Radio Guide

Radio Technology for Engineers and Managers

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August 2004

Volume 12 Issue 8

Tower Maintenance: A Vertical Challenge

Keeping Your Sticks Up

Page 4 – The late Ronald Regan was eating jellybeans in the Oval Office when I took over the engineering at a three tower directional array. An inspection tour of the studio and transmitter sites with the engineer, just before he left the area, brought me face to face with what seemed like a critical problem.

Radio Guide Writer to Receive a VoxPro

Page 27 – The VoxPro, a popular digital editing system, is designed for use in the control room. As our Technical Initiative continues, our judges will select among the **Radio Guide** articles, and one of our writers will be picked to receive a VoxPro system, provided by Audion. It could be you! Share the knowledge. Let us know what excites your imagination.

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Columns & Articles

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Where Are All the Engineers?

Page 7 – "You can never find an engineer when you need one." It is true – many have left the field of broadcasting. Some got fed up with the long hours and poor pay. Others got tired of the lack of respect and the poor treatment.

Restoring Old Radios

Page 14 – Restoring an old radio is a rewarding experience. With time, patience and spare parts, you can rebuild a nice antique that looks good in your collection, and will probably sound surprisingly strong.

The SBE at 40

Page 24 – Almost forty years ago I received a letter from a John Battison, a consulting engineer in Ohio. It was one of several hundred letters Mr. Battison had sent to engineers all over the country, proposing an organization of people involved with broadcast engineering.

Cover Photo:

Bill Bordeaux inspecting a new base insulator.

What a Job!

It is a secret most radio engineers know, yet share freely: radio engineering is one of the most interesting, challenging professions around. Not quite like repairing a space station while floating in a space suit in zero gravity – but not so far away either in many respects.

Radio engineers utilize a set of skills and range of workplace activity rare among jobs anywhere. They range from microelectronics to giant structures and from tiny cramped closets to spectacular mountain tower sites in the middle of nowhere. (For the most part, we'll leave the tops of those towers to the riggers – but they don't get to go on remotes, do they?) And much of the work is done completely alone, or with at least minimal contact with other people.

What a great feeling it is to stand on that ridge, looking out over the market (and further), knowing where the signal goes and why! Or, as you'll see in our cover story, watching a tower being virtually levitated to effect an important repair.

All of which is why few engineers willingly give up their jobs.

Yet, many do just that in this "new age" after consolidation. Not so much tired of being on-call 24/7, nor the occasional non-technical task, but of the lack of respect and pay commensurate with their achievements, more than a few have reluctantly left.

We applaud the SBE's 40th anniversary. The organization has helped many over the years. As the SBE presses ahead, we hope it continues to adapt its mission to meet the needs of its members. Now more than ever, radio engineers need an organization that will help them achieve more in their careers, but also will help them deal with their modern working conditions. That is a real challenge indeed.

Keeping Your Sticks Ups

Replacing a Tower Base Insulator

by William Bordeaux

[SAN LUIS OBISPO, California - August 2004] The late Ronald Regan was eating jellybeans in the Oval Office when I took over the engineering at a three tower directional array. An inspection tour of the studio and transmitter sites with the engineer, just before he left the area, brought me face to face with what seemed like a critical problem.

While at the transmitter site he brought my attention to the base insulator on one of the towers. The insulator had a visible crack in it as well as several small chunks missing from the metal casting that was sandwiched between it and the tower base. He warned me that it had been like that for several years and was in danger of complete failure at any moment. It was essential that I put pressure on the station owner to get it replaced without delay.

SEEKING REPAIR FUNDS

I did explain the problem to the best of my ability, but the owner would not or could not spend the money required to get it replaced. As the years went by the cracks became bigger and more pieces fell off of the insulator. I kept pestering the owner about the insulator, but could never get the "go ahead" to replace it.

Finally the station was sold to new owners and at last I thought the chance had come to properly repair the tower. Alas, the insulator repair never made it to the top of the list. In fact, Bill Clinton was winding down his Presidency when the station was finally put out of its misery and decommissioned. At that point, I went from Chief Engineer of the site to Caretaker.

For several years the County planners, The Sierra Club, the Coastal Commission, and other groups too numerous to name, debated our plans to pull the towers down and remove the transmitter building from the site. Days turned to weeks, weeks to years and finally, almost 20 years after the engineer had warned me about the dangerously cracked base insulator, the demolition plan was approved; guy wires were cut and the towers came crashing down. I went to the tower base once the dust had settled, and sure enough the base insulator had shattered when the tower hit the ground.

Even though the tower held on all those years, I was intrigued by the thought of replacing a base insulator. I could not imagine what it would take to lift up many tons of steel and install a new insulator.

THE PROJECT TURNS REAL

This past fall at a client's transmitter site, we received a report of high VSWR. Upon arrival, we found a failed insulator. There were deep carbon tracks running the length of the insulator and black deposits of carbon on the metal caps from the prolonged arcing.

This insulator was clearly beyond repair and needed to be replaced. After several calls we found a tower company that had the time and expertise to do the job.

We made careful measurements of the failed insulator's dimensions and sent them off to the tower company so they could to find a replacement that would be sure to fit with little extra work. Fortunately, they were able to find an insulator that was within an inch in height of the old one. This would mean that there would be little if any adjusting needed in the guy wire lengths. Had this not been the case, a change in guy wire length and the associated work could easily add many hundreds (or thousands) of dollars to the cost of the project.

Within a few days, the crew arrived and began work. For several reasons, there was no way the station could stay on the air while the insulator was being replaced, so careful planning found a time for the tower crew when the off air work would be least disruptive to the operation of the station.

This is an ex-insulator.

MEASURE TWICE, CUT ONCE

Once the power was shut down the tower crew went to work. The first order of business was to confirm that the new insulator would be able to fit properly. Once that was established, the crew went to work building a unique steel structure within the framework of the tower. This structure would allow two bottle jacks to lift the entire tower just high enough to slide out the old insulator and slide in the new one. Sounds simple, no?

Not so fast. Calculating the weight of the tower is a complex equation. Not only is there the mass of the steel stacked up into the sky, but there is also an ever-changing weight exerted by the downward component of the guy wires.

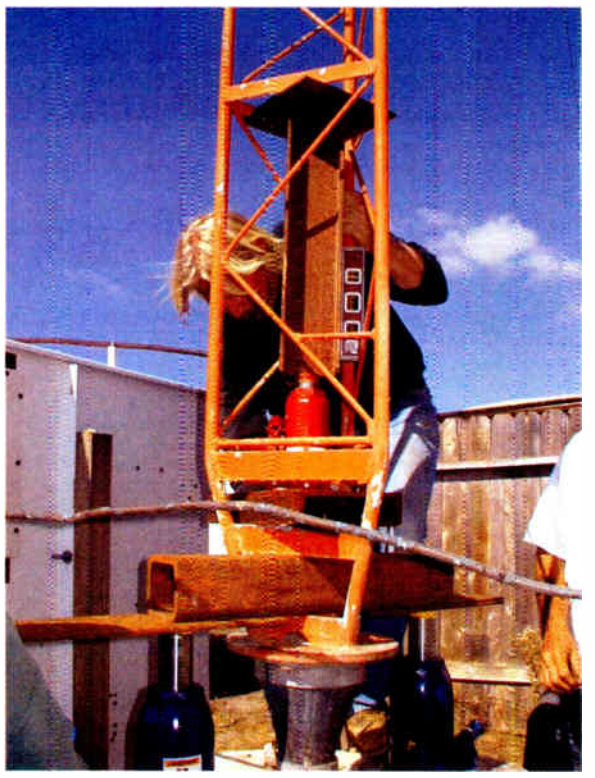
With no wind, the tension in the guy wires can be resolved into two force components. One force is in the horizontal direction starting at the guy attachment point and the other is a force in the downward direction beginning at the guy attachment point and going down the leg of the tower. The magnitude of these forces will be equal if the guy wire comes off the tower at a 45-degree angle. As the angle between the tower and the guy wires decreases, the downward component of the force becomes greater than the outward component.

When the wind blows and exerts force on the side of the tower, the force again gets resolved into two components by the guy wires. Some of the force of the wind will cause an outward force from the tower in the opposite direction from the wind and another component will cause a downward force, effectively increasing the "weight" of the tower.

Having an understanding of the forces acting on a tower gives you a greater appreciation for the unique skills a tower crew brings to the party. Jacking up a tower and replacing an insulator is a carefully orchestrated balance of forces, lots of planning and a little bravado.

GET READY

The tower crew placed large, thick steel plates on the concrete tower bases. These were used to place the bottle jacks on. In this way the load of the tower is translated though the bottle jacks and spread out over the area of the steel plates.



Setting the jacks and jacking platforms to allow weight to be carried by multiple cross members.

The name of the game here is pounds per square inch management. By spreading the loads out, they made sure not to over stress any one component of the jacking assembly. Keeping with the plan, steel plates and more bottle jacks are used to create a jacking point that spreads its load out among several cross members of the tower.

LIFTOFF!

Once the jacking assembly was in place it was time to begin the jacking. Because the tower only needed to be raised an inch or so, it was determined that the guy wires had enough slack to allow movement of the tower without having to loosen them up any futher.

Slowly jacking the tower off its insulator.

Remember, when raising the tower not only are you lifting the dead weight of the steel tower but you also are pushing against the downward component of the tension on the guy wires. As you raise the tower that component increases, and in effect the higher you jack the tower the more it weighs.

CAREFUL ...

The tower crew used a level and transit to insure that as the jacking progressed, the tower remained plumb. The jacking has to be synchronized between the two jacks to insure that the tower rises straight up from its resting-place. If the tower leans while jacking, forces become even more complex with some of them acting in directions that are not conducive to the safety of the crew or health of the tower!

Once the tower was jacked up leaving enough room to slide the old insulator out, the real work began. The flanges that held the old insulator on were different in dimensions from the one new one that was to replace it. New boltholes had to be drilled into the base of the tower as well as the concrete base to accept the new flanges.

(Continued on Page 6)

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Keeping Your Sticks Ups

Replacing a Tower Base Insulator

Continued From Page 4

One of the most interesting tools the tower crew used was an electric drill fitted with a huge electromagnet. When the drill is positioned properly on the work piece, the electromagnet is energized and the drill becomes a portable mini-drill press. This is surely a great invention! Anyone that has tried to drill though plate steel by hand can really appreciate this tool.

Here's a strange site.
The tower seemingly is floating in midair.

Finally the holes were drilled and the new insulator was carefully slid into place. The pressure was carefully, slowly and evenly bled out of the bottle jacks and the tower came to rest on its new insulator. The flanges were bolted into place and the lighting gap was sized.

FINISHING THE JOB

The job was not complete until the tower crew checked the guy tension and plumb on the tower. After that, we had them check the tower plumbness, guy tensions and the base insulator condition on the two other towers in the directional array (as long as they were in the neighborhood). The site got a clean bill of health and should be good for many years of trouble free service.

Our nice new insulator holds the tower up.

So what exactly caused the failure of the insulator in the first place? The tower crew and manufacturer of the base insulator could not say for sure.

There had been some changes in operating conditions within the last several years. The station power had been increased from 5 kW to 10 kW, and there was a new 5 kW station sharing the tower. The old insulator was rated well beyond the calculated base voltage, but perhaps the increase in power along with the years of weathering had taken their toll. At this point we have more questions than answers.

In any case, we expect good service from our new insulator. Maintenance will be simple. An occasional cleaning of the outer surface of the insulator with a soft cloth and alcohol, maintaining proper lightning gaps, and periodic guy wire inspection and tensioning should go a long way to preventing future failures.

Some of the photos provided courtesy of John Bartal

Bill Bordeaux is always amazed at the variety of issues radio engineers are called upon to handle. His email address is: bill@stationengineer.com

Where Are All the Engineers?

by Mark Mitchell

[HOUSTON, Texas - August 2004] One often hears, "You can never find an engineer when you need one." It is true – many have left the field of broadcasting. Some got fed up with the long hours and poor pay. Others got tired of the lack of respect and the poor treatment received from staff and management.

It seems like only a few years since I began my journey into the fantastic world of broadcasting, filled with many people staffing the various positions every minute the station was broadcasting. But these days, with de-regulation, automation, budget cuts by bottom line owners, and better opportunities outside of broadcasting, many of those positions have disappeared.

