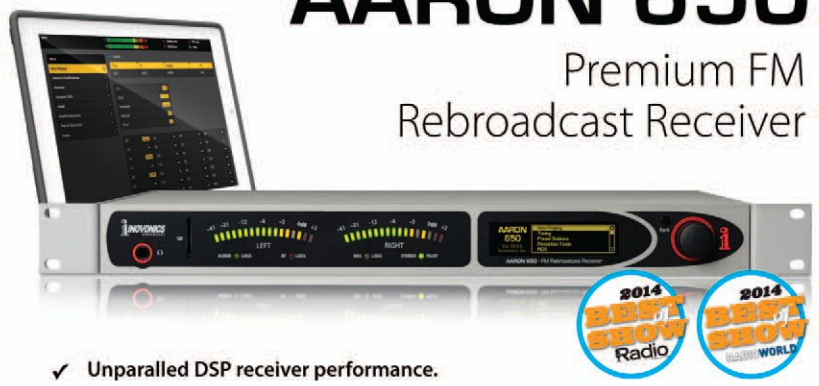
www.broadcasttools.com

Designed in Washington State and Assembled in the USA

NEW!

AARON 650

Premium FM Rebroadcast Receiver



2014 Best of Show Radio

2014 Best of Show Radio World

- ✓ Unparalled DSP receiver performance.
- ✓ Composite Pass-Through & Baseband Regen modes.
- ✓ Baseband FFT and RF BandScanner.
- ✓ Alarms for Audio Loss, RF Loss, Pilot & RDS Loss.
- ✓ Failover audio backup via SD Card or Web Stream.
- ✓ iOS/Android/ Web Listening.
- ✓ Email/Text message alerting.
- ✓ SNMP control & monitoring.

INOVONICS BROADCAST

ACCESS 2USB

We know that remotes boost ratings and can even serve the public trust. When going live from a disaster zone, breaking news location or just a local coffee shop, the ACCESS 2USB BRIC IP Audio Codec delivers the clearest, most reliable remote connections. Use 3G, 4G, WiFi, BGAN, LAN or POTS to connect your talent to the station from nearly anywhere.

1 800 237 1776 1 978 784 1776

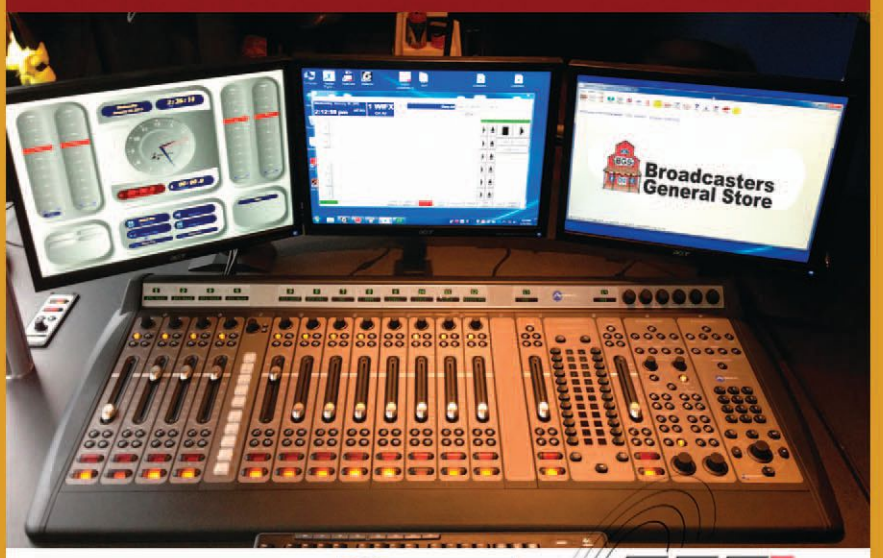
www.comrex.com info@comrex.com

COMREX BROADCAST RELIABLE

Industry Leaders in Design and Integration

We provide the highest quality in studio design and integration.

Full integration services • RF services • Custom furniture



GRAHAM STUDIOS

Broadcast Furniture

Xenirad Inc. Broadcast Engineering

SOCi SECOND OPINION COMMUNICATIONS, INC.

Tech Support

Just Pick Up the Phone

by Steve Callahan

I've bought a lot of broadcast equipment over the years, and one criteria that sometimes sways my decision on what to buy from whom, is a manufacturer's customer service or technical assistance after the sale.

I'm not sure why there is a reluctance among some engineers to call a manufacturer's technical help line. We're all busy with a million and one projects and responsibilities, but having a knowledgeable and patient voice on the other end of the phone when your transmitter is totally dead is a very good thing. Doing a Google search doesn't take the place of an experienced and well trained voice on the other side of the telephone line.

I once had a problem with a 10 kW transmitter that was the sole transmitter at an AM site. The manual was well written and user-friendly, but the problem was just not easily identifiable. Of course, ownership and management were on the phone every five minutes asking when we would be back on the air. I called the transmitter manufacturer's technical service line and got connected to a service engineer. That most patient fellow spent several hours on the phone with me while we tracked down every possible cause for the fault. Fortunately, we stumbled headlong into the solution and the transmitter roared back to life.

I never forgot that customer service experience and when I later visited that manufacturer's factory, I made it a priority to meet that service engineer in person and express my thanks for a job well done.

I Have Other Callers ...

On another occasion, I was at a 50 kW FM station and I thought I had correctly diagnosed the problem with their transmitter, but I needed a "second opinion" just to make sure I was on the right track. I finally got through to that company's customer service person on-call, and after listening to my assessment of the problem, he told me, "You probably know more about that transmitter than I do, so let me know if that solves it ... I have other callers." That was a customer service experience I also didn't forget about.

Equipment manufacturers spend a lot of time and training on just the right folks to man the phones, to field your questions and help you. Jeff Welton of Nautel is one of the best customer service folks I have ever known. I recently asked him what priority Nautel gives customer service. Jeff said, "Nautel was founded by engineers and has historically been an engineering-driven company. As such, technical support has always been given a very high priority. These days, with instant communications – and the ability to spread the word about poor service experiences before the phone has even settled into the cradle (figuratively speaking) – the priority given to customer service is even higher. We've always tried to provide the best possible customer experience and with advances like our Phone Home technology in current models, we've gotten to the point where we could conceivably know about a problem with a transmitter and have replacement parts ordered and on the way before the customer even knows something's wrong!"

When asked what he liked and disliked about "working the phones," Jeff told me, "Even now, as a sales manager, I still get quite a few technical calls, and frequently run interference by trying to provide support on several on-line forums. I think what I always liked most was the times when you reach a level of mutual trust with a customer – where you can totally be certain that you're getting an accurate description of what they see, and be sure that your suggestions are being followed to the letter, as if you were there doing it yourself. Those are the calls where you know you're going to get to the bottom of it – or find you need to refer it to a design/engineering authority – with a minimum of fuss. That, and the feeling of satisfaction when you've troubleshot something that was really giving the customer headaches and at the end of the call you hang up knowing it's working as it should and you had a part in it"

Approach a Problem From Various Angles

As to what he liked the least, Jeff said, "At this risk of offending anyone, I was never a fan of the calls where a customer would call, try to tell you that the problem must be a design issue with the transmitter that they've had for 15 years with no failures, and they won't listen to suggestions or respond to questions asked in order to try to be certain we're on the right track. Overall, though, those calls tended to be few and far between – for the most part, customers are patient, even when we ask the same questions over and over, trying to approach a problem from various angles."

I asked another company that is well known for its attention to its customers, Comrex Corportion. Chris Crump, CBNE, Senior Director of Sales and Marketing told me the talents they look for in new technical support people at Comrex: "We look for the same qualities in Technical Support personnel that we look for in any of our employees. Comrex is an employee-owned company so our primary focus is the customer, not the shareholder. We look for individuals that have that certain "spark" that shows they are keenly interested in providing solutions for our customers and are willing to work hard to deliver positive results. To be honest, anyone that works here is considered a "customer service rep."

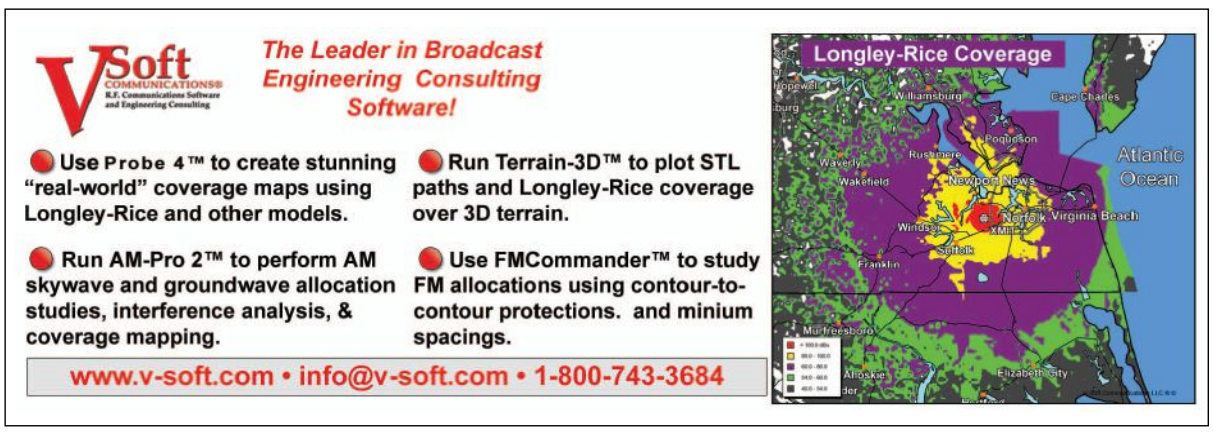
I then asked Chris how Comrex measures the quality of its customer service. "We are pretty open and responsive to customer feedback. That's one of the advantages of being a small and agile company. We can quickly escalate service-related issues as warranted, and do our best to ensure that the customer is taken care of. Continued sales and the longevity of our business (we are in our 53rd year) are good indicators of our success in resolving customer issues. We get lots of email, phone and social media praise for our Technical Support and customer service. We monitor everything we can on-line, and listen to our dealers to make sure that our customers are satisfied with their purchase and ongoing support. Luckily, our industry is relatively small and we have a fairly tight knit bond in our community. So, we hear things and do our best to respond to concern as necessary."

"We've Never Heard of That ..."

Jeff Welton got the last word regarding why engineers are reluctant to call the manufacturer. " I think that's a twofold answer. First, nobody wants to admit they're stumped when it comes to solving a problem. My counter to that is typically that, if I'm hired to keep the station on the air and get problems resolved as quickly and efficiently as possible, with the least impact on the bottom line, then it makes perfect sense that, when I run into a problem, I should be calling somebody who has probably already encountered this problem and already knows the solution.

"Secondly, manufacturers, some more than others, have developed a reputation for not having the best support going. The age old industry joke has always been, 'we've never heard of that problem before – but we've got a field mod to fix it.' Obviously, not all manufacturers are like this, but the reputation still can persist."

You may reach Jeff Welton at Nautel at jwelton@nautel.com and Chris Crump at Comrex at chris@comrex.com



Sicon-8 Internet & Voice Remote Control

The CircuitWerkes Sicon-8 Remote Monitor & 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!

Web-Based Remote Controls w/Streaming Audio Option

Introducing the SiteSentry4 (4 channel remote control), SiteSentry2 (2 channel remote control) & WAM-2 audio monitor

- Web enabled remote controls with 6 relay outputs & 2 status inputs on all units.
- All units detect Stereo or Dual Mono Silence (independantly adjustable channels).
- User-programmed relays (DPDT) close automatically or via Web control
- All products include onboard temperature sensor
- Internal logging with onboard e-mailing.
- Supports DDNS services and Netbios names
- Upgradable firmware. Keep your product current with downloadable updates!
- Streaming audio option encodes Ogg-Vorbis & decodes mp3 or Ogg-Vorbis.

SiteSentry4 SiteSentry2 WAM-2

Remote Broadcasting Solutions

Discover more online at www.circuitwerkes.com

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

FCC Focus

Political Ad Quiz

by Peter Gutmann

What, another article about the political advertising rules? Hopefully, you and your staff are experts and can safely turn the page. But just in case, here's a quick quiz.

A word of warning – this just skims part of the surface and simplifies a complex area of law, so please be sure to contact your communications counsel for guidance in specific situations. For a primer, you and your staff may want to consult *Womble Carlyle's Political Broadcast Manual.* It's available as a free download on our website at:
www.wcsr.com/resources/pdfs/politicalbroadcastmanual.pdf

Here we go:

• We're noncommercial. Do we have to run political programming or ads?

Not if you hold a noncommercial educational license (as opposed to merely choosing to operate noncommercially). But once you do accept political programming, then it becomes subject to all the rules. NCE licensees cannot accept political ads.

• Our station is time-brokered, so is our broker responsible for all this?

No – although you will want to coordinate political programs, spots and rates with the broker, licensees of time-brokered stations cannot delegate this duty and remain liable for following the political rules.

• Who is entitled to demand access?

Only legally-qualified candidates (or their authorized representatives) (a) for federal office (President, Vice-President, US Senator or US Representative) or (b) those entitled to equal opportunities.

• So can I refuse or limit access to all others?

Yes. This is more a public relations consideration than a legal one – if you refuse the candidates for a state or local race, you risk a frosty reception when one of them wins and you want to interview them.

• Can I donate time to a candidate I support?

Sure, but all legally-qualified opponents will be entitled to request free equal opportunities.

• How can I tell if a candidate is legally-qualified?

There is a three-part test of having made a public announcement, meeting the requirements of applicable law for the office sought, and either qualifying for a place on the ballot or engaging in substantial campaign activities.

• Can a federal candidate demand odd lengths of program time?

Yes. You must offer spots and allow programs in any lengths in all day-parts, unless that would cause extreme disruption to a station's schedule (a very hard standard for most radio stations to meet).

• How do I notify opposing candidates of their equal opportunities?

You don't. It's up to them or their representatives to monitor your political file to determine if they are entitled and then to contact you with their request within seven days of a "use."

• What is the significance of a "use?"

Only "uses" are entitled to federal access, equal opportunities and lowest unit rates. To qualify as a "use," a candidate's voice must be clearly identifiable. Reading the required sponsorship tag usually suffices.

• Can a candidate unintentionally trigger a "use" and entitle opponents to equal opportunities?

Yes. "Uses" include involuntary or unauthorized appearances unless they are disparaging. However, most news programming is exempt from being a "use." Most debates also are exempt, even if they include only certain opposing candidates.

• What can I do about a "use" we're supposed to run that's outrageous and likely to offend our listeners?

Nothing. You may not censor a use in any way, whether for content or presentation. In exchange, stations are exempt from liability for the content of uses. You can preface a use with a disclaimer, but only if you do so for all uses.

• What if an opponent complains about the content?

For uses you have no choice. But if a spot or program does not qualify as a "use" then you may get caught in accusations of liability and may have to sort through conflicting claims.

• What about personal attacks?

If it's a genuine use, then you have no obligation. But here, too, you could be liable for the content of other ads or programming.

• Can I refuse a spot that lacks the required sponsorship identification?

No, but if a political spot fails to state who paid for and authorized it, then you can add the appropriate tag and may charge your usual production rate for it.

• What if I suspect that the claimed sponsor is inaccurate or misleading?

Unless you know that the identified sponsor is false, you may rely upon its representation unless you feel that it is patently unreasonable. Deceptive names (such as a notorious polluter claiming to be "Americans for Fresh Air") are not your problem.

• How can I provide exactly equal opportunities to all who request them?

You don't have to. Equal opportunities does not mean the exact same time or positioning. Rather, it requires reasonably comparable exposure in terms of audience and demographics.

• Can I charge for the use of our production facilities?

Yes, but your rates must be reasonable and you may not discriminate in the availability or charges for production facilities among legally-qualified opponents.

• Who is entitled to our lowest unit rates?

Lowest unit rates apply only to uses within two windows: 45 days before a primary and 60 days before a general election. Outside these periods political advertisers can be charged no more than "comparable rates" for commercial advertisers for the same class of time.

• Lowest unit charges are such a headache; can I just set a political rate?

Yes, but you need to be sure that your political rate is no more than the lowest unit rate mandated by law, so you can't avoid the issue altogether. If you charge less than the applicable rate you must extend the same discount to all candidates.

• We don't sell single spots, so how do I calculate our lowest unit rates?

Commercial spots that are part of packages and volume discounts must be pro-rated to determine the lowest unit rate that applies to individual spots for each class of time. Eligible uses must be offered the applicable lowest unit rate for the applicable class of time regardless of how few spots are purchased.

• We adjust our rates constantly, so how do I take that into account in calculating our political rates?

Political rates may be calculated on a weekly basis so long as that is the station's practice for commercial spots.

• Can I charge premium rates for issue ads? How about discounts for ones I want to encourage?

The political rate regulations only apply to ads by candidates (or their authorized committees). But be careful – discounts may affect your lowest unit rates.

• If an on-air employee becomes a legally-qualified candidate do I really have to kick her off the air?

Yes, unless you are prepared to give equal opportunities to all her opponents or they agree to some lesser arrangement.

