

# Radio Guide

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January-February 2011 – Vol. 19, No. 1

## Myat Inc. – 60 Years Young



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*Rick Hunt, Vice President  
and Director of Radio Engineering at  
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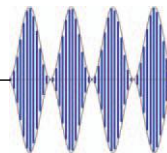
# Radio Guide

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by Ernie Belanger – Editor



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### Radio Guide

Volume 19 – Issue 1

PO Box 20975, Sedona, AZ 86341

Phone: 928-284-3700 • Fax: 866-728-5764

Publication Website: [www.radio-guide.com](http://www.radio-guide.com)  
 Classified Ad Website: [www.radio-classifieds.com](http://www.radio-classifieds.com)

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Radio Guide, ISSN 1061-7027, is published bi-monthly, six times a year, by Media Magazines Inc., PO Box 20975, Sedona, AZ 86341. Radio Guide is copyright 2011, Media Magazines Inc., and may not be copied, reproduced, or stored in any format, without the written permission of the publisher.

### Welcome Roger

I hope this new year started off on a positive note for you. Speaking of positive notes, I am pleased to welcome Roger Paskvan, an Associate Professor of Mass Communications at Bemidji State University in Minnesota, to the publication as a regular contributor

### An Important Safety Issue

Richard Strickland, of RF Safety Solutions, has made us aware of specific RF safety monitor issues. You'll find his important letter to us on page 24 of Jeff Johnson's *Safety and Security* column.

### Compelling Content

As always, this issue of *Radio Guide* is loaded with compelling content. Our IT Czar, Chris Tarr, discusses Maintenance Tracking Systems. In this issue, we've switched up Scott Schmeling and Steve Callahan. In *Chief Engineer*, Steve tries to help you learn when to say "No!", while Scott tells his *Xtreme Engineering* story of an antenna rebuild under a time crunch.

If the new Community Broadcast Act has your blood boiling, check out *FCC Focus* – Peter Gutmann's comments may help lower your blood pressure at bit.

Mike Callaghan finishes up his Remote PA project, and George Zahn has some follow-up to his "Shoestring" series. Tweaker looks at running "Naked" as an option for your antenna, and I deliver a slightly twisted look at the fable of the Three Little Pigs. Plus, we help Myat celebrate it's 60th birthday on the page 6 *Cover Story*.

– Ernie Belanger, Editor

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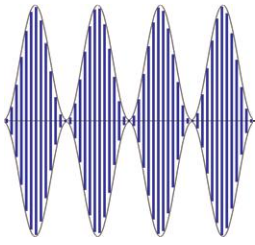
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## Myat Inc. – 60 Years Young

Francis (Frank) Michael Malhiot (pronounced “MY-at”) was a tool and die maker by trade, and engineer by education. Having completed his tool and die apprenticeship with Western Electric at an early age, near his home in Maywood, Illinois, Frank began what would be a very long and successful career with the company.

Moving up quickly within the organization, he earned high marks for his innovative approaches to machine production techniques and processing. His hard work and commitment earned him a promotion and a transfer to the Western Electric plant in Carney, NJ, where they had just begun work on a new Research and Development facility.

Working by day, and attending school at night, Frank earned his Engineering Degree to compliment his years of experience as a machinist. Once the new facility in Bayonne opened, he was appointed manager of the R&D Model Shop, in charge of prototype production and manufacturing process development.



Frank Malhiot

He managed the shop for twenty years, from the late 20’s, through the conclusion of World War II.

Although he was truly a “Company Man,” Frank had always been adventurous and independent. As a young teen in Illinois, he would often take off for several days alone in his canoe, on the Des Plains River, to fish, camp and explore. Even then, Frank had dreamed of one day running his own place.

After WWII ended, Western Electric was dealing with the challenges of a changed marketplace. Reorganization was in the air and, after 30 years with the Company, Frank decided that it was now time to open his own shop.

### Myat Opens for Business

Frank founded Myat Sons Screw Machine Products in 1948, in a rented two-car garage. He immediately met with success doing production runs for local businesses, as well as small lot and prototype work for his former employer.

While his passion and expertise was for machining and production, the “business” end of his endeavor was not something with which Frank had a great deal of experience.

Profitable and growing, Frank recruited his new son-in-law, Anthony (Tony) Cindrich, to help him with the new company’s accounting and other financial matters.

Tony had studied engineering and accounting at Cornell and Bucknell, in and around his time in the Navy. After graduation, Tony began a career with the accounting firm Price Waterhouse in New York City.

On weekends and evenings, Tony organized his father-in-law’s books, and worked with Frank to simplify front office operations. It was obvious to all involved that the pair made a formidable team. Myat incorporated itself in 1951.

### Tony Joins Myat Full Time

By focusing on rapid delivery, cost control and precision, the company continued to prosper and expand. However, with Frank’s two sons both serving in Korea, he found he could no longer support the growth on his own. Turning once again to his son-in-law, he tried to convince Tony to join him full time.

After a couple more years of part time collaboration and countless after-Sunday dinner discussions, Tony agreed he would join the company full time and would concentrate on business development and automation.

### Automation and Contract Manufacturing

The addition of “young blood” to the management team came at just the right time. The growth of the company had forced it out of the garage years before, and now in their new factory in Bergenfield, NJ, the company was prepared for additional growth. The “new” technology in the industry at that time was “NC” (Numerical Control) machining, and the company embraced it. By adding “NC” milling to the operation, greater precision and throughput was made possible.

With the new capability for accuracy came the opportunity to offer products and services with greater complexity. By adding a greater variety of process offerings such as plating, brazing and welding, to its already established machining expertise, the company was now delivering a wider array of products, from gyroscope-based navigational system sub-assemblies, to high power electrical connectors, to parts for advanced vacuum pump valves and controls.

### A New Name and Prestigious Customers

These advances in capabilities not only prompted the company to shorten its name to simply, Myat Sons, Inc., but it also brought prestigious new customers. Bendix Corp., Grumman Aircraft, General Electric (GE), Westinghouse, Communication Products, RCA, MicroLab and most importantly Prodelin, were soon all on the roster of customers.

Prodelin had many product lines. Among its most successful was its rigid coaxial transmission components, which it supplied to GE’s Broadcast Products Division.

Myat Sons initially only provided machined parts for Prodelin, but as the relationship grew, the company began to produce complete assemblies, building finished rigid line, elbows, reducers and accessories. Myat Sons also began to produce rectangular waveguides assemblies and other components for the newly developing Aerospace Industry.

### Market Evolution

The late 60’s and early 70’s brought an evolution to the Broadcast RF business. GE made the decision to exit the business, and sold off its assets to Gates Intercom, a Division of Harris Intertype.

Prodelin, an important GE supplier followed suit, deciding to pull out of the high power broadcast RF market as well.

Myat Sons seized this opportunity to service the Broadcast market directly, launched its own catalog of rigid coaxial transmission line, components and accessories. Since Frank’s two sons never joined him in business, the company decided to drop the “Sons” from the name and became simply Myat, Inc. Tony Cindrich took over the reins of Myat after Frank’s passing in 1969.



Myat employees assembling elbows and reducers.

### Growth Continues

The early 70’s saw George Higgins joining Myat lending his talents and experience to the company’s increased concentration in the Broadcast Equipment market. Having managed Prodelin’s rigid line business for years and after spending some time at Telerad and Lionel’s Communication Products Division, George was pleased to once again be focused on Broadcasting.

George’s relationships with engineers and purchasing executives at GE, Gates/Harris, Continental Electronics, and many other large manufacturers, provided the company with the opportunity to work with these organizations during their product development process, and the Broadcast product line grew.

The growth of FM radio and UHF TV in the 70’s and 80’s fueled Myat’s expansion. The already expanded factory in Bergenfield, NJ was again bursting at the seams by the Mid-80’s. It was so congested in fact, that at times the cleaning and packing of transmission line sections had to be performed in trailers parked out in the back lot.

### Moving to Norwood

Myat packed up and moved to Norwood NJ in the fall of 1986. The new facility provided the company with what it most desperately required – space to grow. Production accelerated, and Myat was now shipping complete transmission line systems on an almost weekly basis, and individual transmission line components were shipped out daily.

It was just before the move that Tony’s youngest son, Philip, returned to the company after earning his degree, and after working for Ecosphere in Englewood, CO. Phil, like his four brothers, had spent school vacations and summers working at Myat either assembling elbows, turning flanges or assisting in the drafting department – Tony always found ways to put his boys to work.

(Continued on Page 8)



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# Cover Story

## Myat Inc. – 60 Years Young

– Continued From Page 6 –

### Management Transition

Shortly after the move, Tony became ill, and the time he could spend at the new facility was greatly reduced. Malcolm Campbell (the long time Plant Manager), Joan Connelly (Tony's secretary and assistant), and George Higgins (then Vice President of Sales), pulled together with the help of many others within the company, to help Tony keep operations running smoothly.

Tony passed away in September of 1987, and the company faced a difficult transition. George Higgins had advised the company of his intention to retire in June of 1988, well before Tony had become ill, and he had already put off retirement once. Rather than ask George to put it off again, Philip was named President in late September 1987.

### Built On Relationships

Tony Cindrich had believed in relationships, one of the many values he and Frank had stressed within the organization. Whether it was with customers, vendors and suppliers, bankers, or employees and associates, relationships mattered. It was the strong relationships that he had built over the years with the people in all aspects of the business that made the transition after his death possible.

Internally, he had assembled a dedicated team of talented and capable individuals. Externally, he had earned the respect and trust of customers and suppliers alike, knowing that Myat would provide excellent products, meet deadlines and honor all of its commitments.

### Big Shoes to Fill

Among other things, the loss of Tony created a huge hole in engineering. After many inquiries within the industry regarding engineering talent, a trusted supplier suggested that Phil contact a bright engineer he knew who might be interested in "making a move." Don Aves arrived at Myat in June of 1988, in one of his old station wagons, to interview and see what Myat was all about. He and Phil hit it off immediately.

In addition to being a brilliant engineer, Don possessed a wealth of experience and expertise from his days in the Army Radio Corps, Prodelin, Inc., Phelps Dodge and Celwave. Don took over as Director of Engineering and improved performance at every level. Don's passion, energy and enthusiasm resonated instantly within the organization.

Under his guidance, Myat improved product quality and performance, widened product offerings, and innovated – receiving numerous patents. Don was also highly instrumental in the recruitment of other top engineering talent, most notably Steve Kolvek, Myats' current Director of Coaxial Products.



Tuning a cavity filter at Myat's factory.

### Getting Digital Ready

By the late 90's, it was obvious to the management team that Myat had to once again expand its offerings of solutions to include products designed for the next wave of technology, Digital Broadcasting. In October of 2001, Myat purchased Lowpass Prototype, Inc. of Raymond Maine, and began producing RF filters.

Derek Small, an authority on filter design and application, was the force and creative mind behind Lowpass Prototype. Derek and the Myat team had developed a strong relationship over the years and all agreed that working together would be the best way to bring new filter products and technology to market.

Myat opened a facility in Falmouth, ME to house the new Filter Division, and further expanded the team to include Dennis Heymans as head of Filter Sales, and John Lund, as head of production.

Over the next seven years, with the assistance of some very talented local employees, and under the guidance of Myat Director of Manufacturing Paul Sidow, and Robert Hilsdorf in Norwood, Myat produced FM, TV and L-Band filters at two locations in the Portland, ME area.


In 2008, with the Digital TV transition moving to a conclusion, the Filter Division was relocated to Myat's current facility in Mahwah, NJ.

### 60 Years Young

This year Myat, Inc will be celebrating its 60th Anniversary. Frank Malhiot would no doubt be pleased to know his company was still going strong six decades after he had founded it. In fact, the Future is bright for Myat, and its management team and employees look forward to taking on whatever challenges the next sixty years have in store.


– Radio Guide –

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## Emergency Antenna Fix

We see and read a lot of articles about transmitter sites – most of them about transmitter troubles and their solutions. But there's another portion of the transmission system we don't often talk about. Normally, once the line and antenna are hung on the tower we can almost forget about them. As long as we keep the line and antenna pressurized, we expect them to keep working.

That's in a perfect world. In the real world, anything is possible, as I am well aware.

### Blowin' in the Wind

We have an FM site near Lake Benton, Minnesota, in an area called the "Buffalo Ridge." There's a twelve bay antenna on top of an 835 foot tower. The tower sits on an 800 foot hill. When it was built, about 23 years ago, it was the highest radiating point in Minnesota; it's my favorite site of all.

The view, which was incredible then, has become more and more impressive with the growth of an over 1,000 wind generator farm. Those wind generators dot the ridge because the wind almost always blows – therein lies the cause of our antenna troubles.

You could call the ridge a "hostile environment" for an antenna. The wind almost always blows, and during the winter and the antenna can become encased in a thick block of ice. In fact, after the second winter, we had to replace all twelve of the antenna's "T" sections with much stronger reinforced ones that were designed for use with radomes. Since replacing them, we had gone 20 years or so without a problem, but that was about to change.

### Signs of Trouble

The first thing we noticed was a pressure leak. When winds died down enough to allow the tower to climb, they found cracks in two of the antenna radiators. The crew taped the cracks as a temporary fix and replacements were ordered.

When the replacement radiators were installed, our reflected power was still higher than normal. The VSWR had been edging up a bit from normal, but after replacing the two radiators, we couldn't get to full power before the transmitter would either foldback or overload.



One of several damaged parts found on the antenna.

### Bigger Problems Discovered

A closer antenna inspection showed a few dents caused by falling ice and holes at the cap end of the radiating elements caused by lightning strikes. No big deal there.

But the inspection also showed a couple potential hot spots. We decided to bring the entire antenna down for a closer look. But that would have to wait until later – wind permitting.

### Factory Support

During the process, we were in contact with Mark Steapleton, Engineering and Technical Support for the antenna manufacturer. Among other things, they recommend that an antenna be taken down every 10 years or so for routine maintenance (replacing all the O-rings and bullets) and a good internal cleaning.