For those of us that are left, the responsibilities have drastically increased. All too often, it seems the addition of three more stations to a cluster does not increase the engineering staff – sometimes the result is a net loss of bodies!

The Chief Engineer probably used to be the most respected person at the station. His was the final word for anything technical at the station. Now, much of that respect has been lost and the authority diluted. No wonder so many engineers are fleeing the field.

I believe we can change the way we are looked at and regain some of the respect lost over the years. There are several ways we can get started toward that goal.

LET'S "RETAKE" THE FIELD

The first and most important thing is to be competent – knowing our craft, and proving it by what we accomplish each day. On the other hand, I have run into many people who know how to "fix" some things, yet they do not really know how to solve the underlying problem. Their complacent or incompetent work undercuts our credibility as professionals.

Many of these so-called engineers have been working in broadcasting in some form or fashion. They put a band-aid on the problem and call it "good." And they usually work cheap. While these folks have helped me make money correcting the items they "fixed," it leaves the owner or manager with a sour taste for engineers, tarnishing the image of those of us really trying to solve the problem – not just the symptom.

This is a major issue; the SBE and the NAB should be supporting professional radio engineers and good engineering standards. The SBE and NAB need to educate General Managers and owners as to the economic and physical safety dangers of stretching the staff too thinly. Good engineering practices include having an ample engineering staff, educating that staff, and providing it with the right tools and test gear to keep the stations in good working condition, as well as FCC compliant.

WE NEED MORE MAINTENANCE

This is especially important in regards to preventive maintenance. When budgets get tight, management usually targets engineering as the first place to cut. But it is false economy, from both an expense as well as a lost revenue point of view, to have a station go down due to lack of maintenance.

Although preventive maintenance will not totally eliminate catastrophic events, regular maintenance keeps equipment in better shape and the engineer more familiar with it. This makes it possible for the engineer to get things back up and running much quicker. This is a very big advantage if several sites drop at the same time in a bad storm, for example.

Secondly, we need to follow through with continuing education and keep up with the latest trends in equipment and technology. With the onset of digital radio and HDTV, many of the old ways of doing things will not be valid. We need to regularly review the technical and legal basics.

It is not hard, for example, to avoid fines for EAS violations. It is simply a matter of following the Rules, making sure everyone involved knows his or her responsibility – and the consequences of not doing the job.

COMMUNICATE!

Despite all the changes in the industry, communication is one skill too many engineers leave at the wayside. It is just as important for us to be able to communicate the reason why the transmitter needs a $5,000 tube as it is for us to be able to replace it.

We should be able to clearly communicate what are our primary duties:

1. *Protect the license.* This means keeping the signal within licensed parameters and ensuring your equipment meets specifications. It also means keeping good records, especially regarding licenses.

2. *Keep the station on the air.* It sounds simple, but requires doing necessary preventive maintenance: changing filters on a regular basis, keeping the transmitter room clean, etc. A few minutes a month with vacuum and mop can make a big difference in transmitter reliability.

3. *Improve signal quality and sound to help the station build revenue.* This means keeping a check on all of the equipment in the air chain. A bad power supply in the STL or processing can cause audio problems that diminish the air quality. Carefully build your station's sound signature. Avoid unnecessary items in the audio chain; there will be fewer points of trouble or failure.

WE ARE STILL HERE

Many of us still love doing our job. We are proud of what we do. By being competent and communicating with management and each other, we try to make broadcasting a fun and profitable career; we know complacency and "getting by" is no longer enough.

Where are all the engineers? They are in the office and at the transmitters doing the best they can, working long hours in the trenches to keep the stations on the air. They are out there waiting for the industry to show them the respect they deserve and have earned.

Mark Mitchell is a Chief Engineer in Houston, Texas. You can contact Mark at radio@broadcast.net

User Reports From Radio Guide Readers

Field Guide

Broadcast Warehouse DSP-X

by Mike Erickson

[NEW YORK CITY, New York - August 2004] Quality audio processing on a budget. For many years, this was the claim from audio processor manufacturers when introducing low priced devices.

But more often than not, you get what you pay for, and end up needing two or three support processors (Prisms, Compellors etc.) to make the inexpensive stand-alone unit sound *almost* like the big boys. Needless to say, it takes a lot of money to get the flexibility and cut-to-cut consistency.

ANOTHER CONTENDER

When I saw the ad from Broadcast Warehouse for another low priced "wonder," I was very skeptical. For only $1,000, I – as a beta user – could help shape the design of this box and, for my input, would be able to keep the box after the beta program concluded. The eventual MSRP was to be $3,000 so, even if I did not like it, I figured someone on eBay would buy it from me and I would break even. What the heck, I went for it.

The unit arrived with Version 0.92 beta software loaded. My initial observations were that the unit was promising but there were problems. The clipper quickly got nasty and the pre-emphasis control with the HF limiters was poor. Also the bass was quite thin and the multiband AGCs overcorrected the audio (especially the highs, where the audio would get dull on some material with lots of HF content).

I immediately got into an e-mail exchange with Scott at Broadcast Warehouse and expressed my concerns. Soon V 0.93 arrived. It got a little better. The bass now had a parametric EQ attached and the HF limiter had a limit/clip tradeoff adjustment (similar to the 8100) but there were still issues with the AGC and the overall clipper was still not up to the task.

ALMOST READY FOR PRIME TIME

V 0.94 came after Christmas 2003 and what a present it was! The clipper was much cleaner, the AGC was improved with adjustable ratios and coupling features in *all* parameters (AGC and limiting). The wideband AGC had window gating so the AGC does not hunt for noise (or overcorrect) and the peak clipper was multiband with a main summing clipper and composite clipper.

There was also a look ahead limiter available in the digital output (for HD) and the analog output was selectable for digital (look ahead limiting with de-emphasis), analog (audio with or without pre-emphasis; clipped without the composite clipper and stereo generator) or the "DJ" low delay mode (selectable de-emphasized audio for talent headphones – the throughput delay varies from 5-9 ms ... you will see why later).

It was at this point the DSP-X Version 1.0 came out, which was a final tweak on the main clipper and a few other odds and ends. The current layout of the box has audio entering and conditioned with a low-pass filter and phase rotator. The wideband AGC is next, with adjustments for drive, attack, decay (another word for release), gate and the ability to have the band rest when gated at a preset level (like -4 or -8) called RTR level. There is also an adjustment for how fast the band returns to rest (called RTR speed).

After the wideband AGC, the selectable insertion of pre-emphasis (which is later defeatable on certain outputs) and the parametric bass EQ follow. Then comes the four-band AGC. Like the wideband AGC, the four-band AGC has adjustments for drive, attack and release, ratio, gate, RTR level and RTR speed. There are also coupling functions that make the unit a three, or even two-band AGC depending on how close you set the parameters.

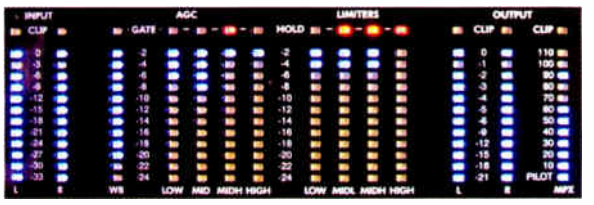
The multiband limiter has different settings: Drive, Average Attack and Decay (similar to compression) and Peak Attack and Decay. There is a hold button (which freezes the band like a gate) but there is no RTR level or speed. There is a threshold control to indicate where activity in the selected band should start, and the HF limiter has the tradeoff clip/limit control which helps tame the pre-emphasized audio without tearing the audio or sounding too busy.

A mixer follows which lets you fine-tune the tonal balance. There is not much leeway here because there is no protection before the final clippers so adjustments are very small. Most EQ changes should be made by adjusting the drive to the AGC and limiters.

For the composite output, there are two clippers: the multiband clipper that sums the bass and midrange into one clipper, while the presence and HF bands have their own respective clippers. For the bass clipper, there are two options: hard or soft clipping. Soft clipping adds look-ahead (which makes the overall throughput delay approx 9 ms) for a clean, full bass effect that plays out with Urban, CHR and Dance formats. Hard clipping is closer to real time (the units throughput is approx 5 ms) and adds a little more bass, better for harder hitting rock formats.

All three clippers in the multiband section have threshold controls and the entire section has a drive control. The main clipper follows with its own threshold control and the idea is to tradeoff clipping in the various multiband stages over the main to find a sound that has good peak control with the least amount of artifacts.

A composite clipper follows for an added dB or two of sheer loudness and the pilot is inserted after the clipper. Finally, the system output is standard BNC. (The digital output has a look ahead limiter in place of the clipper stages that features attack and release and drive for each band.)



The metering is all LEDs, and all parameters are visible at once.

The DSP-X stores multiple processing setups. There are currently 8 user presets and 10 factory presets. You can save and import presets thru HyperTerminal using the COM port on your computer. When PC software control becomes available from Broadcast Warehouse, importing and exporting presets and software will be much easier.

Future software will also include a clock for dayparting, the ability to control the unit via PC from a remote location and software for an AM version.

CRANKING IT UP

Now, how does it *really* perform? At home, with my QEI exciter into a dummy load, I was able to match the sound of local stations running the expensive boxes. Loudness was equal and modulation was in check and it looked really good on the scope.

I put the box through its paces with different genres of music from CHR to Classical, Jazz, Oldies and Classic Rock and the box performed each time. My findings about the unit's ability to maintain loudness against the big boys were verified in a demonstration putting the DSP-X up against one of the big boys on a Hot AC station in a very competitive situation. Programming had been dealing with an older digital box and was very interested and impressed in this little box that did the job without breaking the bank.

WISH LIST

Are there downsides? There have to be compromises with an inexpensive box. The bass still could be a bit better, or should I say, easier to "extract." Adjustable crossovers will help that in future versions, but if you tweak enough, the bass does come out to play. The menus and display are also not as easy to navigate as the more expensive boxes, but with PC software coming, that should also improve.

Right now, the unit is in the "all expert, all the time" mode, so there is no easy way for non-technical individuals to make small changes without risking the end of the world. With the menu system the way it is, it also takes some time to get used to how to save presets and it is very easy to make a mistake and erase your work. Fortunately, the factory presets do give you a decent starting point.

If you are looking to replace that analog box, older digital box or an alternative to the expensive boxes that seem like they are out of range for small budgeted stations, the DSP-X deserves a lot of attention. Even for those looking for two separate boxes for HD and FM (or an internet stream and FM), you can afford it with the DSP-X! From LPFM to 50 kW flamethrower the DSP-X is the first inexpensive box that – for me – lives up to the big box promise.

Their website is at: www.broadcastwarehouse.com

Mike Erickson is an engineer and audio enthusiast in the NYC area. We are pleased to report that after his test-drive of the DSP-X, his ears still work. Contact Mike at wirelessmedia@computermail.net

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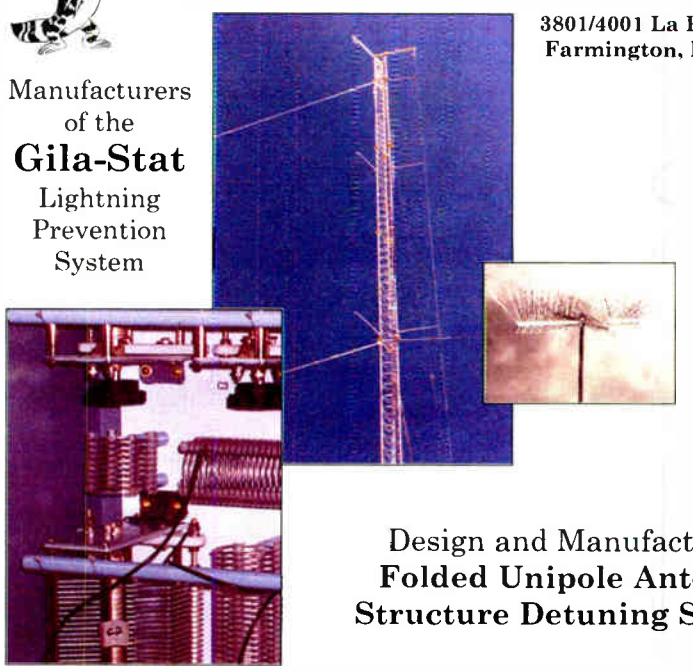

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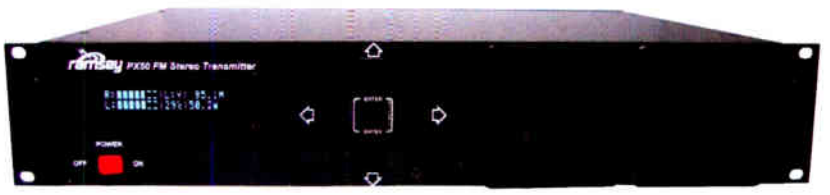

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EAS Guide

The NWS Connection

by Phil Alexander

[INDIANAPOLIS, Indiana - August 2004] Until a few months ago I looked at the Emergency Action System (EAS) as just another nuisance, a leftover from the cold war days that spawned Conelrad, later replaced by EBS and now EAS. In fact, in today's world where cable news seems to be on the scene of every battle outbreak, I had always thought of EAS as pointless and redundant.

