Radio Guide

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May-June 2011 – Vol. 19, No. 3

The Telos Alliance

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The "Telos Alliance" from left to right: Michael Dosch, Steve Church, Frank Foti, and Tim Carroll.

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Radio Waves

by Ernie Belanger – Editor

Welcome to Summer

I've shaken things up this issue, moving our regular authors around a bit, to bring us a different perspective in some of our columns. In this issue, we have added a new column, *LPFM,* authored by one of the leading experts in the field, Leo Ashcraft. In *Small Market Guide,* Roger Paskvan gives us the final installment on web site revenue generation.

With winter solidly behind us, our attention turns to the usual summer tasks. We discuss the need for office and building inspections in *Safety and Security,* while Jeff Johnson takes a serious look at disaster plans in *Disaster Preparedness.*

Steve Callahan and Mike Callaghan handle RF this issue, with Steve revealing the hidden cause for his AM failure in Rhode Island in *Xtreme Engineering,* while Mike finishes up his building planning in *Transmitter Site.* License renewal time brings a new and "interesting" certification issue discussed by Peter Gutmann in *FCC Focus.*

Scott Schmeling describes a Marti STL-10 modification in *Practical Engineering,* and in *Chief Engineer,* Gary Minker looks at air filters to find out which ones will actually keep your transmitter and other gear clean.

Chris Tarr helps us select the right portable electronics in *Operations Guide,* as George Zahn takes a look at speakers and headsets as part of *Studio Site.*

As always let me know what your thoughts are for stories or improvements, and email me your suggestions at: editorial@radio-guide.com – ***Ernie Belanger, Editor***

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Cover Story

by Ernie Belanger

The Telos Alliance

When we pull back the curtain that figuratively hangs behind every brand and reveal the people, the driving forces behind it, we find some amazing things. These include the initial motivation that drove its founders to create the innovative products that have shaped our industry's past, and the new innovations that will continue to do so into the future.

The Start of Telos

With Telos, the "Ah-ha" moment came when founder Steve Church had become so frustrated with the poor technical quality of his on-air phone calls, that he had enough. He knew, instinctively, that there had to be a solution that would improve phone call quality, and he set out on his quest to find it.

Steve was an engineer, and also a radio station talk show host at WFBQ, Indianapolis. After many weekends spent in a nearby university technical library, a few extended lunches with professors, and months of long nights in the station's engineering lab, he had taught himself about the emerging field of digital audio signal processing (DSP) and invented the world's first radio studio product using digital technology. Remember, this was back in 1984, when Compact Discs were "revolutionary."

Steve's initial quest brought about the Telos-10, digital telephone interface. As word of his invention spread, he began receiving requests for the new system from friends in the radio talk show business. At the 1985 National Association of Broadcasters convention, Steve introduced his pioneering use of the DSP technology to a wider audience. The overwhelming audience response to Steve's economical and technically elegant solution to a nagging problem, provided the incentive to ramp up a company to build and sell the Telos-10. Telos Systems was founded that year.

Crowds gather to see new Telos technology at NAB.

A Solid Business Philosophy

Church decided that Telos' technical focus would be to design equipment, using cutting edge technology, that would allow radio stations to significantly improve the technical quality of phone calls and program feeds being received via phone lines. He also decided, based on his experience, that Telos would be a company that would also focus on being responsive to customers' needs, offering exceptional customer service and technical support.

This philosophy propelled company growth, and the company continued to break new ground. New products included the Zephyr Digital Network Audio Transceiver. The Zephyr was the first device to provide the full stereo bandwidth demanded by broadcasters. The Zephyr provides high-fidelity stereo audio capability on a single dial-up ISDN (Integrated Services Digital Network) phone line. This allowed broadcasters the capability to send broadcast quality audio, via terrestrial lines, virtually anywhere in the world for about the same price as a phone call.

A Notable Marriage

In 1992, Telos Systems acquired Cutting Edge Technologies, a Cleveland-based manufacturer of innovative audio processing equipment for radio (later Omnia Audio). Cutting Edge was founded in 1988 by Frank Foti, a radio engineering consultant and former chief engineer for WMMS, KSAN, WHTZ (Z-100), and Malrite Communications.

Steve and Frank had worked together at Malrite, and had become good friends. While Steve was starting Telos, Frank was the chief engineer who built WHTZ-FM (Z-100), as it went "from worst to first" in New York City.

Similar to Steve's Telos Systems story, Frank created Cutting Edge out of a need to improve the over-the-air sound presentations of radio. Cutting Edge's first product, called Vigilante, was the "secret weapon" many leading stations used to best the competition. From this initial success, Cutting Edge developed and marketed an analog/digital hybrid processor known as the Unity 2000i.

But Frank couldn't quite achieve, with analog processing or a hybrid, what he heard in his head. Steve saw the opportunity to help his friend realize his dreams, by bringing the audio processor completely into the DSP domain; the two companies merged, allowing Frank to ultimately fulfill that dream. Research into DSP technology and the pitfalls of other digital products led Frank and his R&D staff into ground-breaking work, as they developed the first great-sounding digital audio processor. This became known as Omnia.fm. Today, the Omnia family of DSP audio processors has become the preferred choice of leading radio and Internet broadcasters worldwide.

Company Expansion Continues

In 1999, Michael Dosch was recruited to establish a new product category for the company: broadcast consoles. Prior to joining the Telos Alliance, Mike had served as Console Architect and COO of Pacific Recorders and Engineering (PR&E), the leading console company in the radio industry, at that time. As successful as PR&E had been, like Steve and Frank, Mike wasn't satisfied with the status quo and imagined future consoles that could do much more.

For years, the audio console had been considered the center of the radio studio. When broadcasters first began using computers to replace cart machines, Mike imagined the computer moving to center stage. But in order for the radio studio to take advantage of the latent power of the computer, the console and every other piece of audio equipment would need to be intelligent and interconnected. He imagined a console audio "engine" that would be used to play computer audio and perform all of the console functions – but everything would be software controlled via tangible control surface (knobs and switches) or PC applications. He imagined computers would not have sound cards, but rather would connect to the "engine" via Firewire connections, and even multiple engines would be able to do a form of networking via Firewire.

One of the Axia test areas at Telos headquarters.

Telos was the ideal environment in which to incubate his new ideas and innovative approaches. Steve heard the ideas and got excited. He thought – like Mike did – that the industry was stuck in the past and that tight integration between the various products in the studio would lead to a very interesting future; so they joined forces. Steve's idea to use Ethernet instead of Firewire for the interconnection, was was a brilliant insight and became the foundational technology for Axia consoles.

Axia Audio is Launched

In 2003, Axia Audio was officially launched, with its introduction of the world's first Ethernet-based console system for broadcasting. But, unlike the Telos-10's instant success, this was such an innovative, "out of the box" idea, that the company spent nearly two grueling years educating customers – enjoying "fine" airplane cuisine and coming home with very few actual sales. Then the idea finally caught fire in 2005, after a few dozen brave pioneers were convinced to install Axia and share their results with others. Once the industry realized this wasn't just a "science experiment," but a solid, viable, reliable technology platform, Axia sales took off and the company couldn't build consoles fast enough to keep up with demand. Axia has since sold more than 2,000 of its innovative consoles to radio broadcasters all over the world.

A Turn Toward Digital Television Audio

While all this was going on in Cleveland, Tim Carroll was working for Dolby Laboratories in California. Just as the DTV (digital television) standard was emerging, he was tapped to head up the group that developed Dolby's DTV products. Being an "inventor" like Steve, Frank and Mike, Tim began dreaming of a better way to manage DTV audio. His vision would require a departure from Dolby's approach.

(Continued on Page 8)

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Cover Story

The Telos Alliance

– Continued From Page 6 –

Linear Acoustic

Tim left Dolby in 2002 to start his own company. From humble beginnings in Tim's garage, Linear Acoustic grew into one of the most respected companies in DTV audio processing. In 2004, Tim decided to move his car back into the garage, and he moved the company into its new Lancaster, Pennsylvania offices that it still occupies today.

It may seem strange for a radio audio company to acquire a company that specializes in television audio, but Frank Foti had known Tim Carroll for many years and was always impressed with his approach to managing audio levels in broadcast television.

When Telos approached Tim about working together, they found that Linear Acoustic had great ideas, great products and a great reputation, but it needed capital to finish some products and to market them properly. Since there was synergy between companies and Telos had the cash, acquiring the company made perfect sense and it has turned out to be of great benefit to both companies.

Great Successes in TV Audio

In 2007, Linear Acoustic became part of the Telos. Today, Linear Acoustic makes the most advanced television processors on the air in all of the top markets. It has manufactured 5.1 channel up-mixers, loudness meters, in-rack audio monitors, and some of the surround sound mastering tools used at the Beijing and Vancouver Olympics, the 2009 Academy Awards, Dancing With the Stars, FIFA World Cup, and other events.

Chances are if you are watching a TV channel without loudness shifts, it probably has Linear Acoustic technology in the path.

Axia Consoles tested and ready for burn-in.

The Telos Alliance is Formed

In 2010 Telos became the "Telos Alliance" of companies, The various companies within the Telos Alliance continue to develop innovative audio products for radio and television broadcasting, telephony, and the Internet.

All design work is in-house, with most manufacturing outsourced to select ISO-9002 certified manufacturers who build to Telos' strict quality standards and specifications. Telos inspects and performance tests every product to verify that it indeed meets all of its specifications.

Telos has experienced steady growth since its initial production run of 25 Telos-10 units in 1985. To date, there are tens of thousands of systems in the field; it now is hard to find a broadcast facility in the world without at least one piece of Telos gear. Company sales are split pretty evenly between customers in the U.S. and customers in Europe, Asia and other parts of the world, through its international network of re-sellers.

Telos has won the Case Western Reserve University, Weatherhead School of Business' *Growth Award* six years straight. This is a rare achievement. Many Telos products have won broadcast industry awards as well.

Where is Telos?

So exactly where is Telos? The best answer is "everywhere." But if home is where the bills go, then Telos' home is a 40,000 square foot facility in downtown Cleveland, Ohio. About half of the employees work out of this office. Most of Linear Acoustic's staff is in their office in Lancaster, Pennsylvania. Internationally, Telos has sales and technical offices in Freising, Germany (near Munich), Riga, Latvia, and Beijing, China. Making extensive use of networking tools, Telos' employees can be found telecommuting from home offices around the world, including San Diego, Nashville, Baltimore, Atlanta, Detroit, Los Angeles, Shenzhen, China, London, England, and Kiev, Russia.

Telos' future is bright, as this innovative, privately held company continues to push the cutting edge of technology, leading the broadcast industry into its future.

For more information about the Telos Alliance and their product lines visit www.telosalliance.com, email inquiry@telosalliance.com or call 216-241-7225.

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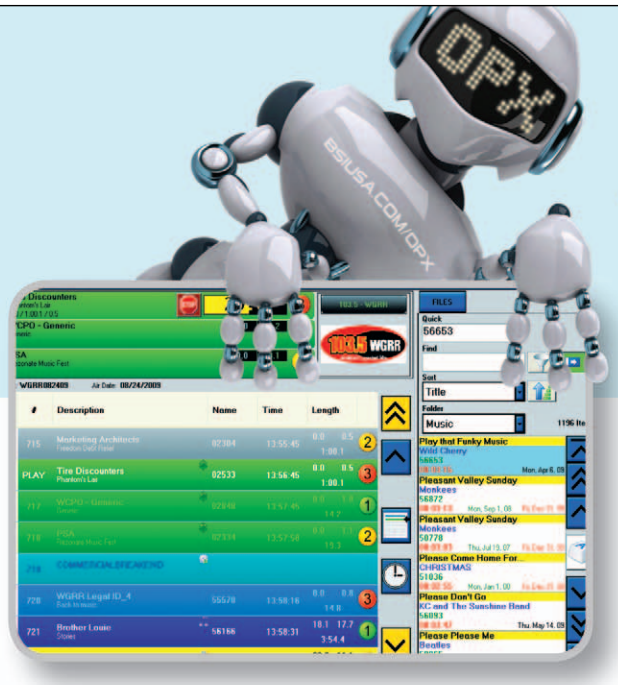

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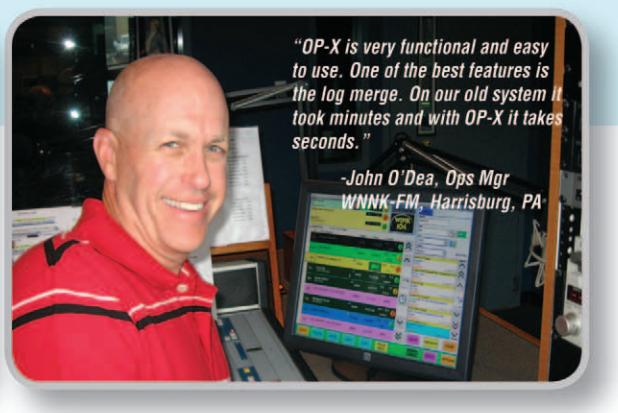

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Xtreme Engineering

By Steve Callahan

A Real Head Scratcher – *Part 2*

In the last issue, we left off with me finally getting some RF to my non-directional Tower #1 using a temporary, and spliced, run of coax. You'll remember that one very cold morning I was awakened with a station off the air, and after some investigation, I found that all four transmission lines to my four tower array all seemed to be shorted. We had to do some quick scrambling to get the station back on the air. It didn't seem logical at the time, but read on to learn what we discovered in the following weeks.