• How can I accommodate all candidates entitled to access – we're sold out!

No you're not. Even if placement in a specific program or time slot is unavailable, comparable exposure must be made available somewhere else in your schedule.

• Can I refuse to take political ad orders for the weekend preceding an election?

Yes, but only if you have never done so in the past year for a commercial advertiser.

• Can I bar political ads on election day itself?

Yes, but only if the policy applies to all federal candidates.

• How can I protect myself against accusations of over-charging?

There is no absolute protection, but your best approach is to be sure that you fully disclose all your rates and selling practices to political advertisers and their representatives with consistent information. There is no prescribed form, but you need to be sure that even a naïve buyer cannot claim to have been misled into buying ads or paying rates they didn't want.

• No one's perfect – what if I make an honest mistake?

It is important to discover it and notify the relevant party quickly in order to offer a refund or adjustment while it is still useful.

• What needs to go into our political file?

Information concerning all requests to purchase political time and their disposition must be kept in a political file that is accessible at the same location as the public inspection file. Mere inquiries about rates or for general information are not included.

• How often must the political file be updated?

The political file must be updated continuously but at least daily, so that anyone viewing it will be able to determine their rights to equal opportunities and rates. You need to keep the political file available for at least two years (or longer if it is subject to a pending complaint).

• Do I have to post our political file on line?

No. That requirement applies only to TV stations so far. It may be coming for radio. But for now, you need only make it available with the rest of your local public file. The political file must be accessible during business hours plus at all other times appropriate to apprise opponents of equal opportunities.

• Can I accept only those issue ads with which I agree?

Yes. Only federal candidates are entitled to access and only uses are entitled to equal opportunities. You can be as focused as you wish in deciding which, if any, other ads to air.

• But what about the fairness doctrine?

Despite constant rumors, there is no fairness doctrine anymore and there is no serious attempt underway to restore it. Thus, you are free to editorialize or to reject any issue ads you wish, so long as they do not qualify as uses or equal opportunities.

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

The best LPFM transmitter.

Impress your boss and gain respect from your peers as your decision to buy a TX300 V2 Transmitter proves again again you made the right choice for your LPFM station!

Listeners will marvel at your amazing sound quality, peers will wonder in awe how this is possible without a separate audio processor, and your boss will be delighted at the extra bucks you've saved him.

The power is in your hands as you monitor and control your transmitter without leaving your seat!

Swoop to the rescue and avert major disasters with your ability to change critical parts at super sonic speed. There will be no dead air on your watch!

TX300 V2 - designed for LPFM

bw broadcast

How to make your LPFM station a success

LPFM stations come to us daunted by the overwhelming number of products available. As a smaller broadcaster, usually on a tight budget, making the wrong decision could mean the station fails.

Here at SCMS we have more experience in setting up LPFM stations than any other US company, and over the years we have formulated what makes a successful station. Our very experienced sales team know this market and the products inside out. They are based all over the US, so you can have the peace of mind that there's always someone close at hand to help and advise.

TX300 V2 is only available from SCMS, so call us today and order yours.

SCMS INC.
YOU KNOW WE KNOW RADIO

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

Science of Sound

Acoustics and Radio – *Part 4*

What We Hear

by Jeff Johnson, CPBE

Sound is all we have. In radio, what is heard is our product. Knowledge of sound, the science of acoustics, is useful to us as broadcasters, musicians, recording artists, communicators. Our awareness of what we hear, and its perception by others as it is passed to them, is radio – a noun based on the verb "to radiate." We must "touch at a distance."

Think of the greatest moments of your life. What did you see? As important and just as memorable, what did you hear? What did you hear standing under Horseshoe Falls? What did you hear as a Saturn 5 rocket lifted to the moon? What tune was playing for the first dance with the love of your life? Remember?

Think of the sensory experience of sound. This is what radio sells. Radio sells a subtle companion or a roar of ecstasy. Radio sells a shared experience. Radio sells a single sound in front of a microphone that, "... can be hurled from the top of a giant transmitter and, in one instant, reach millions," says David Hendy in his book *Noise.*

"We drive around in our cars coccooned in our own portable and controllable soundscape," says Trevor Cox in *The Sound Book.* And there we have our gold, those of us in radio. A soundscape. Our created, broadcast soundscape – the immersive environment.

There are three elements of a soundscape:

• ***Keynote*** sounds – traffic, wind, waves – often not consciously noted, as they are expected but subconsciously heard.

• ***Signal*** sounds – bells, shouts, sirens, "dinner is served," even EAS alert tones – get our conscious attention.

• ***Soundmarks*** – like a landmark, a sound distinct to a location.

These can arise from three sources:

• ***Geophony*** – naturally occurring sounds – waves breaking, leaves rustling.

• ***Biophony*** – sounds originating biologically – lions' roar, geese calls, whale songs.

• ***Androphony*** – human sounds – a kiss on the lips, grand opera arias, applause.

In radio, we haven't used these terms, but we do utilize the elements. Our keynote sounds are music beds, our positioning jingles. Many use biophony such as animal calls – even a frog, such as does a popular station in Cincinnati. Our signal sounds are our playlists and our characteristic hosts – and what characters some of them are! These, with distinctive processing, constitute our soundmarks – and denote that landmark position on the dial distinctive to each of us, our frequency.

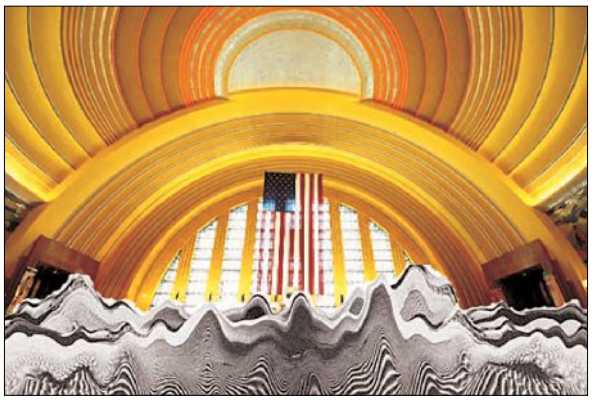
"Drive Time" is the time, the golden hours of the broadcast day, when we have captive audiences in our cars. Many of us relish this time when we can listen to just what we want. We are not constrained by the family's likes, interruptions and dislikes. We are not constrained as we are, while at work – even those of us in radio! We can satisfy our secret passion for bluegrass or rap, or revel in the talk from the other side of the political spectrum from the rest of the family. Who is to know? We can even root for the "wrong" ball team!

Whatever we prefer, we will need clarity. The soundscape must be distinct. It must stand out from, not only the competition up and down the dial, but from road noise – that semi that pulled up aside us just as we were enjoying a winning hit – baseball or rock and roll! Reverb was a subject of the most recent article, now we are looking for the opposite.

"The ear is a little bit sluggish. When the ear receives a very short sound, like a handclap, it takes a little time for the system to respond to the stimulus. The ear also continues to respond after the initial stimulus has gone away. The hair cells (cilia) in the inner ear continue to send signals to the brain for some time after the clap has ended," says Trevor Cox.

"The brain is constantly trying to make sense of the electrical signals coming up the auditory nerves. If the desired signal (the soloist or speaker) comes from both directions, left and right, the sound in each ear is identical, having traveled an identical pathway. Adding together the signals from the ears boosts the direct sound. Reflections from the sides, when recorded, arrive at different times and some cancel out. This binaural processing increases the loudness of the speech relative to the reverberance," states Cox. "Too much reverberance can mask the desired signal. Moderate asymmetrical reverberance can enhance listening pleasure but will not interfere with clarity."

Trevor Cox explains that the double slit wave experiment, familiar from the physics of light, is also applicable to sound. A loudspeaker is used instead of a lamp, and the slits are further apart, of course. Peaks and troughs of loudness can be heard. We've all tried to determine which smoke detector is chirping by listening. Confusing isn't it? We've all been in a room where a shrill tone is emanating from an alarm, and when moving around the room it seems to become louder or quieter, but we cannot locate it.

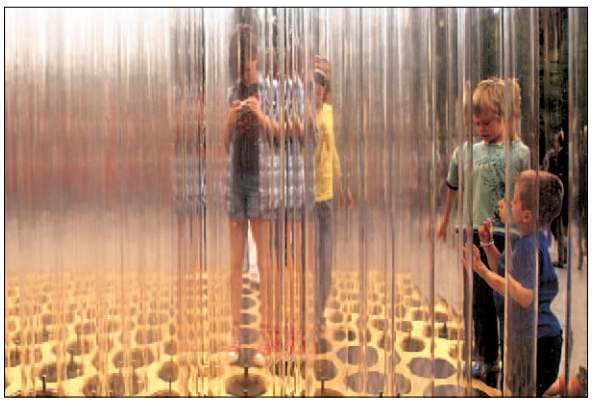


Cincinnati Union Terminal – a dramatic soundscape.

Cincinnati Union Terminal rotunda has a Reverberation Time of better than six seconds. There are "whispering points" at each end of the arch. The space is perfect for the E. M. Skinner Concert Organ installed there, but terrible for acoustic clarity and placement.

These reverberative effects must be taken into account when recording a voice or musical performance in order to create ambience. However, clarity is destroyed by reverberance. The two – clarity and reverberance – work against one another. Too little reverberation, reflection, and the sound is "dry." Too much and we have "wet" the desired sound and drowned it! In previous articles, details of eliminating or enhancing reverberation in a controlled manner have been explored.

The Organ of Corti is an inner ear structure that responds to sound and is the inspiration for a sculpture designed by Francis Crow and David Pryor. The sculpture consists of a number of vertical cylinders, sized and spaced to act on differing frequencies. They take advantage of the principles of sonic crystals, which absorb different parts of sound, modulating the sound from one side of the sculpture to the other. It is at Carter Lane Gardens, next to St. Paul's Cathedral, London.



Organ of Corti

The artwork was, "designed to sculpt and recycle environmental noise such as traffic sounds that mask the bells of London," Cox. This is exactly what we attempt in recording and radio, to emphasize the desired signal and diminish the undesired.

Sonic crystals? Is this New Age or science? Photonic crystals are tiny structures that alter light. The colors of a peacock's tail are the result of this phenomenon. Francisco Meseguer of Madrid, Spain, realized that if photonic structures were scaled up they would make a sonic crystal, stopping sound at particular frequencies from passing through, and reflecting some frequencies intensely.

Francis Crow, speaking of the Organ of Corti sculpture, explained that a motivation behind the work was to "change how people listen." One visitor stayed inside the sculpture for over a half an hour and exclaimed, "I made my own symphony," – his own soundscape.

Radio profits from creating soundscapes. Each radio format – from our content to our processing – is an attempt to create a soundscape that attracts and hopes to hold listeners. We must "touch at a distance" over the air. Our formats may extend from calm "urniture music" to excited political rants. Our goal is always to attract, please and retain listeners. Whether we are commercial radio or non-commercial, public or religious, our success relies on our soundscape. Sound is our product. It is all we have.

Thanks to R. Murray Schaffer for the outline of the elements of a soundscape.

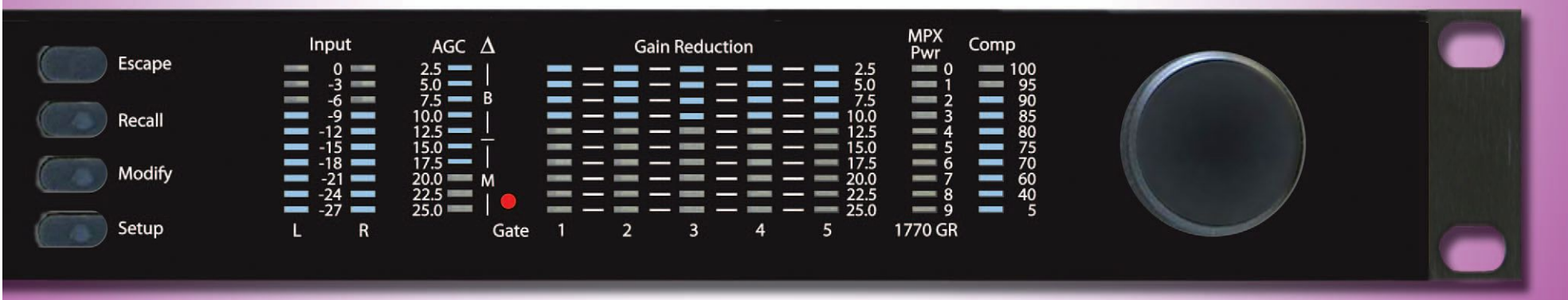
Jeff Johnson can be reached at: jeff@rfproof.com

WireReady® Incorporated
We offer these solutions:
Satellite Automation
Music on HD
News Playout
Storm Closings
Telesales Database
Podcasting
Single Click Website Updating
Since 1989, family owned and 2000+ happy customers
(800) 833-4459 wireready.com

COOL-RUNNING PACKAGE

At a More Affordable Cost with Compact 1RU Spacing

The Mid-Priced OPTIMOD-FM 5700HD Digital Processor



Processing equivalent to OPTIMOD-FM 8500

CONTACT SCMS for ORBAN products

800-438-6040

Mike, Matt, Ernie or Bob at the N.C. Corp Office

SCMS INC.
YOU KNOW WE KNOW RADIO

Latin America	West Coast	Central	North Central	North-East	Mid-South	Southern Gulf	Pro Audio/South-East	Bradley Division
760-650-1427	818-398-7314	315-623-7655	573-478-3737	315-623-7655	877-391-2650	866-205-6905	877-640-8205	800-732-7665
Lily Massari	Doug Tharp	Bernie O'Brien	Pam Leffler	Jim Peck	Bob Mayben	Andy Cole	Ric Goldstein	Art Reed / Bob Eburg

Broadcast Equipment Solutions

www.scmsinc.com

Tower Topics

The Truth of Towers

Part 4 – Triggering the Specifications

by Leonard Weenou, P.E.

We have elected to do a sort of fantasy design tower for illustration purposes, and have now progressed to the point where we have ascertained our principle *loads* and identified the limitations of our *location*.

This leads us to the tower specification: our Mt. Alexander fantasy tower is going to be guyed, triangular and 42 inches in face width.

Well Proven Structure

Guyed structures similar to our case study have been with us for hundreds of years. The most ordinary appearances in past Western culture were the guyed masts on sailing vessels.

Anyone who has seen the motion picture "Master and Commander: The Far Side of the World" can recognize the parallels. The grand British ship, H.M.S. Victory, had a main mast system that topped out 223 feet above deck. Many AM towers do not even reach this height, and they are not mounted on a rolling ship!

Prior to Pierre Eiffel and his contemporaries, there was little attention paid to the mathematical analysis of the structures constructed with a "design by failure" sort of approach. Those who hated failure however annotated what data they had gathered from countless structural calamities culminating in such tomes as *Steele's Elements of Mastmaking, Sailmaking and Rigging,* which was a guide for the British Navy, et al, for fabricating rigging and masts systems.

Here Comes the Math Again

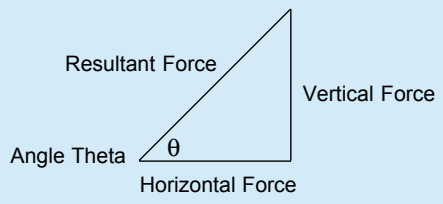
Last time, we made the blanket statement that engineers love trigonometry – possibly more than they love a free lunch on the station. Perhaps your first response is: "No way!" But, just follow along with me for a moment; it is not that bad.

To begin that love affair, here are our basic formulas. These formulas allow us to calculate the forces in each of that mass of triangles that make up the vast majority of towers. If you intend to do much with towers, make these formulas your mantra.

Vector of Force Components:

Vertical Force in Triangle (VF) = F(Sin θ)
Horizontal Force in Triangle (HF) = F(Cos θ)
Force Resultant = Vertical Force/Sin θ
Force Resultant = Horizontal Force/Cos θ

These components can be illustrated this way:



Putting all this to use, here is a stripped down, highly simplified example of the formulas to exercise your calculator. Suppose you have a short little tower that looks like the triangle above in your back yard, and the total force away from that lonely, single guyline is 200 pounds. If the angle of the guy line between the ground and the wire is 45°, what force in pounds is being exerted in that guy line from the tower falling away?

Force resultant (the force on the guyline) = Horizontal Force/Cos 45° = 282 pounds

Please do not get upset if you do not get the same answer. First, check your calculator's batteries. Most personal calculators do not have trig lookup tables as you found in the back of your school texts, but rather calculate the trig value via iteration; this is one of the longest and most current demanding calculations performed in that little handheld miracle. If the batteries are adequate, then check the data entry.