That was before I almost met a tornado "up-close and personal," starting a chain of events that changed my mind about several things, and gave me a new perspective and appreciation for the National Weather Service.

It started simply, late one afternoon just about a year ago, as I pointed our service van toward one of our client stations and tuned in to monitor them during the trip, looking for anything audible that might need attention. It was one of those very common hot, muggy, partly overcast summer days in the midwest, so weather was not on my mind, even though the sky got darker and the wind blew.

IS ANYONE HOME?

Then the station's audio dumped to dead air and the usual sequence of duck flatulence blasted the speakers. "OK, another one of *those* days," I thought, as I waited for the automatic rebroadcast of the local NWS warning to began. However, there was no warning, just dead air. The sky turned black, then shifted to that peculiar shade of metallic gray-green, well known in the flatlands as Mother Nature's own extreme weather warning.

Meanwhile, on the radio dead air continued. There was no voice alert, no "End of Message" (EOM) salute from the duck; nothing but silence. I flipped to another station originating from the same studio complex and heard the same thing – or more accurately, the same nothing. Clearly, it was not an equipment fault at the studios. Silently, I began cursing the NWS for failing to send neither a warning nor an EOM burst.

Meanwhile, the sky was turning darker, the clouds were dropping in a rolling black squall line and the wind was gusting heavily, rocking the van and turning leaves of the trees wrong side out. A few seconds later the sky began to fall; not the pitter-patter of little raindrops, but a deluge of near biblical proportions.

"Ah well, that one's over," I thought to myself, because tornados do not come in the wind and rain. The old story about the deathly calm before a tornado is true and when the sky unloads a deluge you know that although the violent weather has passed nearby you are safe – perhaps wet, but safe.

Less than a minute later a second EAS alert sounded, this time the Local Primary station seized the station's EAS decoder and originated an alert complete with a local announcer reading the text of the tornado warning from their newsroom. They followed protocol perfectly, transmitting the EOM to release station air chains back to normal programming. I continued toward the transmitter site very thankful a tornado and I had not crossed paths that afternoon.

BUT, WHY?

That should have been the end of the story, just another boring afternoon of driving and inspections. It was, instead, where this story really begins. About four months later, a couple of comments on an Internet mailing list reminded me of the events that "interesting" afternoon, and naively I inquired, in effect, "How can NWS be serious about their commitment to EAS if they miss not only the EOM, but the entire warning text itself, all in one alert? If they are serious, how is that possible?"

Looking at the responses, I was not sure if I was about to be pilloried in stocks or simply tarred, feathered and ridden out of town on a rail. What I had thrown out as an innocuous challenge to discover if others had similar problems was apparently taken as a mortal insult.

Within a matter of days I got a call from the Meteorologist in Charge of the Regional NWS office, who had received reports of my "affront" from other NWS offices, including NWS National Headquarters. During what developed into a pleasant conversation, I was invited to visit the NWS office, see what they had and perhaps draw my conclusions with a little broader insight.

What I learned should interest all broadcasters, especially those involved with any phase of EAS, and especially those interested in giving real public service during local emergencies.

SOME ANSWERS, QUESTIONS STILL REMAIN

After an extended search for the reason for the missing EOM signal that started my adventure, we were not able to find a cause, and a year later there has been no similar event. However, I did learn that the NWS has evolved in the 21st century with computerized technology that really works, and is amazing to watch. Just looking at what they have and what they can do with it ought to be enough to convince anyone with a technical background that the NWS is far more than its name implies.

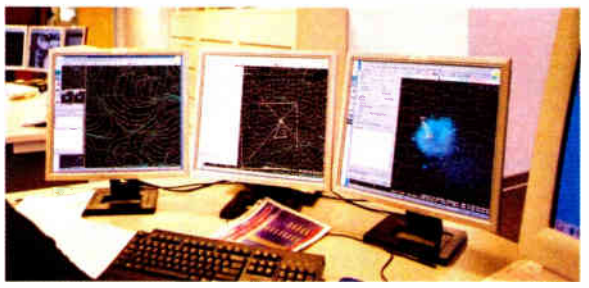
At this point let me insert a disclaimer on behalf of the regional NWS office. While I thank John Ogren, Meteorologist in Charge at the Indianapolis NWS office and his crew for showing me their operation and explaining the equipment and its many applications, the conclusions I have drawn are my own, not those of the fine folks at the NWS.

Severe weather, chemical spills that vent to atmosphere, natural disasters, and now – in the post 9/11 world – terrorist attacks using chemical or biologic weapons; all of these emergencies typically involve windborne or waterborne hazards.

Where will wind or water carry a particular hazard? When will air at point A arrive at point B? What is the possibility of a temperature inversion in the atmosphere? When will stream pollution released at 3 PM at point X arrive at the municipal water system intakes of the first downstream city? Also, modern commerce and transportation require current data about winds and weather; water flow in streams and rivers; tidal ebb and flow and a whole host of other environmental information.

Finding the answers to these, and many other questions are all a part of the NWS meteorologist's skill set. For nearly 135 years the National Weather Service and its predecessors have provided information about our environment and what we can expect in the future with ever increasing accuracy.

Modern technology has given them tools that were only dreams as little as a generation ago. While there is a lot of debate on how to get this important information to the general public quickly, accurately, and directly, in a way that could save lives, the NWS could be the vital link that helps protect us in case of disaster or attack.

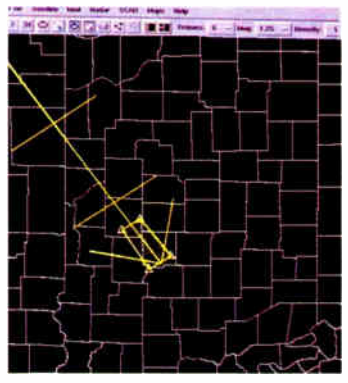


GETTING THE WARNING OUT

NOAA Weather Radio (NWR), originating from 121 forecast offices and distributed over a network of more than 600 transmitters adds direct broadcast distribution and public warning capabilities. But, there is no way to truly appreciate what the National Weather Service can do until you see one of their facilities.

A vast network of automated reporting instruments gives them a real time picture of weather conditions over a wide area, and computer technology turns this into wind flow patterns making accurate movement of weather or windborne hazards possible on a minute to minute basis. Modern Doppler radar shows precipitation over the same areas, and satellite observations complete the picture.

When severe weather develops, radar can show it and by looking at the current wind maps the forecaster can predict its movement. By simply drawing a box on a display screen around bad weather and the area it will affect before it dissipates, a text description of the hazard is generated. The forecaster can edit the description if needed, but the programming of the computer doing this task usually makes that unnecessary.



The text released by the forecaster goes directly to an automated voice synthesizer. The voice synthesizer interrupts normal programming on the Weather Radio transmitters covering the area, sends the EAS digital message and broadcasts the synthetic voice message.

The message can be on the air, literally in a matter of seconds, and in cases of extreme emergency a forecaster can be on the air live to all NWS weather radio stations in the region, to one station or to any selected group of stations.

Lives that might be lost to a tornado, a volcanic eruption, a blizzard or any other rapidly developing hazardous weather can be saved. But, this is only part of what this system can do.

WHO YOU GONNA CALL?

Suppose a train derails and a tank car full of ammonia breaks open. If you were the Sheriff or Mayor or responsible Civil Authority, what could you do to help save the lives that are your responsibility? Call the Weather Service?

Yes, you could, and it would probably be the best call you could make. They are staffed 24/7. They can tell you in less than a minute where people will be at risk if they know where the gas has been released. If you have a computer and can send them an e-mail containing the text of the warning message you need to broadcast, they can broadcast it as an EAS message that will cover all weather radios in the area and will be picked up and relayed by some, if not all, of the broadcast facilities in your area.

This can happen as fast as you can get the information to them. This does not mean that Weather Radio is the only means of communicating emergency management messages, but there is no contesting its speed, accuracy and reliability. Its only shortcomings are the lack of receivers among the general population and the fact that broadcast stations carry these messages voluntarily, so some may not relay them.

ASSEMBLING THE RIGHT TOOLS

In the post-9/11 environment there is no question that emergency management and public warning are part of defending us from what was once unthinkable.

(Continued on Page 12)

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EAS Guide

The NWS Connection

Continued From Page 10

It is equally true that emergency management needs a standardized kind of mass communication for natural disasters and other widespread emergencies. The Partnership for Public Warning (PPW) is deeply involved in exploring these needs and has drafted a lengthy report about the broad topic of EAS.

We need to chart the future, but we also need a basic warning system that works now – today – to protect us until better ways of using new technology are found and programs are operational. Surprisingly, we do have the pieces of that system now, if only we put them together and all involved understand using them.

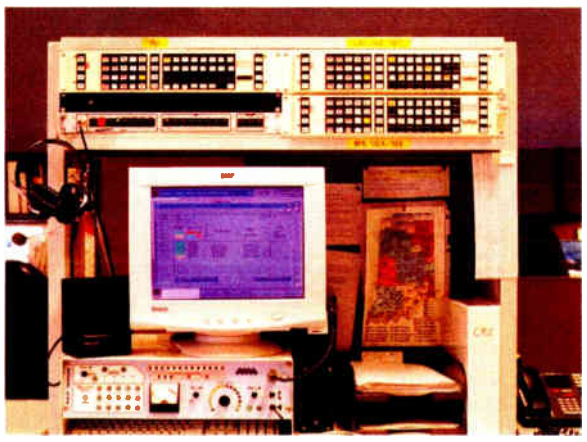
One of the complaints about EAS is that it is unreliable because it depends on everyone in the chain from originator to the last station down the line doing their job and doing it correctly every time there is an alert. When human error or human failure happens in the middle of the chain, the system breaks down because there is little, if any, redundancy in many areas. The various State Emergency Coordinating Committees construct EAS plans for their respective states.

Placing the NWS in the middle of these plans would solve two problems.

PUTTING NWR TO WORK

The NWS Weather Radio network covers most of the populated areas in the entire country. Every broadcast station either receives them now, or with the addition of a receiver to their EAS equipment, can receive the NWS signals, which easily could become a back up distribution network for EAS messages. This would give EAS the redundancy it needs to be reliable. Secondly, the NWS offices can originate local warnings for authorized emergency management officials and other civil authorities with the equipment they have in place.

As I write this, the Department of Homeland Security (DHS) has apparently reached the same conclusion. DHS and NWS jointly announced an agreement on June 17, 2004, that will transmit DHS hazard warnings via the NWS network.



This is a step in the right direction, but it does not complete the path to the average citizen who has never heard NWS Weather Radio on its special VHF frequencies in the 160 MHz band. While some broadcast stations rebroadcast NWS warnings via EAS, some do not. The system is voluntary and some programmers seem to see any interruption as an unwanted intrusion into their world; the fact that people once turned to broadcasting for instant information seems to escape them.

In the battle with satellite services for their audience, some programmers may need to step back and realize the local public service that satellites cannot give may be a plus for them, especially if it leads more listeners to view local radio as a source of vital information.

However, since stations are licensed to operate in the public, interest, convenience and necessity, in times like these, participation should be a requirement – as a matter of public safety. All stations are required to have EAS receivers and are required to use them to relay a Presidential message if one is ever released. Adding a requirement to broadcast all NWS "warnings" (not "watches") might make the system much more useful at the local and regional levels if some mechanism could be found to avoid over-activation.

MAKING IT BETTER

Three changes can give us a defense against natural and man-made disasters now, with very little new equipment and retraining.

First, we need a standard method of text communication between local emergency management authorities and the NWS for transmitting verbatim emergency messages to the public. This can be as simple as a fax or an email sent with proper security from the local sheriff, mayor or other civil authority to the NWS office for that region.