But does anybody really do that? We ordered a "rebuild kit" for our twelve bay. He also suggested getting some lint-free rags, some Scotch-Brite pads, and ketone solvent to dissolve and remove any soot we might find inside.



Note the extreme damage on the 3rd from the left inter-bay section.

### Happy Halloween

On October 31st, we were able to bring the antenna down, and we fully dismantled and inspected it. What we found was much worse than we expected. The hot spots discovered earlier proved to be areas with significant internal damage. We found damage to some of the inter-bay sections, some of the blocks, some of the T-sections, and the upper matching section. In addition, there was soot in much of the rest of the antenna.

We had a backup transmitter at the studio site, a fraction of full power. We were missing coverage in a very large portion of our sales area, and compounded things was the fact that the Christmas sales season was fast approaching! We had to get back on the "big tower" as soon as possible.

### Decisions, Decisions

We debated the options and decided it made more sense to replace the whole antenna rather than repair or replace the damaged parts. But a new antenna would take 30 days to build and ship. We needed to do something to get back closer to full power and coverage as quickly as possible. Again, we talked to Mark to discuss the situation.

Our center-fed, twelve bay antenna is essentially two end-fed six bay antennas with a matching section or "splitter" in the middle. We had enough good parts to build a six bay. All we would need was a new tuning section – that could be built and shipped overnight. The order was placed and we went to work cleaning the parts we'd be using.

### Handy Cleaning Tips

In addition to the Ketone, Scotch-Brite, and rags, we bought a three inch wire brush – the type that goes on a drill – and three twelve inch drill extensions. These worked beautifully for cleaning the blocks and the "T" sections.



Keith Wright cleaning a "T" section.

Speaking of the "T"s, the long inner conductor slides over a bullet at the far inside end. That bullet screws into the short end inner conductor. To properly clean the inside of the sections, the inner conductors had to be removed. We created a tool to remove that "screwed in" bullet.

### The Tool

We took a section of inner conductor from one of the damaged inter-bays, cut a slit in it and put a hose-clamp on the end, with a portion of that clamp going through the slot we had cut.

This fabricated tool slides over the internal bullet, the portion of the hose clamp that goes through the slot slides between the slits in the bullet. This grips the bullet preventing the inner conductor from spinning on it and allows us to unscrew and remove it for cleaning.

With the antenna on the ground and dismantled, we started cleaning. Operations Manager, Keith Wright, members of our Dietz Brothers tower crew, and myself, all worked together to get everything cleaned, reassembled and ready to take back up the tower.

### Antenna Location

The new twelve bay would go back at the top of the tower. We didn't want to put the six bay at the top, only to have to take it down when the twelve bay arrived.

Besides, the six bay would make a dandy backup antenna. Using 250 feet of coax I had in storage, we mounted the "new" six bay at 250 feet.

Mark had given two theoretical positions for the tuning slugs. With that information, the antenna tuned quickly using Kevin's FDR (Frequency Domain Reflectometer) and the transmitter's VSWR meter.

This was not one of those "fun" projects, like the initial installation of all new stuff. But it went smoothly, thanks in no small part to the tower crew, who gave us priority whenever the wind was favorable – and Mark Steapleton, whose knowledge of antenna design and manufacturing was an invaluable aid.

Ten years from now, when we bring the twelve bay down for "servicing," we'll have a dandy six bay backup antenna to switch to.

*Scott Schmeling is the Chief Engineer for Minnesota Valley Broadcasting, a 16 station group in Southern Minnesota. He can be reached via email at [scottschmeling@radiomankato.com](mailto:scottschmeling@radiomankato.com)*



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## To Dome, De-Ice or Run Naked? That is the Question

by Tweaker

When you ask the question, “What is the best way to run your FM antenna system – with radomes, de-icers, or Naked?” The answers you get vary from engineer to engineer, and may vary from application to application. But there are some rules of thumb that must be factored into the decision making process of what is best for your build.

### Location, Location, Location

No, we’re not about talking real estate, we’re talking geography. It’s obvious that in areas where snow and ice are a usual part of winter, one considers some type of protection, depending upon the antenna being purchased.

But in recent decades, with weather patterns shifting, consideration needs to be given to ice protection where it hadn’t been in the past. Temperatures this winter, for example have plunged to below freezing – at least overnight – as far south as Florida with enough moisture to cause ice. In the West, there has even been snow in Las Vegas not to mention temperatures as low as the 20’s even in mid-Arizona.

So, the question of what to do with future station builds, or when it is time to replace your existing antenna should be on the mind of every engineer.



### Running Naked

Depending on the type of antenna you are purchasing and your location, running without de-icers or radomes may be an option for you. While some manufacturers suggest this option for certain broadband, high power antennas, medium and low power antennas usually aren’t broadband enough to allow the antenna to operate without some type of protection.

The theory is, that even if ice forms on the antenna elements, the antenna is broadband enough so that the ice doesn’t de-tune the antenna sufficiently to raise the VSWR to a level which might initiate a transmitter shutdown or significantly folding back. While some elevated VSWR may be present, it usually is minimal allowing the transmitter to compensate.

Nevertheless, depending upon the amount of ice that does develop there may be a reduction in power output sufficient to cause reduced signal coverage. Depending on the cloud cover, temperatures and moisture levels, you could be running under these conditions for days or even weeks.

### Radomes

Fiberglass and Polyethylene radomes have been used as a way to protect the antenna elements from ice forming directly upon them. The covers are designed to encapsulate the element, keeping the ice on the outside of the dome a few inches away from the radiating element.

The dome’s main advantage is that it eliminates direct icing that cause VSWR, and they do so without the ongoing operating expense of running de-icers on the antenna to keep ice off the elements.

Bob Surette, of Shively Labs, points out that there are other benefits to radomes, “In addition to protecting the antenna bays from direct icing, radomes also protect the antenna bays from falling ice coming from higher up the tower.”

### The Forgotten Benefit

While we usually think about radomes to protect the antenna in the winter from ice, Bob also pointed out an almost forgotten benefit: “Radomes also protect the antenna elements from environmental contamination such as acid rain,” he concluded. I’m sure we can add possible damage from a nut or bolt accidentally dropped by a tower crew working above your antenna to that list of protection as well.

The trade-off however, may cause you to reconsider this approach. From a cost perspective, adding domes adds considerably to the antenna price – as high as \$2,100 per bay or more, plus there may be additional cost in heavier brackets.

### Other Costs to Consider

Depending upon the tower where you are going to mount the antenna, you might get hit with the need for an engineering study to ensure the tower-as-built can support both the extra weight of the antenna with domes, but more importantly to ensure that the tower can accept the extra wind load of an antenna with domes.

Both Bob and Doug Ross of PSI Broadcast point out that some radomes cause less wind load than others. Ross noted, “The radomes we use on some of our antennas are closely contoured to the element so wind load is minimized.”

### Additional Facts

There are still other considerations with radomes as well. As domes age, they can become cracked as they are weakened by constant UV exposure. Surette pointed out that the Shively radomes are made of Polyethylene and that UV isn’t an issue with their domes.

Another factor to consider is the fatigue of constantly being exposed to wind which, over time, can cause a weakening at connection points.

It’s important to ensure that the domes remain intact. Both Ross and Surette agree that to do this there should be an inspection done every year, or possibly two years at the most, to inspect the integrity of the radomes to make sure cracks that may have started are properly sealed. This will prevent further damage to the radome or damage to the antenna if a radome is compromised.

These costs should be factored into the long-term costs of operation and you do need a commitment from ownership that they will budget for them.

Another problem that occurs on occasion is that domes make excellent targets. Stories abound in the engineering community of hunters or “marksmen” causing damage to domes by using them for target practice.

### De-icers

De-icers are the third method to keep ice from forming on antenna elements. Each element is equipped with tiny electric heaters that keep the antenna warm enough to prevent ice from forming on them.

An electric wire is run up the tower to power these. This system eliminates VSWR potential completely, unless of course the system malfunctions or isn’t on in time to prevent icing.

Usually a controller is placed outside of the transmitter building to automatically turn the de-icers on or off at times ice could form.

### Controller Options

“The most economical way to run deicers, is a controller that has both a temperature sensor and moisture sensor.” according to Doug Ross. “We advise customers that the dual sensing system is the best controller because it helps reduce their operating cost.” Ross says. “Controllers with only a temperature sensor do work, but the problem is the temperatures could be within the “operating window” for days or even weeks. If there isn’t enough moisture for ice to form, all that power to run the de-icers is wasted.” He noted.

### Do It Yourself Control

Some station engineers opt to run deicers without factory controls. They will build their own controller or hook up the deicers to come on when the transmitter sees VSWR. Ross noted that “The problem with connecting them up to a VSWR monitor is that the de-icers may not be able to warm the antenna quickly enough to prevent heavier ice from forming.” He concluded.

### Initial Cost

The cost of deicers vary per manufacturer but on average run between \$750 to \$1000 per bay. You also have to factor in the cost of the controller, the additional electrical wire running up the tower to the antenna and any additional installation cost by the tower crew and your electrician to “open up” (wire) another circuit in your electrical panel.

In addition to these expenses you should estimate the cost of running deicers and factor that into your station’s operational expenses. Check with you antenna manufacturer, they may be able to give you an estimate of the power consumption for the deicers and the temperature range within which they operate.

They might even be able to provide you with information regarding the number of days or nights you can expect them to run in your area. While this run time data might give you a ball park for figuring power consumption, you can’t hold on to this information as Gospel.

### So Which is Best?

At the end of the day, consulting with the antenna manufacturer of your choice, exploring the weather patterns at your site, and running both a short and long term cost analysis between different antennas and options will give you the answer.

---

*Bob Surette is the Director of Sales engineering at Shively Labs (www.shively.com), he can be reach via email a bsurette@shively.com, Doug Ross is the President of Propagation Systems, Inc. (www.psbroadcast.com) his email is doug@psibroadcast.com*

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## 2011: Looking Forward, Looking Back

by George Zahn

At a recent New Year's party, our host became introspective and wished all of us "a happier 2011, after such a rough 2010 in this economy." As we all look to the New Year, I wish all of us as managers and engineers the same.

In recent issues, I've shared some tips on maintaining studios at minimal cost, and in this issue, I'll follow up on some flash drive technology that was discussed in the August 2010 *Radio Guide*, and how radio station WCNW has adapted their use of the technology to their needs.

While we're still basking in the glow of a New Year (or is that the warm radiance of an old Philco cathedral radio?), it's a prime opportunity to look forward as well, and I received a marvelous note from a long-time engineer who reminds all of us to look at the big picture in this New Year.

### And the Survey Says ...

Near the end of 2010, I sent out a quick questionnaire to a number of engineers about creating a "wish list" for the New Year, including things as basic as new EAS gear, to some new pet projects, or a focus on new technology.

I extend that invitation to all of our *Radio Guide* readers, who wish to send me their ideas for future issues, but one response struck home, and it had nothing to do with any specific device. Instead, it was a message of career and corporate survival.

"As I was reading your suggestions for New Year's "wish lists" from engineers, it occurred to me that too often broadcast engineers get caught up in their own world and lose sight of the bigger picture – that being the station's goals and how engineering can contribute to their station's success," says Jim Stitt of JMS and Associates, a broadcast engineering design and consulting firm in the Midwest.

Stitt's message is one of communication – uh hem, isn't that the business we're all in? Yet all of us can find instances where we fail?

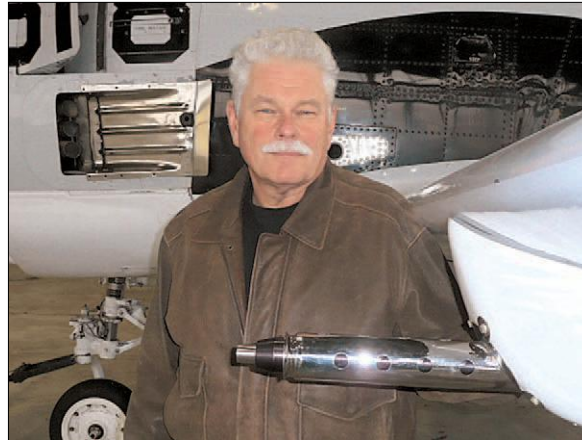
Jim says, "Savvy General Managers realize that the Chief Engineer is an integral part of the management team, and therefore plays a critical role in the success of the station. At those stations the Chief is involved in the strategic planning, budgeting, and attends department head meetings to foster communication and camaraderie. Too often though, that is not the case."

### Spirited Conversation

You don't need a visit from Marley's ghost to get the point. Management often views the engineering resources at their facilities as those who do the thankless repair work, or even help in such "blue collar" duties as changing light bulbs. But Stitt, who has looked at the "isolation conundrum" from both sides, says: "While short-sighted managers can be at fault, sometimes the engineers can bring on the isolation. Respect is earned. If your G.M. and colleagues don't respect you, perhaps it is deserved. There is much more to being a valuable asset to the company than being a technical wizard."

Stitt made a checklist of questions that could benefit all of us on either side of the engineering/management/programming lines: "Do you know and understand the station's mission and goals? Do you appreciate the pressure on the P.D. to achieve ratings, or the sales department to meet their sales goals?"

And how about the G.M. that has to motivate all the diverse personalities of the staff, coordinate every department, and make the bottom line work during trying economic times. Ever consider walking a mile in their shoes? And how about attitude – Are you accessible, cheerful and communicative? Do you treat requests for your assistance as an opportunity or a burden? Do you dress like a department head?"



Jim Stitt of JMS and Associates

### You Say You Want a Resolution

And on resolutions for a better 2011, again equipment wasn't at the top of Jim's list, "Vow to be a more productive member of the station's management team. Start by making an appointment with each department head, for a one-on-one meeting to discuss how you can help them achieve their goals. Use discretion regarding requests for new equipment, and then work with the G.M. on how to best fit the absolutely necessary items into the budget. Open up lines of communication and look for ways to contribute. Pay it forward. Only when the station is successful can you expect to win as well."