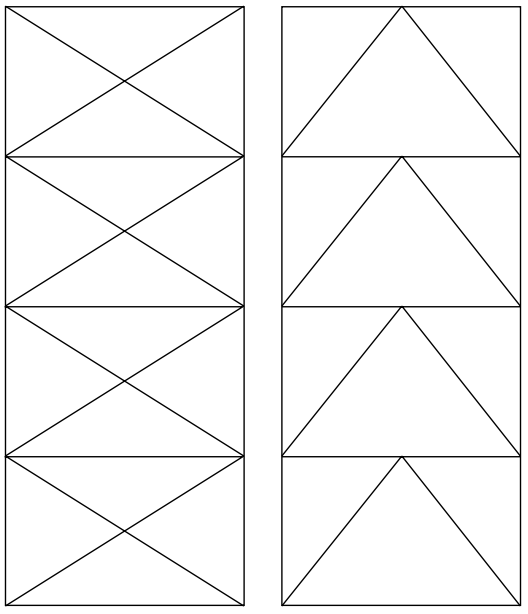
Suppose you move the anchor of that little tower closer to the base, making a more oblique angle. Try 60°. Interesting is it not? Now try the anchor further out, creating something like a 30° angle.

Now you see why tower designers prefer long guys over bowstring guys where the angle nears 60° or more.

Final Specifications

Taking this back to the WQRM-FM tower, we are closer to making some critical final selections to get our tower eventually ordered and built. Remember, the design comes together from recognition of the tower *loads* and *location*. We are also ready to issue the purchase order for the antenna, since the antenna has the longest delivery time.

Our preferred tower vendor has two standard 42-inch face width tower member patterns, a "K" brace and an "X" brace.



Typical "X" Brace Face Pattern | **Typical "K" Brace Face pattern**

The MFFMAC (Mighty Fine FM Antenna Company) will start to do model range testing of our antenna on an accurate scale model of both the "K" and "X" braced version of the 42-inch face towers. A 4 to 1 reduction is the norm, so the folks on the range are testing at 435.2 MHz for WQRM's 108.8 MHz operating frequency on toy-like 10.5-inch tower faces instead of a full size 42-inch tower. A 10-inch face is a whole lot easier to pick up and move around, compared to a 42-inch unit!

Once this testing is complete, they will then be able to answer three questions for us.

Important Questions and Answers

The first question is: can we use a standard tower section around the main antenna? The issue here is to minimize the influence on the antenna pattern from the tower itself. The goal is to achieve the smoothest, most circular pattern practically possible.

The second question is: (and can only be answered after the general section selection – or design – is determined), what is the optimal if not ideal antenna positioning? This includes details for the antenna elevation on the face, angle address of the antenna to the tower, mounting position point on the face (leg, face center, face offside, element in open space, element in front of a horizontal member, etc.) and standoff distance.

When considering the mounting of the antenna, the FCC allows plus or minus 2 meters of elevation from the construction permit value (Center of Radiation, or COR) to fool around with and achieve the best antenna performance. So why not use it?

An intrepid climbing rigger boldly ventures into a "mass of triangles."

The third important issue is: what is the minimum distance the STL antenna can be mounted above the main FM antenna to reduce or eliminate interaction?

In fairly short order MFFMAC informs us that they have found a "sweet spot" on the standard "K" brace section without cable ladder, that produces minimal nulls and a handsome full and smooth sweep of signal towards Utopia, our city of license. The COR elevation will be 418 feet AGL (Above Ground Level) with a slight offset from the legs. They also tell us that positioning the STL in line with the main, 3-feet above the stub end, will result in minimal interaction.

From everything we have learned so far, we have good news all around. Our tower can be made out of mainly standard "K" sections to a total height of 449 feet AGL, which was on our first Notice of No Hazard (FAA height approval). This would be 443 feet of steel and 6 feet of lighting. We will not have to ask for a height increase.

Keeping the Tower Up

As we have repeatedly mentioned, the forces impressed on a tower are: the wind, ice, its natural tendency to fall over and its own weight. Also as noted, in essence, both guyed and unguyed towers create the strength resistance to these forces by using triangles incorporating the proper materials. These same four forces are also exerted on the antennas and their mounts.

Mounts for antennas and other appurtenances such as ladders and beacon supports are not usually viewed as being very sophisticated in design requirement. But let me tell you, *they are.*

The original design engineer is normally responsible for the antennas and mounts of the original buildout. After that, it is sort of "open season" on the tower and quite often all sorts of bailing wire, duct tape, super glue, coat hangers, etc. wind up as part of any follow up mounts.

All kinds of people get involved in what is installed next: the hardware store guy, the newbie climber, the local welder, and the guy who sells you your antennas, but has never seen your tower – does not know where it is – but assures you emphatically that "this is the way it has always been done."

My observation of the aftermath of the last few decades of "big blows" in Florida and elsewhere is that it is more than ordinary to see a tower that has survived, and many of the antennas have failed. Or vice-versa, the tower should have survived but poor mounting and tower antenna housekeeping brought it down.

If you want to protect your tower investment, have a competent structural review and mount design made for every attachment. *– Radio Guide –*

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

In The Field

Back On the Air – Minutes or Days?

by Chris Tarr

It always starts with my phone ringing.

I received a phone call from one of the stations that I look after, and the news wasn't good. They had taken a lighting hit, and two of their four stations were on the air but had no audio.

So knowing that we were probably dealing with some dead studio equipment, I loaded up my car with cables, adapters, and other things. My lifesaver in these situations is usually a roll of CAT-5 cable and a good selection of StudioHub+ connectors. More on that in a moment.

The hardest part in dealing with a problem like this is that your mind starts to race with all of the possibilities that you could be facing. It's easy to lose focus as your mind drifts. To prevent this, I typically have different "kits" of things that I'll need for certain situations, in addition to the usual tools depending on what the problem might be. This helps with the "running around" that can happen in advance, when you try to remember everything that you should bring with you.

In the meantime, I was able to walk the local tech through connecting their automation machines directly into their audio processors. Fortunately those weren't damaged, so they were back "on-the-air" for the time being.

I walked in the building and immediately smelled burned components – this was a significant strike. By nature, our inclination is to dive right in and start tearing things apart. This can actually hurt later on – the best plan is to take a few minutes to assess the situation. Look at all the equipment and do a little triage. You can then figure out what things are easy to work around, and what will take a little more time. In these situations, a calm, thoughtful approach will instill confidence in those around you and will help you come up with the right solution.

It was obvious to me that there was going to be some equipment replacement happening, so the first (and most important) step was to talk with the General Manager or station owner about the protocol for dealing with the insurance company. You want to make sure that the insurance company is made aware of the situation immediately and that they're available to assist with any questions.

In our case, we got the deductible information and were told to go ahead with repairs and replacement orders, since the adjustor would be coming by ASAP. With that out of the way, it was time to get to work.

My first order of business was to go to their "big" station's studio, which was dead, and determine how I was going to get them back on-line. Fortunately they were voicetracked, but they do have some live shifts, so getting them a functional studio was important.

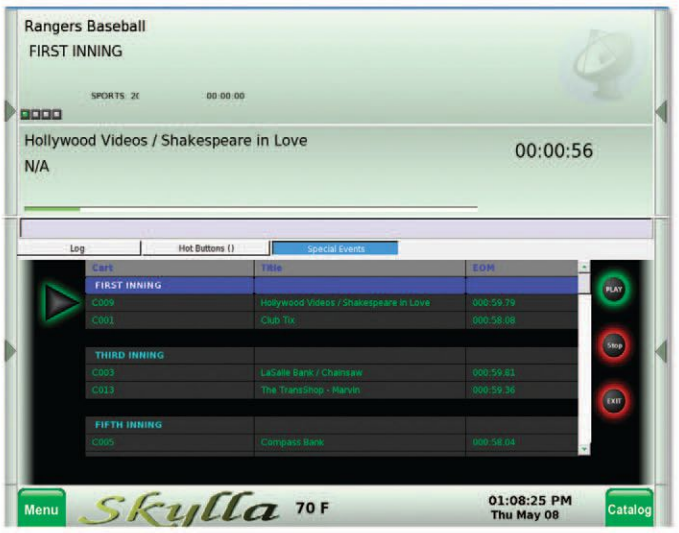
They showed me the console for that station, and it didn't look promising. At the very least, the main output board and power supply were gone. Even worse, it was a 20 year old console that we'd have a difficult time procuring parts for. It was determined that a new console was called for in this case. Knowing that it would be days before a replacement would get here, we then moved on to setting up a different studio to operate from.

Early in this article I mentioned keeping a stock of StudioHub+ connectors and CAT-5. There is no easier way to create long (and odd length) cables than having those items. In our case, I determined that one of their production studios would be an excellent candidate for a backup studio. What made it an even better candidate was that the program output of the console fed a computer. That made it really easy to grab a long section of CAT-5 and make a cable with the appropriate ends to take that program feed and connect it to the audio processor. About ten minutes later, we had that station up and running in its temporary home.

(Continued on Page 22)

Skylla Automates Baseball - Flawlessly

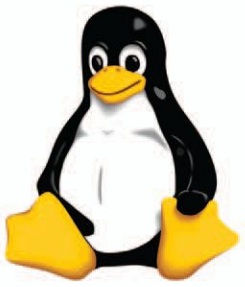
- Rain Delays - No Problem!
- Games After Midnight - No Problem!
- Local Games - No Problem!



Whether you need network sports automation with full walkaway, or just a better way to broadcast your local games, we've got you covered.

We were the first company to automate satellite feeds in 1989 ... and today, we still lead the field with the best walkaway automation for sports.

Our unique sublog system allows you to schedule and forget each game ... when the closures fire, the ballgame starts. You can relax and have a hot dog.



Automation That Is Bullet Proof

Our Linux operating system was built to do one thing: run your audio. You'll find that Skylla takes you to a whole new level of reliability. You'll get better security. You'll get better support - because we built your system, took a picture of it, and then installed it for you. There will be no surprise operating system updates. Rather, we'll have your back ... 24/7/365. We will solve problems for you.

"Making a four-station investment in Skylla was one of the best decisions I've made in 36 years of small market ownership. Our stations sound better, Skylla support is outstanding and I consume a lot less Rolaids than before making the change. My only regret is not doing business with Smarts many, many years sooner than I did."

- Roger Utnehmer, Nicolet Broadcasting, Sturgeon Bay, WI

SMARTS Broadcast Systems

1-800-747-6278

www.SmartsBroadcast.com

Back On the Air ...

– Continued from Page 20 –

With that out of the way, we could move to station number two. This station had a newer console, and while it was powered on, there was nothing coming from the program channel.

I popped up the front of the console and immediately found the issue. The left and right program amplifier IC's were fried. In fact, one of them fried so badly that it blew the IC in half, melted the socket, and welded the IC pins into place. This was not going to be repaired with a simple IC replacement. I placed an order for a new main board to take care of that.

After running a few tests, I could see that the Audition channel was working fine. I ended up taking the line from the program output and connecting it to audition. I could hear audio out of my "sniffer" when I got to the audition channel, yet we were still off the air. Oh boy.

In situations like this, you need to work down the line. That's easy if you either built the facility, or have good documentation from whomever did. Neither applied here, so it was a game of "Where's Waldo!"

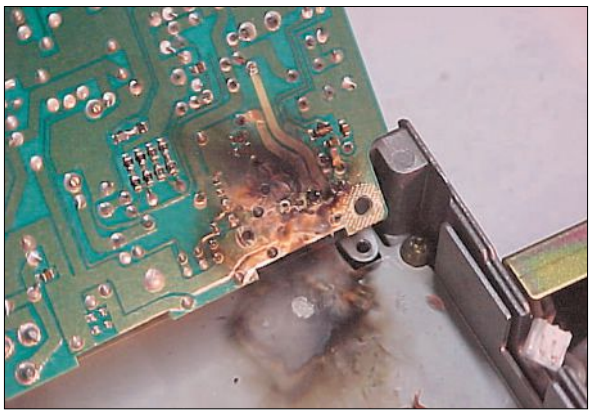
After a while, I traced the problem to a failed distribution amplifier. Bypassing this brought the station back to life. Great! With both stations back on the air from proper studios, we could start working on "collateral" damage.

Looking for failed equipment can often be like trying to find a needle in a haystack – you have to spend some time looking and testing, knowing that you're likely to miss something.

A little more time searching found a dead Tieline, CD player and microphone processor, among other things. For a day or two after, we were still finding little "surprises."

With situations like this, there are a few important things to remember. The first (and most important) of them is to operate calmly and methodically.

This is a catastrophic failure and the station manager's business is at risk – he or she is seeing dollar signs fly out the window. They're relying on you to be calm, accurate and reassuring. One of the things they thanked me for after my visit was for calmly taking charge and basically quelling the chaos. They felt that the way I handled the situation gave them confidence that things would turn out OK.



The second thing is making sure you take time to assess the situation and come up with a "return to operation" plan. Look at the inventory of the entire building and determine what spare gear could be pressed into service if needed. Be sure you have some programming people available to help determine if a particular backup plan will suit their needs.

Finally, use some care in how you attack repairs, especially when insurance claims are involved. Often times, when an old piece of gear is involved, we try to do our best to "band-aid" it together to make it work – sometimes with limited success. In a situation like this, it's important to know what can honestly be restored to pre-event condition, and what should just be written off and replaced.

In cases where I couldn't make repairs on the spot, I removed the equipment and received repair estimates. Some of the gear was deemed non-repairable, in which case we ordered comparable replacements. It's important that you work closely with the insurance adjuster in these situations – they don't often deal with broadcast gear and will usually need you to help them understand the failures and why something can't be repaired. You need to be accurate and honest in your assessments.

In the end, they were only off the air for a short time, and within a few hours all the stations were back on from properly equipped studios. All of the replacement equipment was ordered the next day, and on the way. As far as catastrophic failures are concerned, this one ended well. However it took a lot of patience, planning, and teamwork to make it happen.

The next time you have a few free minutes, give some thought to what you might do if something like this were to happen. Do you have what you need to put something together? Does your emergency plan cover something like this? Would you know what to do? If you answered "no" to any of those questions, take the time to prepare. It can mean the difference between being off the air for minutes or days.

Christopher Tarr CSRE, CBNE, DRB is the Director of Radio Operations/Engineering for 88Nine, Radio Milwaukee. He can be reached at chris@radiomilwaukee.org

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?

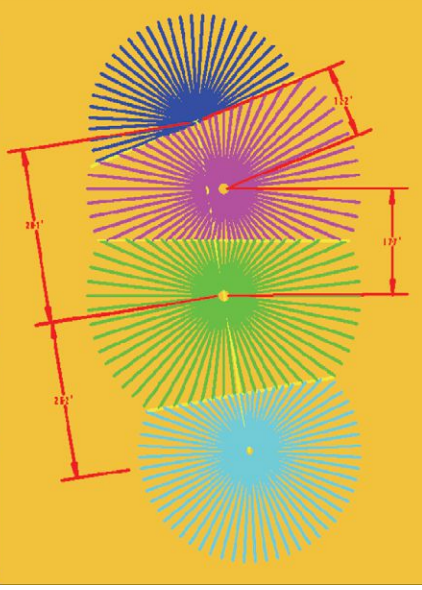
All of the above are indicators of hidden ground system problems that may be reducing your coverage.

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

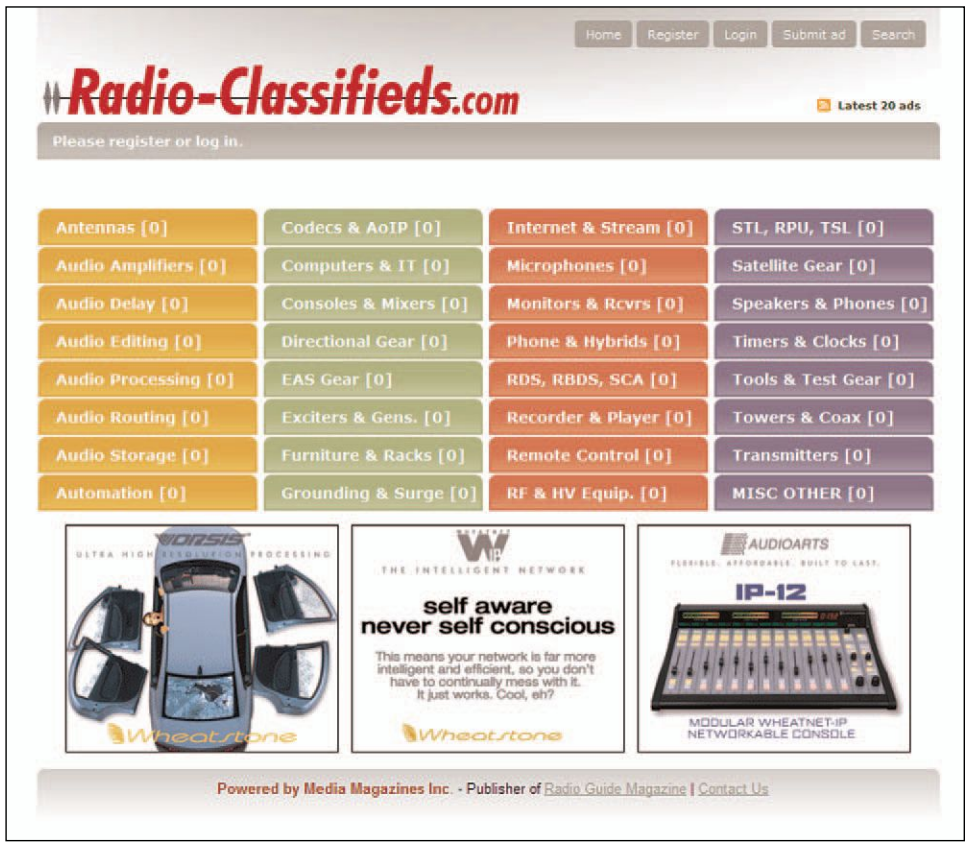
We easily accommodate
compressed
time-line projects.

