Radio Guide

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September-October 2011 – Vol. 19, No. 5

Shively Labs – Where FM Antennas Are Not Just a Sideline

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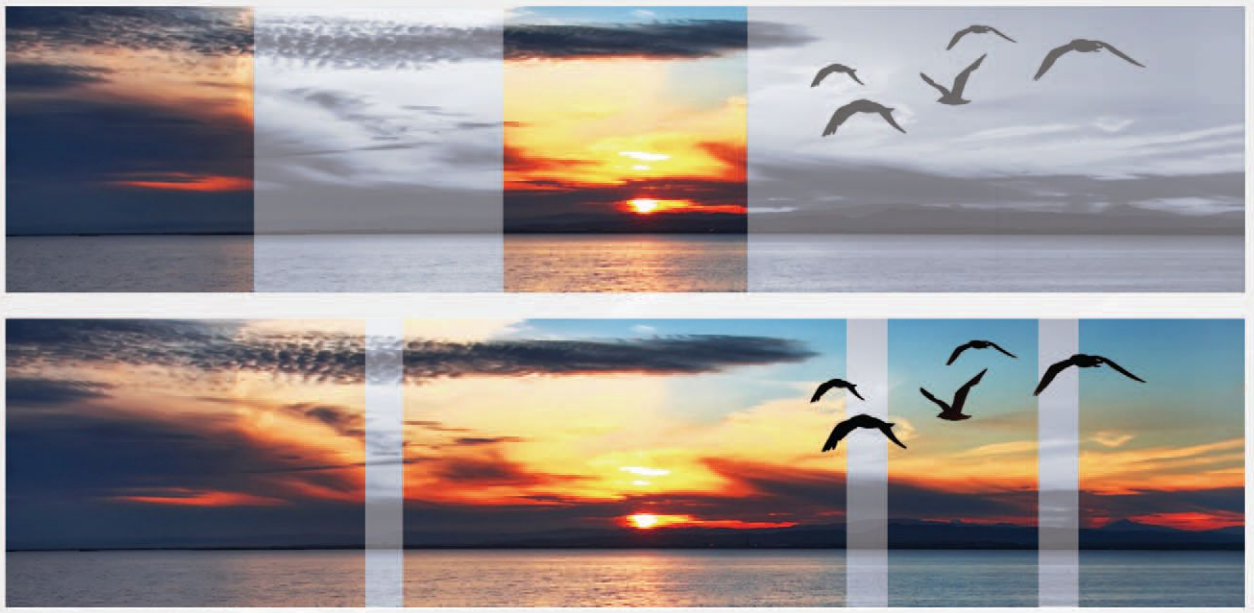

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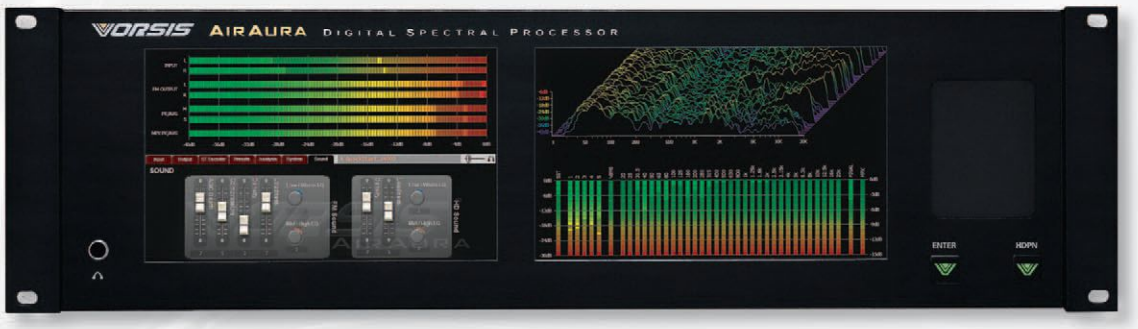

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Radio Waves

by Ernie Belanger – Editor

Winter is Almost Here

Time to dust off your winter survival kit to make sure all of the provisions are still within date code, check the batteries in your flashlight, and be sure your transmitter site "bedroom" is prepared just in case you have to spend the night in a blizzard.

It's time to give some serious thought to finishing up those last minute outside projects, if you're in an area that gets harsh winter weather. Scott Schmeling gives us advise in *Chief Engineer* on rewiring your tower lights. Something you will want to do before winter, if they have been problematic. Gary A. Minker has some safety warnings in *Transmitter Site,* Jeff Johnson discusses video security in *Safety and Security,* and I talk about post-disaster recovery in *Disaster Preparedness*. Mike Callahghan discusses keeping your frequency in check in *Practical Engineering* and Steve Callahan discusses some strange detuning situations in *Xtreme Engineering*.

In *Small Market* Roger Paskvan tells us the story of having to replace a buried transmission in Gopherland and Chris "geekjedi" Tarr passes along some ideas on how a remote control can make your life easier in *Operations Guide.* Peter Gutmann takes a trip down memory lane – remembering community ascertainments – in our *FCC Focus*. *In Studio Site,* George Zahn does some out-of-the-box thinking, with his equipment wish list for 2012. Finally, Leo Ashcraft discusses LPFM/Translator Rulemaking in *LPFM Guide.*

We're always looking for writers, so if you want to write, or you just have a story idea, drop me an email: editorial@radio-guide.com – ***Ernie Belanger, Editor***

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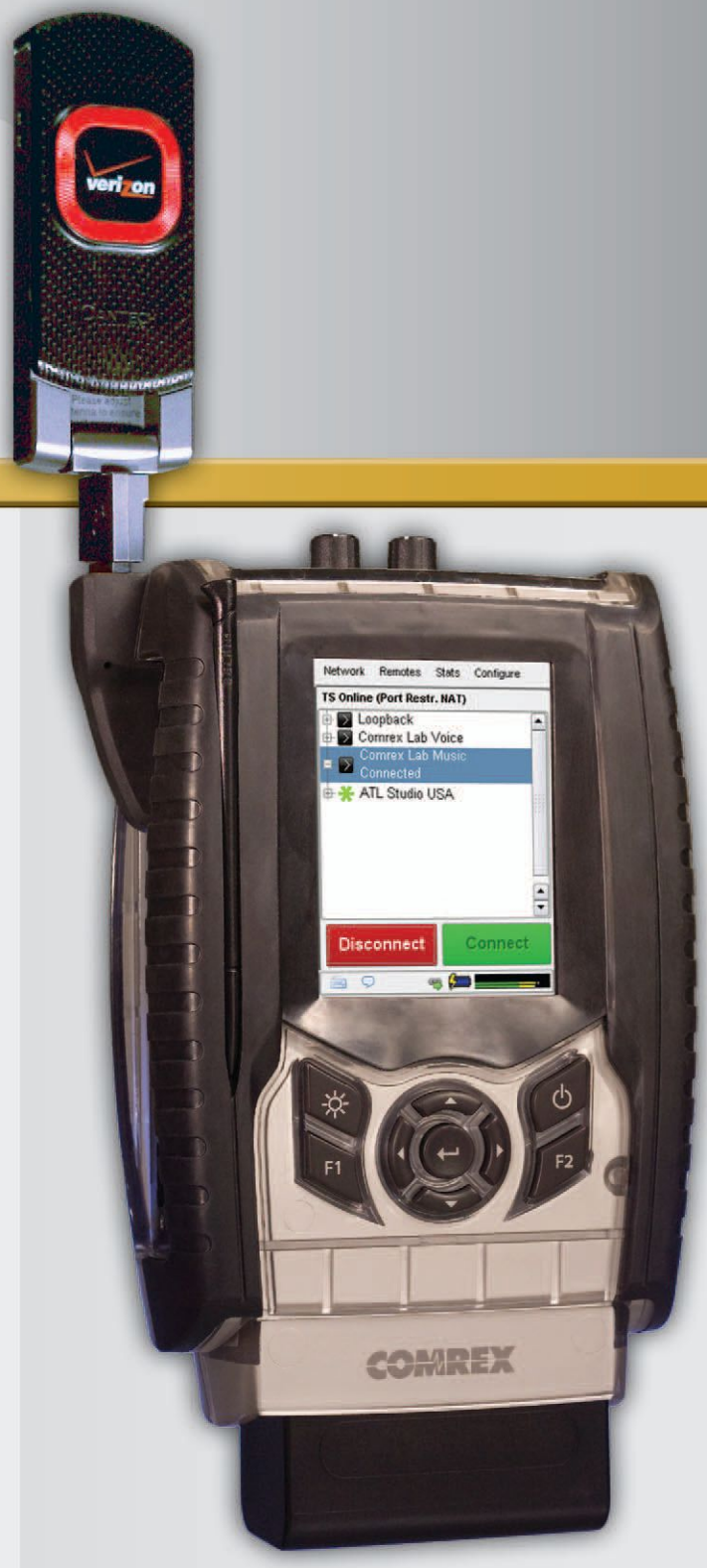

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Cover Story

by Ernie Belanger

Shively Labs

Where FM Radio Antennas Are Not Just a Sideline

I remember fondly, my first experience with Shively Labs. I was building a 100kW station in Colorado and, unhappy with other antenna manufacturers, the equipment dealer I was working with suggested Shively, and put me in touch with Bob Surrette. Bob and I discussed my tower selection, and other pertinent information, and then he computer-modeled my options to get the best coverage.

Back then, the Internet wasn't in existence, so Bob faxed me potential coverage patterns, and we discussed which pattern would be best for my needs. Thanks to Bob's efforts, we ended up with the strongest signal around – where it counted. Back then, I believed that Bob *was* Shively Labs. Like you, I now know better.

I soon learned that Shively was a company with many people working tirelessly, with an eye on quality, to produce excellent FM antennas – and only FM antennas. So now it is time to open the doors and take a peek behind them – and meet some of the men and women who, along with Bob, have dedicated themselves to us FM radio broadcasters.

Bob Surette, Paul Westcott and David Allen *(L to R)* at Paul's retirement cook out in September.

A Solid Lineage

It will come as a surprise that, like Bob, most Shively employees have been with the company over the long haul. Just recently, for example, after more than thirty years with the company, the President of Shively Labs, Paul Westcott, retired. While for decades, the names Shively Labs and Bob Surette have been synonymous, Paul has had his hand on the tiller, keeping Shively Labs on a steady course of growth, and development.

Paul was replaced by David Allen, himself a company veteran of 29 years. Longevity and stability are just two words which aptly describe Shively Labs, a company that boasts employees in place well over thirty years, with centuries of collective broadcast engineering experience in both the domestic and international markets.

Bob Surette is, of course, the majority contributor to those centuries of engineering experience, having been with the company since the early days of Ed Shively. Bob worked alongside Ed, starting back in 1974 as a very young, engineering graduate. He learned Ed's philosophy regarding patterns and the nuances of pattern adjustment.

Past, Present and Future

For those of us who don't know the entire history of Shively, it was founded back in 1963 by Ed Shively, a pioneering engineer in the newly growing field of circularly polarized FM broadcast antennas. Shively Labs has been at the forefront of the industry ever since, dedicated solely to FM Radio broadcasting.

Ed understood early on, that signal coverage was essential to the growth of every station, and being somewhat dissatisfied with the efforts of his former employer, he set out on his own. Ed developing a unique line of ring-stub radiators which remain some of the most sophisticated FM antennas on the market today. With a strong emphasis on antenna pattern purity and development, Ed's radiators favored symmetry and electrical balance, and they still dominate the industry as a directional antenna of choice.

A Transition to a Bright Future

In 1980, Shively Labs was purchased by Howell Laboratories Inc., which was managed by their still relatively new president of three years, Paul Wescott. While Howell was already focused on the design and manufacture of equipment for the United States Navy, Paul recognized that the manufacturing methods, the design requirements and even the materials used for the Navy gear, were very complimentary for both companies. While admittedly completely different product lines, they must both survive for decades in very hostile environments. Both needed to be resistant to shock, vibration, hot, cold, corrosion, and have a minimum maintenance requirement.

Since Paul's historic decision thirty-one years ago, Shively has been an integral part of Howell Laboratories, sharing the same U.S. Navy certified welders, machinists and assemblers that continue to provide systems of the highest quality installed on every Navy ship in the fleet. Shively Labs and its parent company Howell Laboratories converted to an Employee Stock Ownership Program (ESOP) in 1995 and for the past sixteen years every single employee has been vested as a part owner of the company.

Evolving Product to Meet Market Needs

Recent years have seen many changes, both to the product line, the very loyal customer base, and of course to the people which make up Shively Labs. Several years ago, Shively expanded its line of filters to cater to the lower power markets from 500 Watts through 10 kW, and the company continues to innovate and improve upon those products which are among the most compact combiners/filters available anywhere. It also introduced its own line of coaxial components from 7/8-inch through 6-1/8 inch. These products are available both as components or incorporated within Shively's many different combining and antenna systems.

Several years ago, Shively added the popular and highly efficient Model 6017 (Lindenblad) array to the traditional line of side-mount and broadband panel radiators. Since then, additional broadband antenna solutions have been added in response to demand. A new model of new high power, circularly polarized antennas will soon be introduced to serve its growing international focus. The stable theme though, is the line of antennas originally developed by Ed Shively, which offer the same excellent performance that Ed strived for in the sixties – if it works this well, why try to "fix" it. Shively's products provide a level of understated performance, and what they advertise is exactly what you will get. To quote one former customer-turned employee: "Shively was always a pleasure to work with. If they promised a level of performance, you knew that it would be achieved in practice. You just felt confident that you were making the right decision."