Sometimes we need to look beyond technical issues in this column and understand that all aspects of our business can benefit from comments such as Jim's. Thanks, Jim, for your input on better communication and teamwork that we can try to attain in the New Year!

### An Update

In *Radio Guide* of August, 2010, I conveyed the challenges of rebuilding a badly out of date production studio at radio station WCNW. Included in the make-over was a debate on which medium to use to replace carts for short form production.

As a small station, WCNW remained tethered to carts longer than most stations had, and they needed a dependable replacement. The engineer on the project, Jay Crawford, who is one of our regular contributors in this column, was charged with taking a studio that consisted of a cart machine, ancient reel-to-reel deck, and a home CD player, and making it into something more functional.

### Flash-Back

Some of the improvements were somewhat obvious. Crawford sought to bring the station into the digital editing age by installing a basic computer in the production studio, loaded with decent editing software.

The question at the time was how to effectively replace the failing carts and cart machines on a shoestring, and the choice of the station at the time was four, Marantz Flash Drive recorder/players – two placed in the air studio and two placed in production. In mid-2010, Crawford said the "jury was out" on the effectiveness of using flash technology as portable media at WCNW.

According to Crawford, the station and the personnel love the new flexibility of the flash recorders. The original plan has been changed, and the configuration at WCNW now has just one unit in production and three in the air studio. Crawford explains, "We use the standard computer in production and a basic USB interface to load audio files onto the flash memory."

The station keeps the one Marantz unit in production to verify content on the cards and for occasional extra production.

### Really Stacked

In the air studio, the three Marantz units come in handy. The station keeps separate flash data cards for collections of themes, commercials, PSA's, and other production. You slide the card into the recorder/player and you can easily access the files you wish to play from that card. The three players replicate an old triple-stack cart deck – remember the old ITC Delta III? The only exception is that when you load one card in the Marantz, you have access to an alphabetical list of all spots on that "cart."

I have to admit, I did a similar thing working in Operations at WXU, where we were in a long-term transition from carts to a digital delivery system. Back in the 1990's, our intermediate medium was mini-disc, and I created different mini discs for everything from spots, to liners, to show themes.

### Flash Technology

The nice part about flash technology is that it is far quicker and easier to back up than waiting on the old mini-disc backup recorders.

Crawford points out another advantage to flash: there are no moving parts as in carts or even mini-disc. He even points out that hosts who need to rip some quick, one-shot music to a card, can do so – and then erase the file which makes space on the card, making it a nice recyclable resource.

It sounds as if WCNW has made a sound decision for a station looking at an intermediate bridge between analog audio and an eventual digital delivery system.

Two quick caveats with the WCNW solution: remember that when you have all your spots on one card, you're one accident away from losing everything. It's good to schedule a daily backup of each card so that you're never caught with your files down. Also, Jay stresses that the production computer is kept isolated from the Internet to avoid getting potential viruses onto the flash cards.

If you take nothing more away from reading this column always remember. It is best to keep your on air and production computers completely isolated from the Internet to avoid a virus from entering these vital systems.

---

*Do you have some resolutions for 2011, such as Jim Stitt's feedback? What about new technologies that excite you going forward? What are some of your strangest and/or best engineering challenges?*

*Share them at: [gzahn@mkcommunities.org](mailto:gzahn@mkcommunities.org) and your story could educate or entertain us all in a future issue of *Radio Guide*.*

*George Zahn is the Station Director/General Manager for WMKV Radio in Cincinnati. email comments or questions directly to George at: [gzahn@mkcommunities.org](mailto:gzahn@mkcommunities.org)*

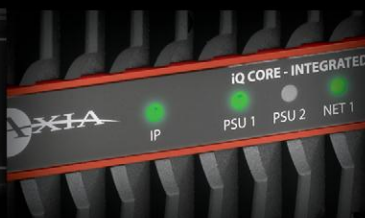
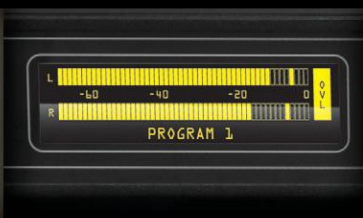


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## Mitigation – Planning Ahead

by Ernie Belanger

*In our last installment, we discussed the need for a disaster plan for station employees and their families. This included designating in advance, who would do what, and where it was to be done, when a disaster occurred.*

*Part of the plan included a call tree to alert staff that the station's disaster plan was being activated, and the need for a contingency plan to ensure employees' families were out of harms way if disasters in your area warranted.*

*This installment will discuss "mitigation" from an equipment perspective.*

### Definition

By its definition, mitigation means: "To cause to become less harsh or to make less severe or painful."

From a disaster preparedness perspective, it means contingency planning, so when a disaster strikes the impact of the disaster has a minimum interruption on daily life.

Truthfully, most stations don't properly plan for disaster in advance; they don't prepare for it, and at the eleventh hour before a disaster, management and employees usually run around trying to think of what to do. They are like the first two pigs in the children's fable of the Three Little Pigs.



### The Three Little Pigs

Don't laugh. There is a huge lesson to be learned from that fable with regard to disaster preparedness.

The first two pigs, you will recall, did build shelter but when the wolf came to the door, their "shelter" proved inadequate. On the other hand the third pig planned properly for the wolf and was ready when he came. You need to be like the third pig.

### Proper Planning

Start by making a list of the natural disasters that strike your area. There are some common effects that could occur with each of them that you have to plan to address, while each also has unique features to factor into your planning.

These potential common occurrences are loss of power, loss of phone and cell phone service, loss of Internet, and the mobility of personnel being hampered at best, if not restricted completely.

Let's explore ways that you can recommend to station management or ownership, to mitigate these common denominators so your station is prepared when disaster strikes.

### Loss of Power

This is probably the single, biggest problem you face. Without power the station is off the air, and totally useless to the owner. Not only will it be unable to keep the public informed of what is going on as the disaster progresses, but most importantly, from a management and ownership perspective, their cash flow is interrupted.

Remember, even in a disaster and thereafter, if the commercials or underwriter announcements are on the air the cash stream is flowing.

Now that may sound mercenary but it is a fact that we have to deal with. And this fact is the one that will most likely be your best tool in getting management to sign off on the budget you'll need to mitigate the effects of a disaster.

### Plan for Generators

Make an assessment of the power needs at both your studio and transmitter site. With this data, you can determine how large of a generator you will need at each location to keep the station on the air when you lose power.

When you assess the studio needs, you could plan to have only essential equipment on back-up power to lessen the size of a generator you will need. However, the generator that you size for the transmitter site should be adequate to keep your station at full power – in a disaster you don't want to be at reduced power, putting signal over only part of your coverage area.

### Fuel Needs

Part of this planning will also be determining the size of fuel tank you will need. You may recall the problems that occurred after Hurricane Katrina with stations running out of fuel so they couldn't pass vital information to the public.

If I were planning for this contingency, I'd plan for a minimum of two weeks of operation around-the-clock, at full power. Remember, depending upon the disaster and the location of your transmitter site or studio, you might not be able to get fuel in a week or even two.

### The Emergency Management Office

When it comes to back-up power, which is the largest expense a station would have in disaster mitigation, there may be a far less expensive alternative for you.

Radio is considered a "first responder" in a disaster because we can get vital emergency information to the public immediately – there aren't a lot of battery operated HDTVs out there.

If you haven't already, plan now to visit with your City or County Emergency Management Office to see how you fit into their disaster planning.

As part of their disaster plan, they could provide your station with the needed back-up power to stay on the air, because it is a vital communication link they'll need in the times of emergency.

They might be able to provide be a large portable power generator that would brought to the site before a disaster strikes, or grant money may be available to cover all or part of the cost of a permanent installation.

Don't forget to discuss with them the ongoing fuel needs, if a disaster has a long term effect on power.

They may be able to provide your station with the fuel you need to keep powered up, should your normal commercial fuel provider not be able to deliver post disaster.

### Keeping a Signal On-The-Air

Think about how you get your signal to your transmitter site. If you use the Internet, a dedicated ISDN or other wired method you need to plan a contingency to mitigate the effect a disaster may have so you can stay on the air.

Consider the installation of an STL system or microwave to use in an emergency. If your location(s) makes that impossible then you need a "Plan C."



### An Emergency "ON-AIR" Package

Put together a small equipment package that can serve as an emergency studio to broadcast from your transmitter site. This should include a small mixer, a microphone or two, headphones and your programming source. A good laptop or netbook computer with a large hard drive or an external hard drive will do the trick.

As part of your Disaster Plan, this computer or hard drive should be a mirror of the station's on air computer. So set up a plan to have it updated daily just as the on air computer is.

This way, when your programming staff transitions to the back-up system at the transmitter site, they'll have the most current traffic logs, commercials and other information – just like they would at the studio.

### Be Real With the Package

While we've all read about creative uses of smart phones or portable MP3 players for this purpose in a pinch, keep this in mind. During an emergency, using these would become tedious for an air staff that is too busy dealing with the real issues revolving around the disaster to be playing with "toys."

Your staff needs *real* tools that mirror as closely as possible the environment they normally function within – the main studio. This normalcy will help them deal better with what is going on vs having them delve into a totally different way of functioning at the worst possible time.

### Environmental Considerations

You might want to have some sound absorbing panels handy help isolate the "studio" from the noise of the transmitter as much as possible.

Sound deadening foam glued to some 4x8 sheets of plywood, hinged like a book so they stand up unsupported, would work great.

Directional mics, with a tight on-axis pattern, will help keep the background noise down as well.

*How is your station mitigating for disaster. Share your disaster plans with other engineers. Please contact me at: [editorial@radio-guide.com](mailto:editorial@radio-guide.com)*

Flood photo by the National Oceanic and Atmospheric Administration/Department of Commerce. Photographer Lt. Commander Mark Moran, NOAA Corps, NMAO/AOC.



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## The Local Community Radio Act of 2010

by Peter Gutmann

The new “Local Community Radio Act of 2010” had attracted broad support in both the House and Senate, even while causing considerable consternation among much of the broadcasting industry.

The specifics of the new law are significant. If you already are familiar with the details, feel free to skip this next section, but otherwise it’s worth a few moments of your time to review the details.

### Third Adjacent Protection

• The FCC may no longer provide full-power FMs with third-adjacent channel protection from LPFM stations. It must remove its current Rule that specifies third-adjacent channel separation between LPFMs and full-power FMs, translators and boosters.

• LPFMs that have third-adjacent channel short-spacing under the current rules must provide protection equivalent to translators and boosters.

That is, they must cease operation immediately if they cause any interference to transmission or reception of any other authorized station, whether full-power, translator or booster.

• All LPFMs on third-adjacent channels must address interference complaints within the protected contours of all other stations. They are “encouraged” to address all other third-adjacent channel interference complaints as well.

• During its first year of operation, any LPFM on a third-adjacent channel must broadcast periodic announcements alerting listeners of possible interference and instructing them how to submit reports. Upon receipt of such a report, an LPFM must forward it to the FCC.

• The Commission must afford LPFMs on third-adjacent channels the technical flexibility to remediate interference through collocation with other stations on their third-adjacent channels.

• However, in “States with more than 3,000,000 population and a population density greater than 1,000 people per one square mile land area”, (translation: New Jersey) LPFMs must remediate all interference to full-service FM stations – but only within the applicable co-channel minimum separation distances between LPFMs and various classes of full-power FMs, as provided in the current FCC Rules.

### Second Adjacent Protection

• The FCC may waive second-adjacent channel distance separation requirements where an LPFM can demonstrate that it will not interfere with any authorized station. Terrain-sensitive propagation models are to be accepted for such showings.

• Upon receipt of a second-adjacent channel interference complaint, the FCC must notify the LPFM within one day. If an LPFM receiving such a waiver causes any actual interference it must suspend operation.

### Translator and Booster Protection

• Full-power, translator and booster stations using their analog subcarriers for reading services are entitled to full distance separation protection from LPFM stations.

• Although LPFMs, translators and boosters are to remain equal in status (but secondary to all full-power stations and applications), the FCC is to award licenses based on the needs of the local community.

• Finally, within one year, the FCC must submit to Congress an economic study that assesses the impact of LPFM stations on full-service commercial stations.

However, the findings are to have no impact upon authorized LPFM stations, so their sole purpose would seem to be to guide future Congressional policies.

### So, What Does All This Mean?

Presumably, the relaxed spacing restrictions will facilitate the grant of considerable numbers of additional LPFM stations. However, that may take quite some time.

Unlike many other Congressional acts, this one does not directly provide for immediate implementation of the new features. Rather, most provisions merely order the FCC to modify its Rules.


Several provisions of the new law are far too vague to be implemented directly, and will require considerable refinement and specificity before they can be applied to the application process.

### What Exactly is “Community Need”?


For example, consider the requirement that the FCC must award LPFM licenses “based on the needs of the local community.” What does that mean, what “needs” are to be considered, and what procedures are to be used?

(Continued on Page 20)


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by Peter Gutmann

– Continued from Page 18 –

If “needs” are to be construed in a broad sense of “informational requirements,” the Commission will need to figure out how to weigh the adequacy of existing stations’ programming, without running afoul of the First Amendment.

## Using Section 307(b)

If the FCC decides that “needs” are to be assessed solely in terms of existing signal coverage, will this require a full-blown showing under section 307(b) of the Communications Act to compare the attributes of the communities of license proposed by mutually-exclusive applicants?

If so, will the standards used for AM and FM 307(b) battles be applied – including lengthy showings and arguments over whether ostensibly unserved suburban communities are sufficiently independent of nearby well-served cities to merit their own station?

Is the FCC apt to side-step traditional 307(b) showings to base its decisions strictly on signal coverage to underserved populations, as with educational FMs? But, although efficient, how can such a procedure address the needs of “communities,” as Congress has mandated?

## Related Issues

Will this provision automatically favor LPFMs that originate programming over boosters and translators that merely extend the service of existing stations?