Reliable, On-time Installation
Firm Quotes
Quality Workmanship



Radio-Classifieds.com

- Buy or Sell Your Used Equipment
- Place as Many Ads as You Like
- *FREE!* – There's Never Any Charge



get modern...
modernist-radio.com

Uniform Audio Across the Network

You don't have to be into cars to know that a white door on a red car just doesn't work.

The same goes for all those translators and sister stations that carry the same programming across the network. You shouldn't have to mix and match processors, and have to settle for a different sound for each. That's one reason why we just came out with the SG-192 stereo generator. With a high quality Wheatstone processor at your studio (may we suggest AirAura or the FM-531HD?), you can now distribute that audio uniformly to your transmitter sites by using the Wheatstone SG-192 as the final peak processor and stereo generator at each site.

Click here to learn more: INN11.wheatstone.com

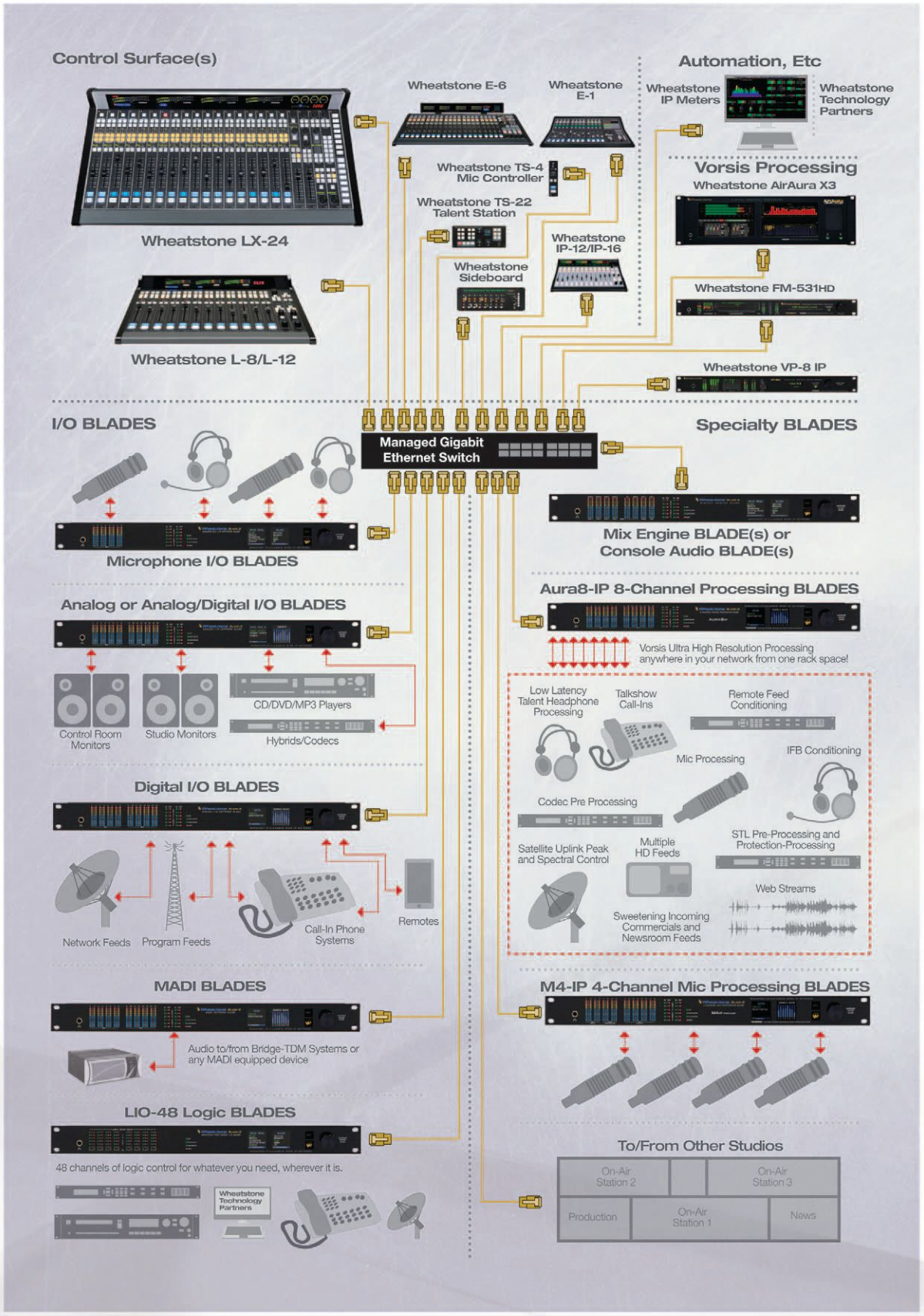
Virtual Consoles Are a Reality

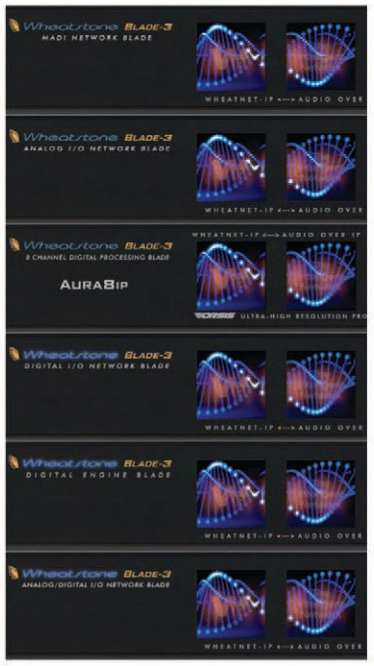
Whoever said that the laws of physics are merely a suggestion could be onto something.

The entirely virtual broadcast studio is not only possible, but most of the pieces are already in place. A good majority of what stations do today – schedule music, stream it, record news updates, even turn on a mic and preload settings for it — can be done without ever leaving the WheatNet-IP network. And, there's more to come, including a suite of WheatNet-IP applications for tablet/iPad devices that will make workflows even more virtual.

Click here to learn more: INN11.wheatstone.com

With The Right Stuff, Your IP Audio "Feature Creep" is Already Under Control





Your job is to stick to the budget, yet build in some room for all those big ideas that will surely come along the minute you implement your new audio over IP system.

That's why our I/O BLADEs have microprocessors inside that we can add to, change, and adapt for just about any scenario the future holds. For example, we did away with costly distribution amps and made routable mixing possible by dropping virtual utility mixers into our network I/O BLADEs for this purpose. Now, we're adding multi-band stereo processing to our new I/O BLADEs as yet another cool routable function that can be used for spot processing of satellite feeds, headphone audio, web streams or whatever else comes down the studio line. Here's what else you need to know when planning your next IP Audio project.

Read the rest of the story here:

INN11.wheatstone.com

OK, this spread is an advertising space paid for by Wheatstone. But hopefully you'll find it informative, entertaining and compelling.

Chief Engineer

It Was a Dark and Stormy Night

by Scott Schmeling

"It was a dark and stormy night ..." Snoopy always started his "novel" with that line. As broadcast engineers, we all pay special attention to stormy weather. I had a situation develop recently that I'd like to share with you.

As my wife and I drove home from South Dakota last Mothers' Day, after visiting our mothers and going out for a Mothers' Day brunch, we watched many distant lightning storms and listened to the National Weather Service break in on normal programming to alert us to storms in the area. Fortunately, all the bad weather was well ahead of our home destination.

We arrived safely home and got the car unpacked and went to bed. At about 12:15 a.m., however, my deep sleep was interrupted by a ringing cell phone. One of my transmitter sites was calling with a "Power Failure" message. This was no surprise, since there had been storms in the area. I checked transmitter forward power and could see it was ramping up. Then the call disconnected, and the SINE control called me again – with another "Power Failure."

This told me two things: first, that we were on generator power and second, that the generator was going to shut down again, soon. (This is a prime example of groggy deductive reasoning at it's best!)

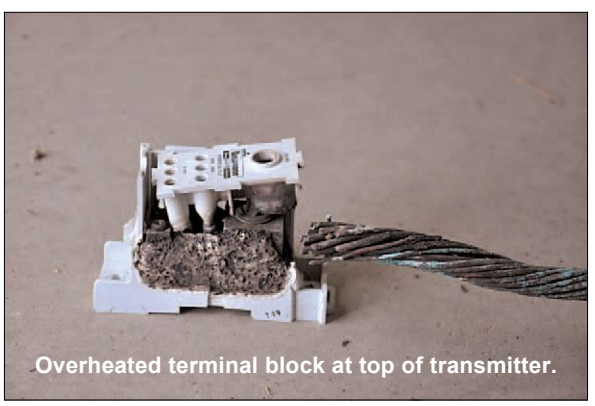
There are two transmitters at this site, a Nautel NV20 and a Harris HT10. I knew we were on generator because the NV20 has to be set down to 50% output because the generator can't handle both transmitters at full power. I knew the generator would be shutting down because the last time we used it, it overheated and ... shut down! (One of the other guys was supposed to have some vents installed, but I knew that hadn't happened!)

Let me mention here, the generator is housed in a storage shed. We had checked with the manufacturer about getting a "standard" outdoor enclosure but we were told that would take a lot of "additional engineering." So we opted for a conventional storage shed.

Now, back to my "stormy night." Knowing the stations would be down again soon, I got dressed and hit the road, arriving on site at about 2:30 a.m. A call to Xcel Energy told me the power was expected to be off until about 4:00 a.m. – that was much too long to remain off the air. When I checked the generator, the "Overheat" indicator was on, as expected. Fortunately, our storage shed has a big dual front door which, when opened, provides ample fresh air for the generator engine to run. So I propped the doors open and turned the switch from Auto to Off – then back to Auto. The generator fired right up.

A quick run "next door" to the transmitter building showed the lights on and both transmitters on their way up. The HT10 came up to 100% and the NV20 came up to 50% – just like they should. I breathed a sigh of relief and started looking around to see what I could do for the next hour-and-a-half (I was going to stay on site, at least until the power was restored). It seems there's always more "stuff to do" at a transmitter site than there is time. Suffice it to say, I would not be bored.

Shortly after 4:00 a.m., I heard a noise coming from equipment that was not on the generator. Looking outside, I could see farm lights – the power was back! I actually did a little "happy dance!" After the 5-minute delay, the transfer switch switched back to primary power. I watched the HT20 blink and come right back to 100% power just like it should. But the NV20 was another story. It didn't blink. I heard some "popping and crackling" and it closed its eyes and went to sleep! This was *not good!*



Overheated terminal block at top of transmitter.

The screen was black and the indicators on all the modules inside were dark. Even the three "Power Present" lights on the back were out! After checking the circuit breaker, I grabbed the ladder and checked the top where the AC feed is connected.

(Continued on Page 28)

ARRAKIS SYSTEMS INC.

NEW...

ARC-10BP-Blue

ARC-15BP-Blue

Bluetooth inside

'fast' hands free Cell phone interface & Stereo streaming

Arrakis leads the way again !!! The #1 selling ARC-10BP & ARC-15BP advanced Radio consoles have gone 'Blue'... Bluetooth enabled that is! This means that the last channel on the console can be paired to any Bluetooth enabled audio device such as your Cell phone, MP3 player, MP3 recorder-editor, and more. Just pair your cell phone to the console and answer your incoming calls with the 'Call' button and drop them with the 'Drop' button, just like a standard phone hybrid. The Caller receives the console bus mix ('minus' the caller audio) so there is no feedback. OR... you can pair any Bluetooth enabled audio device such as an ipad, Tablet device, or MP3 player and stream full bandwidth, high quality stereo (A2DP) audio to the last channel on the console. If a paired Cell phone call comes in, then the stereo stream is dropped and the call can be answered. Arrakis does all of this while still allowing an external phone hybrid to be connected to the same channel at the same time. Your imagination is the only limit !!!

ARC-10BP-Blue $2,795 ARC-15BP-Blue $3,795

NEW...

DIGILINK~HD

- Single station to Multi-site Group
- VPN Remote Voice tracking
- Your Music scheduler or ours
- Multi-sound card Console interface
- Live & Automated Games with Rain delay
- Share audio files across the hall or continent

DHD-Tools

Network control of up to ten On Air workstations: Scheduling, Production, Voice tracking, Music Management, Reporting...

Scalable, high speed Radio Automation for Multistudio, Multisite Applications

Digilink-HD (DHD) is designed from the ground up for today's fast paced, distributed content, single station or multi-site Group. It empowers local and remote talent to collaborate to deliver exciting content, build your audience share, and increase sales. DHD has the tools to enable you to work faster, work smarter, and do more. For On Air, DHD supports live on air, live assist, hard disk automation, satellite automation, and Games automation. DHD supports multiple sound cards for interface to a console and live crossfading. Audio files can be shared across the station or across the planet. To create live sounding automation and facilitate flexible use of talent, DHD features a powerful segue editor, voice track recorder-editor, and remote voice tracking over a VPN (virtual private network). The voice track recorder-editor supports complete control plus the ability to assign a music bed under the voice track with ducking. DHD supports any kind of programming and any size market or multi-site group.

4 On Air Station cluster only $500 / month

www.arrakis-systems.com

970.461.0730

Chief Engineer

It Was a Dark and Stormy Night

– Continued from Page 26 –

What I found there was disturbing. Two large wires go to the terminal block at the top of the transmitter. One of the wires was fine. The other one had been severely overheated – to the point where the insulation was *gone!* (What's surprising is that the breaker hadn't tripped.)

I called the electrical contractor who does our work. Naturally, since it was 4:00 in the morning, I got a recorded message with various after-hours phone numbers. I called the person I usually deal with (Dave), who in turn called the electrician who had previously worked at the site (Kevin). Kevin called me for some detail. He had me check the wire size and length. He went to the shop to pick up some wire and would be right out. In the mean time, I did what little I could. I took the cover off the circuit breaker panel.

When Kevin arrived, I explained what I had seen and heard. He took a look at the wiring and agreed it had to be replaced. He loosened the bolts on the breaker and the connector block on top of the transmitter. Then we (mostly Kevin) pulled the wire out of the conduit. And that's when we could see that four-and-a-half *feet* of one of the conductors had *no insulation* left! In addition, the connector block on the transmitter had been severely overheated and it had to be replaced. Fortunately, the transmitter had a couple unused terminals as part of the assembly. We pulled the bad terminal out and moved a good one into its place.

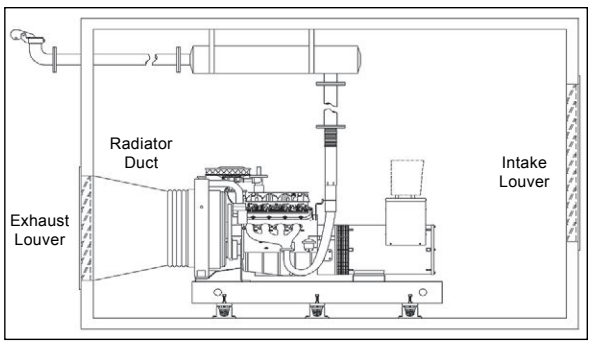
The next step was to push the new wire through the conduit. That's two 25-foot runs of 0000 wire! Then Kevin routed and trimmed the ends and tightened the connections on the circuit breaker and the connector block in the transmitter.

After a thorough inspection, we turned the breaker on and watched the transmitter boot up (it's controlled by its internal computer, so technically, it *does* boot up), then ramp the forward power up to 50% just as nice as could be. Choosing Preset #1 took it right up to 100%. We were back on the air at 6:45!

After looking closely at the end of the wire and the damaged terminal, we think the Allen screw on the connector block possibly loosened enough that the connection started heating up. It was obvious this had started some time ago. Kevin told me it is recommended that those connections be checked once a year. A substitute for actually putting an Allen wrench to the screw (after removing power, of course) might be to check the connections with an infrared thermometer to see if there is any abnormal heating.

Since then, I've been doing some research on the air requirements of generators. In a nutshell, what I've learned, is that the intake louver should be 50% to 100% *larger* than the size of the radiator and the exhaust louver should be 25% to 50% *larger* than the radiator. In addition, the engine *pushes* air through the radiator, so the hot air is coming out the *front*. That hot air should be ducted to the exhaust louver so it doesn't circulate back around the room.

I was thinking about using motorized dampers that would open when the generator started, but I've decided on louvers instead because there's not much to fail with a louver, whereas the motor could fail or the damper could jam.



Intake louver 50-100% larger than radiator.
Exhaust louver 25-50% larger than radiator.

There's one other thing. This incident has reminded me of the importance of having a listing of important phone numbers at every transmitter site. On that list I would suggest your *electrician* (for reasons that have just become obvious), your electric utility, including your service address and/or account number, and the sheriff (just in case). Of course, you should also have the reporting number for tower light failures at Lockheed Martin in Texas (877-487-6867) as well as your transmitter manufacturer's tech support and parts numbers.