Strong Customer Base

Shively's customers, both at home and abroad, have always been intensely loyal, and that loyalty is now expanding to include more international markets including the Philippines, Indonesia, Malaysia and the Middle East. At home, Shively has been very active helping a large number of educational and religious broadcasters achieve their needs, especially at the lower power levels. They really do approach each sale as the beginning of a lifelong relationship. Shively takes to heart each and every customer concern, and genuinely cares about finding the right solution.

Thumbs up by the crew after a successful installation of an antenna and combiner system in Dubai. Matt Smith and Martyn Gregory are in the center.

Solid Corporate Foundation

With so many very long-standing employees, retirements have been a very infrequent occurrence at Shively Labs – until a few years ago. Since then, two long-standing and well-known sales managers, Joe "BJ" Rohrer and Edd Forke have been ably superseded by Dale Ladner and Jon Clark, both of whom were formerly with Shively in the nineties, and both of whom spent time with various competitors before returning once again. Dale and Jon collectively add more than 50 years of experience. Shively's mechanical design team comprises similar experience.

(Continued on Page 8)

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Cover Story

Shively Labs

– Continued From Page 6 –

Dennis Butterfield, Alan Plummer and Mark Cotton are responsible for product mechanical design and drafting with a combined experience of over half a century between them.

Sean Edwards tuning an FM filter.

The Sales Department

Angela Gillespie is currently the "youngest" member of the Shively sales force, joining the company in 2005. Before joining sales, her background was in mechanical design with both Dielectric and with Passive Power Products and subsequently, Andrew Corporation.

In 2006, Adam Jones, PE, joined the company from RFS and previously, Dielectric Communications, to head up mechanical engineering and design. He has subsequently taken over the direction of company-wide operations and manufacturing.

2007 saw the addition of Martyn Gregory as Vice President, after several years with Crown Castle Corporation and Richland Towers. Prior to moving to the U.S., he was with the British Broadcasting Corporation for twenty years, specializing initially in transmitter engineering and subsequently in antenna and RF systems.

Also in 2007, Sean Edwards was promoted to the position of Test and Development Engineer, and has since been intimately involved with the design of new products and the improvement of many of the legacy products offered by Shively.

In 2008, Matt Smith joined the company as an RF Technician. Smith joined Jeff Allen, to fill Sean's shoes, and since then, he has expanded his field service capabilities as far afield as the United Arab Emirates, and off the shores of Haiti, while working on Howell equipment on board the USS Carl Vinson, CVN 70.

Back to Bob

Bob Surette has held his position for over thirty years. In that time, he has helped thousands of broadcasters (including me) achieve the coverage they need, and he continues to hand out engineering advice and recommendations, based upon decades of experience and hands-on engineering. Among so many veteran employees at Shively Labs, Bob insists that, while he has mellowed a lot since his early days, he has no intention of retiring for at least another several years.

It is comforting to know that, together with Peter Long, who runs Shively's recently enlarged and modernized antenna pattern range, Bob will be taking care of broadcasters' coverage needs for many years to come. It is also a comfort knowing that, when he does finally retire, there will be a solid staff to step in and continue with the same attention to pattern detail that Ed Shively had when he founded the company – and that he passed on to Bob.

The Coverage You Want, Where You Need It

In the early days, Bob and Ed Shively would develop antenna patterns in what he affectionately refers to as the "outhouse." It was literally just that, a converted wooden outhouse building, which had been attached to a traditional Maine summer camp cottage; the camp itself became a storage facility. While the "outhouse" disappeared many years ago, the camp portion of that original test range facility was finally demolished last year. In its place, a new, larger, custom-built facility provides Peter and Bob with all the capabilities they need to develop the most complex of antenna patterns, perform the measurements, and verify that performance complies with a new Construction Permit.

But there is a down side to the demolition of the old camp. The one thing now missing from Shively's new pattern test facility is – you guessed it – an "outhouse." But that won't effect your antenna pattern.

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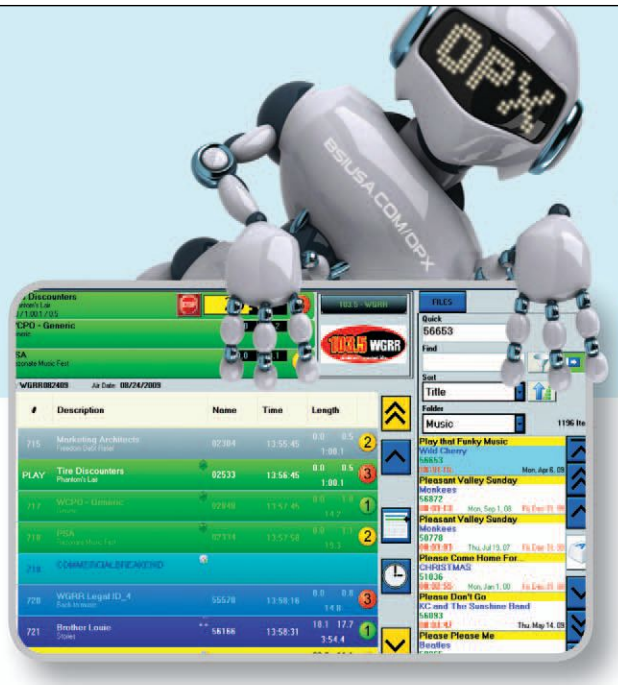

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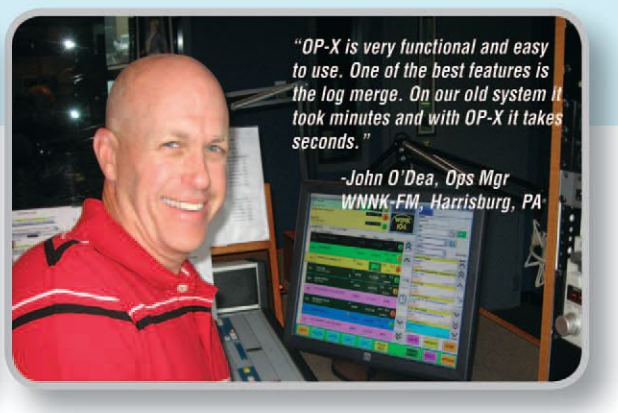

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Xtreme Engineering

By Steve Callahan

To Detune or Not To Detune

Working at a directional AM station, you always have to be aware of any new structure near your transmitter site or near your monitor points. (You do measure your monitor points at least seasonally, don't you?) New construction such as a cellular monopole can pop up practically overnight. If a cell site is to be built within 3.2 kilometers of a directional AM station, or 0.8 miles of a non-directional station, the cell operator has to pre-notify the AM station.

That pre-construction notification should consist of a measurement of your monitor points to establish a base line. Now you understand why it's important for you to measure your monitor points regularly and make sure they are within tolerance.

A typical detuning unit.

Working With the Tower's Consultant

Some of the cellular companies use a third-party consultant like Site Safe or Waterford to notify the directional AM station and perform the monitor point measurements. Personally, I always take the time to ride with the consultant to confirm that the measurements are being taken at the right place – and it actually saves the consultant's time to have me efficiently direct them from point to point.

While you may not feel this falls under Xtreme engineering, when it comes to some projects it certainly can. Once the pre-construction monitor point measurements have been taken, construction of the nearby cell site can begin. Once the new cell site is done, the consultant returns for post-construction measurements.

Ensuring Consistency

An important note is that the measurements should be taken in the same season, as they will vary with the seasonal conductivity shift. If the before and after measurements are substantially the same, no further action is needed. If there is some obvious interaction, then the cell operator is responsible for installing a detuning network on their cell tower to make the cell tower "invisible" to the AM station.

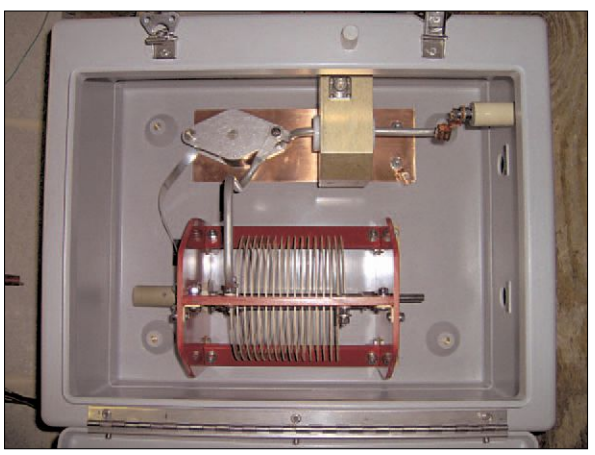
Work with the cell operator to get access to the detuning network so you can maintain it. I got a call one midday from a cell site contractor, asking me to turn off my AM station so he could finish installing a cell site on a nearby smokestack. It seemed that his workers were drawing arcs from my RF. I reminded him that it was noon on a weekday and I hadn't received any pre-notification of his construction. He then told me, "consider this your pre-notification!"

A Strange Reading Indicates Trouble

On another occasion, I was doing a monitor point run when one of my points was way out for no apparent reason. I didn't see any changes in or around the monitor point, but on my way back I noticed that a nearby cable tower, less than a half mile from the transmitter, and in the opposite direction of the funky monitor point, was being disassembled. This tower had a detuning network installed on it, but the tower crew just dropped it to the ground not knowing what it was. This little incident required some unanticipated and extensive adjustments to my array to compensate for the removal of the tower.

Be especially aware of any nearby cellular construction which involves smokestacks, or taller-than-normal telephone poles. Some cell companies feel that if they construct a non-metallic support structure site, then pre-notification is not necessary. I had to explain to more than one cell company that his thirty-six or more vertical runs of 7/8-inch coaxial cable looks like a tower to an AM station.

I got an interesting call one day from a consultant, in regard to a cell site in the null of two AM directional stations. As I approached the site, I saw that the detuning wires mounted vertically on the cell tower were flapping in the wind, and that all of the insulators to hold the vertical wires off of the tower were broken.



The suspect detuning unit.

When I checked the detuning network, I found that it was a *single-frequency* detuner – remember, this is a cell site in the null of *two* local AM directional stations. To add to the problem, an adjacent second cell tower had no detuning at all! To his credit, the consultant repaired the insulators and adjusted the single-frequency detuner for my client's station's frequency. Unfortunately, when we tried to call the main number of the second AM station, there was no answer over two days. A poorly maintained detuning network is much worse than no detuning network at all. The cell site techs often don't have the time or experience to maintain the detuning network, so volunteer to keep an eye on it for them.

What it Takes to Build One

A detuning network is not hard to build and you might have the necessary parts in your junk box right now. A waterproof metallic box, a variable cap, a variable inductor and some waterproof feed-through connectors are all that you will need. You can get real fancy and put a base current ammeter in the box and use it to indicate minimum current.

Construction of Which to be Aware

If you see a new cell tower pop up near your AM station, be especially concerned if the cell tower is close to the height of your tower. To check for reradiation of your signal by the nearby cell tower, grab your trusty field intensity meter (you do have one, or can borrow one, don't you?) and draw a visual line from the center of your array to the new cell tower.

On the line, midway between the two, take a ninety degree turn and proceed to a point that puts your array ninety degrees off of your meter's antenna, but puts the cell tower in alignment to your meter's antenna. This will null your direct signal but will allow you to see and hear any reradiated signal from the cell tower.

The Cooling Towers of Dominion Energy. They sit adjacent to the WSAR tower site in Fall River Massachusetts. One of station's towers is in the foreground of the photo.

Watch out for nearby structures which contain a lot of metal or rebar for any potential reradiation. Consultant Charley Hecht shared a picture of some power company cooling towers that he recently had to detune because they were extremely close to a neighboring AM array. I recently had a discussion with another consultant who wondered how to best detune a windmill that might be located close to an existing four tower AM array.

Finding Additional Revenue

Even though the construction of new cell sites has slowed in the past year, always be vigilant. Spread the word to your local municipal zoning and planning departments to give you a courtesy call if they receive any new tower construction proposals.

If you can, contact the cell company proposing a new nearby tower to offer to co-locate their antennas on your tower. Generally, cell companies have been told to shun collocating on AM towers, but your overture might result in some unanticipated non-broadcast revenue, and your general manager and the station owner will really remember your name.

Steve Callahan, CBRE, AMD is the Director of Engineering for Rhode Island Pubic Radio.

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Transmitter Site

How Do You Say, "*BVZST?*"

By Gary A. Minker

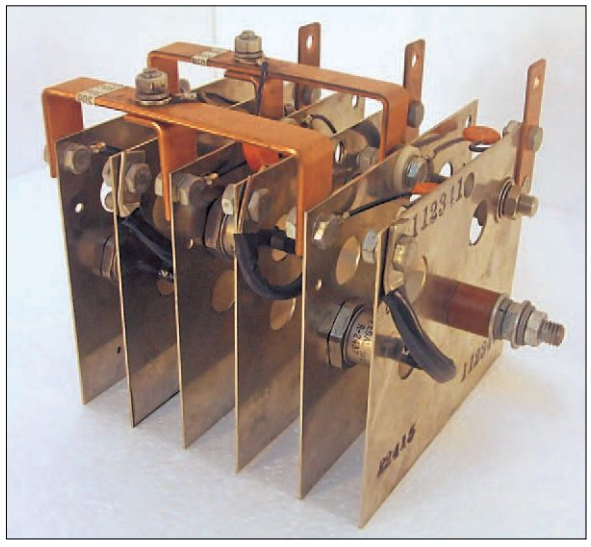
If you figured out what the title is, you have probably "lit yourself up" a time or two by touching something inside our transmitter that you either shouldn't have, or that you thought you had discharged before you touched it. Electrocution isn't such a fun word and to most of us, it is a "shocking" occupational hazard.