Or might there be situations in which “fill-in” facilities might be favored to enable a full-power station to provide emergency information to poor reception areas?

After all, despite their local focus and best intentions, some LPFM stations simply lack the resources to provide meaningful emergency information.

If LPFMs are to be preferred, does this mean that the Commission will open windows for new LPFM applications, which then will take precedence over pending translator and booster applications?

The Prometheus Radio Project, the leading LPFM proponent, has advocated this.

## Rule Making Will Address Issues

Presumably, all of these concerns, and many more, will have to be addressed through rule-making proceedings and appeals that can take years.

And the prospect of a lengthy review process is quite likely, as there is bound to be widespread disappointment with various provisions.

To cite just a single example, aside from the special case of New Jersey, the bill focuses exclusively on second- and third-adjacent channel interference, and provides full power stations with little protection against co-channel or first-adjacent channel LPFM operation, which many engineers predict could occur.

## The Battle Lines Will be Drawn

Although the NAB officially supported the new Act, it has traditionally fought hard against LPFM and many of its members are less than thrilled over the prospect of a flood of new local competition as radio faces the extraordinary challenge of audiences continuing to be siphoned off by the new media.

On the other side, many organizations are apt to urge prompt implementation, as they hail the opportunities that LPFM presents to those increasingly excluded by radio’s growing financial demands and by the shrinking local ownership opportunities resulting from consolidation.

## More Potential Issues

And if all that were not enough, another related problem looms – what will become of the thousands of pending translator applications that have been on hold since the last (2003!) filing window?

Presumably FCC staff has the computer power to determine which of the technical proposals are mutually-exclusive, but it has yet to divide them into groups and proceed to award permits – except for the relative few it found to be singletons.

Among its reasons may be the unmanageable size of daisy chains that could string together up to hundreds of applications that are mutually-exclusive. In addition, Congress requires that all commercial broadcast facilities – even translators and boosters – be awarded by auction. That’s fine for new or major changes in full-power stations, but auctions for translators and boosters hardly seem worth the effort.

The new LPFM policies promise only to add further delay and complication to resolving the translator backlog.

## A Proposed Solution

Shortly before deadline, a group of commercial broadcasters proposed a creative solution to break the logjam: that the Commission grant translator applications that prevailed through either settlement or auction, if accompanied by a showing that spectrum exists for at least one LPFM and one booster station in the same community.

In that way, they reason, the FCC can fulfil its obligation under the new law to “ensure” that licenses will be available for all three co-equal types of facilities. Perhaps at this point all that can be said with full certainty, is that the ultimate outcome of the LPFM matter is uncertain.

*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 pgutmann@wcsr.com*

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Value at Cursor Record: Date/Time :  
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# Safety and Security

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

## Electrical Shock and RF Burns

by Jeff Johnson

Broadcast engineers work in a dangerous environment. We climb. We service high-power, high-voltage equipment and systems. We can get hurt.

Burns inflicted by the environment in which we work may be from electrical current, AC or DC, even lightning, passing directly through the tissues of our body. Non-ionizing radio frequency (RF) energy may induce heating in our bodies causing deep burns.

The author is fortunate to have a sister-in-law, Chris Johnson, who is a Nurse Practitioner having a specialty in Industrial Nursing. Chris wrote the following directed to the readers of *Radio Guide*.

### Occupational Safety and Health

Occupational safety and health are of prime importance in the workplace. It is the worker's responsibility to be aware of the array of exposures that the everyday work environment may have in the settings that the worker finds themselves working in during the course of their varied field endeavors.

Radio engineers find themselves in many settings throughout the country where they might be exposed to different types of burns, such as thermal burns, lightning burns, radio frequency burns, and electrical burns.

This article will explain the types of burns and briefly discuss the treatment of the burns in the field. Keep in mind that all burns are treated essentially the same.

• *Cool the burn, assess the damage done, cover the burned area.*

• *If an electrical burn (including lightning) or radiation type burn is involved, a cardiac assessment (EKG) in a hospital is essential.*

*This will give hospital staff access for a complete work-up to rule out any heart involvement such as irregular rhythms (arrhythmias) or myocardial (heart) tissue damage. Blood work is also drawn at times depending on the extent of the burns.*

*Burns can be minor to life threatening. Any time you suffer from a burn take this seriously and live another day.*

### Electrical Shock and Burn

Electrical shock and electrical burn are essentially the same phenomenon and are caused by contact with alternating or direct current that has a pathway through the body.

*Occupational Health Nursing Guidelines for Primary Clinical Conditions* defines "electrical burn" as:

Tissue destruction caused by intense heat, resulting from the passage of electrical current through the tissues. There may be extensive destruction of underlying tissue along the pathway of the current.

Characteristics: One of the most common complications is ventricular fibrillation. Exit sites may be apparent.

### An Action Policy

Avoid direct contact with affected employee; use a non-conductive/non-metallic object (i.e., dry stick, rope, belt) to remove the source of the electrical current or turn off the current.

Anyone with an electrical burn should be immediately evaluated in an occupational health unit and referred for further medical evaluation."

Further information of interest to broadcast engineers on electrical injury is found in *Pathophysiology, Fourth Edition*, by Carol Mattson Porth, Ph.D.

### AC vs DC

Alternating current (AC) is usually more dangerous than direct current (DC) because it causes violent muscle contractions, preventing release of the electrical source and sometimes resulting in fractures and dislocations.

The pathway that a current takes is of critical importance, because the electrical energy disrupts impulses in excitable tissues. Current flow through the brain may interrupt impulses from respiratory centers in the brain stem, and current flow through the chest may cause fatal cardiac arrhythmias.

Resistance to electrical current varies from the greatest to the least as follows: bone, fat, tendons, skin, muscles, blood, and nerves. The most severe tissue injury usually occurs at the skin sites where current enters and leaves the body. After electricity has penetrated the skin, it passes rapidly through the body along the lines of least resistance – through body fluids and nerves.

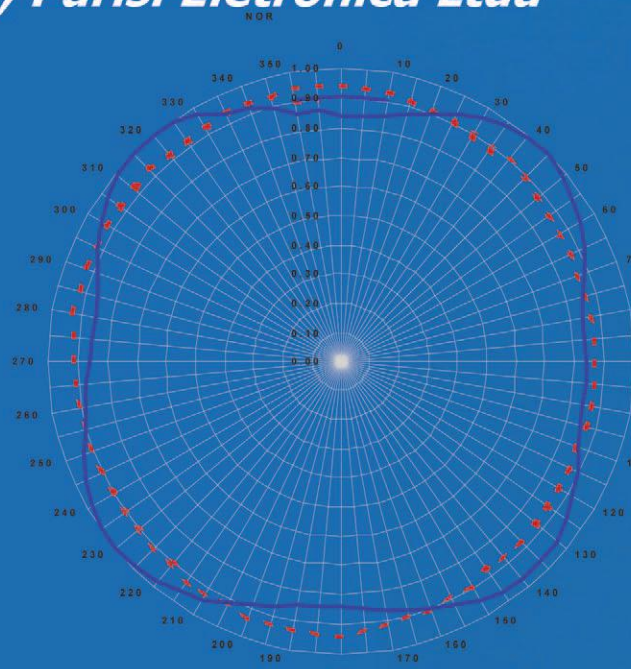
### RF Burns

An RF arc can carbonize flesh, causing a painful and dangerous, bone-deep RF burn that may take months to heal.

(Continued on Page 24)

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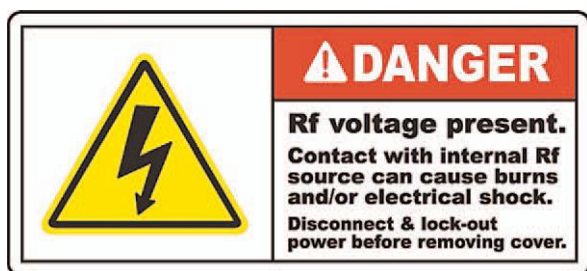
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# Safety and Security

by Jeff Johnson

– Continued from Page 22–



This gruesome fact was recently brought home to broadcast engineer Paul Walker. In his words:

*"I was setting up for our first of five live remotes today. I saw that the antenna was up and ready to go, so I thought it was connected to the Marti. I turned the Marti transmitter on. I reached my hand around the back of the unit to check something out and my pinky brushed against the part where the antenna cable was supposed to be connected (but apparently wasn't) and got one heck of an RF burn."*

*He continued, "Kinda felt like I held my finger on a stove burner way too long! Thirty Watts isn't that much power, but it's 30 Watts too much for me to come in contact with. Luckily, I had some snow in the parking lot at the grocery store we were at, and I held some of that to my finger while my roomie ran across the street to CVS and got some burn cream."*

*I applied some burn cream about every 20 minutes ... finger feels fine now ... just have a little mark where I got the burn. I've learned my lesson and will double-check the thing before we use it next time."*

Another case of burns from a surprising source was found in an OSHA report on San Francisco longshorem.

*The San Francisco Regional Office has brought to our attention a potentially serious hazard involving burns on longshorem caused by radio frequency radiation. Two hazards were noted at this location. The burns were apparently caused by spark discharges from crane cables. Also present was an induced-current grasping hazard.*

*The longshorem were working on a pier that is located in close proximity to several AM radio station transmitting towers. The radio frequency radiation emanating from the transmitters induced electric currents in the longshoring operation cranes' cables, due to the cables acting as antenna receptors to the radiation.*

*Because of this induced current and an open circuit voltage from cable end to ground measured at approximately 300 volts by the Health Response Team, spark discharges occurred just before and after grasping the cable. These discharges have resulted in burns.*

Professional advice on RF burns is as follows: These burns are usually deep, penetrating, third-degree burns. To heal properly, RF burns must heal from the inside toward the skin's surface. Do not take RF burns lightly. To prevent infection, you must give proper attention to all RF burns, including the small pinhole burns.

Guidelines gives this advice for any thermal burn:

- Cool burned area with tap water. Do not apply ice.
- Do not remove adhering clothing.
- Cover burned area with sterile clean material.
- Do not break blisters or apply topical anesthetics or ointments.
- Prevent shock, and transport to a hospital.

Jeff Johnson can be reached at: [jeff@rfproof.com](mailto:jeff@rfproof.com)

**Richard Strickland, of RF Safety Solutions, has made us aware of specific RF safety monitor issues discussed in the Nov/Dec-2010 issue of Radio Guide. Richard writes:**

**Dear Radio Guide:**

When you purchase safety equipment, it is important to consider its specifications with regard to your requirements. When you buy a safety harness, you need to make sure that it is strong enough to hold you. should you fall, and that the attachment mechanism is reliable. An inexpensive safety harness that isn't rated to support your weight is hardly a bargain.

The same logic should be applied when purchasing an RF personal monitor. While some features may be nice, one specification is critical – accuracy. A monitor that is too sensitive, and overestimates the RF field level, can cost you money because your workers may stop work when there really isn't a problem. A monitor that underestimates the RF field level can lead to safety, regulatory, and liability issues.

The Nardalert XT has been the most popular RF personal monitor for several years. It has some nice features, but most importantly, it is accurate. The guaranteed frequency response from 100 kHz to 100 MHz is +3/-1 dB. This means that the monitor might overestimate the magnitude of the RF field by as much as a factor of two, but it will underestimate the field level by no more than about 20 percent.

In contrast, the SafeOne RF personal monitor has an "absolute accuracy" of +/- 6 dB from 400 to 2,500 MHz. The frequency response outside this band is not specified. A monitor with these specifications might overestimate the magnitude of the RF field by as much as four to one, and it might underestimate the field level by as much as four to one within its rated frequency range. That is a very wide tolerance! And for broadcasters, what is the accuracy at FM radio and television frequencies? One might assume that it would be less accurate outside its rated frequency range because those frequencies are not included in the specifications. – **Richard Strickland**

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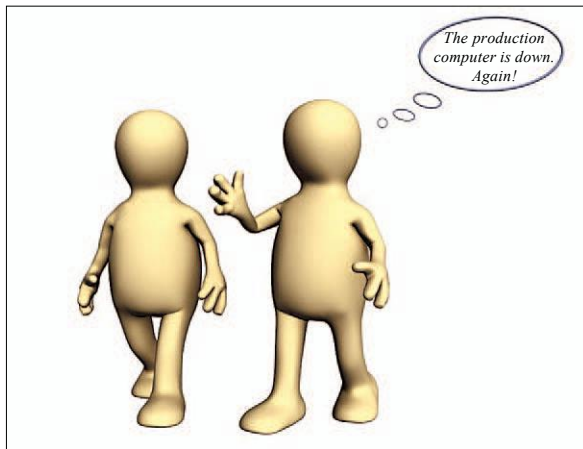
# Operations Guide

## Maintenance Tracking Software

by Chris Tarr

Problems happen on a daily basis. It is said that a piece of gear starts its march to failure the moment you put it into service. It's important to have a system for the reporting and management of problems that crop up in your facility.

The systems I've seen in the past, range from the proverbial "conversation in the hallway" all the way to a full, automated trouble ticket system.



The system you use should depend on many factors, such as the size of your organization, how many people are in the technical department, and ease of use for the staff. A consideration for any system is accountability.

The biggest complaint I get from GM's and air staff both, is that they often feel that the Engineer is not responsive, or that they have no clue what the Engineer, or IT folks, do all day. A good system addresses both those concerns.

### The Conversations in the Hall

The biggest problem with the "conversation in the hallway" system is that there's no documentation. It's easy for the person asked to forget, and there's nothing left to document the issue or the resolution. You can imagine the pitfalls involved with this. Because of those pitfalls, I recommend at the very least you have some sort of form in a centrally located area where people can report problems.

### Support Email

My suggestion for small shops is to create a "support" email address that your staff can use. Set it up as a distribution list, copying your GM or Operations Manager.

When people send an email to that address, use "reply all" in order to keep everyone up to speed on the status of the problem.