I finally got home at 4:30 in the afternoon. It was a long night, but I felt good about having accomplished a number of things and having a plan in place so there would be no more concern about the generator being starved for air. And there were no storms forecast for Monday night. Sleep was sounding pretty good! That's my "Dark and stormy night" story. Until next time – keep it between 90 and 105!

Scott Schmeling is the Chief Engineer for Minnesota Valley Broadcasting. You may email him at: scottschmeling@radiomankato.com

NEW

AARON 650

Premium FM Rebroadcast-Receiver

UPDATE

DAVID IV

FM/HD Radio™ Broadcast Audio Processor

Rev 3 firmware update adds new features, more control, and greater sonic power.

NEW

INOmini 402

RDS Sign-Driver/Receiver

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

Coming Soon....

Introducing **AARON 650**: a totally-new FM rebroadcast/translator receiver built to handle the most challenging reception scenarios. **Rev 3 firmware** brings adjustable crossovers, attack and release times, "Windowed AGC and more to our **DAVID IV FM Audio Processor.** Plus, our **INOmini 402 RDS Sign-Driver** enables large format, live RDS for your control rooms, studios and outdoor billboards. Call your broadast dealer today!

Learn more at
www.inovonicsbroadcast.com

3 year WARRANTY

MADE IN U. S. A.

INOVONICS BROADCAST

State of the Station

We've Come a Long Way Baby!

by Tommy Gray

You may remember (if you are old enough) the TV commercial from many years ago that used the phrase, "You've come a long way baby!" It was of course, talking about the advancement the ladies of our society have made down through the years. As I was thinking about a topic for this month's article, this phrase came to mind. Not about society, but about the advancements we have made in the broadcast industry down through the years.

Being old enough to look back through the years, and see where we used to be and where we are, gives you a perspective to know that we *have* come a long way. I first got initiated into electronics, in general, in the back of my dad's Radio and TV shop in our small town. Dad was the only guy there who had any electronics experience in the area. Around 1933 he had gone to Chicago and taken a Radio, Television, and Sound Reproduction course, graduating from, what I was told, was the first class of the Coyne Electrical School, Radio Division. I still have his diploma hanging on the wall in my office as a cherished piece of history.

How It All Began

I used to laugh at the "Tube Thumping" he and his assistant did to find a defective tube. In those days, repairs were many times as simple as just changing out the bad tube with a good one.

I also remember sitting in the floor in the back of the shop and listening to the little AM station we had in our town, on a Philmore crystal radio I built from a kit my dad had ordered me out of Popular Mechanics magazine. I would put on the headset, attach the antenna lead to a water pipe in the back of the shop, and carefully adjust the cat's whisker on the germanium crystal until I heard radio. I would sit for hours listening to my "Radio Station."

Later on, in high school, I would go down to the local station that went on the air in the late 50's, and look through the window to see the announcers as they did their shows. I would say to myself, "One day I will work in a radio station." I finally was able to work there and got my first taste of Radio Engineering shortly thereafter.

The station owner was also the owner of the local newspaper. He made enough off the newspaper that he could afford to "play radio." He was Ham Radio operator as well. Just for the fun of it, he had purchased a kit transmitter for the little AM, and built it right there on site. That old Bauer kit transmitter lasted for many years there. I remember coming back home from time to time years later for a visit, and would go to the station as a contract engineer to work for them. They would always save up the "dead stuff" for me to come and fix.

"The Glow"

One of the things that I always enjoyed there was the old Bauer. It was an "almost clone" of the RCA BTA1-R transmitter that I had become very familiar with by that time. On one of those trips, I remember making mods to the box to replace the 4-400 modulator tubes with 4-400As, per an RCA tech bulletin, to up the modulation, and boy did the Bauer sound good! I always loved to look through the glass in front of the PA tubes and see the healthy cherry-red glow of the PAs and the Modulators on those old transmitters.

Later on, they put an FM on the air on the AM tower. That "Mom and Pop" AM had become a "Broadcast Group!" The AM/FM combo ran until the late 70's then went dark. Today, it is owned by a large group and is run as a satellite station. The AM tower eventually rusted out and fell, and when it did, they just turned in the license and the AM was, as they say, history. Today there is a new tower, portable building and a dish, and nothing else. The beautiful art deco building and the old Bauer were hauled off to the city dump long ago.

After completing school and going into broadcasting, I got my "1st Phone" and landed a job as a Chief Engineer of an area TV station. I spent the next half of my career in Television but never got away from my roots. Everywhere I worked, there were always some radio stations that needed a guy with a 1st Phone as Chief Engineer, so I got the chance to keep my foot in the door in radio and made a few extra bucks to boot. Finally, however, I figured out that Radio was a lot less stressful (and a lot more fun) so I went into radio full-time and left TV, except as a consultant and contract engineer.

Technology was still, what all would consider today, as "Ancient" back then, but it was good for the time.

(Continued on Page 32)

When you want more than just an antenna

JAMPRO ANTENNAS, INC.
Est. 1954 Made in the USA

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.

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

AM/MW ANTENNA SYSTEMS

Diplexers, ATU's, Isocouplers, Copper, Coils & RF Capacitors

CAMI ISOCOUPLERS

Hot Tower Isolation for AM Translaters, STL's & Communications

THE LBA COLOCOIL®

The Best Way to Share Your AM Tower for More Income!

LBA Technology
SINCE 1963 – WORLDWIDE

www.lbagroup.com | 252-757-0279
lbagrp@lbagroup.com | 3400 Tupper Drive | Greenville, NC 27834

State of the Station

We've Come a Long Way Baby!

– Continued from Page 30 –

Having had ther opportunity to work in everything from small market radio to major market TV during my career, I have a perspective that helps me to understand where each is in the business, better than if I had been "narrowcasting" in one place.

Sounds in the Night

Ever had the phone ring at 2:00 in the morning with a voice from the station on the other end saying, "The transmitter is down, I need you to go see about it?" If you have been in broadcasting for long, you can answer with a great big *"Yes."* There were times when I had worked maintenance night and got home, only to have to go right back because something else had died and there was no way to reach me while I was traveling.

What's That Noise?

Well, we finally arrived technically. We got our "beeper on the belt," – a pager. Now, we could get a page, drive to the nearest phone, and call for details. At first I loved them because they saved me time once again. Eventually, folks would start paging for even the smallest problem, and I found myself running to the phone constantly for trivial calls. The blessing turned into a curse!

The Cool Box!

Then came "Mobile Phones." That big black bag phone on the seat or that pile of phone electronics and the roof mounted antenna, were the "in" thing. You could actually make a call or get a call right in your car. Wow – imagine that! It didn't matter that the thing weighed 20 pounds, or took up the whole front seat of the car. You were "connected."

The problem I had was that the transmitter sites were always remote, and if the phone worked at all, you paid your kids college tuition in roaming charges each month! It was still better than no communications, or a pay phone and pager.

We Have Arrived!

With the advent of "Dial-Up" remote control systems, the days of getting called at 3:00 a.m and having to drive out to the transmitter site to hit the reset button, became history as well, for the most part. We could enter a few DTMF tones on the keypad and the old box would come back to life. We could roll over and go back to sleep, and all was at peace in the world once again. For years we have depended on these units as our lifeline. We can actually go on vacation, and when the phone rings, and we are 300 miles from home, we can put the transmitter back on the air, and no one ever knows but us!

We've Come a Long Way ...

Fast forward to 2014, and we have left the world of vacuum tubes (except in a few mic processors from time to time) and huge plate transformers, and have entered the world of IP STLs, Solid State transmitters, and HD radio. In many cases (as with several of our sites) we now have Internet or dedicated data lines at the transmitter site. We have computers, MPLS, PTP, IP remotes, and all kinds of state-of-the-art equipment connecting us to, monitoring our sites and controlling them. We sit at our desk, in our car on the phone or iPad, and know exactly what is going on out there in an instant. For the most part, we have complete control of the sites from wherever we are.

Today, we have IT departments who work closely with the Engineering departments and between the two of them they maintain digital audio plants made up of audio engines and nodes, servers, RAID arrays, IP networks, and things that once could only be found in an Internet ISP facility or datacenter

.

Yes We Have ...

I have to tell you I am very happy to work with a team of competent Engineering, IT, and Facilities folks, who work together to keep our operations humming. We still have a problem from time to time as does everyone else, but these times are kept to a bare minimum through good engineering practice and great technology.

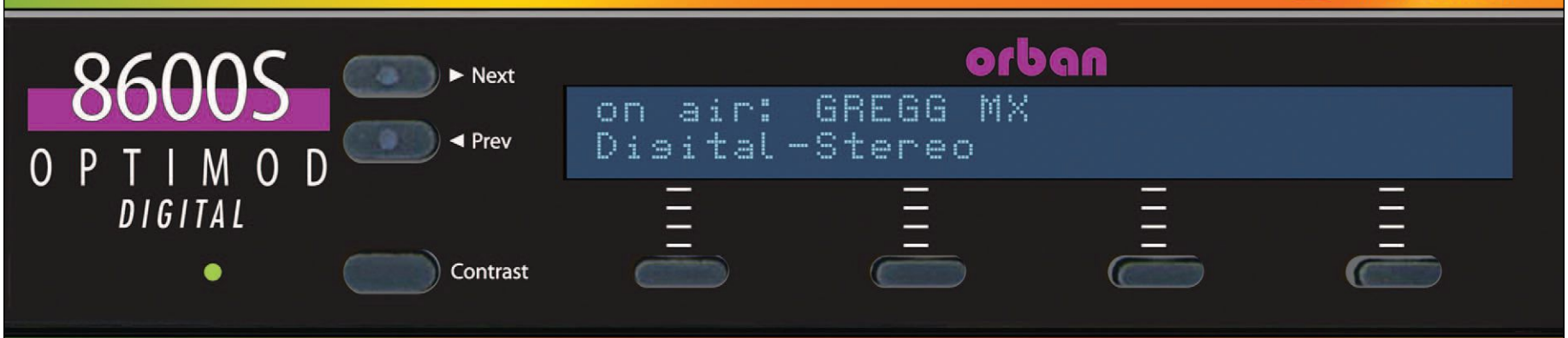
It takes a lot of technology today to keep things going. On the other end of those network cables are transmitters and satellite uplinks, fed with multiple formats of audio for both analog and HD broadcasting on multiple stations. There is all the technology we never dreamed of, and that we only saw in science fiction movies in the old days.

Instead of running tons of wires, our teams are looking at IP address tables and charts drawn in Visio and displayed on a tablet, working to route something to a new piece of equipment. No more tracing or figuring out how to run the wires, or documentation scratched out in notebooks. Today, we track down a problem or perform a setup by looking into a web interface or some configuration software. At those times, we can smile and say to ourselves, "We've come a long way baby – enjoy it!"

Tommy Gray is the Director of Broadcast Engineering/Technology/Facilities at KSBJ/NGEN Radio Networks. He may be reached at: tgray@ksbj.org

The loudness, clarity, and punch of Optimod-FM 8600 processing
are now available in a compact package.

orban
www.orban.com



The 8600S-FM offers Orban's flagship 8600 "MX" audio processing technology in a cool-running, fan-less 1 rack-unit package. 8600S-HD is coming soon, and any 8600S-FM will be upgradeable to HD without removing it from the rack.

LIGHTNER ELECTRONICS INC

Lightner Electronics Inc.
Your Ultimate Supply & Service Solution!
Sales 866-239-3888 www.lightnerelectronics.com

www.studioitems.com **STUDIO ITEMS INC.** **(815) 669-2070**

SI INC

LOW PROFILE MIC BOOMS

ON-AIR LIGHTS

MICROPHONE ACCESSORIES

HEADPHONE CONTROL PANELS

SPEAKER MOUNTS

Disaster Preparedness

Emergency Operations Planning

by Jim Turvaville

After seeing natural disasters reported on the news, it's clear that the stations who prepare for those events are the ones that rise as the heroes of the local community; we are all proud to be broadcasters when we see other stations stand out and remain a voice in time of tragedy. Obviously, if you operate a station in an area prone to such events, it only makes sense to have prepared some way of keeping a signal serving your community in such a time.

Whether that is hurricane preparation in Florida or the Gulf Coast region, ice storm preparedness in the Northeast or tornado preparation in the Midwest "tornado alley" region, it is not unusual to see local stations with alternate studios or tower locations on standby. An emergency in your specific area may not actually involve a natural disaster of some kind, it is most likely to be from a mass utility outage, an uncontrolled fire, vandalism, wind storms or simply some major failure of your broadcast facility.

From my 35+ years of radio, I have observed that the great majority of stations, outside the "Top 5" owners, do not have emergency facilities. Much like your spare tire, it is an expense you make with the anticipation you will not ever need to use it. I cannot tell you the last time I needed to actually use my spare tire, and I'm not sure even how to find the jack in my truck. But I do have both of them. Most of us do not expect to need a backup facility, so spending the money to build one seems to just not be as important. It's not that the money is not there, but it is most likely that the money has a purpose which is much more immediate. And if asked about what it would cost, most everyone would think a backup facility would break the bank. While it certainly can, there are some ways to prepare that can meet most every station's budget which can be affordable. Let's look at some ways you can prepare to keep your station serving the community in some means, no matter what comes your way.

What is an Emergency?

First, we have some direction by the FCC on what constitutes an emergency under the Rules, thereby triggering several Rule Sections on operational variance. They have given quite a bit of definition and latitude on allowing stations to declare an emergency in Section 73.1250(a)

Emergency situations in which the broadcasting of information is considered as furthering the safety of life and property include, but are not limited to, the following: Tornadoes, hurricanes, floods, tidal waves, earthquakes, icing conditions, heavy snows, widespread fires, discharge of toxic gasses, widespread power failures, industrial explosions, civil disorders and school closing and changes in school bus schedules resulting from such conditions.

This understanding is important, because once a local situation falls under these definitions, the stations have options open to them that do not require prior authority from the FCC. These include using the station to broadcast point-to-point messages (as in from one emergency operations location to another), using the AM daytime facilities at night in order to reach your community better, and broadcasting from an alternate unlicensed AM or FM transmitter location or utilizing an alternate unlicensed FM antenna or AM radiator. If this event happens, a notice to the FCC Secretary in Washington is all that is required, which describes the mode of operation and the nature of the emergency.

Staying on the Air

While the transmitting side of our radio operations gets the most attention, being able to provide programming in an emergency cannot be overlooked. With our modern computerized facilities, this is not as difficult as it may seem. With little exception, it is not a technical challenge to originate some form of your programming from the transmitter site. It may not be highly processed, in stereo or in HD, but if you genuinely need to get audio on the air, it can be accomplished rather quickly at the tower.

If your studios are rendered unusable, a small studio can be assembled ahead of time for a few hundred dollars which can be the single source of providing programming in an emergency. A simple mixer with 2 microphone and 2 line inputs with a balanced output is under $100. Pair it with a couple of microphones and a laptop running a simple automation system – even one of the common freeware automation packages – and you have a basic radio station studio. A set of audio files that are compatible with your format can be kept on the laptop, and occasionally

(Continued on Page 36)

A little extra for good measure

The combination of MR-PRO and XL2 offers you extra flexibility and extra performance providing a complete and easy-to-use audio measurement solution.

MR-PRO

The MR-PRO is a versatile reference grade analog audio source generating both standard and user-stored signals at extremely low distortion. It also includes some remarkable additional features including readout of the impedance and phantom voltage of connected devices, as well as a cable test/signal balance function.

- Sine waves, Pink & White Noise
- Sweeps, both stepped and continuous; programmable
- User stored signals and signals for polarity and delay testing
- +18 dBu output at -96 dB distortion

MR-PRO XL2 (with M4260 microphone)

XL2

A high performance audio analyzer and acoustics analyzer together in one efficient battery-powered package. Designed to close the gap between handheld and benchtop instruments in performance and features, it functions as an audio/distortion analyzer, with frequency counter; octave and 1/3 octave real time analyzer, sound level meter, FFT spectrum analyzer, RT60 reverberation analyzer, polarity tester, delay time analyzer and optionally, as an STI-PA speech intelligibility analyzer.

