

# Radio Guide

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Digital Issue Now On-Line

January-February 2011 – Vol. 20, No. 1

## Radio Systems – “Such a Deal”



First commercial product



RS Series Consoles

Mom and Millennium Products



Digital Consoles



1964

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ESA10 Consoles



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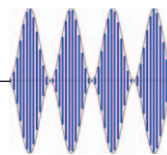
# Radio Guide

## Contents

January-February 2012

## Radio Waves

by Ernie Belanger – Editor



<b>Cover Story</b> .....	<b>6</b>
<i>Radio Systems – “Such A Deal”</i>	
<b>Xtreme Engineering</b> .....	<b>10</b>
<i>Just Another Day In Paradise</i>	
<b>Transmitter Site</b> .....	<b>12</b>
<i>Transmitter Site Tips for Techies</i>	
<b>Studio Site</b> .....	<b>14</b>
<i>2012: The Sound of Things to Come</i>	
<b>Disaster Preparedness</b> .....	<b>16</b>
<i>The Power of Negative Thinking</i>	
<b>FCC Focus</b> .....	<b>18</b>
<i>Telemarketing Cautions for Stations</i>	
<b>Safety and Security</b> .....	<b>22</b>
<i>Station Grounding</i>	
<b>Operations Guide</b> .....	<b>26</b>
<i>You Gotta Have An Ops Manual</i>	
<b>Chief Engineer</b> .....	<b>30</b>
<i>Transmitter Surprises</i>	
<b>Gear Guide - New Equipment</b> .....	<b>34</b>
<i>Array Solutions, Axia, Vital Sounds</i>	
<b>Small Market Guide</b> .....	<b>36</b>
<i>Let's Find Some Radials</i>	

<b>Practical Engineering</b> .....	<b>38</b>
<i>Preparing for the Heat</i>	
<b>LPFM Guide</b> .....	<b>42</b>
<i>LPFM Economic Study: FCC Says “No Impact”</i>	
<b>Service Guide</b> .....	<b>44 &amp; 45</b>
<i>Radio Equipment, Products, and Services</i>	
<b>Radio Pipeline - Broadcast Connection</b> .....	<b>46</b>
<i>Equipment Distributors, Suppliers, and Engineering Services</i>	
<b>Final Stage</b> .....	<b>47</b>
<i>Convention, and Event Register – Advertiser Information</i>	

## Radio Guide

Volume 20 – Issue 1

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### When Will Spring, Spring – Soon I hope.

OK, winter has only just started and I'm already sick of it. Have you ever noticed that the older we get, the colder winter seems to be. Hey, I just had another birthday and while I won't tell you how old I am, let's just say this. When I looked in the mirror the morning of my birthday I noticed I'm looking more and more like a slimmer version of the fat guy in the red suit that visits at Christmas.

But on the bright side, even in the cold of winter, I find a bright spot under my now needle-less tree. We are happy to welcome Tom Bosscher to our pages, with this issue's *Transmitter Site*. Tom discusses a handy little FM analyzer – offering a couple of Tips for Techies.

With many of us snowed in this time of year (no kidding), Steve Callahan decided to give us a little warming up, as we travel to our 50th state for this issue's *Xtreme Engineering*. George Zahn is checking out the Android app that could replace your studio (well ... almost) in *Studio Site*.

Mike Callaghan looks at a recent disaster in *Disaster Preparedness*. In *FCC Focus*, Peter Guttman has some warnings if you telemarket. Jeff Johnson discusses chemical grounding in *Safety and Security* and while Chris Tarr talks about the need for a clearly written Ops Manual in *Operations Guide*. Scott Schmeling takes us through the trials and tribulations of a weekend transmitter fix in *Chief Engineer*, and we'll wrap up our quest to find ground radials with Roger Paskvan in *Small Market*. Finally in *LPFM*, Leo Ashcraft discusses an FCC LPFM economic study.

– Ernie Belanger, Editor

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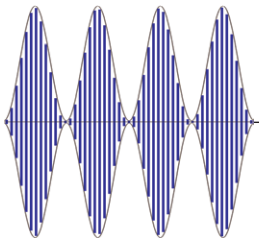
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## Radio Systems – “Such a Deal”

One of the greatest things for me about editing *Radio Guide* is the opportunity to write our cover story each issue. This cover story is a special one for me.

You see, I was building out a station in Colorado back in the late eighties. Initially I had selected a main studio console from a company that was (unbeknownst to me or the dealer with whom I was working) having some financial difficulties. I was about two weeks from our scheduled sign on date when they finally let me know that the console – already four weeks late – would be further delayed.

I was encouraged by the dealer to check out a company about which, at the time, I knew almost nothing – Radio Systems. The dealer faxed to me literature and specification (this was before the days of the Internet!). In our remote location, overnight delivery took two days – one day to get to Colorado Springs and a second day for a private courier to bring equipment out to us. With time being of the essence, I made my decision – we were going to purchase a Radio Systems console.



**Gerrett Conover, Vice President / Jo-Ann Dunn, Sales Manager / Dennis Greben, Manufacturing Manager / Leo McClosky, warehouse manager – with a combined 85+ years of Radio Systems employment!**

### Holding My Breath

I made that decision based on those faxed specs, a photo from another distributor’s catalog, and a brief conversation with a guy named Dan Braverman, who confidently committed to deliver in the time frame we needed. I must admit that I held my breath, waiting for the console to arrive. We continued to pre-wire the studio after Dan, (who never mentioned that he was the president and owner) helped to prep us with the parts that we would need to hook into the console.

The plan was to have the wiring all in place, to help expedite things, and then just drop the console into place. Dan, true to his word, called to let me know the console had been shipped – ahead of schedule I might add – and told me that if I had any questions or concerns to call him directly.

To make a long story short, the console arrived two days after the call, and from the moment we opened the box I was impressed. Our new ESA-10 exhibited excellent craftsmanship – it went into place just as we had planned, and we had the studio up and operational in a couple of hours.

But that’s not the end of the story. About a week out, we started having a problem with a couple of P&G faders. A quick call to Dan had replacements on the way out to us. When they arrived we simply “lifted the hood,” replaced the bad faders, and were back in business.

### Not Unique

My story isn’t unique; I’ve heard many similar ones over the years. Dan is always willing to do everything possible to help out broadcasters, and he backs Radio Systems’ products with excellent service and his personal commitment. Those two things: quality products and excellent customer support, are two of the keys that have kept customers coming back time and again for Radio System Consoles and studio products.

But that isn’t the end of the story. You see, as technology has progressed, so has Radio Systems – innovation is the third key that keeps them ahead of the pack. Dan has kept the company on the leading edge of development, bringing new products to market that employ new concepts, and morphing existing products into updated versions that are adapted to incorporate this new technology. But before we move to Radio Systems today, let’s blow the dust off the cover of the Radio Systems history book. As always, we can best understand where a company is today based on the foundations that were laid in its history.

### How It All Started

Dan Braverman founded Radio Systems as a contract engineering service to non-commercial radio stations in 1976. This beginning gave Dan keen, hands-on understanding of the market’s needs just as technology – including the move from tubes to IC’s – started making quantum leaps.

By the early 1980’s, Dan recognized that many of the products he was installing were behind the times, and that led to creation of a manufacturing division to make studio gear. The contract-engineering department evolved into a full-blown installation division, providing complete, turnkey solutions for existing and new broadcast facilities – both non-comm and commercial.



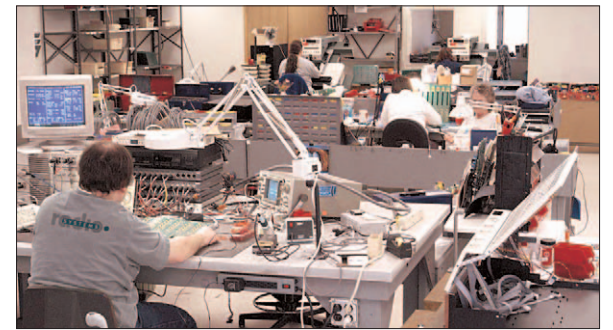
**Radio Systems employees, customers and manufacturing partners on a recent training seminar hosted at the plant.**

### Low Power AM

But Radio Systems didn’t just focus on studio products for broadcast stations. One of the first products the manufacturing division produced was a low-power AM transmitter. Initially marketed to colleges for carrier-current broadcasting, Dan recognized two other substantial mar-

kets – drive-in theatre sound (hey, this was the 70’s!) and licensed Travelers Information Services (TIS) for highways and airports.

Today Radio Systems remains the sole U.S. manufacturer of low power AM transmitters for Part 90 broadcasting, and captures greater than 70% of that marketplace. Oh, and those “Talking House” transmitters that Realtors use? You guessed it – Radio Systems sells them, too, having acquired the company that marketed them several years ago. But let me get back on track.



**Radio Systems assembles all circuit boards and products on site in their New Jersey 13,000 foot facility.**

### Console Evolution

The ESA-10 consoles that I mentioned at the beginning of the story were replaced in the product line in 1988 by the RS Series of consoles. The RS Series was the main stay of their console line for ten years, with thousands installed around the world. And in those ten years, along with their RS Series consoles, many stations took the quantum leaps in technology – including vinyl to CD, analog to digital, and finally to PC-based digital audio storage.

And Radio Systems consoles also evolved from the RS Series into the Millennium Series, introduced in 1998. The Millennium line started as an analog console, morphed into a digital version, and ultimately into a network-capable board. As technology continued to evolve, Radio Systems kept up with their international introduction of The Platform console system in 2010.

### The Mother Load

But console development wasn’t the only thing that was resonating within the creative department of Radio Systems. In 1999, while Dan and a group of engineers were spending endless hours struggling to hook up studio equipment on a multi-studio turnkey project, he observed a young computer tech hook up an entire data network in a few short hours.

Curiously, he challenged the installer to confirm all of his work was done. Dan observed all the routers and servers were operational and all were wired together consistently and properly. That chance encounter caused the light to go on, and that illuminated the vision which led to the development of what probably has become known as Radio System’s most well-known and versatile product: “StudioHub+.”

*(Continued on Page 8)*

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# Cover Story

## Radio Systems

– Continued From Page 6 –

This single product development revolutionized how we wire studios today, using the same “plug-and-play” technology as computer networks. It truly gave radio its first wiring standard for studio equipment hook-up – RJ45 connectors and Cat-5 cable.

The StudioHub+ revolution continues today, as more and more manufacturers adapt this technology to make their gear capable of being quickly connected and installed. And if a customer had a piece of gear that isn’t native StudioHub, Radio Systems has hundreds of adapters to match different connectors to the technology.

### Where Things Are Now

Today, Radio Systems consoles, studio products and StudioHub+ wiring systems are in active use at thousands of U.S. radio stations, and employed world wide, with a concentration of their international marketplace in New Zealand, Africa and India. And over the last 35 years few U.S. radio engineers have not had some experience with Radio Systems products – almost all of it positive!

Now I would be remiss if I didn’t mention, that while Radio Systems is Dan, he isn’t alone at Radio Systems. He has a dedicated staff that handles manufacturing, shipping, development and sales. Gerrett Conover is the company Vice President and serves as General Manager and CFO, Mike Sirkis is Chief Engineer, Dennis Greben is the Manager of Manufacturing (with a staff of 15), Jo-Ann

Dunn is Sales Administrator, and Leo McKlosky is Warehouse Manager. The average tenure of these key personnel is 18 years, and their experience and dedication mean that every product and customer gets expert attention.

### A Man of Principal

Anyone who knows Dan knows that he is a man of conviction and drive. He so believes in Radio, as a medium that can bring about positive change, that in 2002 he founded the not-for-profit African Broadcast Alliance (A.B.A.). This organization is designed to help African communities establish, equip and operate local radio broadcast stations.

A.B.A. believes that private radio can help empower new and emerging democracies, by providing an efficient medium to educate and communicate a message of unity, hope and strength. Radio Systems and other broadcast manufacturers and distributors have contributed enough gear in the past decade to equip more than ten community radio stations throughout Africa.

### Hello Mom, I Got This Crazy Idea!

In conclusion, nothing I can say better demonstrates Dan’s personal involvement, pride and salesmanship than his creation of one of radio’s most memorable ad campaigns featuring his own Mother! Only Dan would have had the moxy and confidence to incorporate his indomi-

table Mom into ads offering, “Such a Deal” for a Radio Systems console! And that really says it all – Radio Systems, such a deal indeed!

**Radio Systems Consoles**

## “...Such a Deal!”



“Dan was always a good boy. And so technical. Even when he was just a baby he was always taking things apart. He works so hard. I tell him – the people already know how good your radios are – so many features and wires. And so complicated! But to look at it, who would know!”

It’s so beautiful. Of course my son makes the best. But I tell him – what people want is a good buy, not a good buy. He should listen to his old mother. I don’t buy anything if it’s not discount. Not like my son with their fancy eyes. I take public transportation – after 10 am when they let the seniors go for free.