Regardless of repair status, everything from, "I've received your message and I'll be working on it soon," to "I'm working on it now," all the way to, "Everything's good to go, let me know if you have any more issues" – will make sure that everyone is in the loop on what's going on.

Everyone involved will certainly appreciate the communication. Be sure to save the email – it becomes a great reference tool for tracking the history of gear and other problems, which makes a great troubleshooting tool, helping to discover patterns and trends.

### Web Forms

If you're good with web design, you could also develop a web form that users could access, that allows them to report problems without email. It's a good way to go if there's a particular way you like to see the data come in, or if you have a tracking system that can import data.

Microsoft's Front Page for Windows and Rapid Weaver for Mac are two examples of WYSIWYG web design tools that allow you to create forms for the web.

The systems work well if you have one person doing all the maintenance and repair, and you have a relatively small staff.

### Systems for Bigger Operations

What happens, however, when you have several techs and many stations over a few locations? Things become much more difficult to manage and logging and documentation become a whole lot more important.

At this point, you're probably looking at some sort of trouble ticket system. Good trouble ticket systems help by providing the following features:

- A single contact point for end-users.
  - Ability to assign a tech to a specific report.
  - Ability to keep interested parties informed on the disposition of their ticket at any time.
  - Ability to add notes and additional information.
  - Ability to build a searchable "knowledge base" of previously issued tickets.
- (Continued on Page 28)

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### XL2

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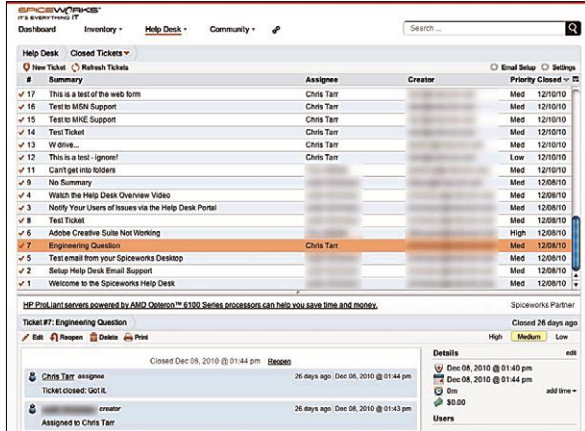


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by Chris Tarr

– Continued from Page 26 –

With a system like this, the work flow is fairly automated and there is plenty of data generated so that it's easy to document what your department is working on, and where your organization's problems lie.



Spice Works administration screen.

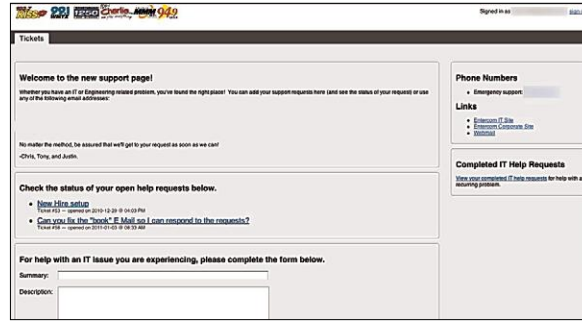
## How They Work

The systems generally work this way: A user sends a ticket to a "support" address. This email generates a "ticket" or work order and sends a message to the techs.

The ticket can be assigned to a tech by a manager, or claimed by a tech. The user who reported the problem then gets an email.

The email tells them the ticket has been assigned.

It also informs them which tech is assigned to the ticket. At this point in the process, the assigned tech performs the work needed.



Chris' user portal for trouble reports.

There's a place in the ticketing system for the tech to document what the problem was, and what he or she did to fix it.

With the work complete, the tech can write a note to the user and close the ticket. All of that information is retained, is searchable, and can be used to generate reports.

## Free and Not So Free Systems

There are many different systems available, ranging from free to very expensive.

My personal website favorite is Spice Works ([www.spiceworks.com](http://www.spiceworks.com)). Spice Works is ad supported – you'll find the ads in the administration console – but it is fully featured and includes some great IT tools.

Another completely free and open-source system is Trouble Ticket Express. The Trouble Ticket Express software has all the basics: ticket creation and assignment, plus the ability to track ([www.troubleticketexpress.com](http://www.troubleticketexpress.com)).

There may be others but these work very well.

In the pay category there are several choices as well. There's Manage Engine with varying prices, ([www.manageengine.com](http://www.manageengine.com)) Support Center at \$199 ([www.qualityunit.com/supportcenter](http://www.qualityunit.com/supportcenter)) and Live Help Now ([www.livehelpnow.net/products/ticket\\_system/Subscription](http://www.livehelpnow.net/products/ticket_system/Subscription)) to name a few. All of these systems cover the basics as well.

## Just Use a System

Really, it's not about what system you use, it's about just using a system. In my shop, we use the Spice Works ticket system in conjunction with a phone tree with an 800 number – we have stations in two areas, this makes the call free for both.

It doesn't matter if the user calls or emails, they're assured that their question or problem will get routed to the person best equipped to handle it.

They know too, that there will be plenty of documentation and accountability in the process, and anyone can check on the status at any time, and can escalate the status of the problem if they feel the need.

I'm able to assess the performance of my team and have the data to measure the effectiveness of our systems. Additionally, my managers can see what we've been up to, and it's a great way to end the, "I told you about this a month ago!" type of disputes that always seem to crop up. Since everything is documented and saved, it's easy enough to see if that's truly the case.

I'm not usually one for New Years resolutions, but now might be a great time to resolve to improve communication between the technical department and the rest of the staff. In the end, it will make your life a whole lot easier!

*Chris Tarr CBRE, CBNT, DRB is the Director of Engineering and IT for Entercom's radio stations in Milwaukee and Madison, WI*



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# Chief Engineer

## Know When To Say No

by Steve Callahan

We radio engineers are busier than ever, trying to keep multi-station clusters, with tower sites in all different directions, on the air. We all have more complex studios that ever before and it seems with smaller and less experienced air staffs that need instruction and constant guidance.

We are also trying to do a lot more with a lot less budget than just a few years ago. Sometimes we just have to say "No!"

### It's in Our DNA

We are radio engineers because we like to make things work. Nothing is more satisfying than to hit the "plate on" button on a dead transmitter and have it spring back to life. As kids, we took things apart and put them back together again.

It's in our DNA to be able to rationally work through a technical problem, come up with a resolution plan, execute that plan, and have the outcome be successful.

### Fast Forward to 2011

You have to budget your time carefully and be constantly ready to revise your list of priorities based on the next unanticipated emergency.

I start off each week with a very long list of things-to-do, which are subject to constant change throughout the week.

Some are legitimate problems that need immediate attention and some are not. However, as radio engineers, we frequently take on any project that is dropped in our laps.

I'll admit that years ago I once was asked to go to the general manager's house to hook up his personal stereo. If I hadn't helped him, his stereo would still be sitting in the box today. You want to be a team player and help the boss, but your time is a very perishable commodity.

### Protecting Your Time

I hear stories all the time about station engineers who are pressed into service painting the studio, or moving surplus office furniture to the transmitter site.

All too often, we allow others to hijack our time and resources and we have to later adapt. If you find yourself being hijacked constantly, you have to know when to say "No!"

### Not the Plumber

When I was the Chief Engineer at a station in Boston, I got a frantic call from the sales manager that there was a flood in the sales area. I immediately ran up the hall and what I found was a wave of water coming from a stopped-up toilet in the ladies bathroom.

No one else could figure out how to work the moving parts in a plunger so I solved the problem.

I could have just said no at the time, but I first resolved the problem and then suggested that we have a plumber's number handy for the next time it occurred.

### Not the Mover

I once worked for a station that was consolidating from two floors in a downtown office building to one floor. The station owner didn't ask but demanded that the entire staff meet on a Saturday to move office furniture down one floor, and to store anything not immediately needed at the AM transmitter site.

This was so wrong for so many reasons. Aside from hijacking the entire staff's Saturday, someone could have been seriously hurt lifting file cabinets and desks.

A better way of handling this would have been to pay a moving company that does this type of work everyday, and use it as an introduction for the sales department to get a possible advertising contract from the moving company in the future.

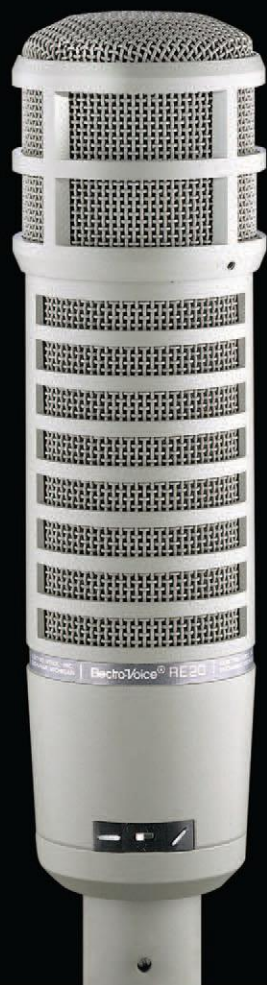
### Your Time Has Value

Take a look at what your IT consultant bills per hour or what it costs to have a mechanic work on your car. Both are probably billing a very healthy per-hour rate.

Most electricians or plumbers won't walk in the door for less than \$80 to \$100, to cover their first hour of time and overhead.


I have a friend who paid \$150 for a service call on his washing machine. This was the minimum charge for a tech to drive to the home, 15 miles one way, evaluate the problem and perform the repair (if it took less than an hour to fix the problem). If not, it was an additional \$75 per hour after the first hour. The tech had the part in his truck and was on site for just 20 minutes.

(Continued on Page 32)



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# Chief Engineer

by Steve Callahan

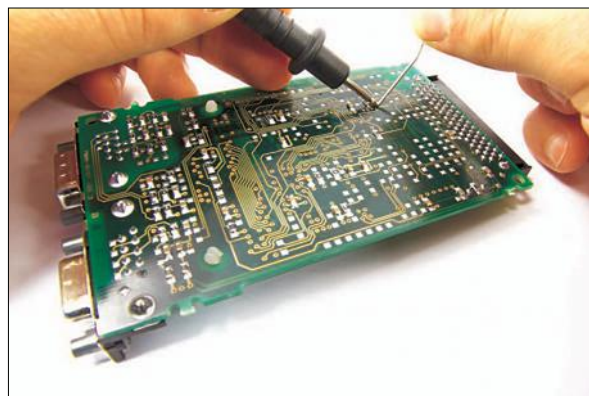
– Continued from Page 30 –

## So What Are Your Skills Worth?

If you do contract work, are you billing at the market rate? Are you getting paid for your experience and knowledge? How about for your travel and tools?

I once did contract work for a station owner who paid me with a lunch he traded at a local diner, and a traded tank of gas. However, the station owner drove a new Mercedes.

It took me several months to realize that it would not get any better at this particular station and I knew when to say no.



## Don't Work Cheap

A fellow contract engineer told me recently that he works so cheaply because if he didn't, the station owner will just find someone else to do the work. This is the mind set of far too many contract engineers.

I had to explain to this misguided individual that good, reliable contract engineers don't have to accept a low rate for contract work because there aren't as many of us available these days to do the work.

Ask around at your next SBE meeting and see what other contract engineers are getting paid in your area, and then adjust your rates accordingly and hold your ground.

Don't be afraid to say "NO!" to that station manager or owner who doesn't respect your time and talent. Often they will threaten to get someone else for less, but this is sometimes just a tactic to drive your prices down. Whatever you do, try not to fall into their trap.

Use references from other stations to support your pricing structure and the value of the quality work you do.

## Be Proactive

Too often we are the "guy with the tools" who sits in that room with all the machines.

It's been preached before, but you have to demonstrate that you are a part of the station's management team and that your knowledge, experience and talent are a part of your station's success.

Have you ever taken your general manager to your transmitter sites? My personal policy is to maintain the appearance of my sites so that an owner could visit unannounced at anytime and be proud of the way it looked. It doesn't take much to keep the inside of a transmitter building clean and looking like a professional work space.

## Make the Station Money

When was the last time you offered to generate income for your station? Station owners and managers rarely hear those words from their engineer's lips!

Do you have a possibility to rent or lease your surplus tower space? How about leasing your FM SCA?

Is there another AM station in your market that could benefit from duplexing with your station? Talk with the GM about these – it will show that you are thinking like they do.

## Don't Speak a Foreign Language

We radio engineers speak a strange and foreign language that only we understand. Try not to speak engineerese when you are communicating with other staff members. Learn *their* lingo so you can better understand what they are trying to do with the limited resources they have.

Whether it's the on-air staff or the sales staff, if you express interest and really listen to what they are doing and their problems, then you will get a much clearer view of what they really need you to help them with.

## Time to Walk Away

Last year, I had the opportunity to visit a nearby AM station that was interested in having me do some contract work for them.

I spent some time in the studios watching the station employees struggle with broken and ancient equipment. I took the time to examine their Public File because I've found that the maintenance of the Public File is a clear barometer of how serious a licensee is of properly operating its radio station. I spent some time at the station's tower site with the local manager and took copious notes.

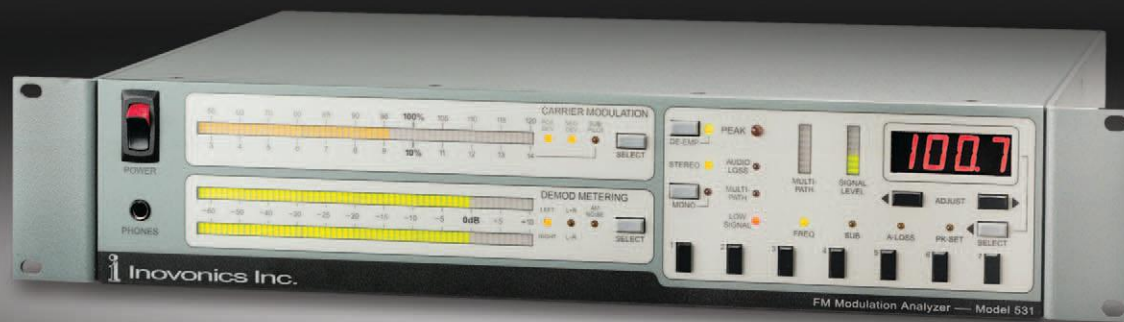
When I spoke to a representative of the licensee on the phone, I was not surprised when he immediately said that his station was a rundown junkyard because of the "economy."