- Live Sound Solutions
- Installations and Venues
- Broadcast and Studios
- Environmental and Community Noise Measurements

Incorporating:

- High (-100 dB) audio performance
- Ergonometric package with brilliant hi-res backlit display
- Multi-parameter Sound Pressure Level Meter
- RTA and high resolution FFT spectrum analyzers
- Balanced and unbalanced audio inputs
- Monitor speaker, headphone output, tripod mount and shock jacket
- WAV file recording for later reference or post-analysis
- Data & setup memory storage and recall on micro SD card

NTi AMERICAS INC.
PO Box 231027
Tigard, Oregon 97281 USA
503-684-7050
www.minstruments.com
info@ntiam.com

Superior Broadcast

Leading the way with Outstanding Performance, Service & Value

5,000 Watt to 40,000 Watt Solid State FM Transmitters

Broadband across FM Band
Automatic Gain Control
User friendly Control Panel
High gain power Mosfets
High Efficiency Pallets
Low Driver Power
Output power 5 kW & 10 kW
Output Impedance 50 ohm
Output Connector 15/8 inch
Over Temperature Protection
Over Current Protection
Switching Power Supplies
Power requirement 208-250 V
Fold back protects your Transmitter

30 Watt to 2500 Watt Solid State FM Transmitters

All Transmitters 30 to 300 watts are FCC Certified

The SBFM Series of Transmitters, Exciters, and Translators has un-compromised transmission quality at very attractive price. Ideal as a Transmitter or as a driver for a higher power transmitter. Audio Performance has outstanding features with very low distortion and inter-modulation values and high signal to noise ratio. User Friendly features. Universal 80 to 260 volt multi voltage power supply enables operation on different line voltages with no need to preselect voltage .Automatic power control and hold-back protection ensures reliable operation under most operating conditions. Input/output interface built in high performance stereo coder, L&R analogue audio inputs, mono input, MPX composite and auxiliary input for SCA.

Professional Radio Automation

Music & programs, advertisement, jingle and time signal management
Designed for FM stations, Community Radios, Web Radios, Syndications & P.A.
Play-list and Advertisement manage
Hot-keys for instant replay
Simultaneous play-out and Web streaming
Smart-phone App for audio recording and upload
Automatic musical selection based on user defined criteria
Play-list web viewer for speakers and guests
Album artwork, title, artist, etc, from Internet
Social Network and SMS viewer built in
Play-list info publishing for the Web
Multichannel configuration available

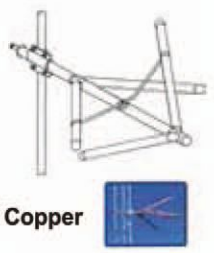
Broadcast Audio Console

OXYGEN 3 - up-to 20 channels

OXYGEN 3 is a compact audio console for "on-air" and production in the broadcast radio field.
It is very simple to use and provides maximum operating flexibility.
The OXYGEN 3 console is a complete and self contained piece of hardware, requiring no additional equipment to operate.
All relevant functions are built-in, such as 2 telephone hybrids with conferencing capabilities. On Air lamp control, Monitor loudspeaker cut-off and Talk-Over facility.
The console features 3 micro inputs and 9 stereo inputs (1 of which configured by default for Phono sources).

Low Power FM and Translators need the best possible Transmitting System

True Circularly Polarized
2 kW Input per Bay
Arrays up-to 6 Bays
Omni Directional
Low VSWR < 1.1:1
Standard Mounting included
Dicers Available
Rugged Marine quality Brass and Copper



Audio Processor

HIGHLIGHTS

- **5-Band Digital Audio Processor**
- **AES/EBU and analog I/O Over XLR**
- **Automatic audio input changeover**
- **2 Composite outputs and 2 AUX inputs**
- **Stereo Generator with composite Clipper**
- **MPX power control - ITU-R BS.412**
- **Digital RDS Encoder, 2 Dataset**
- **Multi-band AGC, speech detector, 3-Band EQ, stereo Enhancer**
- **Brilliance control, Expander and Super-bass Enhancer**
- **USB, Serial, 4 GPIn-4 GPOut**
- **Front Headphone output**
- **Hardware bypass**

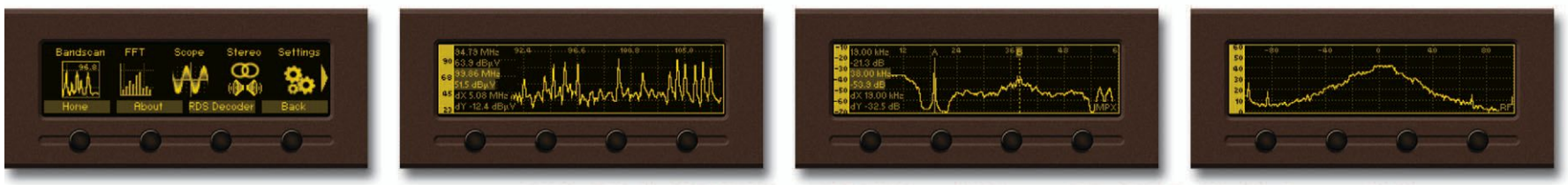
Superior Broadcast LLC

Contact Jimmie Joynt Tel: 972-473-2577
E-mail: jjsbp@msn.com | www.sbp-tv.com
18208 Preston Rd. Suite D9-297, Dallas, TX 75252

DEVA® BROADCAST

DB4004 Modulation Monitor

Product with no equal in the industry
… it's Simply the BEST !!!



Price: $3200

Fully Digital DSP-Based IF Filter • iPhone, iPad & Android Compatible
Built-in Audio Streamer for Remote Listening • Easy to use WEB interface • FTP Server
Alarm dispatch via E-mail, SMS, SNMP and GPO • Built-in 50 channels Data Logger

Available in the US from SCMS, Inc. Call: 800-438-6040

www.devabroadcast.com/products/fm-monitoring

Emergency Operations ...

– Continued from Page 34 –

refreshed with current imaging and ID's, making you ready at all times. If your engineer has prepared the proper interface cable from that mixer into the transmission path at the tower, any staff member could potentially get programming on the air again from the tower site.

We all know that backup power is important in an emergency, and the portable generator is the ideal solution. These can be purchased quite affordably, stored in a safe place, and transported to tower sites or studios as needed. While most of us think of gasoline generators as the most common, the RV industry utilizes Propane powered generators which are equally affordable and offer the added benefit of extremely long term storage of the fuel. Have your engineer calculate the maximum power needed for a potential emergency operation, based on transmitter and studio gear demands, and use a factor of at least 1.5 times that, for sizing a generator purchase. A permanently installed generator is always nice, but not always available, but there are options which can work in a crunch.

Antennas and Transmitters

From the RF side of things, I find it Interesting that most facilities for emergency operation are not required to be authorized prior to use by the station. The definition and permission for emergency antennas is outlined in Section 73.1680:

(a)An emergency antenna is one that is erected for temporary use after the authorized main and auxiliary antennas are damaged and cannot be used.

(b) Prior authority from the FCC is not required by licensees and permittees to erect and commence operations using an emergency antenna to restore program service to the public. However, an informal letter request to continue operation with the emergency antenna must be made within 24 hours to the FCC in Washington, DC, Attention: Audio Division (radio) or Video Division (television), Media Bureau, within 24 hours after commencement of its use. The request is to include a description of the damage to the authorized antenna, a description of the emergency antenna, and the station operating power with the emergency antenna.

This gives a wide variety of affordable options for the station, particularly if an auxiliary facility is non-existent or is also rendered unusable.

That Rule section continues with specifics for AM and FM antenna operations:

(1) AM stations. AM stations may use a horizontal or vertical wire or a nondirectional vertical element of a directional antenna as an emergency antenna. AM stations using an emergency nondirectional antenna or a horizontal or vertical wire pursuant to this section, in lieu or authorized directional facilities, shall operate with power reduced to 25% or less of the nominal licensed power, or, a higher power, not exceeding licensed power, while insuring that the radiated filed strength does not exceed that authorized in any given azimuth for the corresponding hours of directional operation.

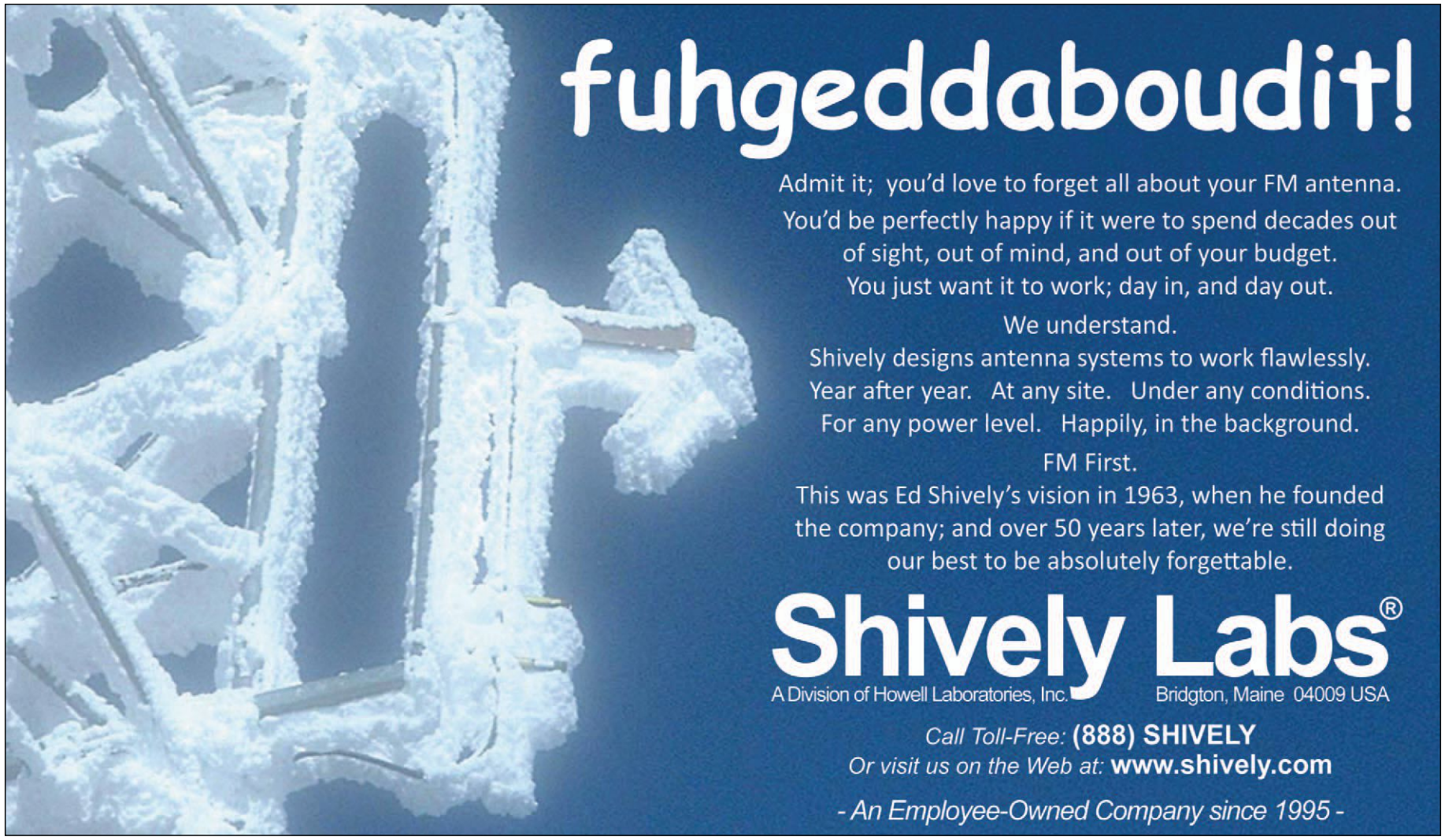
(2) FM, TV and Class A TV stations. FM, TV and Class A TV stations may erect any suitable radiator, or use operable sections of the authorized antenna(s) as an emergency antenna.

For AM stations, the traditional "long-wire" antenna becomes a first thought. If you have the luxury to design one ahead of time and just keep it rolled up at the tower, that is certainly a bonus. But also remember that the 160 meter Ham band is just above the AM broadcast band, and many of the manufacturers of Ham Radio antennas offer a product which will function even at the lower end of the AM dial. These antennas are often rated at 1 kW or more; and with the addition of a similarly affordable antenna tuning unit designed for Ham Radio use, it can be fed by most any of our Standard Broadcast transmitters operating at a compatible power output.

For FM stations, the operation can be inexpensive low-power antennas like used for translator or LPFMs, strategically located within the coverage area population and fed with similarly inexpensive transmitting equipment. Recall that in this emergency operational scenario the use of FCC type accepted equipment is not required. Some of the foreign made transmitter gear which is extremely competitive in price and commands respectable performance, but not permitted for domestic use because it is not FCC type accepted, could be used. An FM station would also have the ability to utilize vertical-only antennas in this situation, which would not normally be permitted for regular broadcasting. These antennas are often available inexpensively and afford added gain of a single polarity for maximizing coverage area.

Of course, a permanent licensed AM or FM auxiliary facility is always a good idea, but if that does not seem to fit your budget there are many ways to prepare for an emergency which will let you maintain a connection to your community in times of emergency.

Jim "Turbo" Turvaville has been Director of Engineering and I.T. for WAY Media (www.wayfm.com) since 1999 and currently works in their Corporate Office in Colorado Springs, CO. He also maintains a small clientele of stations under his Turbo Technical Services (www.jimturbo.net) operation providing FCC application preparation and field work.



Now with 3 New Panels

StudioHub+ Grows Everyday

MATCH-PANEL
Balancing Amp

DUAL HEADPHONE-PANEL
Two Headphone Amps

HEADPHONE-PANEL
with Mini & 1/4" Jacks

StudioHub+®

StudioHub+ IS BROADCASTS' - Pre-Wired, CAT-5, Adapting, MatchJacked, RJ-45, Dongled, Analog AND Digital, Console Harness, Tie-Line, Talent-Panel, Pre-Powered, Shielded, Plug-and-Play – **WIRING STANDARD!**
Use it to save time and money on your next studio installation.

Radio Systems, Inc.
601 Heron Drive
Logan Township, NJ 08085
(856) 467-8000 phone
(856) 467-3044 fax
www.studiohub.com

Logitek® Networked Console Systems

5622 Edgemoor Dr.
Houston, TX 77081 USA
713.664.4470
Toll Free: 800.231.5870
Fax: 713.664.4479
www.logitekaudio.com

ROC Digital Console

An Updated Version of a Logitek Classic

When we introduced our first ROC digital console in the late 1990's, its networked audio and assignable inputs were a novelty to most users. Now, they're a must. Our updated version of the ROC leverages the power of JetStream Dense-Node AoIP Networking to bring you all of the I/O, mix-minus, delays, processing, hard-disk playout and control you need for air studios, production rooms and more. The new ROC is available in sizes ranging from 6 to 24 faders; the monitor module includes 12 user-assignable softkeys along with controls for source selection, timer, monitor feeds and headphone output. Two sizes of meter bridges are offered along with our computer-based vMix+ metering.

Now in our 35th year, Logitek continues to develop new ways of managing broadcast audio. Contact us to arrange a demonstration of Logitek Audio Networking or browse our console options at logitekaudio.com.

Audio Guide

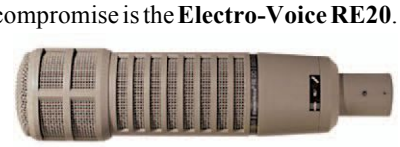
Microphone Shootout

by Mike Phillips

As broadcasters, we love our microphones. It's axiomatic that not every microphone works best for every voice. In a recording studio, engineers usually have the benefit of a mic closet with a large variety of vintage and current dynamic and condenser microphones. They also have the opportunity to play around and pick the best mic for the application.

Radio stations are faced with a unique challenge in that a mic selected for the on-air or production studio must work for a wide variety of voices. Imagine the headache (and negligible benefit) of having each person use a mic critically selected for his or her voice. Some stations address the issue by having programmable voice processors that allow each person to create and recall his or her own profile. What a hassle.

Over the years, for many stations, the microphone chosen as the best compromise is the **Electro-Voice RE20**. They're everywhere. The RE20 is not the best mic for every voice, but it's probably not the worst mic for many voices. Broadcasters have a love-hate relationship with them.



The RE20 attained its dominance in the marketplace for good reasons: Its sound quality is good, its pickup pattern makes it easy to use, its integral pop filter is very effective, the 309A shock mount mechanically isolates it very well, and, like most EV mics, it's durable. You might not want to drive a nail with one, but according to EV's ads, you can.

Many voice-over guys prefer condenser mics over dynamics. These guys have trained ears, they know what sound they want, and they know how to configure their setups to get that sound. While few stations would be willing to spend the money to equip their studios with Neumann U87s, like some of the networks have done, there are certainly a lot of condenser mics in use in broadcast studios. A condenser mic can cost drastically more than a dynamic microphone, which is one reason that a station might decide to use a dynamic. For example, an RE20 has a street price of $450. A Neumann U87 is $3,600. Does a U87 sound eight times better than an RE20?

Neumann U67

The growth of Internet broadcasting and podcasting has created a new market for microphones. On-air studios used to be confined to the local radio stations, but now they're everywhere. Most of these hobbyist studios use inexpensive equipment, like Mackie mixers, but their owners' interest in microphones is on par with that of commercial broadcasters.

The most popular podcasting mic is probably the Heil PR40, thanks to Leo Laporte and his TWiT network. He has a studio full of them, and they are constantly visible on camera. People who like the way he sounds on his PR40 want one for themselves. The syndrome is not unlike seeing Roger McGuinn play a Rickenbacker 12-string guitar and deciding you have to have the same one to get the same sound.