Results Vary

Getting "zapped" usually comes in two forms. The first is the one where you miss Sunday dinner with the family for the rest of eternity, and the other is where you make yourself mad from the embarrassment of having put your hand where it didn't belong.

National statistics for deaths by electrocution are really quite low. I maintain that when the typical civilian gets shocked from having their finger in the wrong place, they freak out so badly that they give themselves a heart attack. You and I on the other hand, as embarrassing as it may be, have likely managed to zap ourselves with alarming regularity and for all the wrong reasons.

The most common is rushing to get a station back on the air, and in doing so we side-step our safety guidelines and ultimately pay the price for that infraction. So, let's review some of the safety guidelines that we should *never* side-step.



A typical diode stack.

Grounding Sticks

These innocent pieces of safety apparatus have tried to kill more people that you could imagine. One equipment manufacturer still uses a coiled microphone cord as a conductor. The first time you discharge the monster cap in the transmitter's power supply, you vaporize all of the copper, tin and tinsel out of the cord, through a million new microscopic holes that just burned through the rubber cover. In that one simple step – "TaDa" – no more grounding stick! I know that I'm not the only one who has taken over a site, only to find one of these that was left by the previous engineer.

Now raise your hand if you're among those ranks. Use an ohm meter to test grounding cords, rather than taking the risk of assuming it's OK. Always replace coiled cords with clear, covered #10 AWG (minimum size), fine layer braided wire – this works best for grounding sticks. Oh, and if the stick is wooden, replace it with something that is non-conductive. Moist or wet wood *will* conduct along a moisture trail.

High Potting Components

This excellent method of testing power supply components has led to more smoking finger tips than a hot book of matches. Let's say you take your cool new capacitor tester with the leakage function and use it to test for insulation breakdown on the capacitors, inductors, iron cores, insulators, and wire, etc.

A transmitter power supply.

Now if you also use this fantastic tool to stress test the rectifier stack and you forgot to disconnect the stack from the rest of the power supply, the diode is charged up to 1,000 Volts DC.

Yup, you guessed it, in this situation the first filter cap sucked up that charge and gave it back to you through the rectifier stack and "BVSDT" you're zapped again. Remember even tiny burns smell really bad.

Bleeder Resistors

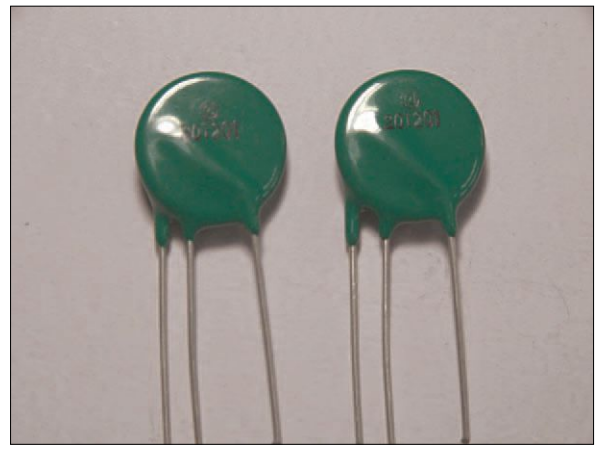
Sometimes more aptly called "bleeding" resistors, because when they fail, they often crack, and when you remove them they cut your fingers and you bleed. These handy ceramics are in place to save your life. So always replace them. Sure they put a small load on the power supply, but this has a calming effect on wild voltage transients and regenerative ripple.

And remember, by and large, the bleeder stack is there to be your friend. Just remember to be careful removing them. If you notice that the plate or bias meter reading is hanging around a bit longer than normal (about five seconds) chances are that you have a problem that might be waiting to send you to the promised land.

MOVs and Other Components

Generically a Metal Oxide Varistor (MOV) is the most common type of varistor, but where these semiconductors come into the hazard region is when they fail and then are not replaced. MOV's, arc gaps, absorbs, avalanche diodes and other Zener based devices are installed to either regulate, or provide a safety valve for runaway voltages.

These devices, like any other safety device should be inspected for proper operation and kept clean or, when you need them most, they will not be home when you call.



A Pair of MOVs.

Telco Woes

I know that none of us are afraid of a little 48 VDC but the reality of this leakage level current is that when you are salty, soaking, or covered in crud, that not only can the 48 Volts hurt you, the 130 Volt ring voltage may kill you.

There is a video running around of a technician who pierced his fingers with the sharp probes of an old analog Voltmeter and sent himself in to cardiac arrest with a "D" cell. Let's not do that, OK?

Lightning

Can we all agree that no matter what methods of grounding you subscribe to, that both waiving a golf club around in the air during a lightning storm, and working on anything attached to the 1,000 foot lightning rod that is your tower, is a bad idea? With weather radar apps being offered on your smart phone, you can easily keep an eye out for the approach of storm system.

When a storm is approaching, give yourself time to get people off the tower, stay away from the transmitter, and stay alive just in case your grounding system lets you down.

Dirt – The Final Frontier

Certainly not last, least or worst, dirt is the nemesis that can reach out and actually take the transmitter down – and if you are not careful, take your life with it. Dirt, in a word, is a highly conductive arc path for voltages down to around 500 Volts in various humidity conditions. Not to be sacrilegious, but you should get the point that a lack of cleanliness can put you in touch with your Godliness.

Our Challenge

The challenge for us engineers is to pay attention to the details. What you don't know in certain circumstances, can and will often kill you.

Keep those dust bunnies in check, and always discharge the machine after shutting off the circuit breakers or safety disconnects – *every time* you stick your hand (only one at a time please) in to the jaws of the "beast."

I know that we all take risks and we all make mistakes. The great part is that most of us are still here to know that we should do something different the next time.

Be safe, be sure! Remember to always teach safety to others so they can benefit, and not make some of the mistakes you have. The knowledge could save their life.

Gary A. Minker is the owner of Radio Works R.F. in Lake Wood, Florida. He can be reached at 561-969-9245 or via email at Gary@Radioworksrfconsulting.com

Power supply photo courtesy of Armstrong Transmitter.

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Studio Site

Thinking Out of the Box, (and Out of the Groove) for 2012

by George Zahn

With a few months remaining in 2011, it's not too early to start a high tech wish list, with an ear and an eye toward some "new toys" for 2012. Browsing publications and the multitudinous Internet banner ads that surely must dwarf the number of Santa's helpers at the North Pole, I couldn't help but stumble upon one of the items that is sure to be a radio producer's holiday headliner. A recent project sparked a second idea, and a listener's lead sent me looking for a third item that could bust Donald Trump's budget.

For starters, here's an item to be found in stations by 2012, if not sooner. I've addressed the desktop production market to help loosen log-jammed production studios. Now imagine taking a full, multi-track studio with you in the field. News Directors and producers rejoice, because now you can add "natural sound," edit interviews, and do solid multi-track production on your iPad.

To date, the apps allowing the iPad to do basic production have been out there, but the interface has been an issue. There hasn't been a major call yet, to improve the I/O portion of the iPad. That meant if you lugged a recording device of some type, you could then dump the audio into the iPad and edit away.

What's Up, Dock?

Alesis has stepped into the fray with a new device called the iO Dock, which is designed to work as an interface for the iPad or iPad2. Originally designed for musicians, the iO Dock has a pair of XLR/quarter inch inputs with individual gain control.

The switchable phantom power is an obvious nod to musicians more likely to use condenser mics. Also, not as useful for broadcasting, are built-in MIDI jacks and even a foot switch jack that can be assigned, based on an application's specific needs. The I/O quarter-inch jacks are balanced, tip-ring-sleeve.

There is a USB port as well but, according to Alesis, the port is mainly for MIDI data flow. Maybe I'm way off base, but if you already have the iPad, this is an accessory that would allow for the most professional results and interface for the device.

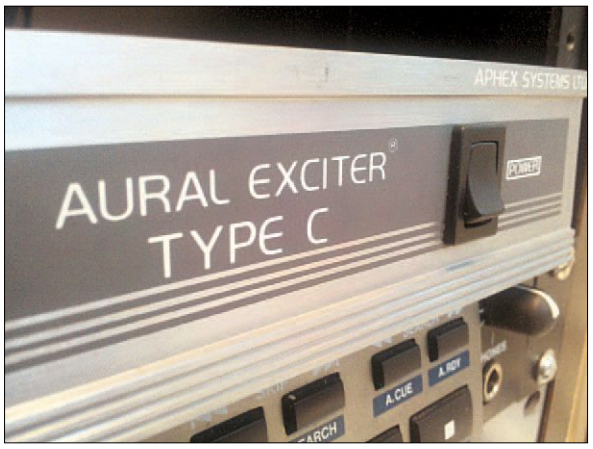
It seems only a matter of time before producers are able to create more professional field recordings, using professional microphones plugged directly into their iPads. Alesis contends that the unit is rugged enough to handle lugging to clubs and on tours.

Is iPad Up to the Task?

My biggest concern is whether the processing engine of the iPad or iPad2 could handle high quality, complex audio multi-track mixing. Dave Schram is Apple certified, and is an iPad owner, as well as an FM station operations director. While he does not own the iO Dock, he offered this take on the processing power of the iPad: "The key is to not have too many windows open. You don't want to have Apple Mail, Safari, and other apps running at the same time. But even on the basic iPad, there should be enough horses under the hood!"

The iO Dock unit itself is shaped like a wedge into which the iPad slides horizontally. The slope creates a nice user angle for editing and recording.

It has a fairly friendly retail price of $170-$200 at many outlets. I'm very interested to know if you're already using an iPad for broadcast applications, and to what extent Alesis is filling a niche for broadcasters, even though their original target was music recording and production.



"Exciting" News

The second wish list item is much more fanciful and, again, was originally designed for music production. For some producers, it has been a staple in production studios for more than thirty years. I was recently working on an audio restoration project, including some old recorded material of noted broadcast icon Ruth Lyons. The goal was to salvage very rare recordings from her 1960's programs. Adding to the challenge, was the fact that the music was recorded on a reel-to-reel recorder on a fairly cheap microphone – in front of a TV speaker.

Amazingly, some of these pieces are of tremendous fidelity for their inherent limitations. Two cascaded parametric equalizers we borrowed and brought into our studio, along with some robust clean up in Audition, put us in the ball park of making the tracks usable. Then I was hit with a "blast from the past." The producer with which I'm working brought in an old cardboard box.

In the beat up box was a 1980's vintage Aphex Aural Exciter Type C. For the uninitiated, this is a processing box that has just three basic controls per channel: Drive, Tune and Mix. What this unit has done, for countless musicians/producers and radio producers, has been to increase intelligibility and fill out bass.

Simply Magic

I still swear it's a form of black magic, because this isn't just a basic shelving equalizer. The "Drive" equates basically to an input level control. It seems to determine how much level at the key frequencies is used by the Exciter. "Tune" allows you to mold the tonality which is adjusted, and "Mix" does just that – balancing the affected signal with the original. Many years ago, I used one to help process a live recording of Merle Travis taken off an AM broadcast, and it nearly sounded like studio after the Aphex.

That type of "miracle" is rare, but even just that brief reunion on the restoration project, made me wonder how many stations might have one of these in mothballs, or racked somewhere collecting dust. It also sparked a question as to how many have ever tried one of these in a broadcast processing chain, or how it compares to the Aphex Compellor.

Big Bottom – Happy Endings?

For the record, the producer found this Exciter on eBay for well under $100. I've seen the old Type C units on eBay for a bit more, but this was indeed something that taught me that old dogs and old tricks are often reunited! Aphex has made a newer version of the Exciter with a feature called the "Big Bottom" with three more controls: Drive, Frequency and Amount, that handle the bass end of the spectrum. Aphex says the Optical Big Bottom controls deal with 10Hz-38Hz.

I tried reaching Aphex CEO David Wiener to no avail. Adding to the mystery of how the Exciter works is the official explanation I found: *"Consonants have percussive leading edges. The Aphex Aural Exciter accentuates the 'percussive edges' on consonants with our patented and proven harmonics generation process..."* I honestly believe the equations are stored alongside the KFC Colonel Sander's recipe of eleven herbs and spices somewhere in a secret vault.

The newer Exciter units retail at about $250, well within the range for a station that finds it might have some mad money at the end of a fiscal year. I'd love to know of any of your stories about the Exciter – new or old.

Beamin' and Groovin'

The final, or should I say vinyl, item on the wish list is one that might break the bank. I know a few old school broadcasters who still love to pull out the 45s and LPs. A listener tipped me off to a device that's been on the market for some time. ELP Corporation out of Japan has just introduced its latest laser record player in 2010. Imagine a record player in which no needle contacts the sides of the groove, thereby reducing any future wear from contact with a stylus.