I tell him – people want the best, but they also want a deal! I love that – saving money. I don’t buy if I don’t get it at a discount. If I were a big deal company president like my son, I know how I would sell more radios. I’d make everyone a deal!”


Save hundreds of \$\$\$ during Radio System’s “Such a Deal” sale! Fax or phone for details on our free factory options and dealer discount!

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The ad featuring Dan’s real Mom, that started an industry advertising legend!

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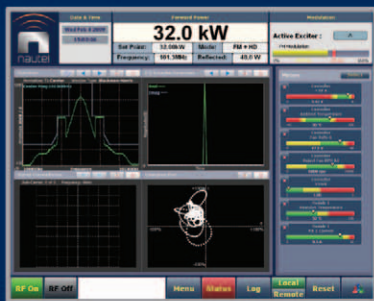


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## Just Another Day In Paradise

Hawaii is beautiful place to visit and live. Yes, there is radio in paradise and there are the unique challenges of a new mountain top transmitter site on the island. Consulting Engineer Don Mussell is the “go-to” man when it comes to good radio in Hawaii. Don piqued my interest when he explained what he had to do to build his new transmitter site.

### An Xtreme Build

According to Don: “The transmitter site is 4,500 feet above sea level, and situated high above Kihei and the south coast of Maui, on the lands of the historic Ulupalakua Ranch. Getting to the site requires four wheel drive, at a minimum, as the “road” (as we like to call it) is more or less a lava rock path on the bottom three miles, and graduates to pasture land on top three miles.

“But the pasture land is also lava, but older and more weather beaten, so it is ground up into small pebbles and new soil. On a good (dry) day, the road can be traveled in about 30 minutes, as long as the rough lower section has been smoothed recently by a road grader.”

### Weather Woes

“During wet weather, the lower section is slippery but mostly passable, but the upper section can become impassible due to mud and “pasture by-products.

“If the clouds move in, it is very easy to get lost quickly if you are not familiar with the twists and turns of the various trails that branch off of the “road.” To get the transmitter up on the mountain was difficult, as one might imagine, but we managed as the weather was favorable. Once we completed the hour long journey (in low gear and at crawl speed), we then had to forklift the transmitter into the upper level of the 40 ft. container.



The “road” across the pasture.

“As one might imagine, this was a sunrise to sundown operation. Installing the Nautel was the easy part of this project. After finding a few loose connections, the transmitter went on the air, on schedule, and has been running since day one with no down time and no real trouble at all. It really is a dream machine.”

I asked Don some specific questions about this very unique installation.

**Callahan:** When and why did the station decide to locate at the Ulupalakua site?

**Mussell:** KIPM is a new station as of 2011. After a long wait, we finally received authorization for constructing

KIPM in 2010. We originally applied for the permit during the 2007 filing window. It was modified to allow operation as a full class C FM.



Backing down to the containers.

**Callahan:** Was there already a station operating from the site?

**Mussell:** Hawaii Public Radio was already operating KKUA from the site, and it was moved there in early 2007 after operating for many years atop Haleakala. We would have preferred to stay at Haleakala, which is 10,000 feet above sea level, but the observatories and Air Force facilities atop the mountain forced all broadcasters (our FM and a number of TV transmitters, and even the Weather Service) to move away.

Ulupalakua was the only place we could go, due to countless restrictions, including cultural and environmental concerns. Ulupalakua was established as an electronic site in the 1990s, and does a good job covering Maui and Hawaii County. It just requires much more power than our previous operation at 10,000 feet (14 kW was a full class C up there).

**Callahan:** What special environmental requirements are there, when building such a site in Hawaii?

**Mussell:** There are migratory bird concerns, and towers need to be hidden as much as possible. A remote site, far away and above main populated areas, and the use of private land, are the easiest way to establish a site.

But it is not easy or quick by any means. It takes years and years, and many many dollars to move through the process. This being Hawaii, we are especially concerned with being a good neighbor, and not be something that tourists notice while sitting on the beach.

**Callahan:** What is the electrical power to the site and how does it get to the peak?

**Mussell:** MECO (Maui Electric Company) supplies the three-phase power. We are a long way from the generating plant down on the south coast, but not too far from the local, up-country communities of Kula and Keokea, so the electrical service was extended about eight miles up to the site, when it was originally built 20 years ago.

Because we are at the end of the line, power regulation and surge protection were essential to dependable operation. But because we are so far away, there are three large

generators at the site: a 60 kW unit for the commercial FMs, an 80 kW for public radio, and a 150 kW unit for the TV broadcasters (at the adjacent site).

**Callahan:** It looks like everything is housed in four containers arranged on top of each other. Is there a limitation on ground space, and what is in each container?

**Mussell:** The lower containers house the commercial FM transmitters, which are mostly 10 kW units; they utilize a large panel array at the top of the tower. Public Radio has the upper container on the south side. The individual containers are 10 feet wide, 10 feet tall, and 40 feet long. They are secured to the ground and also guyed in place for earthquake and hurricane protection.

**Callahan:** Why was Nautel the transmitter you chose?

**Mussell:** Maintenance is difficult at most of our sites, either because of lack of easy access, or lack of spare parts close at hand. We were looking for transmitters with enough power, good efficiency, small footprint, and fewer moving parts - and a price that would not break our budget. Before just a few years ago, we did not have the choices we have now. Nautel has placed their higher power transmitters in the same price range as our tube transmitter choices.

Based upon all of these factors, it made sense, long term, to go with solid state. Another important consideration for us was, way out here in mid-Pacific, was the lack of experienced engineers. There are just a handful of engineers main-

taining nearly 100 transmitters spread across five very separate islands. Maintaining a high power tube transmitter is partly an art, as well as requiring experience and caution. Add in unpredictable tropical weather, and I think you can see it is not typical by any means. A solid state device, kept cool, just provides more dependability in this environment, and allows us to sleep a bit more regularly.

**Callahan:** At such a height, what considerations were there for antenna performance?

**Mussell:** I was not happy with the coverage of the antenna system in use by the commercial stations at the site, so public radio opted for a separate, optimized antenna system. We needed to have enough gain to allow full class C power, but few enough antenna bays to reduce the nulls to the population below. In hindsight, we would have chosen horizontal polarization as well, mostly because the main audience is no further away than 15 or 20 miles, and the lack of vertical power does not appear to make any difference to signal strength close in.

**Callahan:** Has the performance of the station from this site met your expectations?

**Mussell:** Yes, very much so. And our listeners as far away as 130 miles south on the Kailua-Kona coast of the Big Island are very happy to be able to hear our services now.

Don Mussell can be reached at [dmsml@well.com](mailto:dmsml@well.com) and you can see other interesting Nautel installations at [www.nautel.com/resources/customer-stories](http://www.nautel.com/resources/customer-stories). Steve Callahan is the owner of WVBF, 1530AM, Middleboro, Mass. and can be reached at [wvbf530@yahoo.com](mailto:wvbf530@yahoo.com)



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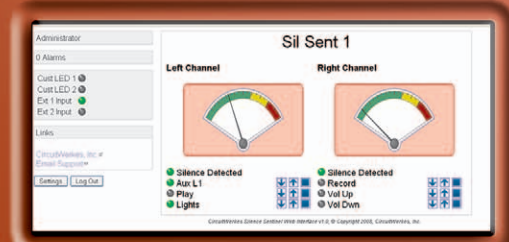
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## Transmitter Site Tips for Techies

By Tom Bosscher

Cornerstone University Radio of Grand Rapids, owns five radio stations. Three of those have transmitter sites that are far enough away, where they cannot be heard from the main studio. While the transmitter remote control can tell you that the transmitter is putting out power, knowing exactly what is on the air was a concern.

### Get Internet Access

A while back, I decided that it would be prudent to have Internet access at all transmitter sites. This was implemented, with each transmitter site also receiving a dedicated computer with enough RS-232 ports to control everything in the room. The computer would monitor the remote control, and give us a very nice GUI to look at. I would dial into the computer using “LogMeIn” or “UltraVnc.”

I could also now look at any devices that had an Ethernet port, like the transmitter site audio processor, newer transmitter designs and EAS units. But I still did not feel comfortable, with not knowing what was on the air. At one of the sites, I simply hooked up a local tuner, and fed that into the computers line input jack. Now, I could listen in.

### A New Monitor Discovery

But one night, just “tuning” around the ‘net, I stumbled on a device that would not only let me listen to my station, but keep a very tight eye on modulation and pilot/subcarrier levels. I had not heard of Pira from Czechoslovakia before, but the price was reasonable, so I ordered one. Delivered to the U.S., the Pira P175 costs about \$320.

The monitoring radio is small – about 7 x 3 x 1.5 inches. It has a local LCD display, an antenna jack, a power jack and a RS-232 port. I tested this unit at the studio first; software is included to talk to this unit via the RS-232 port. I very surprised to see that this box could deliver. To call this a radio is not doing it justice. It is a remote tunable radio, with a modulation monitor and baseband spectrum analyzer added on.



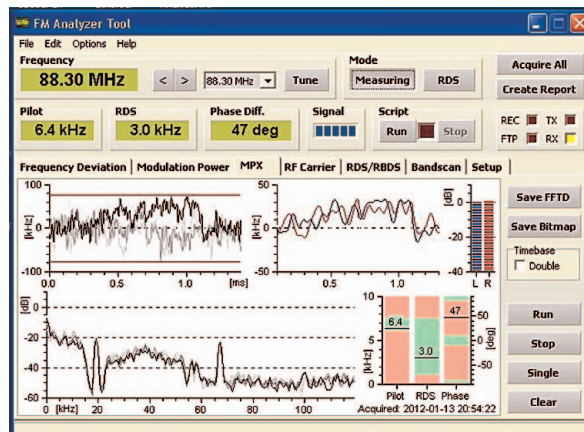
The Pira Monitor – [www.pira.cz/eng/](http://www.pira.cz/eng/)

I then took the first of my three units to one of my remote transmitter sites. I have EAS equipment at all three of these sites, so I used a splitter to share an EAS monitoring antenna. I brought up the software, and I was in business. I can now log into any of my remote sites, bring up the software, and I can look at my station, or any other local stations.

I took the line level audio output of the Pira P175, and plugged it into the line level input of the on board audio card in the computer. I can now listen to the off air audio of my station, or anyone else in the market – from my work office, home, or using the “LogMeIn” Ignition app for the Iphone.

### RDS Monitor

There is an RDS monitoring tab on the main software, but additionally, Pira supplies the “RDS Spy” software free of charge which can look deep inside your RDS data stream. I found quite a few stations in my market who encode a time signal, but it is off by one hour! When we had our national EAN test, I had three computers at the studio dialed into my three remote transmitter sites. This allowed me to make sure all went well. Additionally, I had installed a copy of the free Audacity recording program, so I was able to record the actual aired audio of the national EAN test.



FM analyzer screen shot.

### Lots of Data Available

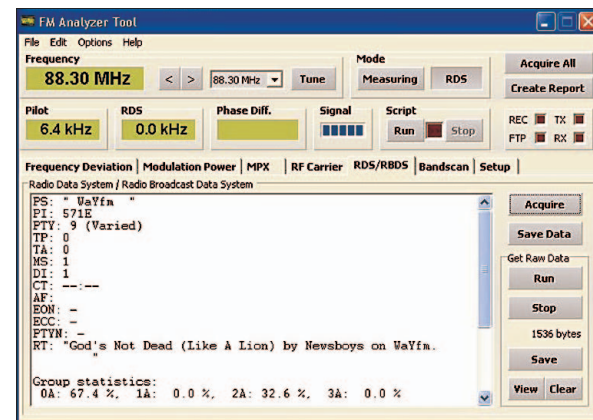
Take a look at some of the screen shots of the P175 in operation. There is a lot of information being handed to you. Total modulation is there, along with a histogram. What I really like is the built-in baseband spectrum analyzer. I found one FM in my market that had gone to all talk, and instead of switching the audio processor to mono, they simply turned off the 19 kHz pilot.

They still have plenty of L-R audio surrounding the 38 kHz area. I can see and measure RDS injection levels, along with SCA's. Notice on the one screen shot, the 88.3 MHz signal has the pilot, 57 kHz RDS and 67 kHz SCA. At one of my transmitter sites, I found that for some reason, the internal 67 SCA was turned on inside the exciter, where it was not needed.

### Another Advantage of Internet Connectivity

As long as you have the computer at the transmitter site, add a remote controlled audio switch and a broadcast quality audio card (like the Henry USB box), and you can now store back-up audio for your station at the transmitter site. At one site, I lost the STL, and I actually had the transmitter computer simply play the on-line streaming audio we offer the public, and I put that on air. Not the highest quality, but we were on the air.

Now, about having Internet access and computers at the transmitters' sites. As we advance in technology, sometimes we go backwards. Who would have thought ten years ago that we would have network switches at our transmitter sites? Having a computer and Internet access at each transmitter site is a wonderful jump forward in productivity. One technical problem will become very apparent. Sooner or later, any DSL or cable TV modem, will hang up. They just do. And that is a long drive to reset a device. And those really cool IP controlled outlets? While some of them have a “lack of communications” ping and reset capability, those auto resets present other problems.