That signaled loud and clear to me that he had no respect for his employees, and his few listeners, and that I would have to fight for every dollar needed to bring his station into the 21st century – and to even get a paycheck for my efforts. I terminated the telephone conversation, and just said "No!"

*Steve Callahan is the Director of Engineering for Rhode Island Public Radio. You can contact Steve by email: [scallahan@wrni.org](mailto:scallahan@wrni.org)*

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# Field Guide

## RF Monitoring

### Coaxial Dynamics Watt Meters

by Steve Floyd

The High Frequency Active Auroral Research Program, aka "HAARP," is a world class U.S. Government-funded ionospheric research facility located in Alaska. The primary goal of the HAARP program is the study of the properties and behavior of the earth's ionosphere, with particular emphasis on its understanding and usage, to enhance communications and surveillance systems for both civilian and defense purposes.

This is arguably one of the largest, highest powered, and most unique radio broadcasting systems in the world. The transmitter system consists of an HF antenna array covering 42 acres and utilizing 180 individual antennas. Each is connected to its own independently tuned, 20 kW HF transmitter; the two 10 kW amplifiers of each transmitter are independently routed for a combined total array RF input power of 3.6 Megawatts!

As you may have surmised, this is not your typical transmitter installation. In fact, due to the scientific application of the facility, this transmitter system is actually considered as a piece of precision test equipment requiring high precision calibrations well beyond the norms of the broadcasting world. It is here that Coaxial Dynamics partnered with us to achieve a precision RF output power calibration technique unheard of in the broadcast industry.

#### Need for Precision RF Monitoring

As the final expansion of the HAARP was being built in 2006, I received a firm mandate from our scientific users; "The programmable RF output power accuracy for each of the 360 tuned amplifiers must exceed the system specification and it must achieve +/- 2.5% accuracy over the entire allocated frequency range."

Yikes! How would I do this with the standard RF Power meter tools available?

After repeated attempts to get the "best known" name in RF power measurement involved in this precision project, I was told that standard product was all they could offer. With no further ideas or assistance offered. I was left to fend for myself.

It was then that I contacted Coaxial Dynamics and asked for technical assistance and advice. I was pleasantly surprised to receive the very positive and helpful response that the full engineering resources at Coaxial Dynamics immediately provided to me.

After many excellent engineering discussions, it was clear that Coaxial Dynamics had an engineering capability with the real experts who place the customer's needs ahead of all else.

We decided to use the standard broadcast power meter line with the single element 1-5/8 EIA line section couplers - however, with a very important twist.

A high precision calibration would be performed by Coaxial Dynamics over the HAARP operating frequency range of 2.8 to 10 MHz. and each of the defined "sets" of power meter components would stay together as a calibrated set (meter, line section, element).



The Coaxial Dynamics watt meter in action.

In addition, Coaxial Dynamics provided a calibration error curve for each component set, showing the small residual error-verses-frequency values for us to further use in our power calibration procedure.

We ordered six Wattmeter sets to be used in our portable test systems for the power calibration of the 360, 10 kW transmitter amplifiers. This technique worked great and the desired accuracy was achieved.

#### A Minor Glitch

During the calibration process, we suspected some calibration drifts and a component set was sent back to Coaxial Dynamics for inspection. Sure enough, the calibration had moved, however this was due to our maintenance staff placing too much test cable torque on the line section couplers, slightly damaging the internal coupler geometry.

Again, Coaxial Dynamics engineer Dave Kaltenborn analyzed the situation, found a solution, and instructed us to mount the coupler to the test load in a way that would eliminate the mechanical stress on the line section.

We took Dave's expert advice and the power calibrations have remained stable for years. We do return the Wattmeter sets back to Coaxial Dynamics for calibration on a schedule to maintain our excellent precision power calibration. The HAARP facility now uses Coaxial Dynamics RF Power measurement equipment for all of our RF Power measurement needs. We have found Coaxial Dynamics products to be very rugged and 100% reliable in our extreme Alaska environment where every environmental extreme is encountered including temperature variations of plus 90 degrees Fahrenheit to minus 65 Fahrenheit!

I would definitely point out that one Coaxial Dynamics Power Meter is worth way more than two in the bush!

Steve Floyd is the Chief RF Engineer for the HAARP Research Station. For more information on Coaxial Dynamics' products please visit: [www.coaxial.com](http://www.coaxial.com) or call 800-262-9425.

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# Field Guide — Studio Furniture Systems

## RAM Systems LLC

Like many companies, RAM Systems, based its beginnings with its founder, working for another company. In this case, the other company was McCurdy Radio Industries Limited, based in Toronto, Ontario, Canada.

Ron Mitchell started his career with McCurdy Radio in 1967. He began working in the test department; testing circuit boards that were to be installed in cages connected to hand wired mixers. In those days, there was no such thing as modular mixers. Great care had to be taken to avoid cold solder joints and ground loops. In a few years Ron moved from test to engineering where he was able to design systems for both small and large broadcast facilities in Canada and the United States.

While working in the engineering department at McCurdy Radio, Ron became aware of all the challenges that faced engineering departments when designing a broadcast facility from microphone to antenna. He worked with many engineers to design systems to meet those challenges. That resulted in a few product lines of standard broadcast packages. Although these standard packages worked for many facilities, it became evident that in larger facilities it was necessary to design and build much more custom systems. That led Ron to move into sales.

Ron was given responsibility of all U.S. sales. In a small office in Toronto he worked with both small and large broadcast groups, designing system flow diagrams and furniture layouts. After a contract was signed, he would follow the project through the shop to make sure everything sold was incorporated into the final product. This went on for a few years.

In 1973, Ron was transferred to Chicago to start a new operation for McCurdy Radio. There he continued to sell and manufacture broadcast systems. In 1983 McCurdy Radio was sold, and Ron founded RAM Systems.



**WYLL AM 1160 Studio**

RAM Systems was fortunate to begin operations with the ability to continue selling product for the new owners of McCurdy Radio. Along with McCurdy's support, RAM was able to partner with many other broadcast equipment manufacturers. This provided cash flow to allow purchases of hardware to facilitate the building of large systems.

RAM Systems began to grow, and in 1988 RAM added a mill shop to facilitate the manufacturing of custom furniture. The mill shop allowed RAM to better control delivery dates

and facilitate changes in design at a moment's notice. As projects flowed through the shop and technology advanced, RAM personnel began to see there were opportunities to design and build products to enhance the integration process. RAM SYSTEMS began to design and manufacture microphone accessories, monitor mounts, headphone controllers and custom computers.



**WYLL Corian Workspace with Embedded LED Strips**

In 2001, RAM SYSTEMS was approached by Motorola to build test bays and RF trays for their overseas operations. Since then, RAM has manufactured and sold Motorola assemblies to Agilent, Rohde & Schwarz, Microdian and Motorola.

Studio design, pre-wired systems, on-site installations, custom furniture and equipment sales are still the core of RAM's business.

Shown in the photos is a custom, solid surface studio table with illuminated LED's imbedded in the Corian edging. Frank McCoy, at Salem Communications in Chicago (WYLL AM 1160) had designed this studio and asked RAM Systems to build it. — Radio Guide —

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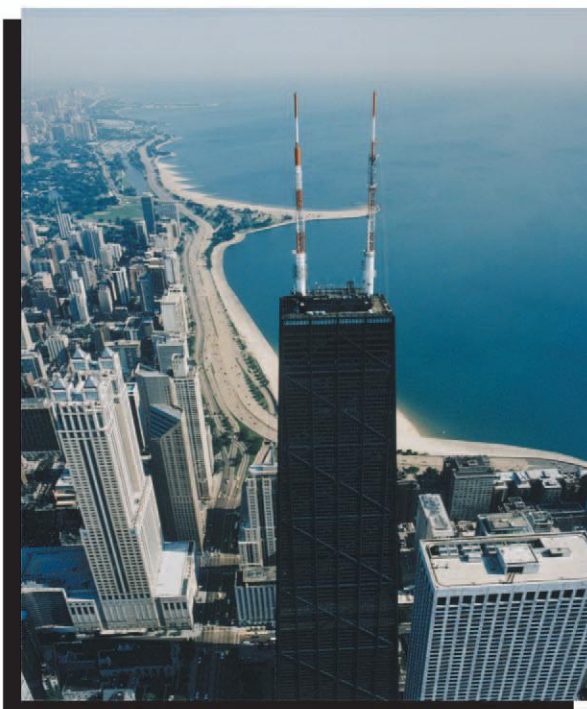
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# Practical Engineering

## Who Builds the Best Promo P.A. Ever?

### You Do! - Part 2

by Mike Callaghan

In the last issue, we went over mounting the power supply, amp, and the radio head on the rack shelf. Your homework was to find a pair of patch bay jacks to use for speaker connectors. Today we'll hook everything up and put the mixer and the LED panel in place.

#### Front Panel Connections

The two XLR connectors and the LEDs are mounted on the blank half panel that was provided with the mixer. The LEDs simply push into grommets; only the red LED in the center is polarized.

The long lead of the red LED goes to +12V through the 150 Ohm resistor. The green LEDs go across the amp outputs through 220 Ohm resistors. Use the 6 lead, pre-made cable for this connection.

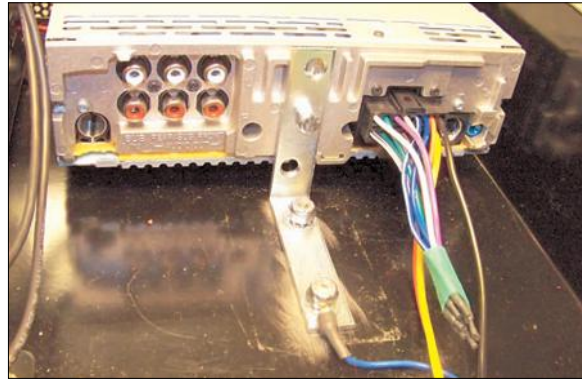
You can use two of these cables in series so there is plenty of slack in the wiring. To connect the cables to the LEDs, clip the resistor leads to 1/2" and then splice one end to an LED lead. Slip on 2 inches of shrink tubing before splicing the cables to the other end, sliding it down to cover the resistor and both splices and then shrink it in place.

The other end of the cable goes to the power amp output and power connections. Remember *all four* of the speaker leads must stay separate and isolated.

Note that you may have to put a jumper between +12 on the amp and an "enable" terminal to make it turn on.

#### Prepping the Radio

On the rear of the radio, there's a multi-conductor plug to connect the power and speakers. You will use three leads from this plug: +12V "ignition" lead, the +12V "Iways on" lead, and the ground.



Rear of the radio showing the finished harness. Note the ground and two 12V + wires are not cut.

Cut the speaker leads and other unused leads to about 4 inches. Slide a piece of small shrink tubing over each end so the end is centered, then shrink the tubing to prevent any short from occurring. Finally, shrink on a larger piece of tubing to hold all the unused leads together and tie wrap that to the leads that are used.

#### Hooking Up Radio Power

Now take the +12V "ignition" lead, the +12V "always on" lead, and the ground. These go to the 12V distribution block. The two +12 Volt leads connect to the (+) block and the ground goes to the (-) block.

Daisy-chain the terminals on the 12 Volt block so there's three positive and three negative connections. Tie one of the negative terminals to the rear screw on the angle bracket at the rear of the radio. This serves as a ground.

#### Connecting the XLRs

Make up two short mike cable jumpers to tie the front panel mike jacks to the XLR's on the back of the mixer.

Follow the table [found in on-line RG] for the connections between the amp, speakers, and the LED panel.

The rear-panel XLR is paralleled to both the L&R inputs on mixer channel #2. The radio preamp outputs go to channel #1. Channel #3 is reserved for the wireless mike.

#### Connecting the Amp

Use the red and black number 10 wire to connect the amp power block to the 12V block terminals 1 and 2. This is also where the power supply connects. The radio goes to terminals 3 and 4, while 5 and 6 are reserved for the wireless mike receiver.

#### The Rear Panel

Use four fender washers and the two telco "mushrooms" to form the cable wrap-arounds for the power cord. The fender washers reinforce the thin panel so it won't bend.

Get out the pair of patch bay jacks you acquired. These mount on the rear perforated panel, and connect to the amplifier with the four lead, pre-made cable.

(Continued on Page 40)



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# Practical Engineering

by Mike Callaghan

– Continued from Page 38 –

## Speaker Jack Mounting

Using a piece of plexiglass, bakelite, or some other non-conductive, panel material to isolate the jacks from each other and the panel.

When placing the jacks, insure that their back end doesn't hit the rack shelf when this all goes together, and the jacks are far enough apart that using oversize speaker plugs won't short them together.

The amp outputs connect to the jack frame and to the tip contact. Use shrink tubing for these, and remember to follow the phasing.



The antenna mounted on the rear panel.

## The Antenna

The auto antenna takes a one inch hole towards the right end of the rear panel.

When drilling this, remember the panel goes on the rear of the PA with the recess facing inward. Leave room for the rubber clamps that carry the auto antenna.

Make up a chart showing the different interconnect colors you used in the pre-made cables for each connection. This will facilitate working on the P.A. later and make cabling consistent if you build more units.



The rear panel assembled.

When you're ready to slide the parts into the SKB case, place the mixer/LED assembly on top of the rack shelf/radio panel combination. Connect the LED cable, and then slide them both into the case.

Lift the case up on its back, line up the panels, and then secure the rack screws. Put the case back down, turn it around to face the back, and plug the AC and speaker cables together. Reach in and plug the IFB cables from the XLR connector and the AC cord into the back of the mixer, and then plug in the auto antenna. Finally, fasten the back panel in place with two rack screws.