The ELP original model dates back to 1989, and the new model also offers a de-click module for already damaged records. The unit uses five separate lasers, two for tracking, two for reading the side walls of the groove and one which reads and helps regulate the height of the laser head over the record, for those warped discs. One caveat: if you own any translucent, clear, or off-colored discs, those are the only platters that ELP says their unit will not play correctly.

The company's been hit hard by the March disasters in Japan and they are debating how many units to manufacture in 2011, so there could be a waiting list. This high-tech wish list item will not come cheap. A three speed (45, 33-1/3, and 78 RPM), laser turntable will cost you minimum of $10,000 for the most basic model.

That's a Wrap

I suppose the most important thing we can all take from a few recent life lessons that I shared here, is that even in very tough economic times, we can still scheme and dream, and plan what we'd like to do to improve our sound and performance in 2012. Some of the changes can be done fairly inexpensively and might be just the thing to enhance your station sound to make it stand out. Also, don't dismiss old techniques that have worked for decades, just because they're "old." Even flare jeans are coming back into vogue. What secrets are lurking in your storage closet?

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

Post Disaster Recovery

Reaching Out to Those in Need

by Ernie Belanger

I was recently speaking with an engineering friend about *Disaster Preparedness* and I came away from the discussion with a different perspective. One belief that he had was not quite accurate. I realized that same misunderstanding might set the tone that is shared among many managers, owners, program directors and, yes, even engineers. That opinion surmises, "Disaster Preparedness and Disaster Planning are purely conjecture."

While on the surface the above could appear to be a completely true statement, that isn't exactly what disaster preparedness is all about.

You see, disaster planning and preparedness is attempting to mitigate the effect that a disaster might have on people's lives and businesses. Now, while the planning may not be based on the exact outcome of events you or your station may have or could experience, it is developed from the likely outcome of events taken from the actual lessons learned and information gained from previous similar disasters.

A house knocked off its foundation in Prattsville, NY.

Consistent Results

Hurricanes, for example, always create strong winds and a lot of rain. This usually results in flooding. Afterwards, tornados may be potentially spawned as well. As a result, there are possible evacuations of people to safe areas above potential flood stages.

This event also includes the inconvenience and damage of power outages, possible sewer systems spills, gas leaks, cable TV and Internet interruptions, as well as interruptions in cell and land line telephone services. Public transportation issues arise and States of Emergency that prevent travel by non-essential personnel must be declared.

Many of these same results have been replicated time and time again. So if you are in an area where it is possible to be in the path of a hurricane, you should prepare and practice for a disaster plan to cover those possible events that you will most probably see – as was the recent case with Irene as it made its way up the Eastern Seaboard.

While it may be somewhat conjecture, because you're guessing at exactly what will happen should a hurricane strike, there's enough history of what normally happens to move this from conjecture, into the probable reality column. The key to a good disaster plan is to be flexible enough to make changes as we learn from one disaster to another.

Changes Save Lives

Here's an example of what I mean: let's look at Hurricane Katrina and the deplorable response of FEMA to that disaster. The plethora of errors in that response showed the agency, and the rest of us as well, just how poorly it was prepared. Post Katrina, huge changes were made in the FEMA Disaster Preparedness and response plan.

So, when Hurricane Irene was predicted to hit major population centers on the East Coast, including our largest city, New York, FEMA began moving assets into the area in advance to deal with what could have been the enormous consequences of the storm's passing.

Your Plan

Over the past issues, we've looked at your disaster plan. Planning you should have in hand to cover those likely outcomes of disasters that could effect your station and its cash flow. For this column, let's assume that your station has taken the time to make plans that can instantly be put into effect, to remain on the air and to pass vital life saving information to your listeners and others who may tune in.

In this issue, we'll look at some ideas of how your station can get involved in helping members of your community who may have lost everything in a disaster. By everything, I mean just exactly that.

By now you have probably heard of Prattsville, New York, a sleepy little Hamlet along Route 23 in the Catskill Mountains. Until Tropical Storm Irene made its way through, with three days of heavy rain, the town was virtually unknown. The flooding that resulted from the storm's passage virtually destroyed the town. It's been reported that only two buildings in the entire town were not touched by massive flood waters that reached as high as eight feet in some homes. The water's pressure moved massive two story homes off their foundations. Virtually, the entire town's population was rendered homeless by the raging waters.

Post Disaster Ideas

While this may not be an engineering function when it comes to helping after a disaster, it's "all hands on deck."

Does your station have any listening posts (receivers with amplified speakers) that could be set up in shelters so that those affected by the disaster, or their loved ones, can keep updated on the progress of the storm, power outages etc. – or simply have a means of entertainment and a distraction? As an example, perhaps you might consider having a small refrigerator that could be used to provide water or other refreshments for those stranded.

Does your station have a post-disaster plan to help residents deal with their basic needs? As proven time and time again in post disaster situations, the story becomes one of neighbors helping neighbors.

Be A Leader

Your station can be the pipeline that allows listeners not affected by the disaster to help those who were. Now is the time to sit down with the local churches, civic groups, the Red Cross, and others, to see how your station can interface with them to help coordinate fundraising, clothing, food donations, and other needs.

Should your station choose, you could run your own food and clothing campaign on the air, and then donate the food to a local organization for distribution to those hard hit by the disaster. Remember, while this may not necessarily be a technical function, in a time of need, everyone should be pitching in to accomplish the relief mission. Then too, you could be called on to set up a remote broadcast from a drop-off location, to help generate even more listener interest.

Let's explore some of the many ways your station can get involved and how planning in advance can get your emergency support plan instantly into action, so your listeners can help others in your area that may have been affected in a disaster.

A building slamming into a bridge in nearby Windham, NY. Flooding caused by Irene.

Assessing the need

First, look at the history of disasters that have hit your area. Once you have that list, take a look at the aftermath of those disasters that have struck recently in your area, or in other parts of the country. Look at the needs of those who were hardest hit. Now make a list of those needs. With that list in hand, you can now work with your promotion and programming staff to formulate a plan for on-air promotions to meet the need.

Because of the power of radio, you might want to explore needs that are often overlooked. An example of this was right after Katrina struck; the WAY–FM stations in Florida had a diaper campaign for flood victims. In a couple of days; listeners had donated enough diapers to fill two tractor-trailers.

The Red Cross told them that diapers are one of the most overlooked but needed items when there is flooding of any magnitude. Everyone apparently thinks about food and clothing but not diapers. Perhaps, this might be possibility for your station. Hold a diaper drive. Mother and babies both will be very appreciative!

This is just one of many post disaster relief efforts your station could spearhead. But remember to lay out a complete plan, including all logistics and participants now, so you won't get caught trying to plan them on the fly in the middle of a disaster. Ultimately, your station will be remembered as a caring and sharing neighbor who reached out to community members in their time of need.

Does your station have a disaster plan or a post disaster plan. Please share it with us email me, editorial@radio-guide.com

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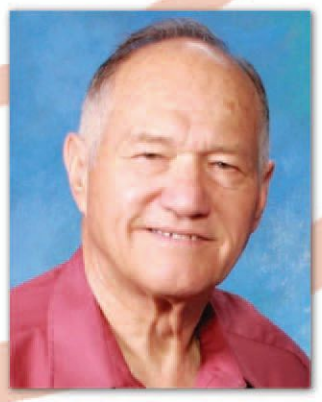

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FCC Focus

A Blast From The Past

by Peter Gutmann

Now that we're in the midst of the current station license renewal cycle, perhaps we should take a few moments to recall how much the process has changed in the last three decades.

While the current form isn't quite as streamlined as the postcard application of the 1990s, it's a far cry from the grueling process that preceded deregulation.

A Little Perspective

In preparing for the recent move of our firm's Washington office to sleek new LEED (Leader in Energy and Environmental Design) - certified quarters, I came across two ancient, yellowed documents – the 1970's version of the license renewal form and the 1976 Primer on *Ascertainment of Community Problems by Broadcast Applicants*.

For some, they may seem a mere historical curiosity, or perhaps some bizarre fiction, but for others they will bring back a flood of memories – or, more likely, migraines. Either way, reading this column may help place into perspective any perceived burdens of filling out the current renewal form.

And please bear in mind that, back then, license terms were only three years, so the process struck far more frequently.

The Good Old Days

The Commission premised its renewal process upon its statutory obligation to make an affirmative finding that the grant of any application would serve the public interest. To that end, it claimed that the renewal application required a factual demonstration that a licensee's performance during the prior license term was a sufficient predictor of future fitness.

In addition to substantial engineering and financial data, the most burdensome portion of the form focused on the now-outmoded considerations of ascertainment and programming. Ascertainment, in turn, mandated two formal surveys of community needs, whose requirements were prescribed in a detailed primer.

Gathering The Data

The first survey was of community leaders, and was to be conducted as a continuous process throughout the license term. In an effort to ensure a representative sample, the Commission published a checklist of nineteen socioeconomic elements whose leaders were to be consulted, with the burden falling on a licensee to demonstrate that one or more were not applicable in their particular area.

Leaders in each of the following groups were to be interviewed: agriculture, business, charities, civic, neighborhood and fraternal organizations, consumer services, culture, education, environment, government (local, county, state and federal), labor, military, minority and ethnic groups, organizations of and for the elderly, organizations of and for women, organizations of and for youth (including children) and students, professions, public safety, health and welfare, recreation, and religion.

A Guessing Game

How many leaders were to be interviewed? Here, the Commission was rather vague. On the one hand, it claimed that was not mandating any particular number. Yet, it also stated that conducting a specified "reasonable" number of interviews would insulate a renewal applicant from scrutiny by the full Commission. In other words, it would be a very good idea to meet the FCC's expectations! The numbers it suggested were according to the population of the city of license: at least 60 interviews for cities of 10,001 to 25,000 population, 100 for 25,001 to 50,000, 140 for 50,001 to 200,000, 180 for 200,001 to 500,000, and 220 for over 500,000. (Communities of license of less than 10,000 and outside all Standard Metropolitan Statistical Areas were exempt.)

Forced Management Involvement

The Commission further specified that management level employees were to conduct at least half of all leader interviews, including at least one in each category, and that they were to supervise all others. While informal contact and group panels were permitted, they were to be supplemental to face-to-face interviews, which were to be the staple of leader consultations.

(Continued on Page 20)

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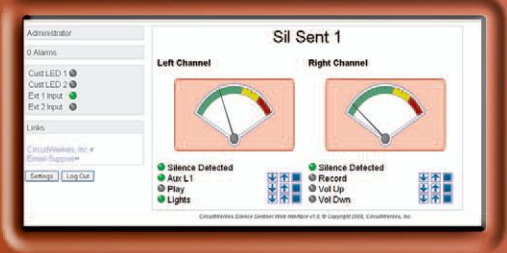

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FCC Focus

by Peter Gutmann

A Blast From The Past

– Continued from Page 18 –

Once an interview was completed, a *Leader Contact Form* was to be completed to detail the problems, needs and interests identified by the interviewee. The form was to be placed in the Public File unless a leader asked that his or her comments be kept confidential, which the Commission cautioned should be rare.

Even More Expense

The second survey was of the general public. Although the Commission did not specify a particular methodology, it did generally require that a valid survey encompass all areas within a station's service contours and that it be a random sample. Rather than rely on its own employees, many licensees hired professional organizations or statisticians from the math departments of local colleges to design and conduct the public survey.

In a forerunner of the current quarterly issues/programs lists (hopefully these sound familiar), analysis of the survey results culminated in an annual list of between five and ten significant problems in the survey area, together with programs that addressed them.

The Commission disregarded PSAs and news segments as lacking sufficient depth and required primary reliance upon full-length responsive programs. The scheduling of those programs was left to licensees: *"good faith judgment as to when broadcasts reasonably could be expected to be effective."* (Translation: none of the graveyard slots so prevalent in time brokerage agreements nowadays.) In addition to the annual lists, required Public File materials included demographic data of the service area, narrative descriptions of the public survey methodology and results, a checklist of leaders interviewed in each of the nineteen categories, and a break out of their race/ethnicity and gender.

Delivering on Your Programming Promise

But all of this was mere preparation for the most crucial part of the former renewal application – programming promise v. performance.

Each applicant was required to pledge to devote a specific amount of its weekly airtime to news, public affairs and all other non-commercial, non-sports material and to specify the maximum amount of commercial matter in any given hour. (Public affairs was defined to mean: *"programs dealing with local, state, regional, national or international issues or problems, including, but not limited to, talks, commentaries, discussions, speeches, editorials, political programs, documentaries, mini-documentaries, panels, round tables, vignettes and extended coverage (whether live or recorded) of public event or proceedings, such as local council meetings, Congressional hearings, and the like."*)

Full Commission Review

Here, too, the Commission did not mandate amounts, but rather enforced quotas indirectly by requiring that any proposals for non-entertainment programming of less than 6 % for FM, or 8 % for AM, be referred to the entire Commission for review (rather than being routinely processed by bureau staff). Similarly, the full Commission was to review any proposals to air more than 18 minutes per hour of commercials (20 in seasonal resort markets, and 22 during periods of high demand for political advertising).

To assess past performance, the promises in the prior renewal application were compared to an analysis of program logs from a "composite week," consisting of seven days selected by the Commission at random from the preceding year (i.e.: Monday June 3, Tuesday October 24, etc.). That, in turn, reflected the long-gone requirement that every station maintain program logs documenting the broadcast of every program, including spots. Any shortfall of 15% in any category required an explanation (and it had better be a pretty good one!)