First Things First

I had my FCC attorney immediately apply for an STA to operate with one-quarter power until we could find the problem and correct it. At least the station was on the air and serving our city of license. The coax runs are approximately 400 feet each and run in a "T" shape. The coax starts at the transmitter building at the base of the "T", and then goes to a distribution box at the intersection of the "T".

The four cables then fan out to each of the four towers. All four pieces of 7/8 inch coax fit into a three-inch, inside-diameter, metallic conduit on the way to the distribution box. Yes, it is a tight fit but we got it to work ten years ago. Sample lines, control cables, and the ground travel out to the array in a different three-inch conduit.

The Task at Hand

Now we had to find the reason that all four coax lines appeared to be hard shorted. My trusty tower guy brought out his Time Domain Reflectometer (TDR) and we looked at the coax from the feed end and the destination ends. All of our readings pointed to a fault in each cable around 130 feet from the transmitter building. This is in the part of the system where the four lines are all in one three-inch conduit before it gets to the distribution box. (It's finally nice to see some consistency with this project!)

It would be impossible to open up the conduit run by unscrewing a section of the pipe. So my tower guy, armed with a hand grinder, cut a six foot, canoe-shaped piece from the bottom of the conduit with the now dead coax lines. We centered the cut at 130 feet from the transmitter. No need to worry about nicking the coax because it was already definitely dead.

Presto!

When we removed the canoe-shaped piece of conduit, we saw something inside the conduit that we had speculated about but not really expected – ice! We also saw that the coaxes that had been crushed by the ice that had been trapped by the close confines of the conduit, and were now obviously shorted. Now we were making progress!

The problem with ice in the conduit occurred in late December of 2010. Back in April of 2010, Rhode Island had been hit with extremely high floodwaters and the water level at the transmitter site had been high enough to damage a horseshoe–shaped dam on the property. From March to December of 2010 the site had been high and dry and even through the hot summer months of 2010, the water level was extremely low.

What Went Wrong?

A well-respected local tower guy, who had spent his early career as a plumber, had designed the conduit system. He had designed the coax conduits to be open at both ends and he pitched the conduit to self-drain in the unlikely event that any water ever got into the piping. Obviously, some water during the flood had gotten up inside the piping, but why didn't it drain out, and how could it have stayed in the pipe for ten months through a hot summer and not evaporated?

Ice flattened coax. For perspective, note the author's boot tip at the bottom of the picture.

My trusty tower crew brought their surveyor's transit and "shot" all of the coax runs. What he found explained why the water got trapped inside the conduit. Instead of a gradual pitch downward to the distribution box and the drain, there was now a dip in the conduit at the 130 foot point, just enough of a dip to catch some water in an unintended low spot in the conduit.

Now we were getting answers to our questions. There was no damage to the coax lines in the arms of the "T", so we cut the lines at the distribution box and pulled out the four runs from the distribution box to the transmitter building. It was not a pretty sight.

I was amazed at the force that had been exerted by the ice on the coax inside the metallic conduit with no damage to the conduit. We cut up the damaged coax and saved a piece for the station's general manager.

Fixing the Problem

The crew spent a week repairing about 60 feet of the conduit run by re-pitching it to drain naturally and also adding new supports and anchors to prevent any more shifting of the conduit in the future. We also flushed the previously ice filled conduit with fresh water and pulled a foam ball through the conduit to make sure it was cleaned. The canoe-shaped piece of conduit was welded back in place making sure that no burr was left on the inside part of the weld.

Unfortunately, our progress screeched to a halt in February. The entire coax replacement project cost was estimated at $60,000, but it took over a month for our insurance company to view the damage, and another month to process our claim, because the insurance company was already dealing with claims from over 40 collapsed buildings due to the extreme snowfall in Rhode Island in January and February. The winter weather had not been kind to us or many others in the Ocean State.

Check Please

We finally got a check from the insurance company in April and immediately started work on a new conduit from the transmitter building to the distribution box. There was no way we were going to get all four lines back in the old conduit, so I elected to put in a new third conduit, this one PVC, which would carry the lines from Tower #1 and #2 and the old conduit would carry the lines for Tower #3 and #4. This way, just one conduit wouldn't be so tightly packed again and the coaxes for Towers #1 and #4, which have non-directional capability, would travel in different conduits.

What No Coax!

We were making some good progress until we ran into another snag. My tower crew had ordered the new 7/8 foam coax on four hundred foot reels but was told that the manufacturer was heavily backed up and we would have to stand in line for our order to be shipped. We checked with other coax distributors and the story was the same. We had all of the necessary connectors and hardware but no new coax – we had a plan but no material. Adding to the frustration, was the manufacturer missed two previous delivery dates to us.

As we go to press, we are still waiting for the long-anticipated coax. In an attempt to speed up the delivery, we split the coax order into two 400-foot reels now and two 400-foot reels later. When the new coax does arrive, we are ready to immediately get the four runs in place. I plan to keep the emergency coax in place and terminate it in the distribution box just in case it's ever needed again.

Your Response

I got some emails from readers who posed some interesting questions based on Part-1 of this story. One reader asked if there had been any weep holes installed in the conduit. I had asked that same question when it was installed ten years ago, but we decided that with the self-draining pitch it was more secure to avoid weep holes which could also become many entry points for water to get in the conduit. Another reader asked it there were any connectors in the distribution box which could have failed.

Originally, all four coax runs were "home runs" from the input of the ATU to the top of the phasor. However, the new coax runs will be connected in the distribution box to the existing old coax runs still in the arms of the "T" and they will be heavily waterproofed. This allows for a place to make emergency line "swaps" and it will provide a mid-run test point if we have any coax failures in the future.

The Lessons Learned

What I've learned from this project is to go with your gut instincts and don't discount any possible cause for failure.

Remember, that weather can delay a project and in ways other than you could ever imagine. Before you order materials, always make sure that you can get them on a timely basis if they are needed in a hurry. Many thanks to my trusty tower crew, Broadcast Tower Service of Bridgewater, Massachusetts, who were invaluable in finding the problem and preparing for its repair.

Steve Callahan, CBRE,AMD is the Director of Engineering for Rhode Island Pubic Radio. Email: scallahan@wrni.org

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Transmitter Plant Planning – *Part 2*

By Mike Callaghan

In the first part of this series Mike discussed general layout plans using CAD software, so changes could be made easily. These plans should including rack and light locations, developing a grounding plan, documenting your installation including photos, and being sure everything is labeled properly.

Audio Paths

The audio program path should be intuitive when you stand in front of the rack. Chasing signals through gear mounted in all different locations simply slows you down. If you plan on more than one program path, investigate automatic path switching when a primary path fails. This can be as simple as a set of contacts that close when a T-1 circuit or RF link fails.

The important thing is, to get the program back on as soon as possible. If you have the room and money, a separate VU meter monitoring each path will verify they're all working. An inexpensive switcher can monitor different sources, processors, and the modulation monitor. This is great for checking each part of the program path quickly.

Mike's Source Switcher

A Tip For AM Installations

For AM's, install a phasor interlock bypass switch. Then you can open up and look inside the phasor while it's on the air. It's great to be able to look for burned parts and problems without signing off. Remember to stay well outside the open door, so you don't become a burned part. Install annunciator lights next to all these bypass switches – you don't want to walk out the door when a safety bypass is left on.

Air Conditioning

Air-conditioning transmitter plants is a science all its own. Fortunately, newer transmitters have become much more efficient. Not only do they save power, but they exhaust less heat as well.

If you can afford it, install a system with enough cooling that it can remove all the heat the transmitter produces without bringing in outside air. Doing this, combined with good filtration, will mean the transmitters and your other equipment won't get nearly as dirty as using outside air. And, a clean transmitter is usually a reliable transmitter. In the big markets we install twin systems, with either one powerful enough to do the job alone.

We also use dual thermostats, with one set a few degrees above the other. This setup will kick in the second system if the first one fails, or you fire up a second transmitter into a dummy load, and the extra heat overtakes the first system. This redundancy shouldn't be market driven – it is an excellent approach regardless of market size.

Other worthwhile additions to your transmitter building design are a temperature sensor to keep track of the room temperature, and a second sensor to monitor the HVAC output plenum. The difference between these two readings will let you know if the HVAC has failed, or if it's working, but a high room reading is just because of a high ambient air value.

Remote Control Planning

When setting up the remote control, remember to add a check channel. This is just an on-off circuit that triggers a status light and a meter reading when the "raise" is pressed, and turns them off when "lower" is pressed, allowing you to easily verify the control portion of the remote control system is working.

If you use a dehydrator to pressurize your transmission line, you should plan to use a remote channel to send back a line pressure reading for the transmission line; it's good to know about leaks and pump failures as soon as possible.

Put a shelf for your dehydrator on an easily accessible wall. Make it secure, but easily removable if it needs work or replacement. The air manifold and line pressure sensor can be mounted below it for convenience.

RF Plumbing

Transmission lines are a huge expense, and it's easy to overspend. When adding new line to an existing plant, measure and finalize the length of each line at least twice.

Go once from the antenna to the transmitter room feed point, and then again the other way, from the feed point to the antenna. Allow for bends and burials. Don't design flexible runs that can kink or stress the line, and try for long, sweeping turns as much as possible.

Don't build anything around the line, or make it a captive. It may need to be replaced.

For the flexible runs, the CAD program can help you avoid some expensive mistakes. If possible, use a measuring wheel to walk the paths the lines will follow – at least two times. For the cable hardware, use a CAD page to draw each cable, including every transition, flange, barrier, elbow, and fitting that will be in the line. Assign a specific label to each of the different fittings.

Then, start at one end and count the number of each different fitting between one end and the other. Write down the total of each. Starting at the other end, go back in the opposite direction. Write down those totals. Compare the two sets of totals. They need to match.

Do this for each of the flexible lines. When you've done them all, total the number of each different fitting on all the pages. This will give you the total of what you need to order.

Hard line mounted with a resilient rigid mount.

Plan Ahead to Avoid Frustration

Nothing can be more frustrating than running short of hardware during a build. You never know when a part will arrive damaged, or get broken during installation. You don't want to stop the project while awaiting parts, so you'll want spares. RF parts are expensive, and most vendors want a restocking charge if you send them back.

To get around this, when you place the order, let the vendor know you're getting extras, and will be returning what you don't use. Tell him you'll be returning unopened boxes, and you want the restocking fee waived. By setting this straight when you place the order, you will typically get the waiver.

You may also want to save time and effort by having the factory fasten the fitting on one end of the line before it ships. Pick the end that will be closest to the antenna, so you won't have to push the fitting through holes and around corners.

More Helpful Tips

If build time is an issue, you can keep things moving by avoiding building inspections. Check with your local building department to confirm that if you surface mount electrical and signal conduits on the wall, the electrical inspection can usually be avoided until the work is complete. As long as the inspector can see the entire wire run even after the walls are installed, it makes no difference when it happens. This will help prevent a work stoppage while waiting for an inspection to take place.

Take the time to visualize and rehearse each step of the project beforehand. You want to avoid being caught by some small detail that was overlooked in the planning. When the project completes smoothly and on time, you'll find it was well worth the effort.

If you have comments, or you have some Transmitter Site tips or tricks you want to share, email us at: editorial@radioguide.com. Mike Callaghan is the Chief Engineer at KIIS-FM in Los Angeles, CA. His email is: mc@amandfm.com

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Studio Site

Sound Off!

Debate on Speakers and Headphones

by George Zahn

A while back, we had the debate of whether any microphone will make do for your station sound. Arguably, the microphones you choose for your on-air sound have a greater impact on your sound than the speakers and headphones your hosts are using. The microphone you choose may be limited, or enhanced, by your station's processing, studio acoustics, and the greatest wild card – your listener's environment. A question directed especially for FM managers and engineers: Have you ever cringed to think that someone might be out there listening to your "sound" on true audiophile headphones, with no acoustic coloration from the outside. As personal stereo headphones improve, that once rare situation is becoming a bit more common, and we should all aspire to reach the highest common denominator.