## Wireless Mic

If you use a wireless mike, chances are it came with a 12 VDC wall wart. Instead of using that, it gets power from the 12 V distribution block. You can either make up a new power cable or cut off the one supplied with the mike. Slip red shrink tubing over the positive lead.

The receiver can be secured a number of ways. (I used a small aluminum shelf fastened to the 12 Volt block mounting screws.) Turn the volume up all the way and set the squelch before mounting it.

The antenna gets extended toward the rear of the PA. My receiver had a 1/4" phone jack output. The matching plugs went to both channels of mixer input #5. The mike itself travels in a zip-up canvas pouch under the front cover of the SKB case, along with spare batteries, the remote control for the radio and a USB flash drive, if you use that. The pouch storage goes at the end opposite the radio.



The completed system.

## Set-Up is Easy

Unfasten the rear cover, unwind the power cord, and plug it in. Slip out the antenna and screw it onto the chrome ball. Plug in the speakers. Turn the PA system around and undo the front cover.

Turn on the radio and play whatever you'd like. Finally, when the crowd's gathered, take the wireless mike out of the pouch and turn it on.

## More Available On-Line

More photos, Mike's diagrams and trouble shooting tips are all on line in *Radio Guide's* "Digital Edition." Check it out at [www.radio-guide.com](http://www.radio-guide.com)

Mike Callaghan is The Chief Engineer, KIIS-FM, Los Angeles

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# Small Market News

## Not So Traditional Revenue – Part 1

By Roger Paskvan

*As traditional advertising dollars become scarcer for radio, especially in smaller markets, a lot of stations are turning to non-traditional ways to generate additional revenue. Many are turning to the Internet using their web site as a revenue source. This two-part series will discuss some inexpensive and creative ways to do this and expand to this new media.*

### Non Traditional Revenue

Non-Traditional Revenue (NTR) has been one of the main buzzwords in the broadcast world for the past ten years. Although a lot of focus has been put on it, the concept and several ways to generate NTR at radio stations have been around nearly as long as commercialized radio.

By definition, NTR is any means by which a radio station brings in revenue through other than on-air commercial or underwriter sales. Until about ten years ago, most Non Traditional Revenue generation revolved around events and promotions.

### The Changing Landscape

With the advent of widespread Internet usage and other technological advances, several new avenues have opened. Now is the time for small market radio stations to capitalize on this new revenue stream.

Businesses are moving toward the Internet and other new media for their marketing needs. This move is forcing traditional media to rethink its business models.

Instant response, unlimited access, and a global perspective make it hard for the small station to compete.

### New Media

The advent of this “New Media” has been both a blessing and a curse for the traditional forms of media, including radio. Yet, the Internet’s potential in bringing cash generating opportunities to radio can’t be ignored, even though it is a double edged sword.

The relatively low costs make it easy for small businesses, the life blood of small market stations, to do a large portion of their marketing without involving other traditional media outlets like radio. Plus, the Internet alone provides competition. Internet only radio stations stream audio, which competes for listeners.

### New Revenue

In addition to giving your station an audio web presence by streaming programming, a radio station’s website can create a number of non-traditional revenue opportunities.

Even non-commercial stations can offer advertising for supporters, by inserting actual commercials in their Internet stream, while underwriter announcements are “on the air.”

Banner ads can generate income, as can sponsored community information such as school closings, news information, extensive weather information and other items of interest that you don’t have time for on the air. You can package these on your site and sell advertisers sponsorships.

### Take A Step Into the Present and Future

But, even with the potential of additional revenue from a web site, there are a lot of small market stations who still don’t have a web presents.

Many feel that developing a website for a small market radio station isn’t an inefficient use of time and money. This is partly due to the cost of developing and maintaining a functional site, but these services have become increasingly inexpensive and sometimes can even be traded out for airtime.

The value of a station’s website, if used correctly, can far offset any development or maintenance costs of the site.

### Ramping Up a Site

Let’s tackle the problem of developing a website for a typical small market radio station. I am assuming that not every engineer or manager knows how to develop a web page, so here is a small cookbook to get the ball rolling.

First, some background. A web page is simply a well put-together, functional page that contains the artwork and text of the originator.

Someone has to utilize a program to generate the code for your web page or you must hire this done by an outside source for a fee. After the web page is designed, it must be hosted on a computer (server) designed to be accessed via the Internet. All the information for a website is sitting on that server and people can access the server to see your web page.

While hosting your own page may seem more cost effective, using a company that specializes in web hosting has several advantages including access to pre-designed web templates, back-up systems and expert technicians on staff to ensure your site is available 24/7/365.

In my next installment we’ll delve deeper into the step-by-step processes to get your web site up and running, to give your station the web presence that you need to have to remain competitive and for your station to start generating additional revenue even in the smallest of markets.

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

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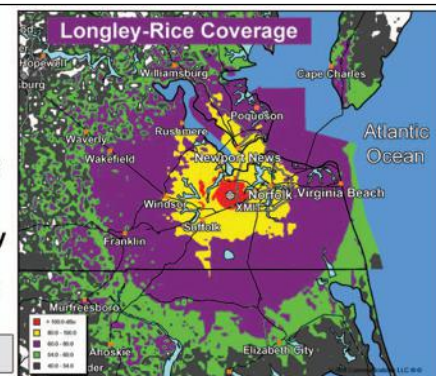
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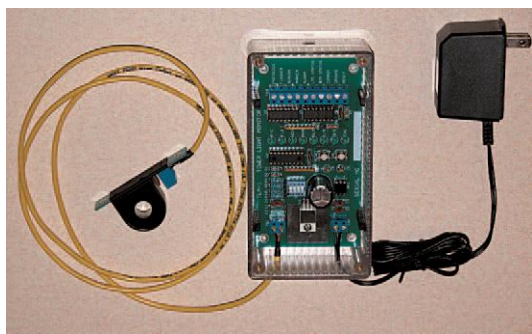


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The question often comes up: Just what is **RF Specialties**, and what do they do? With RF as part of their name, it is a good question. Customers in the broadcasting industry already know what RF is, but they sometimes think that all they sell are transmitters, antennas, and associated equipment. Some non-broadcast inquirers have no clue, one way or the other. Those with a penchant for the environmental movement think that they must be the cause for “global warming.”



RF Specialties group photo. Founders, John Schneider and Don Jones are in the first row at the left.

The real answer is that, although their name might imply that RF products are their sole interest, **RF Specialties Group** represents a broad spectrum of broadcast related products. Transmitters, antennas, microwave systems, etc., are certainly a significant portion of their wares, but they also sell all manner of studio equipment, such as analog and digital consoles, amplifiers, microphones, speakers, and all the infrastructure items such as racks and studio furniture – plus all the mundane items such as connectors, cable, and the tools to put it all together.

It all started back in 1980, when two former McMartin sales engineers, John Schneider and Don Jones, formed their own broadcast equipment companies. Don’s company was Broadcast Marketing Service and John’s company was Northwest Broadcast Systems. In 1981, John and Don met to discuss ideas for expanding their customer base and product lines. The meeting resulted in a cooperative arrangement between their two companies, called the **RF Specialties Group**, for which they designed and registered a trademark, the familiar red “bullseye.” (You can imagine an antenna in the middle of the smaller circle, the concentric circles representing the emanating radio waves.)

As the “Group” developed, it was decided to expand, to include other independent sales engineers, such as Bill Turney, another alumni from McMartin Industries. Further additions included Tom Monahan, Chris Kreger, and the late Sam Lane.

Each company was designated by the name of the state where the company was based. At present, the roster includes the following companies: RF Specialties of Washington, of California, of Texas, of Missouri, of Pennsylvania, and of Georgia. The Group took on an international identity in 2004 with the addition of **RF Specialties of Asia**, owned by Ed Edmiston and based in The Philippines.

The **RF Specialties Group** is not a franchise, as some might think, but is a “Trade Association,” consisting of seven independently owned and operated companies. Six of these companies are located in the U.S. with one located in Manila, The Philippines.

While some sales organizations hire order-takers, the **RF Specialties Group** has always looked for people with solid backgrounds in the broadcasting industry. Hands-on experience in studio operations, engineering, production and management are great value-added resources which they take very seriously. A quick count of the combined years of broadcast experience, within the RF Specialties sales force, totals somewhere over 400 years.

A couple of our former principals, Bill Turney and Bill Hoisington, (RF Specialties of Florida), and current principal, Dan Sessler, have been radio stations owners. Most have been radio and TV chief engineers and announcers, and several have been sales executives of major manufacturing companies, such as RCA, Harris, McMartin, Belar, World Tower, SWR, and Moviola.

One of their newer Group members, Steve Moreen (RF Specialties of California), besides being a major market TV chief engineer, was formerly co-owner of a large satellite uplinking company in the San Francisco area, and he was the recipient of an Emmy Award for Technical Excellence. Among the former announcers and engineers, they have Chris Kreger, John Sims, Rick Funk, Kevin Clayborn, Chris Hall, Ed Young, Phil Joiner (a master bagpiper), Wray Reed, Bob Trimble, and Bill Newbrough. From the manufacturing side they have Don Jones, Dave Edmiston, Ed Edmiston, and David Shepard.

Early **RF Specialties Group** line cards showed a modest 20 to 30 product lines, but this has steadily

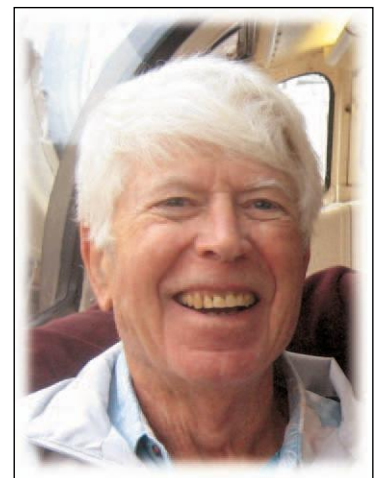
grown, over the past 29 years, to well over 300 product lines. They are fond of saying, “we carry everything from the microphone to the antenna.” The rapid progress of electronic technology has presented a surge of computer-based products, along with the challenge of keeping up to date with the digital world. If you think back to the 1970s and early 1980s, would you have believed that we would someday be deliberately putting a mouse in the control room, or even in the transmitter facility?

As 2011 is the beginning of their 30th year in the broadcast equipment distribution industry, the **RF Specialties Group** is giving thought to how they can best celebrate this milestone. More information on that will be revealed in upcoming months. Needless to say, this milestone would not have been possible without the continuing support of loyal customers in all 50 states and foreign countries.

Just as the **RF Specialties Group** is very much like a family, they feel that their customers and vendors are part of their extended broadcast family. Many customers and vendors have become close personal friends over the years and they do appreciate that friendship and camaraderie.

In closing, we tip our hats in memory of two beloved RF Specialties personalities, Harry Larkin from our Philadelphia PA sales office, whom they lost in 2008, and Sam Lane, the former owner of RF Specialties of California, whom they lost in 2009.

As you meander along Radio Road, remember this: **RF is Good For You!**



In Memory of Same Lane



In Memory of Harry Larkin



**RF Specialties®**  
[www.rfspec.com](http://www.rfspec.com)

# FINAL STAGE



## RADIO ROUNDUP

### The Radio Guide Event Register

Email your dates and info to: [radio@rconnect.com](mailto:radio@rconnect.com)

#### NATE 16th Annual Conference and Expo

February 21-24, 2011  
Oklahoma City, Oklahoma  
[www.natehome.org/AnnualEvents/](http://www.natehome.org/AnnualEvents/)

#### National Religious Broadcasters - NRB 2011

February 26 - March 1, 2011  
Nashville, Tennessee  
[www.nrbconvention.org](http://www.nrbconvention.org)

#### Michigan Assoc. Broadcasters & SBE-91 Conv.

March 8-9, 2011  
Lansing, Michigan  
[www.michmab.com/conferences/gbbc\\_main.html](http://www.michmab.com/conferences/gbbc_main.html)

#### CBI Spring College Media Convention

March 13-15, 2011  
New York, New York  
[www.askcbi.org](http://www.askcbi.org)

#### NAB 2011 Spring Convention

April 9-14, 2011  
Las Vegas, Nevada  
[www.nabshow.com](http://www.nabshow.com)

#### NAB 2011 Radio Show

September 14-15, 2011  
Chicago, Illinois  
[www.radioshowweb.com](http://www.radioshowweb.com)

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### Website

[www.altronic.com](http://www.altronic.com)  
[www.amgroundsystems.com](http://www.amgroundsystems.com)  
[www.aarlon.com](http://www.aarlon.com)  
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### Website

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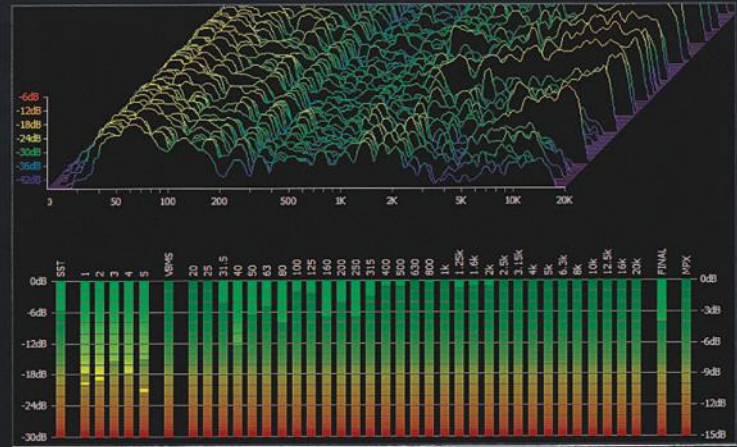
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# RADIO GUIDE



## VORSIS AIRAURA DIGITAL SPECTRAL PROCESSOR



"I am giving the Vorsis development team a BIG thumbs up as this product stands out as a very SUPERIOR audio processor design."

"This processor is amazing!"