Explain That Please

A further explanation was required for every hour of the composite week in which a station exceeded the applicable limit of 18, 20 or 22 minutes of commercials. And although the FCC would never even think of doubting its licensees' veracity, in order to verify licensees' claims, it further required that copies of the program logs for the composite week be filed as an exhibit to the renewal application.

As if all of that were not enough, prior to a 1976 relaxation further information had been required concerning an applicant's news staff and facilities, its policies with regard to discussion of public issues, its contribution to overall diversity provided by its programming, and its overall station management policies.

So ... while in some respects broadcasters claim to be over-regulated and aptly pine for the good old days before the crushing pressures of consolidation, new media and the economy, perhaps we should be glad that some aspects of the business have changed for the better. Surely among those is the current renewal application.

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

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Safety and Security

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

Keeping A Watchful Eye

Video Surveillance

by Jeff Johnson

A remote transmitter site, that the author is responsible for, was recently "visited" by creatures other than the resident cows, deer and snakes. Damage and loss were minimal – so far.

Absent my grandmother's hawklike eyes (and my grandfather's shotgun), how can such a site be monitored and secured? Beyond high-security fencing and locks, an active video monitoring capability will be required.

This site is quite rural, relatively inaccessible and the folks living in the region would probably know anyone making an unauthorized "visit." Even if an entry and theft occurred undeterred, video of the perpetrators, their vehicle and license number, would be of great value for prosecution.

Possible Solutions

Researching possible solutions to this problem, a vast range of equipment and services were found to be available. There is everything from professional systems, actively monitored by personnel 24/7, to inexpensive, do-it-yourself consumer gear.

In previous articles in this series, we discussed intrusion detection, fire-alarming, and touched on video surveillance. All of these security techniques require connections to the "outside-world" or, in addition, long term retention of images and intrusion information. Old-time engineers will recall that telephone companies provided "dry pairs" or "alarm lines" – those are now obsolete. Internet and wireless Internet are now available, and capable of much greater information transfer, such as real-time video.

Advanced Technology

As computer technology has advanced, data storage has become inexpensive. Cameras are everywhere, and archival video is retained indefinitely and searchable in detail. Think of the images of the Airbus landing in the Hudson River. Think of the value of video like that – of a theft at a tower site! We may not get our copper back, but we sure would have a good idea of how and when it happened, and by whom.

We engineers must assume we will be planning, installing and monitoring the system. As we begin the process, we must first decide what we want the system to do. Seeing and sensing, yes, but from what locations on the secured property? Keep in mind we have a mighty tower upon which to place cameras to view everything.

Questions to Answer

Do we want to alert on movement? Will we interconnect with wires or be wireless? Will we store the video ourselves, or will it be sent elsewhere for review or storage?

Cameras can output either analog video CCTV (Closed Circuit TeleVision) or digital IP (Internet Protocol). Either way, camera signals are sent to a central point where they are recorded on video tape or hard drives. At that central point, each camera's image can be viewed in real-time or stored images can be searched. Video, by its nature, is high bandwidth – there is a great deal of information per second. For storage, that bandwidth must be reduced. Currently, for digital transmission and storage, the data reduction of choice is called H.264 compression.

Video Compression

Quoting industry sources: *"H.264 is a next-generation video compression format. H.264 is also known as MPEG-4 AVC (Advanced Video Coding). The intent of the H.264/AVC project was to create a standard capable of providing good video quality at substantially lower bit rates than previous standards – half or less than the bit rate of MPEG-2, H.263, or MPEG-4 Part 2. Developed for use in high definition systems such as HDTV, Blu-ray and HD DVD, as well as low resolution portable devices such as Sony's PSP and Apple's iPod, H.264 offers better quality at lower file sizes than both MPEG-2 and MPEG-4 ASP (Advanced Simple Profile)."*

Picking the Right Equipment

Camera placement will differ with each installation. Camera choices to be made will be: indoor or outdoor, omni or telephoto, fixed or variable focal length, color or monochrome, built-in camera lights – probably invisible infrared LEDs – or area lights. *(Continued on Page 24)*

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Broadband Internet is everywhere. Which makes it ideal for live remotes.

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Safety and Security

by Jeff Johnson

– Continued from Page 22 –

Camera choices are virtually endless; you must also decide if you want analog CCTV or IP, bullet form or blister form, unprotected or vandal resistant, and finally wired or wireless.

Cameras can be purchased for less than $100, up to many thousands. The value of the equipment or site to be protected will be a significant determining factor. One advantage of wireless will be the inability of a perpetrator to cut cables, as there will be none!

Concealing cameras and any cables will improve security, as they will be much more difficult to locate and disable. It is important to note that systems are available that will set an alarm if a camera is disabled, shot, disconnected or spray painted.

Monitoring Systems

When camera type and locations have been determined, the next step is choosing the monitoring, storage and retrieval system. Perhaps the simplest setup is a video encoding card and software running on a computer. Both NUUO and Geovision offer cards. The NUUO Video Capture Card is described as, *"An analog encoder that compresses the video into H.264 or MPEG-4 format, PCI/PCIe compatible with audio in support."* Compatible software is loaded onto the computer to form a complete system. You can use a "composite" system that includes both digital IP and analog CCTV cameras if you choose.

Such a system includes a playback system (client) that makes browsing of video smarter and faster through intelligent search. Video enhancement tools can be used to sharpen, brighten or grey scale the images. Logs keep a record of all the events. The client playback system can be accessed remotely via IP.

Storage Systems

Many dedicated hardware capturing, compressing, storing and retrieval systems are also available. Examples of this type are by Bosch. Simple systems costing a few hundred dollars, to high-end installations costing many thousands are offered. According to Bosch, a low-cost system: *"The DVRC4C digital video recorder lets you watch every corner, hallway, door, or aisle. This high performance, economical system provides continuous video and audio recording from four cameras plus alarm handling, motion detection and local archiving."*

Complete turnkey, all-inclusive systems are readily available from consumer to professional levels. A familiar vendor, Logitech, offers the Alert™ series. This system, costing only a few hundred dollars, is based on a customer-supplied computer.

The Logitech website walks the potential user through custom configuration and camera location suggestions. As seen in the illustration, monitoring can take place remotely via Internet-connected portable devices.

Logitech AlertTM series

Once you have done all of your homework, you can decide which system or hybrid system will work best for your application. But always remember, that for greater reliability, it would be logical to choose a dedicated hardware system with more expensive cameras. Systems can be configured to trigger remote control systems, make calls or send emails.

They are just what we engineers need – additional sources of 3:00 a.m. calls! But then, would we not want to know of vandalism and theft in time to catch the criminals? A good video security system will allow us to sleep better and protect our property.

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

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Monitor and Control

Handy Remote Control Ideas

by Chris Tarr

Times have changed, and engineers are managing more equipment with less help. Our friend Murphy dictates that the urgency of the problem is inversely related to the distance of the equipment from your current location. That box that is supposed to be streaming audio to your transmitter site is locked up, and there's silence? It will only happen when you're at another site – 40 miles away.

We're continually seeing equipment that is placed in remote locations, being used to perform special tasks. Unfortunately, managing all of this equipment is becoming more and more difficult – after all, we've seen our ranks shrink for many years now, and we're finding ourselves held responsible for more equipment, in more locations than one person can reasonably handle. So, what can we do to make out lives easier?

Remote Magic

Chances are, you have the solution already installed. Modern transmitter remote controls are a wonderful thing. They have the ability to provide a wealth of information and control, especially if you think "outside the box."

For many years, the remote control unit served very simple purposes: turning the transmitter on and off, giving us transmitter readings, and telling us the status of various pieces of gear that provide that information.

What about other things in the building? Many of us over the years have taken things further, by adding temperature and tower light sensors – mostly "plug and play" solutions – that are offered by the remote control vendors. However, with a little thinking, it can do even more.

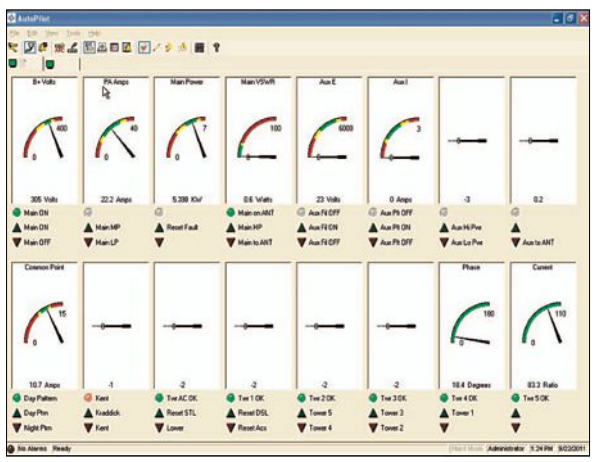
Be Creative

In my first paragraph, I mentioned a streaming box. It so happens that I have a streaming box that feeds audio from a satellite receiver to a studio 70 miles away, via the Internet. We've occasionally run into situations where the box has frozen up and stopped feeding audio. The only way to fix it was for someone to run to the transmitter site, and reboot it – not an optimal solution.

What if I could just dial the phone, and enter in a command to fix the problem? Of course – if we built a box with the appropriate relay inside, we could create a "switched outlet" that would cycle the AC mains to the streaming box, triggered by a command from the remote control. No more running to the site for that.

Intruder Alert

How about building access? Do you want to know when someone opens a building door, and don't need a full-blown security system. All you need is a magnetic door sensor (you can get them at home centers or The Shack). Simply connect it to a status channel on your remote control. Then have the remote control programmed to call you, when the opening door triggers the sensor.

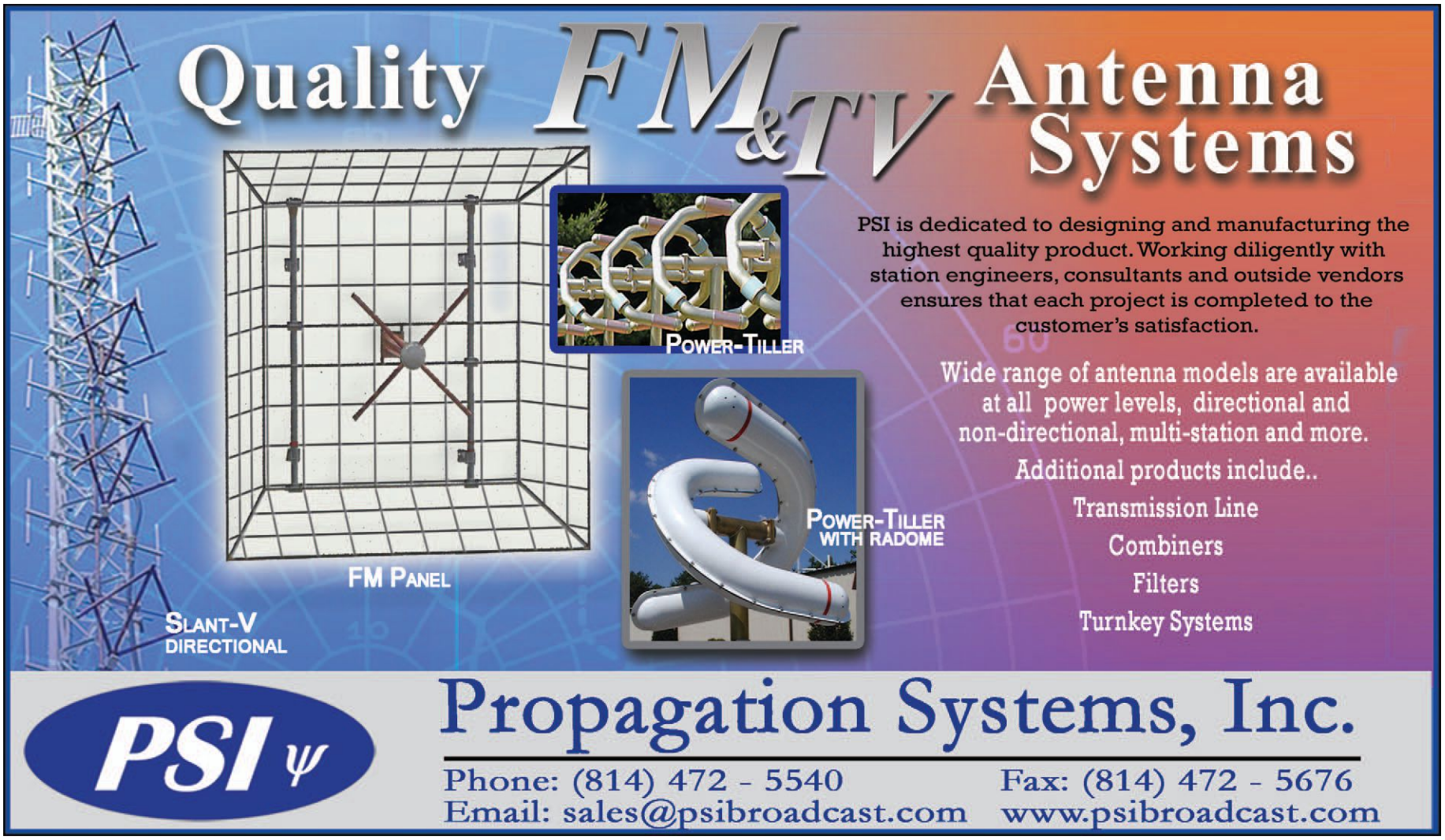


Chris' screen shot of his remote control software including monitoring of his switching.