If you've been a regular reader, you know my feeling that microphones can help your on-air sound. The best processing in the world won't salvage a "garbage in" situation, but a good, crisp vocal microphone can minimize the magic needed by your broadcast chain. That combination lends itself to your station's sound.

As you know, the microphone is a transducer that changes acoustic energy, the sound waves around it, into audio. Have you thought about the devices in your studio that are the inverse of the microphone? The speakers and headphones that our talent is using, at their most basic function, take the electrical audio and change it back into sound. I now pose the question that we asked about microphones: Does the quality of speakers and headphones make any difference in our station sound?

Speaker of "The House"

I hope we get some feedback – pun intended – on this topic, including your best suggestions for inexpensive, good sounding speakers, and durable but decent-sounding headphones. Obviously, the microphone affects the outgoing product, but do the simple monitors we're using at the station affect the output of what we create every day? Just as a station generally has to settle on a narrow range of microphones for its use, it's basically impossible to switch out speakers whenever a shift changes. There has to be a station standard. Thankfully headphones can be swapped out to hosts' varying tastes.

If you adhere to theories of psychoacoustics and sound perception, the speaker sound in our studios may indirectly affect the performance of our talent. Professional announcers will generally rise above any deficiencies here, be it a "dark sounding" studio, or speakers that sound tinny or hollow. I'm sure you've experienced the gamut, from those hosts that will point out minute frequency differences between left and right speakers, to the folks who just want to see how much they can shake the studio walls by sheer volume.

The "Can" Festival

In a previous article, we discussed the idea of a station providing one pair of decent headphones (cans) to each host, with the caveat that when they're busted, the next set's costs is paid for, or shared by the host. Everyone keeps their own.

Many stations just settle in on one or two models that seem durable, and the sound quality be damned. Sometimes, it's whatever happens to be on sale. I argue that the headphones are a more critical decision for announcers, and that not just allowing, but urging, talent to be more proactive in selecting headphones may help to improve the station's sound.

Just as microphones are judged on frequency response, speakers and headphones can be ranked the same way. To briefly revisit the criteria: frequency response is the clarity with which the speaker or headphone element recreates the frequency spectrum from bass to treble. A "flatter response" means less variation as the speaker reproduces sound over the whole spectrum. There's generally a difference of overall quality, and in many cases, price.

"Van Go" Speakers

We've all heard about the guys in parking lots, selling speakers out of the back of an unmarked white van. Supposedly, they are $1,000 speakers that they're letting go for $200 bucks. Many home audio buyers were sorely disappointed to find out that $1,000 price had an extra zero, or maybe two, added.

I doubt many of us have purchased those, but if you're looking to change speakers, you know you can't really do it without hearing what you're getting.

Many of us make speaker or headphone choices based on past experience, and that's a valid way to choose – if you know what equipment gives you the sound you want. If you're considering new speakers, near field monitors (speakers intended for very close listening in tight studios and minimizing reverberant environments), or headphones, you have to consider the variables if you're concerned about making a critical choice.

Let's look at, or listen to, some of those variables.

• **The amplifier that is driving the speaker or headphones should be a "known quantity."** If the amp performance is unknown, it may be coloring the frequency response of the entire sound.

• **The source material that you're listening to.** Many professionals prefer to listen to a CD that they know, rather than depend on whatever might be "pumped" through as a demo track, which might be something geared to making the speakers or headphones sound better than they are!

• **The environment in which you're listening.** If monitoring in a loud showroom, you may have to cut some slack, but try to check these devices in as close to the environment you intend to use them.

• **Ability to handle a wide volume range.** Especially for speakers, you need to make sure that, "Shake, Rattle, and Roll," or "Bring In Da Noise," are just songs you play, not by-products of your speakers.

Speakers are long-term investments, so taking the time and effort to investigate the possibilities can pay dividends. I've often wondered if there are any stations out there who have separate speakers set up for different talent, but I have yet to hear about a double sets of speakers in a studio. I guess stranger things have happened!

In The Mix

If your station is doing a lot of live music mixing from visiting performers, the monitors you use take on a whole new degree of importance. If you have a true separate space for performance, with a control room dedicated largely to mixing music, your speakers are paramount to your station sound. If your facility requires that whoever is doing the mix be in the same room with the performer, and they must mix on headphones, the choice of headphones is critical.

Earlier in my career, I was in a situation where my station was doing remote live music broadcasts from clubs around town. I was often either at a table in the back of the club, or in a van outside the club hunched over a multi-channel console. I also was the recording engineer for live-to-stereo digital recordings of Riders Radio Theater for public radio. In the latter case, the recording setup was in the basement of the Emery Theater in Cincinnati (directly below the stage), and no amount of acoustic baffling could deaden the space.

At the Emery, I did have a pair of near field monitors at my disposal, but also used headphones to listen more critically, shutting out the effect of the reverberant stone walls around me. When I was directly mixing a band in the same room at a club, speakers were not an option. Here's where the quality of the headphones was absolutely vital to what we were doing. I quickly learned that "studio reference" headphones were important here.

Studio reference headphones are generally more expensive and are tested and rated by the manufacturer for the flattest possible frequency response. By using these reference headphones as a monitor, every tweak of any frequency control on each mic input could be done with confidence, since I could do it without compensating for deficiencies in the headphones. Please keep in mind that some manufacturers may use the term "studio reference" merely as a marketing tool. Check the specs, or see if you can test drive a set of cans from a friend or colleague while controlling the monitor variables mentioned earlier.

Don't you love marketing? How about the "Digital Ready" headphones still be marketed out there? Since headphones are connected to an analog output, every set of headphones is technically "digital ready."

Cheap and Good?

In summary, every station is different and has dramatically varying needs and budgets, when it comes to monitors. How much you spend depends on how critically you need to be listening, and personalized performance for talent.

What's your secret to great "sound" in your studio? Share your thoughts on the most durable, yet tolerable, headphones. Are more expensive speakers and cans worth it? We all learn from the engineers and managers who share their experience. We may be sharing your ideas in a future article of ***Radio Guide****!*

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

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Disaster Preparedness

The Best Laid Plans ...

by Jeff Johnson

We can plan, scheme, and carefully assemble disaster prevention and response scenarios, but as thorough that they may be, something overwhelming can come along. This year's disasters in Japan, and tornadoes throughout the southern states have proven once again that our best-laid plans can be overcome. Better plans must be made.

As radio station engineers and managers, we are especially vulnerable, while being at the same time, especially responsible. At times of disaster, broadcast is turned to for information and direction. We must be ready while we also may suffer the same power outages and damaged infrastructure.

We are also vulnerable by our high profile – not only to nature, but terror, vandalism and hostage situations.

Disaster Plans

Let us consider disaster plans on three scales: a local radio station, a university, and an urban region. Obviously, the radio station is the only situation we can take care of directly, but our broadcasting can be of significant influence on larger scales. When land lines, cell communications and the Internet fail, radio will still be there if those of us in the industry do our job.

For all three scales of preparedness and response, actual plans are referenced.

At Your Station

While preparing to take over ownership of WPAY-FM, the author encountered a well-done emergency procedures plan prepared by previous engineer Jay Woodard.

The document includes a station floor plan, and information concerning fire extinguishers, fire zone locations, evacuation routes, and first aid locations. It specifically directs personnel as to what to do in differing emergencies:

"If an alarm activates, immediately place the CD labeled "EMERGENCY" in one of the players and put it on the air. If visible signs of an accelerated fire or excess smoke exist, LEAVE the area immediately and call 911."

"Everyone needs to take the time to familiarize themselves with the location of the (fire) zones, as well as the locations of each type of fire extinguisher."

"Notice the two different types of fire extinguishers, Type ABC (powder) and Type CO_2." The document instructs that, *"ABC extinguishers should be used for combustible materials fires, but if used for electrical equipment fires, the powder will damage the equipment. For electrical fires use a CO_2 extinguisher, but grab an ABC rather than look around too long!"*

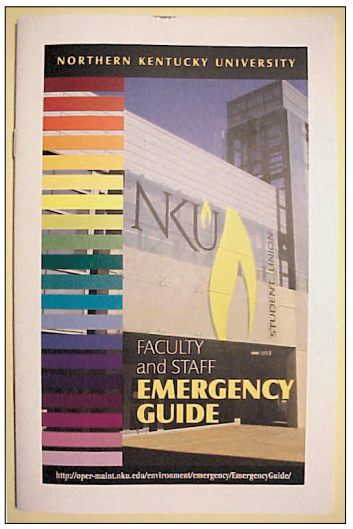
"Evacuation routes: 1-Back stairwell, 2-Front stairwell, 3-Fire escape ladder at the rear balcony." These are all good common sense advisories.

Review Your Plan

It's best to review details of an emergency preparedness document before it becomes your, or your employee's, sole lifesaver. Have each employee read the document and answer a quiz periodically. Document this compliance and the quiz results. It may seem silly to everyone in prospect, but a lifesaver in retrospect. A dark, hot and smoky corridor to an exit is frightening, but getting through it is manageable if its layout has been memorized.

A University's Plan

Northern Kentucky University (NKU) has wisely retained, and is expanding its radio service. When many universities are ridding themselves of what they see as a dinosaur, NKU realizes that service to the public by broadcast, remains important.



Should a disaster or emergency of any sort arise, NKU officials can utilize its broadcast stations as a resource for dissemination of information to the campus and community. The booklet pictured here covers what to do in instances of: Active Shooter, Bomb Threats and Suspicious Packages, Chemical Spills, Civil Disturbance, Earthquake/Structural Collapse, Evacuation and Evacuation Collection Areas (where to go), Fire or Explosion, Criminal Activity, Medical Emergency, Psychological Crisis, Severe Weather/Tornado, Shelter-in-Place and Shelter Areas, and Utility Emergencies (power outages, gas leaks).

The booklet also lists Emergency Contact Numbers, and all locations of Blue Light emergency phones.

WNKU is a Key Player

In addition, it outlines the operation of the NKU Alert System, and important to this article, WNKU. The following is from the NKU Alert System pages:

WNKU Radio – Radio station for emergency announcements.

"WNKU 89.7 FM radio is an NKU-owned public radio station that can be used during an emergency. In certain emergencies, the Department of Public Safety will request that WNKU place an announcement on the station and the public will be directed to tune to WNKU for additional information."

NKU's new Class C station in the Portsmouth, Ohio area (Scioto County), WPAY-FM, will be participating in that county's earthquake awareness and preparedness program this spring. The New Madrid fault will sooner-or-later devastate the Ohio River Valley. We must be as prepared as possible today, tomorrow and in the next century. WPAY-FM's great reach will assist in that preparedness. It is for reasons such as this that, NKU has had the foresight to retain and utilize broadcast as a core University asset.

Disaster on a Wider Scale

Consider the wide scale availability of Broadcast. Broadcast is "broad-cast!" Coming first to mind is EAS, the Emergency Alert System. While the EAS has proven its usefulness if properly setup and utilized, more important in the long run are people. People operating the stations, people facilitating communications, amateur radio operators feeding information to broadcast stations.

The author has heard first-hand stories of radio's response to hurricane Katrina, from the GM of a New Orleans station at the time. Broadcast communications in a time of stress and disaster can, and has saved many lives.

Having people available and working under difficult circumstances also requires planning. These personnel are the "ride-out" team – they ride out the emergency. This excerpt is from the KUHF Houston, Texas' disaster plan:

Ride Out Team - Essential Personnel

"When essential personnel are scheduled to report to work during the watch/warning stages, they should bring with them the following, in case they are unable to leave the campus: Several changes of clothing, personal articles such as: hygiene products, tooth brush/paste, soap/shampoo, towels/wash cloths, prescription medication, special dietary food stuffs, flashlight and batteries, bedding/pillows (Dept. will provide an air mattress).

Being Prepared

As engineers, we are quick to point out that a dead mic or dead transmitter is useless. The Nevada Broadcasting Association has put together a transmitter and technical Emergency Ascertainment Survey. Here it is. As the preamble points out:

Your answers will guide you as you set up an Emergency Operations Plan.