Next we need inclusion of NWS in the State EAS plans designating Weather Radio stations as monitored stations for EAS in addition to the designated primary broadcast stations. And finally, to make the system fully functional, the FCC needs to make fuller EAS participation for stations mandatory as a part of the obligation to serve the public necessity. Whether using NWR receivers, a fax service, or via the Internet alert, stations need to pay more than lip service to getting emergency information on the air.

With these changes, all warnings – whether National, Regional or Local – could reach everyone listening to a radio or watching a TV set, and give them life saving information in times of emergency.

It would also make full use of what I have come to see as a national treasure, the folks at the NWS who are on the job 24/7. As their motto says, they are "Working together to save lives."

Phil Alexander, CSRE, is a contract engineer based in Indianapolis, IN. Over the years, Phil has had extensive experience from both the manufacturers' as well as stations' perspective. You can contact Phil at dynotherm@earthlink.net

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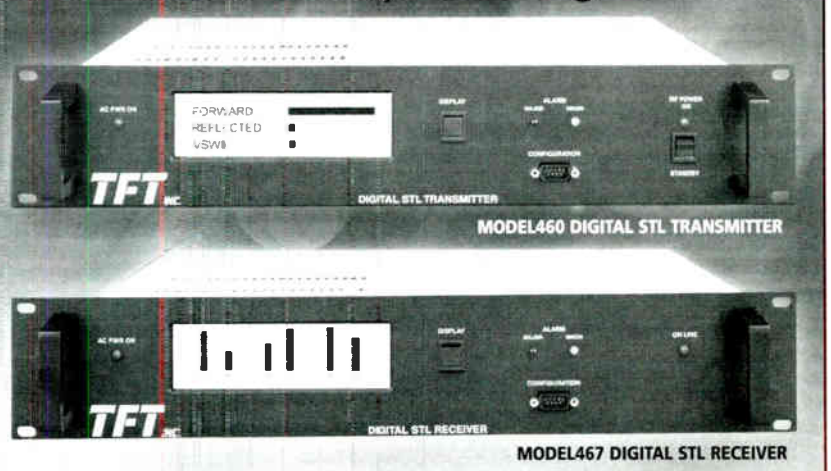

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Restoring Old Radios

Part 1: Starting the Process

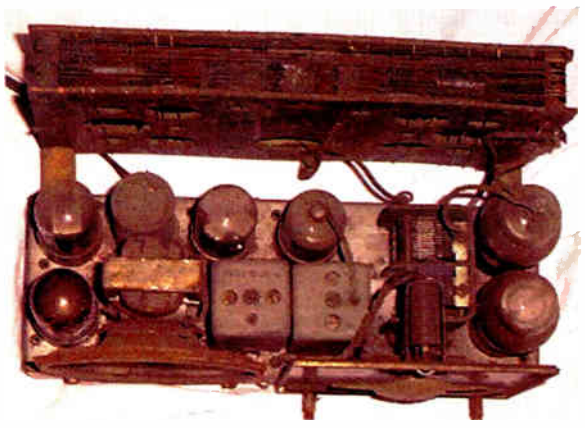
by Allen Singer

Many of our readers enjoy looking at the famous radio receivers of past years, whether the "cathedral," desktop, or other styles. Allen Singer is such an enthusiast; in this article he shares some tips and tricks for those who would like to restore an old receiver.

[CINCINNATI, Ohio - August 2004] Restoring an old radio is a rewarding experience. With time, patience and spare parts, you can rebuild a nice antique that looks good in your collection, and will probably sound surprisingly strong. Even better, fully restored and operational antique radios can be turned around and sold -sometimes for many times what you originally paid.

FINDING AN OLD RADIO

Estate sales and auctions are the best places to find old and broken radios, with many of them in repairable condition. However, you are less likely to find restorable radios at flea markets and most yard sales. Fewer typical yard sales offer old radios, and many sellers at flea markets price their radios too high for reasonable restorations.

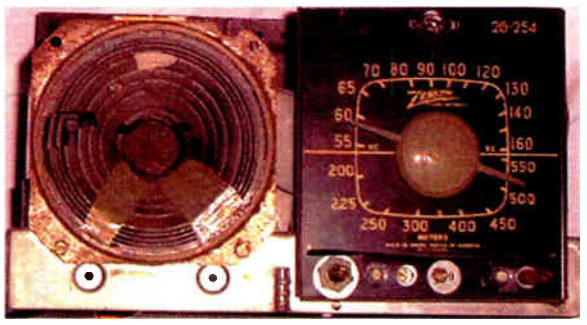


If you are planning on restoring more than one radio, it is helpful to keep spare parts on hand. Do not hesitate to spend a few dollars on a junk radio at an auction. Even if the unit is beyond restoration, it is likely that it will yield at least a few good spare parts for use on another radio: speaker, tuning string, tubes, knobs and anything else salvageable.

The value of these "spare" units will become apparent as your restoration projects move along. You never know when you will have to replace a broken or missing AM loop antenna or other part that will not be available at the TV repair shop. Original knobs can be even scarcer.

FINDING DOCUMENTATION

Old radios come in all shapes and sizes, but their model numbers are almost always on a label inside the radio. Find the model number and order a schematic.



Notice the Zenith model number in the upper right; it is not normally seen when the case is on.

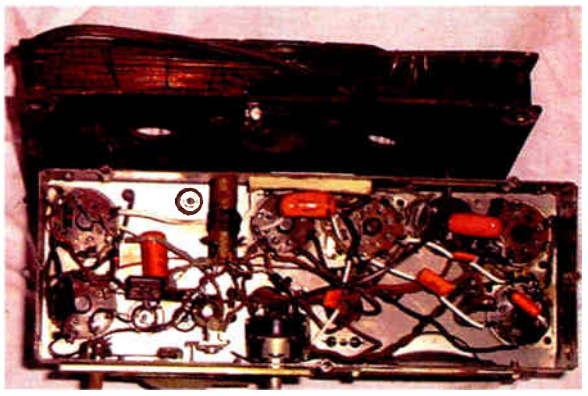
Doing a quick Google search will bring up a variety of sources for schematics; I recommend radioclassics.com. For only a few dollars, the owner of this site will mail you a Sams diagram for nearly any radio ever made. Even if all of your parts in the chassis are labeled, you will still need a circuit reference for the critical troubleshooting phase.

INSPECTION TIME

When you sit down with your radio for the first time, *do not turn it on!* Unless the radio is in excellent shape and you know it already works, the ancient components can fry parts that are still good and working.

Start by removing the chassis from the cabinet and examine it carefully. Since the project will likely take some time, it is a good idea to have a little box and/or tray to hold the screws and other small parts you remove from the radio. Better yet, if you have a digital camera, take several shots at each step. This will prove invaluable in re-assembling the unit later.

Thoroughly clean the entire chassis with a dry paintbrush, and then clean the unit with Windex, detailing the smaller parts and crevices with Q-Tips. A careful cleaning like this will reveal additional problems, and make the unit look nicer and easier to work on.



As you make a list of parts to acquire for your project, you should plan on replacing all the capacitors, even the ones that look OK. Remember, Radio Shack generally does not carry the high voltage capacitors required for an old radio, so check with your local electronics parts shops. Antique Electronic Supply [www.tubesandmore.com] is also a great source for all kinds of these parts.

We will continue our inspection and parts acquisition next time.

A freelance writer in Cincinnati, Allen Singer writes on broadcast topics, as well as authoring a book on the Cincinnati subway system. You can email Allen at allensedge@yahoo.com

A Top Ten List of:

WWV Promotional Ideas

by Gary Liebisch

[MASON, Ohio - August 2004] According to recent reports, the National Institute of Science and Technology (NIST) has been surveying the listeners/users of WWV to see how they can improve their service. Here are my own Top 10 suggestions for "hyping" WWV:

10. Buy the rights to the "bee-doop" from old Mutual network.

9. New Station ID: "WWV, Fort Collins-**DENVER!**"

8. New Slogan: "Give us 22 minutes – we'll give you 22 minutes!"

7. Hire "Tom" and "Donna" away from NWS to do side-splitting morning show.

6. Have music director expand the playlist to include "Theme from 60 Minutes."

5. Do a station promo poking fun at the Canadians on CHU.

4. New Drive-time Slogan: "Propagation and Solar Weather Together on the 5's."

3. Schedule a Live Solar Flare Remote from surface of the Sun! (Be sure to send the interns.)

2. Hire low paid female sidekick who laughs hysterically whenever the announcer gives the time.

.... and the #1 Promotional Idea for WWV

1. The "2139.4035th Caller wins an Atomic Clock!"

Gary Liebisch is a Radio Transmission Applications Engineer at Harris Corporation Broadcast Communications Division in Mason, OH. You can send your rim shots to him at gliebisc@harris.com

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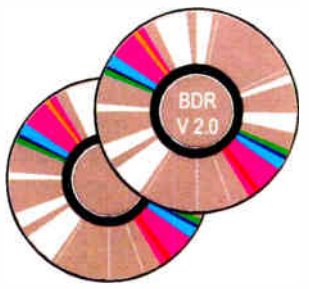

The CD includes several sets of Radio Utilities, an AM and FM/TV database viewer (including DA patterns), as well as EAS printer paper sources, project schematics, historical data and pictures – even some interesting Top Ten lists.

Recent additions include the FCC and EAS checklists, and some equipment manuals. Having this out at the transmitter site can save you lots of time and effort.

A Table of Contents for the BDR can be found at: www.oldradio.com/bdr.htm

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	Comrex Matrix	Tieline Commander	**Zephyr Xport**
Audio Bandwidth @ 24 kbps	14 kHz	15 kHz	**15 kHz**
@ 19 kbps	11.2 kHz	9 kHz	**15 kHz**
Direct Internet Software Updates	No	No	**Yes, via Ethernet port**
Digital PC Audio Input	No	No	**Yes, via Ethernet port and supplied driver**
Audio Metering (XMIT/RCV)	Transmit only	One-at-a-time	**Simultaneous**
Audio Processing	None	Simple AGC	**Digital multi-band AGC with look-ahead limiter by Omnia**
Remote Control	No	RS-232 and dedicated computer	**Ethernet via Web browser**
Auto Dial Storage	19 Numbers	50 Numbers	**100 Numbers**
Frequently-Used Settings Storage	none	none	**30**
Standards-based POTS Codec	No - Proprietary	No - Proprietary	**Yes - aacPlus (MPEG HEAAC)**
Transmit-Receive Quality Display	No	Yes	**Yes**
Contact Closures	2	2	**3**
Display Resolution	120x32 LCD	120x32 LCD	**128x64 LCD**
Analog Cell Phone Interface	Optional	Standard	**Standard**
Mixer Inputs	1 mic, 1 mic / line	2 mic / line	**1 mic, 1 line**
Phantom Power	No	No	**Yes - 12 volt**
Automatic Voice-Grade Backup	No	No	**Yes**
Power Supply	External	External	**Internal auto-switching**
Local Mix Audio Outputs			
Headphone	Yes	Yes	**Yes**
Line Level	Yes	No	**Yes**
Direct Receive Audio Output	No	Yes	**Yes**
Uses ISDN at the Studio Side for More Reliable Connections	No	No	**Yes - your Zephyr Xstream becomes universal POTS and ISDN codec.**
Available ISDN Option	$850.00 (adds MPEG L3 & G.722)	$850.00 (adds G.722)	**$495.00 (adds G.722 & state-of-the-art AAC-LD for high fidelity and low delay)**
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The routing switcher gets a new twist.

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Everybody needs to share audio. Sometimes just a few signals — sometimes a few hundred. Across the hall, between floors, now and then across campus. Routing switchers are a convenient way to manage and share your audio, but will your GM really let you buy a router that costs more than his dream car? Unlikely.

If you need a routing switcher but aren't made of money, consider Axia, the Ethernet-based audio network. Yes, Ethernet. Axia is a *true network*. Place our audio adapter nodes next to your sources and destinations, then connect using standard Ethernet switches and Cat-6. Imagine the simplicity and power of Ethernet connecting any studio device to any other, any room to any other, any building to any other... you get the idea.

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Scalable, flexible, reliable... pick any three.

An expensive proprietary router isn't practical for smaller facilities. In fact, it doesn't scale all that well for larger ones. Here's where an expandable network really shines. Connect eight Axia 8x8 Audio Nodes using Cat-6 cable and an Ethernet switch, and you've got a 64x64 routing switcher. And you can easily add more I/O whenever and wherever you need it. Build a 128x128 system... or 1024x1024... use a Gigabit fiber backbone and the sky's the limit.