Use Scripting to Automate Events

Modern remote controls are even more advanced and allow things like scripting. Certain inputs can trigger a chain of events – automating several steps – saving you some precious time. For example, I have an HD transmitter that I use as an analog backup.

(Continued on Page 28)



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Monitor and Control

by Chris Tarr

Handy Remote Control Ideas

– Continued from Page 26–

In order to make that happen, several steps need to occur. The analog transmitter needs to be shut down, the coax switches need to be moved into the right position, the HD transmitter needs to be shut down, switched to analog, and then turned back on. That's a lot of steps.

Fortunately, with a modern remote, all of those events can be scripted and run with two commands (it can be done with one, but I'll explain in a bit why I don't do that). All it takes is a little time to lay out the script and test it.

Back to the Streaming Box

How about that streaming box I mentioned earlier. We can feed multiple satellite receivers to it, based on time-of-day. I have an audio switcher, connected to my remote control, which is controlled by scripts that run at certain times of the day. At 5:00 a.m. it can change the switcher to channel 1, then at 10:00 a.m.switch it to channel 2. No more relying on yourself or others to hit the switch.

Another problem I solved with a remote control, was one that cropped up when we first started running our HD-2 channels. Technology hadn't caught up with the FCC rules yet, and we needed a way to insert our Public Affairs programming on the channel.

The problem was, that we were streaming the programming to our HD-2, and had no way to preload the program – though we could pre-empt whatever was on the air.

No problem! Sunday morning at 9:00 a.m., my remote control sent out two commands. One triggered a relay that was used to start a CD player, and the second command was to put the CD audio on the air. Problem solved. (We did eventually come up with a way to insert the audio in "gracefully," thank goodness.)

Some Rules to Live By

Yes, the lowly remote control can be a problem solver. However, I've also learned that you must always live by two rules:

The first: Trust, but verify. You are placing a lot of work (and probably some hacks) in the hands of "dumb" equipment. If the equipment malfunctions, things won't happen the way you'd like. Always have a way to positively verify that the system is working, and a way to be notified when it's not.

The second: Be safe. There are stories out there of engineers who set up remote controls to automatically reset faults and restart transmitters when they fail. That's a great idea – I do that as well – but be sure to build in a limit on how many times that action will happen before it gives up. You don't want to keep trying to run that transmitter into a dead short. I also never set a transmitter to automatically turn on from the "off" position, for obvious reasons.

My Transmitter Plan

For example, I have a script that monitors my main transmitter. If the transmitter trips off, it will try twice to reset it. If the transmitter still does not come up, it shuts the transmitter off completely, switches the coax switch to the backup, turns the filaments on to warm up the backup, calls me, then stops. It does not take the last step of turning the plates on. Why? Because it's always best for a human to assess the situation first – did the coax switch actually go to the right place? Is the main transmitter really off? Do the readings on the backup transmitter look good? Is there anyone working at the site that should be called?

Yes, it's true that 99 out of 100 times you could have that script do all of the work without a problem, but it's that 100th time that can keep you awake at night.

Look Beyond the Obvious

One of the reasons why people don't think to use remote controls for various events is due to their simplistic nature. Each channel gives you two relay closures, an analog voltage sample input for meter readings, and an "on-off" analog input for status.

The key is to look past that simple nature. Relay closures can make many things happen, especially if they're slaved to other relays that can be time-delayed, or held open or closed.

How about those voltage sample inputs? There's no end to the data you could sample, like building AC voltage or RF signal strength of your STL receiver. You could even take the STL "fault" closure, tie it to a status channel on your remote, and have it trigger a backup CD at the transmitter site in the event that the signal drops.

The bottom line is, that with some creative thinking, a remote control can save you from a lot of headaches and running around. All it takes is a little creativity and effort. Yes, your transmitter site may start to fill up with Rube Goldberg devices, but the end result is completely worth it.

Have you done any creative things with your remote control? Email me – I'd love to hear about it.

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

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Chief Engineer

Keeping the Lights On

by Scott Schmeling

Before I begin this article, I would like to take a moment to extend best wishes to any and all of our broadcasting brothers and sisters who were affected in one way or another by Hurricane Irene. As I was watching the news, as preparations were being made, I heard one discussion about using smart phones to get updated information, and how the wireless network might be overloaded. An official of some sort (sorry, I can't tell you exactly who) stated that the best-way to get the most accurate and current information was to listen to your local radio station. Of course, we've known that for years! But it was nice to hear someone else say it. – Scott

A Non – Broadcast Piece of Gear

As broadcast engineers, we are responsible for maintenance and proper operation of a wide array of equipment. But there's at least one item that has nothing to do with broadcasting – directly. I'm talking about your tower lights. They don't have any direct effect on our signal transmission, or audio quality, but we are required to keep them working. It's not because they're pretty. The lights provide both warnings and navigation aids for aircraft.

Tower light system controllers come in three basic flavors: 1. Strobes, 2. Incandescent lamps with solid state flashers, and 3. Incandescent lamps with a mercury switch riding on a motorized cam.

Basically, they all turn the lights on at dusk (or change from white to red), flash the beacons, and turn off at dawn. I recently had an issue with a "flavor 2" system.

Junction Box and Photo Eye. ***(Photo 1)***

The Problem

The photocell seemed to be erratic. But replacing it didn't make any difference. The circuit breaker would sometimes trip – but not consistently. One thing we did find was the "hot" lead from the photocell was open. In this installation, the photocell is mounted near the base of the tower, and the controller is mounted inside the building.

The Configuration

A conduit full of wire goes from the controller out to the bottom of a wiring junction box and photocell, mounted on the tower (see photo 1). From there a rigid conduit goes up the tower, taking the wires to their respective light fixtures. The problem with this, is that it's almost impossible to completely waterproof vertical conduit. Face it, water is going to seep in – then gravity takes over and takes that water as far down as it can go.

Sometime earlier, I had noticed signs of rust and corrosion inside the building, where two conduits were coupled together, but I hadn't thought too much about it. But on this particular day, I had a tower crew on site for another project and we started digging into the tower lights, too.

We found the red wire from the photocell actually protruding out the top of horizontal conduit running from the building to the tower. Apparently, water had dripped down, filled the conduit, and froze – bursting the conduit and damaging the wire.

The Solution

I considered the options; I could try to pull just the broken red wire, but the conduit was so full I knew I couldn't possibly pull one conductor through. Besides, I didn't know if any of the other wires had sustained any damage; chances are at least one did. I could pull all the conductors back through the conduit and replace them all, but the conduit made six, ninety-degree bends. Add to that, any corrosion from water infiltration and I knew there was no way I could pull wires back through. Besides, over time water would probably do it again.

(Continued on Page 32)

Itching for a new console? This one's half the scratch.

So, it's time to upgrade your studio. Hey, let's be real - it's way past time. You knew those analog consoles were only good for 10 years when you bought them... 15 years ago. They need resuscitation so often, you keep a defibrillator in your tool kit.

Still, your GM says it'll cost too much to replace them. That's when you make like MacGyver and whip out your secret weapon: Radius, the new IP console from Axia. You show him the pictures. You tell him what Radius can do, with its 4 program buses, automatic mix-minus, instant-recall console snapshots, one-touch Record Mode, convenient talkback and rugged machined-aluminum construction. You show him the built-in Ethernet ports you'll use to eliminate the miles of expensive cable in your ceilings, and you can tell he's already counting the money he'll save.

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Chief Engineer

by Scott Schmeling

– Continued from Page 30 –

My best option was to completely replace the conduit and wire, and reconfigure the path outside to prevent (as much as possible) any future damage. Before taking anything apart, I drew a picture of the current arrangement and measured everything. Just let me say here – it always sounds easier than it is. ("I'll just replace the wires and conduit – that's easy!")

In addition to damaging the wires and splitting the conduit, the water also corroded the threads of the conduit coupling coming out of the bottom of the junction box (photo 1). Removing the conduit took a combination of hacksaw, pipe wrench, and hammer – and more hammer, and more hammer.

Moving Forward

Once everything was down, I took all the pieces – and my drawing (complete with measurements) – to my favorite electrician. Since I don't have a conduit bender, I opted to have him cut and bend it for me. Using my measurements and drawing as a guide, and the original conduit as a pattern, he was able to bend perfect copies of my originals.

(Let me digress for just a minute. It probably would have made more sense to simply hire the electrician to replace the conduit and wire. He would have sent a two-man crew with all the parts, the tools, – and the experience to do the job. But I decided to do it myself.)

Once I had all the parts I needed, I returned to the site and went to work. My plan was to duplicate the original path of the conduit, up to the point where it reached the tower.

But then, rather than bend rigid conduit up to the box, I planned to run water-proof flexible conduit instead. Again, referring to photo 1, my plan was to run the flex to the right side of the box, and move the ventilator from the right side to the bottom so water could drain out rather than into my brand new conduit. I also included a T-connection where the flex meets the rigid, and drilled some holes in a plug in the center port (facing down) for another place for water to drain.

The finished project with flex conduit, and the drain hole facing down to allow proper drainage.

Putting it All Together

I got all of the conduit pieces in position and started pulling the wire. This is where I really wish I'd had someone helping me. Even using wire lube, pulling all the wires I needed was no easy task. I just had to pull a section at a time, but finally the wires were pulled and ready to dress and connect. A huge sigh of relief – so far so good.

The last thing to do was put the ventilator in the bottom of the junction box. This is where the downward, exiting conduit had been connected. Remember the one I used a hacksaw, pipe wrench and hammer on, because of corrosion in the threads? Well, because of all that, the threads were damaged to the point where I could not get the ventilator to screw in. I needed a 3/4 inch pipe tap to clean up the threads at the bottom of the box. But I didn't want to buy one, just to use it one time.

Don't Have a Tool – Make It

I know we've all improvised a time or two. We broadcast engineers are probably the most resourceful and creative people I know. Rather than buy a 3/4-inch tap, I decided to try to make my own. I put a threaded pipe nipple in my bench vise and cut two grooves into the threads with a hack saw. It doesn't look as pretty as a commercially manufactured tap but it did work. I was able to get the ventilator threaded into the bottom of the box. Now, water from the vertical conduit will drain out and not go into my conduit.

One last thing, if your tower lights do go out, you must notify the FAA within 30 minutes. The phone number is 1-877-487-6867. Remember to get the initials of the person you talk to for entry into your log.

Since rebuilding, the lights have worked flawlessly. No intermittents, no tripped breakers – just good, reliably operating tower lights. What's interesting is that, after going through this, I find myself looking more closely at the tower light conduit arrangement on every tower I see. It's amazing how many provide a direct downward path for water to drain right into the horizontal conduit. I may have a few more rebuilding projects in my future. Maybe I'll call an electrician this time.

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

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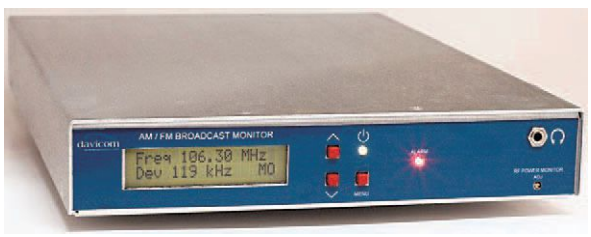
Gear Guide — Davicom - Henry Engineering - V-Soft

Davicom – *AM-FM Broadcast Monitor*

Davicom, a Division of Comlab inc., announces the release of its new AM-FM Broadcast Monitor (FMBM).



The FMBM adds AM and FM signal monitoring capability to the Davicom-MAC line of products. The unit has both high-level and low-level inputs to accommodate on-site and off-air monitoring. It can monitor AM and FM signal strength and power, AM modulation index, FM peak multiplex deviation, FM carrier frequency, Stereo pilot presence, L & R audio, RDS strings – all with user-defined threshold levels.

The FMBM interfaces to the Davicom MACs through a simple USB connection, or with GPIO signals for older MAC units. The FMBM features alarm contacts for stereo absence, high deviation, low deviation, low power and carrier frequency drift.

Davicom, a division of Comlab inc, manufactures intelligent remote site monitoring and control systems for transmitter sites and unattended studios. In business since 1984, the company's systems are used by leading broadcasters and telecom operators around the world.

www.davicom.com – 877-282-3380

Henry Engineering – *Talent Pod*

Henry Engineering has announced Talent Pod, a new product that solves the problems often encountered when doing remote broadcasts. Talent Pod is ideal for use at sports remotes and other on-location broadcasts.

Talent Pod gives an announcer control of his mic and headphones. It lets the announcer turn his mic on and off, and also lets him create a mix of Local and Return (IFB) audio in his headphones. A large illuminated MIC ON button controls the mic; the COUGH button is used to momentarily mute the mic audio.

There are inputs for Local and Return headphone audio, and two Headphone Volume controls - one is for Local audio (from the remote site mixer); the other is for Return audio. This allows the announcer to set the mix of the two. To prevent confusion, Talent Pod has two PAN switches, so the announcer can independently position the Local and Return audio in the center, left, or right channel of his headphones.