The RDS monitor screen.

### The Furman MP15

I found one sure fire solution from a pro-audio company. Take a look at the Furman MP-15. This little black box, with a street price of around \$100, is one of those so simple solutions. Plug its AC male plug into the AC power, and plug your DSL or cable TV modem into it. Now, hook up a spare control contact from your dial up remote control, set it for a 2 second closure – and hook those wires to the MP-15. The MP-15, with no contact closed, supplies AC power to the duplex receptacle. Short the contacts, and the relay inside the MP-15 opens the AC feed. Now, your modem is reset. I have found many times that the modem is locked up, but the dial up remote control is still there. This black box solves the problem of the “hung up” modem.



The Miniport 15  
From: [www.markertek.com](http://www.markertek.com)

While the MP-15 solved my problem with the DSL or cable modem locking up, I also have installed multiple outlet Ethernet controlled power strips. There are many of these available on the market, and I use an 8 port unit so I can log into the transmitter site computer, and then look at and reset 8 different devices inside the transmitter building. The unit I have used comes from Digital Loggers, which allows you to not only turn on and off and recycle 8 power ports, but you can monitor AC voltage and current. The newer IP controlled power strips have auto ping built in, where you can configure the AC strip to check for Ethernet/Internet connectivity, and if it is missing, to have it recycle a DSL/cable modem.

By adding Internet connectivity at your transmitter site, and then adding the Pira P175, and then the Furman MP15, you have now given yourself a giant step forward in monitoring what is going on at your transmitter site.

Tom Bosscher is the Chief Engineer at Cornerstone University Radio. Email him [tom@bosscher.org](mailto:tom@bosscher.org)



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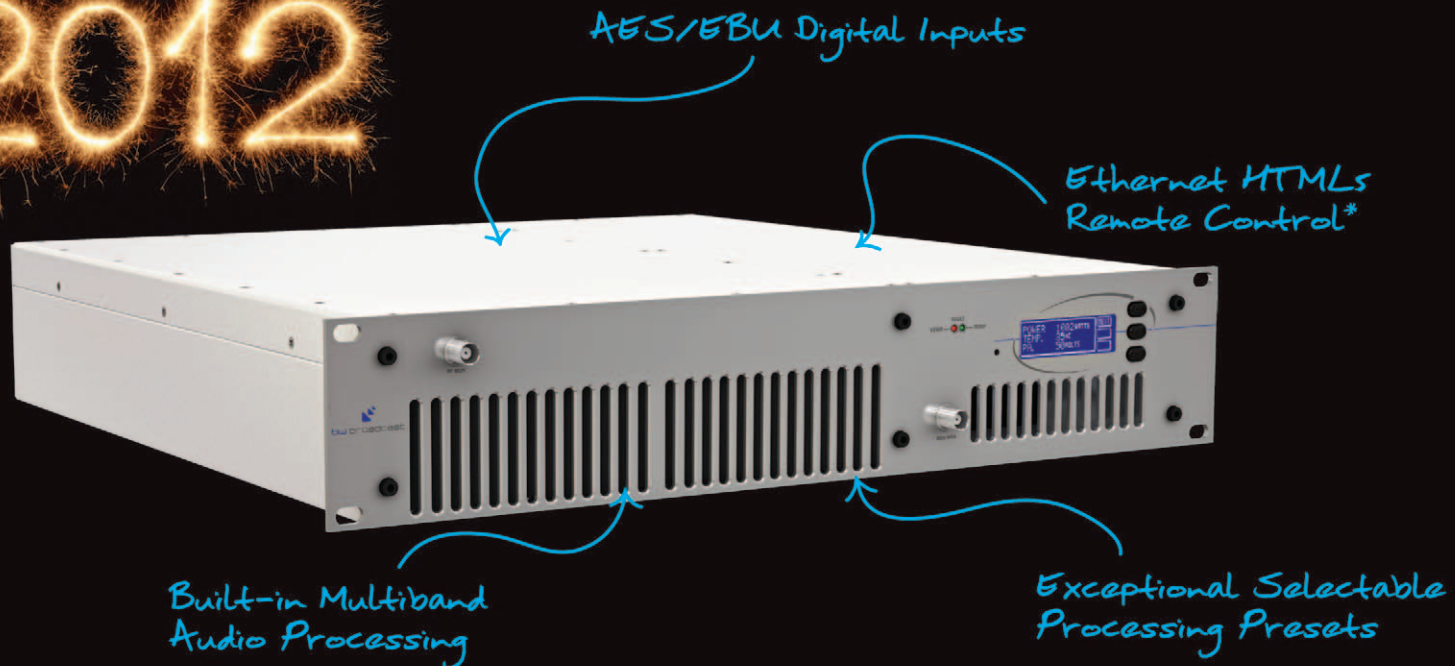
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## 2012: The Sound of Things to Come

by George Zahn

Many of us may scoff at the predictions of the end of the world in 2012. Hollywood blockbusters and the Mayan calendar notwithstanding, I'm not aware of any broadcasters who have cancelled discussion or projection of budgets for FY 12-13. While I remain skeptical about the world as we know it ending, could audio production in our studios as we know it, be drawing to an end?

Let's look at topics that have made headlines in this column in the last year alone. There's been an explosion of intuitive and powerful computer audio editing programs in the last five to ten years. From the very basic, free, open source Audacity program that has been a gateway program for countless high school and college students – to the far more detailed audio components or stand-alones such as Apple's Final Cut Pro, Adobe Premiere (Audition). Even the smallest of stations can add an audio "editing suite" in a back room or empty office with a basic computer.

It was almost like a subsonic revolution at first, but now there's an ever growing roster of editing software, ranging from under \$100 to a small fortune, that in the last decade has taken digital editing from a luxury to an expectation. That distant rumble the long-timers heard has become a thunderous roar.

### I/O, I/O, It's Off to Work We Go

Yet, there were some basic limitations to digital editing. Sure you could rip audio from a CD or pull audio from a thumb drive recorded in your production studio, but for real time input, there was a drawback in the I/O equation. How do we get professional quality audio input into the computer, to edit with solid and noise free output?

If you're dealing with a basic "off the shelf" sound card on most computers, the analog inputs and outputs leave plenty to be desired. They're generally stereo mini-plugs, and not likely to meet the signal-to-noise ratio expectations of a studio device. A quick fix was to add a digital audio input sound card that would accept optical audio input from a digital source, or a USB interface that would allow for XLR input and output connections.

As if the burgeoning digital edit capabilities of our desktops and laptops weren't enough to rock the foundation of the traditional production room, another sonic boom hit just a few months ago. In a major leap, Alesis launched a docking station that made audio editing on the iPad more of a possibility. Now, we could record and edit on a tablet! The dock solved the I/O problem to a significant extent by adding balanced TRS, quarter-inch inputs and outputs.

Amazingly, Alesis seemed to be rather unsure of how well the device would be accepted by either musicians or radio stations. When I tried to contact Alesis, upon first hearing about the iO Dock early in 2011, there was a delayed response by a few weeks when a spokesperson admitted that they hadn't really thought much about radio production applications. I'm very interested in hearing from our readers as to whether any are using the iPad as an audio editing device, and if so, which apps are useful for radio production, ranging from basic editing to multi-track applications.

### Can You Hear Me Now?

In case you haven't followed the progression so far, from editing block and splicing tape, to simple delete and

undo commands – or from the behemoth, 60 pound Ampex 700 tape deck, to a wispy light iPad or Android tablet, there is yet another wave coming. Given the speed with which advancements in technology are being developed and released, I hope this issue hits your mailbox before this becomes terribly old news!

Imagine your audio workstation totally encapsulated in your smart phone! Whether it's in the studio or in the field, you may eventually be able to record, edit, mix, and have decent fidelity playback from your phone. Given the large memory card capacity of our smart phones today, is it really any wonder that we could produce a finished and polished news story in the field, then just email it from the phone?

If you bring the phone into the studio with your news story, of a finished, in-house production piece, a number of smart phones are already solving the output portion of the equation – and quite by accident for the radio side. More and more newer phones have HDMI (High Definition Multimedia Interface) output to allow playback of movies and video clips direct to a TV. The great part is, that the HDMI interface carries no noise-added audio. The only noise or distortion might come from whatever HDMI studio interface you might use.

The biggest limitation so far in the smart phone arena is the input, especially if you need decent microphone sound. Once that's solved, there's little reason to believe that our smart phones can't replace other traditional editing options – especially in the field. While I haven't seen one on the horizon yet, it's possible someone is developing a smart phone equivalent of the "iO dock."

### Your Phone's "App"-titude

And for those still with a basic cell phone, you'd be amazed at the cavalcade of apps that are becoming available for smart phones. Forget Angry Birds for the moment. How about some of the good utility and basic editing apps. To give you an idea of the relative power from a small device, I am using a basic, first generation Android phone. The phone holds several hundred songs at a decent MP3 quality. One app I have allows me to search and access any of the songs, play them on two graphic "turntables" and even allow scratching, like a real night club DJ. The headphone output actually gives a fairly decent fidelity stereo feed. New phones with HDMI interface should be even cleaner!

Just for kicks, I did a search on some of the apps that are available for Android smart phones. Could these be the evolutionary predecessors of what will make smart phones key audio editing devices in the next year? One of the devices I discovered was *Tape Machine Recorder for Android*. This is a free app that seems to have the rudimentary features that a next generation editor may build upon. While the app records only in mono from the smart phone's microphone, there are enough other features to make it an interesting editing "toy."

Tape Machine appears geared for more than simple dictation tasks. You can see a pretty clear graphic display of the audio waveform, even being able to zoom and scroll. Basic effects include "fade in" and "fade out" and you can do simple cut and paste editing by highlighting portions of the waveform with the touch of a finger.

To make this a good stop gap field recording app, you can edit, then export and email your monaural clip all from the one device. If you're perusing applications, you'll find that many of the free apps are "Lite" versions. For instance the *BMS Record Edit* app has a Lite version that records good quality .wav files, but only up to a sampling rate of 32 kHz. The pro version of the app will run you a few dollars and offers the pro standards 44.1 kHz (the same sampling rate as a CD) and 48 kHz (the old digital DAT standard).

### A GUI Mess

One of the biggest complaints is the GUI, or Graphic User Interface, which is part of the software. A really important tip is to read reviews before paying for an application for your smart phone. Some apps work better with different brands or models of phones, so we are far from a perfect editing world on the smart phone. Remember when we had to read minimum operating system requirements on the spine of the software box? It's important to make sure that the Android version on your phone meets the minimum specs for the app before paying for it!

A few other editors (some of these are also available for tablet computers running Android) that seem to have fun bells and whistles: an app simply called *Recorder* which offers pitch bending, the *Recorder Pro Lite*, and the *Virtual Recorder* which lets the operator play with pitch and even let's them reverse audio files. The pro model of the *Virtual Recorder* actually lets you import files, a very valuable commodity which breaks the limit of getting audio from the smart phone mic. *Talkbox* is a creative voice synthesizer to help make the operator sound like a robot, zombie, or put your voice on helium.



Pocket DJ Pro's screen shot.

While the computing power and user interface are more attractive on a tablet computer, it is worth noting that there's even a 4-track mixer available for some Android smart phones. One app of note is the *JAT*, offering very basic 4-track editing and mixdown. It might cost a few dollars (under \$5 at the app store I visited), but can you imagine sending a news person out with the app, to collect natural sound, interviews, and voice over – then have them edit and mix it on site, export the finished report and email back to the studio? Not bad. And by emailing the report, it beats doing a drop-out laden "phoner" on the new "improved" digital cell phone technology. We may just be hitting the beginning of the potential for these smart phones.

### Share Your Stories!

How many of us are already ahead of the curve? Is anyone using Apple, Android tablet or smart phone technology to do in-station, field, or emergency editing? What are the creative uses you've discovered, or may be considering for this new technology? Has the technology gone too far and are we trying to get too much out of too little? I invite you to share stories with our readers as we look for creative studio ideas for 2012!