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Put your snake on a diet.

Nobody loves cable snakes. Besides soldering a jillion connectors, just try finding the pair you want when there's a change to make. Axia Audio Nodes come in AES/EBU and balanced stereo analog flavors. Put a batch of Nodes on each end of a Cat-6 run, and BAM! a bi-directional multi-channel snake. Use media converters and a fiber link for extra-long runs between studios — or between buildings.

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BALSYS

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"This sounds expensive." Just the opposite, really. Axia saves money by eliminating distribution amps, line selectors, sound cards, patch bays, multi-pair cables, and tons of discrete wiring — not to mention the installation and maintenance time you'll recover. And those are just side benefits: our hardware is about half the cost of those big mainframe routers. That's right... *half*. Once you experience the benefits of networked audio, you will never want to go back. AxiaAudio.com for details.

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User Reports From Radio Guide Readers

Field Guide

FMCONT

A Polished FM Allocations Analysis Tool

by George Nicholas

[CEDAR RAPIDS, Iowa - August 2004] Having used V-Soft Communications software for nearly 15 years, it is easy to write a user report on FMCONT™, V-Soft's premier FM spacing/contour/allocation analysis software – the package really has worked well for me. Short for "FM Contour," FMCONT is an outgrowth of author Doug Vernier's previous QChannel™ and SearchFM™ programs (both still available).

While QChannel does tabular spacing studies and SearchFM adds a graphical user interface, they are based on FM channel spacing – which is fine if you are interested in commercial FM stations under 73.207. But if you are working with 73.213 or 73.215 short-spacing, as well as non-commercial educational stations and translators, you need a program that is fast, accurate, and can display the results based on actual predicted contours. FMCONT does that, and a whole lot more.

Although available to the general public – and FMCONT does feature an automatic "tracking" routine for searching for open channels – FMCONT's price point indicates it is a professional program, geared towards consultants and engineers with allocation experience. Yet, it is intuitive enough for even the novice user to learn very quickly.

GETTING STARTED

Installation is straightforward, with the latest version arriving on CD, along with a HASP™ parallel or USB port dongle plug. Also included is a complete, enhanced, FCC CDBS FM, TV channel 5 & 6 and low power TV database.

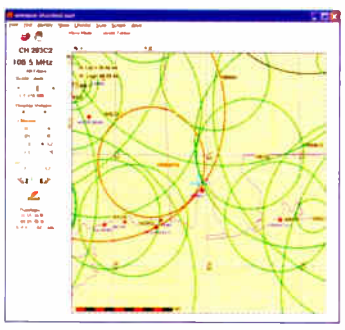
FMCONT's screens are easily customized to your liking, using the Windows color palate. From the splash screen, you can choose to perform a new study, or load a previous study. To analyze an existing station in a new study, you choose "New" and enter any searchable criteria in the database lookup at the bottom of the screen – calls, licensee, city of license, state, channel, etc.

If a new site is desired you simply plug in the latitude and longitude and other pertinent information and start the study. The program will easily calculate the maximum facilities of a class with a simple click of the mouse. A useful feature of FMCONT is "Minimum Study," which analyzes the channel, a span of plus and minus three channels and the IFs. This greatly reduces the job file size and computer time.

QUICK RESULTS

In a few seconds, your study is complete, and the results can be viewed by spacing, or interference. The spacing criteria can be the current (or former) domestic spacing tables, the Puerto Rico/Virgin Islands or, as automatically selected the Canadian/Mexican tables. The results can be displayed in any number of ways, from straight tabular, to side-by-side tabular with map, to a full screen interactive map.

Text colors indicate spacing or interference status. For example, short-spacing is indicated by the color red, and compliant-spacing by green. The maps also use a similar color code, so you can easily discern how many short-spacings have occurred. Even when short-spaced, through the use of contour-to-contour studies, you can find new ways to upgrade a station, or move its transmitter site. The program also includes some handy switches, automatically turning on or off certain functions in the program.

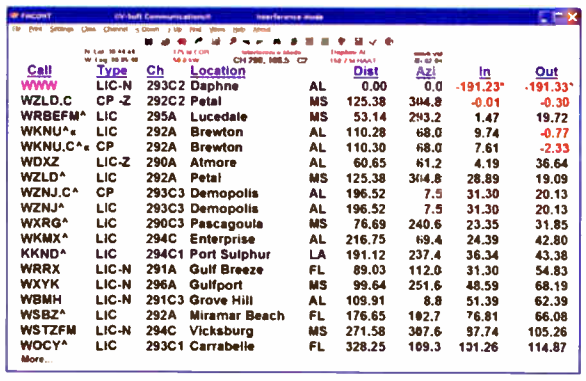


For example, on the tabular display, I like to automatically view the minimum separations of any class C stations that can be downgraded to a C0 to take advantage of the lesser spacing and contour protection requirements. All class C stations automatically downgraded to C0 then use the C0 spacings and are suitably labeled by an underline of the call letters or the light blue color separation circle for maps.

There is also a switch to "round down" by 0.49 km to spacing study distances, so the absolute area to locate is shown; any short-spacing identified by the round-down function will be analyzed as such. At the same time, the program also changes font colors to indicate those stations whose distances would allow short spacing under 73.215. There is no need for you to think about the protected and interfering contour values – FMCONT does it for you, automatically, based on the relationship of the FM channel and class of the reference station to all others.

POWERFUL FEATURES

The real power of FMCONT comes from its contour-to-contour analysis and mapping. For example FMCONT's on-screen displays and print-outs show the amount of contour overlap or clear space distances in two easy to read columns labeled "In" for incoming overlap and "Out," for the overlap your reference station causes to other stations.



Call	Type	Ch	Location		Dist	Azi	In	Out
WWW	LIC-N	293C2	Daphne	AL	0.00	0.0	-191.23*	-191.33*
WZLD,C	CP -Z	292C2	Petal	MS	125.38	304.8	-0.01	-0.30
WRBEFM^	LIC	295A	Lucedale	MS	53.14	293.2	1.47	19.72
WKNU^	LIC	292A	Brewton	AL	110.28	68.0	9.74	-0.77
WKNU,C^	CP	292A	Brewton	AL	110.30	68.0	7.61	-2.33
WDXZ	LIC-Z	290A	Atmore	AL	60.65	61.2	4.19	36.64
WZLD^	LIC	292A	Petal	MS	125.38	304.8	28.89	19.09
WZNJ,C^	CP	293C3	Demopolis	AL	196.52	7.5	31.30	20.13
WZNJ^	LIC	293C3	Demopolis	AL	196.52	7.5	31.30	20.13
WXRG^	LIC	290C3	Pascagoula	MS	76.69	240.6	23.35	31.85
WKMX^	LIC	294C	Enterprise	AL	216.75	69.4	24.39	42.80
KKND^	LIC	294C1	Port Sulphur	LA	191.12	237.4	36.34	43.38
WRRX	LIC-N	291A	Gulf Breeze	FL	89.03	112.0	31.30	54.83
WXYK	LIC-N	296A	Gulfport	MS	99.64	251.6	48.59	68.19
WBMH	LIC-N	291C3	Grove Hill	AL	109.91	8.8	51.39	62.39
WSBZ^	LIC	292A	Miramar Beach	FL	176.65	102.7	76.81	66.08
WSTZFM	LIC-N	294C	Vicksburg	MS	271.58	307.6	97.74	105.26
WOCY^	LIC	293C1	Carrabelle	FL	328.25	109.3	131.26	114.87

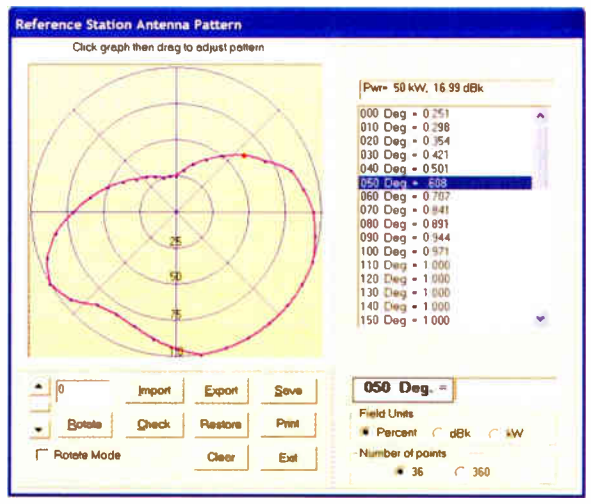
The amount of contour overlap is represented by the distance between the appropriate interference contours and protected contours. Lack of overlap interference (received or caused) can be confirmed when the display shows no negative distances (overlaps) in the incoming interference column and no negative distances in the outgoing column.

Negative figures, colored in red, indicate an intrusion of an interference contour along the direct line to a protected contour of another station or the overlap of the reference station's protected contour with the interference contour of a station from the database. FMCONT will automatically check 180 degrees of arc of the interference and protected contours of the reference station. If overlap is found along any azimuth, the call letters of the affected station will turn red in the listing and the "<" carrot symbol will be placed next to the number in the appropriate "In" or "Out" columns. When selected, FMCont's "interference" map screen plots the protected and interfering contours over a county map.

To make an adjustment to the reference station (or any station in the tabulation), simply click on the call sign. A second window appears with the CDBS database info of the record. You can dynamically change the data fields, such as antenna height or ERP. The program will automatically recalculate any overlaps and with a few tries you can easily find the maximum facility the FCC will allow without prohibitive overlap.

DIRECTIONAL AND CHANNEL 6 ISSUES

Need to create or edit a directional pattern? No problem. Simply drag a pattern point on FMCont's graphical pattern display and save the pattern as a user file for future use. If you run a study this pattern will automatically be saved with the reference station parameters in the job file you create.



If FMCONT sees a station in the FCC database that uses a directional antenna, it will automatically apply the station's pattern in the direction of your reference station. FMCONT accesses the FCC CDBS database to acquire all 36 pattern azimuths and the extra azimuths the FCC may also include representing minimas and maximas.

In addition to contour-to-contour interference checks, FMCONT features an array of convenient routines to determine whether interference to TV Channel 6 exists as spelled out in Sec 73.525 of the Commission's Rules, including the ability to map a Channel 6 interference contour and the protected grade B contours of Channel 6 TV stations.

As a part of this process, FMCONT searches the television database for Channel 6 stations within the cut-off distance. The protected grade B (and grade A) contour of all such stations is automatically calculated, as is the allowable signal of the FM station at such contours. Channel 5 stations are pin-pointed by the program so that you can determine if they cause interference to a Channel 6 over the same area which receives interference from the FM station. Additional routines are built-in to determine maximum power when the FM station is co-located with a Channel 6 TV station.

Another recent addition to FMCONT is a site check, which performs a "Protected Zones" report. This study calculates your reference station's relationship to AM stations, U.S. borders and the various quiet zones.

PROGRAM SPECS

All contours are in kilometers and are predicted using the actual FCC TVFMINT FORTRAN algorithm as published in FCC report No. RS 76-01 by Gary C. Kalagian, so the numbers you get will match identically with the FCC. FMCONT does requires a low cost terrain database; the V-Soft NGDC 30 arc-second digitized terrain database may be used, as well as V-Soft's new satellite corrected 3 arc-second USGS National Elevation Dataset.

For output, FMCONT can use any standard Windows color or laser printer, locally or on a network, as well as output graphically to the clipboard. The printed page allows for two lines of text from the user, such as a title, and includes an automatic map scale on the graphic.

Technical support for V-Soft's FMCONT program is available several ways. An extensive hypertext help file and a complete user manual are included. Toll-free and Internet support is also available. Updates to the program and data are available at two different levels, with the highest level allowing daily FCC database updates, and program updates when available. All updates are available via secure server at http://www.v-soft.com.

All of this and we have only scratched the surface of FMCONT! I have used V-Soft software, including FMCONT, to analyze and file many, many FM applications over the years, both as an independent technical consultant and regional engineering manager for the largest broadcasting companies in the world. All of them have been favorably received by the FCC, and our client stations have been pleased with the end result. It is hard to ask for more than that.