1. Do you have back up power for your transmitter? How often is it tested?

2. How long can you operate on your transmitter back up power system?

3. How much fuel do you have on site for your transmitter power back up system?

4. What procedures would be used to refuel your generator?

5. How would you get additional fuel to your transmitter back up power system?

6. Does your fuel jobber have an emergency plan for extended power outages?

7. Where/how would your fuel jobber get supplies if his normal source is not available?

8. Would you have to lower power to operate your transmitter on the back up power system for an extended period of time?

9. How would lower transmitter power affect your signal? Would lower power operations affect your billing?

10. Is there an alarm system to tell you when your transmitter switches to the back up power system?

11. Have you made arrangements to contact the FCC if your transmitter will be operating out-of-parameters for more than 10 days?

12. What kind of security do you have at your transmitter site? Does your transmitter site/building have an alarm system?

13. Who would your employees contact if the transmitter building alarm was activated?

14. Do your engineers wait for law enforcement assistance when responding to alarms at the transmitter site?

15. Are there duplicate/back up copies of engineering data and technical logs in case the originals are lost?

16. Is your transmitter and other equipment insured? Do you know the agent and how to contact him/her? Do your engineers know who to contact to replace equipment lost in a disaster? How long would it take to replace your transmitter or tower or other vital equipment?

The FCC uses the term "service" to our cities-of-license and the public. As broadcasters, we and our radio stations can be of great benefit. We must be prepared. We must serve.

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

Please share your disaster plan with us and your fellow readers email: editorial@radio-guide.com

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FCC Focus

License Renewal Non-Discrimination Clauses

by Peter Gutmann

Now that radio licenses have eight-year terms (remember when it was only three?), it's tempting to give little thought to the next renewal. But the current cycle of filings has begun, with radio license renewal applications in Maryland, Delaware, Virginia and West Virginia to be submitted by June 1.

Among some significant changes in the application (FCC Form 303-S), one in particular is already in effect, and demands immediate attention, even if your own renewals won't be due for a while.

New Certifications Needed

The new form will require all commercial radio renewal applicants to provide the following certification:

Non-Discriminatory Advertising Sales Agreements. *Licensee certifies that its advertising sales agreements do not discriminate on the basis of race or ethnicity and that all such agreements held by the licensee contain nondiscrimination clauses.*

Unfortunately, the scope of this seemingly simple certification is far from clear, and little meaningful guidance is yet available.

The instructions to this portion of the new form do little more than paraphrase the certification language. They read as follows:

"Applicants for renewal of commercial stations are required to complete the certification that their advertising agreements do not discriminate on the basis of race or ethnicity and that all such agreements contain nondiscrimination clauses. ... Prohibited discriminatory practices include "no urban/no Spanish" dictates. Broadcasters must have a reasonable basis for making this certification. If the response to [this certification] is "no," please attach an exhibit explaining the persons and matters involved and why the matter is not an impediment to a grant of this application."

It is essential to note that the certification is to be accurate for all agreements in effect on or after March 14, 2011, and so compliance cannot be deferred.

So what does this mean, and what are broadcasters supposed to do in order to make the necessary certification?

First, a Little Background

The concern which led to the new requirement arose in the FCC's March 2008 Report and Order entitled *"Promoting Diversification of Ownership in the Broadcast Services."* Its main thrust was to loosen the attribution rules, distress sale policy, and construction deadlines to benefit relatively small businesses (including those controlled by minorities and women).

The Commission used its report to address another concern – *"... the insidious practices of certain advertisers, rep firms and advertising agencies of imposing written or unwritten 'no urban/no Spanish' dictates ... intended to minimize the proportion of African American or Hispanic customers patronizing an advertiser's venue – or that presume that African Americans or Hispanics cannot be persuaded to buy an advertiser's product or service."* The Commission concluded that such practices were potential violations of our country's anti-discrimination laws.

Out of sensitivity to the First Amendment, the Commission did not mandate specific contract language. Rather, it elected to, *"require broadcasters renewing their licenses to certify that their advertising contracts do not discriminate on the basis of race or gender and that such contracts contain nondiscrimination clauses."*

Note that the original provision spoke in terms of race or gender. This was consistent with the Commission's diversification Report and Order, which was prompted by the need to promote media ownership by minorities and women. Even so, in May 2010, the Commission modified its advertising discrimination language to its final form, which refers to race or ethnicity.

Still More Questions

Taken literally, not only the certification itself, but also the renewal form instructions and the FCC's only explanation of its rationale, refer exclusively to advertising contracts. So it's an open question whether other methods of potential discrimination are included.

That question has prompted considerable concern within the industry and among attorneys – especially since the FCC's action arose not from a contract, but an email, and was prompted by complaints of subtle suggestions or covert understandings. *(Continued on Page 20)*

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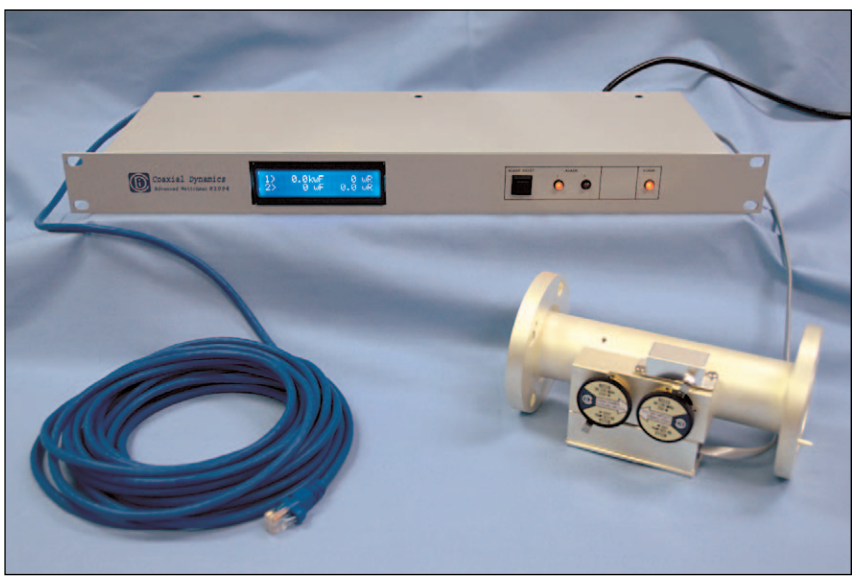

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FCC Focus

by Peter Gutmann

– Continued from Page 18 –

As of now, it's unclear whether practices outside of provisions in formal ad contracts, that might have the effect of discrimination, are covered by the new certification requirement (and, if so, to what extent).

Practical questions extend even further. Broadcasters, reps, agencies and advertisers all have underlined the rather obvious point that ads are not bought blindly or spread evenly among all media serving a given radio market. Rather, any intelligent advertising campaign applies research and strategic input to select stations and specific demographics in order to target the most likely prospects for a given message and thus maximize the impact of the expenditure. It is axiomatic that targeting a specific format or audience necessarily excludes others.

What About Targeted Ad Campaigns?

It clearly would be discriminatory to demand that ads not be run on stations with specified racial or ethnic formats or appeal. But what about the opposite?

Would it violate the new requirement (or at least its intent) if an agency were to seek a time-brokered program with a Jewish music format for a special Hanukkah promotion? Or if it specified an Italian-language broadcast to recruit vacationers to discover their ethnic roots through a trip to Italy?

Are these practices discriminatory, even though they clearly direct ad dollars away from urban or Hispanic stations in favor of other audiences?

And what about a Kwanzaa promotion that targets urban stations to the exclusion of Hispanic ones?

A final question to consider is the extent to which a broadcast station is able to monitor, much less control, the media buying decisions of advertisers and agencies – and why a broadcaster should be held responsible at all for the activities of independent outside entities. Senior FCC Media Bureau staff has commented that its requirement is tempered by a "common sense" approach. In the unlikely event that a rep openly boasts that she is placing a buy in lieu of an urban station, presumably the station should refuse it. But in more probable circumstances, the level of diligence required of a broadcaster remains an open question.

Yet, these are matters to ponder for the future and hopefully will be clarified in time. For immediate purposes, it is essential that appropriate racial/ethnic nondiscrimination language be included in every advertising sales agreement, whether written or verbal. Even if your renewal lies well in the future, you need to be sure that when the time comes, you will be able to provide the necessary certification going back to March 14.

More Renewal Changes

In addition to this crucial change, the broadcast license renewal form has been changed in three other respects.

Of greatest importance, the Commission has modified its instructions to the "environmental effects" certification, even though the certification itself remains unchanged. Previously, all renewal applicants had to conduct an RF assessment, often including measurements, to ensure that radiation exposure to workers and the public remained within prescribed limits. Now, if there has been no material change in a station's RF environment since the last grant of a station license or renewal, the certification may be based upon the information submitted at that prior time.

Minimum Operating Certification

Also, there is a new certification of adherence to a station's minimum operating schedule. Specifically, renewal applicants must certify that for any period of more than 30 day, during the preceding license term, the station has not been silent nor operating for less than its prescribed minimum operating hours.

The purpose of this certification is to ensure compliance with the FCC rule that requires notification within ten days, and application for special temporary authority within 30 days, of going silent or limiting operation below the prescribed minimum daily hours. An exhibit specifying the applicable dates is required if the thirty-day period had been exceeded.

Finally, renewal applicants will be required to certify compliance with the FCC's radio/newspaper cross-ownership restrictions.

It Could be Worse

Overall, these matters seem trivial in comparison to the burdens of the renewal process prior to deregulation. Remember ascertainment surveys? And how about filing copies of composite week program logs, along with analyses of their content? Or pledges of specific amounts of various categories of public service programs? Whether these stir headache-inducing memories, or if you entered broadcasting after their demise, you can be grateful they're long gone!

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

If you have a comment about Peter's column or if there is a legal question you would like Peter to explore in a future column, please let us know. Email us at: editorial@radio-guide.com

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Safety and Security

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

Safety and Maintenance Check-Up Time

by Ernie Belanger

Knock – Knock; "It's your friendly neighborhood OSHA inspector." Those six words are probably the second most scary words you'll hear at your station next to, "It's the FCC."

Why? Human nature. No matter how perfect your station is maintained, an inspection makes the hair on the back of our neck stand up and our chest tighten, because, try as we might, we fear somehow, somewhere the inspector will find something we might have missed.

Run a Summer Check

Although it isn't our responsibility as engineers to ensure the entire station is safe, in the spirit of being a good corporate citizen it may be worth a lot of political capital to take the lead role in doing an entire station safety check up. With the change of season to summer, this is probably the best time to do this because, for those of us whose station's buildings are free-standing, an outside check should also be done. Likewise (and this does fall within our usual realm), we should check the transmitter building out as well.

Our check-up shouldn't only be for safety issues, but also for general maintenance. Remember, it's better to get ahead of any issue we find before it becomes an expensive problem to solve. Now I'm not advocating that you do any work outside your normal duties. If there are areas that are found to have issues, it's up to station management to contract with a vendor to correct those problems. You aren't a maintenance person – you're an engineer. Let's begin our inspections on the outside.

Outside Building Check

Now that the snow has melted away for those of us in the northern part of the country, we can get a good look at what damage, if any, winter may have caused. Here's a short list of things to check outside.

1. Look at the sidewalks leading to the building: Are they flat and level or did frost distort them? Is the surface cracked or are there pieces of the walkway missing? Would a lady wearing high heels potentially catch a heel in the crack or missing area, possibly tripping her or causing a fall or a twisting injury to a knee?

2. Look at any stairs. Like the sidewalks, are they flat and level, free of cracks or voids?

3. Examine the substructure of walks and stairs to ensure that winter weather didn't weaken or wash away some of this. Leaving those problems unattended could set up a huge future repair or replacement bill.

4. Check the parking lot as well, with the same eye for trip hazzards. Have any bumps or "pot holes" appeared?

Left unattended, these issues can lead to major repairs, not to mention the potential of doing damage to staff or client's vehicles, as they bounce through the "lunar landscape" your parking lot may have become, thanks to winter weather.

Winter damaged stairs. A potential injury and possible law suit waiting to happen.

The Building

While you are outside, you should also check to see what other building maintenance needs to be done.

1. Check the paint; is it peeling or blistering? Not only does this mean it needs to be painted, but it could also be a sign that there is a larger problem hidden by the paint – moisture getting between the paint and the building surface.

2. If there are outside faucets, are they working properly or do they need repair or maintenance?

3. Check all the outlets and lights to make sure they are working and in good repair.

Consider changing the outside outlets to GFI units. That is the current code, and it could prevent electrocution when electric garden tools are being used and the area is moist, or if someone accidently cuts through a power cord with a tool.

4. Before you move inside the building, be sure to check the condition of the gutters. *(Continued on Page 24)*

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Safety and Security

by Ernie Belanger

– Continued from Page 22 –

Moving Inside

Let's start with the offices. The following checklist is provided by the State of Nevada Department of Office Safety. While some items on the list may make you scratch your head, wondering why they're there, if you think about it for a minute you will clearly see the potential for trouble. Making sure your station complies with checklist will help keep you and your employees safer.