George Zahn is the Station Director/General Manager for WMKV Radio in Cincinnati he can be reached via email [gzahn@mkcommunities.org](mailto:gzahn@mkcommunities.org)



2/08/2010 01:18:32

192.168.2.199

Fault: None

Config: <none>

Preset: CGSmooth

Input: Livewire 1

Setup

Pri Sec

Input

AGC ST

Wide Band

AGC

Limiters

FM B M

HD S L

FM HD

Output

Analysis

LOUDNESS MONITOR

16 20 25 32 40 50 63 80 100 125

14 -12 -10 -8 -6 -4 -2 0

Preset Wizard Basic Advanced

SL

LO

ML

XO MH

HI

SH

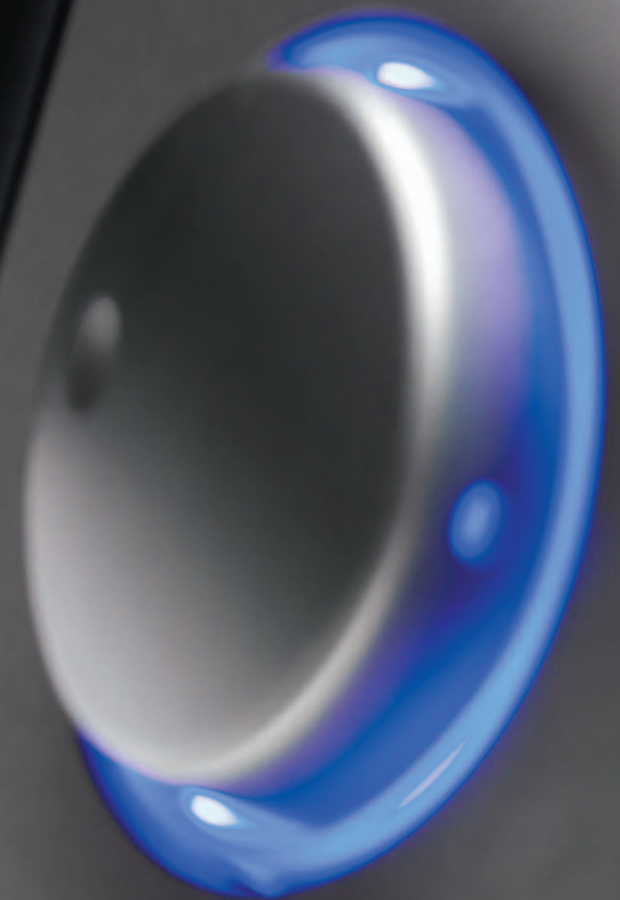
Lim Thresh 0.0 dB

SL to LO Sync -12.0 dB

Attack Offset 8.3

Release Offset 5.6

Gate Offset -4.0 dB



## The Power of Negative Thinking

by Mike Callaghan

Do you remember the deeply ingrained motto you learned in the Boy Scouts? – “Be Prepared.” That’s an important bit of advice for broadcast engineers.

### Are You Backed-Up

Let me ask you this, “How many different ways do you have of getting the program audio from your studios to the transmitter?” If you say “Just One,” you’re not prepared. If you have just one transmitter, or one audio processor, or one of anything that’s critical to keeping your station on the air, you’re not as prepared as you should be.

At KIIS we use Prophet’s “Nextgen” storage system for all of it – music, commercials, public service programs, almost everything that goes on the air. The system has redundancy, backups, and everything you could imagine to keep the music and commercials flowing. But a day may come when it stops. Chances are tiny, but it might happen. So, in the rack, there’s a drawer with a box labeled “For Prophet Failure Only.” Inside is a harmonica, some sheet music, and a note: “*After all, this IS a music station ...*”

I hope we never have to use it. But, just in case, we’re prepared. All kidding aside, there are CD players and a stack of CD’s ready to go. We have irreplaceable interviews on the Voxpro. So it gets backed up to external drives every couple of weeks.



The KIIS-FM Emergency Harmonica Box

### Not Just Natural Disasters

It’s good to be prepared for disasters; and the disasters don’t have to be courtesy of Mother Nature. Wait until the jock spills a Coke into the console – you know *that’s* a major disaster. You may have another studio ready to go on the air, but does that backup studio have a call screener monitor so the transplanted jock can see who’s on what line? “No?” It’s better to put one in now, before you have to do that, and also deal with a sugary console – both at the same time.

### Negative Thinking

Planning for disasters is one time when negative thinking can put you ahead. We just recently had some windstorms in Southern California that caused more problems than anything else in recent history. During and after the storm, Mt. Wilson was without commercial power for three days. Believe it or not, there were unprepared stations that were off the air for the duration. *Three days* off the air, can you imagine that? The mind boggles at what effect that had on the ratings or their revenue.

Fortunately, for the other stations, the back-up generators ran as expected and most of the airwaves remained occupied.

### Plan For Surges

Electrical equipment does not like power surges. Surges are what happens when the power starts and stops, either due to problems at the power company, a generator problem at your end, or anywhere in between. For this reason, there’s some wisdom behind the thinking that as soon as the wind kicks up, it might be good to switch to the emergency generator until the winds settle down again. This will give your transmitting equipment a reliable and stable source of power until the danger of surges has passed.

In Los Angeles, with our tendency for smog to appear if too many people light a match at the same time, we’re limited as to the number of hours we can run our generators without being fined or disciplined. This discourages the generators from being used unless absolutely necessary. Mt. Wilson, where the majority of FM and TV stations have transmitters, has two different broadcast power feeds. This is good for reliability, but bad when Southern California Edison has trouble making a clean switch from one to the other. If you can run on your generator without penalty, it’s a good idea to do that a few hours a month. Exercise benefits machines as well as people.

It’s also good to invest in some of the smaller Uninterrupted Power Systems (UPS). Using these at transmitter sites to power exciters, processors, and other digital equipment, will prevent dead air while everything reboots following a power dip. A medium-sized, rack-mounted unit can handle most exciters, processors, and the remote control system.

### Complete Power Failures

What if the power and the generator *both* fail? You might be surprised at what effect just an exciter can have feeding a good antenna by itself. This can happen if you have a 12 volt inverter in your car, and a long extension cord that can reach the equipment rack from outside. Or you can get one of the little 800 Watt generators that cost about \$150 or so. All you need to power is the exciter, the stereo generator/processor and the STL receiver.

Chances are the program chain is already in the correct order for this to work; you’ll just need a way to connect the exciter output to the antenna. If you have a spare exciter and antenna, those can be rewired to get back on the air and still leave the main system alone. If you belong to a cluster of stations, think about a 300-500 Watt solid-state amplifier you can share. These can cover the whole FM band without retuning. Using one of these with an exciter can give you as much power as some Class ‘B’ stations are allowed.

### Program Link Failures

You can prepare for a STL, phone line, or a total program link failure with an inexpensive MP3 player that has some of your stations programming stored inside. If a decent-quality program logger is available at the studio, you can copy yesterday’s programming into the MP3 player, take it to the transmitter and get at least some of the current advertisements on the air. Don’t forget to announce the switch to prerecorded programming do to a technical problem, this will hopefully eliminate a lot of phone calls.

### Assembling an Emergency Package

Add up the power for the exciter, stereo gen/processor, and STL receiver or T-1 gear. Borrow an inverter with twice that capacity. Then hook it up and test the gear with the inverter. Listen to the output with a radio; sometimes the modified sine wave from “DC to AC” inverters causes problems with the broadcast gear. If this happens, try a different inverter. A pure sine wave inverter will certainly work, albeit at an increased cost.

If the station has just a single program link, dub a day’s worth of programming onto MP3 players, or onto cards that plug into MP3 players. You’ll want to be able to rerun programming from the recent past if the need arises. Having a full day insures the nighttime show won’t have to run during morning drive or vice versa. Have someone refresh the stored programming every month or so. Make sure the player and the program cards are accessible 24/7, and don’t get “borrowed” by staffers looking for entertainment.

If you have an AM/FM combo, and the AM loses the program link – and there’s nothing stored for a backup – you can consider using a tuner to simulcast the FM on the AM. How well this is going to work depends on the two formats, but it would likely be better than having nothing at all.

Clearly, the most important thing is to have something besides a hole when someone tunes to your station. There’s nothing as loud as dead air. A different format than usual builds curiosity and listening. But a dead carrier, or no carrier, is like waving a red flag that something is wrong.

### A Spare Antenna

Putting up a spare antenna for an AM station can represent a real challenge. A long wire, an antenna tuner, and a group of weather balloons have worked successfully in the past. At one time KFI used a trailer with a large reel of antenna wire, an antenna tuner, and a kite to stay on the air. FM stations have it easier; especially if any of the engineers are hams, into J-pole VHF antennas. All you need to do is whip up a three-meter J-pole antenna. FM stations broadcast in the three meter band, and the plans and formulas are in the ARRL Handbook. There are also interactive calculators on-line that give exact dimensions to build one. These are simple enough to be tuned with a wattmeter, and do an excellent job of covering a market with just a few Watts of input power. Just within the past year, KMVE, a Class “A” in Southern Calif., used a J-pole for two days to stay on while the main antenna was rebuilt. Just 150 Watts input produced exceptional coverage.

If you care for an FM station that has no spare antenna, consider building a J-Pole and keeping it available. Remember to also have enough RG-8 to reach from the exciter or RF amplifier to your predetermined antenna mounting point. The parts cost to do this is tiny compared to the value it will prove to be when it might be needed.

### Finally, in the Studio

Is the phone number for the transmitter clearly posted? Is your cell phone number clearly posted? Is a map showing the route to the transmitter available? Are keys available to any locked gates or buildings? It’s imperative that help be able to reach you quickly, if you get hurt at the transmitter site, or just to bring out a part that you might need. Making sure that phone numbers and spare keys are immediately available in the studio will ensure that all personnel have access to them in an emergency.

Doing a good disaster inventory takes a lot of negative thinking. You have to imagine the worst-case conditions, and what it will take to deal with them. But, having a plan and the parts it takes to work it will prove invaluable when bad things happen.

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



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## Telemarketing Cautions for Stations

by Peter Gutmann

Telemarketing is both boon and bane for broadcasters, depending upon whether we're wearing our business or consumer hats. It remains a useful tool for reaching listeners – and particularly those not yet fully on-line. Yet we all hate those annoying calls from others, that always seem to come just as we're settling down to dinner or into an easy chair

Both the Federal Communications Commission and the Federal Trade Commission have implemented rules intended to balance marketing and privacy. Despite some disparity in the two agencies' jurisdictions and approaches, taken together, they provide a largely sensible framework for conducting telemarketing.

### A Broad Outline

Here is a general outline. But please note at the outset that many states – and even some counties and cities – that have enacted their own rules that apply to calls made or received within their territory. Local rules are valid so long as they are more restrictive than the federal rules, but would be considered to improperly frustrate the FCC and FTC regulatory scheme if they are more permissive.

Generally, the telemarketing rules apply to all calls made for the purpose of inducing the purchase of goods or services. Thus most of the rules do not apply to genuine

surveys – so long as the call is limited to the survey itself and does not venture into promotion or a contest. That is, if a call made for the purpose of a survey goes on to tout a station's programming or mentions a sponsor, then it comes within the realm of the restrictions.

Note that most of the rules do not apply to political candidates, ballot initiatives, charitable solicitations and other noncommercial entities. So if you're a noncom, you have more flexibility than your commercial counterparts – so long as you don't couple a call with a message on behalf of a for-profit sideline or another commercial entity.

### Most Confusing Aspects

Perhaps the most confusing aspect of telemarketing involves the Do Not Call ("DNC") provisions. In fact, there are two ways that a consumer may be protected from unwanted calls.

The first is placement on a national DNC Registry managed by the FTC. Beginning in June 2003, any residential caller could request that his or her phone number be placed in the Registry. Once added, a number is permanently maintained in the Registry unless the number is abandoned and reassigned to another user, or unless the registrant requests removal. Within the first two years, over 80 million numbers had been registered.

The list continues to grow by about 19 million numbers each year. Over 200 million now are listed. To avoid making calls to registered numbers, telemarketers are required to access the Registry at least every 31 days.

Placing telemarketing calls without consulting the Registry for the appropriate area code – even to numbers not on the Registry – can trigger fines of up to \$16,000 per call. Data may be obtained in a variety of formats, ranging from full lists to individual number look-ups. Data for up to five area codes is free, but a \$55 annual fee is levied for additional area codes (up to an annual maximum of \$15,000).



The second DNC method is when a consumer specifically requests that a calling entity not call again. Telemarketers are required to keep a list of such requests and to abide by it. Such requests must be honored within 30 days and are valid for five years.

However, they only apply to the specific company to which a request is directed (as well as its affiliates). Thus, while entity-specific requests may avoid a particular nuisance caller, their overall impact is limited.

*(Continued on Page 20)*

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by Peter Gutmann

– Continued from Page 18 –

## Exceptions to the Rules

As with most rules, there are exceptions. The primary one to the DNC Registry restriction is for consumers who have an “established business relationship” with the caller. This can arise in either of two ways.

The first way permits calls for up to 18 months after a customer’s last purchase, delivery or payment. This provision is interpreted quite broadly, and has come to include bank accounts, credit cards, loans, insurance policies, mortgages and even publication subscriptions.

The second method permits calls for up to three months after a consumer makes an inquiry or submits an application to a company.

An additional exception is when a consumer provides written consent to be called, but this must be clear and conspicuous and not hidden in small print or be in the form of a default (as in: “check here if you do not want us to call”). A further exception is for marketers having a personal relationship to the consumer – status as a family member or acquaintance. In all cases, the right to call afforded by these means is cut off if the consumer requests no further calls.