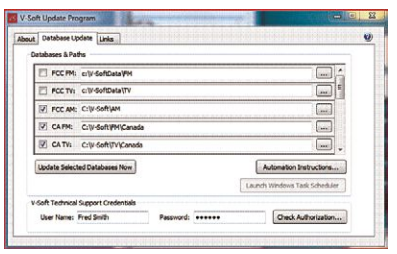
For broadcasts with multiple announcers, several Talent Pods can be used so that each announcer can control his own mic, headphone volume and Local/Return audio mix. The units are easily linked together using Cat-5 cables, eliminating the need for multiple power sources, DAs and complicated wiring.

Talent Pod is now available. The list price is $340, available from all Henry Engineering dealers.

www.henryeng.com – 626-355-3656

V-Soft – *Dynamic Database Update*

V-Soft is pleased to announce that a new system for updating various dynamic databases used by their company's AM, FM, TV and microwave allocations software is now available. In performing frequency allocations studies, it is extremely important to always use the latest FCC or Industry Canada data. In the past, the processing of downloading, unzipping and updating numerous databases to different folders was time consuming and prone to operator error. This new system contains a Windows-based interface for configuring data downloads and is intended to make the process of updating data extremely fast and easy. This program is free of charge to all client users on V-Soft's technical support program.



In addition to transparently updating the program executables, the new program will automatically determine which databases the client user is authorized to download. An initial setup is required, where the user enters the user name and password. A click of the "Check Authorization" button will show a list of databases that the user is subscribed to and authorized to update. Once the program has been set up by the user, it can be programmed to automatically update the user's entire set of data through the computer's task scheduler.

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Small Market Guide

A Spirit of Co-Operation

by Roger Paskvan

This month we will take an unusual turn, and tell a home town story about our local radio station. The town is Bemidji, Minnesota, located about 90 miles south of Canada, in the upper part of Minnesota.

KKBJ is an AM radio station serving this Bemidji area market since 1976. It is a prime example of small market economics, engineering, and shared staff, typical of most small market radio operations.

Off the Air

Our Morning Man called one morning to report the AM transmitter was off. Our PD checked and sure enough we were off the air. A quick call was placed to our local contract engineer who, after multiple trips to the three tower array, delivered the bad news, we definitely had a *big* problem, and it was with the antenna array.

There was no connection to the center tower – we were feeding a chopped off piece of coax that ended "somewhere." Now there were gopher mounds everywhere at the tower site, and I guess Heliax had become the "breakfast of champions" in gopher land.

Getting Help

Utilizing the local Cable TV folks, we made localization trials in an attempt to find the cable break. They gave up because the ground radial system was interfering with their localization equipment. The problem now became a "do it yourself" project with only staff to help, since none of the local contractors understood the reality of the situation.

We even contacted the original engineer that installed the antenna system many years ago, to verify the layout. Ultimately we decided to run a new Heliax line from the transmitter to the tower – after all, that original line was only 35 years old. The job now required locating a path through the radial wire grid – "a path through the spokes," our engineer would say. We woud be running a submarine through a mine field, and it wasn't going to be easy.

Like Needles in a Haystack

Finding radial wires buried in the ground for 35 years was a big challenge. But first, we had to cut the hundreds of Poplar trees and the grass, just to get at the ground – all those years of growth had to go. Our engineer's son tried his coin locator to see if he could pick up the copper wires. There was no response to our wires, but we did find a lot of junk in the ground and some old coins. There had to be a way to see the wires in the ground. We tried cable locators clipped onto the radials with limited success.

Finally, our engineer came up with a homemade contraption that included a ferrite loop stick antenna coil at the bottom of a PVC pipe with a 50 microamp meter at the top. The idea was to sense the current in the wires just below the ground, displaying the readings on the meter. It worked like a champ – as we passed by each wire, the meter would dip. With the help of our staff – including our GM – each wire was located and verified by digging down to it.

KKBJ GM Dan Voss

Yes, our GM got into the project. Now that's the spirit of small market radio in action. This project took several days in the field before completion. It would also be appropriate to thank the supportive wives of our staff for meals and understanding through this venture.

Project Completed

After making a clear path through the radial "mine field," we trenched a new coaxial line to our tower without cutting or damaging any wires in the gournd grid. KKBJ is proudly back on the air, thanks to the cooperation of a staff that works together to make small market radio a fun reality.

Staff cooperation, plus just "pitching in," at the small market level helps to solve local radio station problems in an emergency with an energetic spirit that still makes local radio enjoyable.

Next month, we will show how to build the device to find your buried wires, just in case that awful day comes when you may need to locate your station radials.

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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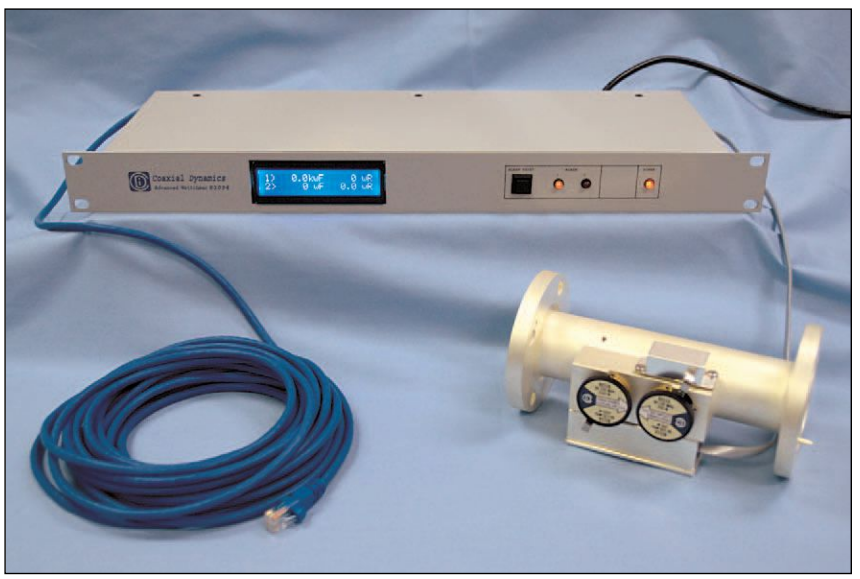

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Practical Engineering

Measuring Our Frequencies

by Mike Callaghan

Now that the Commission has seen fit to let us abandon frequency and modulation monitors, it's easy to forget that we still need to adhere to the limits in the Rules. Modulation is important, and I'll bet the vast majority of stations have a monitor, so they can be as loud as possible without going overboard too often.

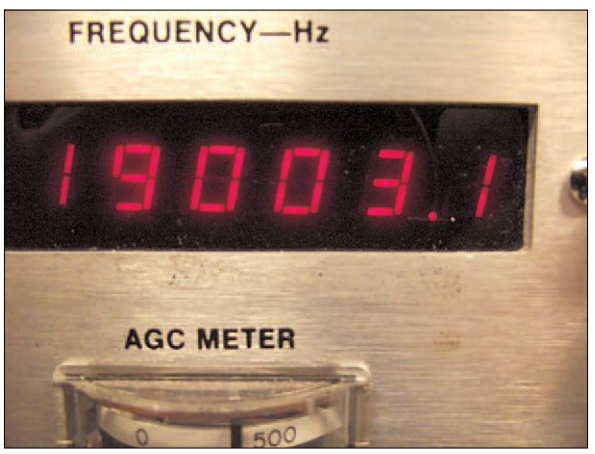
But the forgotten stepchildren – the frequency limits – are easy to ignore. Ignore them at your peril; the fine for being off frequency can easily be as much as for over-modulation. And unlike modulation, you can't misinterpret the Rules!

The Limits

FM stations have two limits to watch: the carrier frequency, which is +/- 2,000 Hz, and the stereo pilot, which is +/- 2 Hz. AM stations have to keep the carrier within +/- 20 Hz of their assignment.

Many stations use external frequency measuring services. These do an excellent job, and usually look at the signals once a month or so. But there are large broadcasters that look at the $10-$20 a month cost for these, and have opted to save the money by leaving the responsibility up to the station personnel.

If this includes you, and you've just assumed that newer equipment stays on channel, you're mistaken. While the old gear had crystals that drifted, the new stuff has frequency dividers that can unlock. A drifting crystal might put you a little off-frequency, but a confused divider chain can really lead to chaos. Would you like an example?



This photo shows a recent pilot carrier measurement in Los Angeles, from a currently available HD exciter. It regularly jumps up outside the legal limit. The manufacturer says the fix is a power off reboot. How'd you like to talk that over with your program director?

At 3.1 Hz high, the pilot's above the +/- 2.0 Hz limit. And the Commission doesn't even have to stop by to send out a Notice of Violation. All they need to do is monitor your signal with their equipment.

Check Your Equipment

Here are the steps in measuring a carrier's frequency: First, you must insure that your frequency counter is accurate. If you have a GPS Master Clock with a 10 MHz output, all you need do is connect that reference to the counter. Let the counter run a few minutes to stabilize, and then trim the internal timebase so the display shows exactly 10.000 MHz

If the counter has a 10 MHz timebase, you can use the GPS Master Clock, 10 MHz output to drive the counter. Most frequency counters will accept an external time base connected to a BNC jack on the rear. This provides the best accuracy of all – close to one part in ten million.

Should there be no GPS-based reference available, you may have to use a communications receiver that can hear 10.0 mHz. Couple a piece of wire to the counter's 10 MHz Timebase, and use that to zero-beat with WWV as heard on the receiver. (A discussion about zero–beating is on page 40, at the end of this article.)

Signal Sampling

Once you are sure the counter is accurate, take a sample of the signal being measured and feed the counter. For the 19 kHz Pilot, most stereo modulation monitors provide a raw 19 kHz sample on the rear panel.

Because you need to have 0.1 Hz resolution for this, you'll need to set the counter's gate to be open for ten seconds. Measure the pilot a number of times, as the last 1/10 of a Hz may vary depending on the dither.

Checking STL carriers can be a challenge. If the transmit dish is on a tower or otherwise inaccessible, you can try making a voltage probe (a 2-3 inch piece of wire), connecting it to the counter, and holding it close to the STL transmitter's output connector.

(Continued on Page 40)

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Practical Engineering

by Mike Callaghan

Measuring Our Frequencies

– Continued from Page 38 –

Depending on the coax, a few turns wrapped around the output cable and hooked to the counter may work. Or, if the dish is close enough to reach, you can make a 1/2 wave dipole on the end of a stick, and hold that in the field by the antenna's feed horn. For 950 mHz, the dipole should be a total of six inches long.

Digital STL's are a special case; to measure them accurately involves killing the modulation. The manufacturer provides information about making this happen.

Looking at the station carrier will involve a trip to the transmitter, unless the modulation monitor uses an RF Amplifier and can drive the counter while it's at the studio. Make sure you give the counter enough time to warm up and stabilize after being cool from the trip. Modulation does affect the accuracy, so if you can either go silent, or at least drop the modulation down very low that helps.

AM vs FM

Modern AM transmitters have a output port right after the buffer stage that has no modulation. Hook the counter to this and take a 10 second sample, to resolve down to 1/10 Hz. FM transmitters don't have a stage that's not modulated, so you can sample the carrier anywhere. If your transmitter is the only one in the area, a simple voltage probe at the end of a wire might do. If there are a lot of transmitters close by, you'll have to find a way to keep the others from interfering.

A few turns of insulated wire around the coax's outer conductor connected to the counter will often provide an adequate signal. Remember the reading will change with modulation, so take a few readings and average them.

If you have an FM station running SCAs, they deserve attention as well. Generally, SCAs are expected to be within +/- 500 Hz of the center frequency. Also, the total injection of all the SCAs should not exceed 20% of the total +/- 75 kHz deviation. SCAs are easy to measure, just hook the counter to the output of the SCA generator. If the modulation makes the reading too unstable, interrupt it for a few seconds.

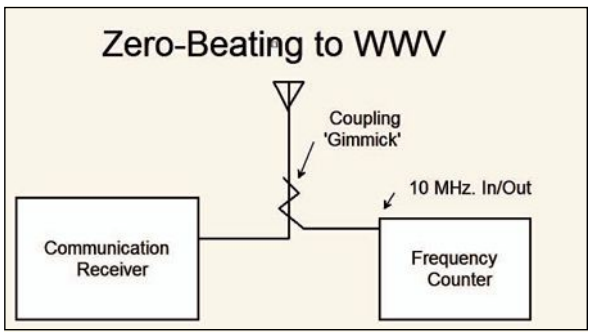
Station frequency stability isn't the issue it once was, Early AM stations used to drift all over each other. Admittedly, these days there are a lot more things to go wrong than a bad crystal oven. Your responsibility hasn't changed, so keeping an eye on the various carriers is just as important as ever.

A Review of Zero– Beating

What is "Zero–beating?" This is a way to match two frequencies and adjust them so they are both the same. The two signals are coupled together and the result is tuned in on a communications receiver.

Most frequency counters have a jack on the rear, to inject an external 10 MHz. signal. There is usually enough of the internal signal present on the same jack to use for the zero-beating. This will be our local signal to compare with WWV.

The coupling can be as simple as wrapping the lead from the local signal around the antenna cable for the receiver – this is called a coupling "gimmick." Coupling between the two is adjusted so they are about the same signal level. With the gimmick, add or remove some of the turns.



Once this is done, the frequency counter internal timebase is trimmed in frequency to match the 10 MHz WWV signal. When they are close in frequency, you will hear the difference as a tone in the receiver; this is called the beat frequency. You then trim the frequency counter timebase, to make the pitch of the tone go down – the tone will eventually become so low you won't be able to hear it. If the receiver has a signal meter, the notes will get so close together the meter will wag back and forth like a windshield wiper.