"I have the HD output feeding our web stream encoder, and two national program hosts at remote locations in the US have told us 'your audio stream sounds incredible!'"

"I can say that the Vorsis processor does NOT sound like the 'O' ther guys! It sounds far better and has a very unique 'signature'. I really, really like how this processor sounds! Every other station in the market sounds like crunched up FM radio while our station is loud now and yet it still has 'life' with CD quality dynamics and punch."

"I've listened to the station since the first few days after the format flip (which was a month ago yesterday), and the one thing I notice most is that the new Vorsis processor's audio quality is always terrific, regardless of the source material."

"If the Vorsis that I heard while you were testing processors last night is your final air chain (it was) it might just be the cleanest and best sounding FM I've heard since...well, forever. Great work!"

"Thanks for a great sounding box that makes us sound bigger than the so called big stations!"

"Your Sweet Spot Technology AGC has the most invisible gain correction that I have EVER heard in ANY on air processor. Listeners have been calling to compliment us on the improvement in our on air sound."

"We've used your product close to a year now and it's just out of this world. When we put the Vorsis box online our audience noticed the difference instantly and started calling asking questions like 'What's going on? What did you all do? Your sound is clear, crisp, and bright and the audio sound level is great now!!'"

"The music sounds great, and this box can be tweaked to anyone's preference. There is a lot to discover in this machine....but our single biggest achievement has been achieving the clearest, cleanest 'voice' I have ever heard come from an FM processor."

"This box sounds much better than any other processor I have ever tried. Ever!"

## Real Comments From Real Users About Vorsis

### Just wait until they get their hands on AirAura™



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www.vorsis.com | sales@wheatstone.com

"I am extremely impressed with the unit's capabilities and how well it performs with our NPR talk/Classical format."

"What an amazing difference in sound quality!!! This is a brand new FM station and comparing it to the other new station in town using the Other brand of processor our client is louder, cleaner, and even legal. Wheatstone definitely has a winner here with Vorsis."

"This is a great sound and we are so, so pleased with our new Vorsis on-air processor. You just threw down the gauntlet to the processing industry with this new unit! Nobody can match a sound this loud, this clean, and this unique! Now everybody gets to chase after us for a while. Thanks Vorsis!!"

"Our signal used to virtually disappear in downtown New York when we went on night pattern because of the extremely high level of man-made noise. Now when we're on night pattern our coverage in downtown is actually better than when we are on day pattern, the other brand of audio processor and a 10X higher powered transmitter! We're buying a second one to put on our daytime transmitter!"

"You have to be kidding! I have NEVER heard FM audio sound this good, this detailed, this smooth, this clean, and this loud (how did you do it??). Very nice work!"

"Love the box!!! Overall the sound of the station is vastly improved. It's loud, wide and clear."

"I guess the only word for Vorsis is 'WOW.' It's got some great bottom end, and it's more transparent than any processor I've heard."

"The AGC/Compressor/SST combination is simply amazing. We play classical CDs. Older classical CDs were mastered at a much lower level than current ones. Announcers don't compensate and never will. Your processor is able deal with what amounts to probably 40-45dB (or more) \*average\* level variations and hold them perfectly in the sweet spot with virtually no squashing, pumping, sucking, or other usually audible artifacts of such wide range level control. In short it does its job perfectly every time."

"I love classic rock and it's the program format on the station that I own. No other processor that I've tried (and I think I've tried them all!) sounds as good on this format. We're nice and loud and still cleaner than the other stations in the market. We were surprised to hear the intentional dynamics of songs actually get on the air - other processors just flatten them out or turn them into a sea of mush. For the first time ever we're also hearing subtle nuances in songs that we used to think we knew every single note of. What an amazing air sound! No.... What an amazing processor!!"

"Your equalizers are actually useful and unlike other processors do not grunge-up the sound merely by enabling them."

"The SST algorithm is the least audible of ANY processor I have ever had experience with. I'm not sure how you did it or exactly how it works but its automatic "leveling" is excellent - no pre-processing whatsoever is necessary with SST."

"The high end of this processor is very open sounding - there is no fake "sparkle" with the HF EQ either. Perfectly clean and natural sound. And did I mention LOUD?!"

"Finally! A processor that deals effectively and transparently with overly-sibilant announcers and audio levels that usually go all over the place! (I especially love the tweakable multiband thresholds!)"

"Why haven't the other audio processor companies been able to make an AM box that sounds this good? I can't think of a positive superlative that is big enough to describe how pleased I am with our AM sound now. Our coverage seems to have increased by quite a bit too!"

"Our multipath is Gone! GONE! As an engineer I have difficulty believing a processor can make this much difference in apparent coverage area but the listening is the proof. We've had several listeners call and comment that their reception has greatly improved and even I've noticed vast improvements when driving through what were previously horribly multi-path prone areas. I'm not sure why, but it sure does work!!"

"This box has great metering and excellent analytical tools - you get good visual indication of everything that is happening inside."

"The unit's stability has been flawless, not even a tiny glitch. We have it set up to time-sync and it works great. The scheduler-based (and SILENT!!) preset switching is perfect! Unit sounds very accurate sonically and is very easy to set-up."

"We are now VERY unique in our audio. Compared to other stations in the market, we are as loud yet maintain legal modulation (at least 4 stations in our market run with 130%+ modulation). We're not "squashed" sounding at all and if you compare us with the other stations (all formats) we're clearly a dynamic and clean stand-out signal on the dial now."

NOTE: We aren't naming names because everyone who is reaping the rewards of sounding better appreciates their anonymity (with respect to the competition). We won't blow your cover, either.



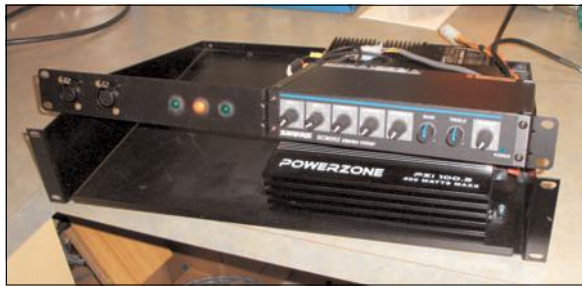
# Digital Extra

## Remote P.A. Project – Part 2

Welcome to this issues Digital Extra. This issue we complete Mike Callaghn’s Remote PA project.

Below you will find the drawings and charts that were referenced in the story that appeared in the print version of *Radio Guide*. There are also some additional pictures that we did not have room for in the hard copy edition that was mailed to you.

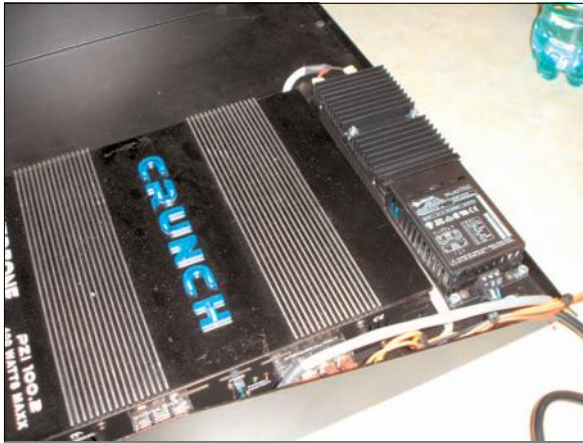
Check the archive for the previous issue’s Digital Extra where you will find other photos related to the project. If you have questions contact Mike via email, [mc@amandfm.com](mailto:mc@amandfm.com)



The mixer and power supply in test.



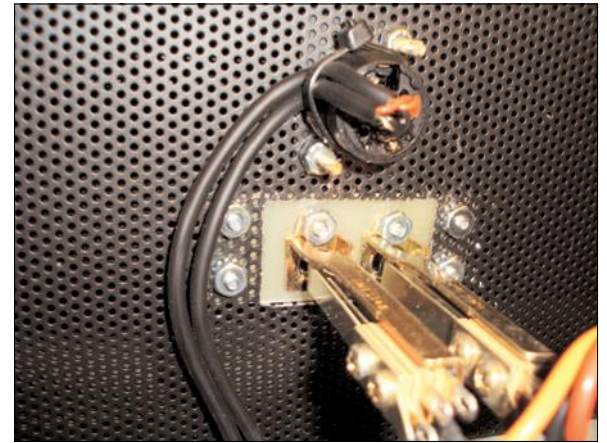
Mounted speaker jacks note they are isolated from the metal panel by an insulated material



The amp and power supply mounted on the shelf.



Amp and power supply from a different angle



Internal look at the jacks. To prevent shorting to the metal rear panel, the internal mount is also isolated.

### P.A. System Wiring Conventions

L.E.D. Panel		Speakers		AC Power	
Power	Red	Left	Black	Hot	Black
	Black		Red		
Left	Blue	Right	Brown	Neu	Red
	Yellow		Orange	Ground	Brown
Right	Orange				
	Green				
N/A	Brown				
	White				
<b>LED Long Lead is Positive</b>					

**Power Series Resistor**      470 ohm 1 watt

**Speaker Series Resistors**      220 ohm 1/2 watt



The rear panel showing the IFB port, jacks and the holders or the dipole when not in use



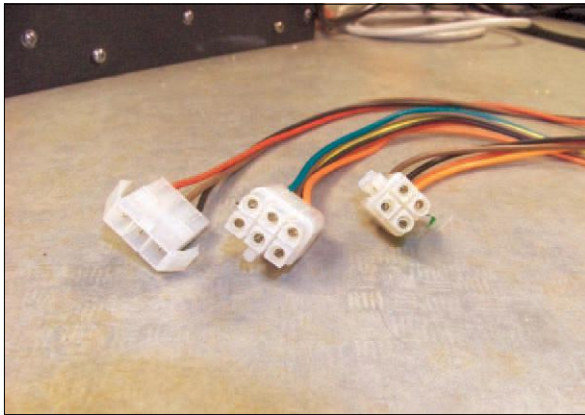
The antenna dipole mounted for transport and the silver ball antenna mount for use.

# Digital Extra

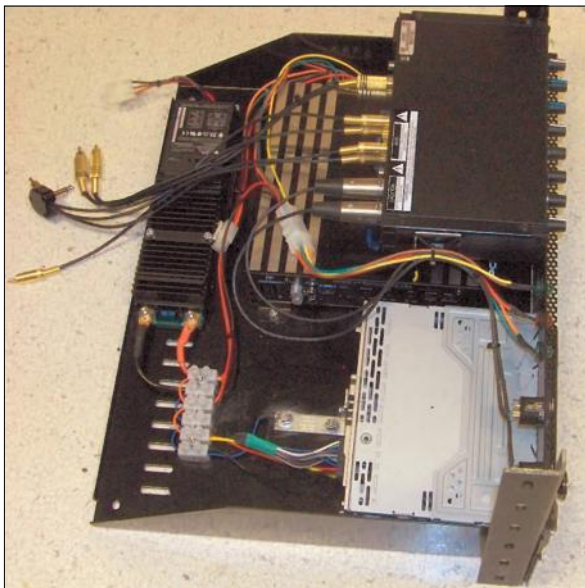
## Remote P.A. Project – Part 2



PA rear showing completed unit including AC cord spools, all jacks and deployed dipole.



Molex plugs on pre-made wires.



The assembled system before mounting in the transport case.

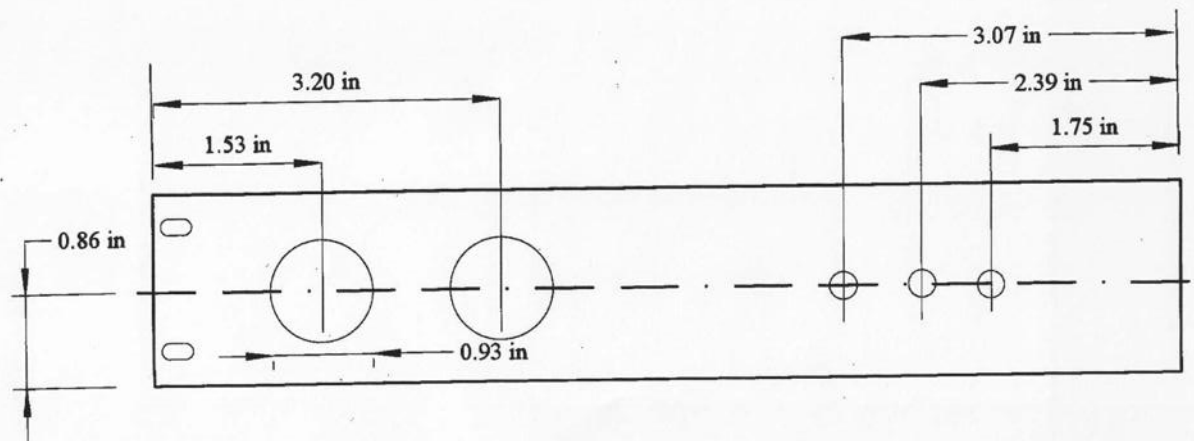


The system mounted in the transport case.

### P.A. System Internal Cables

End # 1	End # 2	Length	Function	From	To
XLR Panel F	XLR Cable M		Mike 1	Front Left XLR	Mixer Mike 1
XLR Panel F	XLR Cable M		Mike 2	Front Right XLR	Mixer Mike 2
RCA	RCA	15	Amp Feed L	Mixer Out L	Amp In L
RCA	RCA	15	Amp Feed R	Mixer Out R	Amp In R
RCA	RCA	14	Radio Out L	Pyle Aux L	Mixer 1 L
RCA	RCA	14	Radio Out R	Pyle Aux R	Mixer 1 R
XLR (above)	RCA		Rear Zephyr XLR	Rear XLR	Mixer 2 L
	RCA		Rear Zephyr XLR	Rear XLR	Mixer 2 R
1/4" Phone (above)	RCA	15"	Wireless Mike	Mike Rcvr	Mixer 3 L
	RCA	15"	Wireless Mike	Mike Rcvr	Mixer 3 R

### Shure Mike Mixer Rack Panel



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