Heil PR40

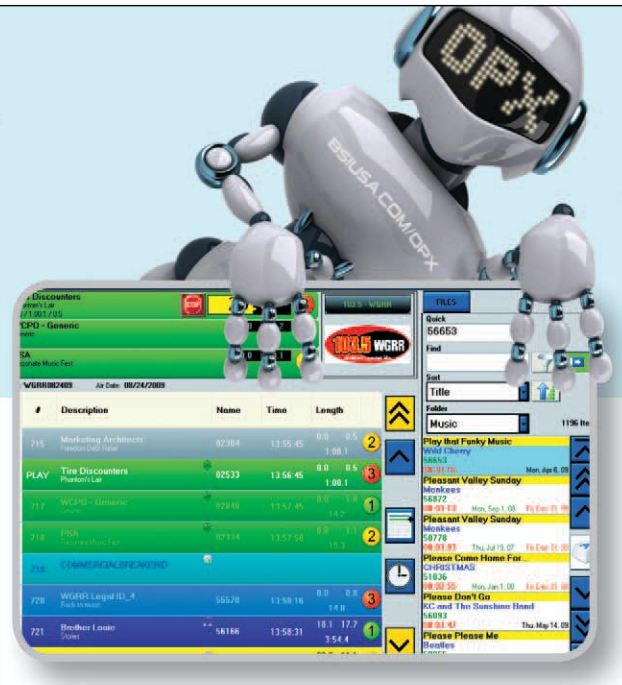
The PR40 has a lot of the same benefits as the RE20, but it definitely has a different sound. What sells the PR40 and the RE20 is that people who use them for the first time can actually hear the difference – even with untrained ears.

One of the most popular voice-over mics that some broadcasters have in their production studios is the Sennheiser MKH-416. This mic is the one often referred to as the Ernie Anderson ("The Love Boat") microphone, since Ernie used it regularly. The 416 is a short shotgun, highly directional mic, originally designed for outside broadcast applications, like boom poles in video shoots.

Sennheiser MKH-416

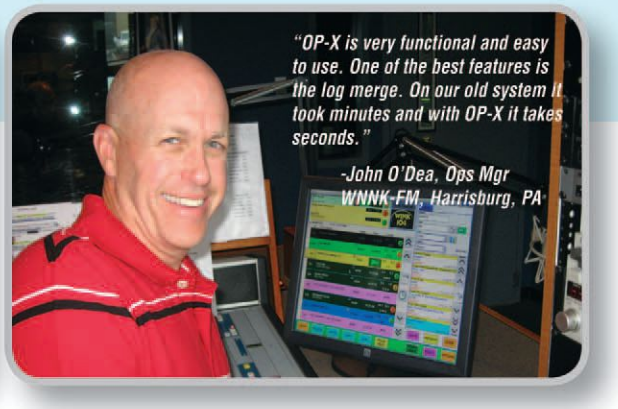
(Continued on Page 40)

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



AUTOMATION

SIMPLE • POWERFUL • REDUNDANT

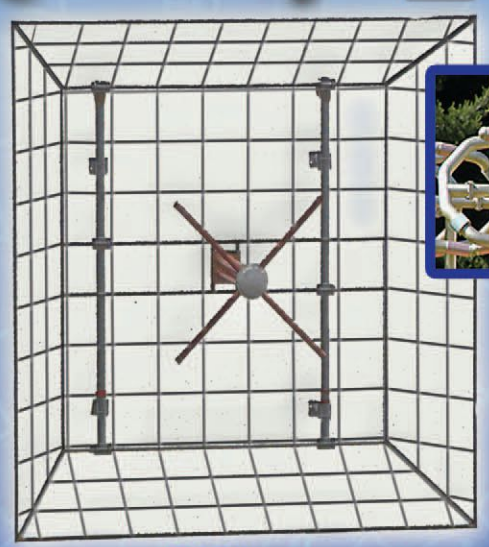


Not since Axia audio-over-IP *was introduced to the broadcast industry have we at BGS been so excited! It is with great enthusiasm we'd like to invite you to take a look at the new Op-X Radio Automation delivery system for any single or multi-station cluster. Op-X's versatility allows it to operate seamlessly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

Op-X RADIO AUTOMATION

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

Quality FM&TV Antenna Systems



FM Panel

Power-Tiller

Power-Tiller with Radome

Slant-V Directional

PSI is dedicated to designing and manufacturing the highest quality product. Working diligently with station engineers, consultants and outside vendors ensures that each project is completed to the customer's satisfaction.

Wide range of antenna models are available at all power levels, directional and non-directional, multi-station and more.

Additional products include..

Transmission Line

Combiners

Filters

Turnkey Systems

PSI ψ

Propagation Systems, Inc.

Phone: (814) 472 - 5540 Fax: (814) 472 - 5676

Email: sales@psibroadcast.com www.psibroadcast.com

Coaxial Dynamics

A CDI INDUSTRIES, INC. COMPANY

SPECIALISTS IN RF TEST EQUIPMENT & COMPONENTS

COAXIAL DYNAMICS has been a leading manufacturer of precision equipment for the measurement and termination of RF Power since 1969. Our equipment is used by engineers in a wide variety of applications throughout the world.

Our products include:

- Directional Wattmeters for both Analog & Digital applications from 1 W to 100 kW and from 2 MHz to 2.3 GHz.
- Wattchman RF Monitor/Alarm Systems.
- Line Sections & Plug-In Elements.
- RF Loads - Dry, Oil, Water, and Air designs up to 200 kW.
- Low Pass Filters & Power Sensors.

6800 Lake Abram Drive, Middleburg Hts., Ohio 44130, USA
440-243-1100 • Toll Free: 1-800-COAXIAL • Fax: 440-243-1101
E-Mail: sales@coaxial.com • Web Site: www.coaxial.com

• Broadcast Equipment •
Wattchman - High Power Wattmeters - Elements
• Line Sections & Meters •
• Termination Loads •
Dry - Oil - Water - Air

Microphone Shootout

– Continued from Page 38 –

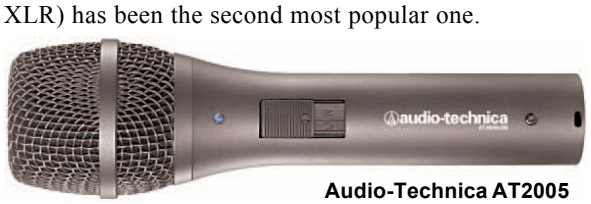
Somewhere along the way, the voice-over community latched onto it, and its fans can be quite dedicated. In my experience, the 416 does not work on nearly as many voices as the PR40 or RE20 does. Just for fun, we tried one on a female vocalist during a session in a recording studio several years ago, and it was horrible. Not one person in the studio thought the track was even usable. However, that same microphone, on a deep-voiced male VO guy, was magic.

So how do you pick the best mic? Should you just go with a PR40 or an RE20 and be done with it? Do you want to go through the hassle of trying a variety of mics in your studio to see which one you like best? Can you rely on the written recommendations of others?

Just for fun, I created a microphone shootout that demonstrates several mics with a typical male voice – mine. (Yes, I know I have a bad case of South mouth.) The test is completely unscientific. Each mic was recorded through the same preamp, a Millennia Media TD-1, into a Sony PCM-M10 digital recorder. The resulting 16-bit, 44.1kHz wave file was imported into Adobe Audition and normalized. There is, of course, no equalization, compression, or other processing on any file. The files are not critically level-matched. The background noise is not unlike the ambient noise you would encounter in any broadcast studio. Listen to the results at the following link: **http://getbetteraudio.com/microphone-shootout-for-may-2-2014/**

Once you listen to these samples, find out which mic is which at the link below. The results are password-protected. The password is "*showme*" without the quotes. **http://getbetteraudio.com/answers-for-mic-test-for-may-2-2014/**

As you will see, blind listening tests can be very revealing. The results from people who have listened to these tests, and reported their results, have been surprising. Each microphone has been selected at least once as a favorite. The MKH-416 has been the top pick. Believe it or not, the $60 Audio-Technica AT2005USB (with XLR) has been the second most popular one.



Audio-Technica AT2005

The Audio-Technica AT2005USB deserves a special mention. Because of its low street price, it is often overlooked in professional circles. The AT2005 is the same microphone as the Audio-Technica ATR2100-USB, which has taken the podcasting community by storm. While the AT2005/ATR2100 might not be your first choice for your studio, try it before you knock it. Moreover, because the mic has a USB output in addition to its XLR output, it can be directly connected to a computer, and with a good Internet connection and Skype, you can have an amazing remote broadcast for very little money. Because of its presence peak and proximity effect, many people prefer the AT2005 over a more expensive alternative, such as the Shure SM58

The Telefunken M82, which is also a large diaphragm dynamic mic, is a relative newcomer to broadcasting mic offerings. Another mic in the same class as the PR40, the RE20, and the M82, is the Beyerdynamic M-99. The differences between these mics are more pronounced with voices that are deep or resonant, but each one has its own unique sound.

Telefunken M82

Picking the right microphone is not unlike deciding what color to paint a room. Sometimes you have to pick the color that offends the fewest people. Sometimes you have to use the cheapest paint. Other times you want to make a bold statement. Whatever color you pick, some people will admire your taste, and others will zealously argue that you have no taste at all! So it is with microphones. There is never a consensus on which mic is best, but for us mic snobs, it's a lot of fun to test and compare.

BeyerDynamic M-99

Mike Phillips started in the radio business in 1962 at his family's radio station in Laurinburg, NC. Over the years, he has been engineer, on-air, sales, and management. He is presently an attorney in Cary, NC and provides audio help for broadcasters and podcasters. You can reach him at radioguide@mikephillips.me

Starts As An EAS/CAP System, But Expands To Do So Much More!

SPARTA BROADCAST EAS XTRA™

- It Can Become Your Station's Automation* Computer!
- You Can Use it to Stream Your Station Over The Net!
- Add The Stereo Generator/Audio Processing Option!
- You Can Even Add-On An RDS Feature!

* SPARTAMATION

PERFECT FOR LPFM STATIONS

BASE PRICE IS ONLY $2150.00.

ORDER ONE TODAY - EMAIL ron@EBSradio.com -or- Call 541-460-0249

PRE-WIRED STUDIO KITS

From The Box To
Operational...
...In About Four Hours!

ORDER ONE TODAY - EMAIL ron@EBSradio.com -or- Call 541-460-0249

Delta Meccanica

Specialists in RF 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

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

Matching 75 to 50 Ohms

by Roger Paskvan

In our March/April issue, I outlined a unique way of adapting connectors to 75 Ohm cable TV hard-line, enabling its use in broadcast systems. Because of the impedance mismatch, the 50 Ohm world and the 75 Ohm cable left a SWR of 1.5:1. To some, this 4% loss is not significant but transmitter engineers like to see the reflected wattmeter return all the way down to zero, so some form of matching is required.

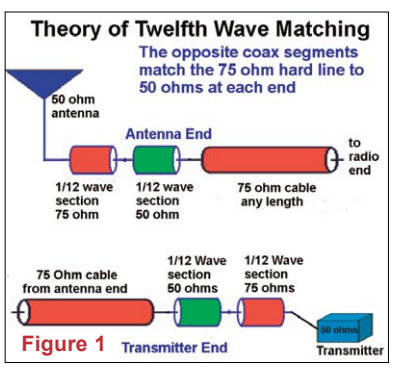


Figure 1

For those of you that would rather buy something to match 50/75 ohms, Telewave offers a TZ150 as well as the EMR Corporation 6450/Z in all frequency ranges for under $200. These devices will do the job but you will need two, one on each end. Although quick and easy, it defeats the "Free" in the process, even though you are getting a transmission line bargain.

With some ingenuity, a long lost method can be employed to easily match the 50/75 ohm problem utilizing small coax segments. This method involves utilizing opposite impedance coax segments in tandem, approximately 1/12 wavelength long each. The mathematics of "Why it works" we will leave to its author Mr. Bramham[1].

Figure 2

$$\text{Wavelength} = \frac{11803}{\text{Freq (Mhz)}}$$

Determines the wavelength for a given frequency in free space

$$W = 131.14 \text{ inches} = \frac{11803}{90\text{MHz}}$$

Factoring the Velocity of Propagation (V.P.)
Wavelength in cable = V.P. of the cable x W (above)

$$\text{Wavelength in cable} = \text{V.P. (.66)} \times 131.14$$

86.55

For a velocity factor of 66% the cable wavelength is 86.55 (inches)

Use this number for all coax calculations (90 MHz)

This is the physical distance inside the coax cable

To match a 50 antenna to 75 ohm coax, one must determine a specific length (1/12th wave) of a 75 ohm coax section and a corresponding 50 ohm (1/12th wave) coax section then couple them together between the antenna and the CATV 75 ohm hard line. ***(Upper Figure 1)*** At the transmitter end of your CATV hard line, another 50 Ohm and 75 Ohm segment of 1/12 wave coax will convert the 75 Ohm cable back to your transmitter's 50 ohm impedance. ***(Lower Figure 1)***

To begin, a little understanding of wavelength is in order. A wavelength is the physical distance of one cycle at a specific frequency. This physical distance (W) in free space is determined by the formula 11803/ Freq. (MHz). ***(See Figure 2)*** In our example, we will use CATV Hard-line and twelfth-wave matching around 90 MHz.

Figure 3

Original 1/12 Wave Formula

L is the distance in wavelength for B the ratio of impedance

$$L = \frac{\arctan\sqrt{\frac{B}{B^2+B+1}}}{360}$$

$$B = Z1/Z2$$

This is the ratio between the two impedances you want to match

B = 75/50 = 1.5

L = .0816 Wavelengths

$$L = \frac{\arctan\sqrt{\frac{1.5}{2.25+1.5+1}}}{360}$$

L x physical wavelength in the coax = 1/12 matching length

.0816 x 86.55 (66% of 131.14) = 7.06 inches for a 1/12th matching length

In ***Figure 2***, the physical distance of one wavelength becomes 131.14 inches for this 90 MHz example. Since radio waves slow down inside coax cable, the wavelength in coax is shorter than that of free space. This phenomenon is called velocity of propagation (V.P.) and expressed as a percentage for all the different types of coax cable. We must now determine the V.P. for each of the 50 and 75 ohm coax segments for this 1/12 matching example. Cable manufacturers publish the V.P. for each type of coax which can be found on the Internet. In our

(Continued on Page 46)

WHY NOT SWITCH TO MCI?
COMPLETE FM/TV PRODUCT LINE

Coax switches from 7/8" through 6-1/8"
Control panels available.

- ANTENNAS
- SPLITTERS
- NOTCH FILTERS
- HARMONIC FILTERS
- POWER COMBINERS
- CHANNEL COMBINERS
- N +1 SWITCHING MATRIX

Free UPS Ground shipping within the continental USA and Canada - SWITCHES ONLY

Micro Communications, Inc.
Toll Free: 800-545-0608
www.mcibroadcast.com

VISA MasterCard

Keep your LPFM station fully compliant with FCC rules!

DV-MICRO
Davicom's Low Power FM Site Monitoring Solution for unattended operation

davicom

Intelligent Site Monitoring
t. 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

FM

100 W	2008	BE FM100C
250 W	2004	Crown FM250E
500 W	1998	BE FM 500C
3.0 kW	2000	Harris Z3.5CD
5.0 kW	1995	Harris HT5CD
5.0 kW	1998	Harris Z5CD - *with two FlexStars*
5.0 kW	1999	Harris Z5CD
5.0 kW	2006	Harris Z5 - *Solid State, Unused*
7.5 kW	2002	Harris Z7.5CD
10.0 kW	2004	Harris Z10CD
20.0 kW	2004	Harris ZD20CD
25.0 kW	1988	Harris HT25CD
20.5 kW HD	2008	Continental 816HD - *with Flexstar Exporter*
27.5 kW	1994	Continental 816R-4B - *Solid State IPA*
30.0 kW	1988	Harris FM30K

Please see our current listings on our website.

Used Misc. Equipment:
Used BE FC30 SCA Generator
Phasemaster T12,000
Sola Consrtant Voltage Transformer #23-23-230-8
Bird Model 8936, 10kW Air-Cooled RF Load

Used Misc. Equipment:
Harris N+1 Controller
MCI 4-Port 1-5/8" Coaxial Swticvh

Exciters & Generators:
New – 30W Synthesized Exciters

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

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

Kintronic Laboratories, Inc.