1. Are floor surfaces chipped and uneven, does carpeting show worn spots or holes?

2. Are aisles sufficiently wide to provide easy movement without bumping into furniture?

3. Are electric and telephone cords placed where they might trip a passerby?

4. Do electrical cords look frayed or damaged? Are they draped around hooks or sharp edges, or are they stepped on?

5. Do floor mounted electric outlet boxes pose a tripping hazard?

6. Are employees allowed to stand on chairs, desk, drawers, or other improvised ladders?

7. Is the paper cutter placed in a location and position where there is enough safe room to work?

8. Are employees using pen and pencil holders with pencil and pen points up?

9. Do employees wear dangling jewelry or floppy clothing around moving machinery (i.e. wearing ties while using shredders)?

10. Are employees allowed to lean way back in chairs?

11. Do employees take caution to avoid spills while carrying liquids through the office? Are spills cleaned up promptly? Are "Wet Floor" signs accessible?

12. Are scissors, knives, razor blades and other sharp items safely stored and used?

13. Are stair handrails, tread and risers in good condition, and stairs well lighted?

14. Are non-slip surfaces provided on stairs?

15. Are floors and stairs free of liter, paper clips and scraps, etc and spills?

16. Are desk or file drawers left open?

17. Is furniture free of splinters or sharp edges?

18. Is furniture with casters easy to move?

19. Is more than one file drawer opened at once?

20. Are files top heavy, with empty drawers at the bottom and full drawers on top?

21. Are boxes, papers and books stored safely on top of files and storage cabinets ?

22. Is there adequate space under desk or workstation for employee to take cover in the event of an emergency?

23. Is there a whistle taped to the underside of desks or workstations?

24. Are transparent glass doors marked so they can be easily seen?

25. Are fire exits clearly marked, easy to access and free of obstructions?

26. Are all smoking restrictions being followed?

27. Do all employees know the location of exits, alarms, and fire pull stations? Are key personnel trained to use fire extinguishers?

28. Are employees instructed in fire reporting and emergency duties?

29. Are all flammable materials stored in metal cabinets and nonflammable fluids used whenever possible?

30. Are storage areas kept clean and orderly?

31. Are heating elements (coffee makers, griddles, portable electric heaters) safely placed and inspected on a regular basis?

32. Are file drills conducted frequently, twice a year?

33. Do fire doors close during alarm or power outage?

34. Are there any receptacles with damaged or missing faceplates? Replace them.

35. Are power strips connected together?

36. Are stairwell doors kept closed at all times?

37. Are employees instructed in proper lifting techniques to avoid back injury?

38. Are all accidents promptly reported? Do employees know who to report accidents to?

39. Are adequate first-aid supplies on hand? (Medicine not required by OSHA)

41. Is there a procedure to assist people who may be trapped in an elevator and advise of elevator malfunctions?

42. Are all elevator landings posted "Do not use elevator during an emergency or fire"?

43. Are employees aware of the written safety program and are evacuation maps posted?

44. Is there a biohazard kit available in case of an emergency? Are employees aware of its location?

I don't like long checklists any more than most of you, but they serve a purpose – to guide us in our inspection process. When it comes to safety, building and grounds maintenance, they can help us prevent a fellow worker or visitor from being seriously injured.

Disclaimer – The checklists provided are not all inclusive, and are in no way intended to be used to do a complete safety and maintenance inspection. They will give you a start in developing your own inspection checklist. Always check with your local or state office responsible for employee safety to get their input or their all- inclusive checklists. Your insurance company may also have an inspection program provided free of charge.

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Operations Guide

Notebooks, and Smartphones, and Tablets – Oh My!

by Chris Tarr

One question I've been asked a lot lately is what my recommendation is regarding new technology purchases. People want to know if I suggest they buy a new notebook computer, tablet, or smartphone. My answer is a resounding "It depends!" Let's take a look at each technology on it's own.

Notebooks

Notebooks have made great strides over the years, from being the more expensive, weaker-powered version of their desktop counterparts, to a tool that can break you free of your desk. Notebook computers have become every bit as powerful as desktops, and have dropped enough in price where, in most cases, I recommend one instead of a desktop, just because of the portability factor.

Granted, you can't upgrade them as easily, but the trade off is the ability to go sit on the deck on a sunny afternoon and get some work done in the fresh air! Additionally, notebooks have gotten much easier to upgrade – manufacturers have done a very good job of making memory and hard drives user replaceable, which means the most common parts that need upgrading (or fail) can be inexpensively and easily replaced. The power of a desktop, in a portable package!

A Notebook or Laptop Computer

Smartphones

Next up is the smartphone. Thanks to Google's Android OS and Apple's iPhone, today's smartphone really is a pocket-sized computer. The latest models sport processors that have more power than full sized computers had not more than a few years ago. It's not unheard of to see a phone with a 1 GHz, dual-core processor!

Of course, the apps make the phone, and as I've mentioned in a previous article, there are plenty of apps that make the life of a radio technologist or manager, easier. The obvious downsides are screen size and user interfaces. As we get older our eyes aren't what they once were and looking at things on those small screens can be troublesome. Then there's the touch-screen – some like them, many hate them! Fortunately there are many different phones on the market and it's pretty easy to find one with an actual keyboard on it.

The biggest benefits of a smartphone are portability and connectivity. It's easy to pocket a smartphone and they generally have an "always-on" Internet connection through the cell carrier, and with WiFi and there are even phones that can act as a WiFi hub, allowing a Notebook or other device to access the Internet through the Smartphone's cell connection.

Tablets Revised

The big buzz these days however, are the tablets. Tablets have been around in one form or another for many years, but just recently, thanks to Apple's iPad, they've experienced an explosion. *(Continued on Page 28)*

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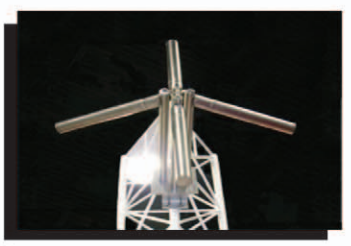

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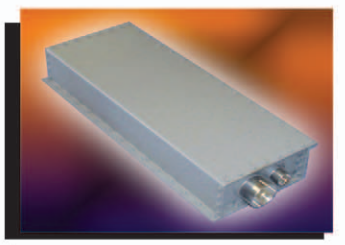

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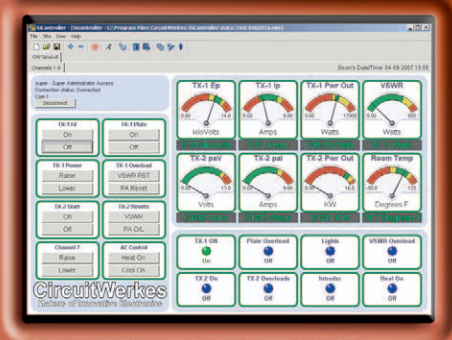

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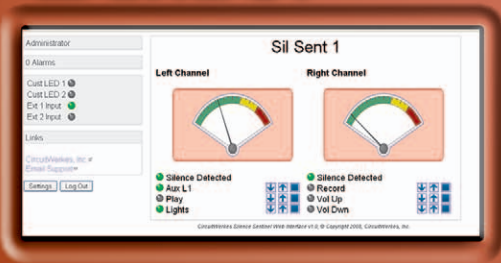

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Operations Guide

by Chris Tarr

– Continued from Page 26–

It seems that the full-fledged computer in a tablet package was too complicated and not portable enough. It simply took the right mix of features, combined with an operating system that was "light" enough not to need a hard drive, to revive this sluggish computer style. We now have the Apple iPad, and a whole slew of tablets based on the Android platform – even BlackBerry has entered the arena. The tablet devices run operating systems that are almost identical to their smartphone counterparts and they run the same apps, but on a larger screen.

Now that we have the players defined, how do you choose what will work best for you? Well there are a few questions that you can ask to help narrow down the field.

How Much Power do You Need?

If you're just going to surf the web and answer email, a tablet works great. In fact as developers gain more experience, we're seeing apps that are every bit as powerful as desktop programs. However, you won't see desktop virtualization or software that require lots of processing power. The tablets are really meant to allow the "cloud" to do the bulk of the work.

Do You Run Specialized Software?

Remember that tablets only run lightweight "apps" which means you're limited by what you can run. For example, if you like to use software to adjust your audio processing it won't run on your tablet.

You could use VNC (Virtual Network Computing – a free remote desktop program) and have it running on a different computer. Fortunately, more and more broadcast equipment manufacturers are building controls right into web interfaces, which means that all you need is a web browser – tablets are perfect for this application.

A Tablet Device

How Portable Does the Device Need to be?

While notebooks are small, they're still relatively heavy and require a spacious bag to carry the computer and all the accessories you'll need. Plus all that desktop-like performance comes with a price – shorter battery life. So while you're free for a while, there are some limitations.

Tablets and Smartphones, however, are much lighter and more portable. A pocket or tablet-sized case is all that's needed, and most have a battery life that is often measured in days rather than hours. But they do have limited memory and capability.

What Kind of Connectivity do You Need?

While notebooks and tablets now have the ability to be connected using the cellular network, be prepared to pay a fairly hefty price for the privilege. If you're not prepared to do that, you'll be limited to WiFi networks only, and while there are more and more hotspots out there, service is far from ubiquitous. That means you're "off the grid" until you find another connection. Smartphones are very handy in those situations. Sure, you'll pay for data, but generally you'll pay less to have that data bundled in with voice minutes than you would separately.

Looking at the players in this way, the decision of what is best for your needs is a bit easier. Generally if you just use a computer at home, work, and maybe the transmitter site, a notebook is an ideal companion. It can run many different kinds of software (even different operating systems) and it has plenty of space and power.

If you already have capable desktop computers wherever you go, but are looking for something that will allow you to roam around the office or house and check your email or read the latest news on line, a tablet is ideal. If you're a true road warrior, who is always on the road and travels light, a smartphone with its always-on connection and longer battery life would be a great way to go. Finally, if you're a tech-savvy guy like me, you can come up with an excuse to carry all three!

One thing I haven't touched on is the netbook. While there are plenty of nice netbooks out there, with the explosion of tablets I have a hard time recommending them, since comparatively speaking, the netbooks try so hard to do so much they don't do anything particularly well. However, there are some isolated situations where a netbook would be a good compromise.

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

Air Filters – or So They Say

by Gary A. Minker

The air filter is such a seemingly innocuous device, that should be so simple to select and install. But as you begin to think about them, the choices are many, their names are assorted, and their functions can be misleading. Some of them are great, and some scream: *"Don't use me!"*

How can an air filter be so deceptive? Let's go over some of the range of what I have run into, in my experience. We find, Hog Hair, Automotive Cartridges, Glass Floss, Foam, Cloth, Hospital Clean Room Sticky Media (HCRSM), Pleated Felt, and the big daddy – Electrostatic (inactive and passive).

With these predominant types of air filters in use (or misuse) today, we should understand their advantages and pitfalls.

Hog Hair

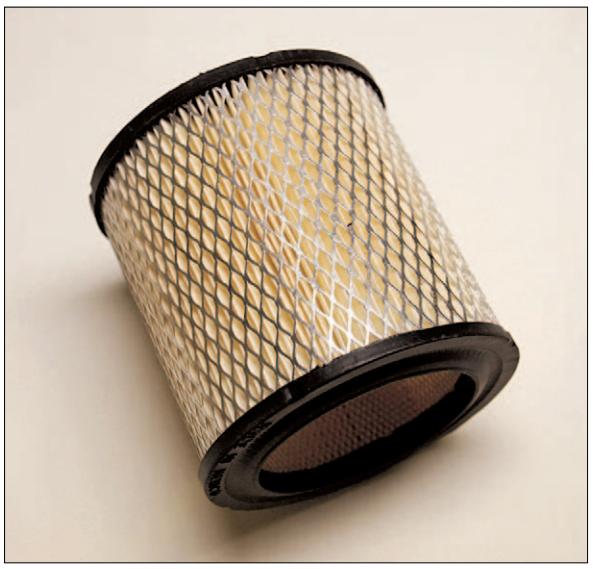
This cheap to buy, and worse to use, filter is commonly blue in color, sold in rolls, and trimmed with a scissors or clipper into the desired shape. It has very low insertion loss and good bug rejection, but it has terrible dust stopping ability. Some manufacturers even insinuate that Hog Hair filters are washable and reusable, but not ecological.