## Errors

Invariably, mistakes will happen. Genuine errors can be overlooked only if a telemarketer can demonstrate that it has written procedures to comply with the DNC requirements, trains its personnel in these procedures, monitors

compliance, maintains a company-specific DNC list, and accesses the national Registry regularly. So to avoid the severe consequence of inadvertent lapses, it is essential to be sure you can satisfy these conditions.



Once you get past these overall hurdles, you still face some limitations on any activity that qualifies as telemarketing. The most basic ones prohibit calls between 9 p.m. and 8 a.m. (unless specific prior consent has been received), disconnection before 15 seconds or four rings, any sort of harassment or coercion, and blocking (or falsifying) caller ID information.

Telemarketers are also required to have a sales representative connect to 97% of calls within two seconds of answering, and to promptly and accurately disclose the caller’s identity, the specific purpose of the call and a number where the caller can be contacted. If contests or prizes are involved, all material costs and conditions must be disclosed, and no purchase may be required for eligibility. If any kind of payment is to be involved, then additional full disclosure is required of total costs, refund and cancellation policies, and other relevant terms that could

affect a decision to proceed. Further restrictions apply to calls made to wireless phones. In addition to all the other limitations noted above (including avoiding numbers registered on the national DNC list), auto-dialed and pre-recorded calls are barred, except for emergencies.

## What About Faxes?

Although used far less frequently nowadays than when the DNC rules were first crafted, concern over the cost of materials led to an outright ban on unsolicited faxes. Here, too, there is an exception for existing business relationships between the advertiser and consumer. However, the first page of every unsolicited fax must contain conspicuous instructions for a cost-free opt-out. Faxes sent by email do not fall within the scope of this ban.

Got all that? The actual rules are far more detailed than we have presented here, but the penalties for noncompliance can be huge – so beware!

## A Final Thought

Despite all the frustration over Congressional gridlock, have you noticed the creativity being lavished on the names of legislative initiatives?

How about the “Commercial Advertisement Loudness Mitigation” Act – CALM – or the “Controlling the Assault of Non-Solicited Pornography and Marketing” Act – CAN-SPAM – or, longest of all, the “Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism” Act – USA PATRIOT. Clever, huh? Even if Congress can’t pass bills nowadays, it sure can name them!

*Peter Gutmann is a member in the Washington, DC office of the law firm of Womble Carlyle Sandridge & Rice PLLC, he specializes in broadcast regulations and transactions. His email is: pgutmann@wcsr.com*

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# Safety and Security

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

## Station Grounding

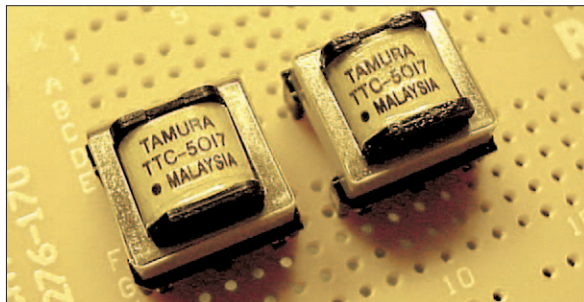
by Jeff Johnson

### Ka Zap! ... No Problem

Grounding and lightning protection too often seem a dark art. Successful protection against a damaging lightning strike appears to be luck more than certainty – and sometimes it is. Luck smiles on the prepared, it is said, and here we will discuss two technical solutions to minimize the risk of lightning damage – isolation of sensitive equipment, and “chemical” grounding of a transmitting site.

Audio monitoring inputs of EAS encoder/decoders are known to be rather sensitive to overload and voltage spikes. The author built a simple isolation device to minimize damage to the audio inputs of a new digital SAGE. It consists of four 600:600 “modem” transformers – Tamura P/N TTC-5017. Most any such transformer should work. These transformers isolate the inputs from ground differential transients that can damage the codecs. They also can provide a balanced-to-unbalanced interface for the inputs.

Simply connect one of the windings to the source – balanced or unbalanced – and connect the other winding to the unbalanced input. The author also incorporated a four channel DA (distribution amp) before the transformers, for level adjustment and further isolation. Be sure to place the DA before the transformers, or the transformers’ ground isolation advantage will be lost.



600:600 isolation transformers on a perfbord.

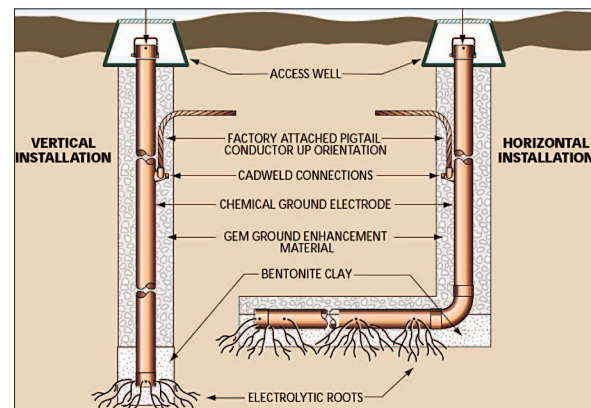
### Chemical Grounding

A chemical ground is especially desirable, and usually necessary, in rocky, dry soil site conditions. Chemical or electrolytic grounding provides the lowest resistance to ground, regardless of the amount of moisture, and type or chemical content of the soil. This is the most stable method of grounding known. According to Jackson Telcom, Inc., “It continuously conditions the soil to provide a low resistance path to earth for unwanted electrical current. Resistance actually lowers over time, and in dry soil will provide an efficiency over driven ground rods of 300 percent to 800 percent.”

ERICO notes, “Optional factory-attached radial strips are available to reduce impedance to high-frequency lightning energy and to control the direction of dissipation.”

Rather than a solid, copper-coated rod, an electrolytic ground consists of a hollow copper tube, often 2-1/8" diameter Type-K copper pipe, with small holes top and bottom, and filled with hygroscopic, electrolytic salts.

According to Couweld, “These salts form a saline solution by absorbing moisture out of the atmosphere. This saline solution leaches out of the holes at the bottom of the tube, which gradually lowers resistivity of the surrounding soil, forming “electrolytic roots” over time.”



A chemical ground system. Source: ERICO

As can be seen in the illustration above, Bentonite clay is laid in the area in which the “roots” are expected to form. Bentonite clay usually forms from weathering of volcanic ash. Bentonite can be used as a desiccant due to its adsorption properties. In other words, it is hygroscopic – it attracts and holds moisture. It is often found in cat litter.

(Continued on Page 24)

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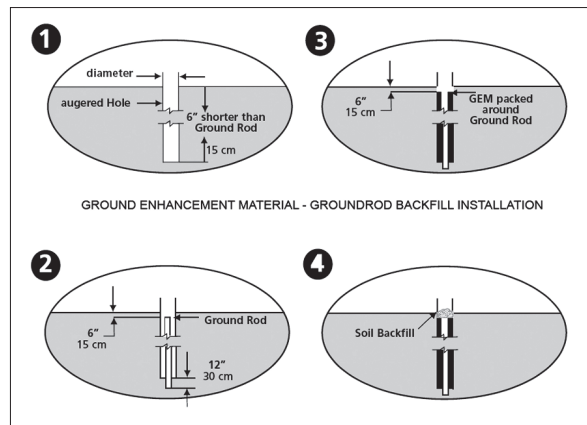
# Safety and Security

by Jeff Johnson

– Continued from Page 22 –

It can be seen that this adsorption of water is advantageous when embedded in dry soil. The “electrolytic roots” growing out of the copper tubes make contact with this moist clay, and electrical conductivity is enhanced.

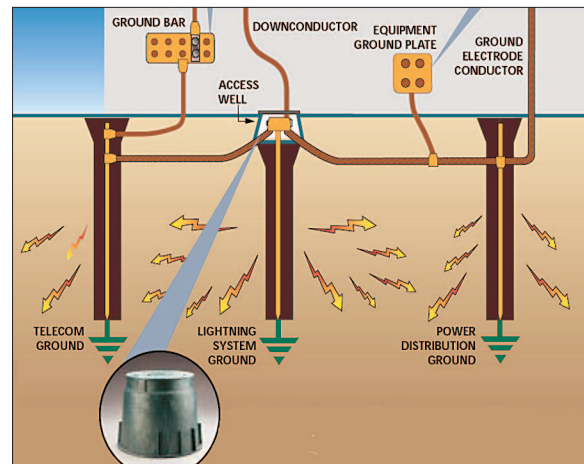
To further enhance ground conductivity, the copper tube is surrounded above the Bentonite by “Ground Enhancement Material.” COUTFILL, Ultrafill and GEM are products of this type.



**Ground Enhancement Material installation**  
Source: ERICO

“Ultrafill is a low resistance, carbon-based backfill material, which lowers ground system resistance,” according to Harger Lightning and Grounding Company. EC+M Magazine states, “A noncorrosive, low-resistance enhance-

ment substance is a conductive cement that you can install wet or dry. An informative source discussing this technology can be found at: [http://ecmweb.com/mag/electric\\_achieving\\_acceptable\\_ground/](http://ecmweb.com/mag/electric_achieving_acceptable_ground/)



**A complete chemical ground system schematic.**  
Source: ERICO

## Electrolytic Grounds Are Very Good

According to E&S Grounding Solutions, electrolytic ground electrode characteristics include excellent resistance to ground characteristics. They have a high corrosion resistance, and winter’s cold weather has a minimal affect on resistance to ground.

Resistance to ground improves over time, and the electrode ampacity increases over time and is rated excellent. There is a down side to these grounding systems. The initial cost of installation is high, however when you weigh that against an excellent life expectancy of 30 to 50 years, it becomes very cost-effective.

## On Going Maintenance

As important as these grounding systems are, it is wise to inspect them periodically. Actually, this not only holds true for inspection of electrolytic grounds. All grounding systems should be checked on a regular schedule. The last thing we want as engineers, is to have our station off the air, because of a ground system failure, when lightning strikes

For electrolytic grounding systems, we need to inspect wells as a component of a the system. Their covers can be removed, and mechanical integrity and electrical resistance can be checked. It is important that you compare the electrical resistance reading you find with the readings you took when the wells were first installed.

If you find changes that are outside of tolerances, contact the manufacturer to discuss potential causes for the changes, and follow troubleshooting instructions to discover the root cause. It goes without saying that once you discover the cause you need to take corrective action to bring the system back to the original readings, which should be the best possible readings you can obtain.

## Research Sites

A complete comparison of grounding electrode types is found at <http://www.esgroundingsolutions.com/about-electrical-grounding/what-are-some-different-types-of-grounding-electrodes.php>

You may find the following references that I used, to be handy as you do further research on this subject:

- [www.esgroundingsolutions.com](http://www.esgroundingsolutions.com)
- [www.ecmweb.com/grounding/](http://www.ecmweb.com/grounding/)
- [www.couweld.com](http://www.couweld.com)
- [www.erico.com](http://www.erico.com), [www.harger.com](http://www.harger.com)
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- for its **remote control**.
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# Operations Guide

## You Gotta Have An Ops Manual

by Chris Tarr

You're running a live broadcast, and everything is running smoothly. Then it happens – *Silence*.

The connection from the event to the studio goes down. Do you have a Plan B? More importantly, have you documented Plan B?



### Document the Plan

Often we have plans in case of failure, yet fail to document what those plans are. If something critical were to fail in your plant right now, would whomever is in the

building know what to do? Would they even know *where* to find the instructions on how to do what needs to be done?

Clear, concise emergency plans are critical in keeping your operation running. It isn't enough to have labels on switches and buttons, and post a sheet on the corkboard. With more and more "non-techs" keeping things running, you need a good operations manual. Good operations manuals really are simple, but often overlooked. Creating one is very easy – it just requires a bit of planning.

### The Key is the Contents

What should go in the manual? As much as possible! Start with a contact list of engineers, along with maintenance staff, plumbers, electricians, etc. The more information at their fingertips the better. From there, possibly add a section on what to do in case of fire, evacuation, FCC inspection, or anything of that nature. After that, you'll want to cover emergency equipment failures, like how to switch studios, backup transmitters, and those kinds of things.

Remember that chances are that if someone is reaching for this manual, something bad is happening. You want to make sure that the user can quickly find the manual, and identify the instructions that apply to the situation. Because of that, a very descriptive table of contents is

extremely important. It can be real helpful in the contents to include an overview on what is covered in each section. The faster the user can find the instructions, the faster the problem will be solved.

### Think Worst Case

Start the project by writing down what kind of failures are possible. Then, for each failure, write out in non-tech terms what it takes to work around the failure. Try to avoid "tech speak" and assume that the person reading the directions knows nothing about what you want them to do. Here is a sample of some instructions I have in my studio.