Their website is at: www.v-soft.com

George Nicholas is an Iowa based consultant specializing in technical and communication consulting throughout the US. You can contact him via georgenicholas@csi.com

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	10 kW	1986	Harris MW10B
	50 kW	1982	Continental 317C2
	50 kW	1985	Harris MW50C3
	50 kW	1986	Nautel AMPFET 50 Solid State
FM Transmitters	1 kW	1998	Harris Quest Solid State
	1.5 kW	1987	BE FM1.5A
	3.5 kW	1988	BE FM3.5A
	3.5 kW	1992	Harris HT3.5
	10/12 kW	1980	CCA 12,000E
	20 kW	1978	Collins 831G2
	25 kW	1980	CSI T-25-FA *(amplifier only)*
	25 kW	1982	Harris FM25K
	30 kW	1986	BE FM-30A
	50 kW	1982	Harris Combiner *(w/auto exciter-transmitter switcher)*

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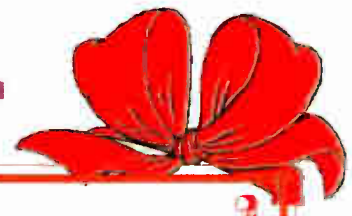

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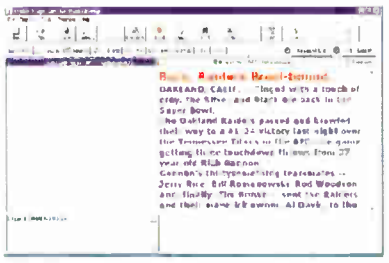

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Internet Browsers

by Tren P. Barnett

As this article went to press, Microsoft announced yet another "patch" to Internet Explorer to plug a "security breech." How effective it is, and how many more patches are ahead is a good question. However, is IE the only browser with a problem? What should a concerned user do? Tren takes a sober look at Internet Browsers.

[TUCSON, Arizona - August 2004] It was not so long ago that the world was all up in arms over the "Browser War." It seemed whether we liked it or not Microsoft's Internet Explorer (IE) had become the most common browser.

IE certainly was not everyone's browser of choice, but it performed well. It met most needs: users could comfortably navigate to their sites and everything looked right. After all, once Windows was installed, downloading and using another browser was just another unnecessary task in life. As Windows voraciously spread across the planet, so did the default browser for many millions of users. But was it good for end users?

WHERE THE FLAWS BEGAN

Greed dictates that in order to win, I do not have to have the most toys – I have to have them all. In the Browser War, undermining and undercutting became common tactics. Standard web content was no longer satisfactory. With the advent of Java, which was supposed to be a cross platform programming language, the real games began. The envelope was pushed and users blindly followed.

On the surface many users assumed they would benefit in the long run. Yet the real problem was only becoming visible on the surface. Control of browsers really was not about helping users, but about control of the Internet. Yet even that does not give the reality in a nutshell.

A MAJOR SHIFT

Behind the scenes, computer browsers were developing a true threat to users. Large software companies were planning on *leasing* software. The intent no longer was to sell software for installation on your own computer system (and use as you wished), but to lease it to you as you needed it. The browser was to become the common interface allowing the software giants to provide the software and control your data.

At first this sounded like a good idea to many. The perk: you would always have the latest and greatest version available, and your data was always available from huge servers that would keep it safely. And from a large software company's standpoint, it was pluses on top of pluses. Data storage meant more revenue; they would make money, and users would continue to have to use their product to get to it. A true "no-lose situation."

After all, once software is purchased, there is no need for a new purchase, unless it impacts a business's bottom line. As the software market saturated with packages meeting more than 99% of the users' needs, software prices to start plummeting. Software innovations no longer brought enough value to the table to excite users.

Software companies saw only two choices: start saturating the market with software that expires, or lease it on-line. Leasing software on-line seemed the most viable. Browsers therefore had to become "the window to the world."

However, to reach this goal, a true Browser War was started with the demise of the basic browser. Browsers would now have to do more than display documents; they would have to go beyond text and pictures. More than HTML was needed; browsers would have to be able to read and compile execution code. They would have to interface with databases, and software. All the major players seemed to want this. Why?

WHY BROWSERS ARE HAVING ISSUES

In order for your browser to wear all of the faces of software, it must become very malleable. This is where the major flaws in all browsers come into play. They must adapt to constant change, yet be secure. Nevertheless, security threats to browsers are becoming rampant.

The most secure product on the Internet is the one that interfaces as little as possible with the Internet. On the other hand, users have grown to many things from a browser. Most do not think twice as they use their browser, along with all the new features. Yet adding those new features – and their controls – is where most browsers begin to fail you.

Does your browser have a blatant security hole?

Internet Explorer has had a lot of bad press lately due to security flaws. If you are an IE user, should you switch browsers? If you are currently using another browser, are you at risk?

INTERNET BROWSERS REVIEWED

In the end, you have to decide for yourself which browser is best, according to *your* needs. With that in mind, let us review some facts about all browsers, which may help your decision. Here are some interesting and accurate quotes concerning browsers.

Internet Explorer

"Internet researchers were scratching their heads over an attack that targeted some of the most popular sites on the Web with a Trojan virus that exploits flaws in Microsoft's Internet Explorer Web browser."

Firefox and Thunderbird

"Mozilla Browser is susceptible to a security flaw that allows existing programs on the system to be executed. This flaw affects all browsers that rely on Mozilla: Mozilla, Firefox, and Thunderbird. It is reported that only Windows users are affected. Updates have been released."

Opera

"Opera today released a fix for a serious security flaw with its browser which could let crackers load and execute malicious code on victim's PCs."

Netscape

"Hewlett-Packard (HP) is now recommending users erase America Online's (AOL) Netscape browser from their hard drives due to a hair-raising list of "potential" vulnerabilities allowing denials of service, information leaks, unauthorized access and remote malicious code execution."

I am sure by now you get my point: The perfect browser does not exist. They *all* have issues and flaws. Which is most flawed? We know which one we hear about the most; that is one nice thing about being the industry leader: you will be the most scrutinized. Likewise, because you have made it to the top of the pig pile does not mean that you are the best, nor will you stay there.

WHICH BROWSER FOR WHAT?

As many readers have discovered by now, I am not a Microsoft diehard nor am I a Linux geek. Whether you are hosting or browsing, whether you are using Windows or Linux, security is a concern; both systems have flaws and security problems. Nor am I a diehard user of Internet Explorer, Netscape, or Firefox. I believe they all have their good and bad points.

Many articles have recently suggested that users stop using IE. If this is what you want to do, go right ahead. But do not let some narrow-minded anti-Microsoft geek convince you that only uniformed carefree users use IE. They all have issues.

And do not forget who won the Browser War. Microsoft did not come out on top of the pig pile simply because they bullied the masses into using IE. It was also because in many ways IE was built better. Still, most wars do not end when they are over – at first, open source seemed a kamikaze attempt at redeeming what complaining to mom did not achieve.

Yet the open source community is making a comeback, and not by whimpering (as was their first attempt), but by doing it better. So how are Netscape and Mozilla Firefox fairing now? Here is my review of these products.

MOZILLA FIREFOX

On the surface:

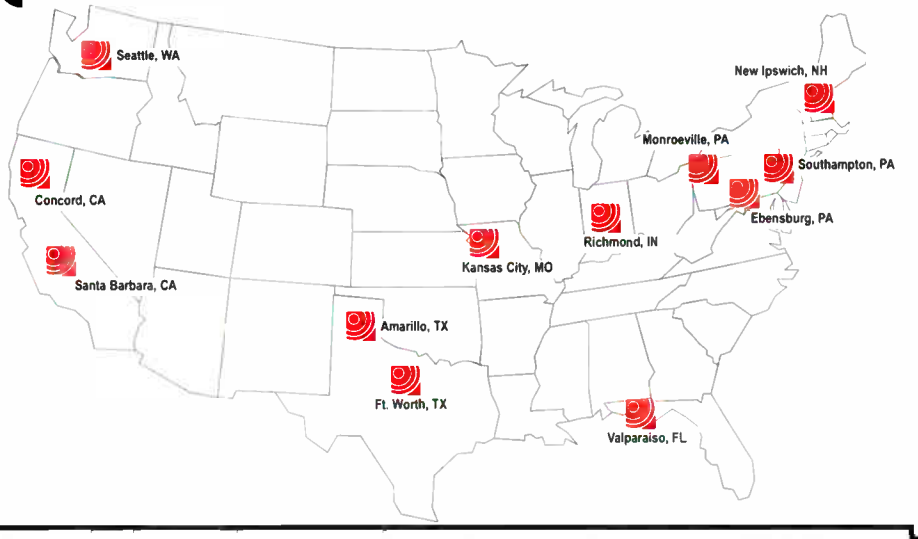
- The latest version of Firefox has a more professional look.
- Tabbed windows allow one browser interface to have open several sites simultaneously.
- Automatically imports your bookmarks, history, site passwords, and other settings from IE.

Security Features:

- Firefox does not keep information for auto-fill under default settings, though this can be changed easily.
- The browser does not keep user passwords under default settings.
- Download manager allows the automatic cleanup of garbage files after a completed download. From a security standpoint, this is a positive feature; from a user standpoint, it alleviates a lot of wasted drive space.
- Cookie settings allow for cookies to be managed, which is important to me. Here are the settings:
  - Cookies "for the originating Web site only" *(which I wish were the default setting and it is not).*
  - "Accept cookies normally" *(The default setting).*
  - "Accept for the current session only," *(which I wish were the default setting and it is not).*
  - "Ask for each cookie."
- Web features stop popup windows from occurring. The user can enable popup windows for specific sites. The popup feature is nice, but when the user wants a quick override that allows a popup, it requires unnecessary effort to have the window popup.
- It is not integrated with Windows, which helps control viruses and malicious code from causing damage.
- There is no support for VBScript and ActiveX, which are the reasons for many of IE's security problems.
- Firefox does not use Microsoft's Java VM *(Big Plus).*
- Firefox does not automatically install third party components, but instead directs you to a location where

(Continued on Page 22)

RF Specialties® Group



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Internet Browsers

Continued From Page 20

you can choose to install such components. This takes a little more effort than IE and Netscape, but works well, and keeps you informed as to what is installing.

Overall Usage

• Firefox is aimed at overtaking the IE users of the world and works well to import IE settings, yet appears to *not* import settings from other browsers – Netscape for example, which would have been nice to see.

• The proxy settings work, but it does not play seamlessly with proxy servers. (A little massaging works.) A word of caution: when I told Firefox to save passwords, it did not like my ISA server and refused to open. I had to uninstall and reinstall to fix the error.

• Basic HTML pages will display correctly for the most part, though it has some problems with tables that IE and Netscape do not have.

• When refreshing the window it overlaps text, and standard page refreshes are lacking so it does not interface as well with hardware administration pages *(i.e. Netgear, Lynksys, HP Printers and Scanners).*

• Help was less than ideal, you might say it was not worth even reading.

NETSCAPE

On the surface:

• Netscape has always strived to be unique in its look. I like the ease of use and look.

• Tabbed windows allow one browser interface to have open several sites simultaneously.

Security Features:

• Netscape keeps information for auto-fill under default settings, though this can be changed easily.

• The browser also keeps user passwords under default settings.

• Download manager allows the automatic cleanup of garbage files after a completed download. From a security standpoint, this is a positive feature; from a user standpoint, it alleviates a lot of wasted drive space.

• Cookie settings allow for cookies to be managed, which is important to me. Here are the settings:

- Cookies "for the originating Web site only" *(which I wish were the default setting and it is not).*
- "Accept cookies normally" *(The default setting).*
- "Accept for the current session only." *(which I wish were the default setting and it is not).*
- "Ask for each cookie."

• Web features stop popup windows from occurring. The user can enable popup windows for specific sites. This popup feature is nice, but as in Firefox when the user wants a quick override that allows a popup, it requires unnecessary effort to have the window popup.

• It is not integrated with Windows, which helps control viruses and malicious code from causing damage.

• There is no support for VBScript and ActiveX.

• Netscape does not use Microsoft's Java VM *(Big Plus).*

Overall Usage:

• In an endeavor to look unique, custom toolbars and menus have been used. Their appearance is nice and professional but their functionality can at times be kluge and undependable.

• Highlighted Items from the menus to links flash a momentary highlight, and then are no longer highlighted. This makes navigation a little bit harder and the look somewhat less than professional.

• Performance actually seemed slower and less reliable than Firefox and IE overall.

• The reliability and accuracy of Netscape was the best of the three.

• Help was readily available, and nicely handled and laid out.