This is *not* what I want to introduce into the sensitive areas of my RF cavity – fractionalized fiberglass.

Hog Hair Filter Material

Automotive Cartridges

These amazingly good filters have been seen in TV transmitters, as well as other critical usage systems where velocity and cubic volume take a back seat to the quality of filtration. After all, if a cartridge type unit is good on your Maserati, it should work great in your IOT. These are an inexpensive, and good choice for the right application.



Automotive Cartridge Filter

Foam / Cloth

This is a "catch all" grouping that covers felts, cottons, and a number of woven or molded foam-based media that are often sold on a roll, and cut to shape by scissors. Some manufacturers might claim it to be reusable and washable. The main objection here is that the flimsy nature of the media really needs to be supplemented with another more rigid filter structure.

When a foam/cloth filter is used as a stand-alone filter, it often gets pulled in and shredded by the fan or blower, and distributed imprudently throughout the critical areas of the transmitter or power supply. Because of their make up, this filter medium makes for a dandy fire hazard and could cause you to do some fancy explaining to the boss.

(Continued on Page 32)

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Chief Engineer

by Gary A. Minker

Air Filters
or So They Say

– Continued from Page 30 –

In the presence of corona and high voltage, these products also tend to disintegrate, so my advice is to not use this medium either.

Spun Fiberglass

This carry-over from your home furnace is a low price, sort-of-effective filter for bug guts, and other larger format intrusions. Even though it seems to filter better the more it clogs up, when this happens, small particles can leak around the sides and through the fibers, making a nasty mess if the filter suffers an eventual implosion from the vacuum of a transmitter's blower.

Hospital Clean Room Sticky Media (HCRSM)

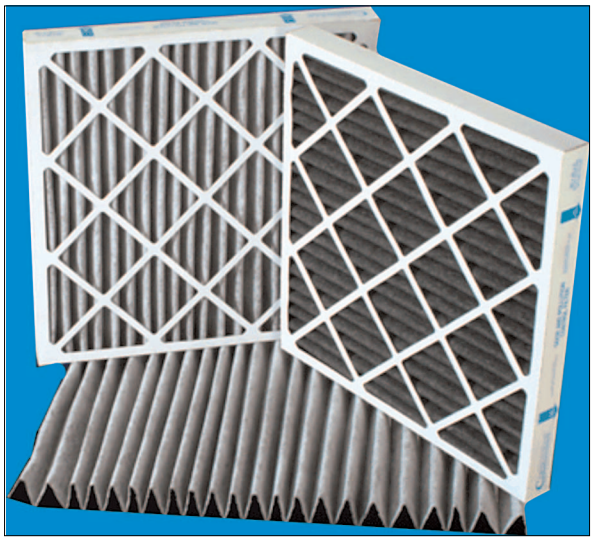
This fibrous material is used very often in the critical ventilation and filtration systems in hospital surgical wards. This fibered felt has one sticky side that attracts very small particles and dust and keeps them from eating away at the insides of your gear.

This media is often applied as a supplement to another mode of filtration, as an additional filtration step. Although HCRSM does a very nice job, it is usually changed out at a ratio of 4:1 over the conventional media, because it clogs up faster. Just don't forget to install it with the sticky side up stream, not on the leeward side of your air flow.

Pleated Filters

This is the most popular filter medium today. They are available in many thicknesses, from 1/2" to 3" in total depth. Between the type of felted material and the sheer surface area, it is an incredibly efficient and long lasting filter.

Some are available with a sticky side which emulates the HCRSM mentioned previously. These filters can run for quite a long time before needing to be changed, and can catch an amazing amount of small dirt and dust, depending on the manufacturer.



A Pleated Filter

Electrostatic – The King of Filters

Electrostatic filters have made such progress over the last 20 years, to grow from the conventional two plates with a lethal voltage charge, to various self-excited plastics and fibers that static up just from the high speed rush of the passing air. However, like any small child or animal, they require a periodic bath, and unlike conventional filters, these are renewable, eco-green, and washable.

An Electrostatic HEPA filter

You Get What You Pay For

Don't let the potential savings of a few dollars deter you from doing the right thing. Proper, quality air filtration is the key to long equipment life and extended up-time. An effective filtration system, with a proper filter replacement schedule, can also dramatically reduce the chances of an expensive arc-over on high voltage PA cavity components.

There are even creative ways to incorporate additional filtering methods into your transmitter or device. Let your imagination run wild.

Gary A. Minker owns Radio Works R.F. Consulting in Lake Worth, Florida. He can be reached phone at (561) 969-9245 or email him at: Gary@Radioworksrfconsulting.com

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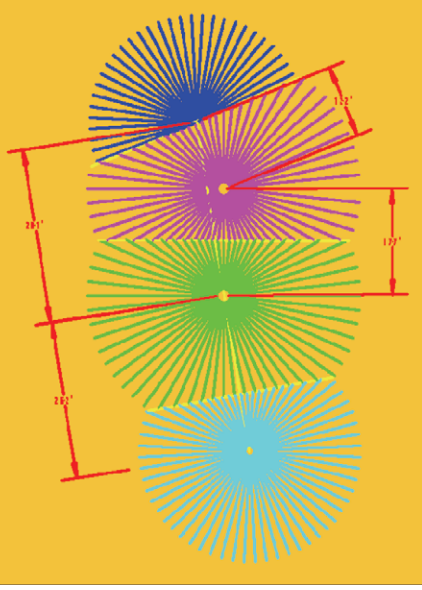

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Gear Guide — Telos – Nautel – CircuitWerkes

Telos VX System - *by Joe Mauk, KMJ-AM, Fresno, CA*

In 1988, state of the art for talk radio was the Western Electric 4A Speakerphone. 1988 was also the year I installed a Telos 10 at KMJ; on-air calls have never been the same.

Fast forward to December 2010, when KMJ began beta testing the Telos VX VoIP platform. We'd used VoIP around the business for three years; this opportunity allowed us to move on-air telephones at Peak Broadcasting's five station Fresno cluster to the next level.

VX is exciting technology that scales to support facility clustering. There was a learning curve (this was also our first time using Livewire), but Telos/Axia support was there at every step.

In our environment, VX connects to an Asterisk PBX, the "firewall" between it and our PRI/VoIP services. Integration of VX and Asterisk was seamless. VX is controlled by a sleek VSet "telephone." Those used to Telos NX consoles will find it familiar.

VX is bundled with a PC application that allows basic screener/host operations, but KMJ elected to use third-party software called PhoneBox VX, by Broadcast Bionics. Like VX, PhoneBox is a facility-wide solution, with a central database that links call handling, collects caller data, flags troublesome callers and supports contesting.

Thanks to embedded Omnia processing, call quality is superb. Even low bit-rate cell calls are greatly improved. It's now five months later, and the combination of VX with PhoneBox is a winner. **www.telosaudio.com**

Nautel VS Series FM transmitter

Nautel's new VS Series FM transmitters are unlike any other, with innovations such as IP audio, Livewire and Shoutcast support, audio backup, advanced control and optional Orban inside. Outputs of 300W, 1kW, 2.5kW are available and prices start at just $5,000.

Recently Nautel introduced the 2RU, VS HD that allows any VS Series transmitter to be easily upgraded to HD Radio transmission. A similar upgrade will enable DRM+ broadcasting as well for international customers. Now, industry-first innovations such as IP audio, Livewire™ support, Nautel's Advanced User Interface (AUI), are enhanced with this simple upgrade to digital transmission ensuring your VS transmitter is future ready.

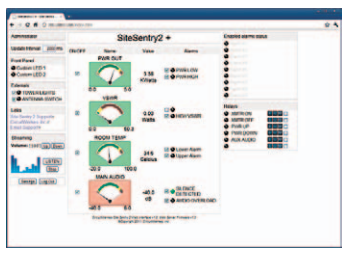
Consider some of the capabilities of the VS HD:

- 2RU digital adapter for Nautel's VS Series FM transmitters.
- Houses HD Radio exciter and Exgine card.
- When combined with the VS 1 transmitter, a VS HD provides a compact HD Radio transmitter/exciter/Exgine for what it traditionally cost for just an HD Radio Exciter.
- Add Nautel's solid state Importer Plus and Exporter Plus, and an HD2/HD3/HD4 multicast capable HD Radio solution can be created in just 7RU.
- The VS-HD can be upgraded to support asymmetrical sidebands and HD PowerBoost for maximum HD Radio broadcast power and efficiency.
- Smallest and least expensive HD Radio Transmitter/Exciter in the industry at approximately $17,000.
- The VS Series has recently been approved for LPFM applications.

www.nautel.com

CircuitWerkes Audio Streaming Feature

This summer, CircuitWerkes is expanding its existing product line with audio streaming capabilities to some products. The first products will be the SiteSentry2plus and the Audio Sentry.



The Audio Sentry is based on the, award winning, Silence Sentinal and includes all of the basic capabilities of the Silence Sentinal, but adds an e-mailing option and the ability to stream low bitrate PCM, ADPCM or 22kHz, stereo audio in Ogg-Vorbis format. Ogg-Vorbis audio is an open-source standard that is similar in quality to mp3 and can be decoded on any PC.

Like the Audio Sentry, the SiteSentry2plus will also include stereo audio confidence streaming and the ability to send e-mail alerts from the onboard webserver.

Both the Audio Sentry and the SiteSentry2plus have firmware that is field upgradable. Whenever new features are added, you can upload the newest firmware to your units without having to swap chips or return the product for an upgrade.

Confidence monitoring/audio streaming will be available for many CircuitWerkes Web-enabled products starting this Fall. In addition to the SiteSentry2plus and the Audio Sentry, products with streaming capabilities will eventually include options for the Webgain4 and the Sicon-8 as well as new products that will be introduced later this year.

The Audio Sentry MSRP is $439 while the SiteSentry2plus will sell for $479. **www.circuitewerkes.com**

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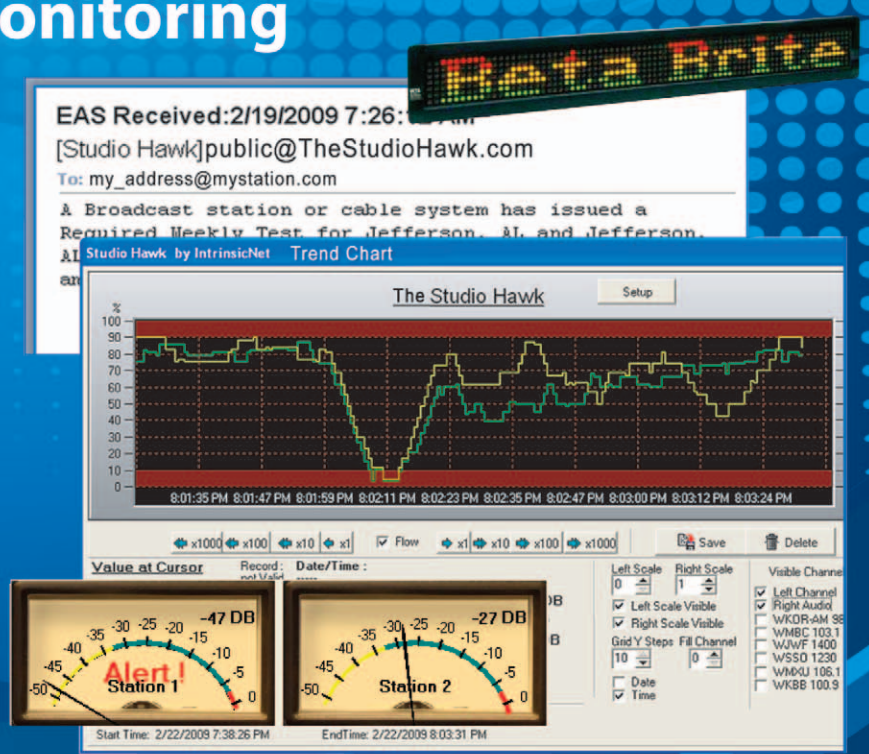

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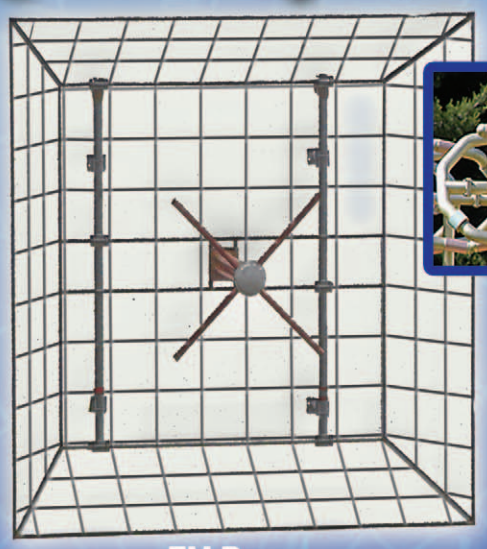

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LPFM Guide

by Leo Ashcraft

LPFM – Poised for Growth

After ten years of waiting, the floodgates for new LPFM radio station applicants may open soon. The Local Community Radio Act of 2010 (LCRA) bill was signed by president Obama in late 2010, and shortly thereafter the FCC chairman Julius Genachowski promised swift action to open the dial to new LPFM radio stations and the valuable service they provide. The Commission's definition of "swift action" is yet to be determined, but progress has finally been made. The new Rules will expand low power radio opportunities, and could soon open the long awaited LPFM filing window. While many speculate this window may occur before the end of 2011, I expect the window to open in the Spring of 2012.