*"So the Kiss studio has blown up. Now what? Take a deep breath and relax. Follow these instructions and you'll be good!"*

*First, go to the Burk remote control (to your right in the studio). Using the "Channel" buttons, select channel 16. Press the down arrow button. This will feed emergency programming to the transmitter. NOTE: You will not hear the audio in the studio. You'll have to check the hallway monitors to verify that it's working. If for some reason that doesn't work, just move on to the next step.*

*Second, let's put the Kiss production studio on the air. Go into the Kiss production studio and put both Maestro channels on the board into "PGM", turn them on, and turn them up. The Maestro channels are the last two channels on the board. Go ahead and load some music in and start it. Be sure to put the Maestro into "Local Automation" and select "Auto" on deck 1.*

*Now, go into the Engineering office. As you face all the racks filled with equipment, look at the second rack from the left. At about eye level is a blue box labeled "WXSS SWITCHER". While holding the "Enable" button, press* (Continued on Page 28)

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# Operations Guide

by Chris Tarr

– Continued from Page 26–

the button labeled “PROD.” Make sure the green light lights up above the button. Did you hold down the “Enable” button when you pressed the “PROD” button? Once the green light is lit you’re almost there!

Finally, go back to the Burk remote control in the main studio, select channel 16 again, and press the up arrow button. This will put you back on the air. Once again you’ll have to check the hallway monitors to verify that what you’re playing in the prod studio is on the air.

These steps will get you on the air with the bare minimum from the Kiss prod studio. The phones are already routed into that studio, so you can take phone calls. Be sure to have a printout of your music and spot logs since the electronic version WILL NOT show up on the prod Maestro! You’ll have to run completely manual. At this point if you haven’t heard from anyone in Engineering, call the numbers on the call list and let them know what’s up. They will be able to help you proceed to whatever steps need to happen next.”

## The KISS Method

Note how the directions are conversational, simple, straight forward and in plain English. There’s a good chance that someone who has very little or no technical knowledge would be able to successfully get the production studio on the air following those directions, and that’s what counts.

I know a technical writer who used to have someone from the front office go onto the production floor with the start-up instructions for transmitters. He would observe the totally unskilled person go through the procedures. This “acid test” proved that even an untrained person could clearly understand the instructions. If a problem was encountered, he would make notes and then adjust the instructions accordingly.



**His station didn’t have an Ops Manual.**

His rationale was that even the minimum wage weekend announcer or board operator should be able to put the equipment on the air if needed, following the instructions.

## What to Include

As you think about putting together the Operations Manual, remember to create sheets like this for every conceivable operation that you’d need somebody to do.

With your list, then take a standard-issue binder and create tabbed sections. Again, try to be non-technical when you label the sections. You may want to put transmitter

instructions and backup studio switching under “off-air” since it’s unlikely that a non-Engineer will make the distinction between being silent and actually off the air.

If you’d like to earn some brownie points, ask the other managers in the building if there are things they’d like to have included – for example, a flow chart on what to do if there’s an outdated copy on the air. These manuals don’t have to be simply for five-alarm emergencies – good ones cover all of the bases.

## Label Equipment

It goes without saying (though I’ll say it anyway!) that the instructions are much easier to follow if all of your equipment is clearly labeled and easily accessible. Creating this manual may be a great time to go through and make sure everything is clearly and accurately labeled, so that you aren’t having to use instructions like, “go to the blue box with white buttons ...” If you really want to make sure that every one is on the same page, take some pictures and annotate them. That eliminates all confusion! Remember to have instructions to hook up gear for remote broadcasts too. Those should always be with the remote gear, with a back-up copy in your “Operations Manual.”

As staffing demands change, more often than not, we’re seeing non-technical people in the position to be first responders when there’s trouble. Giving them the power to fix emergencies not only makes sense, it takes some of the pressure off of the often shrinking technical department to be at the ready 24/7. Some engineers think that this is a way to make them less necessary. The smart ones know this makes them more valuable.

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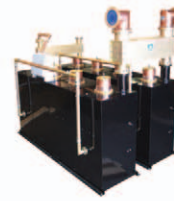
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# Chief Engineer

## Transmitter Surprises

by Scott Schmeling

If I may paraphrase Forest Gump, “Transmitters can be like a box of chocolates – you never know what you’re going to get.”

### Great Old Box

I was recently asked to help a company that had purchased a small group of stations, and was in the transfer process. One of the transmitters was a Continental 816-3 (there was no R on the name plate). Judging by the grey, rather than tan paint, it’s probably fair to presume this was a model from early in the Collins-to-Continental transition. That being said, the transmitter design is rock solid, as evidenced by the fact there are so many in use today around the world!

### From the Top

Ted Mahn, an engineer and one of the partners, reported the initial symptom that started all of this was that the main PA breaker would trip and then show a PA screen overload. Resetting the breaker would restore the transmitter to air. The staff dropped the power to 80 percent, which kept it on until someone could look at it. When Ted arrived he found the screen current to be running at nearly 600 mA (too high) at about 90% power. Ted’s first step was to retune the final. In doing this, he found the tuning control was sluggish or stuck. It didn’t even seem to be moving. However, the

loading control allowed him to bring the power up by 3 kW and get the screen current down. He thought perhaps, that fixed it. Then came Friday afternoon when he and John Daniels (another one of the partners) were standing and visiting in front of it, when they heard a high voltage crack, and saw a flash of light which seemed to come from the PA cavity. John jumped at the sound, but I think we’ve all been there – and done that! It was still making the licensed 18,500 Watts, but it didn’t seem very stable.

### More Problems Found

We found the drivers were no longer balanced and manual power control was choppy. In fact, if we tapped the front panel, the forward power would fluctuate. Ted had also found the PA Plate breaker would trip when the plates were turned off or when control was switched from Local to Remote. And, we found that the Plate Voltage dropped very slowly when plates were turned off.

Ted had been in contact with Continental Tech Support earlier. They told him the plate breaker tripping (when plates turned off) was probably caused by a bad C1 on the A8 board. He also had a fresh pair of balanced Eimac 4CX250Bs for the drivers. Auto power adjustment was nice and smooth, so the choppy manual control was probably a bad R43 motorized pot – but we knew the motor worked!

The slow high voltage drop was most likely an open high voltage supply bleeder resistor. Granted, leaving it wouldn’t have any effect of the normal operation of the transmitter, but as a safety factor we decided we should check into that, too. But, the first order of business – PIZZA! (engineers do not run on caffeine alone.) While eating, we discussed our plan of attack for the night.

### Working the Plan

At our prescribed time, we shut the transmitter down, opened it up and went to work. The first thing we found was lots of dust, but that’s not all that unusual. We could see R7, one of the bleeder resistors, was discolored near the top. Most likely that was our bleeder problem. No real surprises yet.



A look inside the PA – not a pretty sight.

Inside the PA cavity was a different story. We found the plate blocker clamped at the very top of the tube instead of just above the air guide as prescribed by Continental. There were signs of over heating and arching on the blocker and the bottom stainless steel clamp and on the PA tube.

(Continued on Page 32)

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# Chief Engineer

by Scott Schmeling

– Continued from Page 30 –

The bottom of R75, on the left side of the cavity, was literally burned up and melted. R75, along with a metal strap (L14), form a suppressor that dampens third harmonic resonances. We didn't have a spectrum analyzer, so we couldn't verify any harmonic radiations.

Given the cavity "surprises," we reassessed our work plan. It was Friday night and we didn't want to start any repair that might keep us off the air on Saturday. After a bit of discussion, we decided not to touch anything in the cavity until we had parts in hand.

We started to make a parts order list. If we could get the parts next day, we could work on the cavity repairs that night. Ted called Richard, the Continental tech on call, and he verified the parts were in stock, then drove to the plant and boxed up the parts, shipping for Saturday delivery.

Meanwhile, we went to work. First we removed as much of the dust as possible with a duster and vacuum. One area that's usually ignored is the honeycomb piece that passes the air from the blower into the IPA and PA areas. Ours didn't have a serious buildup, but it was surprising how much dust we were able to get out of it by tapping it on the floor.

Remember that one of the original symptoms was the plate breaker tripping when the plates were turned off. Tech support had told us that it was most likely caused by C1 on the Power Control Regulator card. We had one on hand, so we replaced it.

Next, we replaced both driver tubes and set the static bias level. But we found that for some reason, as we were

adjusting, the tubes seemed to "take off" and cathode current would jump up. We decided to put the original drivers back in and set the bias a little low – after all, we were coming back again tomorrow night.

As we were driving away, Ted heard a hi-pitched tone between songs. He went back and found that adjusting the driver plate tuning took care of that.

## Another Saturday Night of Work

On Saturday, I arrived on site at 7:00 p.m. that evening. Ted already had the burned R75 out of the cavity and was cleaning the top mounting clamp (half of the bottom clamp had literally fallen apart because of overheating.). We planned to move the top clamp to the bottom.

We were able to use the damaged clamp at the top, since all it had to do was hold the top of the resistor in place. Using a drill with a wire brush, I carefully cleaned the bottom contact area of the plate blocker. Meanwhile, Ted used a wire brush to buff the high voltage contact area of the tube.

## Blowing Off Some Dust

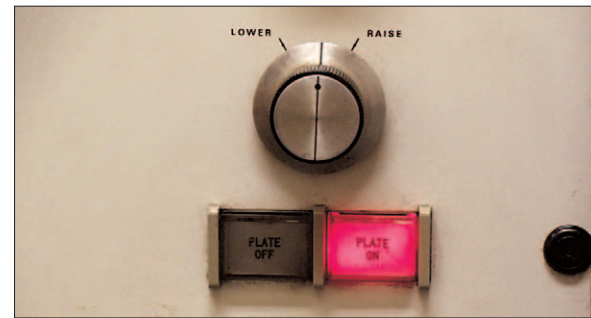
We had located an air compressor that we used to blow out even more dust! There was also a lot of "black stuff" (we called it caramelized dust) coating areas of the driver and PA. We were able to peel off a lot of that with the compressed air. We did find one good thing – the motor that drives the paddle of PA tune capacitor was only stuck. With a little "exercising," we were able to get it to move smoothly and consistently.

Ted was able to replace the bleeder resistors fairly easily. I pulled the Card Cage Assembly (A20) out enough to gain access to the motorized pot R43 (5K, 10-turn). This is the pot that controls the manual power setting. It's located behind the Local/Remote switch on the right end of the A20 assembly.

At this point, we had done all we were going to do. We gave it a quick once-over, to be sure everything was tight and in place, closed up the doors, and put the panels back on and got ready to check our work.

## Gentlemen – Fire up the Box and Hope

This is the best part of the story. After the half-hour warm-up, Ted pushed the Plates ON button and we watched the transmitter output power raise to something over 100 percent. We brought it down to normal and went through the tuning adjustments. Manual power control was nice and smooth, and tapping on the front panel had no effect. And when we turned plates off, the breaker held and the voltage dropped like it should. We now made full licensed power with plenty of headroom. And the transmitter seemed nice and stable. It was a very successful two nights' work.



Scott's LED fix for the push button switches.

One more thing I'd like to add. The push button switches use either a #327 or #387 28 Volt lamp. I have found an LED replacement that works beautifully. The Dialight 585 series is a non-polarized lamp.

*Scott Schmeling is the Chief Engineer for Minnesota Valley Broadcasting. He can be reached via email at [scottschmeling@radiomankato.com](mailto:scottschmeling@radiomankato.com)*

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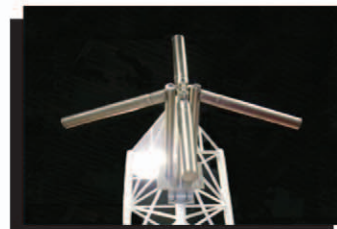
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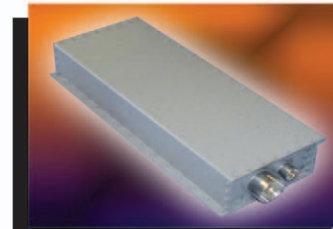
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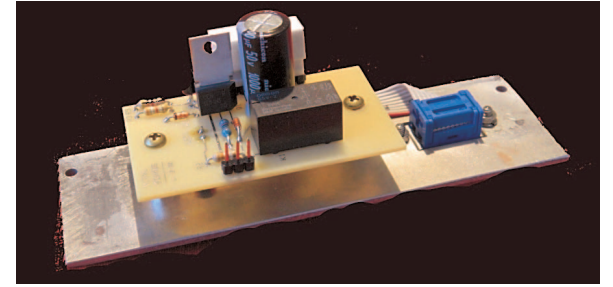
Talkback provides operators with easy communication to talent, studio guests and telephone callers. And, as you'd expect from Axia, Radius is over-engineered for long life with conductive-plastic faders, optical rotary encoders, LED bargraph meters with peak hold (switchable between VU and PPM styles), aircraft-quality switches with LED lighting, and extruded-aluminum frames.

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The circuit operates very quickly; most of the time, the listening audience is unaware anything has happened. Installation is simple using the provided color instructions, and requires 20 minutes or less. There are just three connections inside the Moseley, and all the output signals route through a 9 pin "D" connector.