AND THE WINNER IS:

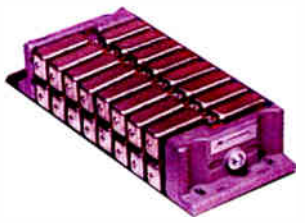
Which browser wins? The only really honest answer has to be for you to try several browsers and choose for yourself which one works best for you. Security will continue to be an issue in all of the browsers, and the top dog is going to be the most noted for its failures. As technology advances, there will always be those who find the hole in the code that needs a patch or fix. Perhaps someday perfect computing will exist, but my gamble is that perfect humans will have to exist first.

What I can tell you is that Netscape is at present my browser of choice. Not because I am worried about security issues in IE. But because they seem to be doing it better at present than all of the other choices. Most often of late, Netscape has failed me the least in overall reliability on my path down the information highway. Please note though, I said "has failed me the least."

Tren Barnett is a programmer and network administrator based in Tucson, AZ. He is available for custom projects, and can be reached at tpb@dakotacom.net

Tech Tips

Transmitter HV Rectifier Cleaning



During an electrical storm, the high voltage transformer in an RCA transmitter shorted, and the high voltage cabinet turned completely black, including the rectifier assembly. The transformer had to be replaced, but I took the rectifier assembly to a car wash and turned the hose on it. Not the recommended procedure to clean rectifiers, but it worked.

Locating a Shorted IC on a PC Board

I once had a circuit board that appeared to have a short in the 5 volt supply circuit. Since the board had several IC's, all soldered in place, there appeared to be no easy way to determine which was the defective IC. So I connected the board to a variable DC supply and slowly raised the voltage. Sure enough, one of the IC's became very hot.

Stanley Swanson, Chief Engineer
KBNL Radio, Laredo, Texas

Laser Thermometer Checks Components

I have discovered a new use for the laser thermometer used by air conditioning technicians.

Whenever I suspect a problem in a transmitter, phasor, or ATU, I use this device to detect a cap, or other component that is heating up. I have found several bad caps in this fashion, and have saved a lot of time in locating the problem.

Temperature measurements with this device are sometimes adversely affected by RF energy, but exact readings are not expected – just something that shows up at a higher temperature than the surrounding components.

Winston Hawkins, Technical Director
Positive Radio Group, Blacksburg, Virginia

The SBE at 40

Tidbits from Four Decades of History

by Ken Benner, Senior Member, SBE

[BUTTE, Montana - August 2004] I am writing this from a motel room only a few miles from Butte, Montana, following a most memorable Alternative FCC Inspection with Chief Engineer, Chuck Beardsley and his assistant, Nick Malkovich.

Part of what made this visit to station KBOW-AM (formerly KQPR-AM) especially memorable is that it is the same place where as Chief Engineer back in 1964 – almost exactly forty years ago – I received a letter from a John Battison a consulting engineer in Ohio.

A PROPOSAL

It was one of several hundred letters Mr. Battison had sent to engineers all over the country, proposing an organization of people involved with broadcast engineering. Many of us agreed the IEEE had pretty much ignored us. My mentor, the late consultant W. D'Orr Cozzins, concluded that this was a good idea and we both decided to assist in any way possible.

John Battison

We contacted Mr. Battison, and offered to serve on any committee needing help and to contribute to the financial needs of the budding organization. With the aid of a local artist, we prepared the first membership certificate and submitted it for approval. Later we assisted with the writing of the Bylaws and Articles of Incorporation. Soon thereafter a substantial membership developed; dues were ten dollars per year.

I was "anointed" a member of the first national Board of Directors and shortly thereafter elected President of the Montana Chapter. We put together a remarkable Montana group thanks to Dutch Meyer, Director of Engineering for the University of Montana broadcast division. He even gave us access to a mimeograph machine to produce our quarterly newsletter.

BUILDING A CHAPTER

One of our directors who owned a station also had a part interest in the Holiday Inn in Lewiston; he gave us a meeting room for our bi-annual meetings. Other directors wrote or solicited excellent articles for our newsletters. Station managers throughout the state – many of them owners – provided substantial financial support and covered the expenses and time off for engineers to attend meetings.

In those years the primary draw was the opportunity to meet and get to know other engineers, and to share knowledge and unique experiences the likes of which no textbook or equipment manual had ever covered.

As with any emerging organization the SBE had its problems. Interest peaked and waned. Some managers refused to allow their engineers to have anything to do with the SBE for fear it was a developing union which one day could cause labor problems.

Thus chapters formed and then died due to diminishing interest. Indeed, broadcast engineers who often are amazingly analytical wonder-people with complex circuitry, design, and an ability to work magic with bailing wire and bubblegum in emergency situations, generally are not inclined to get involved in social events. As a result, the SBE met with disinterest and virtual demise a couple of times over the years, only to be resurrected a few months or years later.

FANNING THE EMBERS

About this time Charlie Hallinan a radio engineer from Binghamton, New York took over the reigns and really put his heart and soul into developing a meaningful, purposeful organization involving various levels of membership and certification. Little did any of us know at this time that certification would be the key to SBE perpetuation.

No one anticipated the demise of the "First Phone FCC License" and those "first phony six-week-wonder schools" with rote memorization programs to prep us for "an exciting, prestigious, good-paying job in the rapidly growing field of broadcasting." (As they say back in Minnesota, "Ya shure doncha know, Charlie, yup yessir!")

Thus, under deregulation we now have a situation where the "Chief Engineer" of the most prominent stations in the nation can perform with nothing more than his dog's license with the FCC's "blessing." Indeed many stations have learned the hard way that hiring someone with little or no certification of competence can be catastrophic.

SBE AT 40

Today, with a membership of 6,000, many of whom have received SBE certification to note their knowledge and achievement, the SBE occupies a place in American Broadcasting as an example of people proud of their work, and dedicated to furthering their art and professionalism. And it all started forty years ago with a simple idea from a forward thinking John Battision.

Ken Benner has watched the industry from several vantage points over his career. Ken lives in Tucson, when he is not roving around and inspecting stations for the ABIP.

Tips From the Field

A Step-Start System Extends Tower Lamp Life

by Warren Shulz

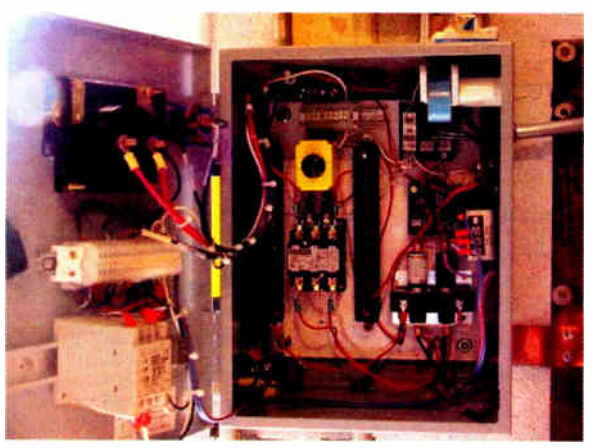
[CHICAGO, Illinois - August 2004] Those stations with tower lighting requirements are conscious of the additional costs involved: electricity to light the towers, and the costs of sending climbers up to maintain the lenses and handle the relamping. Any way that can reduce the costs of this maintenance is welcome. At WLS we have found a way to improve the lifespan of our beacons and sidelights, which translates into reduced costs for energy and tower climbers.

With the lamps hundreds of feet away from the ground, not easy to change, engineers have long winced when the tower lights first come on in the evening. It is the current inrush to the cold filaments that cause the greatest strain on incandescent light bulbs. With that, and the cost of relamping, in mind, a number of stations have chosen to run their lights continuously, to keep the filaments warm – and to reduce relamping costs.

Of course, on some stations (especially low power directionals) the cost of electricity for the lights may exceed that for the rest of the plant's electrical consumption. Our plan was to eliminate the wasted electrical use in the daytime, yet preventing the collision of cold filaments with the inrush current. A two-step sequence with a time delay relay solved the problem for us.

"PRE-START" SEQUENCE

At dusk, or any tower light turn-on cycle, the photocell starts by triggering the SACC flasher. The delay is controlled by a ten second module. We set the control up for three lighting modes: OFF, ON, and AUTO. Auto lets the SACC photo detector control the tower lights. This is default and has a switch guard for this purpose. The other two modes are for maintenance. The step-start is constructed from two 150 watt, 2-ohm resistors that pre-starts the 208 volt circuit to about 75% of normal current.



Because our site had a past history of blown tower light circuit fuses from lightning, we also added a common mode choke for the tower lighting control and a mercury contactor for final turn on. After all, who in their right mind would want to go to the tower base ATU and change out tower lighting fuses during an electrical storm? Not me!

TAMING THE AC FEED

The WLS tower light feed is from the ATU building's 480-to-208 Y voltage step-down transformer. The feed is across main lugs and does not go through a protective device except the tower lights' fused disconnect switch. Apparently, about 25 years ago, the use of a circuit breaker branch circuit feed caused nuisance trips, and parties unknown wired the circuit directly to the main lugs as a solution.

The fused disconnect is set with 20 amp fuses and is the only current limit device. Originally, we attempted to arrest any surges with gas tubes, but that started to blow fuses more often than before the gas tubes were installed. Even with 800-volt breakdown units the gas tubes would fire and open the 20 amp fuses during a lightning event. Gas tubes were abandoned after several blown fuse events; they caused more outages than any apparent protection provided.

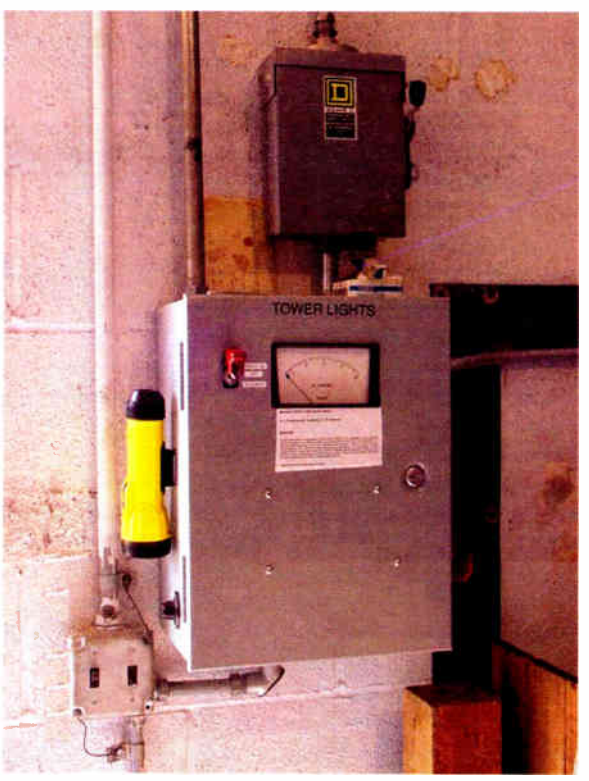
We thought about using MOV's (Metal Oxide Varistors). However, because an MOV has lots of capacitance, the fast shunt would bring us back to the fuse blowing issue. Caution! Do *not* use MOV devices as surge protection in high RF fields. The high capacitance heats and causes the MOV to fail. Only gas tubes (or air gaps) should be used in high RF fields for surge protection.

The common mode choke stopped any fuse blowing. I added 0.01 uF disc ceramic caps on the feed side of the common mode choke feed the tower light load as a "poor gap" and RF bypass. These also serve as a "breakdown gap" as well as an RF – and lighting surge – bypass. (I have seen the disc caps take a hit blowing a side away and still be a capacitor.) These types of failures can be seen visually and replaced as needed.

A 30-mHy choke de-couples the AC 117-volt line within the control box, with the goal of keeping RFI and transients out of the light control area. This control area also contains the loss of tower light detection circuit alarms.

UP TO FULL ILLUMINATION

When the step-start circuit times out after the ten seconds, a mercury plunger relay rated for 50 Amps takes over to provide the full line current, giving the lamps their full illumination. We found the common mode choke plus the 0.01 uF caps did the job, resulting in our having had *no blown fuses* for the past four years!



MONITORING

For metering the tower lights, the actual beacon current is monitored via a peak DC detector using a single turn transformer to a DC output. The metering telemetry then goes to the transmitter building, showing a peak level of 3.4 VDC pulsing as the lamp flashes. Two surge protection devices were used: a gas tube to ground at the basement entry point of the tower wiring, and a TransZorb (bi-lateral Zener diodes back-to-back) device at the input to the remote control. A series resistance gives the TransZorb an impedance to work against.