The LCRA requires the commission to conduct an economic survey to determine the effects of LPFM stations on full power commercial FM stations. That study is to be completed by January 4, 2012. These results may affect how the Commission determines the new LPFM Rules.

Under the old LPFM rules, LPFM stations had been allocated on a minimum spacing method. The new Rules will remove nearly all the restrictions on spacings between LPFM stations and third adjacent frequency stations. The LCRA still prohibits the Commission from reducing first and second adjacent spacing. It does allow for grants of waivers of second adjacent separation in instances where the applicant can establish that the station will not cause interference.

Previous versions of the bill had failed to garner enough votes. That changed when the NAB agreed to ease third adjacent spacings, and in special cases second adjacent spacings. The new Rules will continue to protect full power stations with primary status and protection against interference from LPFM. For LPFMs that do not satisfy third adjacent spacing requirements, the Commission must provide the same interference protection required by FM translators and boosters.

Additionally, up to one year after an LPFM signs on the air on a third adjacent frequency, it must broadcast periodic announcements alerting listeners that possible interference they may be experiencing could be the result of the LPFM's operation. The announcement must instruct listeners to contact the station to report interference, which must then be reported to all affected stations within 48 hours.

FCC interpretation of secondary status includes some agency discretion to resolve conflicts between an LPFM and full power station. The Commission does guarantee some protection to LPFM stations who are encroached by full power stations that move into their signal area. Encroaching stations must warn LPFMs prior to their move, and help with costs and engineering if the LPFM must change locations.

What's Next?

The Commission must first set forth a Notice of Proposed Rulemaking to modify its existing Rules, after which time it may open an LPFM filing window after 30 days publication in the Federal Register.

There are still additional problems to wade through, such as the 13,000 translator applications filed in 2003 during "The Great Translator Invasion." Over half of these applications were filed by just 15 organizations. Those applications that were not singletons are *still* awaiting FCC processing. When this wave of applications flooded the FCC in 2003 and threatened to fill all remaining open FM broadcasting frequencies, the FCC froze the processing. They needed to find a solution that would preserve frequencies for new LPFM stations.

The Commission's solution was to place a 10-application cap on each organization. This was not a complete solution, however, as this would still give most frequencies in large cities to translators. Since the LCRA puts LPFM and translators and the same playing field, as far as secondary status goes, this throws a bit of a monkey wrench into the process. If too many of the translator applications are granted, there will be many lost chances for LPFM in larger cities – going to speculators or networks, rather than an LPFM which could produce valuable local programming.

The FCC must work through these initial issues before making the NPRM since the LCRA did not specify how to handle the LPFM/translator standoff. While no official announcement has been made concerning the NPRM, it is expected to get started in the second quarter of 2011. During the process the Commission will take public comments into consideration which will help shape the new LPFM Rules for the next filing window.

If you are interested in obtaining an LPFM station, you should take steps now to prepare for an application window. LPFM stations are available to non-profit organizations only. Don't let this discourage you from applying however. There are several options available to you. You can work with your local church or other non-profit organization, or simply start your own non-profit organization. This is a simple process which can be achieved fairly quickly and inexpensively – but it must be done before the filing of the application. The older the organization the better, as an organization established two years prior to the filing window would be given extra points in the event of multiple applicants competing for the same frequency.

Under the new LPFM Rules, only one application can be filed per organization. This should help limit speculators and large networks from gobbling up all the available LPFM spectrum from would-be true local broadcasters.

Leo Ashcraft is CEO of Nexus Broadcast. He is a broadcast consultant with over 20 years engineering experience and an avid LPFM advocate. More information at NexusBroadcast.com

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Practical Engineering

Modification to a Marti STL-10 Transmitter

by Scott Schmeling

Marti STL's have been in use in our industry for decades. We recently had a problem with one of ours.

This particular system is only used occasionally from an "auxiliary" studio. At first, when the transmit switch was turned on, everything worked fine. Then the RF output started to drop off intermittently. The time-tested "tap it lightly with your knuckle" test would usually bring the transmitter back up to full power – for a little while. When I opened it up, I found obvious signs of over-heating on the power supply board, but nothing that should indicate component failure.

Exercise is a Good Thing

I've found that quite often with Marti equipment, if you "exercise" the Molex connectors on the circuit boards (pulling the connector off then reinserting it – or even just rocking it back and forth a couple times) you can often fix intermittent-type problems. Spraying the terminals with a good contact cleaner usually makes the fix more permanent.

I tried it on the power supply. I rocked the Molex connector. It worked – the RF output was back to 10 Watts – for a couple seconds. Then I discovered the wires from the transformer to the Molex connector had become quite brittle. In fact, one of the wires broke off right at the transformer. Unfortunately, there was not enough wire left sticking out of the transformer to solder to. The transformer needed to be replaced.

The manual gave no specifications for the transformer – it just gave the Marti part number and the description "Power Transformer." Not much help if I wanted to save money and get a replacement from a "catalog" vendor.

Let's Pause the Story for a Moment

Here is some information for any of you using Marti equipment. Rick Neace, who used to work for Marti Electronics in Cleburn, Texas, now operates SRS Electronics out of the former Marti Electronics location. In fact, George Marti, himself, is sometimes there!

Rick knows the Marti equipment forward and backward, and repairs those great old "Marti Units" if at all possible. Rick's web site is www.rpu-stl.com. I decided to check with Rick to see if he could tell me what transformer I needed.

When I checke his site, I found an STL-10 modification mentioned. The web site indicates this makes the STL-10 more reliable, cooler running and quieter (no transformer humming). I found this intriguing and decided to check into it, so I called Rick and talked with him about it.

During the conversation, Rick said he does not sell parts. But he told me exactly what power supply he uses, and he gave me the Mouser Electronics stock number. From the Mouser web site I was able to download and print the spec sheets for the power supply. Somewhat to my surprise, the switching supply cost was only $34.25. My guess is the transformer probably would have cost more! I ordered the power supplies and the necessary Molex connectors and terminals, and started planning my project. (I will list all the parts at the end of the article.)

The Actual Work

This modification involves removing the transformer, the power supply board, the voltage regulator and some of the individual wires in the wiring harness. The bulbs behind the two meters are actually fed by the AC voltage from the secondary of the transformer that's being replaced, so I decided to replace the incandescent bulbs with LED's, and feed them with DC from the new supply. Besides, those bulbs seemed to be notorious for burning out. LED's should last much longer – in fact, I may *never* have to replace them again!

Double Check the Schematics

My first planning step was to check the schematics, to see for sure what I could remove and what I needed to change for the new power supply. If you have an STL-10, take a few minutes and look at the power supply schematic.

There are actually a couple of errors in it. The schematic shows the AC on pin 7 going to the junction of D2 and D3. This is actually the negative output of the bridge (which goes to ground). The AC from pin 7 should go to the D1/D2 junction. Also, the BLUE and ORANGE labels on pins 4 and 6 are reversed. (You'll see that if you follow the lines over to the voltage regulator.) Not noted on the diagram are the white/violet (pin 5) and yellow/grey (pin 8) that feed the AC to the incandescent bulbs behind the front panel meters. These are easy corrections to make, or I can email you a corrected diagram.

(Continued on Page 40)

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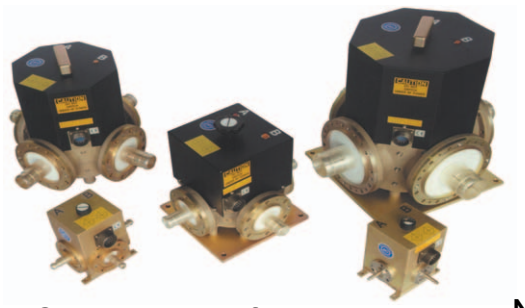

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Practical Engineering

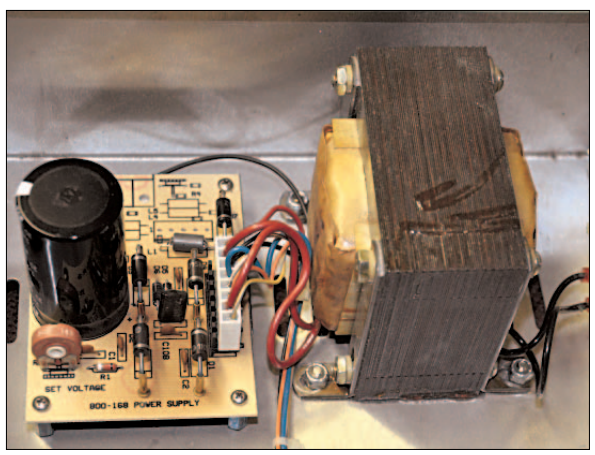
by Scott Schmeling

Marti STL-10 Modification

– Continued from Page 38 –

Let's Get Rolling

First, we removed the following components: the transformer, the power supply circuit board (800-168), and the voltage regulator board (800-168-1).



The Old Power Supply

When we removed the regulator, we also unplugged the Molex connector it goes to. The new switching supply had a 3-pin Molex AC input and a 4-pin DC output – we had to remove the terminals from the original Molex. We inserted four of them into the Molex for the new supply's output.

We also had to remove the orange and blue wires from the wiring harness, and from the top two positions of the Molex connector "heading toward" the regulator. We also removed the stand-offs that held the power supply board, and we repositioned them to mount the new supply.

Next, we planned where to place the new supply and drilled the holes for the standoff's. We oriented it with the AC input connector toward the back. The AC that fed the old transformer came from a circular housing with two 1/4" male quick-connect connectors. We had to crimp mating female connectors and pins for the Molex connectors onto two pieces of wire. The data sheet for the switching supply indicated AC Line and AC Neutral – double-check the AC wiring before you plug it in.

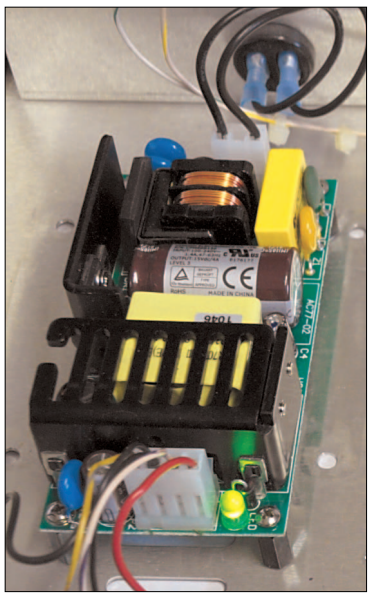
The red and black wires from the original Molex were inserted into the new supply's output connector. There were two positive and two negative pins on the supply. The red wire went to a positive, and the black went to a negative. The remaining two wires were used for the LED's that illuminated the meters. We inserted the white/violet wire in the other positive position, and the yellow/grey wire in the other negative position.

LED Hook Up

The incandescent meter lamps were fed by the AC output of the transformer through 10 Ohm resistors on each leg. You will need to remove the meter board, and locate and remove R4, 5, 6, and 7. (This model of the STL-10 has a bar-graph display to indicate modulation. Be sure to check *your* schematic, to verify you are removing the correct resistors.) I also removed the meters to make mounting the resistors and LEDs easier.

The LED's I chose were 20 ma "High Intensity" LED's from Radio Shack, and I initially biased them for maximum brightness.

I mounted them so they "stuck out" of the circuit board. The LED's focused light beam resulted in a fairly intense circle of light rather than an overall illumination, so I backed off on the biasing for a dimmer light, and bent the leads so the LED's were parallel to the back of the meter rather than pointing at it.



New Power Supply Installed

The proper resistance should be about 422 Ohms, but I chose to use two 1K resistors in place of the two original 10 Ohm resistors. The math indicates a resulting current of 5 ma. This is quite a bit lower than the 25 ma max, but it gave me the desired LED brightness.