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# Small Market Guide

## Let's Find Some Radials

by Roger Paskvan

In the last issue, we showed you how to build a neat little device to sniff out radials that are buried around your AM towers. Some reader emails requested the type of diode to use, which is a 1N34A small signal diode. These are the germanium type and operate at 0.3V making the instrument more sensitive. Regular power rectifier diodes will not work.

### Finding Your Radials

Your tower has 120 radials, made of #12 copper wires that are one quarter wavelength long, equally spaced around every AM tower. There are 120 radials in a 360 degree circle, each radial is spaced every three degrees around the tower. The radial length varies, but it is equal to the height of your tower. Before you begin digging, use a cable locator to find all existing coax feed line runs. You do not want to cut any buried feed lines.

Pick an entry point for your new coax cable run between two adjacent buried radial wires. This path should come from a direction that favors the shortest coax cable length, yet will not cross any of your existing buried radial wires. You will be locating the ground radial wires on each adjacent side of your selected new coax path. Stake out the full length of each of these two adjacent radial wires, digging down to them for verification at selected intervals, from the tower center to the wire ends.

Before you start walking all over looking for these two selected radial wires, do some simple Trigonometry to calculate the adjacent spacing between the wires at their ends and in the middle. At our frequency, 1360 kHz, for example, the radials are 181 feet long. Knowing three degrees is the angle, and it's 181 foot length, you can calculate how far apart the wires should be at 90 feet and 181 feet respectively.

The Tangent of three degrees is multiplied by the wire length, providing the distance between the wires at right angles ( $.0524 \times \text{Length} = \text{spacing}$ ) Knowing the approximate spacing between the selected wires will be a big help when you are electronically sniffing for these buried adjacent wires.

### Working the Sniffer

Starting in the middle, take the radial sniffer and hold it vertically right at the ground level. You should see a meter reading of 20-40 uA. Sweep back and forth until you see a dip in the meter reading. The dip should be right above the wire buried in the ground.

When you are confident that you have located the wire, take a shovel and carefully dig down and verify that the wire is there. Most radials are about six to eight inches below the surface. Now move ahead toward the end in ten foot increments and repeat the above process.

Each time you locate the wire, put an orange flag in the ground. Eventually you will have a straight row of flags that has unveiled the location of one radial. When you have reached the end, move back to the middle and start the same sequence toward the tower.

Proceed until you reach a distance from the tower that you notice two wires a few inches apart. From this point you will have to carefully hand dig to the tower over the buried wires.

### It's Easy From This Point

You now have one radial exposed and must locate the second adjacent radial. Start at the middle again and measure the calculated right angle distance from the above Tangent equation to get you in the ball park. Utilizing the radial sniffer, start sweeping until you locate the adjacent wire. After digging down to verify, go through the same procedure all the way to the end marking every ten feet. Locate and mark the entire adjacent radial. When you are finished, it will look like a race track with flags outlining the edge limits of your new coax path.

On the big day, we carefully trenched in the new cable to put a closure to this process. To help in the future, my son Troy went to the local hardware store and bought 200 large washers. As he pulled out the marking flags along each radial line, he dropped a washer on the ground, stepping on it. The idea was to have a buried row of washers, in line with the two radial paths, that could easily be found with a simple metal detector should the need for this location ever be necessary again. Just another clever idea from the family tree in small market radio.

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

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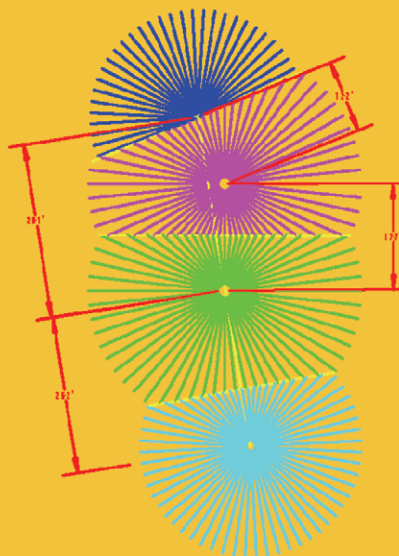
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# Practical Engineering

## Preparing for the Heat

by Bill Croghan

*From time to time, our readers request helpful articles from past issues. We reprise this Practical Engineering article as a reminder of the coming summer heat.*

Most of you think you know about hot weather from the beach, but you may not know how to work in conditions that are easily fatal if not taken seriously.

### Love the Desert, Wary of the Heat

I was raised in New York but I much prefer the desert southwest. After many years in southern Arizona, and now here in Las Vegas, I have learned what hot weather is all about. Summer temperatures here routinely run near 120 degrees.

These years of experience have taught me a few things. I am an active ground Search and Rescue person with Civil Air Patrol and have found too many illegal aliens dead of dehydration in the Arizona border country to ever take the hot weather lightly.

Let me share with you some of what I have learned, so that you do not become a statistic. As I've found over the years, planning ahead not only counts – it is essential. I have a canoe paddle over my desk to remind me never to be up the creek without one.

### The Rule of Threes

In search and rescue, we teach the Rule of Threes. Three minutes without air, three hours without shelter, three days without water, and you are in pretty bad shape – or dead.

Shelter starts with clothing. I have seen a lot of folks who think the way to dress is shorts, flip-flops, tee shirts, and no hat.

While I enjoy that in the lady tourists walking along on the Las Vegas strip, it is not the way to survive in the desert.

Think of classic Arab dress. These guys live in the hottest climate in the world. They are covered head to toe and can survive for long periods. I recommend long sleeve, loose cotton shirts, long pants, and a hat that gives you at least eye shade.

Having lost some good friends to Melanomas over the years, I wear a broad brim hat at all times to keep the sun off my ears and neck. I personally prefer the crushable Indiana Jones-style felt hats for the absorption of sweat, but the cheap straw planters or cowboy type also work as well. Just make sure it has an absorbent inner hatband for cooling.

### Keeping Your Cool

Anything that keeps the sun off your bare body, provides for evaporative cooling, and is comfortable enough to permit free air flow is good. However, nylon, polyester, or most artificial fabrics do not absorb water and are not much good for cooling. Cotton shirts and pants are good at absorbing sweat and then evaporating, providing an efficient cooling process.

Preventing overheating also means staying out of the sun. A cheap plastic tarp thrown over the ATU unit while working in it will give you shade, keep the metal from getting too hot, and protect you from the sun.

If you are working out of a car at a stationary point, put the tarp over the windshield to cut down on the green house effect. Silver would be best for sun reflection – camouflage tarps are suicide if you need to be spotted by rescuers.

### Sufficient Water

You might survive for three days without taking in water, but you would be uncomfortable after a few hours, in trouble after twelve, and may have permanent brain damage after a day or two.

The rule I follow is: Carry at least two quarts of water at all times, four quarts during the summer, and more if you might be away from a source of refill for any serious time. *Do not make the mistake of thinking there is a substitute for drinking water.*

I have seen some folks show up with a couple of liters of Coca Cola, large thermos of coffee, or some other drink. Any drink that contains *caffeine is a diuretic*; that means it causes your body to use water *faster*. Some teach that it takes two measures of water for every single measure of a caffeinated drink – coffee, Coke, etc. – just to break even.

An old rule of thumb is that if you are not urinating once every two hours, you are not drinking enough water. Cold water is nice, but any water is good. I carry a couple GI quart canteens and a lot of 16 ounce bottled water bottles. That way if one of the small bottles breaks, I do not lose all my water.

Sometimes I will freeze a couple of those 16 ounce bottles, refilled about halfway, and then have cool water while it lasts.

### Unexpected Stuff Happens

So there I was, cruising along in my well-equipped SUV, headed for the transmitter site at 7:00 a.m., to get a jump on the hot day. The air conditioner was running already because here in the desert it does not take long to get over 90.

About ten miles past the last ranch house, down a dirt road rarely used by anyone, the SUV made a horrible sound and stopped running. It takes very little time for that SUV to turn into a green house without the air conditioner running and with no wind coming through the windows.

*(Continued on page 40)*

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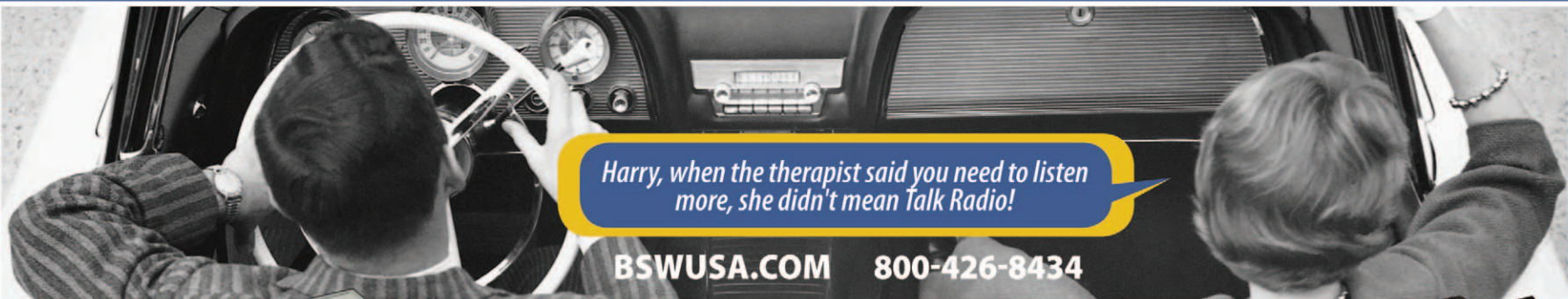


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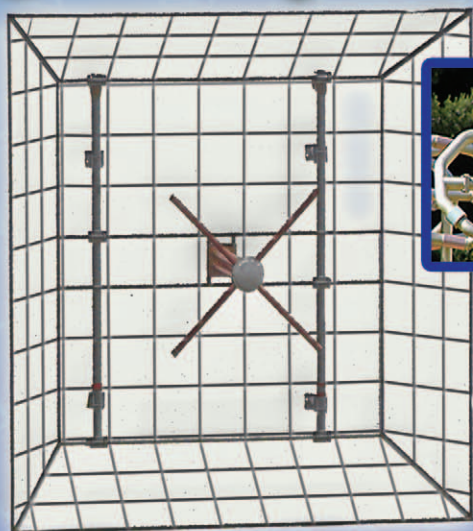
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# Practical Engineering

by Mike Croghan

– Continued from Page 38 –

I grabbed the cell phone to call for help – no coverage. My ham VHF/UHF rig was of no more help since I was on the wrong side of the mountain for the repeaters. I very rarely have the HF in the SUV when I am going to be going up rough mountain roads. So there I sat.

Fortunately, before I left, I made sure that a couple of responsible people at the radio station knew where I was going, the route I was taking, and when I would return. If I waited long enough, they would send someone to find me.

## Prepared for the Unexpected

As the sun rose, the prediction was for another balmy Nevada desert day with temperatures in the low *three* digits.

In the back of the SUV was my emergency kit. I had, as usual, double-checked its contents within the last month. First, I rolled down the windows, opened all the doors, and put a blanket or tarp over the windshield. That helped keep the SUV cool.

Alternatively, I could have gotten out and sat on the shady side of the vehicle, using a tool box or back seat to sit upon, since it is five or ten degrees cooler if you are up off the hot ground.

I checked my water, found I had plenty, and drank a bit when I got thirsty. People have been found dead of dehydration with water still in their canteens; if I am thirsty, it is my body telling me that I need water. The best place to store water is in the body. Sip it – do *not* chug it. Use your water carefully.

It was a long walk back to the last ranch house. If necessary, I would have waited until dark and taken plenty of

water during the walk out, along with a two-cell flashlight I carry – stored with one of the cells turned around to prevent accidental battery drainage.

In the meantime, I exerted myself no more than absolutely necessary. It is always smarter to stay in place and await rescue.



During a less stressful time, Bill Croghan and Jim Owen (r) check out some of the survival tools carried on the truck.

## Stay in Sight

If I had been stuck there longer, one of the best ways to let searchers find me would be to make myself bigger. What this means is to make sure you can be seen easily from the air or from a distance.

One trick is to take a bunch of those CDs I keep in the truck and spread them around, shiny side up. They are great reflectors. One can be used to signal to any low flying aircraft or helicopters that pass. With a little practice, a CD makes a great signal mirror; when a searcher comes near you can flash the mirror at them.

Other options include throwing hands-full of sand into the air to make large dust clouds. Wearing bright clothing works as

well. That Space Blanket from the winter kit is bright aluminum colored and easily seen. Or perhaps one could start a small fire with stuff that will smoke to get attention.

If the situation became really desperate, one could burn the spare tire. It will smoke like crazy and get attention – but only as a last resort, because it will not last long.

## Carry the Right Food

I also keep some food in the emergency kit; foods that keep well, require no preparation, do not use water, and can be eaten easily.

Years ago I used to carry little cans of cocktail sausages until I noticed the sodium content. Sodium = Salt = Need for more water. Now I carry power bars, military MREs, and hard candy – stuff I do not normally like so I will not be tempted to snack on it when it is not needed.