An SACC device detects missing pulses, providing a contact open when the beacon flash rate is missing. It is wired in a failsafe mode. As wired, pins 1 (hot) and 2 (neutral) are AC power line. Pins 3 and 5 are NC when the unit is not in alarm. A 24 volt DC supply in the ATU building powers the Delta meter relay and provides a DC voltage to operate a relay in a building-located junction box and entry point for the ATU control wiring. This reed relay is held closed when the tower lights are flashing.

The relay has a 5 kV breakdown rating and isolates the remote control status monitor from the ingress of lightning transients and RFI infestation from the main tower. A power outage drops this out, but then the tower lights would also be out so it does not matter.

ANTI-ALARM CIRCUIT

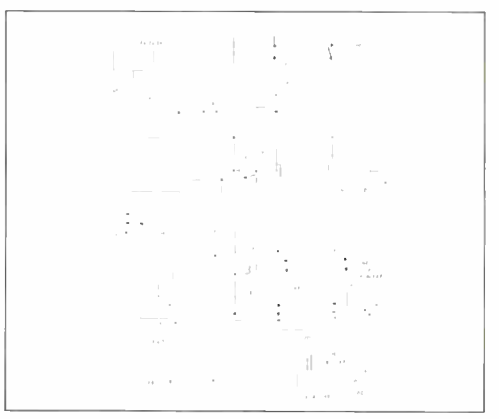
Of course, turning off the tower lights intentionally would normally create OFF alarms. These alarms are of two types: loss of beacon metering telemetry and the missing pulse detector. Each will open the circuit; a relay in the building will open and the status channel will go into alarm.

To cancel these alarms during a daytime shutdown, the missing pulse detector contact must be shunted and the missing telemetry reading must be substituted with a 120% level to prevent alarm when the photocell shuts down lighting. (The higher voltage at 120% reading indicates "daylight hours mode.")

A 5 volt switching supply is the source of replacement DC signal to bias the metering reading when no alarm should occur. 5.04 volts makes for a 120% reading on the remote control. The 120 volt control wiring is decoupled with a 30 mHy choke to strip surges off.

It is important to remember that these circuits are not failsafe in of themselves. The photocell mutes the alarms when the photocell is off (i.e. daylight). This will not catch a defective photocell. (i.e. one that is "off" all the time.) You cannot catch this fault unless you have another photocell with which to do a cross check, or do it by time of day – that is, run a check at 3 AM to see if lights are on. WLS performs two daily tower light checks by remote observation.

Previously this site had their lights on 24 hours, seven days a week for the past 62 years! Think of the power wasted over that time. (When you do the calculation be sure in include the loss of the Austin Ring transformer. Unlike an iron core transformer the losses of the air core are very high.)



A complete schematic is available on our website at:
www.radio-guide.com/tips.html

Now, after four years we have a success story of energy conservation and reduced maintenance. (We do continue to re-lamp annually due to budget planning and the desire to inspect the structural annually.) The project has been a success (although we would design things a bit differently, if we were to do it today – splitting the low voltage system off to a separate box.)

All in all, the bottom line: we no longer see any down side of shutting off our tower lights during the day.

Warren Shulz is Chief Engineer for WLS, Chicago. He can be reached at warren.shulz@abc.com

The Radio Guide Tech Initiative

As announced at the NAB 2004 Radio Show, **Radio Guide** magazine has embarked on a **Tech Initiative** to encourage the sharing of technical knowledge and experience among the engineering community.

As part of this outreach to encourage information sharing, a number of manufacturers have already contributed over $15,000 of gear, to be awarded to the best submissions. Some of the items include:

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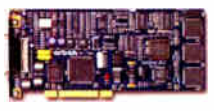

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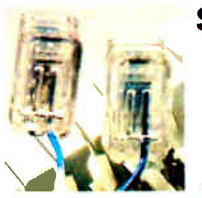

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AM Ground Systems - 11	www.amgroundsystems.com
Armstrong Transmitters - 14	www.armstrongtx.com
Balsys - 13	www.balsys.com
BEXT - 19	www.bext.com
Broadcast Devices - 22	www.broadcast-devices.com
Broadcast Electronics - 12	www.bdcast.com
Broadcast Software Intl. - 3	www.bsiusa.com
Broadcast Tools - 11	www.broadcasttools.com
Broadcast Warehouse - 21	www.broadcastwarehouse.com
CKE - 25	www.rectifiers.com
Conex Electro Systems - 15	www.conex-electro.com
Comrex - 24	www.comrex.com
D&H Antennas - 15	www.dhsatellite.com
Decade Transmitters - 13	www.decade.ca
Econco Tubes - 9	www.econco.com
Energy Onix - 2	www.energy-onix.com
ERI - 5	www.eriinc.com
Harris - 32	www.broadcast.harris.com
Henry Engineering - 2	www.henryeng.com
Inovonics - 5	www.inovon.com
JK Audio - 6	www.jkaudio.com
Kahn Communications - 11	none
Lightner Electronics - 6	www.lightnerelectronics.com
Logitek - 19	www.logitekaudio.com
Micro Communications - 9	www.mcibroadcast.com
Mosley - 7	www.moseleysb.com
NAB - 27	www.nab.org
Nott Ltd. - 9	www.nottltd.com
OMB America - 11	www.omb.com
Orban - 32	www.orban.com
Peter Dahl - 14	www.pwdahl.com
Phasetek - 23	www.phasetekinc.com
Prophet Systems - 31	www.prophetsys.com
RAM Broadcast Sys. - 25	www.ramsyscom.com
Ramsey - 9	www.ramseyelectronics.com
RF Specialties - 21	www.rfspec.com
RJB - 23	www.rjbbroadcast.com
SCMS Inc. - 13	www.scmsinc.com
Sine Systems - 25	www.sinesystems.com
Superior - 22	www.superiorbroadcast.com
Telos - 16 & 17	www.telos-systems.com
TFT - 13	www.tftinc.com
Tieline - 5	www.tieline.com
Transcom - 19	www.fmamtv.com
Turnkey Media - 19	www.turnkeymediasystems.com

Date Book

Radio Conference Guide

List your Convention or Gathering Here
Email: radio@broadcast.net

32nd Annual SBE22 Broadcast & Tech Expo
September 23 – Verona, NY – www.sbe22.org

Electronic Equipment Expo
September 28-29 – Seattle, WA – www.emexpo.org

Pittsburgh Chapt. 20 Regional SBE Convention
October 6 – Monroeville, PA
www.broadcast.net/~sbe20

NAB Radio Show – October 6-8 – San Diego, CA
www.nab.org/conventions

2004 Broadcaster's Clinic – October 12-14
Marriot-Madison West Hotel, Madison, WI
www.wi-broadcasters.org

Southwest Communications Expo
October 19 – Phoenix, AZ – www.sbe9.org

Broadcast Engineering Expo, SBE Chapter 67
October 22-23 – Grapevine, TX
www.sbe67.org

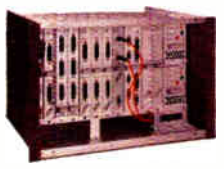
Bos-Con Boston SBE Regional Convention
October 26-27 – Boston, MA – www.sbe11.org

National College Media Convention
November 4-7 – Nashville, TN
www.collegebroadcasters.org/convention.shtml

Equipment Update

The Logitek Audio Engine

Logitek Electronic Systems has announced that the company has shipped its 600th production unit of the Audio Engine, a digital audio router. The Audio Engine provides all audio routing, mixing and management functions for the company's line of digital audio consoles. Logitek also marked the shipment of more than 900 console control surfaces to accompany the Audio Engine units.



The Logitek Audio Engine is an expandable, networkable router with analog or digital inputs/outputs. It provides up to 24 mix-minus busses per control surface, EQ and dynamics processing, simple assignment and selection of audio sources, and (unique to Logitek) full scripting capability enabling execution of complex commands on a single button press or contact closure. Earlier in 2004, Logitek announced the ability to use two Audio Engine units as an Optical STL for bi-directional feeds of up to 64 channels over a distance of up to 6 miles. A number of controllers are available for the Audio Engine, including the Numix and Remora consoles, the vMix "virtual" console, and various router control heads for X-Y selection of sources.

Logitek Electronic Systems
5622 Edgemoor, Houston, TX 77081
713-664-4470 – www.logitekaudio.com

Letters From Our Readers

The Skeletons in IBOC'S Closet

"Those IBOC sidebands from other stations are killing our fringe listeners, why didn't you tell me this was coming?" Those could well be the words of a radio GM scolding the station's Chief Engineer for not sounding the alarm bell about AM & FM IBOC ("HD Radio") and the damage IBOC's first adjacent channel sidebands can do to the fringe-area signals of radio stations – perhaps your station. From what we have seen, the AM IBOC system is particularly prone to causing interference.

If there is one article in the past six months that should be considered *mandatory reading* for every radio engineer – as well as the SCT (Mexico's FCC) – it is this one: *"A Look at the Digital Horizon"* on page 8 of the **July 2004 Radio Guide**.

As Project Leader, Radio Broadcast Systems, at the Communications Research Center in Ottawa, Canada, the author [Barry McLarnon] was responsible for research on new digital radio broadcast technologies. Download the entire magazine by clicking on the URL below (high speed Internet connection recommended), then go to page 8 of the PDF file.

This is important reading. Don't let your eyes glaze over. You need to translate the salient points for the top brass at your station. (The audio time delay built into IBOC broadcast equipment is a detriment not mentioned in the article, but one that you will probably want to discuss as well. That delay is a killer for certain broadcast applications.)
http://www.oldradio.com/jul.pdf

Robert F. Gonsett, W6VR
Publisher, The CGC Communicator

An Excerpt from The CGC Communicator #643

Letters From Our Readers

Dear Editor:

I really appreciate the article by Barry McLarnon on the IBOC recipe! **[Radio Guide, July 2004, Page 8]** This is one of the first, fairly simplified approaches that I have read, and really understood, about the distribution of power.

Very good work.

Stanley B. Adams, Memphis

Dear Editor:

Barry, I just got my first printed version of the **Radio Guide** and it is awesome! Do you have any back-issues from before July 2003? I have downloaded and printed all of them from July 2003 through present for reference. Any older issues that I could download and print would be great!

Thanks for all the hard work!

Justin Kaiser
Director of Operations
Iroquois County Broadcasting, IL

Justin:

We have archived all 2003 and 2004 issues of ***Radio Guide*** *on the Broadcaster's Desktop Reference (BDR). You can find more information on our website at: www.radio-guide.com/products.html*

Editor

Dear John:

I read your columns in "**Radio Guide.**" I'm making a "community station" in my small town and I have purchased a "Rangemaster Part 15 transmitter" with the "Inovonic 222 processor." It is mounted in a good site on a 30' mast with an 8' copper ground rod. The coverage is about 1 to 1.5 miles of good signal (with a good radio maybe close to 3 miles). My question is: I am perfectly legal? I am intending to put in two more transmitters for best coverage of my town. Is it legal mount several transmitters?

Thank for your support.

John

Hi John:

Glad you like the articles, I hope they help! I'm not the FCC field inspector, but I can make a suggestion that should keep you from having trouble with them. You cannot go from the transmitter all the way to the ground rod with one lead. The rules allow a total of 3m from the tip of the antenna to the end of the ground lead. Since your antenna is 8ft, you can only do about 2ft for the ground lead. I would make sure that the ground lead from your transmitter is grounded to the mast and is not more than 2ft long. Then ground the mast to the ground rod. This way you are grounding the mast and not the transmitter directly. It should make that acceptable to the FCC.

There is no limit on the number of transmitters you can use, but I would suggest that you mount the next one far enough away that you don't overlap too much signal. The synchronizer will work for the carrier, but not the audio, so you will still have to make sure that your audio reaches the transmitters at the same time from the same source.

In my case, all of my transmitters are fed by a Cable TV channel feed. This insures that they all get the same signal simultaneously. Internet connections can do this, but they are usually not simultaneous. Direct "dry pair" lines from the telephone company can do this, but at added cost.

Hope that helps!

John Devecka
WLOY Operations Manager

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Useful for high energy morning shows. Create and play audio elements outside of the log for random access or auto-play, send artist/title information. Includes: Electronic Copy module, Cart Deck module, Button Bar module and RDS Export module.

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