OUR KINSTAR ANTENNA TECHNOLOGY OFFERS THE HIGHEST EFFICIENCY LOW PROFILE AM ANTENNA AVAILABLE IN THE WORLD BROADCAST MARKET

ENTERCOM DIPLEXED AM DIRECTIONAL ANTENNA SYSTEM, VANCOUVER-WA

MODEL KSA-VCTB-10 KINSTAR LOW PROFILE ANTENNA ON THE AIR IN COLOMBIA, SOUTH AMERICA

KINTRONIC LABS, INC.
P.O. Box 845, Bristol, TN 37621
(P) 1.423.878.3141 (F) 1.423.878.4224
www.kintronic.com

Service Guide

Radio Equipment Products and Services

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

RADIO TECHNIQUES®

www.radiotechniques.com – 856-546-8008 sales@radiotechniques.com

FM Applications Upgrades AM Applications FCC Technical Representation
Phasor Antenna Couplers Diplexers RadiationHazard Analysis New Stations
Directional Antennas Field Engineering Intermodulation Studies

Ted Schober, P.E. Member AFCCE

Excellence in Radio Broadcast Engineering since 1979

RFE 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

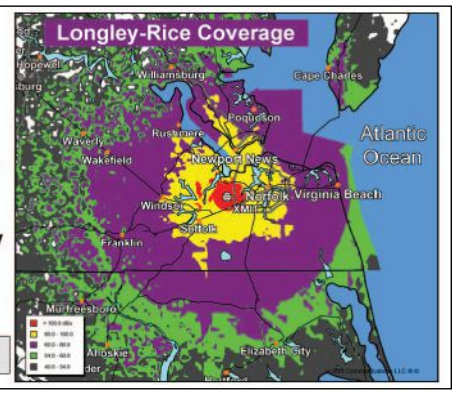
RFEngineers, Inc. 352-367-1725

V-Soft COMMUNICATIONS®

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



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

10 % QTY DISCOUNT

enbergelec.com

TRANSMITTING CAPACITORS

MICA-VACUUM-CERAMIC

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

WARNING

Wrong Safety Sign.
When Danger's inside,
Warning goes outside.

RFSigns.com

- ANSI Z535.2 Compliant
- Easy to order

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

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

Nelco Communications

Broadcast Equipment Brokerage

Let us sell your used equipment AM, FM, TV broadcast transmitters, STL's, antennas and towers. We also deal with Optimod processors and broadcast mixing consoles.

Contact: W.L. Nelson at: 1+ (256) 425-3226

www.nelco-communications.com

WireReady® Incorporated

We offer these solutions:

Satellite Automation
News Playout
Telesales Database
Music on HD
Storm Closings
Podcasting
Single Click Website Updating

Since 1989, family owned and 2000+ happy customers

(800) 833-4459 wireready.com

BAUER TRANSMITTERS, INC.

www.bauertx.com

BAUER - ELCOM BAUER - SPARTA - CETEC

Re-Manufactured
Bauer Transmitters Available

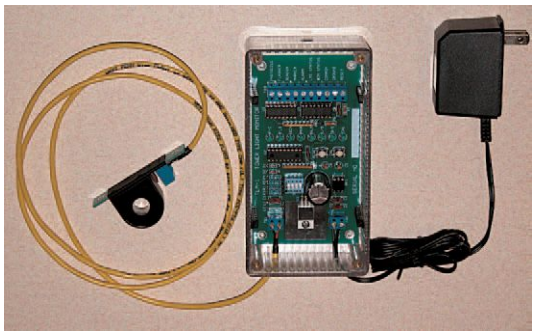
AM/FM – 2.5 kW to 25 kW

www.bauertx.com paul@bauertx.com
Phone: 915-731-7500

Service Guide Radio Equipment Products and Services

TLM-1 TOWER LIGHT MONITOR

Total Monitoring for Older Lighting Systems



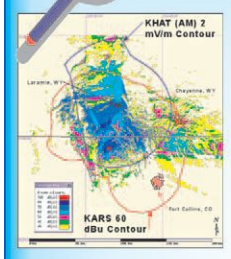
A microprocessor based system designed to monitor the status of FAA type A incandescent tower lights.

- 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

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

MOORETRONIX

BROADCAST & INDUSTRIAL ELECTRONICS

Our 14th 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

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

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

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 www.antennaID.com

Chris Scott & Associates

Visit our website

www.scott-inc.com

Ph: (270)781-5301

Fax: (270)781-1232

Bowling Green, Kentucky

AM-FM Notch Filters

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

BESCO INTERNACIONAL

AM-FM Transmitters

Pre-Owned – Tuned and Tested to Your Frequency

www.Besco-Int.com

Rob Malany – Owner

321-960-4001 • sales@Besco-Int.com

Small Market Guide

– Continued from Page 42 –

case, both the 50 and 75 ohm coax cable segments have a V.P. of 66%. At this point, multiply the V.P. (.66) for this cable by the free space wavelength (W, 131.14) to obtain 86.55 inches. At 90 MHz, this is the physical distance of one cycle inside this coax. ***(86.55, refer to the lower half ofFfigure 2)***

THE EASY WAY TO MATCH 50/75 OHMS

1. Find the distance of one wavelength (from Figure)

$$W = \frac{131.14 \text{ inches}}{90\text{MHz}} = \frac{11803}{90\text{MHz}}$$

2. Find the velocity factor for each cable you are using for the 50 and 75 ohm segments. In our case they are both 66%. If your 50 and 75 ohm cables have different V.P., each will have to be multiplied by their V.P. factors, respectively.

Cable Wavelength = V.P. (.66) X 131.14 = 86.55 (inches)

3. Take the cable wavelength number and divide it by 12

Figure 4

86.55/12 = 7.2 inches

4. For our 66% cable this is the segment lengths that we need to match 50 to 75 ohm cables

This method requires no algebra. The bandwidth is so broad, you will not notice any difference between 7.2 inch or the calculated 7.06 inch segments.(diff. is <0.14 inch)

The actual calculation of twelfth-wave segments involves algebra to determine the segment length. This segment length varies with the ratio of the two matching impedances (B) plugged into the formula in ***Figure 3***. To use this formula, find the ratio of impedances your matching (B=75/50=1.5) and plug B (1.5) into the equation in ***Figure 3***. When you are all done, the formula gives an exact wavelength (L) for twelfth-wave segments specific for this impedance ratio. This exact length is 0.0816 wavelengths. Now multiply this 0.0816 x 86.55(the wavelength in the coax). The resulting 7.06 inch is the length for making 50 and 75 Ohm coax segments.

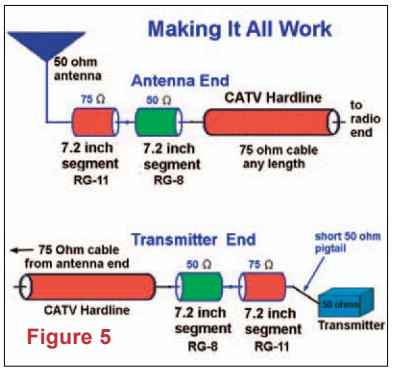
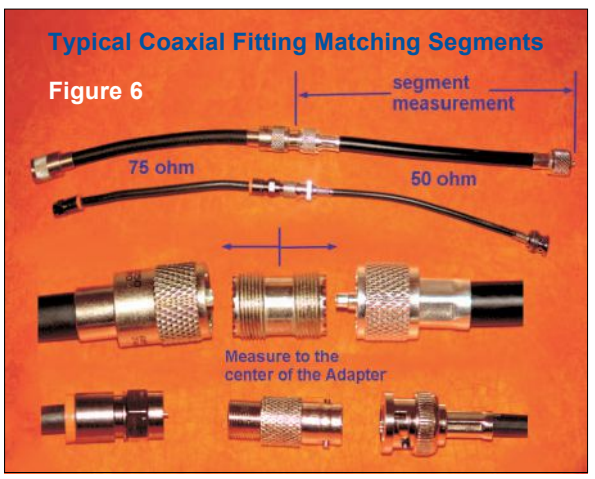


Figure 5

Most of us don't like algebra and for this reason, twelfth-wave matching has remained on the back burner for years. After building many of these twelfth-wave matches, some generalizations are in order. The bandwidth of this match is very broad. For the given twelfth-wave section, that bandwidth is about +/ -15 % of the frequency your working with. For 90 MHz, that's about +/- 13 MHz, most of the FM band, therefore creating a good tolerance for error. An exact segment is not really necessary and cutting errors of one inch make little difference in the results. So, let's just throw the big algebra formula out and generalize at least for small impedance ratios under 2:1.

The Simple Way: To match your 50/75 ohm coax cables, determine the free space wavelength (W). Determine the V.P. for the segment cables and multiply W times that V.P. factor obtaining 86.55 in our example. ***(see top of Figure 4)*** Now just divide this wavelength(86.55)inside the cable by 12 obtaining a segment length of 7.2 inches. ***(Refer to lower Figure 4)*** This 7.2 inches is so close to the big formula result of 7.06 you won't notice any difference. Measure and cut off four 7-3/16 inch segments, two for 50 Ohm coax and two for the 75 Ohm coax cables. If you are going to join these together with connectors allow for the connector length by shortening the cable measurement. To make it all work, connect the two different coax segments together on the antenna end as shown in the ***top of Figure 5***. Do the same for the transmitter end, referring to the ***bottom of Figure 5***. Note that the positioning of the 50 Ohm and 75 Ohm segment order is critical. They are positioned opposite on each end of the CATV line. See ***Figure 6*** for examples of the author's coupling cables with connectors. At higher frequencies, directly soldering the coax segments together on each end may be needed. To finish our example, a wattmeter test at the transmitter will confirm a perfect match with no reflected power.



This little known twelfth-wave technique costs next to nothing, enabling you to truly say you have "free" one inch CATV hard line at no cost, low losses and a perfect match.

[1] B. Bramham, "A Convenient Transformer for Matching Coaxial Lines, "Electronic Engineering, Volume 33. January 1961, pp 42-44.

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

Remote Reboot of AC Powered Devices

Stackley Devices LLC

(609) 647 9677

RemOutlet Reboot Mini $179

Adjustable Power OFF Time

www.RemOutlet®.com

SALE! Now only $3995

Radius Talk

- Comfortably seats 5 people
- Includes plenty of rack space as well as a utility cabinet
- Universal headphone bracket assembly included

GRAHAM STUDIOS
Broadcast Furniture

(866) 481-6696
www.graham-studios.com

SAMCO ANTENNAS, INC.

Fort Worth, TX • Phone: 817-336-4351 • samyagi@flash.net

WWW.SAMCOANTENNAS.NET

- The FM series of yagis for 88 to 108 MHz
- SAM-159FM (5 element 9 db gain) SAM-137FM (3 element 7 db gain)
- SAM-160 (NOAA weather monitoring) 162.5 MHz (6 element)
- SAM-460 (Remote Broadcasting) 450/455 Mhz (6 element)
- SAM-160 (Remote Broadcasting) 161.7, 170.15, 153.11 Mhz
- STL yagis include the SAM-936(3 el) SAM-970(7 el) SAM-91313(13 el)
- SAMCO also can provide TV yagis for Channels 7 to 83

All yagis are designed and manufactured in our Fort Worth, Texas manufacturing facility, USA.

Time to Synchronize

ESE

ES-185U/NTP GPS Master Clock

With ESE's Master Clock, you can display Universal Time Code via the 12-channel GPS receiver and generate many types of Time Code (NTP, SMPTE/EBU, IRIG-B, ESE-TC89, ESE-TC90, RS232C/ASCII, & USB), and an extremely accurate 1PPS signal.

You can also easily interface with new or existing computers, automation and clock systems. Visit **www.ese-web.com** for all your time synchronization needs.

ESE, 142 Sierra Street, El Segundo, CA 90245 USA, Tel: (310) 322-2136

Final Stage

RADIO ROUNDUP

The Radio Guide Event Register

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

Texas Association of Broadcasters (TAB)
August 6-7, 2014
Renaissance Austin Hotel
www.tab.org/convention-and-trade-show

2014 NAB Radio Show
September 10-12, 2014
Indianapolis, Indiana
www.radioshowweb.com

SBE 22 Broadcast and Technology Expo
October 8, 2014
Tuning Stone Resort and Casino, Verona, New York
www.sbe22expo.org

137th AES Convention
October 9-12, 2014
Los Angeles Convention Center
http://www.aes.org/events/137/

WBA Broadcasters Clinic
October 21-23, 2014
Madison Marriott West, Middleton, Wisconsin
www.wi-broadcasters.org/events/broadcasters-clinic/

Ohio Association of Broadcasters (OAB)
October 29-30, 2014
Columbus, Ohio
www.oab.org

Radio Guide Advertiser Info – May/June 2014

Advertiser - Page	Website
Aldena - 28	www.aldena.it
Altronic - 26	www.altronic.com
AM Ground Systems - 22	www.amgroundsystems.com
Arrakis - 27	www.arrakis-systems.com
Bay Country - 41	www.baycountry.com
BEXT - 42	www.bext.com
Broadcasters General Store - 11	www.bgs.cc
Broadcast Devices - 4	www.broadcast-devices.com
Broadcast Software Intl. - 38	www.bsiusa.com
BW Broadcast - 15	www.bwbroadcast.com
CircuitWerkes - 13	www.circuitwerkes.com
Coaxial Dynamics - 39	www.coaxial.com
Comrex - 5	www.comrex.com
Davicom - 43	www.davicom.com
Delta Meccanica - 41	www.deltameccanica.com
Deva - 35	www.devabroadcast.com
DM Engineering - 47	www.dmengineering.com
Econco Tubes - 43	www.econco.com
Enco - 23	www.enco.com
ESE - 46	www.ese-web.com
Graham Studios - 46	www.graham-studios.com
Henry Engineering - 2	www.henryeng.com
Inovonics - 1, 29	www.inovon.com
Jampro - 31	www.jampro.com
Kay Indistries - 47	www.kayind.com
Kintronic Labs - 43	www.kintronic.com
LBA - 31	www.lbagroup.com
Lightner Electronics - 30	www.lightnerelectronics.com
Logitek - 37	www.logitekaudio.com
Michael Patton - 47	www.michaelpatton.com
Micro Communications - 42	www.mcibroadcast.com
Mooretronix - 45	www.mooretronix.com
Myat - 34	www.myat.com
Nautel - 7	www.nautel.com
Nexus - 40	www.nexusbroadcast.com
NTI - 34	www.minstruments.com
Orban - 33	www.orban.com
Phasetek - 47	www.phasetekinc.com
ProAudio.com - 20	www.proaudio.com
PSI (Propagation Systems) - 39	www.psibroadcast.com
Radio Systems - 37	www.radiosystems.com
RF Software - 45	www.rfsoftware.com
Studio Items - 33	www.studioitems.com
Samco Antennas - 46	www.samcoantennas.net
SAS (Sierra Automated Sys) - 19	www.sasaudio.com
SCMS - 17	www.scmsinc.com
Shively - 36	www.shively.com
Smarts Broadcast Systems - 21	www.smartsbroadcast.com
Sparta Broadcast - 41	www.ebsradio.com
Stackley Devices - 46	www.stackleydevices.com
Superior - 35	www.sbp-tv.com
Tieline - 9	www.tieline.com
Transcom - 43	www.fmamtv.com
Wheatstone - 3, 24, 25, 48	www.wheatstone.com

ENJOY THE SOUND. MPA
MICHAEL PATTON & ASSOCIATES
BATON ROUGE, LOUISIANA
WWW.MICHAELPATTON.COM
MIKE@MICHAELPATTON.COM 225-752-4189
EQUIPMENT REPAIRED/RETUNED/REBUILT
✓ AM & FM Transmitters & TX Modules/Cards
✓ Orphans: Older Harris, Omnitronix, LPB, Sine
✓ Antenna Monitors & Modulation Monitors
✓ Exciters, STLs, audio/mic procs, R/C units, etc
An Alternative to Factory Service at Reasonable Rates

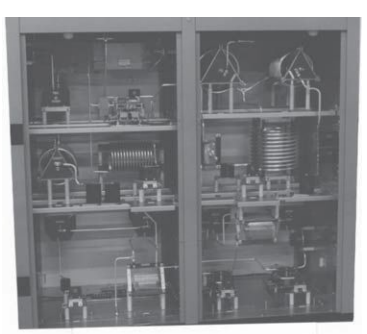
No 3-phase power? No Problem!
Operate any 3-phase broadcast transmitter from a 1-phase utility supply!

- 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.

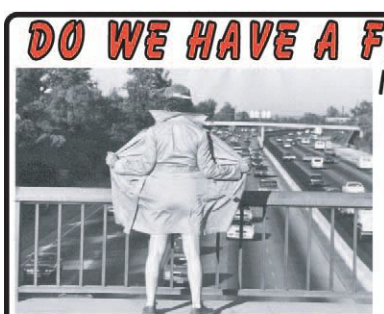
If you have ANY questions about 3-phase electric power for your broadcasting application, do yourself a favor and call Kay Industries first!

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

PHASETEK INC.
Custom Phasing Systems
Phasetek, Inc. is dedicated to provide the broadcast industry high quality AM Phasing and Branching systems, Antenna Tuning units, Multiplexers, and RF components.
Phone: 215-536-6648
sales@phasetekinc.com
www.phasetekinc.com



DO WE HAVE A FLASHER FOR YOU!
NO, NOT THAT ONE.....THIS ONE!
THE STUDIO HOTLINE PHONE FLASHER SERIES
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

THE INTELLIGENT NETWORK

THINK BIGGER
(but not too big)

IP-12

IP-16

sweet...sixteen input faders control a virtually unlimited number of audio sources

introducing the IP-16

(more of a good thing)

WheatNet-IP Intelligent Network Native

Fully Modular Construction & Operation

Flexible, Functional, Reliable, Affordable

for more info, visit:
http://bit.ly/thinkbig16RG

AUDIOARTS
LOW COST DOESN'T HAVE TO MEAN LOW QUALITY

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