Since I am a diabetic, my kit is stocked with food to take account of my specific needs. I have checked with my diabetic dietitians and doctors about what is good for just this situation – your needs may be different.

## Rescue!

Sure enough, my assistance noticed that I had not checked in from the transmitter site. Around four hours later the welcome sight of his vehicle was raising dust along the road. Right behind him was the tow truck. The transmitter visit would wait for another day.

Time and experience prove that even with the best of plans, it is always possible to end up “out there” for extended periods of time. You can survive and work comfortably for a long time in the desert if you just use some common sense and listen to what your body is telling you.

*Active for many years in radio engineering, ham activities, Civil Air Patrol, and Search and Rescue volunteering, Bill Croghan is the Engineering Manager for Lotus Broadcasting in Las Vegas. Contact Bill at [loteng@lvradio.com](mailto:loteng@lvradio.com)*

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## LPFM Economic Study: FCC Says "No Impact"

by Leo Ashcraft

We previously provided an overview of the Local Community Radio Act of 2010 (LCRA), and the Rule changes that the law requires the FCC to make in response. Changes to the level of protection that LPFM stations must provide to full-service FM stations and FM translators were discussed, along with ambiguous language relating to the establishment of priority of LPFM stations in relation to pending FM translator applications are awaiting resolution through a rulemaking proceeding.

The Local Community Radio Act, signed by President Obama last year, repealed restrictions on low-power FM stations, or LPFMs. The law required the FCC to study whether additional community stations hurt large stations.

Recently the Commission concluded the economic impact study, indicating whether LPFM stations will economically impact full-service FM stations. While LPFM stations are noncommercial, the FCC noted, through the underwriting and sponsorship of programs, revenue that may have previously been directed to full-service FM stations in the market may be redirected to LPFM stations. The report released found LPFM radio stations do not impact the ratings or revenue of commercial stations. Surprisingly, the study indicated the LPFM stations may actually help the effected commercial stations overall revenue.

The FCC stated: "Our final conclusion is that the analysis finds no statistically reliable evidence that LPFM

stations have a consistent effect on the economic performance of full-service commercial FM stations."

That is the conclusion of a 106-page report that has been submitted to the U.S. Congress. The study found no statistically significant ratings impact from LPFMs in most cases, and where there was impact, the amount was insignificant. Additionally, the report showed very little if any impact on revenues. In fact, parts of the study indicated the full power station actually increased revenues where an LPFM was added to its coverage area. The only significant decline in revenues was found where LPFMs duplicated commercial formats in religious stations. The FCC stated the difference was caused by "spurious correlation," with the study unable to account for factors other than the LPFM.

Rep. Mike Doyle (D-Pa.), who sponsored the Local Community Radio Act said, "The study confirmed the widespread belief that LPFMs don't cause economic harm or interference to other stations. In fact, if you talk to the folks in the regions that already have LPFM stations, they say LPFMs have had a very positive impact. They provide programs that reflect and enrich local cultures."

From compiled information in its own, as well as a commercial database, the Commission found that LPFM stations serve primarily small and rural markets and have geographic and population reaches that are magnitudes smaller than those of full-service commercial FM stations.

The study observed eight LPFM stations to provide a snapshot of LPFM's overall effect. Even though the stations differed considerably in their individual programming and operation, the results of the case studies show that the LPFM stations generally broadcast a wide variety of programming, operate with very small budgets, rely on part-time and volunteer staff, do not have measurable ratings, have limited population reach, and do not generate significant underwriting earnings. Most of the station operators said that their LPFM station is not competing directly for listeners of full-service stations.

The FCC said that the Act did not specifically require a study of the economic impact of interference and, since the principal purpose of the Act was to determine how the FCC should deal with interference remediation, Congress had already addressed all that needed to be considered about any potential interference.

The inclusion in previous legislation of a specific directive to study interference, which led to the report from the MITRE Corporation, further supported this. The MITRE report concluded that there would be no substantial interference from LPFM to full-power stations, which opened the door to the passage of the Act. Considering this, the Commission reached the conclusion that no additional study of the economic impact of LPFM was necessary.

This clears the way for the Commission to put in place new LPFM rules and subsequently open a new LPFM filing window later this year. Previously the FCC has unofficially stated a Summer 2012 filing window possibility. This would be the second filing opportunity for new LPFM stations nationwide. Stay tuned to **Radio Guide** as we watch and report further LPFM 2.0 developments this year.

*Leo Ashcraft is CEO of Nexus Broadcast. He is a broadcast consultant with over 20 years engineering experience and an avid LPFM advocate. More information at [www.NexusBroadcast.com](http://www.NexusBroadcast.com) or 888-732-3599*

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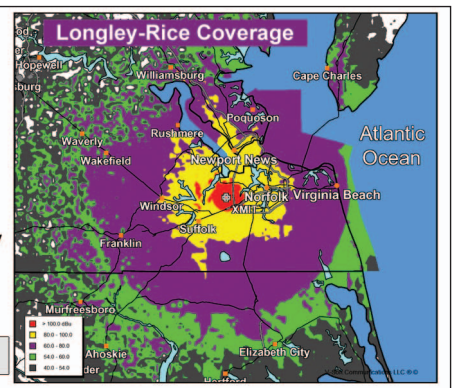


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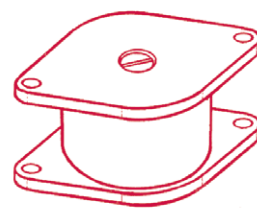
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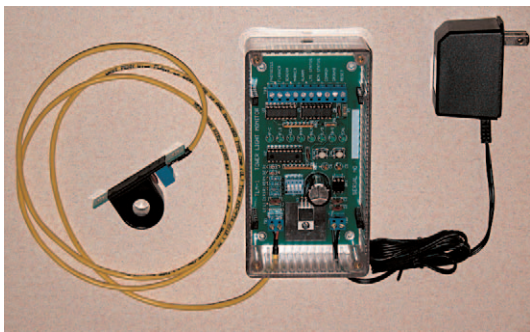
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# Radio Pipeline

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Max Brown's first encounter with the radio industry was humbling.

On a windy summer day in Oklahoma, he climbed an 800-foot tower to adjust an antenna system, as a new hire for ERI. The year was 1981, and he was fresh out of trade school – and he was hooked.

Over the next 26 years, Brown held numerous positions at the ERI plant in Indiana. He welded and machined antenna parts, he worked at the test site, and ran the shipping department. He directed installation and construction services before taking over as western region and international sales manager.



**Max Brown of Broadcast Connection and Ernie Jones P.E., of CEI Engineering, measure a tower for a structural analysis.**

In 2008, Brown welcomed the opportunity to purchase Broadcast Connection, Inc., a full line equipment supplier, from company founder and veteran radioman John Shideler.

Before starting Broadcast Connection in the early 1990s, Shideler had done it all. He was a disc jockey, owned radio stations and even flew traffic reports as a pilot. After years of hard work, Shideler wanted to finally be able to spend more time at the beach. He felt Brown, an experienced and well connected salesman, was a more than qualified successor.

Brown proved him right. He expanded the product line and services of Broadcast Connection, which now has six offices coast-to-coast, and is headquartered in Colorado.

The six-man sales force has diverse broadcast backgrounds from spinning records and climbing towers, to finance and engineering. Each member of the team has a core speciality, yet knows multiple facets of the industry and how all the parts fit together.

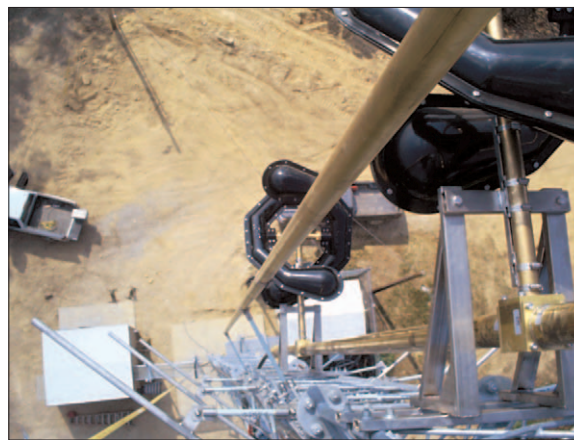
"Experience allows us to cut through a lot of the guesswork," Brown said. "We can get right to the issue. This is important when doing an emergency tower repair in North Dakota, or building a complex radio/TV project from the ground up in Barbados."

Broadcast Connection equips stations from the studio to the antenna. It starts with customer service – but it doesn't stop there.

"We're like the old-time hardware store," said Broadcast Connection salesman Ken Perkins, a fixture in the radio business. "We don't just sell parts, we tell people how to fix it. A lot of equipment sellers are just order takers. This sets Broadcast Connection apart from others."

Sandusky Radio Chief Engineer Clayton Creekmore can attest to this. He recruited the expertise of Broadcast Connection to rebuild station KDKB 93.3 FM in Mesa, Arizona. After 40 years on air, Arizona's first rock radio station was in dire need of a total makeover.

"The tower was in horrible shape, in fact it had been condemned," Creekmore said. "This project took about three years to plan out and get approval. They were there for me in every step of this huge undertaking. They bring a whole new meaning to the term 'full service dealer.'"



**Picking a stub section for a new tower in Greencastle, Indiana.**

Broadcast Connection provided the pattern analysis, structural studies and system design, as well as the full equipment list.

KDKB now has one of the strongest, sharpest signals in the nation. Metallica never sounded so good, and the station's new HD signal is getting some serious head-banging praise.

"We have listeners call up and say they can really tell a difference," Creekmore said.

The industry has changed since Shideler launched Broadcast Connection as a single supplier start-up; but what hasn't changed is that owners, managers and engineers know they

only have to make one phone call to Brown and his team to get solutions.



**New tower and DA installation in McKee, KY.**

Broadcast Connection has had to adapt to the new age of broadcast where the word "radio" is being dropped in favor of "media."

"It is more than radio," Brown admits, "but listening to music, news, talk and sports is still the backbone of radio. What we do is radio. It is our mainstay."



**New tower foundation Greencastle, IN.**

## **Meet the Broadcast Connection Sales Force**

- **Max Brown** has worked in many capacities for ERI before becoming president of Broadcast Connection. Brown lives in Mukilteo, Washington.

- **John George** has worked for Harris, Dielectric and LBA Technology. He lives in Lexington, South Carolina.

- **Terry Becht** started as tower salesman for Central Tower in Indiana and has worked for ERI and Harris. Becht lives in Canyon Lake, Texas.

- **Ken Perkins** operated his own company and was an RF equipment salesman for Continental and Harris. Perkins lives in Evergreen, Colorado.

- **Eric Wandel, P.E.**, has been a systems engineer for RF and communications systems for both commercial broadcasters and Department of Defense clients. He has designed antennas for ERI. Wandel lives in Newburgh, Indiana.

- **John Shideler**, former owner of Broadcast Connection, began his radio career working evenings as a disc jockey at a local radio station while in high school. He later moved into station ownership and management. He divides his time between Arizona, Colorado and the California beaches.

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#### NATE 16th Annual Conference and Expo

February 6-9, 2012

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[www.natehome.org/annual-conference/](http://www.natehome.org/annual-conference/)

#### NRB 2012 Convention & Exposition

February 18-21, 2012

Gaylord Resort & Convention Center, Nashville, TN

[www.nrbconvention.org](http://www.nrbconvention.org)

#### Great Lakes Broadcasting Conference & Expo

March 13-14, 2012

Lansing, Michigan

[www.michmab.com/ProgramEvents/Calendar/](http://www.michmab.com/ProgramEvents/Calendar/)

#### CBI Spring College Media Convention

March 18-20, 2012

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[www.askcbi.org/?page\\_id=2469](http://www.askcbi.org/?page_id=2469)

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### Advertiser - Page

Altronic - 27  
AM Ground Systems - 36  
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Arrakis - 33  
Array Solutions - 22  
Axia - 23  
Bay Country - 43  
BEXT - 41  
Broadcast Devices - 4  
Broadcast Software Intl. - 8  
BSW - 39  
BW Broadcast - 13  
CircuitWerkes - 11  
Coaxial Dynamics - 24  
Comrex - 5  
Davicom - 42  
DM Engineering - 47  
Econco Tubes - 43  
Enco - 19  
Gorman Redlich - 41  
Henry Engineering - 2  
Inovonics - 1, 38  
Jampro - 32

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### Advertiser - Page

Kay Industries - 47  
Lightner Electronics - 30  
Michael Patton - 47  
Micro Communications - 41  
Moseley - 31  
Myat - 29  
Nautel - 9  
NAB - 37  
OMB America - 25  
Omnia - 15  
ProAudio.com - 26  
Progressive - 40  
PSI (Propagation Systems) - 39  
Radio Systems - 18  
RAM Systems - 34  
RF Specialties - 35  
SAS (Sierra Automated Sys) - 27  
SCMS - 21  
Shively - 20  
Systems Store - 47  
Telos - 17  
TFT - 41  
Transcom - 42  
Wheatstone - 3, 48

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