As to be expected, the first modification took a few hours. Much of that time was measuring, double-checking, "trial and error" testing for the resistor values, etc. The second one took about half-an-hour.

I hope I've shown that this is a worthwhile modification, that's easy to do yourself.

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

Email Scott if you want a complete part's list and modified schematic.

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Small Market Guide

Streaming Audio – The Great Equalizer

By Roger Paskvan

In the last two installments, we've covered the need for your station to have a web site, and some recommendations for site building and hosting.

Now that your web page is in place, it's up to your marketing people to make it worthwhile. Remember, that a web page that is never updated becomes a dinosaur and loses its effect as a business tool. Someone must be in charge of updating and page maintenance on a regular basis.

Generating Additional Revenue

One of the most basic means of developing non traditional revenue on your web site is selling banner ads or sponsoring sections of the site. This is an important key factor – your site is not worth much to a sponsor unless you promote it and drive traffic to it. You should be sure you have a compelling reason for listeners to go to your site and then motivate them (drive them) to go there.

Some stations include a business guide on their site that is regularly promoted on the air to drive traffic to the site. The guide provides basic information for all clients, including a link to the business's website. This is a great perk to offer packaged with sponsorships

Some station sites are also offering additional features such as printable coupons in the business guide and/or the familiar "on-line radio auction" where the auction listings and gift certificates are sold.

By including these additional Internet options in a sales proposal, the small market station can provide more of an impression for its clients. The web page also provides the doorway for radio stations to adjust prices as necessary for the increased services being offered to the clients.

Streaming for Revenue

In addition to the money generating ideas we've discussed, there is an all important revenue stream that you need to have on your site – Streaming Audio. This is your station's audio available on the Internet.

More and more listeners at work are listening to radio on their office computers. Emerging technology in car radios and cell phones now gives them WiFi Internet capability, that allows your listeners to tune into their favorite stations wherever they are – across town or even out of town on business or vacation. Many stations report receiving emails from former listeners who have moved, and listen to an old familiar station as a way to stay in touch with things back home.

Streaming Impact

Think about this for a minute. Regardless of your signal coverage area, commuters can continue to listen to your station via the Internet even when they are out of range of your terrestrial signal – that is a great equalizer. You now can compete with the powerhouses in your market, or nearby markets, on a level playing field. Plus – and this is the best part – you can get software that will allow you to insert different commercial content into your streaming audio than you are running on the air. So you now have a way to potentially double your revenue.

So, if you happen to be a Non-Com this means that you can now run bona fide full commercials on your Internet stream without jeopardizing your Non-Com standing with the FCC. Don't be confused about this. What you do on the Internet does not effect your FCC Non-Com license.

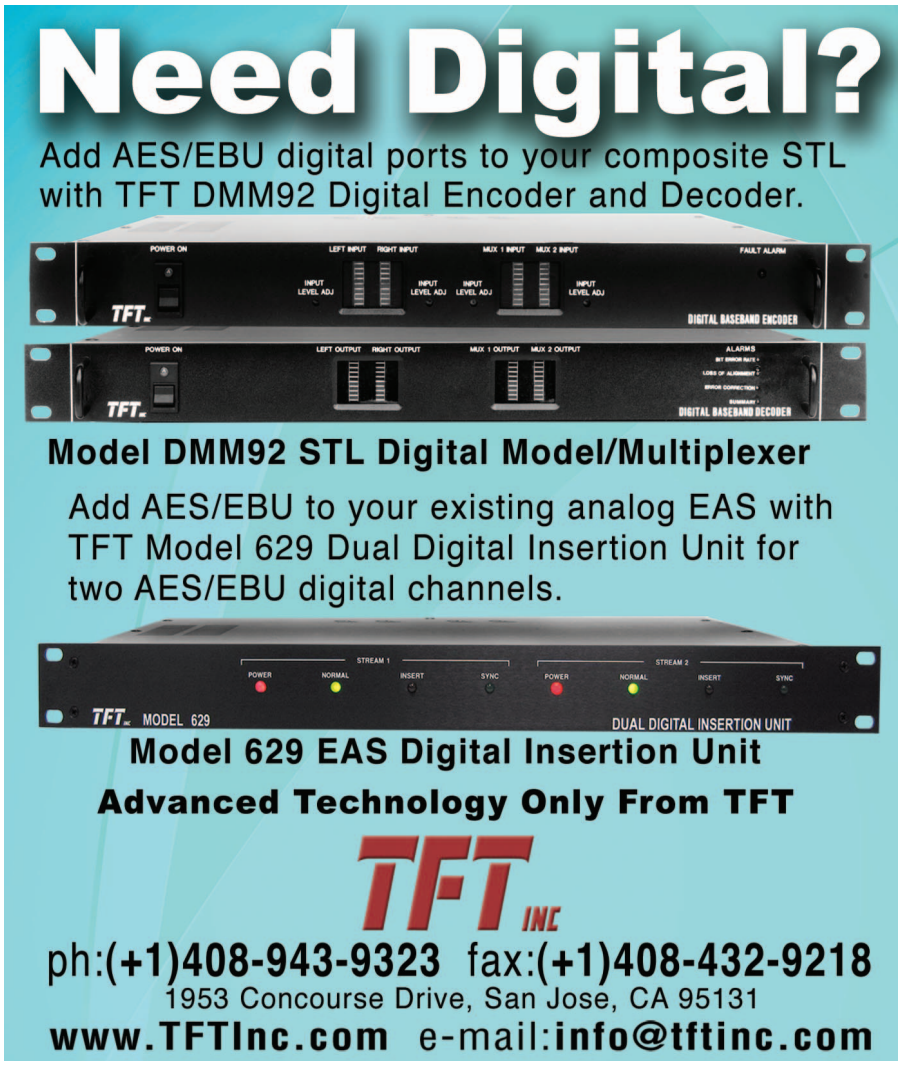
It turns out that, after all the hubbub over Internet royalties for streaming, the royalty cost really works out to be about $500 per year with the current agreements in place, for most small market stations That figure comes from the experts in that field.

Equipment and Software

It doesn't take much to stream your station: a computer with a high-speed Internet connection, an appropriate processor for streaming, and if you want to run separate commercial content on your stream, the software to do that.

The concept of networking over the Internet, banner ads, streaming audio and alternative forms of delivery are taking over. Due to the worldwide advent of the Internet, even small market radio stations can expand their income to the limit of their abilities and time. No longer is your coverage area the extent of your revenue generating potential. If you've been one of the small market stations that have been putting off getting a web site, it's past time for to become part of the 21st Century.

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



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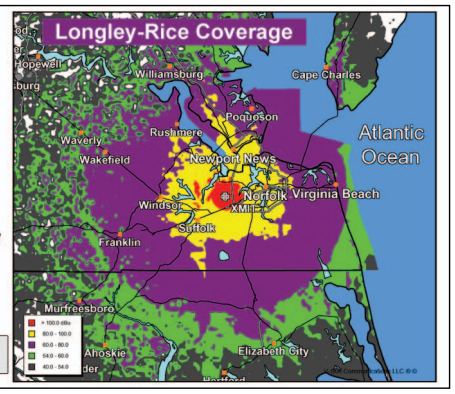

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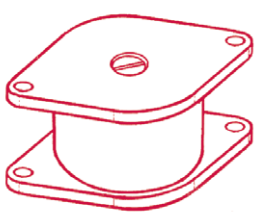

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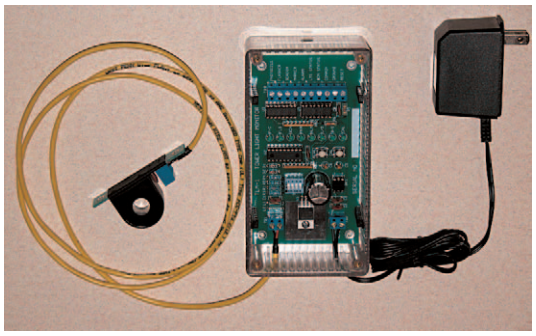

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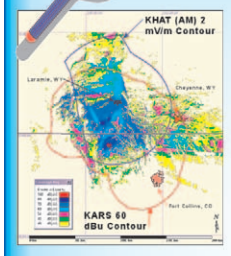

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One of Bob Cauthen's passions is flying. Here he is beside his plane.

At SCMS, they continually ask themselves, "How can we help our customers achieve their goals?" They accomplish this by listening to them, assessing their needs, and providing them with the best solutions.

In response to client feedback and advances in equipment technology, SCMS introduced a digital division in 1992. Initially, digital audio workstations created a large marketplace to replace old analog reel-to-reels and other production gear. As automation grew, so did this specialized market. The digital revolution is increasingly changing, but it is still a valuable part of the company and crosses over into many broadcast and IP-based products. Fortunately, these products have not changed as fast as the mobile phone and PC industry, but those industries continually affect broadcasting.

For the industry to maintain market share and grow, it's imperative to look for ways to achieve innovation, including all forms of content delivery. This grants the audience access to media when and where they desire.

The SCMS team continues to learn new technologies and apply them to the broadcasting marketplace. For example, podcasting, Internet radio, satellite radio and other music sources alone have influenced the traditional broadcast consumer.

When consolidation reduced the number of owners of broadcast stations, SCMS expanded throughout the U.S. and Latin America with ten field offices. Each sales representative has a deep knowledge of broadcasting and the products to fulfill their customers' needs. This expansion helps breaks the ties of region, location, and time zone.

As many companies and market shares decrease, SCMS has made strategic changes to ensure continued growth. They partner with top manufacturing companies in the industry to consolidate their strengths. For example, in 2008 SCMS became the exclusive U.S. representative for Harris studio products, and the only Harris RF channel partner in the country. This type of partnership allows SCMS to offer a deep range of products, maintain a high level of customer service, and offer competitive pricing.

Though a lot has evolved in recent years, customer service has not been compromised. SCMS prides themselves on excelling in this area. They even offer the SCMS RF Guarantee. If you buy a new transmitter from SCMS, and it goes down, they will get you back on the air with a free-of-charge loaner. These are the types of guarantees that their customers ask for, and they listen. For 35 years, they have concentrated on what they know about broadcasting and its needs, both present and future.

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SCMS is based just south of Charlotte, NC. Currently they have 23 employees. A family-oriented business, it is owned by Bob Cauthen (President), alongside Gloria Cauthen (Secretary), Matt Cauthen (Vice-President), and Ben Cauthen (Treasurer). Since inception, SCMS has had very little employee turnover, and most of the people you speak with there have been with the organization for many years.

To further address the needs of their customers, SCMS formed a property development and construction division headed up by Ben Cauthen. Their licensed engineers and contractors manage complete turnkey projects, including transmitter and studio buildings and towers. Many educational institutions require these services, and even commercial broadcasters often prefer a complete package, due to their limited resources, a result of the economy.

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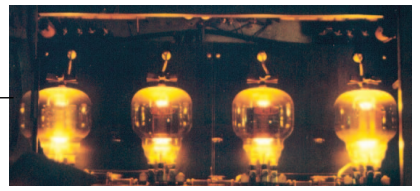

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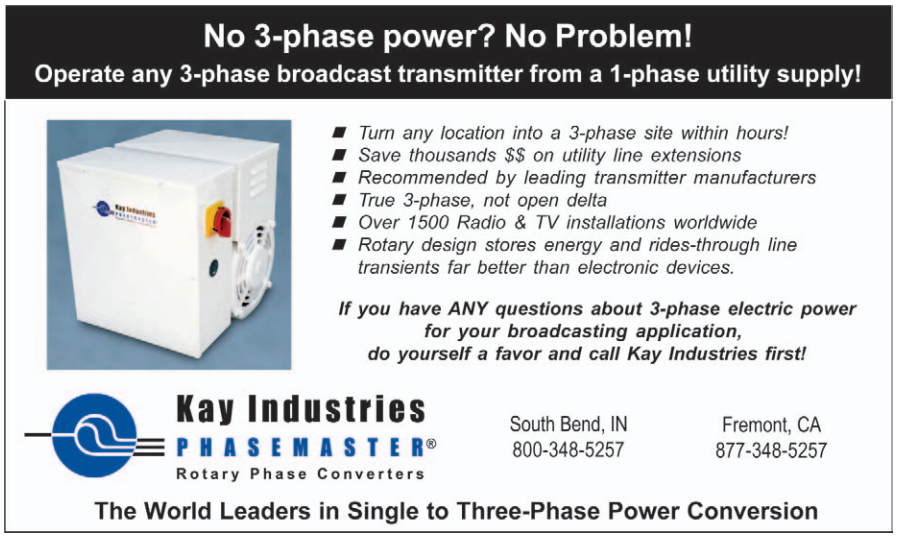

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