If you do have the meter, your goal will be to make it stop. Without the meter, you'll want to make the pulsating noise rise and fall as slowly as possible. (At the point the signals cancel each other out, the receiver picks up noise. As they add together, the signal peaks in amplitude.)

When this happens, the two signals will be very close together, and in the case of the frequency counter and WWV, they should be close enough to look at the signals from the radio station.

If you have comments, a suggestion for a Practical Engineering Column or if you have some tips or tricks you want to share, email us at: editorial@radio-guide.com. Mike Callaghan is the Chief Engineer at KIIS-FM in Los Angeles, CA. His email is: mc@amandfm.com

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LPFM Guide

LPFM/FM Translator Rulemaking

Filing Window Anticipated

by Leo Ashcraft

The new FM radio service known as "Low Power FM" (LPFM) was established by the FCC in January 2000. The LPFM service was originally exempted from providing protection to third-adjacent channel, full-service stations, but an Act of Congress in 2001 restored third-adjacent channel protection. Congress also prohibited the licensing of LPFM stations to any applicants that previously engaged in unlicensed operation.

Congress' passage of the Local Community Radio Act of 2010 (LCRA) has re-established a relaxation of the third-adjacent channel protection requirement for the LPFM service. On July 2, 2011 The Federal Communications Commission released the Third NPRM for the Low Power FM Radio Service (MM Docket 99-25) and the Scope of Translators proceeding (MB Docket 07-172) has been published in the Federal Register.

Publication has triggered the deadlines for public comments in the FCC's recent action to implement the Local Community Radio Act, and license more low-power FMs, and finally, reaching a compromise on the question of spectrum priority between LPFMs and FM translators.

The latest NPRM seeks comment on several proposals to implement the Local Community Radio Act (LCRA) by opening a window filing opportunity for new Low Power FM (LPFM) stations, as well as resolving some 6,500 remaining FM translator applications from the 2003 window. The agency intends to drop the cap of ten FM translator applications per entity – this action in itself comes to the delight of many translator applicants. The FCC is also proposing to allow AM stations to use new FM translator stations, and seeks comments on whether translators from Auction No. 83 should be allowed to rebroadcast the signals of AM stations at night.

Approximately 500 AM stations are currently using FM translators, with many providing their first nighttime authority, as well as the opportunity to operate effectively at night. The NPRM also seeks comments on its proposal to prevent trafficking in translators and will determine how to license future LPFM facilities.

The Commission's proposed approach would permit the Commission to immediately lift the freeze on the processing of translator applications and resume the licensing of FM translator stations in most smaller markets and rural communities, while requiring the dismissal of pending translator applications in markets where little spectrum remains for new LPFM stations. The FCC has implemented an immediate freeze on "move in" translator applications in order to protect the spectrum.

The Media Bureau has conducted a nationwide LPFM spectrum availability analysis. Three approaches are considered: 1) opening of a combo FM Translator/LPFM application window; 2) establish a priority for future LPFM applications; 3) adoption of a market-specific translator application dismissal proceeding policy.

The first section of the NPRM directs the Commission to ensure that licenses are available for all three services. A Media Bureau study found that pending translator applications in the majority of the top 150 markets may preclude any possibility of future LPFM licensing.

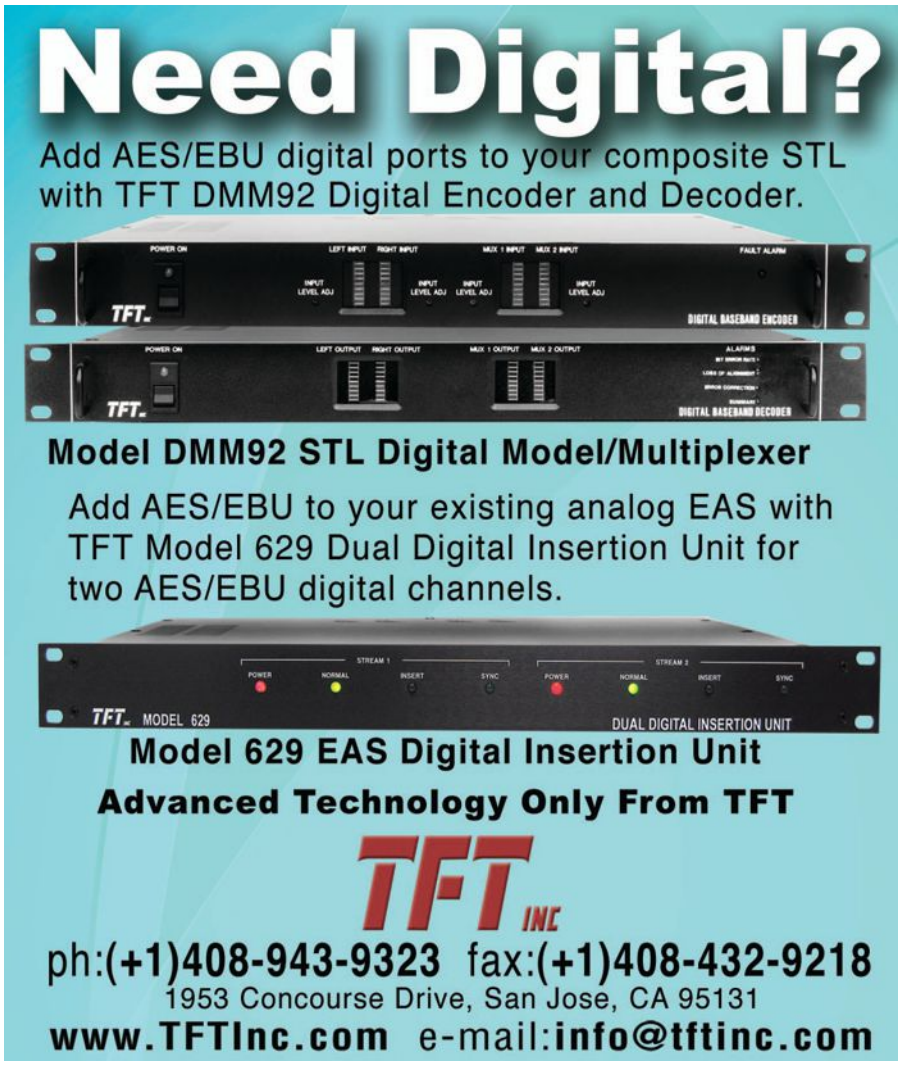
The Commission suggests that a minimum number of LPFMs could be allocated to each market, depending on size, and any available frequencies remaining returned to translator applications. In markets where there are no available frequencies, all pending translator applications would be dismissed immediately, and in other markets, the FCC would begin processing them.

The Commission proposes a set of service floors to ensure at least eight LPFM channels in markets 1-20, seven in markets 21-50, six in markets 51-100 and five in markets 101-150, as well as smaller markets where more than four translator applications are pending. In markets where the numbers of available LPFM frequencies are below the applicable floor, the Commission would dismiss all pending translator applications, while processing those in the other markets.

FCC staffers have indicated a Spring or Summer 2012 filing window, which will be to the delight of many waiting for the opportunity to join the ranks of radio.

Comments were due by August 29th, and replies by September 12th, to MM Docket 99-25; MB Docket 07-172.

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 or 888-732-3599.



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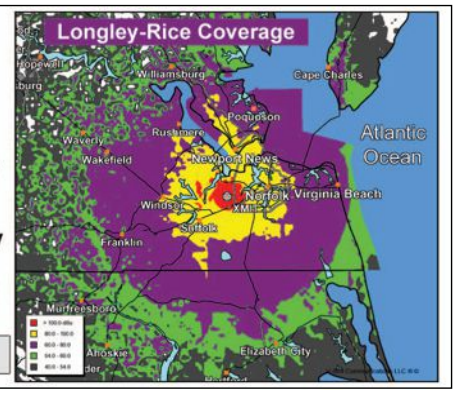

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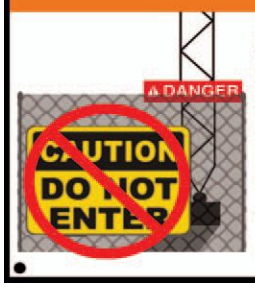

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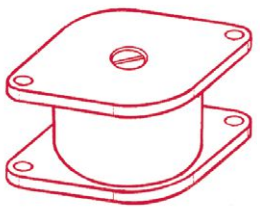

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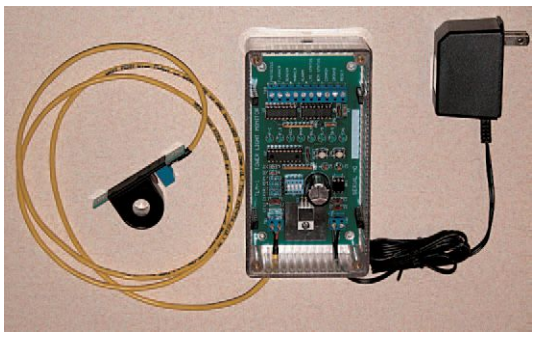

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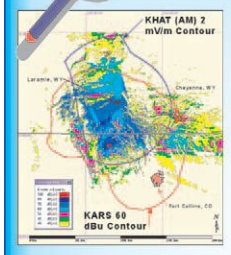

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by Steve Comer

Just before deregulation took off, most radio stations had a full time Chief Engineer. The FCC had limited the number of stations owned in any one market to basically one AM, one FM (and perhaps a newspaper). This made for more independently owned stations, and thus more competition. It also made for independent staffs in autonomous operations, *including* a Chief Engineer. Most radio stations were teaming with people in those days; automation was an assortment of ITC reel-to-reels and carousels (an experiment for the step-child station), records were spun, cue burn was a problem, cart machines ate carts, all transmitters all had tubes!

I remember in early 1994, meeting a fellow radio Chief, Wayne Blackwelder, for breakfast at Sweet Sue's restaurant in Tyler, Texas. While we worked for competitors, we were also friends and helped cover each other's stations when one of us was out of pocket, or needed a hand.

It had just been announced that the respective stations we worked for were being purchased by a large group funded by Wall Street. The two exclusive groups would merge, the staffs would be combined, and one of us would be unemployed! We had already seen the results of deregulation in other markets. While we both believed in the free market of business, it was sad to see the radio and people we knew begin to go away.

Wayne had a plan and a vision. Rather than having our careers and livelihoods as engineers dictated directly by large corporations, their stockholders and ROI, why not form a company of broadcast engineers and offer our services to whomever needed them. Our fate would be in our own hands, and less prone to staff layoffs and downsizing. It seemed like a good idea to me, so I joined him – the name of the company would be Broadcast Works.

We found out soon enough, the work was there; as our name spread, the company grew. In time, we opened offices in Dallas and Texarkana, and had a staff of twelve by 2004. Some of the times were tough going, as all small businesses know, but there was something unique about working with a group of peers every day. The only non-technical people at our company were the business office manager and book keeper (they are our friends and very important). We could be nerds all day, every day, and no one would come by and look at us like, "why do we really need you here?" and "what is it you *really* do?" We also were – and are – happy to employ excellent engineers and technicians, displaced as the large groups continue to consolidate and cut payroll expenses.

In 2004 Wayne sold his interest in Broadcast Works to me and my wife [Steve and Karren Comer]. Since then we have strived to keep the vision of a first class broadcast engineering group. We still supply engineering support and project man-power for the engineers in the big groups, as well as contract support for the independent stations.

Steve Comer

Recently, in a strange ironic twist, some of the mega radio groups have begun to share one full-time engineer in a given market, so instead of one person taking care of 5 stations they now have 10 – talk about limited personal or family life! A new radio group out of the Northeast is even advertising and outsourcing their local engineers to other stations in the area, apparently to create yet another profit center. In effect, this radio group is now competing with the other local, full-time and contract engineers in the same market – usually the same engineers they laid off a couple of years ago!

Our industry has truly changed since deregulation. I can honestly say I sometimes miss the "good 'ole days." But as Bob Dylan sang: "The times they are a changing" – and so they are. On the bright side, the modern world will always need talented technical people. The broadcast industry, so long as it lasts, will always need highly skilled, experienced broadcast engineers – the cream will always rise to the top. Those who choose broadcasting as a profession know the commitment and dedication it requires. It's not for everyone, but for those of us smitten by the "bug" it can be a satisfying career most of the time!

Today, broadcasting is changing even more, to embrace new delivery methods such as Mobile Devices, Satellite, and of course the Internet. Broadcast Works is expanding service offerings into these new areas, including Internet Radio, Audio/Video and Commercial Sound. Many of the same skill sets used in broadcasting apply to these and other new media and telecom technologies. We've found by bringing a "broadcaster's" mind set to these new emerging technologies, we bring a professional value that others may not have. We truly live in amazing times with new opportunities around every corner.

On a personal note: I'm now in my 30th year in this profession. It can't be said enough how wonderful it has been to work with such talented, hardworking and honest people over these many years. People whose personal faith and virtue makes Broadcast Works a great place to work while providing a fulfilling career. Our staff includes: Dave Allen, John Allison, James Cameron, Brian Chase, Aaron Comer, Adam Comer, Hank Hardisty, Ian La Vigne, Wesley Smith, Teresa Spann, Jordan Tomlinson, and Steve and Karren Comer.

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